

UNIVERSITETET FOR MILJØ- OG BIOVITENSKAP





## Sammendrag

Denne masteroppgaven studerer forskjellene mellom risiko og avkastning i det russiske aksjemarkedet, sammenlignet med BRIC og andre fremvoksende markeder i perioden 2002-2012 ved bruk av daglig, ukentlig og månedlig data. Målet er å finne ut hvorvidt russiske aksjer bør vurderes som en separat aktiva klasse. T-test, F-test, t-test i følge Jobson&Korkie ble benyttet for testing av signifikant differanse mellom parametrene.

De empiriske resultatene viste at avkastning i det russiske markedet er forskjellig fra de andre BRIC og fremvoksende markedene. De logaritmiske avkastningene viste at Russland har en av de høyeste avkastningene før finanskrisen, men den laveste gjennom og etter krisen. Diskrete avkastninger indikerer den samme tendensen. Total risiko i det russiske markedet kan være forskjellig fra de andre markedene, selv om ulikhetene er relativt små. Russland og Brasil er mer volatile i gjennomsnitt enn de andre markedene, og ingen bevis for forskjell i volatilitet er funnet. Russland er ellers mer volatilt enn India, Kina og det gjennomsnittlige fremvoksende-marked for hele perioden. Resultater for separate perioder ga lignende resultater. Ingen signifikante bevis for klare forskjeller mellom systematisk risiko (beta) ble funnet, selv om forskjell i usystematisk risiko er påvist. Russland har den høyeste usystematiske risiko, selv om sammenlignet andel systematisk risiko er verken lav eller høy i den andre perioden. Risikojustert avkastning kan ikke sies å være forskjellig, selv om tendensen var lignende til vanlig avkastning. Alle disse funnene indikerer at Russland er temmelig forskjellig fra BRIC gruppen, selv om likhetstrekk mellom dem er funnet. Russland er anbefalt som en aktiva med stort potensial. Porteføljer som består Russland og verden i ulike kombinasjoner er sammensatt for å øke avkastning for en internasjonal investor.

Nøkkelord: Det russiske aksjemarkedet, BRIC, investering i Russland, fremvoksende markeder.

## Abstract

This master thesis studies the difference between risk and returns in the Russian stock market compared to the BRIC and other emerging markets during the period 2002-2012, using daily, weekly and monthly data. The goal is to find whether Russian stocks should be considered as a separate asset class.

T-test, F-test, t-test according to Jobson&Korkie were conducted for testing of significant difference between parameters.

The empirical results showed that returns on the Russian market are different from the other BRIC's and emerging markets. The log returns showed that Russia had one of the highest returns during the period before the crisis, but had the lowest returns during and after the crisis. Discrete returns indicated the same tendency. Total risk in the Russian market can be different from the other markets, though the differences are relatively small. Russia and Brazil are averagely more volatile than the other emerging markets, and no proof for difference of their volatilities is found. Russia is also more volatile than India, China and the average emerging market during the whole period. This was similar for the separate periods. No significant proof for clear difference between systematic risks (betas) is found, though difference between unsystematic risks is proven, and Russia has the highest one. Although the compared shares of systematic risk is neither low nor high during the second period. Risk-adjusted returns couldn't be claimed different, though the tendency was similar to the plain returns.

All these findings indicate that Russia is quite different from the BRIC group, though some resembling features among them are found. Russia is recommended as an asset having great potential. Portfolios using Russia and World in different combinations are compiled in order to increase returns for the international investor.

Keywords: The Russian stock market, BRIC, investing in Russia, emerging markets.

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## 1. Introduction

In this thesis, I wish to find out whether the Russian stock market has the same characteristics as the other emerging markets and the other BRIC or if it should be considered as a separate asset class. This is presently a hot topic as recently as May 7, 2012 an article in The Financial Times stated that the concept of BRIC might be outdated, as these four countries have developed in rather different directions. A sign of BRIC no longer being a very useful grouping for investors, is an increasing outflows from the BRIC funds and rapid inflows in Exchange-Traded Funds (ETF) tracking single-country emerging market indices.

This adds to the motivation for testing a set of hypothesis based on an assumption that the Russian stock market has similar characteristics to the other BRIC stock markets, and if not how it differs from other emerging markets and how it can be included in an investor's portfolio.

The topic of this paper is chosen for the sake of gathering, analyzing and organizing information and data on the Russian Stock market in an attainable form. The paper is primarily of interest to international investors who consider having Russian stocks as a part of their portfolio in search of increased returns and diversification. It can also be useful for financial advisory institutions in order to have more information about the Russian stock market than is available in English. Those traders, who base their strategies on volatility, might find this paper of interest.

The first chapter is the introduction. In the second chapter I present the previous studies on Russian stock market and existing hypotheses about it. Methods applied in the analysis section will be elaborated in the third chapter. The fourth chapter presents data used for this thesis. The basic facts on the Russian stock market will be examined in the fifth chapter. In this chapter I will also discuss development of the Russian stock market in relation to the Brent Crude oil prices and the World's stock market. In chapter six I will name and discuss the trends in the Russian stock market, present the main events that influenced the market, and compare returns on the Russian stock market with the other BRICs' stock markets. The seventh chapter is about volatility in the Russian stock market. Here I will compare the Russian stock market's volatility with volatility in the BRIC and the World stock markets, speculate on the possible reasons for the high volatility, and then study systematic and non-systematic risk at the end of the chapter. The eighth chapter is dedicated to the risk adjusted-returns on the Russian market compared with the risk-adjusted returns on the World, Brazilian, Indian and Chinese stock markets. The ninth chapter describes why international investors should invest in Russia and how they can do it.. The last chapter is the conclusion.

# 'Bric' is no longer useful grouping for investors

**The big picture**  
Putting Brazil, Russia, India and China together loses its attraction, says **Sophia Grene**

The coining of the term Bric was an extremely savvy piece of branding as it created a memorable name for a meaningful concept that sparked interest from investors all over the world.

When Jim O'Neill of Goldman Sachs came up with the term, he was grouping Brazil, Russia, India and China together as the largest, most populous and easiest-to-access markets in the developing world, which he suggested investors should consider adding to their portfolios.

The term launched fleets of products, from hedge funds to exchange traded funds, which were sold widely, and took in billions of investment dollars, as well as inspiring dozens of Bric-themed cartoons in the financial press.

But now the shine seems to be coming off the Bric concept as funds investing in the four countries have seen significant outflows in recent months. In the past six months, investors have taken \$581.4m (net) out of Bric equity funds, compared with inflows of \$12.5bn to all emerging market equity funds, according to figures from EPFR Global.

Recent market performance is in part to blame, with the benchmark index in each country falling by between 17 and 23 per cent in 2011.

"Flows generally in emerging markets tend to be quite sensitive to market moves," says Nick Smith, managing director at Allianz Global Investors, which manages £640m in its Bric Stars fund.

The outflows were particularly large in the Asia-Pacific region, where all Bric funds (bond and equity) saw outflows of \$4.1bn in the seven months to January, according to the Cerulli Associates research.

This is mostly because Asian investors are playing catch-up with trends in

other regions, says Cerulli senior analyst Yoon Ng, pointing out that 2011 saw many European and US investors taking their money out of Bric funds.

"Since 2008, we've seen inflows, subsequent outflows, recovery and then another dampening of interest."

Most of that interest has come from retail investors, who were always more taken with the idea of Bric than were institutional investors.

Retail and institutional investors took different approaches to emerging markets, and current money flows are a reflection of their diverging actions, says Melissa McDonald, global head of

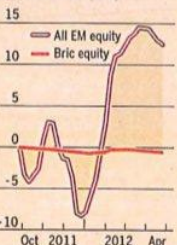
**'India/China was all the rage pre-crisis, but people are slowly taking their foot off the pedal'**

equity product at HSBC Global Asset Management.

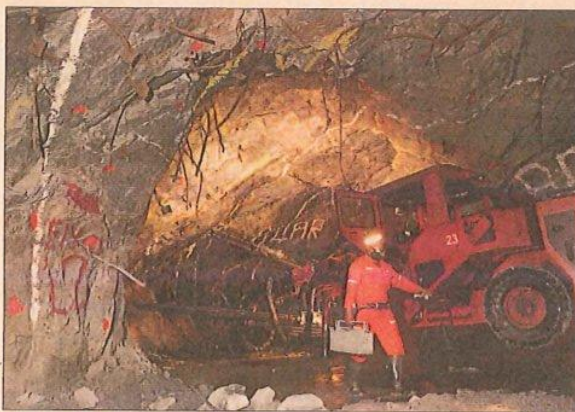
"What we're seeing is flows out of Bric and global emerging markets from individual investors; and inflows to global emerging markets from institutional investors," she says. "It's really risk aversion on the part of the individual that is disguised by the institutional inflows."

There is no rebound predicted for assets in Bric funds. However, if and when markets start to recover and retail investors get brave enough to reinvest, they will probably

**Flows into EM equity funds**  
Cumulative flows (\$bn)



Source: EPFR Global



Each Bric country attracts attention for different reasons: Brazil is rich in natural resources. Gold miners work at AngloGold Ashanti's Cuiaba gold mine in Sabara, Minas Gerais, Brazil  
Bloomberg

look at other ways to get exposure to emerging markets.

"When individuals come back to the market, and I hope they do, they're likely to go to global emerging markets," says Ms McDonald.

Matt Pickering, a US-based analyst with Cerulli, agreed. "The product diversification has become so vast; why would you invest in a Bric fund, when you can choose which of those four you want exposure to? It's not that they're unappealing, it's that people are moving their money out of Bric funds and into [general] emerging markets."

Within the US exchange traded fund market, he says 2011 saw about \$1bn of outflows from Bric products while some \$2bn went into other emerging market products.

For one thing, investors have a much wider range of ETFs to choose from now, he says, as there has been an explosion of single-country vehicles tracking emerging market indices, with iShares alone bringing more than 20 such products to market.

"Brics funds may have been groundbreaking, but now ETF sponsors are drilling down in so much detail", that the Bric package is no longer the obviously best way for retail investors to access emerging markets, says Mr Pickering.

Bric is still "an interesting concept in its own right, as some of the trading relationships are key", points out Mr Smith of Allianz Global. Russia and Brazil both have large natural resources sectors, which depend to some extent on demand from China.

Mr Smith also thinks "some of the key emerging market themes are best accessed through those countries", such as the growth of a middle class with increasing disposable income.

This will not be enough to bring investors back to the

concept, though, according to Ms Ng. Although the four countries have some similar characteristics, the underlying issues driving their economies are very different, she says.

"Bric has segmented into two stories," says Ms Ng. "India/China was all the rage pre-crisis, but people are slowly taking their foot off the pedal with those two because of inflationary pressures."

Investors are paying more attention to Brazil and Rus-

sia, she says, although not necessarily as a twin-pack. "There is a lot more interest in evaluating these markets as single countries, or in Brazil as part of Latin America and Russia as part of emerging Europe."

Even Goldman Sachs, where the concept was born, says it is no longer sufficient to guide investment ideas.

In a December report entitled *The Brics 10 Years On: Halfway Through the Great Transformation*, it says: "In

terms of growth contributions, or more simply in terms of the role of the Brics in driving global growth, the most dramatic change is behind us."

The report identifies a number of themes for the future, including increased importance of other emerging markets, and what it calls "the Expanding Middle" - not a global obesity crisis but a growing global middle class. Could this be the next big idea in investment themes?

## THE TRUTH ABOUT NESSIE

The Loch Ness Monster. Sightings of the legendary creature date back to 565AD, but the most famous is from the 1934 Surgeon's Photo. Some believe. We're skeptics.

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## 2. Previous studies on the Russian stock market

The body of literature on the Russian stock market is still relatively small. However, a number of articles have been published over the last decade. In this chapter I will present a brief overview of some relevant literature of this topic.

Vasiliev (2001) studied the history of major patterns of development of the Russian securities market in 1991-2000. He made a forecast regarding its future development and concluded that Russia is not a unique country, and it is as volatile as other emerging markets.

Tkac (2001) studied the performance of open-end international mutual funds. She compared funds by using arithmetic average of the monthly returns, standard deviation of the monthly returns, Sharpe ratio and Jensen's alpha. Tkac concluded about the Russian funds that their high average return was balanced by their high volatilities so that the resulting Sharpe ratios were not different in magnitude from those of well diversified funds in the developed markets.

Égert and Kočenda (2007) studied the performance of the emerging equity markets, the Russian stock market among them, and confirmed that such markets tended to exhibit compared to the developed markets, possibly because of their sensitivity to relatively small portfolio adjustments.

Hayo and Kutan(2005) analyzed the impact of news, oil prices and global market developments on the Russian financial markets. They examined financial market behavior in Russia in response to 'news' using GARCH-model. They also tested the degree of integration of Russian financial markets into the world markets. They concluded that energy news affected returns, while news from the war in Chechnya was not significant and that market volatility did not appear to be sensitive to either type of news. They also detected a significant effect of the growth in oil prices on Russian stock returns. Test on the degree of integration showed that international influence on Russian financial markets depended on the degree of financial liberalization. The higher the degree of financial liberalization, the stronger was the impact of US stock returns on Russian financial markets. In addition they suggested that banking reform and interest rate liberalization efforts could dictate the globalization of the Russian stock market.

Goriaev and Zobotkin (2006) examined major political and economic events, which influenced the investor perceptions of the country risk and were reflected in stock prices. They carried out quantitative analysis of risk factors explaining considerable time and cross-sectional variation in Russian stock returns. For that purpose Goriaev and Zobotkin used single and multiple factor CAPM model. They documented a

significant role of corporate governance, political risk, and macroeconomic risk factors, such as global equity markets performance, oil prices, and exchange rates, whose relative importance varied a lot over time.

Anatolyev (2008) studied factors influencing returns in the Russian stock market from 1995 to 2004, putting emphasis on how these evolved over time. He found that domestic factors have been playing a gradually diminishing role, while the importance of international factors has been increasing. He also discovered that for the last years the effect of oil prices and foreign exchange rates had diminished, the impact of US stock prices and international and domestic interest rates had increased, while the influence of monetary aggregates such as gold reserves and credit balances had fallen to practically zero.

Salter and Osakovskiy (2011) examined relations between Russian equities, the oil price, reform-news and discovered that there has been a change of drivers in the Russian stock market in 2011: returns became less dependent on short-time drivers as oil price and more dependent on medium-term themes such as reforms to the investment climate; the “time value” of oil, meaning that the longer oil prices remain high, the more the market would become more comfortable with them staying high; and favorable economic dynamics for Russia, with growth accelerating as oil revenues feed through to the economy and inflation starting to head down.

Peresetsky (2011) studied the factors that determined the behavior of the Russian stock market and found that it was determined by oil prices till mid-2006; US stock market on example of S&P 500 before and after crisis; and political and informational shocks.

Abramov(2005) studied the competitiveness issues of the Russian stock market and pointed out the most important such as a weak bank system compared to other countries with the same capitalization level, negative excess return on obligations, and high inflation due to the monetary policy, inability of the Russian Stock Market to mobilize internal investments, absence of laws that protect minor investor.

Fedorov and Sarkissian (2000) examined the average degrees of integration of the Russian stock market into the World stock market. They found that there was a noticeable downward trend with decrease in the portfolio size and also for less diversified industries. The strength of integration was higher for those portfolios that had more firms which cross-list stocks on foreign exchanges and/or sell their output internationally.

Dumov (2009) studied the efficiency of the Russian stock market and pointed out that the Russian stock market was close to the weak efficiency form, but some dependent relations existed between earlier and future prices. Although he found that these relations didn't apply to prices in the nearest future, which limited prediction opportunities.

As a general conclusion regarding the scientific research on the Russian stock market is that there are still many topics to explore. While stock markets in the most developed countries have been analyzed in great detail, the number of such studies in the Russian stock market is small. This thesis is a contribution to a systematic, empirical analysis of this relatively large market. I will present stylized facts on risk and return on the Russian stock market. I will test out a set of hypothesis related to the idea that the Russian market should be identified as a separate asset class, and not as a part of emerging markets class.

### 3. Methodology and hypotheses

This chapter presents the methodology, which will be used for further analysis of the data. I will first describe shortly what methods are used to obtain estimated results and then present underlying hypotheses this thesis builds on.

I use the traditional financial models and analysis to estimate parameters. Descriptive statistics is used to obtain the average returns and standard deviations. The classical correlation estimation is applied to find statistical relationships between returns. Ordinary least squares (OLS) will be used to estimate the unknown parameters in the capital asset pricing model (CAPM)<sup>1</sup>. Among these parameters is  $\beta$ , which indicate systematic risk and is used to find unsystematic risk<sup>2</sup>. For testing the significance of the estimated parameters I use Student's t-test and F-test. I estimated Sharpe ratios and  $M^2$ . I use adjusted Sharpe ratio according to Samuelsen. In order to build the optimal portfolio I use portfolio optimizer and Excel Solver, which compile portfolios with the lowest possible level of risk for the given return.

Below I present the underlying hypotheses about the Russian stock market, which I am going to test:

1. The returns on the Russian stock market are not different from the returns on the Global, Brazilian, Indian, Chinese and emerging markets.
2. The Russian stock market has the same volatility as the other chosen emerging markets.
3. The Russian stock market has the same systematic risk (beta) against the World stock market as the other chosen emerging markets.
4. The Russian stock market has the same unsystematic risk as the other chosen emerging markets.
5. The risk-adjusted returns on the Russian stocks are not different from the risk-adjusted returns on the Global, Brazilian, Indian, Chinese and average emerging markets.
6. Including Russian stocks in the investor's portfolio gives higher returns per unit of risk taken.

Based on the test results of these hypotheses I will conclude whether Russia should be considered an asset class of its own, separate from the BRIC concept and the emerging market class.

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<sup>1</sup> $R_{j,t} = \alpha_j + \beta_j R_{m,t} + \varepsilon_{j,t}$  where  $R_{j,t}$  is the average return on the asset j in the period t,  $\beta_j$  is the assets j beta on the market,  $R_{m,t}$  is the average return on the market in the period t,  $\varepsilon_{j,t}$  is an error term

<sup>2</sup> $\sigma_j = \beta_j \sigma_m + \sigma_{\varepsilon_j}$  where  $\sigma_j$  is assets total risk,  $\beta_j \sigma_m$  is asset's systematic risk,  $\sigma$  is asset's unique risk. (Bøhren 1997)

#### 4. Data

I shall be analyzing daily, weekly and monthly returns based on MSCI World, MSCI Emerging Markets, MSCI Brazil, MSCI Russia, MSCI India, MSCI China<sup>3</sup>, Brent Crude oil prices<sup>4</sup> and 3-month U.S. Treasury bills yield<sup>5</sup> during the period from 8<sup>th</sup> of July 2002 to 31<sup>st</sup> of January 2012.

The MSCI Russia Index is a free float adjusted<sup>6</sup> market capitalization weighted index that is designed to track the equity market performance of Russian securities listed on MICEX Stock Exchange. The MSCI Russia Total Return Index takes into account both price performance and income from dividend payments. The MSCI Russia Index is constructed based on the MSCI Global Investable Market Indices Methodology, targeting free-float market capitalization coverage of 85%. The index has a base date of December 31, 1987. (MSCI)

MSCI Russia Index serves as an indicator of how the Russian stock market developed during the considered period. MSCI Russia reflects the composition of the Russian stock market as 60% of Russian stocks belong to energy companies, and MSCI Russia is also quite commodity-heavy (energy accounts for 55 per cent of the index, with another 15 per cent contributed by materials). (A. Zabotkin 2011)

Security Name	Weight %	Security Name	Weight %	Security Name	Weight %
GAZPROM	25.71	ROSTELECOM COMMON	3.05	FEDERAL GRID UES	1.21
LUKOIL HOLDING	13.2	TATNEFT COMMON	2.99	SBERBANK RUSSIA PREF	0.82
SBERBANK RUSSIA COM	9.42	SURGUTNEFTEGAZ COMN	2.88	NOVOLIPETSK STEEL GDR	0.8
NORILSK NICKEL MMC	5.85	VTB BANK	2.77	TRANSNEFT PREF	0.76
NOVATEK GDR	5.51	MAGNIT GDR	2.32	MECHEL ADR	0.75
URALKALI COMMON	5.32	RUSHYDRO	2.05	AFK SISTEMA GDR	0.72
ROSNEFT	4.89	SURGUTNEFTEGAZ PREF	1.48	INTER RAO EES	0.67
MOBILE TELESYS ADR	3.59	POLYMETAL	1.24	OJSC LSR GROUP GDR	0.31
RASPADSKAYA MINE	0.21	SEVERSTAL	1.22	TMK GDR	0.28

Table 1 - Weights of MSCI Russia Index per 7<sup>th</sup> October 2011. Source: msci.com

MSCI World will be used as a benchmark index for the Global market. MSCI World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets. The MSCI World Index consists of the following 24 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece,

<sup>3</sup> Source: MSCI/BARRA via wikiposit.org (<http://wikiposit.org>)

<sup>4</sup> Brent Crude Oil Spot Price. Source: US Department of Energy via wikiposit.org (<http://wikiposit.org/uid?DOE.RBRT>)

<sup>5</sup> <http://www.bankofcanada.ca/rates/interest-rates/t-bill-yields/selected-treasury-bill-yields-10-year-lookup/>

<sup>6</sup> Free-float methodology market capitalization is calculated by taking the equity's price and multiplying it by the number of shares readily available in the market. Instead of using all of the shares outstanding like the full-market capitalization method, the free-float method excludes locked-in shares such as those held by promoters and governments (Investopedia ULC 2010).



Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

MSCI Emerging Markets (EM) serves as benchmark index for the average emerging stock market. The Emerging Markets Index is a float-adjusted market capitalization index that consists of indices in 26 emerging economies: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, Turkey and Venezuela.

MSCI Brazil, MSCI India, MSCI China are used to demonstrate the performance of the Brazilian, Indian and Chinese stock markets during the chosen period.

Brent Crude oil prices serve as benchmark for the oil price development during the period from 2002 and 2012.

Data is grouped into three periods in order to analyze and compare the Russian stock market with other emerging markets during different business cycles, i.e. the entire period 2002-2012; the period before the financial crisis, i.e. July 2002 – May 2008; the period under and after the financial crisis, i.e. June 2008 – January 2012.

Logarithmic returns are used throughout the thesis, with exception of chapter 6, where I use both discrete and logarithmic returns.

All parameters are annualized unless otherwise specified.

## 5. Basic facts on the Russian stock market 2002-2012

### 5.1 Introduction

In this chapter I will give basic facts about the Russian stock market such as short history, general information about the stock exchange markets, the economic situation, and the main drivers in the Russian stock market. This chapter can be useful for an investor who wants to get the Russian financial market overview in the period 2002-2012, get acquainted with the market, available exchanges and main stocks in the Russian market. The short introduction into history of the Russian stock market will be presented, further background knowledge on the Russian market is provided. I follow by practical information about stock exchanges, the most liquid stocks and largest stocks by market capitalization. The chapter ends with interaction of the Russian stock market and Crude oil prices, and the World stock market.

Russia, once the leader of the Soviet Union, had to create the stock market in the midst of its transition from a planned system to a market economy, during times of severe economic crisis. Starting from scratch in late 1994, the Russian stock market has by now become one of the largest emerging markets in the world, with a total market capitalization 845 billion USD or more than 50% of GDP per 31 October 2011. (RosBusinessConsulting 2011) This growth was driven both by the expansion in the number of stocks and by high returns. Currently, around 350<sup>7</sup> Russian stocks are listed locally or abroad, and IPOs are undertaken often (Zabotkin and Goraev 2006).

The Russian stock market is quite young compared to the developed countries that have had the established stock markets at the beginning of 19<sup>th</sup> century. The first trades were executed in 1994 as the initial phase of Russia's privatization was drawing to a close. In 1995 the first index RTSI (Russian Trade System Index) was launched, putting the Russian stock market on the radar screens of the investing public. As privatization of the early 1990s created numerous joint stock companies, the amount of Russian stocks were always high. It varied from 1994 to 2002, and later stabilized around 300-350 stocks. However, only one third were traded regularly. The situation got better after 2005 as more IPOs took place not only in the commodity-producing industry, but also in telecom, food, retail, media and metal and mining sectors. This improved investors' diversification opportunities significantly. There was also increase in accessibility of the Russian stock market by international investors, especially by large

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<sup>7</sup> Per December 2011. Source: rbc.ru

institutional investors, as more depository receipts (DR) had become available (Zabotkin and Goraev 2006). In 2005 the Russian stock market’s rating was upgraded to investment grade by Standard & Poor rating agency. Decision for upward rating adjustment was based on opportunities for the long-term development. This fact attracted many investors despite of high volatility reputation (MICEX 2010). The global economic and financial crisis of 2008-2009 caused more damage to the Russian economy than to any other G-20 country. Russia’s GDP shrank by 8% in 2009, while the Russian stock market fell 80% from its peak. The Russian economy had difficulties for obvious reasons: A sharp decline in the price of oil and other commodities as well as capital outflows (131 billion U.S. dollars in the fourth quarter of 2008 alone) put the economy in a tailspin (Åslund, Guriev and Kuchins 2010). In the beginning of 2009 a new rule was announced by the Russian financial regulator which limited the global depository receipts (GDR) issuance in the company to just 35 percent of the total and allowed at most half the issue in a public offering to be placed in GDRs. It's either this new rule or a lack of domestic investor base, which was wiped out during 2008 crisis, that companies lined up to be domiciled as offshore in order to get to a listing in London (Oganisian 2012). In the end of 2009 and 2010 the stock market recovered from the financial crisis as oil prices went up and capital inflow to Russia increased. There were few indicators that signalize slow development and even decline in the financial markets at the beginning of 2011 mostly because of the unsettled situation in Europe and the USA. (Tregub and Posokhov 2011) The second half of 2011 lead to a tremendous fall in all markets, and Russia was no exception.

## 5. 2 Sector composition

Figure 1 presents the composition of the Russian stock market, presented by the MSCI Russia Index.

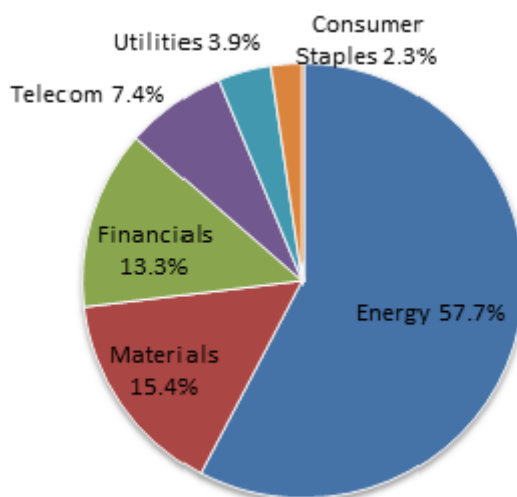


Figure 1 - Sector weights for MSCI Russian Index per 10<sup>th</sup> October 2011. Source: msci.com

As shown in **Error! Reference source not found.**, Energy sector represents 58% of the stock market and Materials sector 15%. This is why development in commodities' prices, especially gas and oil, will have a great impact on commodity related enterprises and further on the development of the Russian stock market. Even though earlier studies on the relations between oil prices and the Russian stock market show that the stock market is not necessarily depending largely on the oil price. Anatolyev (2005) states that in recent years, the influence of oil prices and foreign exchange rates on Russian stock returns has diminished, while the influence of US stock prices and US and Russian interest rates has increased.

MSCI Russia Index is not traded as an exchange-traded fund (ETF), but is used as a basis for futures and options on Eurex<sup>8</sup>, which were introduced in 2008.

There are some stocks<sup>9</sup>, which are commonly accepted as blue chips<sup>10</sup> in the Russian stock market:

Russian blue chips			
<i>Company</i>	<i>Sector</i>	<i>Company</i>	<i>Sector</i>
Sberbank of Russia	Financials	Federal Grid Company	Utilities
VTB	Financials	RusHydro	Utilities
Gazprom	Energy	Norilsk Nickel	Materials
Lukoil	Energy	Evraz	Materials
Rosneft	Energy	Severstal	Materials
Surgutneftegas	Energy	Polyus Gold	Materials
Rostelecom	Telecom	Uralkali	Materials

Table 2 - Russian blue chips

These stocks have leading positions both locally and abroad among Russian stocks and serve often as indicators how the Russian stock market develops.

The 10 largest companies by capitalization per September 2011 are presented under. Market capitalizations of these companies from 2002 to 2011 are given for better insight in their development. Some companies' market capitalizations don't start at 2002 due to the later IPOs.

<sup>8</sup>Eurex is one of the world's leading derivatives exchanges offering a broad range of international benchmark products, operating the most liquid fixed income markets in the world and featuring open and low-cost electronic access. (Eurex 2012)

<sup>9</sup>Sectors are named in parentheses

<sup>10</sup>A blue chip is stock in a corporation with a national reputation for quality, reliability and the ability to operate profitably in good times and bad. (NYSE)

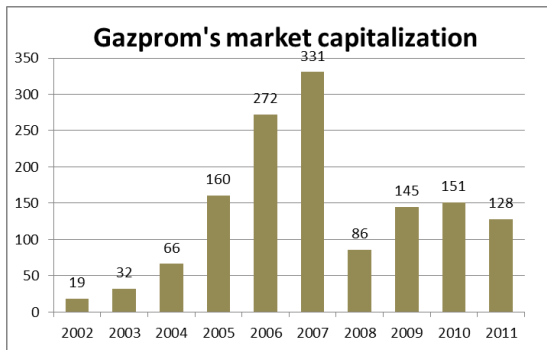


Figure 2 – Gazprom’s market capitalization, billion USD  
Source: gazprom.ru

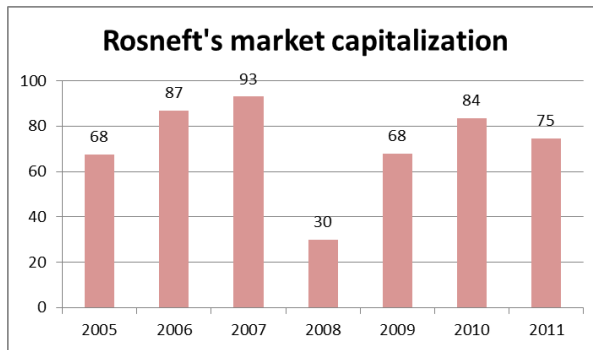


Figure 3 – Rosneft’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

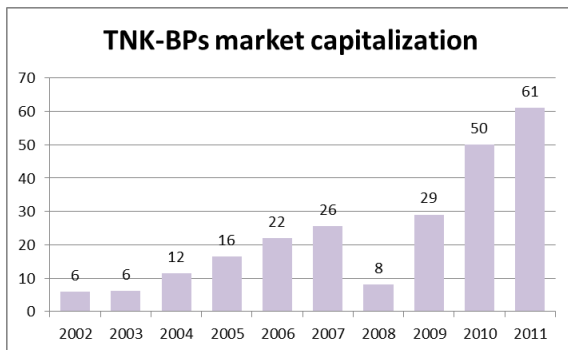


Figure 4 - TNK-BP’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

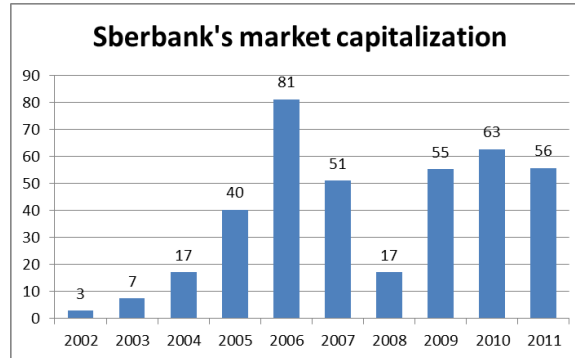


Figure 5 - Sberbank’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

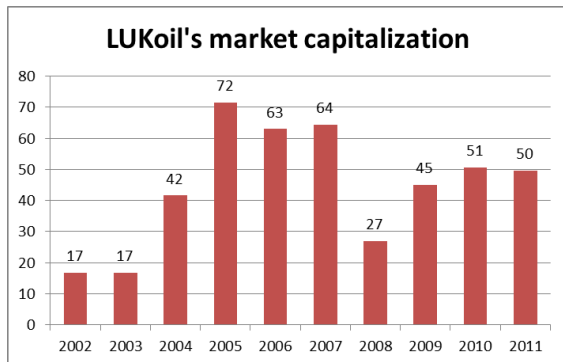


Figure 6 - LUKoil’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

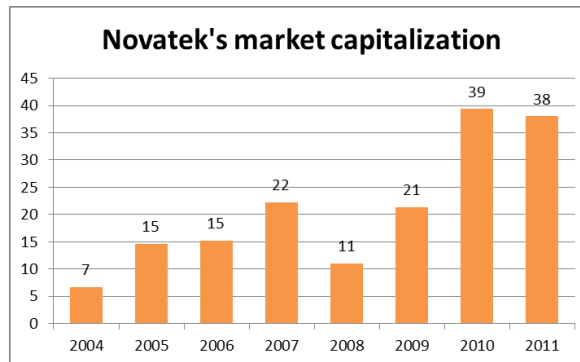


Figure 7 - Novatek’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

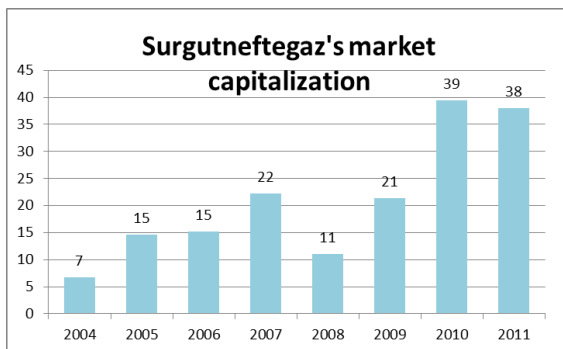


Figure 8 - Surgutneftegas’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

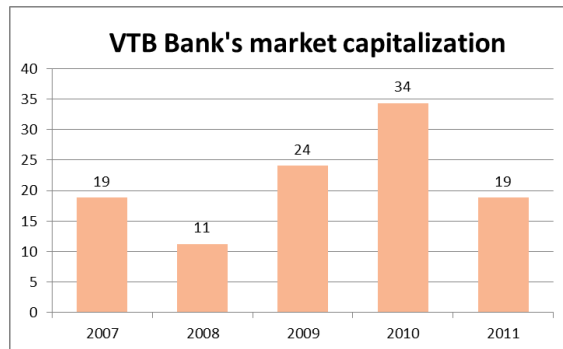


Figure 9 - VTB’s market capitalization, billion USD  
Source: raekspert.ru, rbc.ru

The most liquid stocks per April 2012 are as expected not dramatically different from blue chips and 10 largest companies by market capitalization, and presented in descending order left column first, then the right one. (Troika Dialog 2012).

The most liquid Russian companies			
<i>Company</i>	<i>Sector</i>	<i>Company</i>	<i>Sector</i>
Sberbank of Russia	Financials	Transneft	Energy
Gazprom	Energy	Severstal	Materials
Lukoil	Energy	Tatneft	Energy
Rosneft	Energy	Magnit	Consumer staples
Norilsk Nickel	Materials	Rostelecom	Telecom
VTB	Financials	Mechel	Materials
Surgutneftgas	Energy	NLMK	Materials
Novatek	Energy	Yandex	Technology
Uralkali	Materials	Federal Grid Company	Utilities
RusHydro	Utilities	VimpelCom	Telecom
MTS	Telecom	Sistema	Financials

Table 3 - The most liquid Russian stocks per April 2012, descending order

### 5.3 Russian stock trading

Russian stocks and DR can be bought on international stock exchanges, domestic stock exchange and over-the-counter(OTC).

As a rule there are only American depository receipts (ADR), 144A depository receipts<sup>11</sup> and global depository notes (GDR) that are available internationally. ADR are traded on U.S. national stock exchanges, such as New York Stock Exchange (NYSE), NASDAQ and over-the-counter. Examples of ADR which are traded on NYSE are shown in Table 5. Yandex is traded on NASDAQ. Examples of 144A DR are shown in Table 4. GDR are usually sold on European exchanges and over-the-counter. Frankfurt Stock Exchange (FSE) trades ADR and GDR, examples of such stock are presented in Table 7.

Vimpelcom	MTS
Tatneft	Gazprom
Rostelecom	Mechel
Mobile Telesystems(telecom)	

Table 5 - Examples of ADR traded on NYSE

Lukoil 144A	Gazprom 144A
Tatneft 144A	
Uralmash Zavody 144A (industrials)	

Table 4 - Examples of 144A DR

<sup>11</sup> Rule 144A Depository Receipts are special ADRs that can only be sold to Qualified Institutional Buyers as a private placement and are not subjected to the same rules and regulations as ADRs. A Qualified Institutional Buyer is an institutional investor that can trade privately placed unregistered securities with other qualified institutional buyers. Consequently, these cannot be bought on the public exchanges or over the counter (W. C. Spaulding 2011).

VTB	Irkutskenergo
Aeroflot (industrials)	Lukoil
Avtovaz (consumer staples)	Mechel
Severstal	NLMK
Mosenergo (utilities)	Polyus Gold,
Rosneft	Rostelecom
Surgutneftegas	Tatneft
Transcontainer (shipping)	Vimpelcom

Table 7 - Examples of ADR/GDR traded on FSE

Uralkali	Lukoil
Severstal	Magnit
Etalon (real estate holding and development)	
Global Ports (shipping)	NLTK
Hydraulic Machines (machine industry)	
Novatek	Polyus Gold
X5 Retail Group (consumer staples)	
Sistema (financials)	Rosneft

Table 6 - Examples of ADR/GDR traded on LSE

Examples of some ADR and GDR available on LSE (London Stock Exchange) are shown in Table 6. Some of ADR sold OTC are presented in Table 8.

Federal Grid Company	Sberbank
InterRAO UES (utilities)	Gazprom
Norilsk Nickel	Lukoil
Irkutskenergo	Rostelecom
Avtovaz	Tatneft
Sberbank	Gazprom Neft
Uralsvyazinform (telecom)	

Table 8 - Examples of ADR sold OTC

MICEX-RTS is the largest stock exchange in Russia, located in Moscow, trading equities, bond, derivatives and currencies. The exchange is a recent (2011) merger of the two largest Moscow-based stock exchanges, the Moscow Interbank Currency Exchange (MICEX) and the Russian Trading System (RTS). Both organizations were formed in the 1990s and were for two decades the leading exchanges in Russia, with the MICEX Index and the RTS Index being among the world's top stock indices. The merger created a single entity that is expected to become a leading stock exchange globally for trading across asset classes and to advance Russia's plans to turn Moscow into an international financial center. (MICEX-RTS Exchange 2011) The MICEX-RTS Group ranked among the top 20 largest global exchanges in terms of securities market trading volume and among the top 10 largest global futures and options trading venues in terms of derivatives market trading volume. In 2011 total number of trades across all MICEX-RTS markets exceeded 358.5 million. At the end of the year, the aggregated capitalization value of all stocks traded in MICEX-RTS totaled USD800 billion. According to the 2011 year results, the exchange was the number one trading venue by volumes traded in all segments of the stock market not only in Russia and former Soviet countries, but also among the East European countries (MICEX-RTS Group 2012). Almost all the most liquid stocks trades named above on MICEX-RTS, except for Vimpelcom, Yandex, X5 Retail Group, for Novatek trading are very low as trades mostly as DP and OTC. The highest trading volumes on

this exchange have Sberbank, Gazprom, Lukoil, Rosneft, Norilsk nickel, Surgutneftegaz, VTB, Transneft, Uralkali, RusHydro, Severstal, Rostelecom and etc.

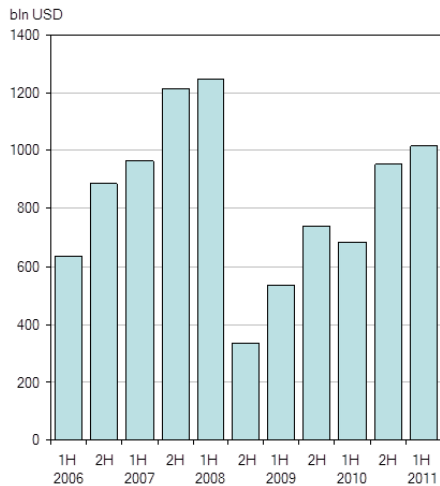


Figure 10 - Market capitalization of MICEX, billion U.S. dollars, 2006-2011. Source: micex.com

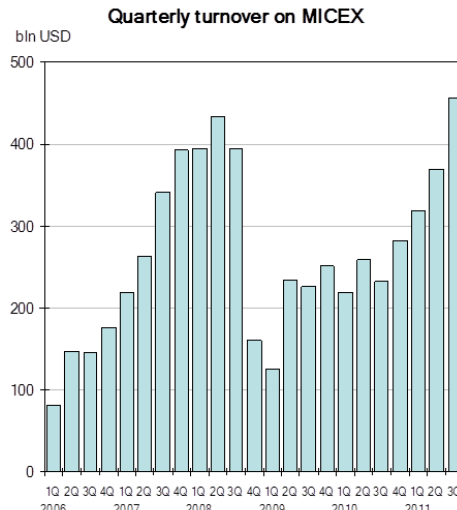


Figure 11 - Turnover on MICEX, quarterly, billion U.S. dollars, 2006-2011. Source: micex.com

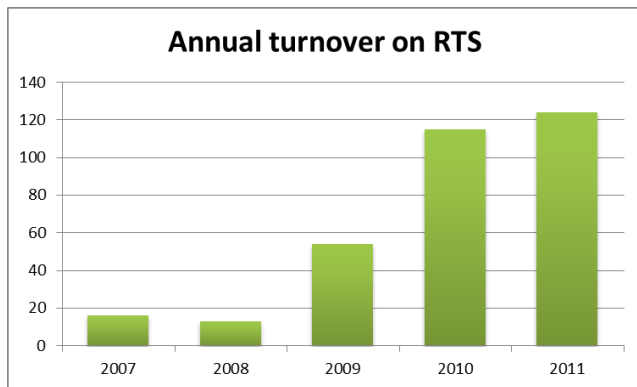


Figure 13 – Annual turnover, billion U.S. dollars, 2007 – 2011 Source: rts.ru

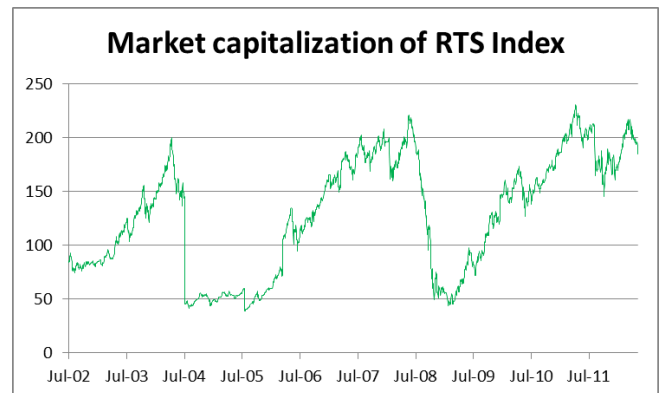


Figure 12 – Market capitalization of RTS Index, billion U.S. dollars, 2002 – 2012. Source:East Capital

The Stock Exchange “Saint-Petersburg” (SPBEX) is located in Saint Petersburg, Russia. The stock exchange was founded in 1991, and it is now the second most active stock exchange in Russia by volume, and the largest outside of Moscow. SPBEX trades stocks, commodities and commodity and stock derivatives. Per May 2012 there are trades in Gazprom; QUIN, shares of closed-end investment funds intended for qualified investors; and also registration of OTC transactions. ( SPBEX 2012) The trading volume of securities has had a falling trend the last years as shown in Figure 14.



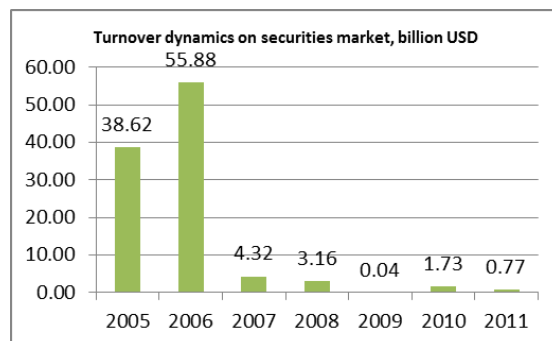


Figure 14 - Turnover dynamics on securities market on the exchange "Saint Petersburg", billion U.S. dollars, 2005 - 2011. Source: spbex.ru

There are also some smaller exchanges:

Moscow Stock Exchange (MSE) was established in 1997 and has become one of the leading marketplaces for commodities and securities among smaller exchanges in Russia. The largest Russian companies, such as Sistema, Eurocement Group (construction materials), Uralkali, PhosAgro (materials), Mechel trade on MSE. According to 2010 results, the volume of securities transactions on the MSE trading exceeded 0.05 billion USD. (MSE 2011)

St.Petersburg Currency Exchanges (SPCEX) focuses mainly on fixed-income securities, though there are some stocks traded such as Planeta(technology), ProfTehResurs (consumer goods), Prominvest (financials). (SPCEX 2012)

### 5.3 The development of the Russian stock market

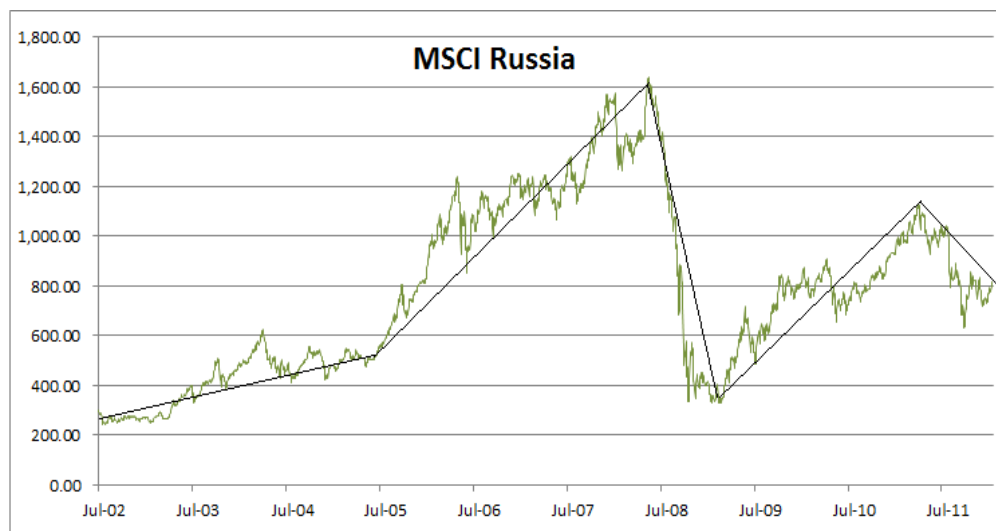


Figure 15 - MSCI Russia, daily observations, U.S. dollar terms. July 2002 - January 2012.

MSCI Russia is used as an indicator of how the Russian financial market developed and was influenced by major events during period from 2002 till 2012.

Figure 15 shows a daily change in the index, which gives us an overall picture of the stock market development. There are five clear trends: moderate uprising, tremendous uprising before the financial crisis, great fall under the crisis, active recovering after, and the falling period after mid-2011.

MSCI Russia began its way up from 293 in July 2002, rose rapidly by 560% and achieved its top at 1643 just before the financial crisis embraced the world. High oil price, a good world economic situation and increased trust in Russia's economic future sent the Russian stock market to unknown heights. During this furious growth period a few noticeable falls are observed.

The stocks that truly have influenced development of the Russian stock market in the period from 2002 to 2012 are Sberbank of Russia, Gazprom, Lukoil, Rosneft, Rostelecom, Surgutneftegas, RusHydro Federal Grid Company/UES of Russia, Norilsk Nickel, Evraz, VTB, Severstal, Novatek, Transneft, TNK-BP, Yukos and Polyus Gold<sup>12</sup>.

<sup>12</sup> For Russian readers, this is in greater detail reported in the two leading newspapers, Kommersant and Pravda. I have used [kommersant.ru](http://kommersant.ru), [pravda.ru](http://pravda.ru), [rbc.ru](http://rbc.ru), and [ru.reuters.com](http://ru.reuters.com) heavily. See also lists of referred literature at the end of this thesis.

### 5.4 The Russian vs. World stock market and the oil price

As mentioned before Russia is a commodity exporting country and its economy depends heavily on prices of sold commodities. Oil prices are among those that have had the largest effect. The question is how great interaction between the Russian stock market and oil prices.

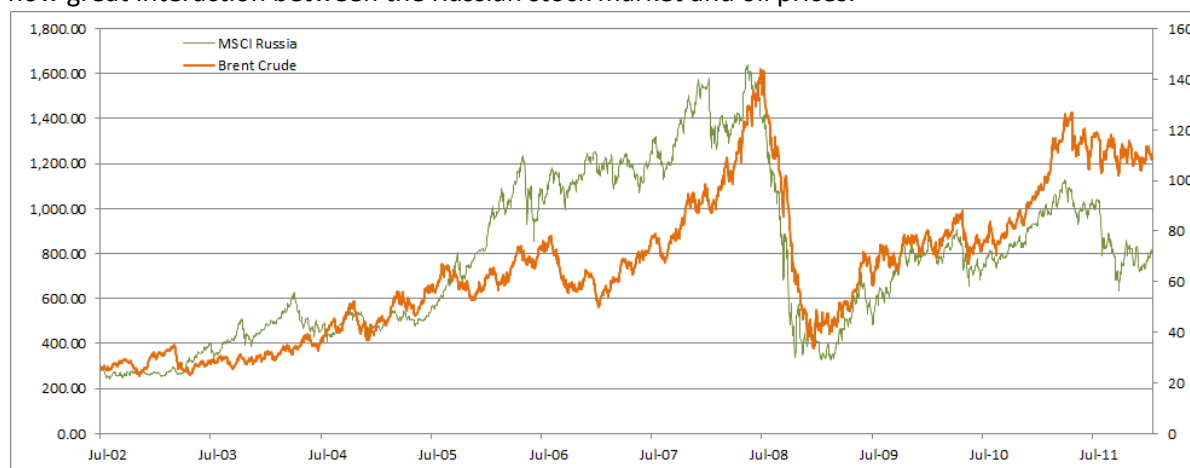


Figure 16 - Development of Brent crude oil prices and MSCI Russia, dollar terms, July 2002- January 2012

Figure 16 shows that MSCI Russia Index follows changes in the Brent crude oil prices relatively closely: development is the same til mid 2005; after that Russia MSCI continues up, while Crude Brent goes down; Brent Crude has a sharper peak right before the crisis; approximately the same development after crisis til mid 2011, where MSCI Russia goes down and Crude Brent oil prices vary at the same level . The correlation between returns on MSCI Russia Index and World Crude oil prices is 0.34 for the given period. Table 9 shows that there has been a tendence of increasing correlation between oil prices and the Russian Stock market during the whole period: it rises from 0.16 in the first period to 0.48 in the second. This can be interpreted as oil prices and the Russian stock market moved much more in the same direction at the second than at the first half of the chosen period. Though at the end of the period coomovement are less sound. It is possible that this 2011-deviation from the usual trend was caused by financial unstability in the Europe and fear of ressesion in US, and relations will come to the earlier balance later. This however indicates that under such situations dependence relations between them are weaker.

	July 2002 - January 2012	July 2002 - May 2008	June 2008 - January 2012
Oil price	0.34	0.16	0.48
World	0.56	0.35	0.67

Table 9 – Correlation between logarithmic daily dollar returns on MSCI Russia, MSCI World indices and Brent Crude oil prices for the different periods

Russia is a part of a globalization process and cannot be considered in isolation. Figure 17 shows that there is the same dynamics in MSCI World and MSCI Russia. But the upcoming trend in the period before and after the crisis and the falling trend under the crisis are much stronger for the Russian Stock Market. As seen in Figure 17 the World stock market during the financial crisis, began to fall before the Russian stock market which even had an extra top before it began its way down.

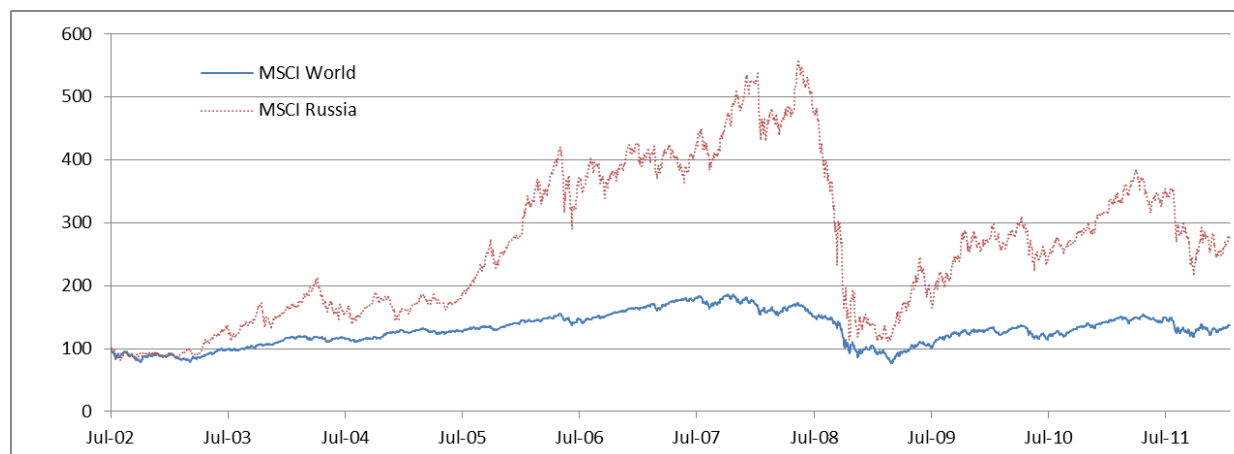


Figure 17 - Development of MSCI World and MSCI Russia, dollar terms, July 2002- January 2012

Table 9 shows that the correlation between returns on MSCI World and MSCI Russia indices is 0.56 during the whole period. There are a few things that should be considered: the first is that MSCI World can also be influenced by oil prices, the second is that our period from 2002 till 2012 contains the global financial crisis, which dominated all indices in the way that correlation was almost 1 for all world stocks. Despite that there is tendency of the Russian stock market being more integrated in the World Stock market with every year, as correlation between MSCI Russia og MSCI World almost doubles from the first to the second period.

## 5.5 Conclusions

After analysing correlations between the oil price, the World and the Russian stock market, we can conclude that samvariation between these two and the Russian stock market has generally increased. The theory and previous studies on the dependence relations between these shows that changes in the World stock market and oil price influnce changes in the Russian stock market. That is why our results can be interpreted as the Russian stock market follows changes in the World market and the oil price considerably more than it did at the beginning of the chosen period. Although after studying the grafical presentaion of daily price development of the Russian market and the oil price, I observe that in the late

2011 these two has become less sound and changes in the oil price is no longer one of the main drivers of the stock market.

## 6. Returns in the Russian stock market 2002-2012

### 6.1 Introduction

In this chapter returns in the Russian stock market will be discussed and compared with the other emerging markets and the World. This information can be of interest to investors wondering what historical returns the Russian stock market provided compared to the World stock market and the other emerging stock markets in 2002-2012, also whether returns on the Russian market were different from others. I start by describing the development of the Russian stock market and explaining the trend shifts. I continue with showing the daily return changes and presenting possible reasons. I further graph the chosen emerging markets and compare their development. After that I discuss the Russian stock market development in relation to the World stock market. I will also present discrete and logarithmic returns for the Russian, Brazilian, Indian, Chinese, World stock markets as well as the average emerging stock market, discuss and test the differences between these returns. In the end of the chapter I will present logarithmic and discrete daily returns on the Russian and the World stock market for the last 6, 12, 24, 36 and 60 months.

### 6.2 Trends in the Russian stock market

As mentioned in chapter 5 and showed in Figure 18, it is observed five trends in the Russian stock market: moderate uprising, tremendous uprising before the financial crisis, great fall under the crisis, active recovering after, and the falling period after mid-2011.

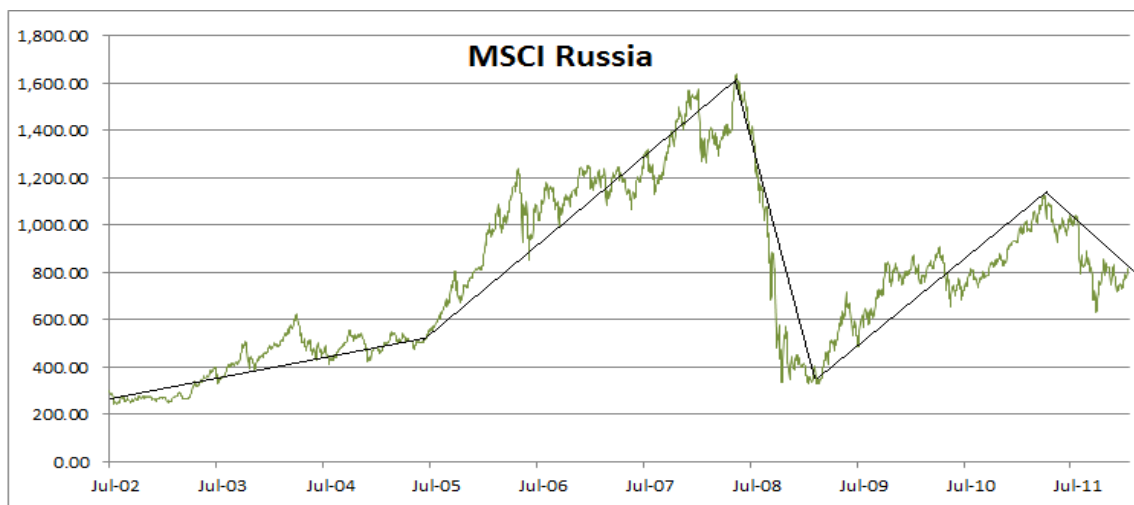


Figure 18 - MSCI Russia, daily observations, in dollar terms, July 2002-January 2012

Under the moderate uprising period from July 2002 till July 2005 the stock market is young, but still attracts new international and domestic investors as many see potential in the Russian companies. The growth could be more intense if not the political attack and involvement had found place.

Tremendous uprising before the financial crisis can be explained by several reasons as the stock market gets mature: better diversification opportunities as more IPOs took place in the non-commodity-producing sector, increased stock liquidity, S&P rating upgrade and good earnings during the moderate upraising period all caught the attention of investors.

The situation under the great fall period was worsen by several things: oil price collapse, fall of the Russian ruble, great capital outflow and agonizing relations between government and private business as many feared de-privatization.

The active recovering in the period after the financial crisis occurred as non-investment panic was almost over, the oil price was on its way up and the Russian government planned to privatize some Russian companies, such as Rosneft and Sberbank, which made many investors positive. The Russian stock market could also offer a great variety of underpriced stocks.

The market situation in the falling period is influenced by fear of recession in the US and default of several European countries.

### 6.3 Daily changes in the Russian stock market in the period from 2002 to 2012

For presenting daily changes in the Russian stock market I use logarithmic daily returns on MSCI Russia<sup>13</sup>.

Figure 19 shows daily changes in the MSCI Russia with marked extreme negative and positive returns in the period from 2002 till 2012.

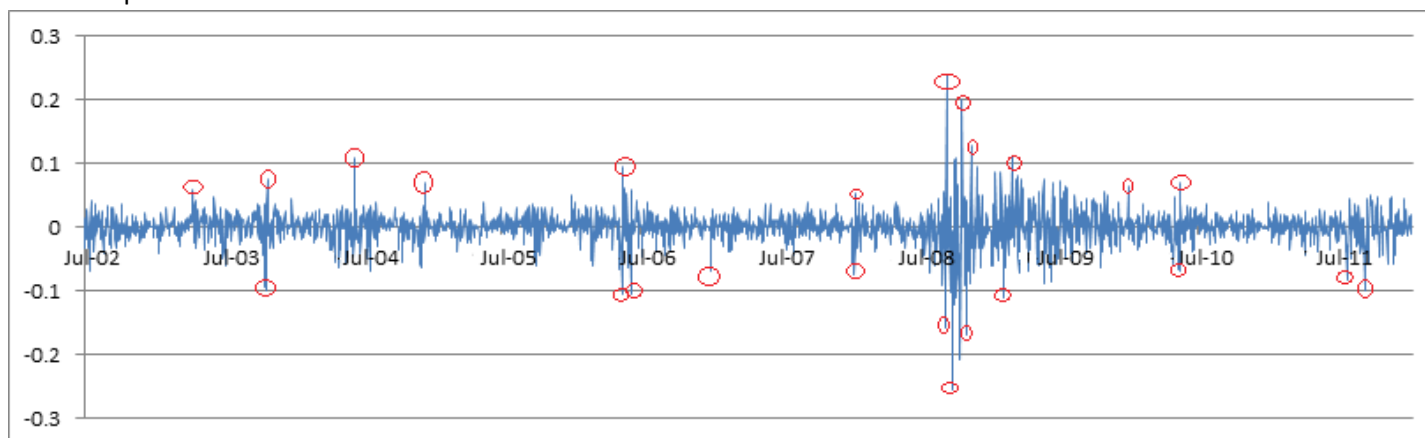


Figure 19 - Logarithmic daily returns on MSCI Russia (measured in USD) July 2002-January 2012

This is a summary of Appendix 1, which describes important events in the Russian market from July 2002 to January 2012.

The two week fall in July 2002 in the European and American stock market lead to a fanatic selling from both local and foreign investors in the Russian stock market. A new joint venture company TNK-BP was established February 2003 between Tyumen Oil Company and British Petroleum. TNK-BP became the third largest oil company in Russia after Yukos and Lukoil. Yukos and Sibneft completed their merger in mid/late May, and Russia's long-term rating with Fitch was later increased from "BB -" to "BB+". In July 2003 Khodorkovsky's partner was arrested on illegal stake accusations during the merger. Khodorkovsky was arrested in October 2003 on the charges of fraud. Putin froze shares of Yukos, leading to a collapse in share price. The market reacts immediately on news around this case. In 2004 the Russian stock market fell several times as a result of rumors of arrest of the head of Interros, the situation of the Yukos affair and the situation in the foreign exchange market. Surgutneftegas reported 66% profit increase. The stock market fell in December 2004 as it feared a "second Yukos" from tax claims against Vimplecom, Tomskneft and Megafon.

<sup>13</sup>  $r_{\text{msci russia}} = \ln \left( \frac{\text{MSCI Russia}_t}{\text{MSCI Russia}_{t-1}} \right)$ , where MSCI Russia<sub>t</sub> is an observed value of MSCI Russia in the period t, and MSCI Russia<sub>t-1</sub> is an observed value in the previous period.



In September 2005 the government announced the decision to liberalize the market. Along with rising oil prices, this lifted the oil sector stocks. The Russian stock market fell on sinking oil prices in October the same year. Russia follows up global news and trends in the World stock market. Headline inflation rates rose in many economies in 2006, and the Russian returns in dollars were reduced. The stock market fell in early 2007 from the anxiety around the situation in the US and a large drop in the SSE Composite Index of the Shanghai stock exchange. In 2008 the US mortgage crisis spread to Russia, causing several significant declines. Putins criticised Mechel CEO. The market also temporarily fell on news from the Georgian-Ossetian conflict and as Asian stock market declined. A 16% drop in the Russian stock market was registered after the Lehman Brother bankruptcy along the serious problems of American International Group (AIG). The Russian 1.5 trillion rubles injection into the banking system raised the market. Several large drops in the stock market followed throughout 2008, with occasional positive trends as well. 2008 saw a loss of more than 70% in the Russian stock market. Returns in the beginning of 2009 varied according to the moods in the World. In April and May the stock market rose 30% as big investors such as big mutual funds went back in to the Russian stock market. Falling oil prices sends the stock market down 7% on June 2009. In July the market raises as a reaction on a rally in the global stock market: Investment analysts agree that the recession in the global economy will soon be completed. In August 2009 the growth continues after good macro reports, rising oil prices and optimism in the market. In 2010 and 2011 Russia has followed up trends in the World stock market with the exaggerating tendency shown in the previous years. 2010 and beginning of 2011 are generally stable time, where Russia still recovers from the financial crisis with active growth. The second half of 2011 is dominated by the fear of U.S. recession and defaults of the several European countries. In December 2011 the market prices in additional political risk as many citizens are unhappy with election fraud. The oil price stimulated and slowed the growth of the stock market during 2010 and the beginning of 2011. After mid 2011 the oil price has had less effect on the market due to the economic instability in the World.

#### 6.4 The development of the Russian stock market versus Emerging markets

Figure 20 shows the development of MSCI World, EM, Brazil, Russia, India and China during the period from July 2002 to January 2012.

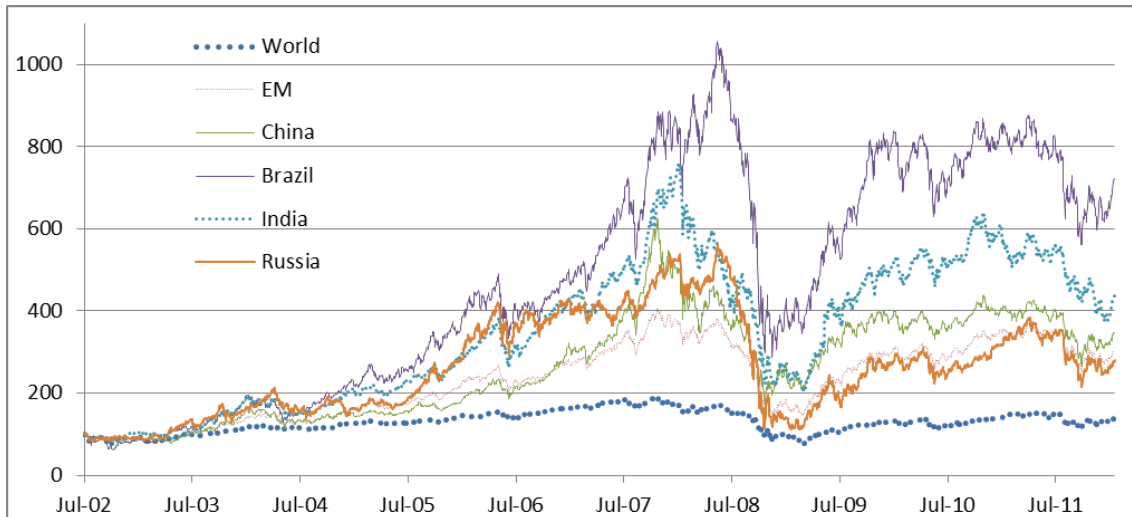


Figure 20 - MSCI World, EM, Brazil, Russia, India and China, daily observations (measured in USD) July 2002 - January 2012

The clear leader is the Brazil stock market, which increases rapidly before and after the financial crisis. The second place belongs to the Indian stock market, which certainly stands out from the crowd. The Russian stock markets development was quite promising before the financial crisis and it was even ahead of the Chinese market till the end of 2007. After 2008 the Chinese market takes over the lead. The Chinese market begins to fall earlier than the Russian stock market, but falls with approximately the same as the Russian stock market under the crisis, though the falling patterns are different.

The average emerging market develops stably during the period and decreases relatively less than other BRIC market do under the crisis. After the crisis, the average emerging market grows more than the Russian one does. The World stock market is clearly the worst in the class: though it shows a stable slow growth before and after the crisis.

Summarized, the Russian stock market was one of the leading emerging markets before the financial crisis, but the fall under was greater than for other markets and resulted into the Russian market struggling to come to the previous heights, though the relative increase has been the same as for other markets.

## 6.5 Development of the Russian stock market adjusted for development in the World market

Figure 21 presents development of the Russian stock market adjusted for development in the World market.

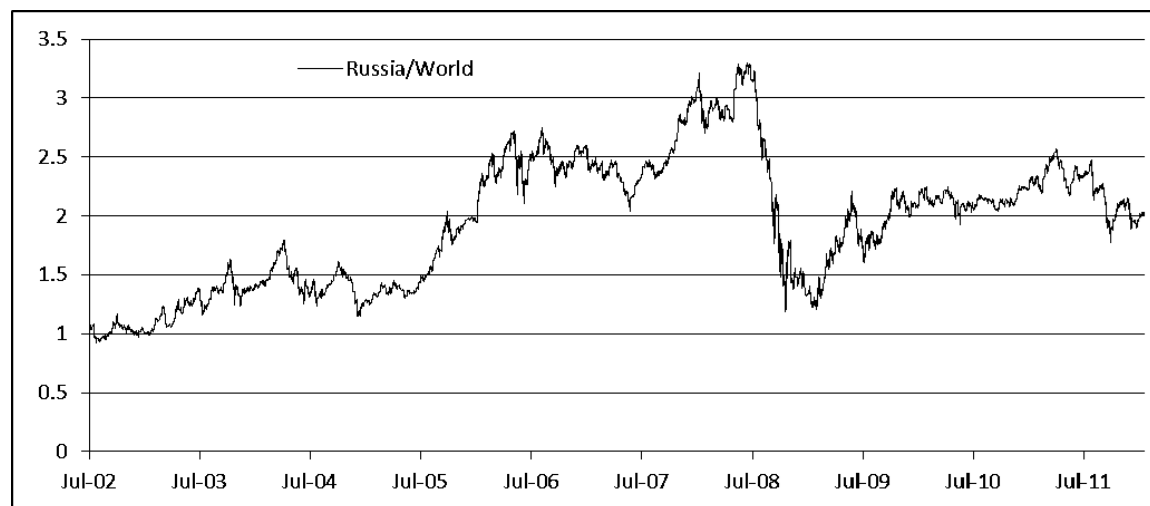


Figure 21 - MSCI Russia adjusted for MSCI World, daily observations, U.S. dollar terms, July 2002 – January 2012

Adjusted MSCI Russia starts at 1, rises almost till 1.8 in the beginning of 2004, falls to 1.15 at the end of the year, then rises again till almost 2.75 in late 2006, after decreasing till 2.05 it increases to highest point of 3.3 in July 2008, after that falls to 1.25 under the crisis, goes up to 2.2 in the mid-2009 and varies around this point till 2011, then rises to 2.5 in the first quarter of 2011, after mid 2011 it is mostly falling till the end of the period. This graph can be interpreted as the Russian stock market has grown faster than the World; right before the crises it has grown 3.3 times compared to the adjusted level it started at, though the fall under the crises was greater than for the World market as the adjusted Russian market reduces to almost original value. From 2009 the intense growth seen before the crisis continues till 2011, in which reaction on the negative financial news causes greater fall of the Russian market than the World. I also observe that even adjusted for the World market's development, the Russian stock market still shows some extreme down and up movements, though most of them are smoother than for non-adjusted MSCI Russia shown in Figure 18.

## 6.6 Discrete and logarithmic returns

Simple returns, or more precisely simple rate of return, are basically the percent change in market value of a certain asset over time. Discrete returns<sup>14</sup>, or more precisely simple rate of returns measured in discrete time, assume that market valuation takes place at certain points in time. Logarithmic returns<sup>15</sup> or more precisely simple rate of returns measured in continuous time, assume that market valuation can take place anytime and therefore that the market value of the asset grows "continuously" over time, and not in "discrete" steps. Logarithmic returns measures continuous compound returns. These returns are also known as one-period geometric returns, and it is common to assume that logarithmic returns are normal distributed (Steiner 2009).

The distinction between the discrete and logarithmic returns is important<sup>16</sup>, as the larger the swings in rates of return, the greater the discrepancy between them is (Bodie, Kane and Marcus 2009).

In order to predict future returns or changes in these returns over the different periods, it is common to use time-weighted average of the one-period returns. The arithmetic average<sup>17</sup> measures the average of a series of one-period returns, where each past return receives an equal weight in the process of averaging. This average return is further used for giving the estimate of future expected returns. (Bodie, Kane and Marcus 2009) With the purpose of predicting what returns the Russian stock market will provide in the next period I will use the arithmetic average return, which is calculated from discrete and logarithmic returns.

<sup>14</sup>  $r_{\text{msci russia}} = \left( \frac{\text{MSCI Russia}_t - \text{MSCI Russia}_{t-1}}{\text{MSCI Russia}_{t-1}} \right)$ , where  $\text{MSCI Russia}_t$  is an observed value of MSCI Russia in the period t, and  $\text{MSCI Russia}_{t-1}$  is an observed value in the previous period.

<sup>15</sup>  $r_{\text{msci russia}} = \ln \left( \frac{\text{MSCI Russia}_t}{\text{MSCI Russia}_{t-1}} \right)$ , where  $\text{MSCI Russia}_t$  is an observed value of MSCI Russia in the period t, and  $\text{MSCI Russia}_{t-1}$  is an observed value in the previous period.

<sup>16</sup> The relationship between them can be expressed as  $r^L = r^D - \frac{1}{2}\sigma^2$ , where  $r^D$  is a discrete return,  $r^L$  is a logarithmic return and  $\sigma^2$  is a stock variance.

<sup>17</sup>  $E(r_{\text{MSCI Russia}}) = \frac{1}{n} \sum_{\text{MSCI Russia}=1}^n r(\text{MSCI Russia})$ , where  $r(\text{MSCI Russia})$  is a return from the period t-1 to t, with total amount of periods equal of n.

## 6.7 Discrete and logarithmic returns in the Russian stock market vs. Emerging markets, other BRIC and World 2002-2012

Discrete returns	July 2002-January 2012			July 2002-May 2008			May 2008 - January 2012		
	r	Min	Max	r	Min	Max	r	Min	Max
World	**4.9%	-7.1%	9.5%	**9.6%	-3.6%	4.7%	-2.6%	-7.1%	9.5%
EM	**13.8%	-9.5%	10.6%	**23%	-5.8%	4.1%	-1.1%	-9.5%	10.6%
China	17.3%	-12.0%	15.1%	**27.4%	-10.2%	10.1%	1.1%	-12.0%	15.1%
Brazil	**27.5%	-16.7%	18.1%	**44.2%	-9.3%	14.1%	*0.4%	-16.7%	18.1%
India	19.5%	-11.3%	21.5%	30.6%	-11.3%	8.6%	*1.6%	-11.3%	21.5%
Russia	18.6%	-22.6%	27.1%	32.7%	-10.1%	11.4%	-4.1%	-22.6%	27.1%
Logarithmic returns	July 2002-January 2012			July 2002-May 2008			May 2008 - January 2012		
	r	Min	Max	r	Min	Max	r	Min	Max
World	**3.2%	-7.3%	9.1%	**8.7%	-3.7%	4.6%	** -5.6%	-7.3%	9.1%
EM	*11.3%	-10.0%	10.1%	**21.5%	-6.0%	4.1%	** -5.2%	-10.0%	10.1%
China	12.7%	-12.8%	14.0%	**23.8%	-10.8%	9.6%	** -5.3%	-12.8%	14.0%
Brazil	**20.1%	-18.3%	16.6%	**38.7%	-9.8%	13.2%	** -9.8%	-18.3%	16.6%
India	**15.2%	-12.0%	19.5%	27.5%	-12.0%	8.3%	** -4.8%	-12.0%	19.5%
Russia	10.5%	-25.6%	24.0%	28.1%	-10.6%	10.8%	-18.1%	-25.6%	24.0%

Table 10 - Daily logarithmic and discrete returns on MSCI World, EM, China, Brazil, India and Russia indices (measured in USD) annualized

Table 10 presents the annualized<sup>18</sup> logarithmic and discrete returns<sup>19</sup> on MSCI World, EM, China, Brazil, India and Russia indices with the maximal and minimal daily changes in these indices.

The whole period from July 2002 till 2012 gives us relatively high returns for all emerging markets: The Brazilian market is in the lead with its average discrete return of 27.5%, the next best is the Indian market with 19.5%, the third best return of 18.6% belongs to the Russian market, followed by Chinese with 17.3%, the average emerging market of 13.8% and the World market of 4.9%. So investment placed in the Russian stock market would have brought 380% better return than investment placed in the World stock market and 47% worse return than placed in the Brazilian stock market. The logarithmic returns shows us a quite different picture: Firstly the Brazilian stock market returns of 20.1% are almost twice as high as for the Russian one, secondly the ranking is unlike one for discrete returns as the Russian market comes out worst of the compared emerging markets. Test for significance shows that returns in the

<sup>18</sup>  $r_{\text{annualized}} = r_{\text{daily}} * 254$

<sup>19</sup> Null hypothesis: No difference between returns on MSCI Russia and other MSCI index:  $r_{\text{Russia}} - r_{\text{other index}} = 0$ . Alternative hypothesis: There is a difference:  $r_{\text{Russia}} - r_{\text{other index}} \neq 0$ . T-test =  $\frac{(r_{\text{Russia}} - r_{\text{other index}}) - 0}{SE((r_{\text{Russia}} - r_{\text{other index}}))}$  I compare the  $t_{\text{observed}}$  to the  $t_{\text{critical}}$  from a table of t distribution and reject the null hypothesis if  $t_{\text{observed}}$  is larger than  $t_{\text{critical}}$  I mark significant values at 1% significance level with \*\*, and at 5% significance level with \*.

Russian stock market are different from returns in the average emerging, World and Brazilian markets, also from Indian market if only continuous returns.

The period before the financial crisis points out the Brazilian stock market as a best performer with an annualized discrete return of 44.2%, the second place belongs to the Russian market with return of 32.7%, the third place goes to the Indian market with 30.6%, followed by the Chinese, the average emerging and World stock markets. As with the whole period the World stock market provide the worst return from 2002 to 2008. The investment placed in the Russian stock market would have brought 340% better return than the same amount placed in the World stock market, but also 35% lower return compared to investment into the Brazilian stock market. The logarithmic returns are not very different from the discrete in a way that ranking and relations between returns are approximately the same. The two worst daily returns for the period belongs to the Indian and Chinese markets, the two best to Brazilian and Russian markets. Test for significance shows that returns in the Russian market are different from all markets, except for Indian.

The period after and under the financial crisis changes the favorites: the best annualized discrete average return of 1.6% belongs to the Indian stock market, the second place has the Chinese market with 1.1%, and the third one has the Brazilian one with return of 0.4%. The average emerging market followed next, followed by the World market and lastly the Russian one. The last three have delivered negative returns of 1.1%, 2.6% and 4.1% respectively. If we continue with an example, the investment in the Russian stock market would have provided 57% worse return than the investment in the World stock market. The logarithmic returns points out the extreme negative return the Russian market has delivered compared to other countries, the Brazilian market shifts from the third place to the fifth with also quite a big negative return, and the last approximately the same negative returns for the World and average emerging and Chinese markets. The two best daily returns belong to the Russian and Indian markets, the two worst to the Russian and Brazilian markets. Results on the test for significance difference for logarithmic returns show that returns for the Russian and the other chosen markets are not equal. Discrete returns according to the same test are non-different from the other markets, except for Chinese and Indian markets.

### 6.8 Returns over the last 6, 12, 24, 36 and 60 months

	<i>Russia</i>		<i>World</i>	
	<i>Discrete</i>	<i>Logarithmic</i>	<i>Discrete</i>	<i>Logarithmic</i>
<i>Returns last 6 months</i>	-35.9%	-45.5%	-7.1%	-10.8%
<i>Returns last 12 months</i>	-10.6%	-16.8%	-3.2%	-5.5%
<i>Returns last 24 months</i>	5.2%	0.3%	6.7%	4.9%
<i>Returns last 36 months</i>	35.6%	27.7%	14.7%	12.7%
<i>Returns last 60 months</i>	4.0%	-7.2%	-1.3%	-3.8%

Table 11 - Annualized logarithmic and discrete daily returns on MSCI Russia and MSCI World for the last 6, 12, 24, 36 and 60 months (measured in USD)

Table 11 shows annualized logarithmic and discrete daily returns on MSCI Russia and MSCI World for the last 6, 12, 24, 36 and 60 months. The stock market was complicated by the troubled situation in the Europe and US the last 6 months, this fact influenced returns in the stock markets giving the discrete negative returns of 35.9% for the Russian market and 7.1% for the World market. Continuous return for Russia is almost 10% lower and 4% lower for the World. Average annual returns in the Russian stock market improves if we consider a longer period: the last 12 month period provides discrete negative return of just 10.6%, meaning that the first 6 months in this period has given an annual return of 14.7%. Compared to the discrete average return, logarithmic one is 6.2% less in absolute value. The same is observed with the World: negative returns are considerably better. The last two years the Russian stock market has delivered annual discrete return of 5.2%; this is just a few percent away from the World. The three-year-period shows significant improvement as annual discrete return is 35.6%: this increase is due to the active recovering year after the financial crisis. The logarithmic annual average return is 27.7%. Compared to the World, these results are quite good as average returns are more than double higher than for the World. The last 60 months includes the global financial crisis of 2008 and the stock market crash of 2011, so it's natural to assume that the average annual return is low. As we look at the returns on the Russian stock market, we can confirm our assumption as the annual average discrete return is 4% and logarithmic one is -7.2%. Both discrete and logarithmic returns on the World are negative, which is different from Russia. The reason why we have such a big spread between the discrete and logarithmic is a high volatility during this period, which I study closer in the next chapter about risk in the Russian stock market.

## 6.10 Conclusions

The comparison of the development of the Brazilian, Russian, Indian, Chinese and the average emerging stock markets from July 2002 to January 2012 showed that the Russian market had one of the leading positions before the financial crisis. Under financial crisis it fell relatively more than the other emerging markets, and currently struggles with achieving previous heights and positions.

The analysis of the Russian stock market adjusted for the development of the World stock market showed that Russia has developed more rapidly than the World, and tops and downs are also exaggerated compared to the World.

The comparison of the logarithmic and discrete returns on the emerging stock markets has shown that returns in the Russian market are different from the other chosen markets. Based on continuous returns, we can conclude that Russia provided lower returns than the Brazil, Indian, average emerging market, but cannot say the same about China during the whole period; during the growth Russia has delivered second best returns after Brazil, though there is uncertain whether returns on the Indian market are different from the Russian ones; during the time of financial instability Russia performed worst. Returns measured in discrete time has shown that Russia has delivered the second best returns after Brazil both during the whole period and before the crisis. There is no difference between Indian and Russian markets for both periods and between Russian and Chinese between the whole period. The latest period the average return on the Russian market has proven to be worse only than the Brazilian and Indian, we cannot find any significance difference between other returns.



## 7. Risk in the Russian stock market 2002-2012

### 7.1 Introduction

In this chapter I will describe the volatility in the Russian stock market, with focus on the total risk and the composition of risk, more precisely systematic and unsystematic risk. This chapter can be useful to an investor who considers investing in Russia and wonders what volatility the Russian market has and how different it is compared to other BRICs countries. I will start by describing the total risk. Monthly observations will be used for this purpose. Here I will also compare volatilities of the BRICs stock markets and the World stock market, and test if there is a difference between them. I will use monthly logarithmic returns to show the distribution of the stock market returns and compare it to the Gauss distribution. Further I will give possible explanations as to why the Russian stock market has been so volatile. The second part of this chapter is about the systematic and unsystematic risk. I present estimated parameters for daily, weekly and monthly frequency. I test for difference between them on the monthly basis. At the end of the chapter I will show the development of Russia's beta against the World. Hereby I will mention why the Russian stock market has such a high systematic risk.

### 7.2 Total risk

Table 12 shows the total risk<sup>20</sup> in the World, average emerging, Brazilian, Russian, Indian and Chinese markets presented by monthly logarithmic changes<sup>21</sup> in MSCI indices.

	<i>World</i>	<i>EM</i>	<i>China</i>	<i>Brazil</i>	<i>India</i>	<i>Russia</i>
<i>July 2002-January 2012</i>	17.3%**	25.2%**	29.1%**	36.7%	32.8%**	36.6%
<i>July 2002-May 2008</i>	11.5%**	18.8%**	27.1%	33.8%**	26.1%*	27.1%
<i>May 2008 - January 2012</i>	23.5%**	32.5%**	31.2%**	39.7%	39.6%	47.5%

Table 12 - Standard deviation of MSCI World, EM, Brazil, Russia, India and China, annualized, based on monthly logarithmic returns (measured in USD)

If we take the whole period in consideration, we observe that the Russian stock market has almost the same volatility as the Brazilian market: these two are also not different from each other at 5% significance level. The other emerging markets are less volatile; this also the case with the World. Test

<sup>20</sup> Null hypothesis: No difference in between standard deviation of MSCI Russia and other MSCI index.

Alternative hypothesis: There is a difference. I inspect the two sample standard deviations: one of them is larger than the other.

I make a fraction by putting the larger variance (squared standard deviation) over the smaller one.  $F_{observed} = \frac{\text{Larger variance}}{\text{Smaller variance}}$

I compare the  $F_{observed}$  to the  $F_{critical}$  from a table of F statistics and reject the null hypothesis if the  $F_{observed}$  is larger than the  $F_{critical}$ . I mark significant values at 1% significance level with \*\*, and at 5% significance level with \*.

<sup>21</sup>  $\text{Std.dev}_{annualized} = \text{Std.dev}_{monthly} * \sqrt{12}$

for significance confirms observed results. The Indian market though is quite close to the volatility of the Russian.

During the period before the financial crisis the Brazilian market stands out from the rest with the significantly different volatility of 33.8%; the second highest volatility of 27% have the Russian and Chinese markets; India follows with just one percent lower volatility. There is no evidence of these markets being different from each other. Returns on the average emerging market and the World are much lower as during the whole period.

The period under and after the crisis points out Russia having the highest volatility of 47.5%, Brazil and India follow with the total risk of around 40%. Though based on result of significance test we cannot say that the Russian market has had higher volatility than Brazilian and Indian market in this period. The Chinese and average emerging market have significantly lower volatility of approximately 32%. The World has been twice less volatile than the Russian one.

### 7.3 Distribution of the stock market returns

The total risk the Russian stock market presented in the previous section assumes normal distribution, so do the average returns discussed in the previous chapter. Normal distribution has skewness and excess kurtosis of 0. To find out whether returns are normally distributed and if not what implications it provides, I plot monthly logarithmic returns on the Russian stock market for the whole period, here I also use normal distribution as reference. Descriptive statistics presented in Table 22 will support further discussion.

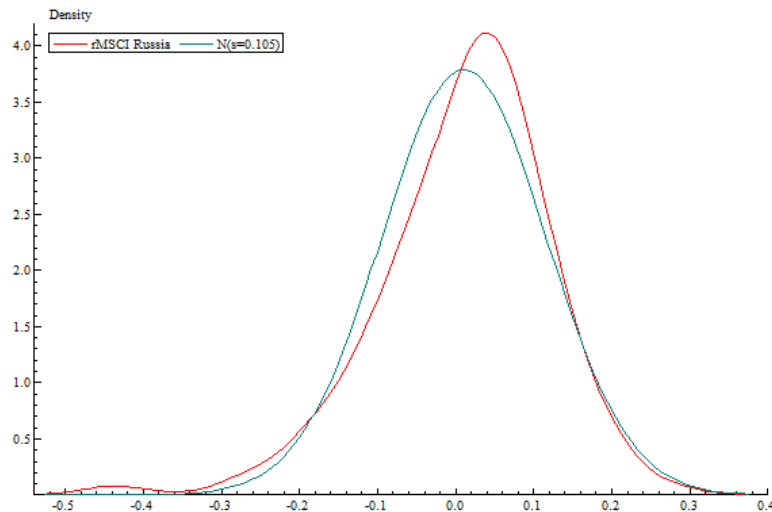


Figure 22 - Distribution of MSCI Russia returns, based on logarithmic monthly dollar returns, July 2002- January 2012

<i>r</i>	<i>Total risk</i>	<i>Skewness</i>	<i>Excess kurtosis</i>
12.9%	36.6%	-0.91	2.29

Table 13 - Descriptive statistics for MSCI Russia, based on logarithmic monthly dollar returns, July 2002- January 2012

Figure 22 shows that the major number of returns lying over the mean of normal distribution, and can be interpreted as the Russian stock market having averagely more positive returns than the normal distribution suggests, Table 13 confirms that with an annualized average return of 12.9%. Skewness equal to -0.91 verifies this slight rightward tendency, but also implies that there is a bigger chance of negative returns than normal distribution implies as the left tail is a bit thicker. The distribution of returns on the Russian market shows clear signs of the fat left tail and peaked top compared to normal distribution, which means more returns lies around the mean and a probability of extreme negative returns is higher. This is confirmed by excess kurtosis equal 2.29, which is considered a bit high.

#### 7.4 Possible reasons for high volatility

As presented in the section 7.2, Russia has one of the highest volatilities compared to the other emerging markets. There are many possible reasons for Russian volatility being so high. I will name those that have had the greatest effect on the volatility of Russian stock market or are distinctive factors for the Russian market.

The first reason is the composition of the Russian stock market: It is dominated by highly cyclical commodity producers, and as result prices on commodities, especially energy commodities, have a great impact on the stock prices of commodity-companies, such as Gazprom, Lukoil, Novatek and Rosneft.

The second reason is the high sensitivity to the situation in the World stock market and external news. Because there are many foreign investors, whose earnings are depended on macroeconomic factors, such as increase in domestic interest rate, depreciation of dollar and strict monetary policy.

The third reason is fact that the Russian stock market, known to be very volatile, attracts many speculators. Though traders contribute to increased liquidity, they also enhance the existing volatility. Recently there has been development of exchange-traded funds (ETF), which made access to the market much easier. But ETF also made the market's exit less complicated as middle man is no longer required. This fact attracts even more short-term traders; in fact 80% of new money inflows lately have gone via ETF. The downside is that these inflows are short-term investments, and became quickly outflows as when the bad news comes.

A fourth reason that has been put forward is the limited liquidity. Though there are around 300 stocks locally and abroad, only a few of them are actively traded. The Russian stock market is dominated with the short-term investors and lacks a number of local investing institutions. In the developed countries these institutions are typically pension funds and insurance companies. These institutions are currently under development. Home, contents, health and life insurance are quite new phenomenon in Russia, but on their way up as the middle class and life standards are both rapidly increasing. Private pension funds are increasing with 20% annually as many see a greater need for this given the population composition and a good chance of decreasing minimum pension guarantees for the private sector in the future. This rapid growth is currently stimulated by employers which include pension benefits in salary packages. Individual pension savings are not that common.

The fifth reason is the political risk. The stock market is very sensitive to the mood in the political environment, especially after the Khodorkovsky case. Fear of prosecution can for example send the stock market 10% down as described in the chapter 6.

The sixth reason is the rapid growth of the market. The Russian stock market can grow extremely fast, emptying investors' money reserves and changing their growth expectations, as result the stock market faces a downside correction, which can be caused both by external and internal news.

The seventh reason is the weak corporate governance and the lack of transparency. The stock market reacts substantially when information around these is revealed. In addition the appearance frequency of such information is higher than for the developed markets.

### **7.5 Systematic and unsystematic risk in the Russian stock market**

In the first part of this chapter the total risk in the Russian stock market, compared to the other emerging markets, was discussed. This part of the chapter will be focusing on the composition of that risk and changes in that composition.

Due to the rapid structural changes in the world economy, increased global trade introduction of new financial trading and information handling techniques, formation of regional economic groups, increased need for foreign investments, and globalization, Russia is in a process of integration and liberalization. That is why the risk in the Russian stock market consists not only of the unique risk, but also of the systematic risk. Beside these two, currency risk can have very important implications for the portfolio

management, the cost of the capital of a firm, asset pricing as well as currency hedging strategies (Saleem and Vaihekoski 2008). But in this paper I chose not to examine the currency risk.

I use OLS-regression to estimate the unknown parameters in the capital asset pricing model (CAPM).

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \varepsilon_{j,t}$$

where  $R_{j,t}$  is the average return on the asset  $j$  in the period  $t$ ,  $\beta_j$  is the asset  $j$  beta on the market,  $R_{m,t}$  is the average return on the market in the period  $t$ ,  $\varepsilon_{j,t}$  is an error term

I further calculate unsystematic risk using formula:

$$\sigma_j = \beta_j \sigma_m + \sigma_{\varepsilon_j}$$

where  $\sigma_j$  is assets total risk,  $\beta_j \sigma_m$  is asset's systematic risk,  $\sigma$  is asset's unique risk. (Bøhren 1997)

These parameters will be estimated from daily, weekly and monthly logarithmic returns. The question is what appropriate and regular intervals for price observations should be. When an investor considers historical volatility in estimating expected volatility, he/she should use intervals that are appropriate, based on the facts and circumstances, and which provide the basis for a reasonable fair value estimate. (Financial Accounting Standards Board 1995) For example, an investor who considers a publicly traded entity would likely use daily price observations, while if he/she considers a nonpublic entity with shares that occasionally change hands at negotiated prices, he/she might use monthly price observations. (Radford 2010)

Summarized what observation frequency investors should use depends on what kind of stocks he/she chooses to invest in. Generally the weekly and monthly observations contain less "noise" or disturbances/disruptions than the daily ones and can be a good reference point for the risk and its development. This can be particularly relevant for the Russian stock market, which can be very volatile on the daily basis.

Theoretically, with a reasonable sample size, daily, weekly, and monthly volatility calculations should converge to the same levels. Even though it is observed that the general trend for daily volatility is greater than the weekly and *monthly ones*, there are exceptions to this simplifying rule (Radford 2010).

	Total risk	$\beta$	R Square	Unsystematic risk
<i>July 2002-January 2012</i>				
EM	22.0%	0.84	50%	6.5%
China	30.5%	0.69	17%	17.8%
Brazil	38.3%	1.47	50%	11.3%
India	29.5%	0.65	17%	17.5%
Russia	40.5%	1.23	31%	17.8%
<i>July 2002-May 2008</i>				
EM	16.9%	0.74	33%	7.1%
China	26.7%	0.60	9%	18.7%
Brazil	33.3%	1.38	30%	15.0%
India	24.9%	0.49	7%	18.4%
Russia	30.2%	0.79	12%	19.7%
<i>June 2008 - January 2012</i>				
EM	28.4%	0.89	59.8%	6.4%
China	35.9%	0.73	24.9%	18.0%
Brazil	45.3%	1.5	67.1%	8.2%
India	35.7%	0.73	25.3%	17.7%
Russia	53.1%	1.44	44.5%	17.7%

Table 14 - Beta, total and unsystematic risk and  $R^2$  for MSCI EM, China, Brazil, India and Russia, based on daily logarithmic U.S. dollar returns, annualized, for the different periods 2002-2012

Table 14 shows global market  $\beta$ s, total and unsystematic risks<sup>22</sup> for the average emerging, Chinese, Brazilian, Indian and Russian stock markets for the three periods, based on daily logarithmic returns. Beside Brazil, Russia has the highest sensitivity to the changes in the World stock market during the whole period: the Chinese and Indian markets are almost half as sensitive, and the average emerging market is 46% less sensitive. During the period from July 2002 to January 2012 changes in the global market induced 50% of changes in the average emerging market and Brazilian markets, 31% in the Russian market, and 17% in the Indian and Chinese markets. The Russian, Chinese and Indian stock markets have the highest unsystematic risk: Though the share of unsystematic risk is greatest for China. Compared to these markets the Brazilian one has much lower unsystematic risk in the whole period, only 11.2%. The average emerging market has the lowest unsystematic risk of 11.2% during the considered period.

World market sensitivity increased for all countries from the period before to the period under and after the crisis, but changes in percent varied among countries: China's market sensitivity increased from 0.6 with 22%, Brazilian from 1.38 with 9%, Indian from 0.49 with 49%, all emerging markets from 0.74 with 20% Russian from 0.7 with 82%. This can be interpreted as the Russian stock market has become more sensitive to the changes in the World stock market than the other emerging markets. This is in addition

<sup>22</sup>  $\text{Std. dev}_{\text{annualized}} = \text{Std. dev}_{\text{daily}} * \sqrt{254}$

to being quite sensitive in the period before the crisis. This could be a great impact of the crisis or/and generally progress on the integration process.

As it is observed with markets sensitivity, the share of changes explained by the World stock market has grown for all markets. The greatest increases are for the Russian and Indian markets from 12% to 44.5% and from 7% to 25% respectively, which is an increase of more than 3.5 times than in the period before. The least relative increases belong to the average emerging and the Brazilian markets from 33% to 60% from 30% to 67% accordingly, though the absolute percent increase for Brazilian market is greater than for the Russian one.

Figure 15 presents global market  $\beta$ s, total and unsystematic risks<sup>23</sup> for the average emerging, Chinese, Brazilian, Indian and Russian stock markets for the three periods, based on weekly logarithmic returns.

	Total risk	$\beta$	R Square	Unsystematic risk
<i>July 2002-January 2012</i>				
EM	25.5%	1.10	72%	3.8%
China	30.2%	0.99	41%	10.8%
Brazil	41.3%	1.62	60%	9.3%
India	29.8%	0.97	41%	10.8%
Russia	41.6%	1.35	41%	15.0%
<i>July 2002-May 2008</i>				
EM	19.1%	1.09	57%	4.6%
China	27.8%	1.05	25%	13.9%
Brazil	36.0%	1.72	40%	13.1%
India	24.6%	0.91	24%	12.5%
Russia	29.8%	0.94	17%	17.3%
<i>June 2008 - January 2012</i>				
EM	33.3%	1.11	79.9%	3.5%
China	33.7%	0.96	58.6%	7.9%
Brazil	48.4%	1.58	77.2%	5.9%
India	36.6%	0.99	52.7%	10.0%
Russia	55.4%	1.5	53.8%	14.8%

Table 15 - Beta, total and unsystematic risks and  $R^2$  for MSCI EM, China, Brazil, India and Russia, based on weekly logarithmic returns (measured in USD), annualized

The first thing one notice is higher betas and R square compared to the daily observations. Almost all parameters have increased, but proportions between them are approximately the same.

The Russian market's beta against the World for the whole period is 1.35; for the first period 0.94; and for the second to period 1.5. This confirms that the Russian stock market's sensitivity to the changes in the World increased during the considered period. The same is with R Square: The changes in the World

<sup>23</sup>  $\text{Std.dev}_{\text{annualized}} = \text{Std.dev}_{\text{weekly}} * \sqrt{52}$

stock market explain a greater share of changes in the emerging stock markets, including the Russian one, from the period before the crisis to the period after the crisis.

Calculations done with weekly observation gives us lower unsystematic risk. Though unsystematic risk in the Russian stock market has the highest unique risk among the other chosen emerging markets, which is different from the calculations based on daily observations.

Table 16 presents global market  $\beta$ s<sup>24</sup>, total and unsystematic risks<sup>25</sup> for the average emerging, Chinese, Brazilian, Indian and Russian stock markets for the three periods, based on annualized<sup>26</sup> monthly logarithmic returns.

	Total risk	$\beta$	R Square	Unsystematic risk
<i>July 2002 - January 2012</i>				
EM	25.2%	1.31	81%	2.5%
China	29.1%	1.22	52%	8.1%
Brazil	36.7%	1.65	60%	8.2%
India	32.8%	1.35	51%	9.4%
Russia	36.6%	1.52	51%	10.4%
<i>July 2002 - May 2008</i>				
EM	18.8%	1.35	69%	3.2%
China	27.1%	1.48	40%	10.0%
Brazil	33.8%	2.06	49%	10.0%
India	26.1%	1.21	29%	12.1%
Russia	27.1%	1.01	18%	15.5%
<i>June 2008 - January 2012</i>				
EM	32.5%	1.29	86.4%	2.3%
China	31.2%	1.08	66.4%	5.8%
Brazil	39.7%	1.47	75.6%	5.2%
India	39.6%	1.34	63.1%	8.1%
Russia	47.5%	1.71	71.2%	7.4%

Table 16 - Beta, total and unsystematic risk and R<sup>2</sup> for MSCI EM, China, Brazil, India and Russia, based on monthly logarithmic returns (measured in USD) annualized

Monthly observations give even higher betas and R square. All betas are higher than 1. Russia's beta for the whole period is 1.52, 1.01 and 1.71 for the first and second periods respectively. It is worth noticing that beta of 1.71 for the Russian market for the period under and after the crisis is bigger than beta of

<sup>24</sup>Null hypothesis: No difference in between betas of MSCI Russia and other MSCI index:  $\beta_{\text{Russia}} - \beta_{\text{others}} = 0$ . Alternative hypothesis: There is a difference:  $\beta_{\text{Russia}} - \beta_{\text{others}} \neq 0$ . T-test =  $\frac{(\beta_{\text{Russia}} - \beta_{\text{others}}) - 0}{SE((\beta_{\text{Russia}} - \beta_{\text{others}}))}$  I compare the  $t_{\text{observed}}$  to the  $t_{\text{critical}}$  from a table of t distribution and reject the null hypothesis if  $t_{\text{observed}}$  is larger than  $t_{\text{critical}}$  I mark significant values at 1% significance level with \*\*, and at 5% significance level with \*.

<sup>25</sup>Null hypothesis: No difference in between unsystematic risks of MSCI Russia and other MSCI index. Alternative hypothesis: There is a difference. I inspect the two samples of unsystematic risk: one of them is larger than the other. I make a fraction by putting the larger variance (squared unsystematic risk) over the smaller one.  $F_{\text{observed}} = \frac{\text{Larger variance}}{\text{Smaller variance}}$  I compare the  $F_{\text{observed}}$  to the  $F_{\text{critical}}$  from a table of F statistics and reject the null hypothesis if the F observed is larger than the F critical. I mark significant values at 1% significance level with \*\*, and at 5% significance level with \*.

<sup>26</sup>Std.dev<sup>annualized</sup> = Std.dev<sup>monthly</sup> \*  $\sqrt{12}$



1.47 for the Brazilian one, but as Table 17 shows these two are not significantly different from each other. During this period Russia's beta is different only from the Chinese and average emerging ones of 1.08 and 1.29. During the period before the crisis Russian sensitivity to the World is the lowest one and twice as low as the Brazilian of 2.05. Russia's sensitivity to the World cannot be said to be different from the other emerging markets, except the Brazilian, during this period according to results in Table 17. The period as a whole shows no significant difference between Russia's beta and other emerging markets' betas.

<i>July 2002 - January 2012</i>					
EM	-				
China	0	-			
Brazil	x	x	-		
India	0	0	0	-	
Russia	0	0	0	0	-
<i>July 2002-May 2008</i>					
EM	-				
China	0	-			
Brazil	x	0	-		
India	0	0	x	-	
Russia	0	0	xx	0	-
<i>June 2008 - January 2012</i>					
EM	-				
China	0	-			
Brazil	0	0	-		
India	0	0	0	-	
Russia	x	xx	0	0	-

Table 17 - Results of t-test for significant difference between betas of MSCI EM, China, Brazil, India and Russia, based on monthly logarithmic returns (measured in USD), annualized

Moving further to the unsystematic risk in the chosen markets, we observe the same dynamics as with daily and weekly observation: The unique risk, based on more seldom frequency returns, is lower. Another observation about the reduction of unique risk from the period before the crisis to the period under and after the crisis is confirmed by monthly frequency. Russia has the highest unsystematic risk of 10.4% during the whole period. This is confirmed by the F-test results in Table 18, the only exception is India's unique risk which cannot be claimed to be different from Russia's. The period before the crisis ranks Russia as having the highest country-specific risk of 15.5%, this five times bigger than for the average emerging market and 1.5 times for the Brazilian and Chinese. Results for significance testing confirm the observation of the highest unique risk in the Russian market during this period.

July 2002 - January 2012	EM	China	Brazil	India	Russia
EM	-				
China	xx	-			
Brazil	xx	0	-		
India	xx	x	0	-	
Russia	xx	xx	xx	0	-
July 2002-May 2008	EM	China	Brazil	India	Russia
EM	-				
China	xx	-			
Brazil	xx	0	-		
India	xx	xx	0	-	
Russia	xx	x	xx	x	-
June 2008 - January 2012	EM	China	Brazil	India	Russia
EM	-				
China	xx	-			
Brazil	xx	0	-		
India	xx	x	xx	-	
Russia	xx	x	xx	0	-

Table 18 – F-test for significant difference between unsystematic risk of MSCI EM, China, Brazil, India and Russia, based on monthly logarithmic returns (measured in USD), annualized. The under-crisis-period shows that that Indian has the highest unique risk, followed by the Russian market, though no significance evidence is found of that. Although based on F-test results we can say that the unsystematic risk in the Russian stock market has been higher than in the Brazilian, Chinese and average emerging markets from June 2002 to January 2012. R2, or share of systematic risk, is the lowest during the first period and neither low nor high during the second, which indicates that Russia’s share of unsystematic risk has reduced from the first to the second period comparably to the other markets.

### 7.3 Development of the Russia’s systematic risk

Recursive estimation in the OxMetrics<sup>27</sup> is used to find the approximate beta against the World stock market for the considered period.

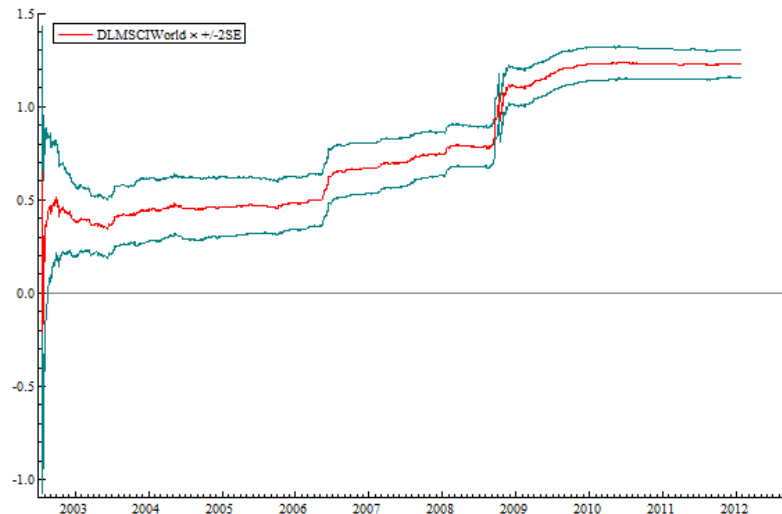


Figure 23 - Development of MSCI Russia’s  $\beta$  against MSCI World, estimated from daily logarithmic dollar returns, July 2002- January 2012

<sup>27</sup> OxMetrics is the software package that provides an integrated solution for the econometric analysis of time series, forecasting, and financial econometric modeling and for the statistical analysis of cross-section and panel data.

Figure 23 presents estimated beta within a 95% confidence interval and shows how beta develops during July 2002- January 2012: Beta has a clear upcoming trend with two noticeable jumps medio 2006 and at the end of 2008. Beta stays relatively stable at 0.5 until the 2006-jump, after which it develops from 0.65 to 0.79 until the 2008-jump, it increases further from 1.13 to 1.23. This can be interpreted as when the World stock market increases with 1% at the beginning of the considered period, the Russian stock market increases with 0.5% ceteris paribus, and at the end of the considered period the same movement in the World market would lead to 1.23% increase in the Russian stock market ceteris paribus. This “passive” beta of 0.5 could be used during the unstable situation in the World stock market, as downside in the Russian stock market wouldn’t be as tough as for the World one. The “aggressive” beta of 1.23 can be used during the “bullish” marked, as upcoming trend in the Russian stock market will be much stronger than in the World one.

The question is what caused these jumps in the beta against the World stock market. As liquidity of the Russian stocks increased, as more companies were listed on the stock exchange, as the Russia’s credit rating were upgraded, and foreign investors got better opportunities to invest in the Russian stocks, the Russia’s sensitivity to the changes in the World stock market has increased significantly. It explains the jump medio 2006 and also the upwarding trend after. It can also be mentioned that the Russian private and state-owned companies were expanding abroad extensively, often buying stakes in foreign companies. The top 25 Russian companies held 59 billion U.S. dollars in assets abroad, which made Russia the third largest investor among emerging markets in 2006 in terms of foreign direct investment (FDI) outflows, and the second largest in terms of outward FDI stock (Åslund, Guriev and Kuchins 2010). The jump at the end of 2008 can be explained by high correlation between all worlds stocks, as all of them went down during the financial crisis. The reason why market’s sensitivity was so high is that many foreign and domestic investors were withdrawing their investments as the situation on the World stock market was worsening, fearing the crack of the Russian stock market: This stimulated an even sharper decline in share prices and resulted in capital outflow of 131 billion U.S. dollars in the fourth quarter of 2008 alone.

The Russian stock market has retained high sensitivity after the financial crisis as stocks all over the World recovered from the fall. Development of ETF usage can be pointed out as one of the reasons to high sensitivity after the crisis as both good and bad news in the World stock market has been followed up actively by the Russian market.

## 7.4 Conclusions

In this chapter I have studied the total risk and the composition of risk for BRIC's and the average emerging markets, and distributions of returns on the Russian market. The Russian and Brazilian stock market are averagely more volatile than the other emerging markets, and we find no proof for difference of their volatilities. Russia is more volatile than the India, China and average emerging market during the whole period. This is similar for the separate periods, except for volatilities of the Russian and Chinese markets are non-different during the growth period; and the Indian and Russian markets during the under-crisis-period.

We observe the tendency of increasing systematic risk and  $R^2$ , and decreasing unsystematic risk with reducing observation frequency.

Estimated betas against the World for the Russian stock market are the highest after Brazil's, but I find no evidence of difference between betas for the chosen countries and Russia on the basis of monthly observations. During the growth period Russia has the lowest beta among BRIC and average emerging market, though no significance proof for difference is found except for Brazil. The period under the crisis points out Russia as having the highest sensitivity to changes in the World, or at least higher than the Chinese and average emerging markets according to test for significance. Summarized I cannot conclude Russia's sensitivity to the World is different from other BRIC and emerging markets, though there are some exception as I pointed out above.

After studying the unsystematic I conclude that Russia has one of the highest unique risks, though it can be directly related to the fact that Russia has higher total risk.  $R^2$ , or share of systematic risk, is the lowest during the first period and neither low nor high during the second. This indicates that Russia's share of unsystematic risk has reduced from the first to the second period comparably to the other markets.

Results also points on that Russia has become more sensitive to the changes in the World and exaggerates both positive and negative trends. Russia-specific risk has declined more during the considered period than for other emerging markets, though the total risk hasn't. Summurizing trends in development of correlation,  $R^2$  and beta, it can be concluded that the Russian stock market is no longer an outsider, but moves in the same direction as the Global stock market.

## **8. Risk-adjusted returns in the Russian stock market vs Emerging markets, other BRICs and the World**

### **8.1 Introduction**

In this chapter I will compare risk-adjusted performance of the Russian stock market in relations to the World, average emerging, Brazilian, Chinese and Indian stock markets through the period 2002-2012. I will evaluate the performance development of these markets over time. This chapter can be of interest to investors who seek diversifying their portfolios into the foreign markets, and consider gaining exposure to equity investments in the Russian stock market. It can also be interesting for those who wonder whether it is possible to earn abnormal returns in the BRICs markets. I will start by describing the investment climate of the emerging markets investors operate in. Further I will evaluate and compare the stock markets using two different methods, Sharpe ratio and M2, to characterize the performance. These methods will be presented in advance. After that I examine the performance development of the World and BRICs markets using 24 month forward rolling Sharpe ratios.

### **8.2 Investment environment in the emerging markets**

When investing into the foreign markets, the investor exposures to the different type of risks:

- Currency risk. Foreign stocks are denominated and traded in the foreign currency. The dollar-denominated returns are thus subject to the additional fluctuation; the foreign currency-U.S. dollar exchanges rates (Tkac 2001).
- Legal and regulatory risk: The differences between laws and regulations and their enforcement on governing accounting standards, protection of shareholders, insider trading and corporate governance affect actual returns on stocks (Tkac 2001).
- Political/country risk can be defined as the risk of government expropriation of assets, political management of the economy, the outlook of inflation, the country's economic growth potential etc. (Tkac 2001)
- Settlement risk and trading costs: Settlement of trades is much less certain: the delay and failure after execution is typically 15-20 percent (Keegan 1999). Delayed and failed executions are the largest contributors to trading costs, estimated to 0.5-1% (Plexus group 2000).

As these risks vary significantly across the emerging markets, one might expect to see this variability reflected in the return performance.

### 8.3 Performance measures, Sharpe ratio and M<sup>2</sup>

This paper evaluates and compares the initial performance of the countries stock markets using two methods, the Sharpe ratio and M<sup>2</sup>, Modigliani and Modigliani measure.

The Sharpe ratio, computes as  $\frac{R_i - R_{rf}}{\sigma_{(R_i - R_{rf})}}$  where  $R_i$  is the average return on an asset,  $R_{rf}$  is the average risk-free return,  $\sigma_{(R_i - R_{rf})}$  is the standard deviation of the average excess return on an asset.

The Sharpe ratio is scale-free reward-to volatility ratio, which answers the question: How much additional average return per unit of volatility does this investment provide? The ratio analyses returns in excess of a benchmark, usually the risk-free rate (Tkac 2001). A rising return differential or a falling standard deviation leads to a rise in the Sharpe ratio; conversely, a falling return differential or a rising standard deviation leads to a fall in the Sharpe ratio (Dowd 2000). Therefore if someone decides on investments before the event, he/she would choose the investment with the highest ex ante Sharpe ratio; if someone tries to evaluate traders after the event, he/she would give higher marks to the trader with the highest ex post Sharpe-ratio (Sharpe 1994).

The challenge is to compare and interpret Sharpe-ratios as it is the scale-free measure and the volatility level of assets can be quite different, though Sharpe-ratios are the same. The Sharpe ratio is also difficult to interpret when it is negative, and as a result it is difficult to compare investments.

Modigliani and Modigliani proposed an alternative measure of risk-adjusted performance, M<sup>2</sup> measure, which derived from the Sharpe ratio. The basic idea underlying M<sup>2</sup> is to use the market's trade-off between risk and return, to adjust all portfolios to the level of risk in the market benchmark, thereby matching a portfolio's risk to that of the market, and then measuring the returns of this risk-matched portfolio (Modigliani and Modigliani 2005).

M<sup>2</sup> measure, expressed as  $(R_i - R_{rf}) * \frac{\sigma_m}{\sigma_i} - (R_m - R_{rf})$  where  $R_i$  is the average return on the asset,  $R_{rf}$  is the average risk-free return,  $R_m$  is the average market's return,  $\sigma_i$  is the standard deviation of the asset and  $\sigma_m$  is the standard deviation of the benchmark.

In this paper M<sup>2</sup> measures the returns on the MSCI Index, adjusted for the standard deviation of the MSCI Index, relative to the benchmark, MSCI World. The Sharpe-ratio measures how much the additional average return per unit of volatility the MSCI Index provides.

Sharpe-ratio may lead to spurious investment rankings when excess returns become negative. In that case, the investment with the higher ratio (or less negative) is not always the best one (Samuelsen 2005). In order to correct this anomaly, Sharpe ratios must be modified in the following way. I use Samuelsen's method (2005) and introduce an exponent to the denominator. This exponent is made up of the excess return divided by its absolute value. The ratios will be unchanged, when excess return is positive, when it is negative, it causes a consequent modification in the result (Samuelsen 2005). The adjusted Sharpe-

ratio will then be  $\frac{R_i - R_{rf}}{\sigma_{(R_i - R_{rf})}^{\frac{R_i - R_{rf}}{|R_i - R_{rf}|}}}$  where  $R_i - R_{rf}$  is the average excess return on the investment, and

$\sigma_{(R_i - R_{rf})}$  is the standard deviation of the average excess return.

Both the Sharpe ratio and  $M^2$  require the use of a benchmark. The traditional benchmark is the risk-free rate, measured as the monthly interest rate on three month U.S. Treasury bills. I choose three month U.S. Treasury bills because I operate in U.S. dollars and this study takes the perspective of the international investors whose alternative investment can be a risk-free Treasury bill.

#### 8.4 Comparison of the Sharpe ratios and $M^2$ for MSCI Russia, World, EM, China, Brazil and India

Table 19 presents Sharpe ratios and  $M^2$  for Russia, World, EM, China, Brazil and India for the three periods presented by monthly logarithmical returns (annualized). Significant values at 1% significance level are marked with \*\*, and at 5% significance level with \*<sup>28 29</sup>.

	July 2002 - January 2012		July 2002 - May 2008		June 2008 - January 2012	
	Sharpe	M2	Sharpe	M2	Sharpe	M2
World	0.11		0.63		-0.02	
EM	0.43	5.4%	1.12	5.6%	-0.02	2.5%
China	0.40	5.0%	0.84	*2.4%	-0.02	2.0%
Brazil	0.60	**8.3%	1.25	7.1%	-0.04	0.1%
India	0.46	*5.9%	1.05	4.8%	-0.02	*3.6%
Russia	0.29	3.0%	1.07	5.0%	-0.09	-2.6%

Table 19 - Sharpe-ratios and  $M^2$  for MSCI World, EM, Brazil, Russia, India and China, monthly frequency, annualized<sup>1</sup>

<sup>28</sup>As all  $M^2$  are adjusted to the same volatility, the volatility of the World, I use t-test for differences between returns, where standard error is SE(MSCI World).

Null hypothesis: H0: Risk-adjusted returns are not different,  $M^2_{MSCI\ Russia} = M^2_{MSCI\ index}$  or  $M^2_{MSCI\ Russia} - M^2_{MSCI\ index} = 0$

Alternative hypothesis: H1: Risk-adjusted returns are different,  $M^2_{MSCI\ Russia} \neq M^2_{MSCI\ index}$  or  $M^2_{MSCI\ Russia} - M^2_{MSCI\ index} \neq 0$

I do  $-test = \frac{M^2_{MSCI\ Russia} - M^2_{MSCI\ index}}{SE(r_{MSCI\ World})}$ , compare the  $t_{observed}$  to the  $t_{critical}$  from a table of T distribution and reject H0, if the

$t_{observed}$  is larger than the  $t_{critical}$ .

<sup>29</sup> I test whether two Sharpe Ratios are different from each other using Jobson and Korkie(1981) method. See Appendix 2 for more detailed information.

Results in Table 19 shows whether high returns on the emerging market are due to the great potential or a result of excess risk.

During the whole period MSCI Brazil has the highest Sharpe-ratio of 0.6. It is followed by MSCI India, EM and India: all three are in the range of 0.4-0.46. MSCI Russia's Sharpe ratio is 0.29. The lowest one is MSCI World's. It can be interpreted as in the whole period the Russian stock market had the lowest additional average return per unit of volatility among the other BRIC countries. At the same the Russian stock market has provided higher returns per unit of risk than the World stock market. T-test shows no significant difference between Sharpe ratios at 5% level. This is also confirmed by  $M^2$  measure, which measures returns in addition to the benchmark, returns of the World stock market: MSCI Russia has  $M^2$  of 3.03%. MSCI Brazil has the highest equal of 8.3% and significantly different from MSCI Russia's. MSCI India has the second best  $M^2$  equal to 5.9% and significantly different from MSCI Russia within 95% confidence interval. The Chinese and average emerging markets have also higher  $M^2$ , though not significantly different from  $M^2$  of MSCI Russia at 1% level. These results as Sharpe ratios indicate that the Russian stock market performed less well than other BRIC countries' during the whole period.

As mentioned before the considered period consists of two different periods: the period before the financial crisis, which can be described as providing stability and facilitating growth; the period after the crisis, which was dominated by the financial crisis and burdened by the insecurity in the World the second half of 2011. That is why it is interesting to know how the different emerging markets have behaved during these periods.

The period before the crisis presents the following results: MSCI Brazil have the highest Sharpe ratio of 1.25, the second best Sharpe ratio among BRIC countries has the Russian stock market equal to 1.07. The average stock market has 5 basis points higher Sharpe ratio than MSCI Russia. The average stock market is quite expected to have high Sharpe ratio as it generally has lower volatility because of diversification effect. The third best Sharpe ratio has MSCI India, just 2 basis points lower than MSCI Russia. The lowest Sharpe ratio belongs to MSCI China besides MSCI World. Though test for significance shows no difference between these Sharpe ratios at 5% level.  $M^2$  measures show quite the same picture: MSCI Brazil has the highest return of 7.1%, followed by MSCI Russia of 5%, MSCI India of 4.8% and with MSCI China of 2.4% at the bottom. Test for significance shows no difference between the first three at 1% level, MSCI China is significantly different from MSCI Russia at 5% level. The interpretation of these results is as follows: After adjusting the stock markets' excess returns to the World market's volatility



level, the Brazilian market performed best, the Russian delivers next best among the BRIC countries. We can only speculate whether the Russian market's risk-adjusted returns are better than the Indian or worse than Brazilian or average emerging markets as there is no significance proof to this hypothesis. We can say with less than 5% inaccuracy that the Chinese market has lower returns than the Russian one. The Russian stock market has delivered better additional returns per unit of volatility than the World stock market, almost 70% higher if we compare Sharpe ratios and 5% higher returns given the same volatility. It should be also pointed out that during the times of stability and prosper in the World the Russian stock market delivers very good results despite the high volatility.

During the period under and after the financial crisis the results are rather different: all Sharpe-ratios and non-risk adjusted returns are negative. This fact introduces to some interpreting challenges. The first one is calculation of Sharpe ratios, for that purpose I used adjusted Sharpe ratio presented by Samuelson (2005). The second one is calculation of  $M^2$ : Our benchmark, the excess return on the World stock market, is negative; this results in improving of negative returns of the emerging markets. The last one is as we adjust negative returns for volatility, the emerging markets with the highest volatility can come out best by reducing the negative returns more than low-volatile emerging markets do. Spaulding (2012) suggests interpreting this abnormality as if other markets took on less risk and delivered the same returns, the markets with higher volatility should be then rewarded as they were exposed to the greater negativeness than the other markets (D. Spaulding 2012).

During this period all Sharpe ratios are negative and MSCI Russia has the lowest one of - 0.09. MSCI Brazil has the next lowest Sharpe ratio. The rest of the chosen indices have Sharpe ratios equal to -0.02. Test for significance doesn't show any difference between Sharpe-ratios at 5% level. These results can be interpreted as all considered stock markets have not beaten the benchmark, which is 3 month U.S. Treasury Bills interest rate. The worst additional return per unit of volatility delivered the Russian stock market, the Brazilian market showed a bit higher return per unit of risk, but still lower than the World, Chinese, Indian and average emerging markets did. The absence of significance in the results means that we cannot actually claim that these markets' performances are different from each other.

$M^2$  measures are positive: this is a result of adjusting for negative benchmark return of 7%. The highest average risk-adjusted return of 3.6% has MSCI India, followed by MSCI EM and MSCI China with returns of 2.5% and 2% respectively. MSCI Brazil shows almost zero risk-adjusted return in this period. The only negative  $M^2$  belongs to MSCI Russia. T-test results show no significance difference between risk-adjusted

returns, except for MSCI Brazil. These results indicate that given the volatility of the World stock market, the excess return on the other emerging markets were positive. The Russian stock market has delivered lower returns than the World stock market if we take the same volatility level in the consideration. The results of this period characterized by dominance of the financial crisis shows that the Russian stock market performs worse than other BRIC countries and the average emerging market. Because of the extra high volatility and low returns under the unstable situation, the Russian stock market delivers worse returns than the World stock even after adjusting them to the World market's level.

The practical question each investors wonders about is whether he/she should withdraw his/her funds from the unstable market during such periods. My recommendation is to leave funds in Russia: The first reason is that Russia needs long-term perspective, in this way investors avoid extreme volatility and are guaranteed good returns. The second one is that withdrawal of funds contribute to even higher volatility, which none investors benefits from.

## 8.5 The development of Sharpe ratios for World, EM, Brazil, Russia, India and China

In order to study the development of the Sharpe ratios for the chosen markets, I calculate annualized<sup>30</sup> 24 month forward rolling Sharpe ratio according to Samuelsen<sup>31</sup>. The Sharpe ratio per February 2010 says what the additional average return has been per unit of risk for the next two years. Calculated rolling Sharpe ratios go to February 2010.

Figure 24 presents these calculated forward rolling Sharpe ratios for World, EM, Brazil, Russia, India and China. The first thing that draws attention is the general variation pattern of the Sharpe ratios: the weak increasing trend before 2006, the falling trend till mid-2006, slightly negative Sharpe ratios for all stock markets till October 2008, upcoming trend till March 2009 and declining 24-month Sharpe ratios after. This pattern reflects the general development in the stock markets discussed in the chapter 6 and 7.

<sup>30</sup> Sharpe ratio<sub>annualized</sub> = Sharpe ratio<sub>monthly</sub> \*√12

<sup>31</sup> The adjusted Sharpe-ratio derived by Samuelsen (2005) is used as the considered period contains negative returns. Sharpe-ratio =  $\frac{R_i - R_{rf}}{\sigma_{(R_i - R_{rf})} \sqrt{|R_i - R_{rf}|}}$  where  $R_i - R_{rf}$  is the average excess return on the investment, and  $\sigma_{(R_i - R_{rf})}$  is the standard deviation of the average excess return.

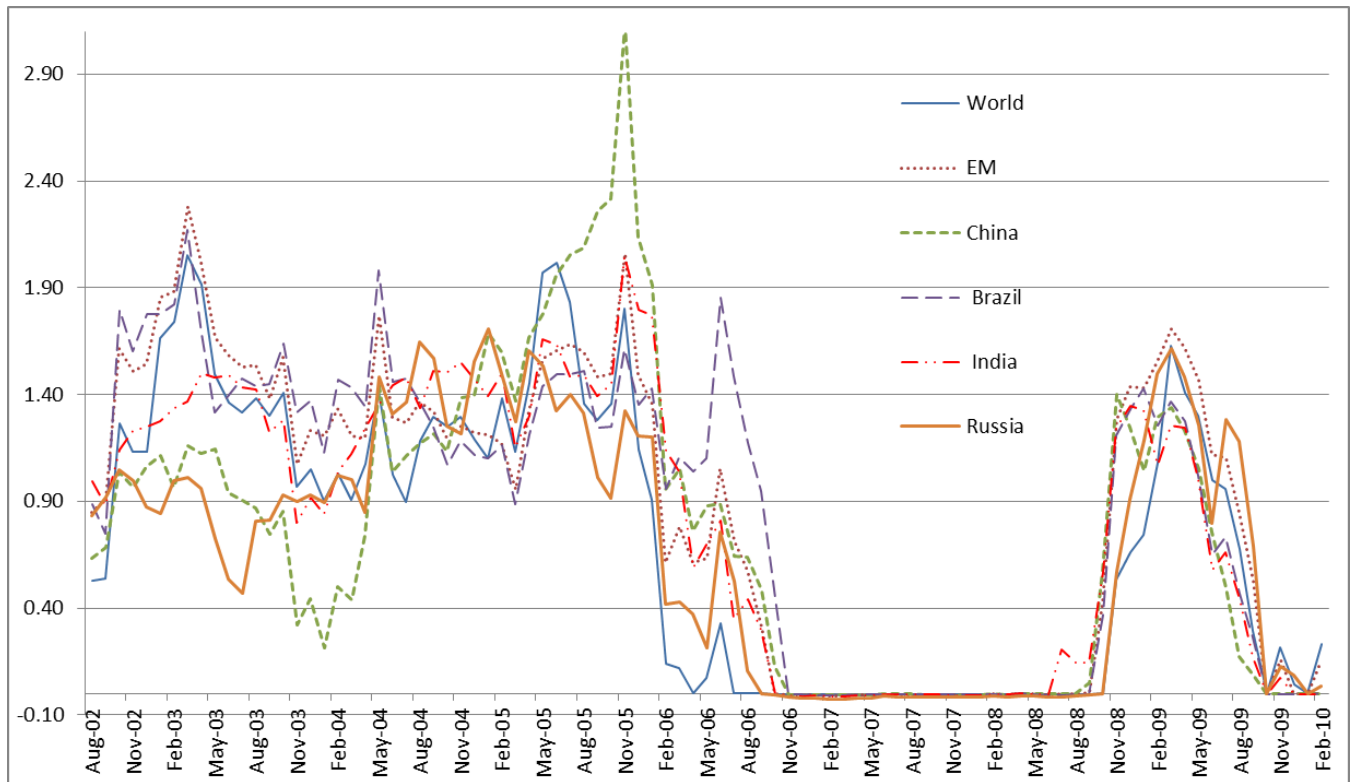


Figure 24 - 24-month forward rolling Sharpe ratios for MSCI World, EM, Brazil, Russia, India and China, annualized, based on monthly logarithmic returns (measured in USD), July 2002-January 2012

The second thing one notices is an extreme top of MSCI China's Sharpe ratio at November 2007, meaning that for the next two years reward to volatility in the Chinese stock market has been 3 to 1. If we continue with the development of MSCI China, we observe an abnormally deep bottom per January 2004, saying that for the next 24 month an additional return per unit of volatility has been 0.2. The possible reasons causing the fall of risk-adjusted returns in the Chinese market include the implementation of the structural market changes, frequent scandals and poor companies' results (Green and Ming 2004). This increased volatility and reduced returns resulting in the lower Sharpe ratios. There was also poor economic environment in the World with rising oil prices and a pickup in inflation putting pressure on the market. This is confirmed by the fall of Sharpe ratios in the other stock markets though less than for the Chinese one. Sharpe ratios for MSCI China lie generally above the MSCI Russia, except for the periods: July 2002 - October 2003 and September 2003-January 2005. This can be interpreted as an investment in the Russian stock market could give higher additional returns per unit of volatility than similar investment in the Chinese one from July 2002 to October 2005 and from September 2003 to January 2007.

Sharpe ratios of MSCI Russia start above Sharpe ratios of MSCI China, MSCI World and MSCI EM, after three months situation changes and MSCI Russia's Sharpe ratios falls lower than other indices. They further rise above Sharpe ratios of MSCI India till December 2003 and Sharpe ratios of MSCI China till January 2005. Sharpe ratios per August 2004-October 2004 are the highest among all considered indices. MSCI Russia has also one of the leading Sharpe ratios till April 2005. After that Sharpe ratios begin to fall until reaching 0.9 per September 2007. After being the worst Sharpe-ratio up to November 2005, MSCI Russia provides higher Sharpe ratios than MSCI World does. Around November 2008 Sharpe ratios become negative and mostly negative for MSCI Russia. MSCI India is the first one out from the negative range of the Sharpe ratios; MSCI Russia is the last one. Sharpe ratios of MSCI Russia rise intensively after the crisis, first taking by MSCI World, then MSCI India, MSCI China and MSCI Brazil. All Sharpe ratios begin to fall in May 2009; MSCI Russia is not exception though its Sharpe ratios increase around May 2009 much more than for the other indices. Sharpe ratios of MSCI Russia hold the leading position as they fall in unison with the other indices. After autumn 2009 Sharpe ratios of MSCI World are slightly higher.

This can be interpreted as the Russian stock market can deliver much higher additional return per unit of volatility than the other markets, but also much lower in some periods. Relatively low Sharpe ratios in the period from November 2002 till August 2005 can be explained by lower returns and extra volatility caused by the disagreements between the government and business environment<sup>32</sup>. Higher returns in the period from April 2004 to April 2007 ensured that investment in the Russian stock market gave higher return per volatility unit than the Brazilian, Chinese, World and average emerging markets. From May 2005 to December 2007 the risk-adjusted returns were lower than for the other markets. Then the Russian stock market provided higher additional return per volatility unit than the World Stock market. All stock markets had the negative reward-to-volatility ratios under the financial crisis; the Russian market had the most negative as it was dominated by negative returns and high volatility during this period. From December 2008 to September 2011 additional return per unit of volatility in the Russian market was the next highest after the average emerging market, saying that investment in the Russian stock market could have given higher returns per risk taken than the other BRIC's and the World stock markets. From July 2009 to October 2011 Russian stocks delivered highest risk-adjusted returns. From December 2009 to January 2012 the average emerging and the World market provided higher risk-adjusted returns than the Russian market, which had the third best Sharpe ratio. Such results during the

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<sup>32</sup> For more information see chapter 6.2

crisis situation can be explained by diversification effect in the World and average emerging markets, which reduced volatility and improved negative returns.

## 8.6 Conclusions

In this chapter I have studied Sharpe ratios and Modigliani measure for the BRIC-countries and the average emerging market.

During the period before the financial crisis, which is characterized as providing stability and facilitating growth, Russia has provided the second best risk-adjusted returns after Brazil. Test for significance showed little proof of that, but still we observe a clear tendency both in Sharpe-ratios and Modigliani measures. The period after the crisis, which was dominated by the financial crisis and burdened by the insecurity in the World the second half of 2011, showed that Russia performed worst among the chosen emerging market. Result testing don't support this claim with the exception of the Indian market, but still estimated Sharpe-ratios and Modigliani measures point to that direction.

Estimated 24-month forward rolling Sharpe-ratio showed that Russia's average return per unit of volatility has varied from leading to bottom positions, depending on the influencing risk factors, till the financial crisis; after the crisis Russia delivered one of the best average returns per unit of volatility and quite differed from the other BRIC, though were close to the average emerging market.

## 9. Why and how should one invest in the Russian stock market?

### 9.1 Introduction

In this chapter I will discuss why the foreign investors should invest in the Russian stock market. I will also suggest some portfolio compositions for investors with different kind of risk preferences. This chapter can be of interest to investors who wonders what the Russian stock market has to offer in the 10-year-perspective. Investors who seek information on the additional returns and diversification opportunities will benefit from reading this chapter. I will start with describing the market's growth potential and current stock pricing. I continue with compiling 9 portfolios, which consist of the World and BRIC- countries. These portfolios are optimized with subject to the highest Sharpe-ratio, which is the highest additional return per unit of volatility. Further I compile three portfolios, where I adjust historical volatilities and returns according to three scenarios: optimistic, moderate and pessimistic, and assumptions about growth of BRIC.

### 9.2 Russia - a good investment opportunity?

There are a few moments investors should consider when they choose which emerging country's market they are going into. Among them are the macroeconomic relations, which in many ways define what the stock market is capable of and how it will develop in the future. As all factors are relative I will use Brazil as a benchmark in my analysis. Brazil is chosen due to the similarity of the Brazilian and Russian markets underlined in the previous chapters, such as relatively high volatility and systematic risk (beta).

The first one is development of gross domestic product (GDP) at purchasing power parity (PPP) per capita: In 1998 Russia's purchasing power was the same as in Brazil, around 7,000 USD. Per 2011 it has grown to 17,500 USD compared to Brazil's of 12,500 USD. The difference between them is increasing and estimated to be more than 6,000 USD in 2012 (International Monetary Fund 2011).

One of the population's purchasing power indicators is the population composition, or more precisely the share of middle class. Russia's share of middle class is around 68%, Brazil's is 31%, China's is 13% and India's is only 3%<sup>33</sup>. If we take a look at the poverty rate in these countries the results are quite the same: Russia's is at 13%, Brazil's is at 27%.<sup>34</sup> The next indicator of the population's purchasing power is the amount of debt. Consumer loans (exclusive home mortgage loans) make 7% of GDP, when Brazil's are

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<sup>33</sup>The World Bank defines the middle class as having a purchasing power-adjusted income over 6000 U.S. dollars. Both numbers per 2010

<sup>34</sup>Poverty rate for Russia per 2010, for Brazil per 2008

16%. Home mortgage loans are just 2.1% of GDP, compared to 51.9% in EU and 81.4% in US. Translated in absolute value, home mortgage loans per capita is 180 USD, compared to 12,370 USD in EU and 26,040 USD in US. Credit cards usage can also be a pointer in this case, though the differences in spread between the countries can be due the general development of the banking system. Amount of credit card per 1000 residents was estimated to 80 in 2008, compared to Brazil's 1250<sup>35</sup>. Based on these facts, we can conclude that the Russian population has more funds to consumption, saving and investing after paying necessary expenses incurred. Low incomes taxes of only 13% only improve the whole picture.

The second factor, especially relevant in the period this paper was written, is the state debt. Among the bigger countries Russia has the lowest state debt, around 12% of GDP per 2011. Brazil has had state debt around 65%, China around 20%, India around 69%, US around 70% and EU around 90% of GDP in the same period<sup>36</sup>. Another pointer is country's international reserves: Russia has the world's fourth biggest foreign currency reserves of approximately 510 billion USD per 2011. Brazil allocates around 360 billion USD<sup>37</sup>. These facts indicate that Russia has relatively good financial stability, macroeconomic soundness and crisis tolerability.

Russia is often described as a less business environment friendly country. According to the World Bank rapport "Ease of doing business rankings" Russia has 120<sup>th</sup> place, which is higher than the Brazil's of 126<sup>th</sup> and India's of 132<sup>nd</sup>, and just a bit lower then China's of 91<sup>st</sup> (The World Bank 2011).

Another aspect is Russia's natural resources. Russia is well known as "energy superpower", being the world's largest energy and mineral supplier. Figure 25 shows natural resources per capita in BRIC-countries in 2011. Russia has clearly not only the leading position, but has managed to allocate almost all most important energy resources among BRIC.

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<sup>35</sup> International Money Fund, Central Bank data 2008

<sup>36</sup> International Money Fund 2011

<sup>37</sup> CIA World Fact Book 2011

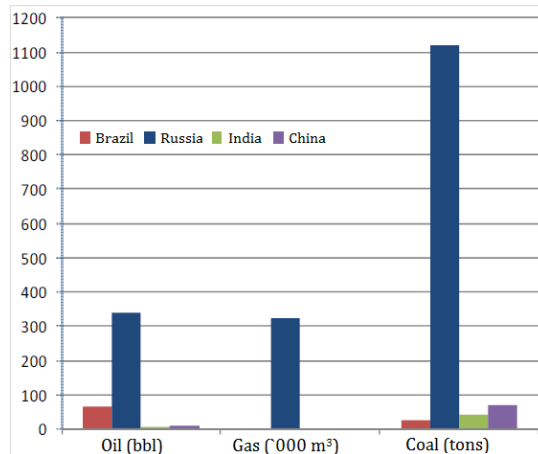


Figure 25 - Oil, gas and coal resources per capita in Brazil, Russia, India and China. 2011. Source: BP, Otkrovenie, East Capital

After we considered the macroeconomic factors and had a quick look at the Russian natural resources, let us go over to the pricing of stocks. Many analytics claim that the Russian stocks are underpriced compared to developed and emerging markets based on basic key ratios such as Price-to-Earnings (P/E) and Price-to-Book (P/B).

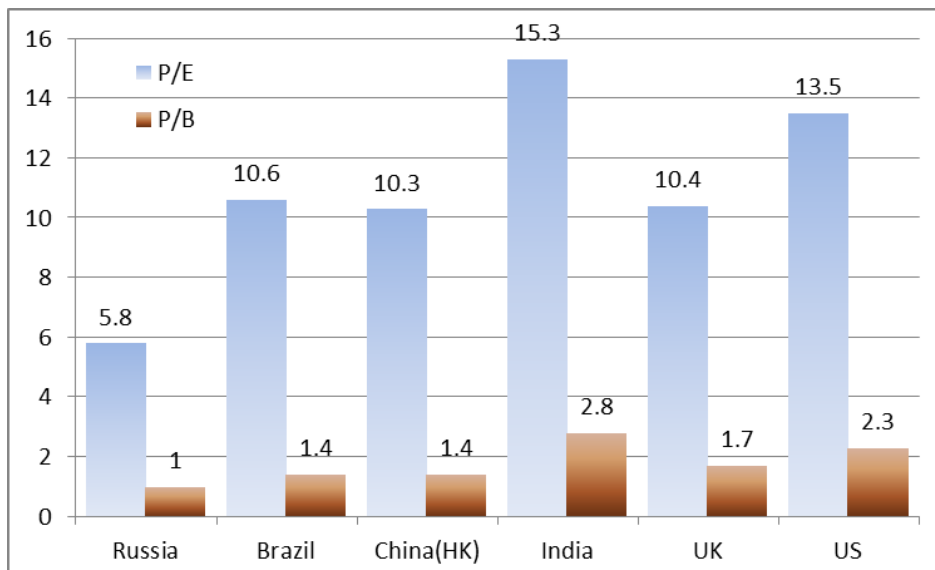


Figure 26 - Average P/E and P/B for Russian, Brazilian, Chinese, Indian, UK and US stocks per 2011. Source: Bloomberg, East Capital

Figure 26 presents the average P/E and P/B ratios for Russian, Brazilian, Chinese, Indian, UK and US stocks per 2011. Average P/E ratio of Russian stocks compared to other BRIC-countries is clearly lower: almost twice as low compared to Brazil and China, and three times lower than for Indian stocks. The same tendency is observed with UK and US stocks. Average P/B ratio of Russian stocks is also lowest among chosen countries: 40% lower than for Brazil and China, 70% lower than UK stocks, 280% and



230% lower than Indian and US stocks respectively. These results can be interpreted as Russian stocks are generally priced lower than stocks of other BRIC countries, UK and US. But we can only speculate whether stocks are underpriced or not: there can be priced in different risk factors, which investors emphasize more in the Russian market than in the other BRIC-countries; or it can actually be a great opportunity for investors to buy discount stocks, which eventually come to the same level as the rest of the world.

If we go back to the definition of stock price, Earnings per Share (EPS) is generally considered to be the single most important variable in determining a share's price. Figure 27 shows the development of 12-month backward rolling EPS, estimated EPS and MSCI Russia.

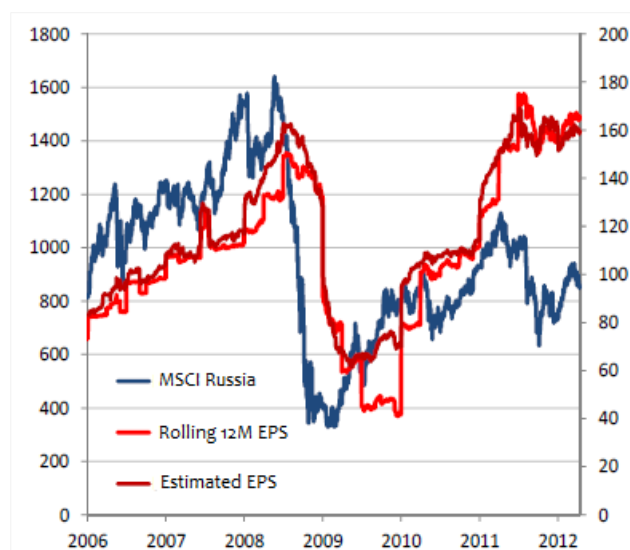


Figure 27 - Development of MSCI Russia, 12-month rolling EPS and estimated EPS, in dollar terms, monthly observations, January 2006-February 2012. Source: Bloomberg, East Capital

12-month rolling EPS, estimated EPS and MSCI Russia develop more or less in the same fashion till March 2011: there are some changes under the financial crisis as MSCI Russia falls relatively more than EPS; during the 2009 rolling 12-month EPS are considerably lower than estimated EPS, but this is result of incalculated low EPS under the crisis; after 2010 both estimated and calculated EPS positions higher than MSCI Russia. After March 2011 EPS and the Russian stock market begin to move in the opposite directions, which is quite strange for such a long period. As discussed in the previous chapters the instability around the debt situation in Europe and possible recession in US triggered the fall in the Russian stock market and as result also this unbalance between EPS and the stock market development. These historical relations can indicate that Russian stocks can actually be underpriced and that Russian stocks can provide good earnings opportunities as these relations come to the historical balance.

Russia is going to play a greater role among emerging countries coming years. Morgan Stanley has done the analysis of emerging markets, in which they considered trends in market capitalization and long-term forecasts of economic growth, and convergence of market capitalization/GDP to developed market level for the period from 2010 to 2020. (Morgan Stanley 2010) Based on these results shares in MSCI EM are expected to be adjusted. Figure 28 shows shares in MSCI EM per 2012 and estimated shares per 2020. The first thing one notices is doubling in shares of China, the second is substantial reduction in shares of Brazil, Mexico, South Africa and other countries. The only countries whose shares were increased are China and Russia.

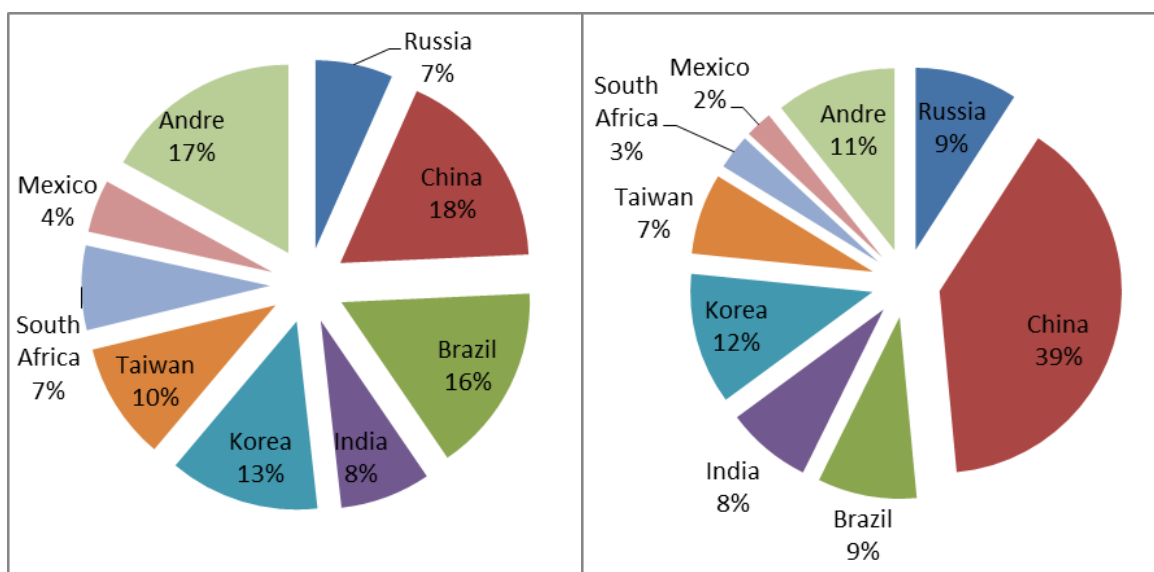


Figure 28 - Shares in MSCI EM per 2012 and estimated shares in MSCI EM per 2020 based on current and estimated market capitalization-to-GDP ratios

This indicates good outlooks for the Russian stock market, which not only kept the current position but increased it.

### 9.3 Portfolios compiled with BRIC-countries and World

I compile 9 portfolios with different combinations of MSCI World and BRIC-countries. For optimal weights in portfolio I use Excel Solver, where I optimize Sharpe ratios subject to different constraints such as minimum return, non-negativity or allowance for short positions, minimum weight of MSCI World. Under follows the description of different constraints:

As the available data contains the financial crisis, the calculated covariance between stocks is unreliable, that is why the optimization wouldn't be so useful to an investor during non-crisis time. To avoid this problem I will use monthly logarithmic returns from January 2009 to February 2012.

		Shares of each country					Mean	Std.dev	Sharpe
		World	Russia	China	Brazil	India			
Portfolio 1	Shorting allowed, min return 6%	0.35	0.84	-0.05	-0.15	0.02	25.5%	31.8%	0.80
Portfolio 2	No shorting, min return 6%	0.22	0.78				25.8%	32.2%	0.80
Portfolio 3	No shorting, min return 6%, only BRIC		0.99			0.01	29.3%	36.7%	0.80
Portfolio 4	No shorting, min return 6%, only World and Russia	0.80	0.20				16.3%	22.0%	0.74
Portfolio 5	No shorting, min return 6%, max 15% of BRIC	0.85	0.15				15.5%	21.3%	0.73
Portfolio 6	No shorting, min return 6%, max 10% of BRIC	0.90	0.10				14.7%	20.7%	0.71
Portfolio 7	No shorting, min return 6%, max 5% of BRIC	0.95	0.05				13.9%	20.1%	0.69
Portfolio 8	Min return 6%, only World		1.00				29.3%	36.8%	0.80
Portfolio 9	Min return 6%, only Russia	1.00					13.1%	19.7%	0.66

Table 20 - Optimized weights, mean, standard deviation and Sharpe ratios for 9 portfolios with varying restrictions, annualized, based on monthly logarithmic returns on MSCI World, Russia, China, Brazil and India (measured in USD), January 2009 - January 2012

The first thing one notice in Table 20 is that MSCI Russia is chosen by optimization as the most effective tool to increase value of Sharpe ratio, this is both for allowance for short positions and not. Portfolio 9 is benchmark with the average return of 13.1% and standard deviation of 19.7%, which give us Sharpe ratio of 0.66. Benchmark with zero exposure to the emerging markets delivers the lowest average return and risk-adjusted return. A risk-averse investor, who desires to obtain some additional returns by including 5% stocks of emerging markets, can place 5% of his portfolio in Russian stocks in order to get best additional return per unit of volatility: this will improve the Sharpe ratio to 0.69 and the average return to 13.9%. For those who want more exposure to emerging markets, world stock can be mixed with 10% and 15% of Russian stocks: this will give annual average return of 14.7% and 15.5% and higher Sharpe ratios of 0.71 and 0.73 respectively. Compiling portfolio with 80% world and 20% emerging countries, in our case Russia, will provide the average return of 16.4% and additional return of 0.74 per unit of volatility increased. A risk-neutral investor would find portfolio 1, 2, 3 and 8 quite interesting as they give almost equally high Sharpe ratios of 0.8, which is higher than all restricted combinations of world with emerging markets. The highest average return of 29.3% among these portfolios have portfolio 3, consisting of only emerging markets, 99% shares of Russian stocks and 1% of Indian stocks; and portfolio

8 consisting of only Russian stocks. Portfolios where no restrictions on short positions were applied will consist of long position in World with 35%, long in Russia with 0.84, long in India with 2%, short in China with 5% and short in Brazil with 15%. This portfolio delivers the average annual return of 25.5%. If investor chooses not to take any short positions, portfolio 2 consisting of 22% World stocks and 78% Russian stocks, provide the same additional return per unit of volatility as the previous one and an average annual return of 25.8% with a standard deviation of 32.2%.

It is difficult to say what portfolio is the best one as preferences till investors will vary when it comes to including emerging market stocks and their risk-return relations. If we base our choice solely on Sharpe ratios, the best portfolios are those which don't have restrictions on the shares of emerging market stocks such as portfolio 1 and 2.

#### 9.4 Portfolio based on expectations about returns and risk in BRIC countries

I have compiled the optimal portfolio using the portfolio optimizer, which based on the historical returns, volatility and covariance. The challenge with such analysis is that history seldom repeats itself, especially for emerging markets that are still in development and is influenced by different factors. If we take BRIC as an example, we observe that these four countries are in quite different growth stadiums compared to the each other, and nevertheless compared to the performance during the studied period and outlooks: Brazil is about to stabilize its market growth, India and Russia continues growing, last one more rapidly, China is about to explode. Table 21 presents the historical returns and volatilities of the BRIC-countries and the World. These parameters should be adjusted according to three scenarios: optimistic, moderate and pessimistic. Also according to expectations about BRIC's development.

	<i>World</i>	<i>Russia</i>	<i>China</i>	<i>Brazil</i>	<i>India</i>
<i>r</i>	13.1%	29.3%	14.9%	21.4%	20.2%
<i>Total risk</i>	19.7%	36.8%	25.3%	31.2%	35.0%
<i>Sharpe ratio</i>	0.66	0.80	0.59	0.69	0.58

Table 21 – Average returns, total risk and Sharpe ratios for MSCI World, Russia, China, Brazil and India, monthly logarithmic returns (measured in USD), annualized, January 2009-January 2012

Optimistic scenario as shown in Table 22 assumes active growth without long-term financial instability in the world. Pessimistic scenario assumes the opposite - the market experiencing economic unbalance. Moderate scenario assumes the market driven by the fear of the crisis during some periods and active growth at others.

		<i>World</i>	<i>Russia</i>	<i>China</i>	<i>Brazil</i>	<i>India</i>	<i>Portfolio's return</i>	<i>Portfolio's risk</i>	<i>Sharpe ratio</i>
Optimistic scenario	<i>Returns</i>	15%	32%	30%	30%	26%			
	<i>Total risk</i>	12%	30%	30%	30%	27%	22.0%	11.8%	1.87
	<i>Weights</i>	51%	17%	0%	16%	16%			
Moderate scenario	<i>Returns</i>	15%	32%	21%	20%	20%			
	<i>Total risk</i>	20%	37%	25%	31%	35%	21.1%	16.0%	1.32
	<i>Weights</i>	39%	25%	0%	20%	16%			
Pessimistic scenario	<i>Returns</i>	3%	1%	2%	2%	2%			
	<i>Total risk</i>	20%	37%	30%	37%	37%	2.7%	16.5%	0.16
	<i>Weights</i>	73%	4%	0%	12%	12%			

Table 22 - Portfolios based on three scenarios with expected returns and volatilities.

I use Solver Excel to optimize three new portfolios given expected returns, volatility and historical covariance from 2009 to 2012. Optimizing is done with subject to maximal Sharpe-ratio.

Based on these assumptions Russia is preferred among BRIC under optimistic and moderate scenario, although both scenarios include Brazil and India. Brazil and India are preferred to Russia under the pessimistic scenario.

## 9.5 Conclusions

In this chapter I described the market's growth potential and current stock pricing compared primarily to Brazil, but also the other BRIC. I found some indications that Russian stock may be underpriced. Further I compiled 9 portfolios based on historical returns from the period 2009-2012: optimizing based on maximizing Sharpe-ratio showed that Russia is preferred when it comes to including BRIC countries in investors' portfolio. Taking in account that history rarely repeats itself in form of exact returns and volatilities, I compiled three portfolios based on optimistic, moderate and pessimistic, using historical covariance and my assumptions about expected returns and volatilities. Russia is preferred among BRIC under optimistic and moderate scenario, although both scenarios include Brazil and India. Brazil and India are preferred to Russia under the pessimistic scenario.

## 10. Conclusions

It's time to wrap up loose ends and sort out what I can say on relative basis and what's still not clear.

The goal of this thesis was to find out whether Russia is different from other emerging stock markets, in particular BRIC, and should be considered an asset of its own. For this purpose I tested a set of hypotheses presented in chapter 3. The main conclusions are:

- Returns on the Russian stock market are different from the other BRIC's and emerging markets. The logarithmic returns showed that Russia had one of the highest returns during the period before the crisis, but had the lowest returns during and after the crisis. Discrete returns showed the same tendency for the period before the crisis, but Russia is different only from, and implicitly worse than Brazil and India under the crisis.
- The total risk in the Russian stock market can be different than in the other markets, though the differences are relatively small. The Russian and Brazilian stock market are averagely more volatile than the other emerging markets, and we find no proof for difference of their volatilities. Else Russia is more volatile than the India, China and average emerging market during the whole period. This is similar for the separate periods, except for volatilities of the Russian and Chinese markets are non-different during the growth period; and the Indian and Russian markets during the under-crisis-period.
- The conclusion about systematic risk represented by beta is not clear. I observe that Russia has had the lowest beta among emerging markets during the period before the crisis, but the highest beta during and after the crisis. I could, however, not find significant proof of that.
- The unsystematic risk in the Russian stock market is different from the other BRIC and emerging markets. Results show that Russia has the highest unsystematic risk among the compared emerging markets.
- I could not claim that risk adjusted returns in the Russian stock market are different from the other emerging markets, though the tendency in Modigliani measures and Sharpe ratios show that risk adjusted returns are among the highest pre-crisis and among the worst under the crisis. From 2009, Russia has delivered one of the highest risk adjusted returns.

Based on these conclusions I can say that Russia is quite different from the BRIC group, though some resembling features among them are found. I cannot find one market among BRIC that consistently

have, throughout the chosen periods, the same characteristics as the Russian market. The Brazilian market does however show several similarities, such as high returns during the growth period, high volatility and high systematic risk under and after the crisis.

Results from examining the last hypothesis about whether including Russia in an investor's portfolio can give additional returns, indicate that Russia is preferred by optimization among BRIC. This supports my conclusion of the tendency of Russia being different from the other BRIC.

As for the international investors I would recommend different portfolios, compiled using BRIC stocks and world stocks, based on historical returns from 2009 to 2012. History is notoriously known for not repeating itself down to the last detail. For this reason I composed three portfolios based on three scenarios of the future market situation. An investor can pick from the portfolio-suggestions best suited to his/hers needs, outlooks on the market and risk aversion.

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## Appendix 1

### 2002

On the 24<sup>th</sup> of July the most liquid stock had fallen 6-12% after the two weeks' fall in the American and European stock market. Both local and foreign investors sold stocks frantically regardless of sector (Rushajlo 2002).

### 2003

11<sup>th</sup> February 2003 Tyumen Oil Company and British Petroleum announced establishing of a new joint venture company: TNK-BP. The appearance of TNK-BP on the scene had significant impact in Russia and in the World. Giving BP credit for half of its TNK-BP, BP becomes the second largest oil company in the World, only exceeded in size by Exxonmobil. In Russia, TNK-BP will be the third largest oil company following Yukos and Lukoil (Pan EurAsian Enterprises, Inc. 2003).

From 16<sup>st</sup> to 21<sup>th</sup> of May. Management of Surgutneftegas has announced the intention to invest 1 billion U.S. dollars into the development of processing facilities (Pravda 2003). The oil company Sibneft has stated that there was a 24.3% increase in the production in the beginning of 2003 compared to the same period in 2002 (Kulagin 2003). It has also announced a record high dividends payment of 1 billion U.S. dollars. The merger agreement between Yukos and Sibneft was concluded. Fitch increases the long-term rating of Russia's foreign and national currencies to the level of "BB +" from the level of "BB -". Gold reserves of the Central Bank of Russia increased to a record high 60 billion U.S. dollars. (Institute of Economic Security 2003)

On the 2<sup>nd</sup> of July Platon Lebedev, a Khodorkovsky partner and second largest shareholder in Yukos, was arrested on suspicion of illegally acquiring a stake in a state-owned fertilizer firm, Apatit, in 1994. The arrest was followed by a delay of the Antitrust Commission's approval for Yukos merger with Sibneft.

As the stock market was on its way to regain strength after the arrest of Lebedev, on the 10<sup>th</sup> of July the Attorney General's office has begun audit of the largest oil companies based on the deputy's suspect of the tax evasion. The stock market started to panic. (Pravda 2003)

On 16<sup>th</sup> and 17<sup>th</sup> the MSCI Russia falls 6.09% and 5.36% respectively due to the continued pressure on Yukos and conflicting information about tax audits. (Pravda 2003)



On 14th August 2003 Russian authorities approved a merger between oil giants Yukos and Sibneft, creating the world's fourth-largest private oil producer. Yukos shares jumped 1.5 percent and those of Sibneft 1.9 percent within minutes of the announcement (CDI Russia Weekly 2003).

On 25th October 2003 Khodorkovsky was arrested on the charges of fraud. Shortly thereafter the government under Vladimir Putin froze shares of Yukos because of tax charges. The Russian Government took further actions against Yukos, leading to a collapse in the share price. It purported to sell a major asset of Yukos in December 2004. Many view the arrest as the Kremlin's attempt to punish Mr. Khordorkovsky for his political ambitions and to gain the control of the company (Mainville 2004).

On 30<sup>th</sup> of October the prosecutors froze some 15 billion U.S. dollars worth of shares in Yukos and Sibneft. Prosecutors said they seized 44 percent of Yukos, which now owned 92 percent of Sibneft, to stop Khodorkovsky from selling his controlling stake in the company. (Belton, Korchagina and Nicholson 2003)

On 3th November as Khodorkovsky resigned, MSCI Russia went up with 7.5%: Markets reaction on Khodorkovsky's resignation statement was confirmation of the fact that the conflict over the Yukos affair was of a personal nature. (Pravda 2003)

From the 11<sup>th</sup> to 19<sup>th</sup> of November the stock markets reacts negatively on the authorities' statements about future nationalization plans, including the president's proposal to pass the regulatory functions of oil export duties to the government. (Pravda 2003)

## 2004

On the 21<sup>st</sup> of April the stock market falls because of the situation in the foreign exchange market. The appreciation of the U.S. dollar forced many investors to close their positions. These investors, mostly non-residents bought stocks at the peak of the market counting on further strengthening of the ruble, as well as those who have decided to invest for a short game against the ruble. (Pravda 2004)

On the 28<sup>th</sup> of April MSCI Russia falls with 5.39%. There are two main reasons to that fall: After Yukos affair the market began to wonder who would be under the next illegal privatization investigation. There were rumors about the arrest of Vladimir Potanin, the head of Interros. The second reason is the Russian court decision to de-privatize Sayano–Shushenskaya Dam, which evoked thoughts of the imminent nationalization of all assets the Russian state needs. (Institute of Economic Security 2004)

From 28<sup>th</sup> to 1<sup>st</sup> June the Russian stock market, still driven by the situation around the Yukos affair, fell.

On the 17<sup>th</sup> of June MSCI Russia goes up with almost 11% after Putin's statement about Yukos future. Surgutneftegas reports 66% profit increase. There is also news about negotiations on the sale of the LUKoil state shares to the American Conoco (Pravda 2004)

From 20<sup>th</sup> to 27<sup>th</sup> of July the Russian stock market goes down as more indicators of Yukos bankruptcy comes up. The Sberbank stocks, which are considered the safe haven, have fallen because of the announcement of reduced profit in 2003 (Pravda 2004).

On the 18<sup>th</sup> of August the market reacts negatively as the court refused to accept Sibneft shares to pay off tax debt. However, the main factor that worsened situation was the request from the State Duma committee to the Russian Internal Affairs authorities regarding the legality of the non-residents' acquisition of Gazprom shares (Institute of Economic Security 2004).

On the 8<sup>th</sup> and 9<sup>th</sup> of December the stock market fell and feared a "second Yukos" after tax claims were imposed to Vimpelcom, Tomskneft and Megafon.

On the 21<sup>st</sup> of December the stock market rose as rumors of Surgutneftegas buying Baikalfinansgrup, which was famous for winning the auction for a 76.79% share in Yuganskneftegaz, formerly the core production subsidiary of Yukos Oil Company. It was known later that it was Rosneft, who bought Baikalfinansgrup (Institute of Economic Security 2004).

## 2005

On the 27<sup>th</sup> of September the government announced the decision to liberalize the market. The oil prices went up the last few days, lifting stocks of the oil sector companies (Institute of Economic Security 2005).

During the whole of October the Russian stock market follows after the fall of the World stock market and oil prices (Institute of Economic Security 2005).

## 2006

On the 10<sup>th</sup> of January MCSI Russia rose with 5.15%, the reason of this success is said to be the positive trends in the World stock market for the preceding six days (Buyanova and Bajbakov 2006).

On the 7<sup>th</sup> of March the stock market was overheated. Fall in the oil price after OPEC made clear that the oil supply wouldn't be reduced, stimulating the market's correction (Obuhova 2006).

On the 20<sup>th</sup> of March the stock market went up as stocks' liquidity, oil prices and the World stock market increased (Parma management 2006).

On the 22<sup>nd</sup> of May MSCI Russia fell with 10.42%, for the last 9 days it had decreased with 25%. It is stated a few reasons for that: the World stock market had fallen two weeks in a row, the commodity market had also began to fall, the interest rate in US was increased and tightening of monetary policy was expected, the Russian stock market had grown with 160% the last year and could not continue in that fashion. It was also mentioned a herding behavior that were triggered by the international factors named above. (Tyagaj, Bajbakov og Gajdajev 2006).

On 23<sup>rd</sup> of May MSCI Russia had risen with 9.39% as there had been signs of stabilization of the World stock market and an increase in oil prices (Bajbakov and Gajdajev 2006).

On the 13<sup>th</sup> of June the stock market fell with 10%. The reason is again said to be the negative tendencies in the World stock market and the commodities markets, especially for oil and metals. It was mostly foreign investors that sold stocks (RBK 2006).

Headline inflation rates rose in many economies in 2006; most of the increase is attributable to first-round effects of higher oil prices. This decreases financial appetite for investments. The prices of commodities became more volatile during 2006, and most of them experienced a significant drop in mid-2006 (United Nations 2007). In addition ruble appreciated confidently to U.S. dollar, so returns in dollar terms were reduced in 2006.

## 2007

From the 27<sup>th</sup> of February till the 5<sup>th</sup> of March the stock market fell with almost 3% every day. Though there are good company-related, country-related news and oil price upward tendency, the anxiety around the situation in the US was influencing the market (Larionov 2007). Also after the SSE Composite Index of the Shanghai Stock Exchange tumbled 9% from unexpected selloffs, the largest drop in 10 years, triggering major drops in worldwide stock markets, including the Russian one (Chen and Kwok 2007).

## 2008

On the 16<sup>th</sup> of January the Russian stock market had the most significant decline over the past year: A wave of selling in the markets of the United States, Europe and Asia collapsed the quotes of almost all Russian companies. The U.S. mortgage crisis spread to all sectors of the financial market, and investors withdrew funds from the securities in anticipation of global economic slowdown and lower earnings in major corporations. (Asker-zade 2008)

On the 21<sup>st</sup> of January a new decline of 7% had found place: Investors' fears continued to grow as the stock markets in US, Asia and Europe fell from 3 to 6% (Asker-zade 2008).

On the 24<sup>th</sup> of January the stock market rose with 5.5% as there was a positive sentiment in the American stock market after the U.S. government announced plan to provide tax incentives to stimulate U.S. economy, and as the Russian finance minister, Aleksej Kudrin calmed down investors with announcement that the global credit crisis didn't threat the economic stability of the Russian Federation due to the fact that debts of Russian foreign financial institutions were rather small (Leluhin 2008).

In the end of July Mechel's stock plunged by almost 65 percent, after Russia's Prime Minister Vladimir Putin criticized its CEO Igor Zyuzin, and accused the company of selling resources to Russia at higher prices than those charged to foreign countries and avoiding taxes, by using foreign subsidiaries to sell its products internationally. The comments, which raised fears of another attack similar to that made on Yukos in 2004, contrasted sharply with previous efforts by President Dmitry Medvedev to improve Russia's reputation as an investor-friendly country (Kramer 2008) (Stewart 2008).

On the 8<sup>th</sup> of August the worsening situation of the Georgian-Ossetian conflict led to the collapse of the Russian stock market - it lost around 7%. Russian and foreign investors dumped securities in an attempt to reduce losses (Asker-zade 2008).

On the 11<sup>th</sup> and 12<sup>th</sup> of August the market rose with 3.5% each day as Russia completed its military operation in Georgia (Zyhar 2008).

On the 3<sup>rd</sup> and 4<sup>th</sup> of September in addition to the World instability, some negative internal news about companies drove most blue chips down with 4% and 5% respectively (Lukashov 2008).

On the 9<sup>th</sup> of September the stock market fell 9.5% after the Asian stock markets went down with 2%, the Brent oil price with 1.5% and Aleksej Kudrin's announcement of a further tax reduction was impossible (Kommersant 2008).

On the 16<sup>th</sup> of September the Russian stock market dropped with 16% after the Lehman Brothers bankruptcy and announcement of serious problems of American International Group, AIG, the largest American insurance company (Asker-zade 2008).

On the 19<sup>th</sup> of September the market increased with 24% after the Russian government chipped in 1.5 trillion rubles into the banking system. Many traders need also to close short positions as the exchanges were closed the previous two days (Asker-zade 2008).

On the 29<sup>th</sup> of September the market fell with 10.3% after emerged problems in the global financial system over the weekend, as well as aggravated concerns about the effectiveness of the U.S. government plan to rescue the financial system. The catalyst for new disturbances was news about a possible nationalization of the Belgian-Netherlands Fortis and British Bradford & Bingley (Kommersant 2008).

On the 6<sup>th</sup> of October the stock market dropped 25.5% following falling commodities prices and stock markets all over the world. The market falls under the influence of selling panic: The foreign investors sold stocks for minimal prices in hope of solving liquidity problems. Before the crisis banks had issued loans to big investors secured by shares. Fall of value of collateral provokes forced closing of positions as banks demanded to repay the loan immediately, or sell the pledged securities (Asker-zade 2008).

On the 8<sup>th</sup> of October the market fell with 12%. The reason is again falling markets all over the world. The trades on the stock exchanges were stopped a lot lately. According to experts, unpredictable actions of exchanges' regulator deter investors from the Russian exchanges (Asker-zade 2008).

On the 9<sup>th</sup> of October there was an increase of 10.5% as many world banks announced reduction of interest rates. Increased could be even higher if exchanges wouldn't be closed as it happened the day before. Many investors moved to the London exchange to avoid these trade stops (Asker-zada 2008).

On the 14<sup>th</sup> of October the market rose with 10%. Among good news that influenced is the Central Bank decision to reduce reserve requirements for all bank liabilities to 0.5% (Shishkin, Gudkov and Mazunin 2008).

On the 15<sup>th</sup> of October as the Brent oil price dropped to 70 U.S. dollar for barrel, the Russian stock market reacted with 11% dip. But still the main reason for the market's decline was the continuing outflows from investment funds (Asker-zeda 2008).

On the 25<sup>th</sup> of October market falls 20% as there are dramatic falls on all international platforms and decrease in oil price. Russian stocks are worth as much as in 1997. The state presence and support in the market doesn't help: State-owned stocks lose 16-33% in value (Asker-zade 2008).

On the 28<sup>th</sup> and 30<sup>th</sup> the market rises with 10%, 15% and 20% as there are U.S. Federal Reserve System has decreased interest rate till 1% and promised providing loans of 30 billion USD to the Central Banks of Brazil, Mexico, South Korea and Singapore. Vnesheconombank intends to place daily up to 0.2 billion USD into stocks and fixed-income securities on the national stock market (Gajdajev, Market frowned. Рынок набылся 2008).

Russian stock market ended 2008 year with loss more than 70% year-on-year basis and was named among top 10 worst performing markets. Such poor performances of Russian stocks were caused by several reasons. Oil prices collapse in the 2nd half of 2008: Skyrocketing in the 1st half of the year to almost 150 U.S. dollars per barrel oil prices crumbled to less than 40 U.S. dollars in December. Russian ruble lost approximately 1/3 against U.S. dollar from its high in July, 2008 after the Central Bank attempt to keep the ruble pegged to two currencies (USD & EUR) basket failed in October, 2008. Relations between government and private business were not the best: fear of de-privatization wrecks the investment climate. (Arbat Capital 2008)

## 2009

On the 26<sup>th</sup> of January there is noticed positive tendency on the market as it rises with 9% as result of private investors place funds in the stock market instead of the currency market. This movement is due to the stabilization of ruble and also positive news from the international exchanges (Gajdajev and Asker-zade 2009).

On the 17<sup>th</sup> of February the market falls with 11% as international traders leave the Russian stock market because of the depreciation of ruble to euro and dollar. There has been also some decrease on the European exchanges, and in the price of Urals oil (Gajdajev 2009).

On the 10<sup>th</sup> of March the market raises with 11% as the oil price increased, traders sell the currency and moves funds to the stock market after appreciation of ruble (Gajdajev 2009).

In April and May the stock market has risen 30% as big investors such as big mutual funds are back into the Russian stock market (Mazunin and Ladygin 2009).

On the 22<sup>th</sup> of June the market falls with 8% as Urals oil price decreases with 7%, and the American and European indices fall with 3%. The falling tendency a week before is possibly caused by low liquidity as the long term investors has done the main investments and even small trade manipulations have a quite of an influence (Gajdajev and Asker-zade 2009).

On the 15<sup>th</sup> of July the market raises 7% as a reaction on a rally in the global stock market: Investment analysts agree that the recession in the global economy will soon be completed (A'LEMAR Investment Group 2009).

On the 3<sup>rd</sup> of August the market increases with 6% as the oil price and international indices go up, there also are good macro news reported, which builds up the optimism in the stock markets (A'LEMAR Investment Group 2009).

On the 28<sup>th</sup> of October the Russian stock market falls 6%. There has been publicized weak US statistics which influenced the American market and investors, which have started to take out risky assets out of portfolios, among them Russian stocks. The oil price has also showed downward tendency (A'LEMAR Investment Group 2009).

### **2010 and 2011**

2010 and beginning of 2011 are generally stable time, where Russia still recovers from the financial crisis with active growth. The second half of 2011 is dominated by the fear of U.S. recession and defaults of the several European countries. In December 2011 the market prices in additional political risk as many citizens are unhappy with election fraud. The oil price stimulated and slowed the growth of the stock market during 2010 and the beginning of 2011. After mid 2011 the oil price has had less effect on the market due to the economic instability in the World.

## Appendix 2

Jobson and Korkie (1981) derived a test for significance of Sharpe ratios. They form a 0-hypothesis:

Sharpe ratio<sub>2</sub> - Sharpe ratio<sub>1</sub> = 0, and an alternative hypothesis: Sharpe ratio<sub>2</sub> - Sharpe ratio<sub>1</sub> ≠ 0.

The 0-hypothesis is rejected when  $t_{\text{observed}}$  is larger than  $t_{\text{critical}}$ , which is normally distributed.

$$T - \text{test} = \frac{\text{Sharpe ratio}_{1,2}}{\sqrt{\theta}}$$

$$\text{Sharpe ratio}_{1,2} = \mu_1 * \text{Sharpe ratio}_2 - \mu_2 * \text{Sharpe ratio}_1$$

$$\theta = \frac{1}{N} (2 * \sigma_1^2 * \sigma_2^2 - 2 * \sigma_1 * \sigma_2 * \sigma_{21} + \frac{1}{2} * \mu_1^2 * \sigma_2^2 + \frac{1}{2} * \mu_2^2 * \sigma_1^2 - \frac{\mu_1 * \mu_2}{2 * \sigma_1 * \sigma_2} * (\sigma_{21}^2 + \sigma_1^2 * \sigma_2^2))$$

Where  $\mu_1$  is the average return of the portfolio 1,  $\sigma_1$  is the standard deviation of the portfolio 1, Sharpe ratio<sub>1</sub> is the Sharpe ratio of the portfolio 1, N is the number of observations and  $\sigma_{21}$  is the correlation coefficient between portfolio 1 and 2. (Jobson and Korkie 1981)