The influence of Ukrainian Crisis on selected financial markets

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Preface

Despite the fact that people should learn as much as possible from each crisis, the Ukrainian crisis is has some distinctive features that make it particularly intriguing. By coincidence, Ukrainian crisis started to develop by the time I was setting off with preparation of Masters Project. As a result, I am able to observe development of the events, and update my thesis on almost daily basis. On one hand, this creates a huge challenge, since it is not possible to see the whole 'picture' of the crisis at once- all its reasons, events that take place and their outcomes. On the other hand, the fact that events are ongoing gives a better chance to fully understand the reasons behind them or to feel political and social atmosphere. This is not possible when past crises are investigated. Furthermore, Ukraine is one of Poland's neighbors, its important trade and political partner. Although the history of relationships between both countries was often brutal, nowadays Poland is very much involved in Ukraine's social and economic situation. Therefore, it is natural for Poles to be interested in the events taking place in Ukraine, especially in those that pose a threat for peace in this region of Europe. There are many Polish businesses operating in Ukraine, and political unrests there can have a major influence also on Polish economy. Last but not least, because of the fact that Poland and Russia are on opposite sites during this conflict, there is also a huge tension in relations between these two countries, which also has a huge, supposedly negative impact on Polish economy.

Abstract

The purpose of this thesis is to investigate the impact of the Ukrainian Crisis (2013-present) on the selected stock markets. The paper aims in analyze behavior of investors facing extreme situation as well as in finding if selected indices follow any patterns and if this kind of political and social crisis impacts them.

The first chapter states research questions and contains an introduction to this paper. Second part is devoted to literature review. It analyzes current state of academic knowledge on a range of topics connected to the research topic: impact of information on markets, patterns in investors' behavior and other features potentially impacting markets and investors, like macroeconomic announcements. In the third chapter extensive long-term analysis of selected stock indices (MICEX, MICEX Financials, MICEX Oil & Gas, UX, WIG Ukraine) are presented. These include analysis of such features as log-returns, volatility or trading volume, correlation between the indices. The chapter covers also calculations of abnormal returns based on CAPM and event studies. Fourth chapter delivers short-term analysis. This part directly links most extreme events from the market to the events from the Ukrainian Crisis and the other way round: it shows how the most severe episodes from Ukraine impacted the markets. In order to do that, two viewpoints were adopted: Ukrainian and Russian. This required creation of two scales: first, assessing the effect of an event for the given country (positive, neutral and negative) and its type, while second assigning qualitative characteristic to each investigated market feature, during each day (scale based on standard deviation of each feature). The paper is concluded with summary and conclusions in chapter five.

This extensive research yields a number of conclusions. Generally, in the long run only WIG Ukraine index was impacted by the crisis in an outstanding, negative way. Indices located in the countries directly involved in the events tend to be immune to the events. This is confirmed by the calculations of abnormal returns, which were highly negative only for WIG Ukraine index. Short-term analysis showed that on a daily horizon only Ukrainian indices were impacted.

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1. Introduction

1.1 Why crisis is interesting for researchers

History of our civilization has always been full of different crises- political, economic, social, cultural, etc…- this list is almost endless. What is a common point for all of the crisis, is that once overcome, they usually led to new, better solutions, ideas, wider knowledge. What follows is that during time of any crisis, possibilities for broadening knowledge and experience which should be particularly interesting for researchers develop. As the name suggests, crisis is the time when we experience extreme events take place. This means, that it is possible to observe particular events and circumstances that have never happened before, or that have never lead to a situation such extreme as crisis. It follows that researchers and theorists get a very useful tool- the possibility to check, whether their prior assumptions, models, calculations can be applied to different real-live scenarios. In financial world, this means that organizations are forced to check whether stress-testing, simulations, and strategies designed for turbulent times were designed and implemented adequately. Of course there are other ways in which researchers are able to benefit form crisis times. Among others, we can list increased data availability. For those, interested in validating their thesis in real-life conditions, any crisis gives an opportunity to gather data, which usually are unavailable. There are more decisions made, more events happen, they happen faster and in more extreme manner than usually. What follows, researchers are able to gather valuable information for their researches. Sometimes extreme circumstances also force people to create and develop the most sophisticated tools and models that help to overcome the crisis.

1.2 Ukrainian crisis

After several years of relative calmness, political and social crisis on Ukraine has developed rapidly, starting in November 2013. President Yanukovych, who was supposed to sign an agreement with European Union, making them politically and economically closer to each other, decides not to sign the agreement. Instead of that, he seeks an improvement in relations with Russia. Because of that, citizens of Ukraine, especially Kiev became furious, and raged into up to 800,000-strong riots. After several months of riots, President Yanukovych disappears, abandoning his function. As a result, the opposition leaders take up the power in Ukraine. When it seems the unrests are over, Crimea's parliament votes for gaining independence from Ukraine, and joining Russia. As a result Russians, who were believed to support president Yanukovych, accept Crimea as a part of their country. Unrests in eastern part of Ukraine continue to escalate, as separatists from several regions want to follow Crimea's

example, and join Russia. Current situation in eastern Ukraine can be described as civil war. Although new president, Petr Poroschenko tries to bring peace back to his country, all the attempts to resolve the conflict come undone. What is globally believed, is that the main factor destabilizing eastern Ukraine is Russia.

Ukrainian crisis has a big impact not only on Ukraine's economy, but also on political and economic relations between western countries (USA and EU) and Russia. It quickly developed from Ukraine's internal problem to economic war between Russia and the West. Many sanctions have been introduced from both sides, aimed in individuals, industries and exports. Both EU and Russia are losing billions of Euros on sanctioned trade. While EU countries are coping with arising issues quite efficiently, Russia is falling behind. Sanctions, combined with plummeting crude oil prices, pushes Russia into recession and forces it to spend billions to save its national currency, Rubel. Russia's situation is so tough and unpredictable, that World's attention has shifted from Ukraine. Although Russia's problems are caused mainly by oil prices, it is clear that if it was not for the sanctions and isolations, overcoming this issue would be much easier for President Putin. This is the direct effect of Ukrainan crisis.

1.3 Aims of the research

What is particularly interesting about this crisis, from the research point of view, is the fact that it is still underway, still developing. As a result, if a researcher draws any conclusions and formulates forecasts, he is able to confront them with real development of events relatively quickly. Furthermore, there has been no such a serious situation for many years. What follows, is the possibility to update and adjust to modern times the academic recommendations, which could be helpful.

The aim of this research is to investigate how the financial markets, especially those in closest proximity to center of the crisis, react to the news coming from Ukraine. Looking at Ukrainian, Russian and Polish stock markets will provide an insight into investor's behavior who are facing such an extraordinary situation. Moreover, this paper should also answer the question whether the indices follow any patterns in their behavior and if political crisis impacts them. These findings should be beneficial not only for academic purposes, but also for individuals, who search for knowledge that could be helpful in adjusting their investing strategy. The paper can be similarly beneficial for institutions, willing to adjust their strategy to more turbulent times.

Another interesting insight this paper should provide, is comparison of reactions of Ukrainian and Russian markets. The crisis quickly turned into confrontation between these two countries. From this point of view, the goal should be to determine, whether events that have opposite political meaning (something that is beneficial for Ukraine is disadvantageous for Russia), also cause opposite reactions of local market (or are the markets consistent?).

What this paper should also achieve, is to conclude whether a situation, when two countries were on rather friendly terms and were cooperating in political and economic issues suddenly shift to being opposition to each other, has any impact on the relationship between their stock markets. The paper aims in investigating, whether the relationship between Ukrainian and Russian markets has changed in year 2014, when compared to previous years.

Finally, there is a lot of literature that covers the topic of markets reactions to macro-news. This paper should determine, whether it is possible to apply conclusions drawn from markets in 'normal' times to these extreme conditions. Moreover, we believe that due to the fact that this kind of crises is very rare nowadays, this paper should fill the gap in academic literature describing financial markets in times of international political crisis.

1.4 Research questions

Having established goals of this paper, it is essential to formulate research questions that will guide this work. The main research question is as follows:

- What is the impact of Ukrainian crisis on selected financial markets?

The answer to this question should give an explicit view on the topic of relation between political and social crises and the financial markets. The research will be focused on the markets in closest geographical and economical proximity to the center of events: Ukraine, Russia and Poland.

To answer the main research question, the following stock market indices will be investigated:

- Ukraine- UX
- Russia- MICEX, MICEX Financials, MICEX O&G
- Poland- WIG Ukraine

To help answer the main research question, there are five sub-questions stated:

- What is the relation between news, financial markets and investors behavior?

In order to give an insight in how the World's economic, political and social situation influences markets, investors, patterns of their behavior and decisions they make, a number of academic studies will be investigated. Answer to this question should provide a better understanding of events that took place on financial markets with regard to the Ukrainian crisis. Furthermore, analysis of available literature and empirical data used for answering the rest of sub-question, could show whether it is feasible to base on the already available academic literature when talking about this crisis.

- Have the trends followed by selected indices in previous years (2008-2013) changed due to the Ukrainian Crisis?

The answer to this question should give an initial insight into the behavior and reactions of the market and investors to events taking place in Ukraine. The question is shaped in such a way to investigate how the crisis influenced investors approach and way of decision-making on the longer time-horizon. In order to answer this question, there will be investigated several characteristics of selected indices. These are going to be trading volume, 10-days volatility, daily and yearly log returns, average daily log returns and finally closing prices. Aim of this part of the research is to identify any trends exhibited by the listed characteristics and to check, whether they have changed after the Ukrainian crisis started.

- How did the indices react to the most important events that took place during the crisis?

While the second sub-question focuses rather on long-time trends and patterns followed by the investors and markets, the third sub-question focuses more on investigating selected dates and short-term reactions to events that, form political and social point of view, are important for development of the crisis. To answer this question, a special scale, dividing the events that took place during the crisis into several categories (regarding their importance and 'magnitude') will be created. Based on this division, it will be investigated whether the most important events match with most important events from the markets or how they influence them.

- Were the most extreme events on the markets related to the crisis?

Fourth sub-question aims in analyzing whether it was Ukrainian crisis that had a major influence on the stock indices in 2014, or rather these were other events, not related or not directly related to the crisis that impacted markets most heavily. Similarly to third sub-question, also this one relates to short-term characteristics of investigated indices. The approach to this question will be reverse, when compared to sub-question 3. First, the most extreme values of

markets' characteristics will be selected. Based on their dates, it will be checked if they can be linked to any events that took place in relation to the Ukrainian Crisis.

- Has the relationship between the markets changed due to the crisis?

The fifth sub-question aim is to determine, whether a situation, that has dramatically shifted relationship between Russia and Ukraine, their politicians, societies, armies and economies had similar influence on financial markets. This question somehow results from the second sub-question, because it aims in identifying long-term trends and their changes. The answer to the last sub-question will be developed similarly to the first sub-question. Trends followed by selected indices in previous years will be identified, but additionally, the relationship between different indices will be also investigated. Based on that, it will be possible to check, whether the nature of the relationships has changed after the Crisis started.

2. Literature review

The main idea of this thesis, is to investigate how certain types of political and social situations influence the financial markets. For the purpose of this paper, we have decided to break down the literature review into three main paragraphs, which combined will give the theoretical foundations for this work. The first part will present the current knowledge on the topic relationship between financial markets and international economy. Second, we will review papers on the behavior of investors, their psychology and patterns of their decision making. Finally, we will research papers presenting what types of events, news and information influence the financial markets. Unfortunately, due to the fact that Ukrainian Crisis is still ongoing and that it is relatively young situation, there is a lack of any academic literature on this topic. For this reason, the literature review includes only some data on the crisis and situation of involved countries, which were available from news agencies.

2.1 Financial Markets

Financial markets are nowadays one of the most important sources of information about the state of world's economy. This can be attributed to the vital role they play in it. According to Lee, Clark, Pollard and Leyshon (2009), the data from October 2009 showed markets world-wide traded $14,910 trillion worth securities during that year. At the same time, world's GDP was estimated to be $5435 trillion. This means that financial markets traded approximately as much as 2.5 times more than the real economy has produced during that time. There are several conclusions to be drawn from these figures: first of all, the financial industry plays a major role in world's economy. Secondly, this scale of trade could not be achieved without high degree of integration of the markets.

There are many voices of researchers agreeing that the second conclusion is credible. With some exceptions, major financial markets are integrated with each other, as well as they influence those minor ones. What the authors point out, is that the leading role is played here by the USA (Buttner, Hayo and Neuenkirch, 2010). Due to the fact that USA is world's biggest economy**,** world's financial markets are influenced by the US in two ways: by macroeconomic news, coming from that country, and by the situation on US financial markets. According to Buttner et al. (2010), the financial markets are closely integrated with announcements of US macroeconomic news. This is true not only for European countries, but for example also for Asia-Pacific region (Vrugt, 2009). These facts show that US economy has a major influence on situation on world's financial markets (with some interesting exceptions, like Latin America). This also convinces that the markets are dependent on the real economy- after all,

US macro news, like unemployment rate, consumer and producer price indexes, GDP, Balance of Trade show the situation in different industries. This is not only financials, but also manufacturing, services, governmental. Researchers also state (Vrugt, 2009) that not only equity markets are influenced but also bond markets, foreign exchange markets or commodities markets.

However, USA is not the only influential economy in the World. For example, in the Asia-Pacific region also Japan has a major impact on foreign markets (Vrugt, 2009). In Europe, the major role is played by Germany, the biggest country in the EU (Nasseh and Strauss, 2000), and the one which is known to have to strongest economy. What may be interesting, is that the same authors found that the UK financial markets are not integrated with continental Europe economic situation. Although this is a huge surprise, this may be caused by the fact of certain exclusion of the UK, caused by keeping the Pound as the local currency, while major European economies shifted to Euro.

As stated earlier, financial markets are influenced not only by other financial markets, but also by the real economies, also foreign. Nikkinen, Omran, Sahlstrom and Ajio (2006) present a good reasoning behind this conclusion. They point out, that world's economic integration is caused in two ways. Firstly, Multinational Corporations (MNCs), sensible to economic, political and social situations in different parts of the World, because of their size- since they operate on many markets, they are influenced by many markets. What follows, is that even though a company's branch in one country exhibits stable and satisfying situation, the company can get into trouble due to problems of a branch located in completely other part of the World. Economic integration does not end on MNCs- it can be compared to a domino effect. On the local markets, those big companies cooperate with domestic small and medium enterprises, which can be easily affected by MNCs global policies, financial situation, etc. The second way in which economies integrate with each other, that Nikkinen et al. (2006) describe, is the fact that local companies, not necessarily quoted on stock exchanges, are owned by both domestic and foreign investors. This way foreign capital is transmitted into local economy.

Buttner et al. (2009) present other reasons for which economies integrate (although this paper is limited mainly to the EU countries, especially those in Euro zone). First of all, due to lack of customs duty, it is much easier for companies to enter and penetrate foreign markets, which makes international trade relations stronger. Second, countries inside Euro zone share the same ECB monetary approach, which for example means similar inflanatory tendencies. What

follows is similar behavior of different countries' economies, with regard to international financial situation. Third, EU makes it easier for foreign banks to operate on domestic countries, which is another simplifies transfer of the capital. Finally, the author states that the integration results from 'market integration as such', which can be understood as generally good environment for making business abroad.

The real economy and finance are not the only means in which financial markets are affected. Another, very powerful, tool to influence them is politics. A good example here is the current Ukrainian crisis, which evolved into sanctions war between western countries and Russia. Because of the sanctions imposed on Russia by the EU and USA, the country has lost approximately $40 billion in 2014 (Reuters, 2014). Of course this works other way around, and Russia is not falling behind the West with their own sanctions, which will cause EU countries to lose 40 billion euro in 2014 (EU Observer, 2014).

To sum up this part of the literature review, there is a lot of evidence that financial markets are not separated from the surrounding world, countries' and world's economy and political situation. They are integrated with many factors, such as foreign financial market, real economy, macroeconomic indicators and political decisions, both domestic and international. It should be noted that USA is the country that has the biggest influence on other countries' markets, due to the leading role it plays in the world's economy.

2.2 Investors behavior

As it was stated in the first chapter, the main aim of this paper is to investigate, how selected financial markets react to events taking place in Ukraine. To fulfill this task, we believe that it is essential to understand what may be the reasons behind behavior of markets' participants and their psychology. According to Barberis, Schleifer and Vishny (1998), there are two types of reaction to the news that are publicly available. The first one, underreaction, occurs when news are investors take news slowly into consideration, while pricing securities. Moreover, it is possible to forecast positive returns in the future, basing on positive news. When a security underreacts it also tends to be characterized by a positive autocorrelation, over the period of past 1-2 years. Underreaction can be regarded as parallel to conservatism- a tendency of slow update of models, using newly available information. The second way in which investors react is overreaction. In this case, when a security experiences a relatively long trend of positive information regarding it (or negative- they have to point in one direction), it tends to overvalue weight of these news. This also means, that if a security has a long history of, for example,

good news, investors tend to overprice it. In case of academic considerations, it is important to know, that Fama and French state that their three factor model is capable of taking overreaction into account, but the same does not happen for underreaction (Barberis et al., 1998). They also point out that underreaction is in line with other phenomena- conservatism. Conservatism means that models are updated slowly (or update themselves slowly), basing on the newest information available. This means that conservative investors, or models, tend not to be affected by the newest events, but require some time to change their approach to certain issues. On the one hand, that could mean they are not easily fooled by current trends and fashion. On the other hand, this can also mean that they do not take (are not willing or not able) to take the advantage of available information. Galariotis, Holmes, Kallinmterrakis and Ma (2014) state, that aggregated overconfidence should be more visible in case the markets were lately up, rather than in case they were down.

Various authors describe a number of other phenomena that may influence investor's behavior, thus be interesting from the point of view of this paper. Since we are going to investigate, how the markets react to Ukrainian crisis, we believe that we should take into account also those behaviors of investors, which might not be rational. Bem (1965) formulated the attribution theory. According to it, people (not only investors), tend to attribute the events in favor of their own actions, to their high skill of either forecasting or supporting actions. At the same time, when events are developing not in line with their expectations and contrast their theorems, they would assign this to either 'external noise or sabotage'. Galariotis et al. (2014) mention that disappointment, resulting from results falling below expected is much stronger, then the positive feeling one gets after outcomes are more positive than expected. These two theories can be perceived as somewhat contradictory. For example, when investor is taking loses on his last decisions, we might attribute them to the events that were unpredictable, which would mean that his approach was in fact correct, hence his investing mood should not be affected. On the other hand, he achieved results below expectations, which is a strong negative feeling. This means that his mood would be affected. Despite the fact that these theories may look as contradictory, we believe that both of them will be useful while analyzing situation on the markets. Another interesting information given by Barberis et al. (1998), is the fact that people tend to extrapolate trends. This should mean, that once an investor identifies a tendency on the market, he will assume that it will continue. This statement is contradictory to the concept of conservatism, hence to underreaction, because one's behavior is based on short term observations. However, while Barberis et al. (1998) write that people tend to follow this

behavior – which may be interpreted as majority of investors – Galiarotis et al. (2014) only describe conservatism, without stating what part of investors actually exhibit this pattern. An interesting observation, noted by Barberis et al. (1998) is representativeness heuristics. According to this theory, people tend to think that there is a certain pattern in events, which in fact are completely random. This can be linked to the attribution theory, especially its part regarding reactions to positive events. Investors may not only believe that their models, behavior are justified by given actions; but may do that basing on accidental events that, as they believe, form a truly legitimate tendency. Here we can also mention overconfident investors (Daniel, Hirshleifer and Subrahmanyam, 1998) which overrate their privately acquired information, while underrate the information known publicly.

2.3 Other influences

In this last part of the literature review, I would like to focus on what researchers have established so far in terms of what factors, news or values influence different financial markets. There are numerous articles and researches dealing with this topic, yet the results are not always in line. Actually, we can distinguish two types of researches. The first one is based on high-frequency financial data from various markets. The second one, on the contrary, is based on low-frequency data. As one can imagine, they yield quite different results and conclusions.

Rapach, Wohar, Rangvid (2005) state that it is a difficult task to identify macroeconomic variables that are reliable source of information regarding future returns on stocks. The author also states that it is not even clear that any of the variables impacts markets. This negative approach is caused by the fact that there are as many papers confirming influence a variable is supposed to have, as those that disconfirm it. This approach should be a warning, of how cautious one should be, when basing his work on single researches. In the same article Rapach et al. (2005) manages however, to draw some conclusions from the research he conducts. It appears that interest rates in developed countries can be regarded as reasonable source of predictive information for financial markets in these countries. The researchers also state that interest rates appear to be more accurate source of information on the shorter time horizons. They draw similar conclusions for inflation rates, however this can be applied only in some developed countries (the authors do not specify the time horizon)

In their paper, Nasseh et al. (2000) remind that in the most standard approach to stock valuation, their prices are affected by the present value of future cash flows. On one hand, this can be perceived as a very simple model, which takes under consideration only company's future

financial situation. However, these models can be regarded also as very sophisticated, since the numerous factors, in fact, can influence company's future cash flows. The factor can have both macro and micro background. The authors claim that their paper supports the existence of a link between stock prices and the following macroeconomic indicators: interest rates, industrial production, consumer prices and manufacturing orders. They base their research on investigating the relations between major European economies with Germany's. They find that fluctuations on German financial markets, interest rates and industrial production have a clear influence on the situation on stock markets of selected countries. However, it is also pointed out that financial markets react strongly to domestic interest rates. What is an important conclusion is that financial markets, generally, exhibit higher volatility than the underlying macroeconomic activities. This finding can indicate, that investors react too strongly to the news and afterwards they have to correct their actions, which causes the volatility. Nasseh et al. (2000) state also that there is a stronger evidence of the cointegration between stock prices ad macroeconomic variables over long time-horizons. That information may indicate that to investigate how financial markets react to macroeconomic news it is more reliable to investigate low-frequency data, rather than high-frequency.

Nikkinen et al. (2006) give other evidence of US macroeconomic announcements influencing major world economies. According to this research, indices like employment rate, employment cost index, customer and producer price indices and NAPM have a visible impact on financial markets of wide selection of countries: G7, Europe and Asia. What comes as a surprise, is the fact that there is evidence of impact on Latin America's markets, despite the geographic proximity. The authors review a number of scientific literature, which proves that not only stock markets are affected by macroeconomic news, but also exchange rates, asset prices, their volatilities and bond markets exhibit a distinct relation. The paper by Nikkinen et al (2006) is another confirmation of theory stating that specific macroeconomic indices influence financial markets, especially when they are announced in the USA.

A very interesting insight is provided by Buttner et al. (2010), who describe the impact of foreign macroeconomic news on financial markets of Central and Eastern European Countries (CEEC), the so-called new member states of EU. According to their research, some of US macroeconomic factors announcements impact parameters of government bonds of different maturity: trading volume, spread and price. This finding not only confirms the important role of US in the global economy, but also the fact that not only stock markets are affected by the events taking place in the USA. On the contrary to articles revived in this work so far, this

paper mentions other type of financial market. The authors also cite Andritzky et al. (2007), who found that in CEEC countries local and domestic news do not play an important role in local bond spreads behavior, while the information coming from the US is of high significance. This means that for markets which are still developing and establishing themselves, it is not the local situation that matters. The leading role is played by the biggest foreign economies, at least in case of bonds. This finding can be very important in the analysis of Ukrainian financial market, which we are about to conduct in this paper. Andersen et al. (2007) points out that not only developing markets are under influence of the US news. In his paper he concludes that also stock, bond and foreign exchange markets in the USA, Germany and the UK are under influence of announcements from the US. However, in case of equity markets, their reaction varies in its intensity, depending on the stage of business cycle the market currently is in. However, from our perspective, the most important finding of Buttner et al. (2010) paper is the conclusion that developing markets are under influence of foreign, international macroeconomic news. In some cases the reaction is stronger than in case of local announcements.

Research by Kim, McKenzie and Faff (2004) features a noticeable difference when compared to previously reviewed works. It distinguishes two types of content carried by macroeconomic announcements. The first one is the expected value of a given indicator, and the second one- the unexpected part of the indicator. According to this work, three major US financial markets do not react to the first content at all. It is the surprise that causes the reaction and impacts markets. This unexpected content is defined by the authors as a difference between market expectations and the actual value of an indicator. This is a reasonable finding, because it can be intuitively understood that investors prepare for expected information before it is actually given to public information, while there is no way they can make investment decisions to news that are unexpected. This conclusion is very important for the main research question our research- it shows that markets should react intensively to the events taking place during the crisis, since it seems that the situation is developing chaotically and without warning.

The paper by Kim et al. (2004) also gives some specific examples of how announcements of US macroeconomic indicators influence financial markets. In case of FX, it is Balance of Trade and Balance of Payments that influence USD exchange rates most. For some currencies also GDP is an important value. In case of bond market, authors suggest that domestic economy indicators play significant role. On the contrary to other researchers, Kim et al. (2004) are reluctant in pointing specific indicators that individually influence parameters of the bond

markets. They point that it is rather the mixture of news that create an impact. Surprisingly, they find that none of the indicators influences stock market characteristics. The only exception is the inflation value, which affects market variance. This is a very unexpected discovery, since it suggests that stocks are almost completely separated from local economic situation. This is on the contrary to previously reviewed articles. Finally, the researchers conclude that none of the investigated markets reacts in a consistent, recurrent way.

In this short paper, its author (Asprem, 1989) draw some conclusions on the relationship between stock prices and major macroeconomic factors. They find that the prices are negatively correlated with employment rate, exchange rates, imports, inflation rate and interest rates. What is an interesting feature of this research, is its contradiction the one we reviewed in previous paragraph. It not only states that local stock market is under pressure of domestic factors, but it also identifies specifically those economic indicators, which create this impact.

In their article, Brooks, Patel, Su (2003) present a different approach to the topic of factors influencing stock markets. While all of the previously reviewed articles focused on macroeconomic news announcements, this paper investigates the impact of firm-specific announcements on the equity market. Under firm-specific announcements, the authors mean information like dividends or earnings announcements. Despite the fact the main focus of our paper is rather in macro-news, we find some features of this articles to be interesting and useful. Furthermore, unlikely most of other researchers, these scientists investigate high-frequency data (intervals of 5 minutes). We believe that some of the findings described by Brooks et al. (2003), can be extrapolated and adopted in macro scale.

In studies prior to this one, it was found that it takes from 1 to 15 minutes for a stock price to react to announced news. In the reviewed paper, authors suggest that it is rather 20 and more minutes. For our perspective, it is interesting that most of the impact caused by announcements is reversed in 2 hours following the event. What is in line with other papers, is that unexpected news are those that influence the stocks. Moreover, they suggest that financial markets overreact to information perceived as bad, adverse. They also advocate, that markets do not cope with this kind of information efficiently. It is also concluded that regardless the magnitude of news, shortly after their announcement, the selling pressure rises, which is reflected in increased trading volume. Another interesting finding is that it appears that stocks react faster to the events that took place before or after trading hours. This may be caused by the fact that more investors have chance to acknowledge this information.

As it was mentioned before, the article by Brooks et al. (2003), is based on research conducted on stock-specific news. However, some conclusions seem to be reliable also from the macro point of view. Especially important information is that the impact of announcements tends to be reversed in some time after the event. This means that when looking on low-frequency data, we can misjudge the actual impact of an events, because there is a lot of noise coming from other events. It seems to be very hard to separate the influence on various events and information, when investigating low-frequency data.

An interesting point of view, although can be perceived as an outdated research, is provided by Hardouvelis (1987). In their paper, they present a theory, according to which stock prices and interest rates react differently to unpredicted component of stock of money announcement. While it is useful to note that the authors notice a relationship between another macroeconomic indicator and financial markets, what is useful for our work, is the fact that this is another paper that appreciates the importance of the unanticipated content of the information. In addition, Hardouvelis (1987) finds that monetary news impact stock prices, while non-monetary do not. While this is an interesting point of view- none of the previously reviewed documents introduced this kind of distinction between news' types, it is contrary to most findings from previous articles. Employment information, for example, is clearly non-monetary information, but several researchers find a link between this rate and stock prices. Unintentionally, the topic of our research seems to be appropriate to investigate, whether this theorem is correct. After all, most of the events described in time-line chapter are rather non-monetary.

2.4 Conclusions

From the reviewed papers, there are several conclusions to be drawn and some statements that should be reflected in our data. First of all, researchers are coherent, and state that financial markets are affected by meaningful events from other countries. They are integrated with each other and dependent on news announcements from other countries, especially from World's leading economies, as well as on domestic news. The degree to which international information influence local markets depends on how well their economy is integrated with the others. Another conclusions, and important finding, given one of the research questions, is that there are certain patterns of investors' behavior: overreaction, underraction and conservatism. Furthermore, investor's psychology has a set of characteristics that determine actions they take on the markets. They exhibit patterns and their behavior is not chaotic. Following this conclusions, it might be possible to determine certain trends that investors follow during Ukrainian crisis, hence to answer one of the research questions. Finally, authors are

inconsistent when it comes to determining what macroeconomic factors influence financial markets. Generally, it can be concluded that these factors influence markets, but authors do not agree in detailed list of these factors. Most scientists state that there can be pointed specific factors that influence markets, but there is a theory that only a set of variables can cause an impact. Moreover, a very important factor in this kind of analysis is frequency of the data. While researches based on high-frequency data yield more factors, low-frequency data point only few variables.

Although the reviewed literature is very useful and presents a lot of interesting theories, it also has some limitations when it comes to applying it to this particular research. First of all, most of the reviewed papers is based on US, European and Asian examples. None of the articles found is based on the example of Ukrainian or Russian market. The closest, in geographical terms, is research based on Central and Eastern European Union Countries. Furthermore, this paper is based on data gathered during the time of a major political crisis. Due to the fact that it has been years since such an extreme situation has happened, none of the reviewed researches uses data gathered and processed from this point of view. Another limitation results from the previous point. Articles did not investigate the influence of non-economic news. In this research, we are going to incorporate publicly available information on the situation in eastern Ukraine, as well as on sanctions imposed by USA, EU and Russia. Of course this information can be easily translated into macro-economic indicators- their trends rather than specific values (for example closure of mines in eastern Ukraine will negatively influence GDP, but it is impossible to forecast precise value). Finally, the data gathered from markets are low-frequency (end of day data). As a result, it may be impossible to separate the influence of Ukrainian news from the others, which are not interesting for this research. On the other hand, events in this crisis are not announced like macroeconomic indicators. It takes longer for them to be confirmed and reliable, hence it takes longer for the markets to incorporate them. For this reason low-frequency data may not be that unreliable, as it seemed.

3. Long-term analysis

3.1 Methodology

The aim of this chapter, is to provide analysis of long-term trends that were exhibited by the following stock indices: UX, MICEX Main, MICEX Financials, MICEX Oil & Gas and WIG Ukraine. Basing on these analysis, it should be possible to tell, whether the Ukrainian Crisis has impacted mentioned stock indices and what follows- financial markets where the indices are listed. Analysis are based on years 2008 to 2014. Thanks to this selection of vintages, the paper includes most recent vintages, which will help to compare performance of the indices during the crisis and during normal times. In addition, the report includes also years 2008 and 2009, which is when the Global Financial Crisis took place. What follows, one will be able not only to compare 2014 to normal times, but also to the times of another crisis (however it had completely different nature and roots).

MICEX index consists of 30 biggest and most liquid stocks traded at MICEX Stock Exchange in Moscow, and is capital-weighted. Stocks are selected to the index twice each year and belong to one of the following industries: banks, IT, transportation, consumer goods, oil and gas, electric utilities, telecommunications, metals and mining, chemicals, industrials. MICEX Financials and MICEX Oil & Gas are calculated on the same basis as the main index, the difference is that their composition is reviewed 4 times a year (each quarter).

UX is the main index of Ukrainian Stock Exchange located in Kiev and is capitalization-weighted. Theoretically it consists of 15 stocks, and the biggest weight that can be assigned to a single stock is 20%. However, at the moment (July 2015), it consists of 10 stocks where one of them has weight higher than 20%. Stocks selected are most capitalized and most liquid companies.

WIG Ukraine is an index of companies which head offices or majority of business is conducted in Ukraine. It is total return type of index that is quoted starting from May 4, 2011. Then number of participants is variable, but if there are less than 20, weight-cap is 40%.

This chapter will be based on analysis of several features of each index: average daily log-return, annualized volatility, average daily trading volume, yearly log return, closing prices, 10-days volatility, trading volume and log-returns. Analysis of these characteristics of each index will give an insight in trends they followed during past years and how the tendencies have changed in 2014, when the Ukrainian Crisis took place. In some cases it was not possible to gather all data, but it will be discussed further. Second part of the chapter presents how

relationships between indices looked like in previous years, and how they have changed in 2014, taking into account the Ukrainian Crisis. This part will be based on analysis of correlation coefficients calculated between each pair of investigated indices. As a result, it should be possible to determine in this paper, whether polarization of political and social relationship between Russia and Ukraine influenced the indices.

3.2 UX

Table 1- UX index characteristics

	2014	2013	2012	2011	2010	2009	2008
AVERAGE DAILY LOG RETURN	0,04%	-0,03%	-0,18%	-0,22%	0,20%	0,26%	-0,53%
YEARLY VOLATILITY	35,09%	20,60%	35,19%	34,98%	39,44%	42,96%	49,41%
AVERAGE DAILY TRADING VOLUME	3 343 024	3 023 617	9 803 506	66 883 816	56 198 857	68 354 156	0
YEARLY LOG RETURN	13,70%	-6,75%	-44,05%	-53,59%	49,08%	64,93%	-131,00%

Analysis of UX index history start in 2008. Unfortunately, it was not possible to retrieve all information that was intended, namely trading volumes for the whole 2008. Regardless this fact, Table 1 presents a set of most important data characterizing this index.

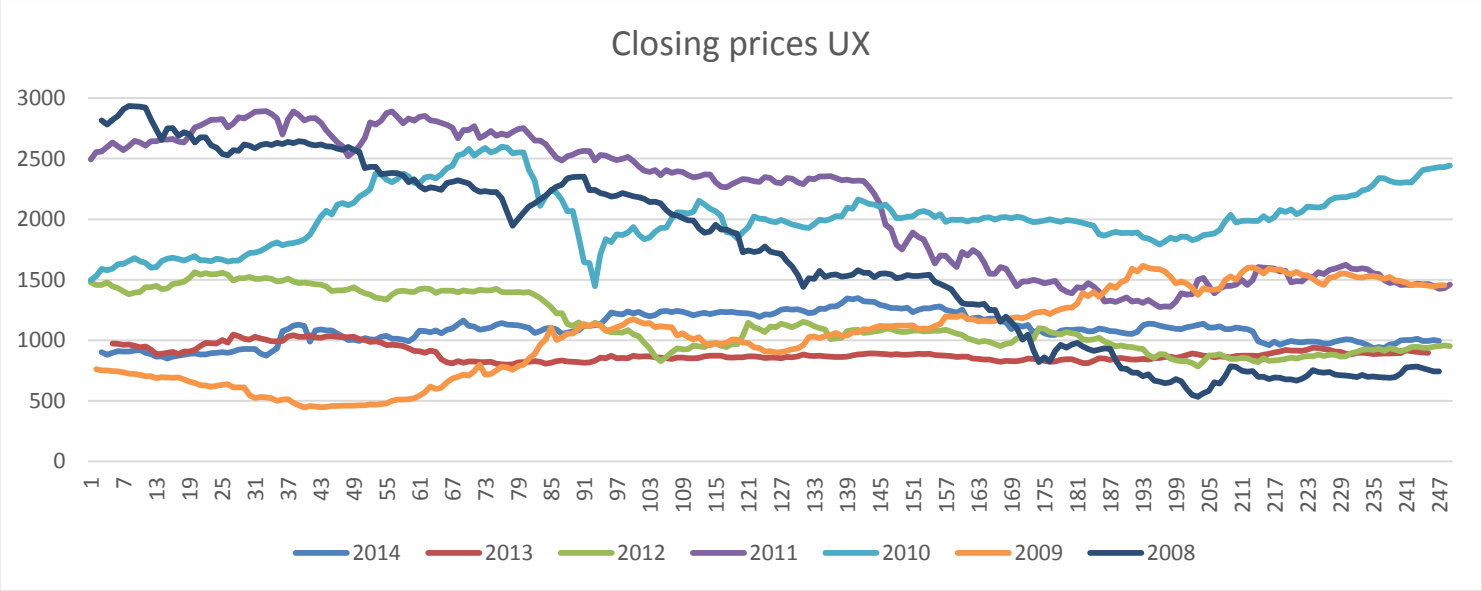
We do not know what the daily average trading volume was in 2008. Besides that, there clearly are two groups of years: 2009 to 2011 and 2012 to 2014. In the first mentioned group, the volume fluctuated between 56m and 65,5m trades. This contrasts sharply with the second group, where none of the vintages reached more than 10m trades daily. Average trading volume in years 2013 and 2014 was around 3m (the second vintage has slightly higher score), while in 2012 it was 9.8m. Before going into deeper analysis, it seems that it is unreasonable to attribute 2013's average to outbreak of the Crisis, since it began in early December 2013. It is very unlikely that one month of extreme situation would affect whole year's average. What is more, in December there are usually less trading days due to Christmas holidays. From researcher's point of view, it is much more intriguing what happened between years 2011 and 2012, when average daily trading volume declined almost 8 times. However, this is not the topic of this research. Coming back to most recent vintages, average volume in 2014 is practically on the same level as in 2013, even slightly higher. This can suggest that investors perceive Ukrainian market risky. Generally, at first sight, in terms of trading volume, is not very much different from previous year, which suggests that the Crisis did not affect this characteristic of the market. It is clearly visible that the market is rather under the influence of a long-time trend

that began in 2011 and lead to sharp decline in the volume. Deeper insight in the issue of volume in years 2013 and 2014 will be provided in next parts of this chapter.

The next feature of the market to be briefly discussed before going into detail is average log returns. As it is presented in Table 1, average daily log returns for the whole investigated period fluctuated around 0%, usually being negative. UX index presented worst results in 2008, when the average daily log loss equaled -0.53%. Another interesting fact is that it yielded the highest returns in 2009, the year of outbreak of GFC (Global Financial Crisis 2007-2008). On average it was equal 0.26% daily. When compared to these two extremes, returns in 2013 and 2014 are very average, respectively -0.03% and 0.04%. The situation is visibly better than in years 2011 and 2012 (-0.22% and -0.18% respectively), which may suggest that investors received more optimistic information in younger vintages than in older. The proximity to 0 suggest that even though the outbreak of the Crisis, investors remained calm (especially in 2014), and the amount of information which they perceived as negative did not outweigh the positives. On the other hand, this numbers might also mean that when facing generally tough domestic and international situation, and having problem with their biggest economic partner, they reacted to every positive news too hasty, which caused the index to overreact.

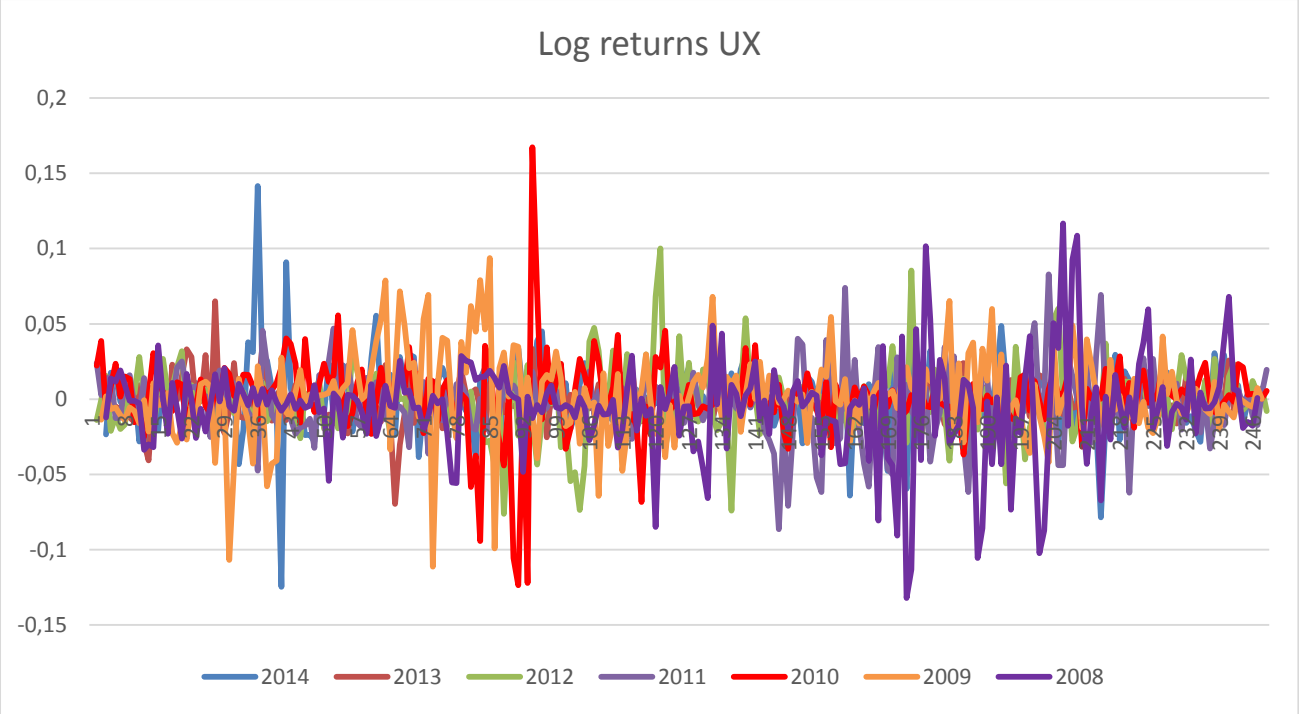
Yearly log return, calculated as the log return between first and last trading day of the year is the next discussed characteristic. It is clear that when compared to 2008, all other vintages present much better results. In that year UX index lost 131% of its value, which is 2.5 time worse result than second most negative year – 2011, when it lost 54%. On the contrary there is 2009 and 2010, when UX gained 65% and 49% respectively. Again, it is very interesting topic for a research, due to GFC outbreak. However, this research focuses on years 2013 and 2014. It is most surprising that in the newest vintage the index, despite generally pessimistic information coming from Ukraine, actually gained almost 14% and had positive average daily log return. Again it is hard to explain without going into deeper analysis (which will be done in this paper), but a wild guess suggest that this can be caused by investors having a positive attitude towards Ukrainian markets, despite all the turmoil the country is and was going through.. Nevertheless, for those being familiar with situation on Ukraine, this is mostly unanticipated information. On the contrary, in 2013 UX lost almost 7%. The annualized volatility results are in line with other features of the market. 2008 was the most extreme year, and the market risk was close to 50%. From that vintage it was gradually decreasing until 2013 (2011 and 2012 are practically the same), when it declined to 21%. 2014 the volatility increased significantly, and reached 35%. Despite there is a huge difference between 2013 and 2014, last

year's result is only 5th highest since 2008, which shows that despite the turmoil and uncertain political and social situation, the investors remained calm, and did not panic.

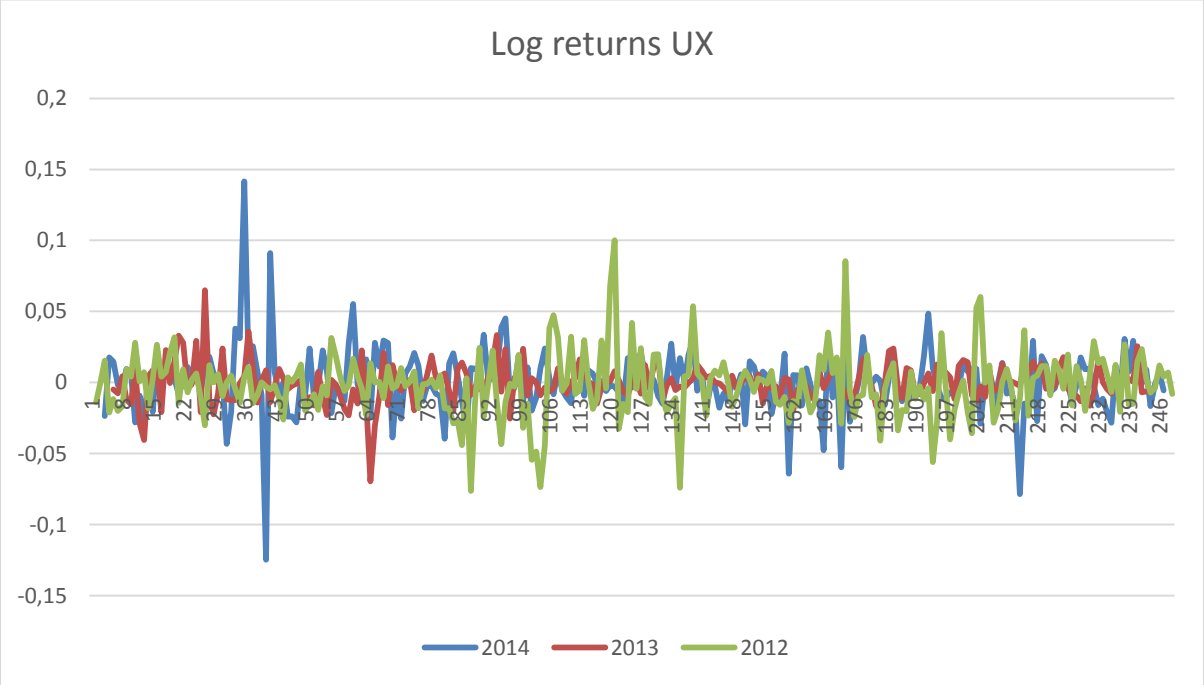


Graph 1- UX index closing prices

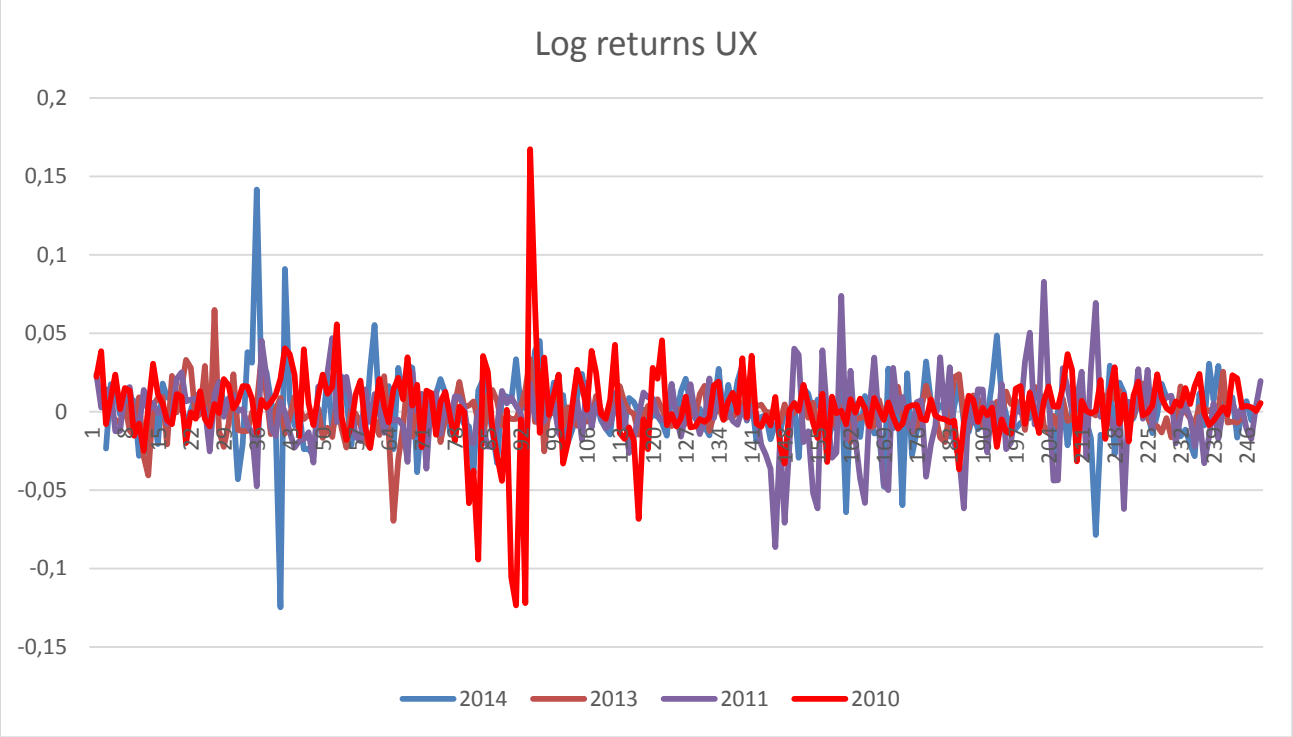
Graph 1 presents daily closing prices of the UX index between years 2008 and 2014. According to this graph, years 2013 and 2014 were the most stable ones. More precise analysis will follow, however from this graph we can conclude, that despite political and civil unrests in Ukraine, these vintages were the least volatile in the investigated population. It is clearly visible, that the worst year was 2008, which was stated in the previous paragraphs. UX index was losing its value practically throughout the whole year. The next year, 2009 was slightly better, with stable positive returns during the whole vintage. The following 2010 was also positive, although it has gained and then lost some of its value in the middle of the period. However, after approximately 100th trading day of the year, the tendency again became stable. 2011 and 2012 again presented stable, negative tendency. On the background of the previous vintages, there are two conclusions to be drawn. First of all, 2013 and 2014 presented stable tendencies, similarly to other investigated years. There were no dramatic turns in the direction of the series, and one could easily predict what the upcoming weeks would bring and how the closing prices would develop. The second conclusions is that, unlikely older vintages, the 2013 and 2014 exhibited daily returns close to 0, and the tendency was flat and stable, which means that after years of turmoil (both positive and negative), the market reached stability, even when the country faced political and social challenges.



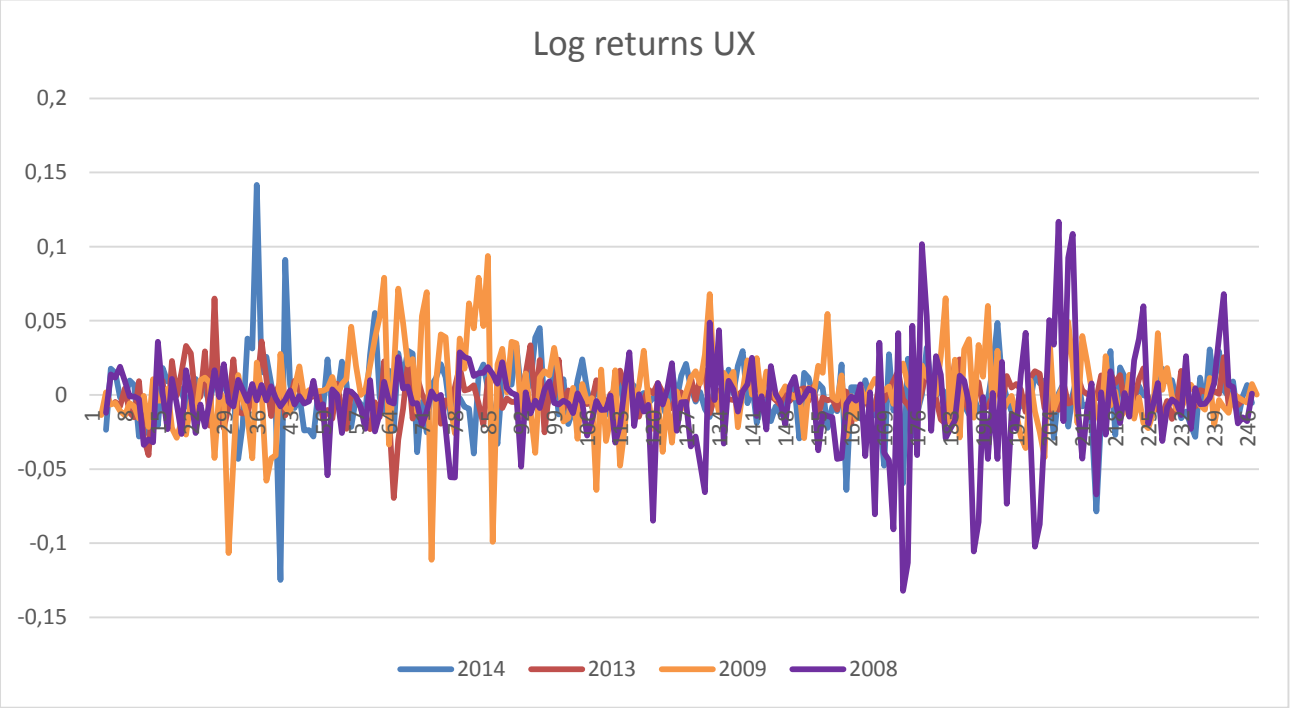
Graph 2- UX index log returns years 2008 - 2014



Graph 3- UX index log returns years 2012 - 2014



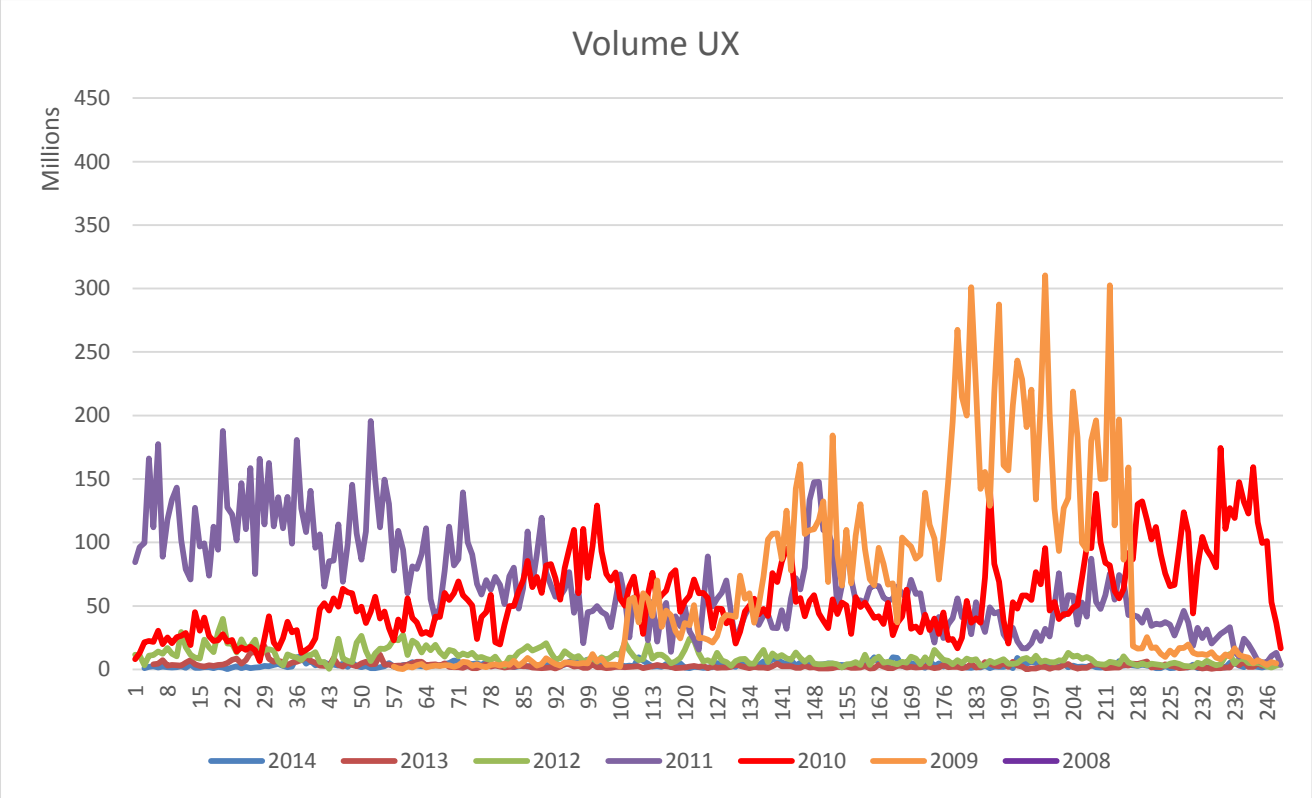
Graph 4- UX index log returns years 2010-2011 and 2013- 2014



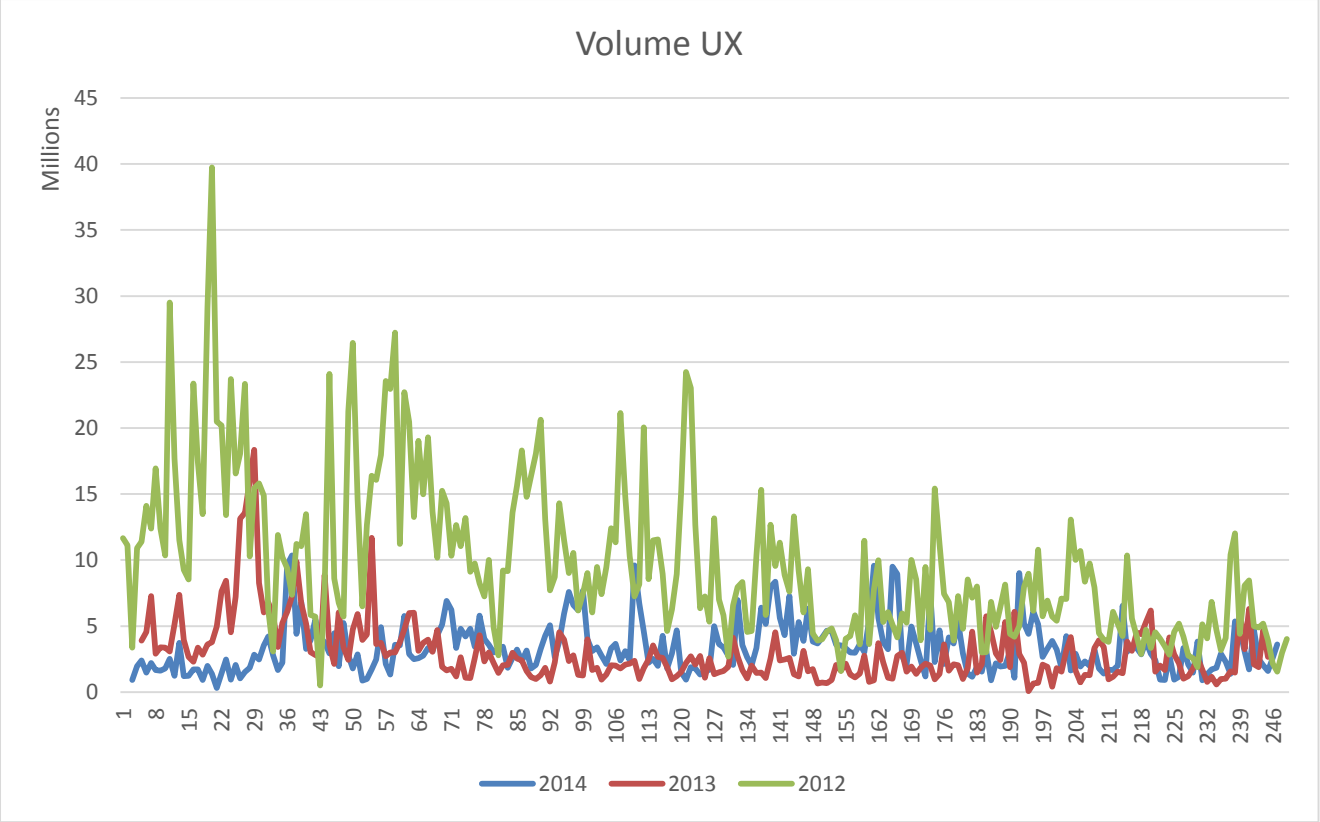
Graph 5- UX index log returns years 2008 -2009 and 2013-2014

In order to present data in a clearer way, Graph 2 presenting log returns throughout the investigated vintages was split into 3 separate diagrams, comparing vintages 2013 and 2014 with two or three other (Graphs 3 to 5). What can be concluded from Graph 2, is that daily log returns in the investigated vintages hardly stand out from previous years' data. Basing on Graph

3, it is visible that in years 2012 to 2014, the index yielded the smallest absolute returns in 2013. Comparing vintages 2014 and 2012 shows, that the newer one exhibited single most extreme, both positive and negative, but the older one gave a bigger number of extreme log returns. Next, Graph 4 compares vintages 2010-11 and the investigated ones. Again, 2013 does not stand out from this background. Interestingly, the beginning of 2014 is the most visible series in this group. However, deeper into the year it becomes less visible. The biggest daily log return was achieved in 2010 (more than 15%), but the second biggest – in 2014, shortly after the most negative log return was exhibited. Finally, when 2014 and 2013 are compared to the oldest available vintages, 2008 and 2009, the situation is similar to the one described previously. The beginning of 2014 stands out, showing biggest returns, while later in the year other vintages take it over. Generally, out of all 7 presented series, 2013 is the least interesting, with daily log returns oscillating around 0. On the other side, 2014 yields the biggest negative log return and second biggest positive. However, the rest most extreme results did not happen in any of these two vintages. This again shows, that despite the turmoil, they do not stand out in terms of extreme market reactions, when compared to previous years.

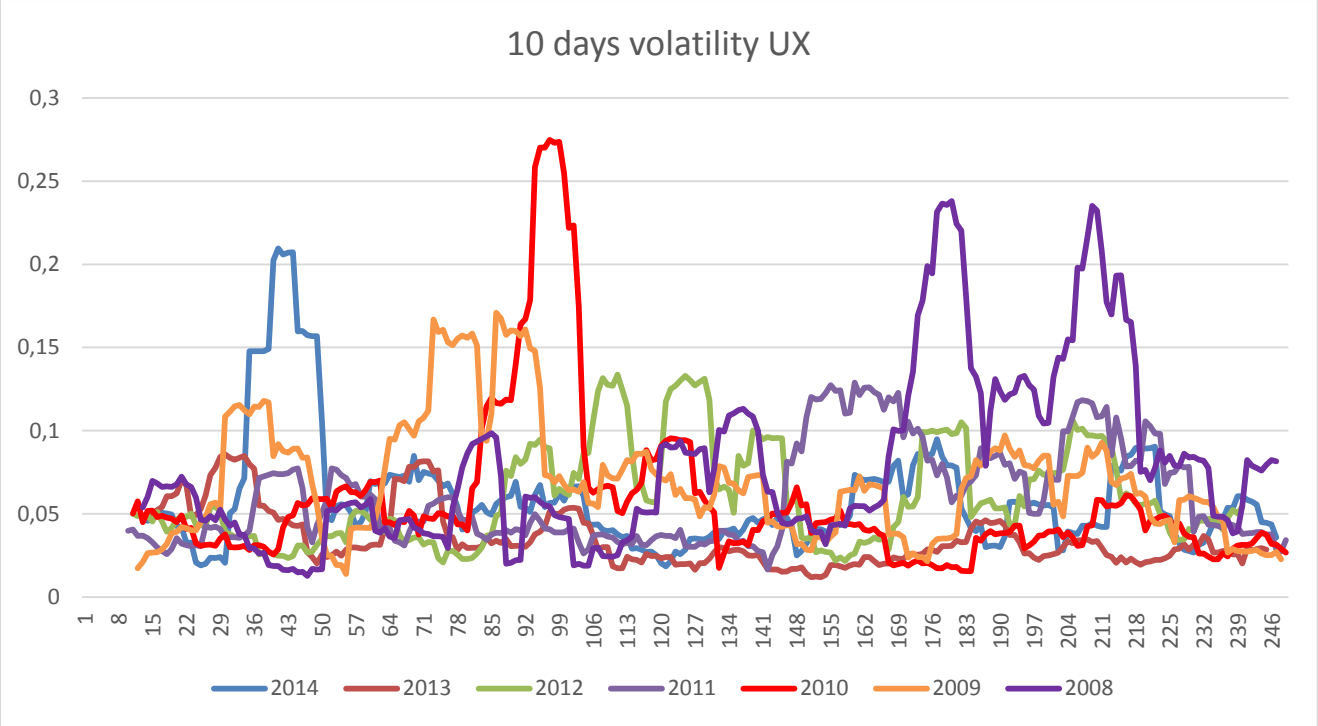


Graph 6- UX index daily trading volume



Graph 7- UX index daily trading volume years 2012 - 2014

Due to the fact that presenting daily trading volumes only on one graph would be ineffective, Graph 7 presents vintages 2012 to 2014, when the volumes were dramatically lower than in the previous years. It is pointless to compare situation from 2014 and 2013 to the vintages 2009 to 2011, as it clearly is presented by Graph 6. Graph 7 presents another proof that 2013 was the least extreme year in this analysis. Despite one peak in the beginning of the year, it usually yielded lower volumes than 2014, not mentioning 2012. An interesting observation is that, starting form 2011, vintages reach their highest daily volumes in the first trading days of the year (in 2014 that was slightly later, yet still during first 40 days). Another interesting fact is that at first sight, in 2013 the volume was much less volatile than in other years. However, deeper analysis of daily volume will follow. Generally, it can be observed that investors were more eager to trade in 2014 than in 2013. The exception here are first 40 days of 2014, when the volume was very low. This might be caused by the fact that probably most of the investors are located in Kiev, similarly to Stock Exchange premises. It was also in Kiev, where the biggest unrests took place in the beginning of 2014 (this will be discussed in the next chapter).



Graph 8- UX index 10 days volatility

Graph 8 presents 10 days volatility in all of the investigated vintages. The highest results were achieved in 2010 and 2008. After them, the fourth highest volatility score was achieved in 2014. While in the majority of vintages, the volatility was volatile itself, once again 2013 has proven to be the most stable and calm year out of all investigated. Its highest scores were never bigger than 9%, and they approached this level only twice throughout the year, in very short periods. For a big part of the year, the 10 days volatility was lower than 5%. Also 2014 when compared to other vintages remained stable. The only exception is short period shortly after the year started, but after that the volatility was low and stable, when compared to the others. More precise analysis of 2013 and 2014 will follow, but it is clearly visible that compared to older vintages, these two exhibit some of the lowest volatilities, and visibly low volatility of volatilities (especially 2013).

3.3 MICEX

	2014	2013	2012	2011	2010	2009	2008
Average daily log return	-0,02%	0,00%	0,01%	-0,08%	0,06%	0,31%	-0,45%
Yearly volatility	23,54%	15,73%	19,51%	27,21%	22,82%	47,02%	70,96%
Average daily trading volume	37 659 mio	29 185 mio	35 822 mio	59 072 mio	47 591 mio	53 916 mio	45 737 mio
Yearly log return	-4,86%	-0,71%	2,05%	-20,07%	15,56%	76,83%	-112,43%

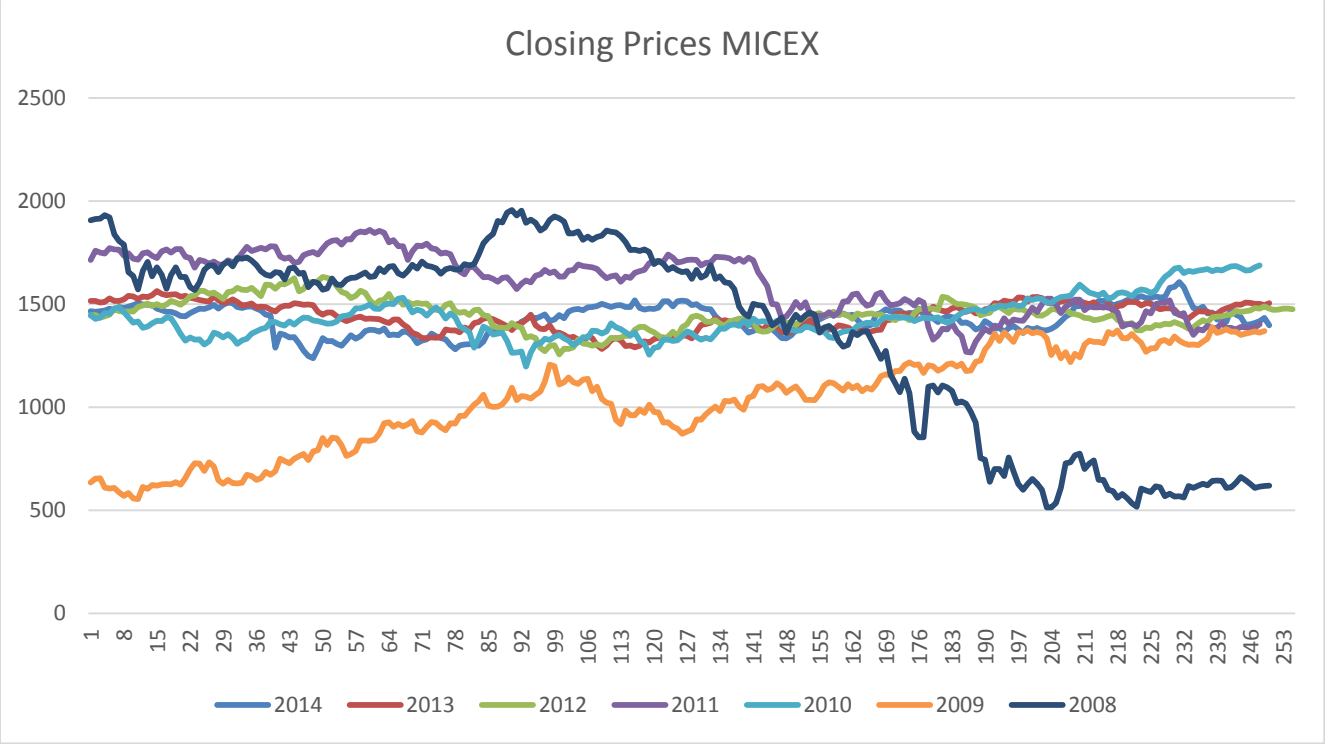
Table 2- MICEX index characteristics

Analysis of MICEX, the main index of Moscow Stock Exchange begin with data from 2008. Unlikely the UX index, it was possible to gather all information and data for the period between 2008 and 2014. Table 2 contains the most important data of this index for the given period. The analysis begin with looking at years 2013 and 2014, which are of interest because of the crisis in Ukraine, in which Russia is actively involved and because of which is under western sanctions, with previous years, when situation, at least in political and social terms, was more normal. Throughout these years average daily trading volume on the Russia market fluctuated, reaching its top in 2011with 35 822mio trades daily. The lowest average was achieved in 2013, when it dropped to 29 185mio trades. The third worst result was experienced in 2014, when the average volume equaled 37 659mio. These are noticeable changes in the trade volume, however when we compare them to UX volume, which was discussed in the previous part of this chapter, it appears that the volume actually remains at a stable, high level, with practically minor fluctuations. Interestingly, the lowest average was achieved in 2013, the same as in the Ukrainian case.

The next discussed market feature are average daily log returns. On average, MICEX yielded the worst results in 2008, losing -0.45% daily. On the contrary, the next year, 2009 was the best among investigated population and the index was gaining 0.31% on a daily basis. Compared to these results, 2013 and 2014 presented the least extreme results- in 2013 the average was equal 0 and next year it was -0.2%. Interestingly, such low returns were also the case in 2012. In all previous years the results were higher and more extreme. This can suggest that log returns close to 0 do not result from the situation in Ukraine, it is rather a tendency caused by some domestic Russian factors. The next part of the research will investigate, whether this is the case. The yearly log return is another figure that confirms the tendency described above. The most extreme was the year 2008, when MICEX lost more than -112% of its initial value. The most positive results were achieved in 2009, in which the index gained

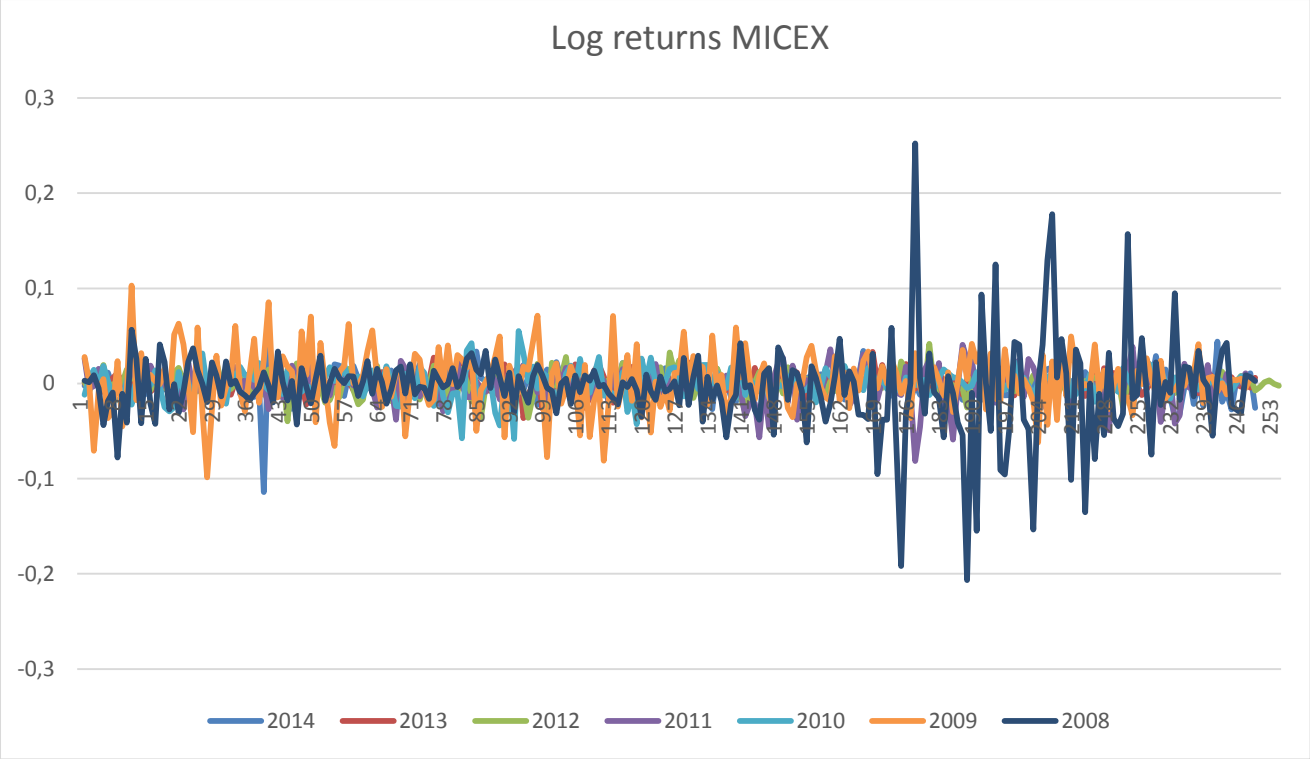
almost 77%. Next, in 2010 and 2011 yearly log returns became less extreme, yet still far from 0%- in the older vintage the index gained almost 16%, only to lose 20% the next year. Finally, yearly log return score was relatively close to 0 in years 2012-2014. In 2014 MICEX lost almost -5%. Although the index decreased its value throughout the years, it is worth to mention that the loss is quite small, given the problems Russia had to face (resulting not only from bilateral sanctions war with EU and USA, but also because of oil prices falling dramatically). Again, year 2013 was the least extreme, with yearly log return close to 0. The last feature discussed is annualized volatility. Similarly to other characteristics, the most extreme results were achieved in 2008 and 2009, when the market volatility equaled 71% and 47% respectively. As in other cases, 2013 was the year when the lowest annualized was realized, with score of only 16%. In 2014, despite the turmoil connected to the Crisis and falling crude oil prices, the result was 24%, which is fourth lowest result among investigated vintages.

When we compare the result of this introductory analysis of MICEX index, with analogical figures for UX index, there is a certain conclusion to be drawn. Despite the fact that size of the markets is practically incomparable, two vintages that are of interest for this research – 2013 and 2014 – present similar position with regard to other investigated years. After restless and chaotic 2008 and 2009, the next years were much more placid, however it can be generalized that the two latest vintages were truly calm and not extreme. This conclusion is limited of course only to MICEX and UX indices.

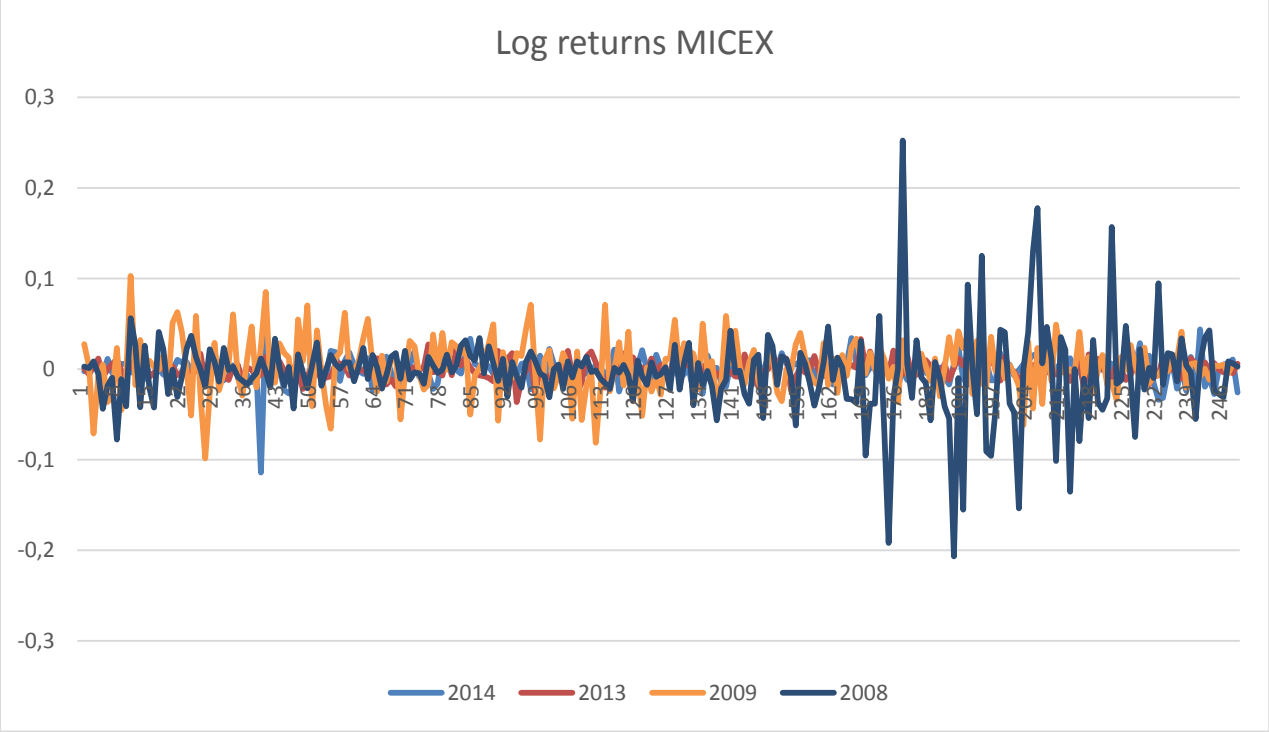


Graph 9- MICEX index closing prices

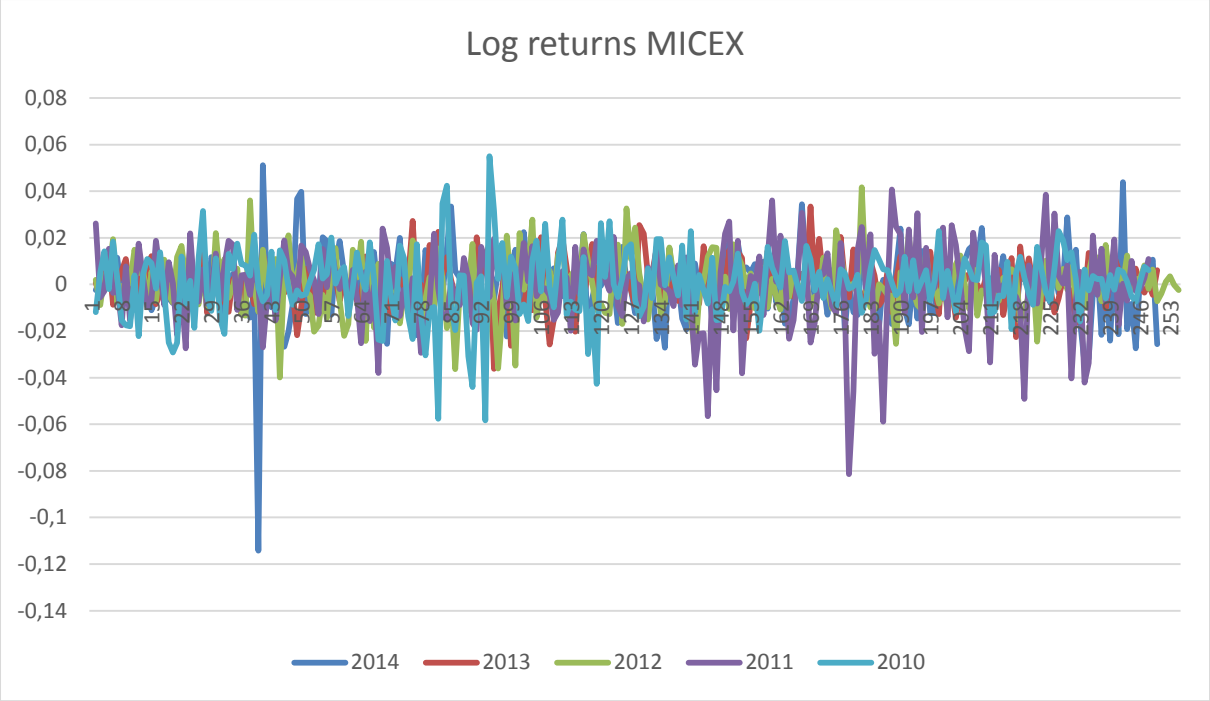
Graph 9 presents daily closing prices of MICEX index. The first two vintages, in the analysis, 2008 and 2009 stand out most of the population. This is because they exhibit strong trends: the older- decreasing and the younger- increasing. What is interesting, is that in 2008 MICEX accumulated its total loss after approximately 100 trading days. Up to this moment, its value was approximately equal to first trading day. In case of 2009, yearly gain was earned practically during whole year. The rest of presented vintages remained quite stable throughout the whole period. From the remaining 5 years, the most volatile and unstable is 2011. Vintages 2013 and 2014, which are of main interest for this analysis, are among the most stable and predictable series throughout the whole year. Interestingly, 2013 and 2012 seem to be closely correlated, but this conclusion is drawn only on the basis of Graph 9 and is rather a coincidence. It again is a surprising finding, that despite the tense situation in Ukraine and global crude oil markets, MICEX did not exhibit any dramatic jumps in daily closing prices. Generally, this graph confirms that after the GFC struck in 2008 and 2009, Russian market remained stable, even when facing different political, economic and social environments.



Graph 10- MICEX Index daily log returns



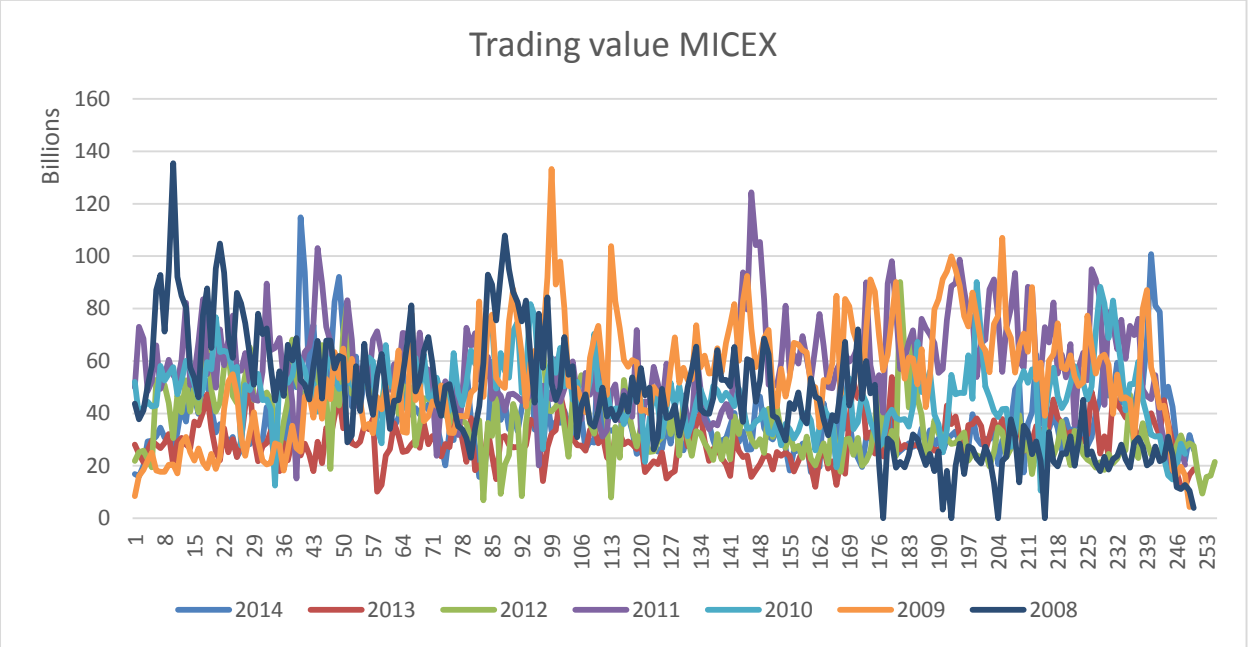
Graph 11- MICEX Index daily log returns years 2008-2009 and 2013-2014



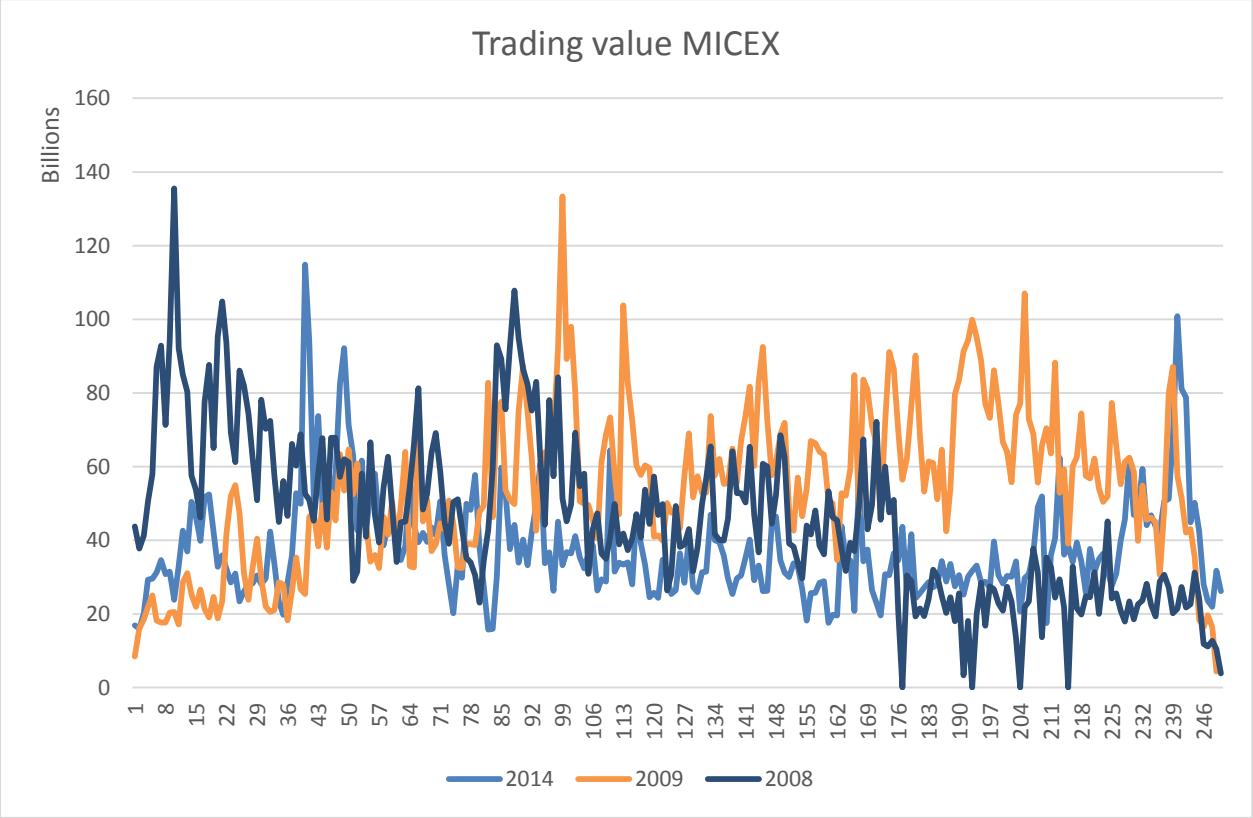
Graph 12- MICEX Index daily log returns years 2010-2014

Because of the amount of volatile data, Graph 10 presenting daily log returns of MICEX index was divided into two other Graphs, comparing years 2008 – 2009 with 2013-2014 and 2010-2012 with 2013-2014. This was done in order to present the data in a clearer, more useful way. Graph 11 confirms that first two years in the analysis were full of extreme jumps of the index value. In 2008 especially second part of the year was composed of surges and dramatic declines of log returns, reaching 25% and falling to -20% shortly afterwards. What is interesting, is that in the first two thirds of the years, it was 2009 that presented more unstable results, with higher values of returns jumps. Compared to these two vintages, in 2013 and 2014 there were practically no events that would stand out. The only exception is sharp decline in the beginning of 2014, when the return felt below -11%. Graph 12, compares the other left vintages with years 2013 and 2014. Again, the youngest populations do not usually stand out, especially 2013 which is very hard to be distinguished on the graph, since its low returns. 2010 and 2011 present daily log returns which are not equaled by later vintages. This is especially 2011, which in the second part of the period made huge losses. However, despite the amount of extreme negative results in 2011, it was in 2014 when the worst daily result occurred. What is also worth noting, is that out of 3 highest returns, 2 happened also in 2014. These observations confirm that, first of all, it is pointless to compare years 2014 and 2013 with 2008 and 2009. It seems obvious, that the GFC had much stronger impact on MICEX, than the Ukrainian crisis and dramatically

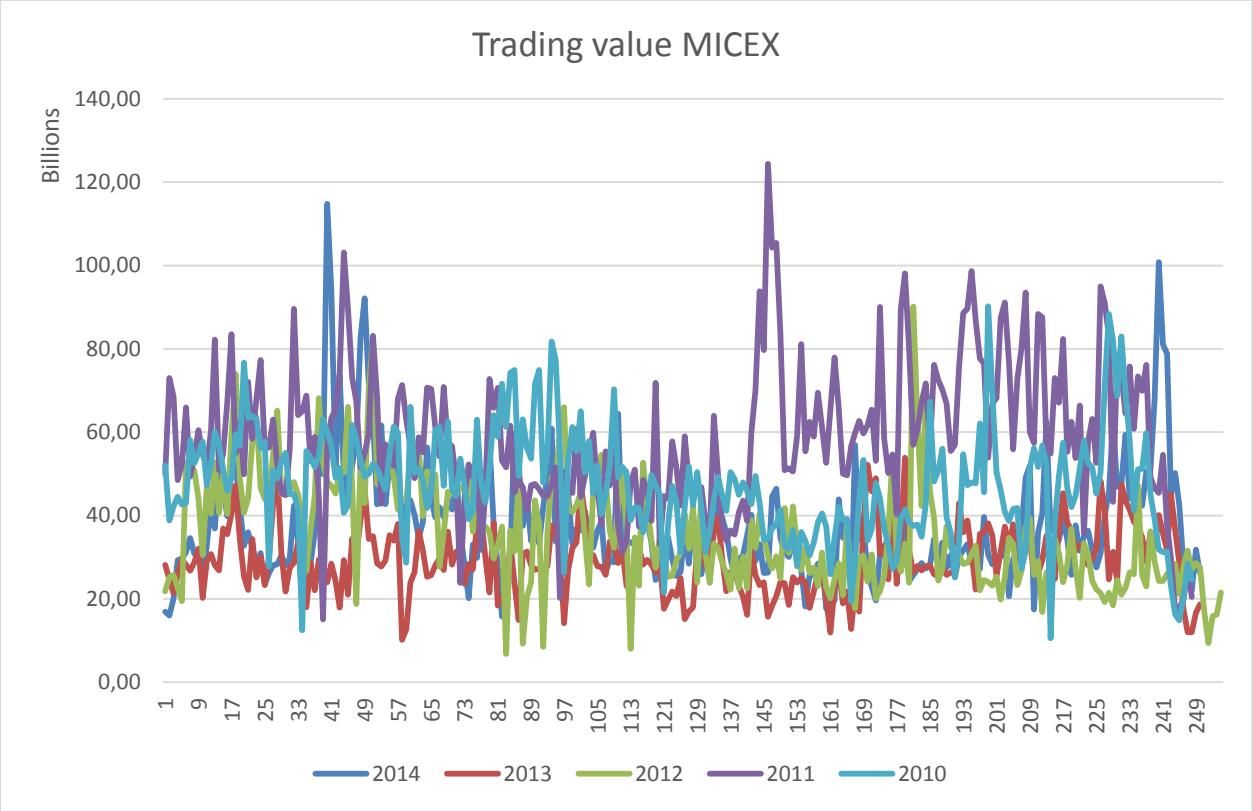
declining crude oil prices. However, looking back at years 2010-2014 shows, that during that time some of the most extreme events took place in 2014.



Graph 13- MICEX Trading value 2008-2014

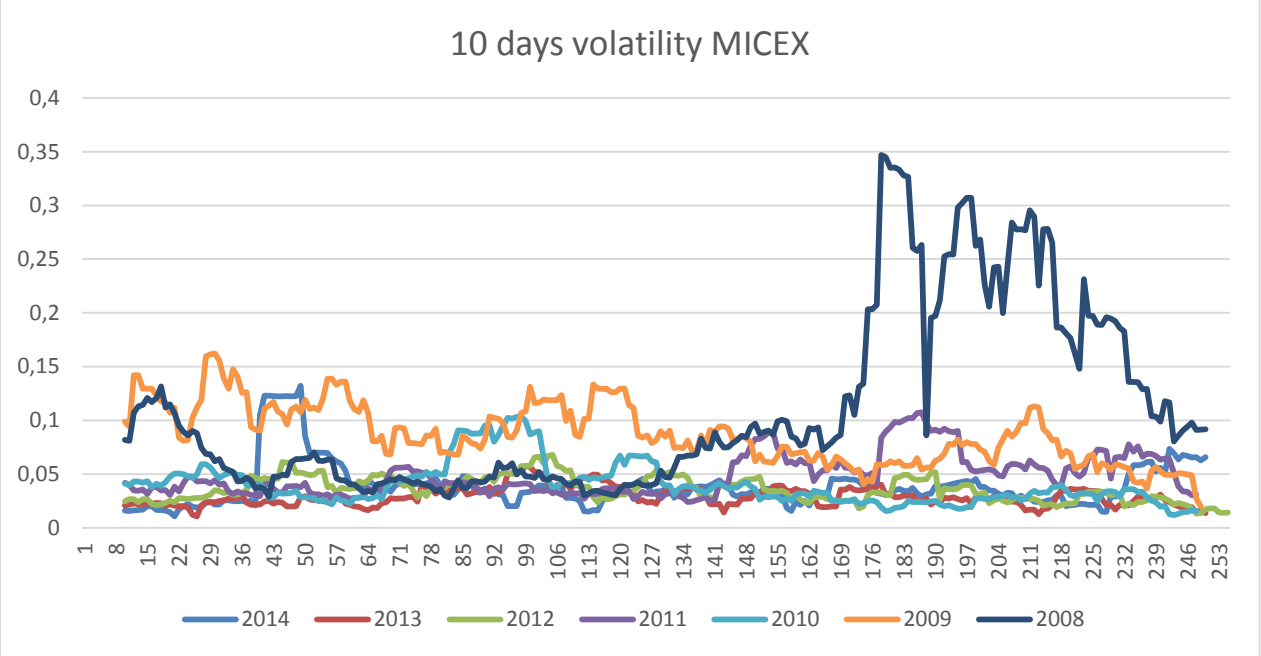


Graph 14- MICEX Trading value 2008-2009, 2014



Graph 15- MICEX Trading value 2010-2014

Graphs 13 to 15 present trading turnover of MICEX main index trough out years 2008-2014. Unfortunately, Moscow stock exchange does not publish information on trading volume, so the turnover is the only indicator of investors' activity on Russian markets that is available to for this paper. As it could be expected, 2008 and 2009 were among the years with biggest turnover, however 2014 also shows some notable records. The most active period was late February and early march 2014, which can be linked to Crimea crisis. Another busy period in 2014 was late November and early December. This however could be rather caused by falling oil prices. Interestingly, 2013 like in all other features is the least characteristic vintage of all, with very low trading value, which had not gone up even when the Ukrainian Crisis started in December 2013. Generally, investors' activity in 2014, despite two discussed peaks, does not bear any special features when compared to previous years.



Graph 16- MICEX Index 10 days volatility

The last characteristic of MICEX index to be discussed in this chapter is 10 days volatility. Again, years 2008 and 2009 stand out from other vintages dramatically. This is especially second half of 2008, when the volatility for long periods was higher than 20%, and practically for 50 days constantly higher than 10%. No other vintage can be compared with 2008, but also 2009 was a very volatile year, and the risk was above 5% for almost whole year. Again, 2013 was the least distinctive vintage. During this year, the volatility hardly ever jumped above 5%. Vintages 2010 and 2011 exhibited some periods of increased volatility, but could hardly reach 10%. Finally, year 2014 was also relatively calm, with some exceptions. In the first part of the year the volatility jumped for short period over 12%, but it soon went down. Similarly, by the end of the year there was a slight increase in its value, but only to 7%. Despite the political and economic turmoil, it seems that 2014 remained a stable year for this index.

3.4 MICEX Financials

	2014	2013	2012	2011	2010	2009	2008
Average yearly log return	-0,09%	0,05%	-0,03%	-0,15%	0,10%	0,34%	-0,45%
Yearly volatility	35,23%	16,55%	20,98%	30,55%	22,33%	48,60%	62,28%
Average daily trading volume	14 769 mio	10 925 mio	14 850 mio	25 097 mio	21 392 mio	25 262 mio	9 133 mio
Yearly log return	-22,57%	12,54%	-6,94%	-36,33%	23,74%	83,25%	-113,26%

Table 3- MICEX Financials characteristics

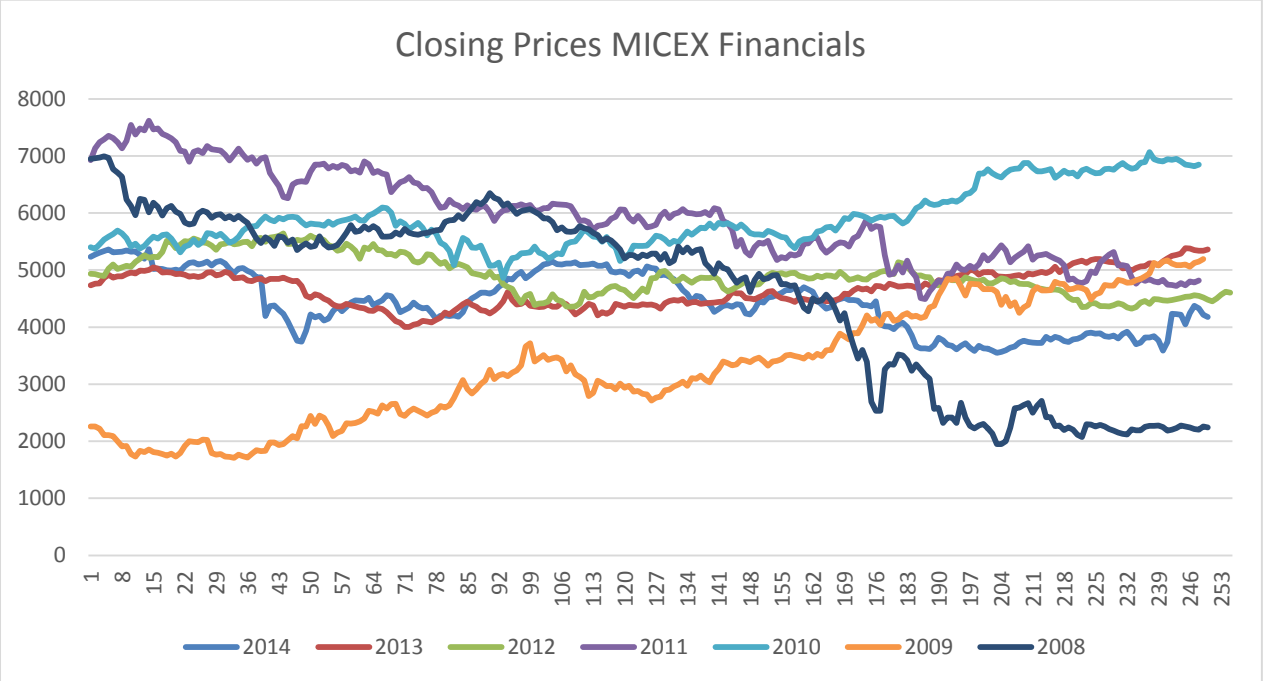
Table 3 presents the most important characteristics of MICEX Financials index for years 2008 – 2014. This sub-index of MICEX main is included in this paper, since it is anticipated that the Ukrainian crisis and especially the sanctions imposed by western countries on Russia should have a major impact on it. For this reason, MICEX Financials is expected to be interesting study material that could strongly support results of the research. According to news releases of major information agencies, Russian financial market suffers great losses due to the sanctions. Confirming this information would help in answering research questions stated in the beginning of this paper.

The analysis start with looking at average daily log return. The index presents results similar to main MICEX, however its results are slightly more extreme. 2008 is the only vintage when MICEXF released average daily log return equal to main's, equal to -0.45%. In remaining vintages the results were higher. The biggest difference was exhibited in 2014, when Financials was losing -0.09% daily, which is -0.07% worse than the main index. On the other hand in 2013 Financials' average return was hand higher than MICEX's, and reached 0.05%. Also in the rest of investigated years MICEXF was outperforming the market. These figures suggest that financial companies are indeed more sensitive to market conditions. 2014's high difference between log returns can indicate that they are also more sensitive to extreme economic and political events.

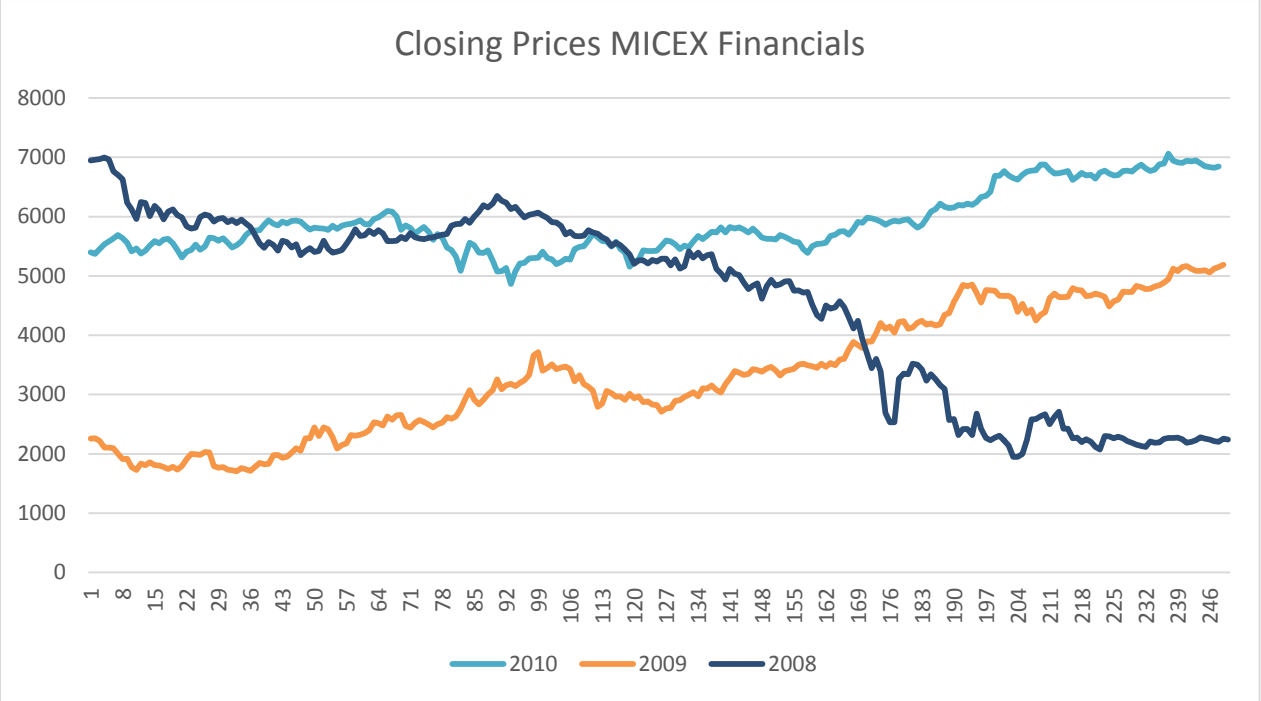
Next analyzed figures are yearly log returns, calculated as log return between the first and the last trading days of the year. In case of this values, there are substantial differences when compared to MICEX main index. Interestingly, the biggest discrepancies are achieved mainly in the last two years- 2013 and 2014. In 2008, the loss difference was less than 1%, which means that financial companies stocks behaved almost exactly the same as rest of the market. However, starting from 2009 MICEXF presented more extreme results than MICEX. In 2011 financials lost -36%, while the market lost only -20%. Almost equal difference was exhibited in 2014, when financial industry declined by -23%, while the whole market only by -5%.

Interestingly, in 2013 the market decreased its value by almost -1%, while financials increased by 12.5%. When both, average daily log returns and yearly log return are taken under consideration, following conclusion can be drawn: on majority of trading days financial industry performs very similar to the whole market, however there is a certain kind of events, to which financial companies stocks are much more sensitive than rest of shares, and react in more extreme way. Next chapters of this research should answer what type of news force financials to react so dramatically.

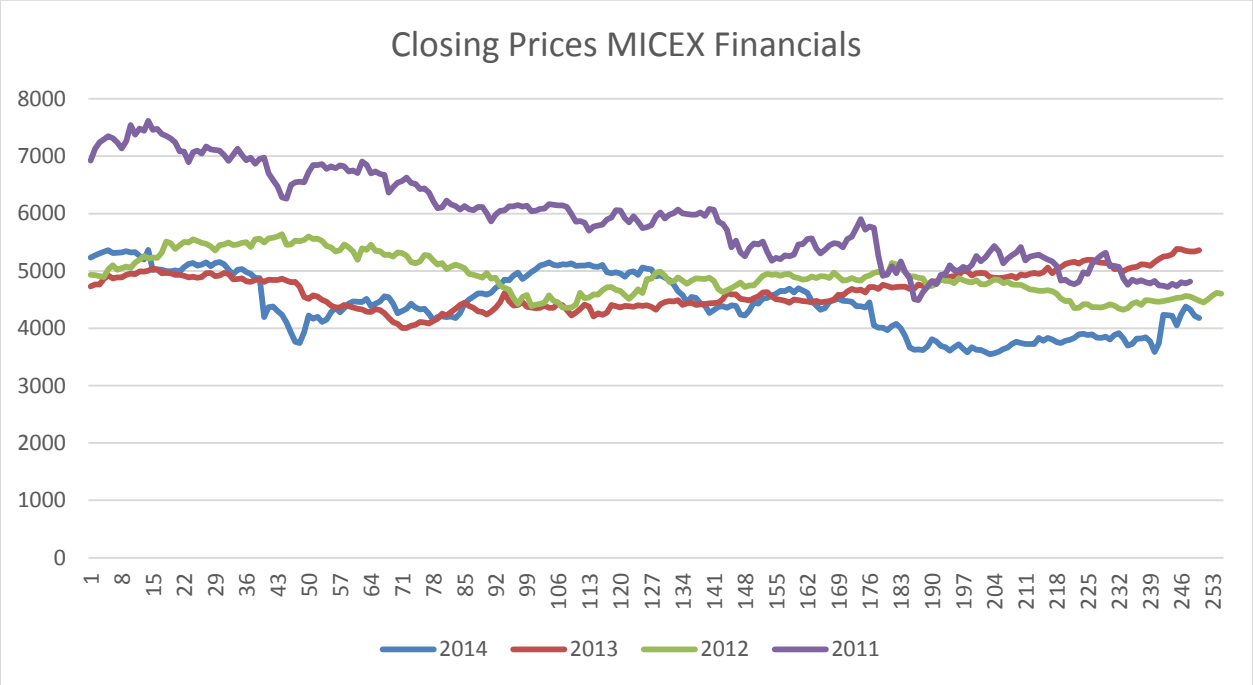
10 days volatility is the last characteristic of MICEX Financials that can be compared with MICEX main. In case of this feature, there are mixed results- in some years Financials index was more volatile, while in other- the main index. Again, 2014 is the vintage that exhibited the biggest difference between obtained results. In that year MICEXF was 11% more volatile than the main market, which is a huge difference given volatility values. An interesting finding is that in 2008, which also was a year full of extreme events, especially for banks and other financial companies, MICEXF volatility is visibly lower than MICEX's. This confirms that there is no tendency that could be easily identified when it comes to relationship between volatilities of the two indices.



Graph 17- MICEX Financials closing prices



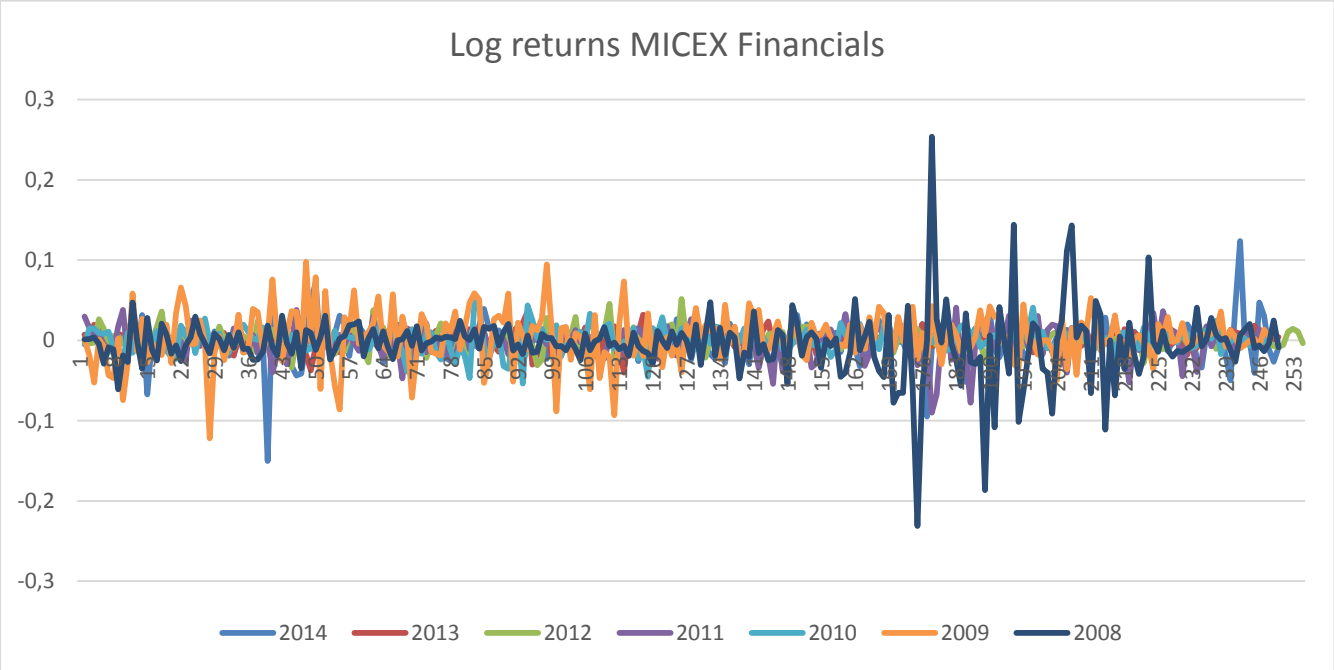
Graph 18- MICEX Financials closing prices years 2008-2010



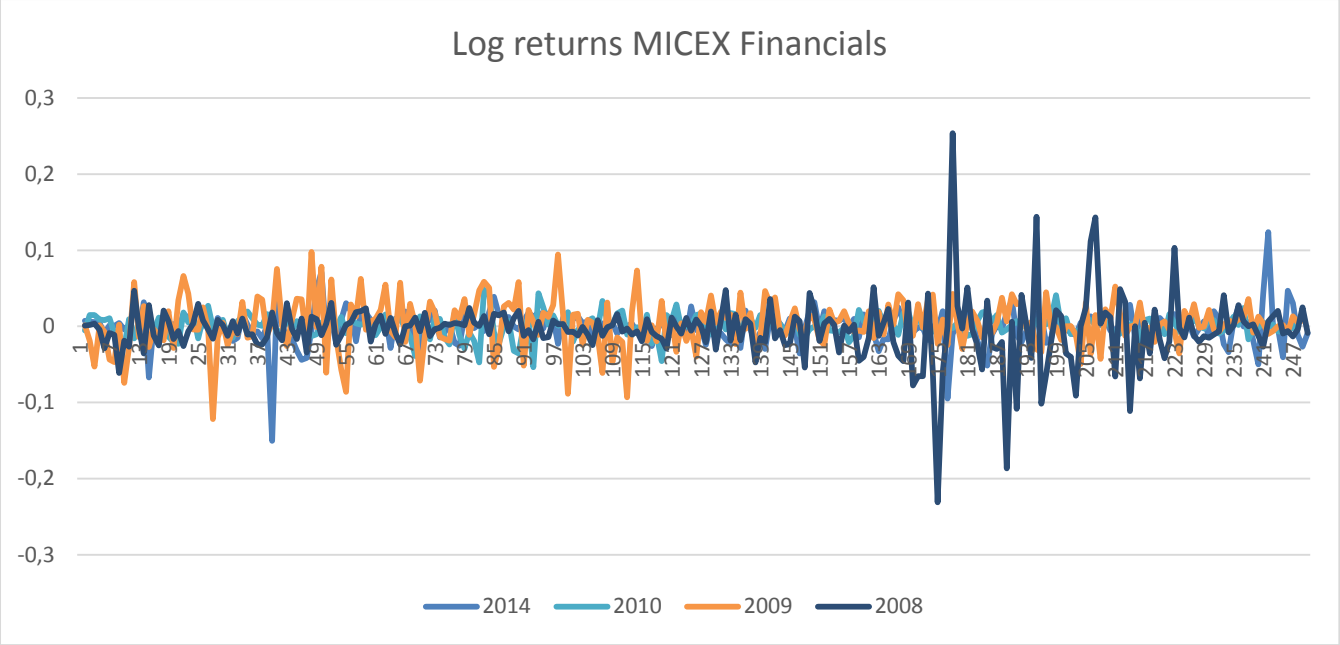
Graph 19- MICEX Financials closing prices years 2011-2014

Graph 17 presents closing prices of MICEX Financials index for years 2008 – 2014. Presented vintages can be divided into two groups. The first one – older vintages, presenting strong increasing or decreasing tendencies. The second group are newer vintages, starting from 2011, which are far more stable. The most negative tendency was exhibited in 2008, when the index was losing its value almost all the time. Similarly 2011 was the year in which MICEX

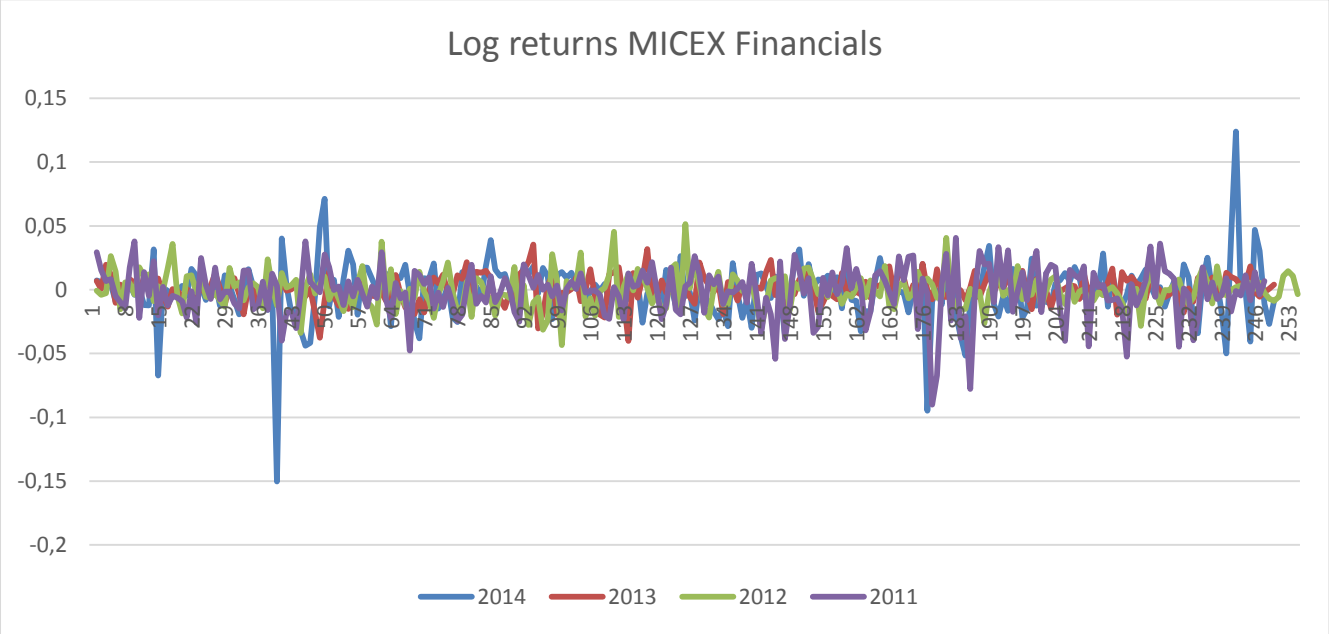
Financials was only declining, although not as dramatically as 3 years earlier. In 2009 the index was increasing practically for the whole period. Compared to these old vintages, the newer ones are much less dramatic. These are especially years 2012 and 2013, when the index changed its prices only slightly, and remained on approximately the same level for the whole year. In case of year 2014, there have been ups and downs in closing prices, however for most of the time index value was gradually decreasing. This vintage is the most volatile since 2011, which can be caused by the sanctions imposed by EU and USA. However compared to older years and the GFC affecting index values, it appears that 2014 was not as dramatic as some of the older years.



Graph 20 MICEX Financials log returns



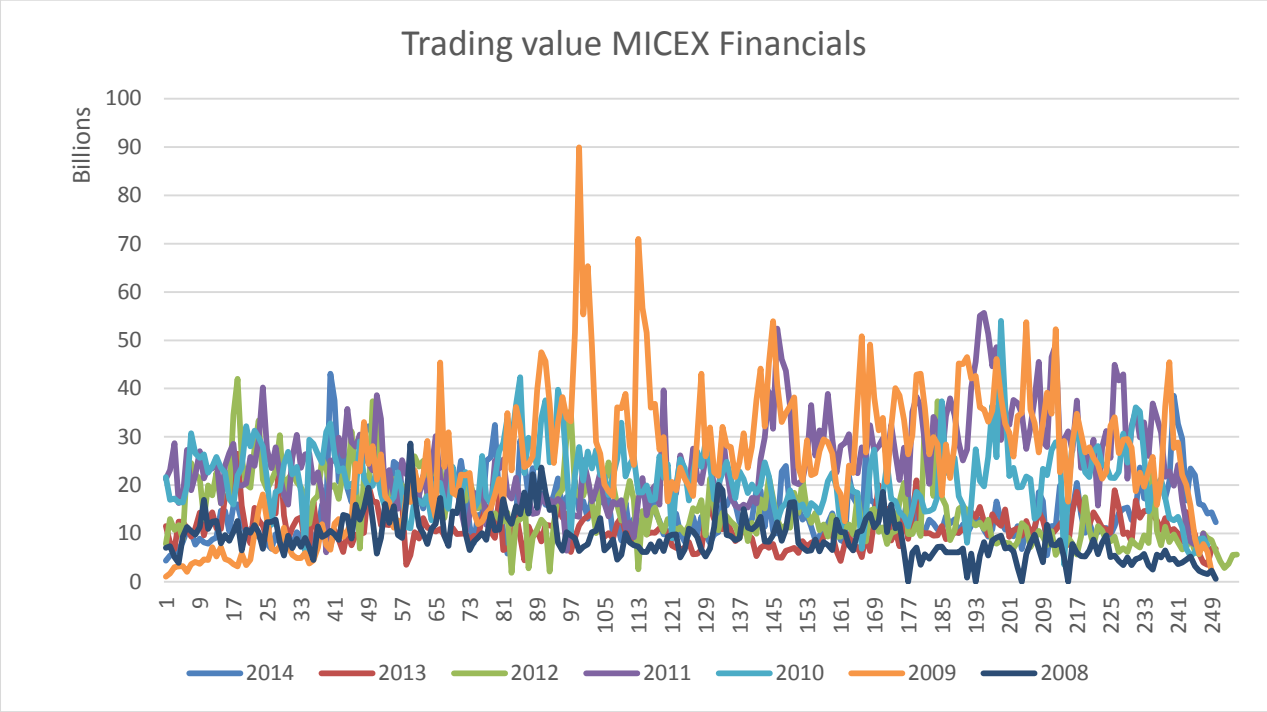
Graph 13- MICEX Financials log returns years 2008 – 2010 and 2014



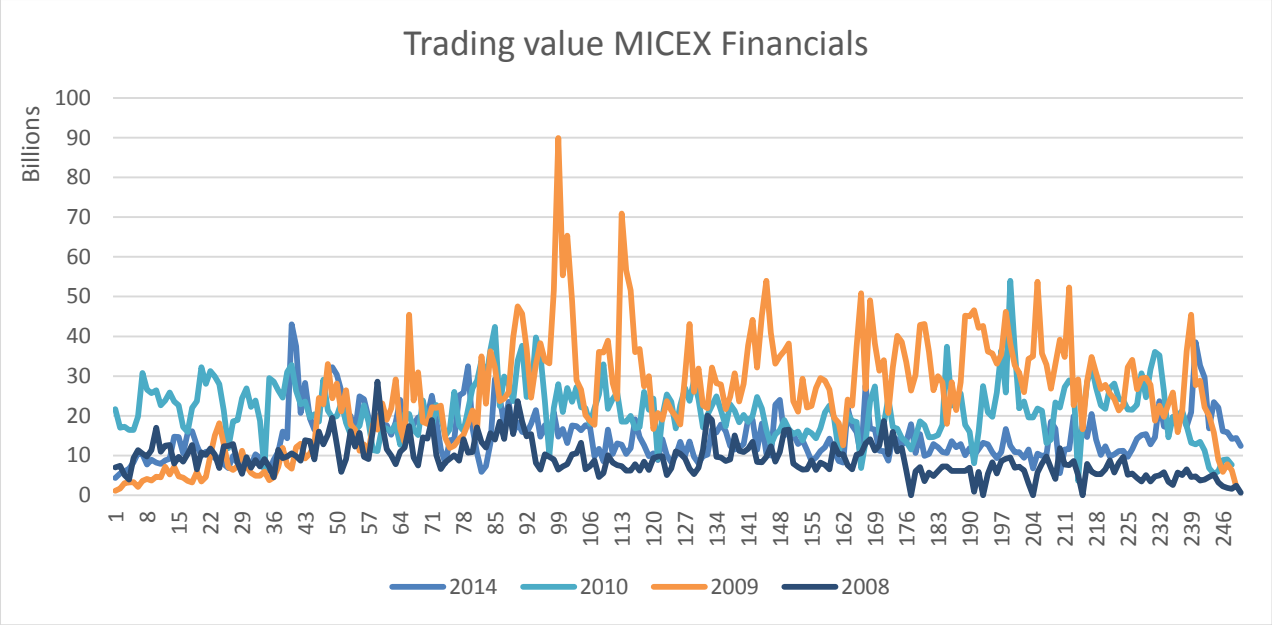
Graph 22- MICEX Financials log returns years 2011 - 2014

Similarly to previous indices, MICEX Financials log returns graph (Graph 20) has been divided into 2 other graphs, which make the visualization of data clearer: Graph 21, containing years 2008 – 2010 and 2014, and Graph 22 with years 2011 – 2014. Graph 21 confirms, that the most dramatic vintages were 2008 and 2009. The first one exhibited the highest positive and negative results: 25% and -23% respectively, which indeed are very huge daily log returns. The second vintage, although did not contain such dramatic changes, has the biggest amount of highest absolute log returns in other trading days. However, it is also visible, that in 2014 the log returns

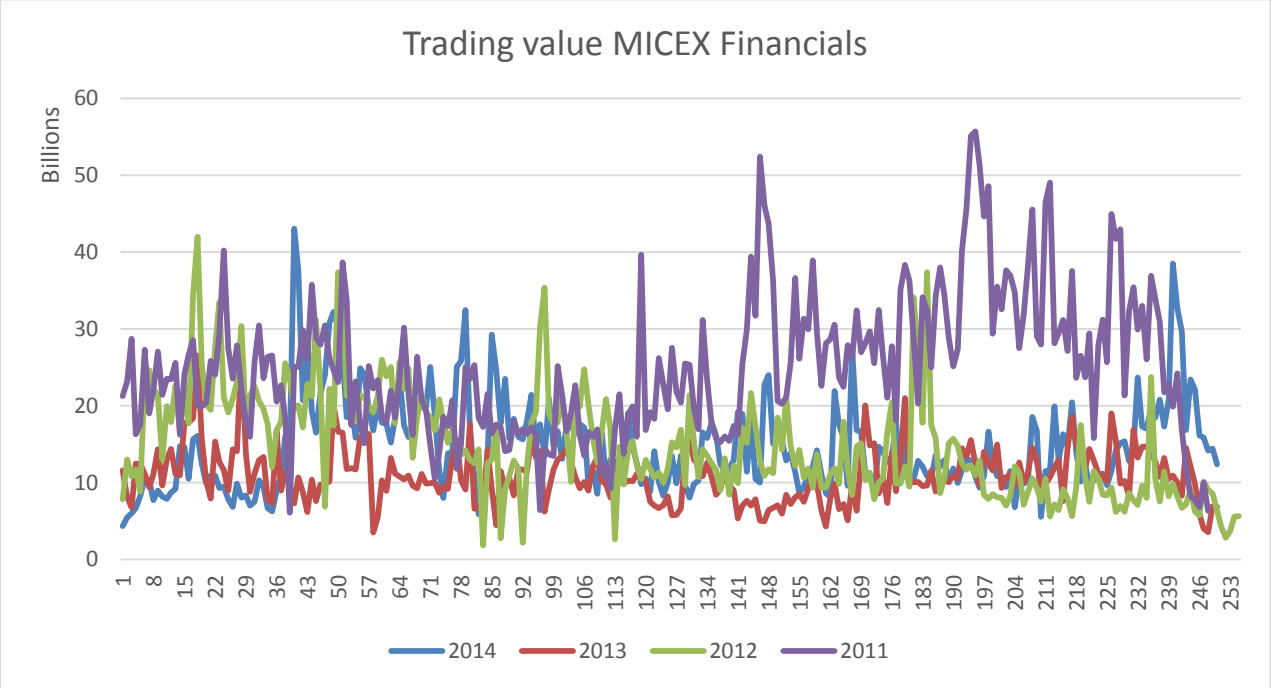
were also high, especially during two trading days (40th and 242nd). These were the highest returns, when year 2008 is not included. Interestingly, in 2010, which also presented strong decreasing tendency, there were no extremely high or low log returns, when compared to the other years. Graph 22 shows that out of the remaining years, 2014 exhibits by far the most extreme results. It has the biggest amount of highest daily log returns (on a given day of the year), and also realized the biggest returns of all presented in this graph. Only 2011 can be compared to the newest vintage, as it is also full of relatively high daily log returns, however Graphs 21 and 22 confirm what was discovered previously. 2014 is the most extreme vintage out of last 3-4 years, but it is far less extreme than GFC vintages.



Graph 23- MICEX Financials Trading value 2008-2014



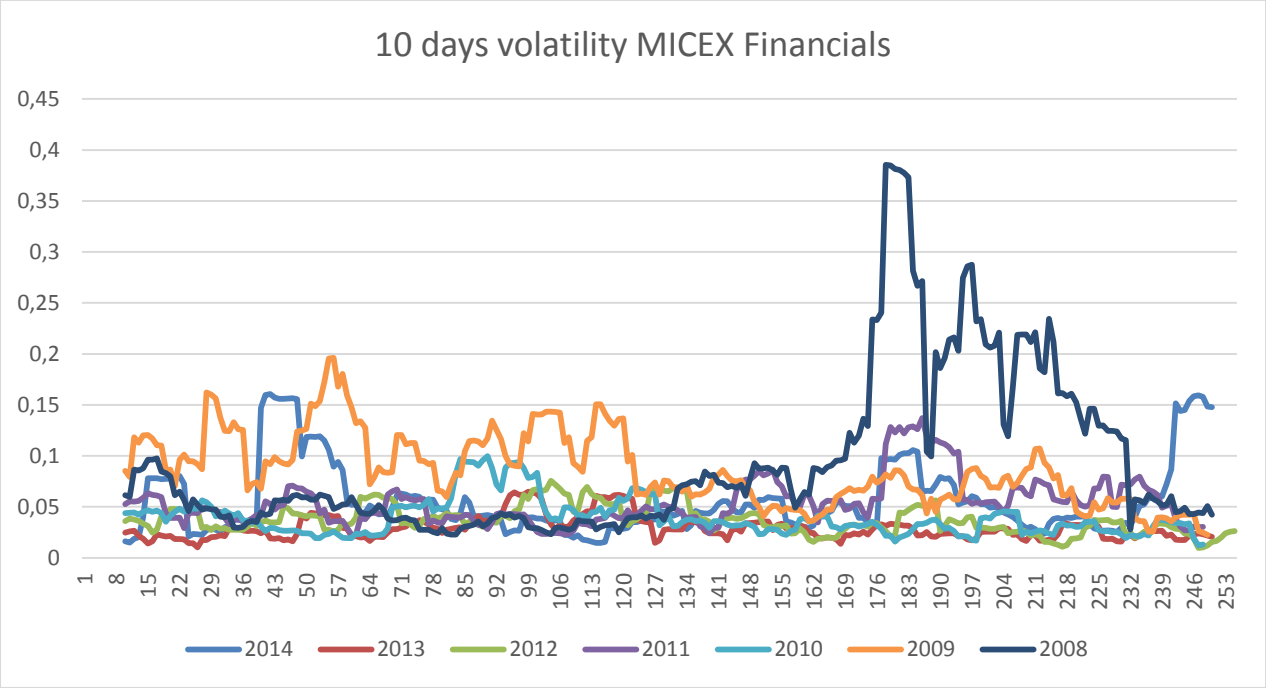
Graph 24- MICEX Financials Trading value 2008-2012, 2014



Graph 25- MICEX Financials Trading value 2011-2014

Graphs present trading value of MICEX Financials index during years 2008-2014. An interesting observation is that most active years were 2009-2011, while during 2008 the investors were less active even than in 2013. Given previous findings, low values in 2008 are unexpected. On this background, year 2014 is rather mild and hard to distinguish. There are two spikes in this vintage, similar to MICEX main- late February and early March (time of Crimean crisis) and late November and early December, which might be caused by falling oil

prices. What is interesting is that during January and February 2014, so while the Crisis in Ukraine was in its early stage, trading value of MICEX Financials was very low, which might mean that until the Crimea crisis, investors did not see any events that could potentially impact Russian financial industry. Second part of the year, so after the sanction on Russian banks were introduced by the EU and USA was also relatively calm, and the investors remained inactive during most days.



Graph 146- MICEX Financials 10 days volatility

Graph 26 presents 10 days volatility results for all investigated vintages. The chart clearly visualizes that years 2008 and 2009 beard the highest uncertainty of all. This is especially the first vintage, in which market volatility, in the second part of the year, was often above 15%, reaching more than 25% on specific dates. Compared to these values, rest of vintages was far less risky- during 6 years the volatility jumped above 17% only once, in 2009. Years 2010 and 2011 had some more volatile periods, however both vintages hardly ever reached more than 10%. The next years, 2012 and 2013 were the most stable and certain years. In case of these series, 10 days volatility increased above 5% only twice during each year. This shows how mild the market was during these years. On the contrary, 2014 was far more volatile than previous 4 years. Investigated parameter went above 15% during some periods of the year. Moreover there were several moments of increased volatility, reaching more than 10%. Analysis of Graph 18 confirm, that 2014 was more extreme vintage than years 2010/2011 to 2013, however it was nothing like 2008 or even 2009, when the market was most unstable.

3.5 MICEX O&G

	2014	2013	2012	2011	2010	2009	2008
Average yearly log return	0,02%	0,01%	0,03%	-0,01%	0,05%	0,32%	-0,37%
Yearly volatility	22,38%	15,94%	19,35%	27,61%	22,09%	47,52%	74,08%
Average daily trading volume	14 577 mio	11 480 mio	14 192 mio	23 982 mio	17 871 mio	21 938 mio	27 219 mio
Yearly log return	3,97%	3,63%	7,44%	-2,50%	11,34%	79,90%	-91,53%

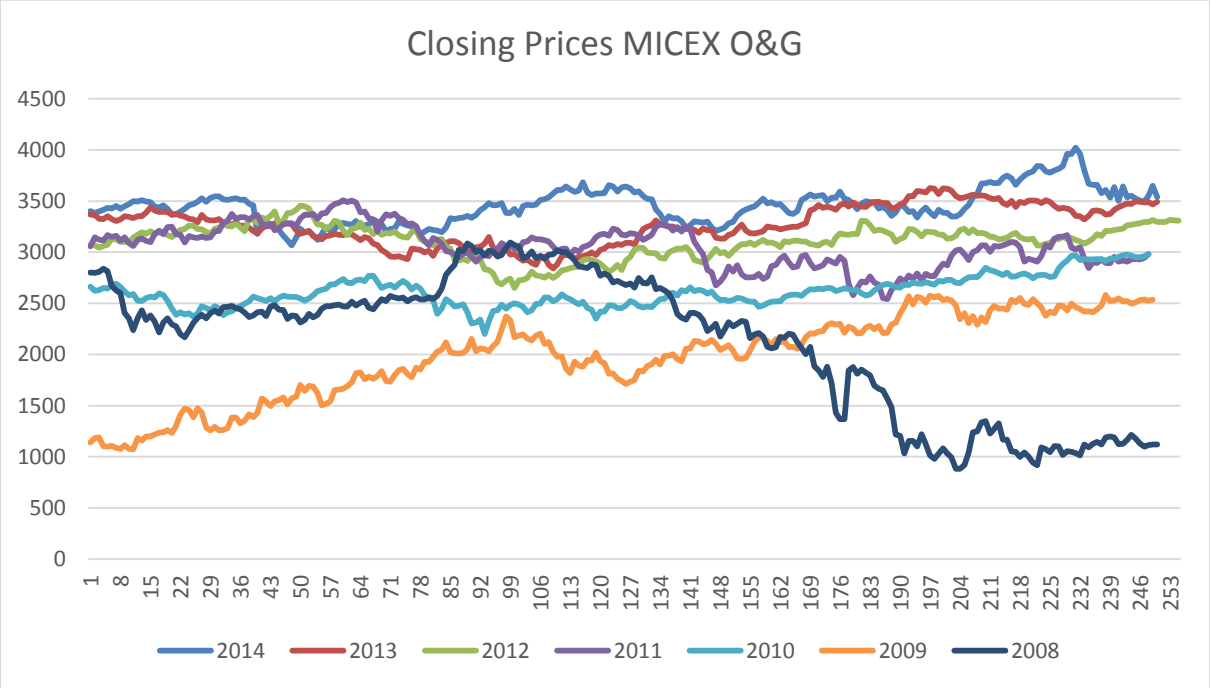
Table 4- MICEX Oil and Gas index characteristics

Table 4 presents the most important characteristics of MICEX Oil and Gas index for the investigated period of years 2008 – 2014. The index is included in this study, because of several reasons. First of all, oil and gas industry is the most important part of Russian economy, having the biggest input into country's GDP. Moreover, over the years, these commodities, especially gas, was used by Russian government as a tool to force its political and diplomatic will on its western partners. Gas import from Russia is the key factor for Ukrainian economy, and proved to be an important issue in countries' bilateral relations.

The first characteristic to be discussed is the average daily log return of the index. Similarly to previously investigated MICEX and MICEX Financials, MICEX Oil and Gas index was declining its value in 2008, during GFC outbreak. The average loss was -0.37%, which is less than in case of the main market. On the contrary, in 2009, when the indices were gaining to their value, O&G was performing slightly better than main index, and was gaining 0.32% on daily basis. The next year worth noticing is 2011, when the sub-index' daily log return was slightly below zero: -0.01%, while main market's log return was more negative: -0.08%. In the following years this tendency has been kept, and on average Oil & Gas index was performing slightly better, especially in 2014, when daily log return score was 0.02% (compared to -0.02% of the main market). This shows that despite the turmoil with oil prices and doubtful future of gas imports to Ukraine (and what follows- to EU), Oil and Gas was performing better than the main market. The next investigated parameter is yearly log return (log return between the first and the last trading day of a given year). Similarly to previous case, also here Oil and Gas index performed better in all investigated years. In 2008, when MICEX lost -112% of its initial value, O&G lost 'only' -92%. The next year, it grew 80% (compared to 77% of the main market), which is not as dramatically different as the year before, however the tendency is kept. The next year, 2010 is an exception, because sub-index performed worse than main index- +11% compared to 16%. However this is only one odd year, in 2011 the situation was back to normal, and O&G increased 5% more than MICEX. In 2014, the difference became even bigger. While

MICEX lost almost -5%, Oil and Gas sub-index gained 4%, which means that the difference between indices was 9%. This again shows that oil and gas companies are more immune to political and social turmoil, then the rest.

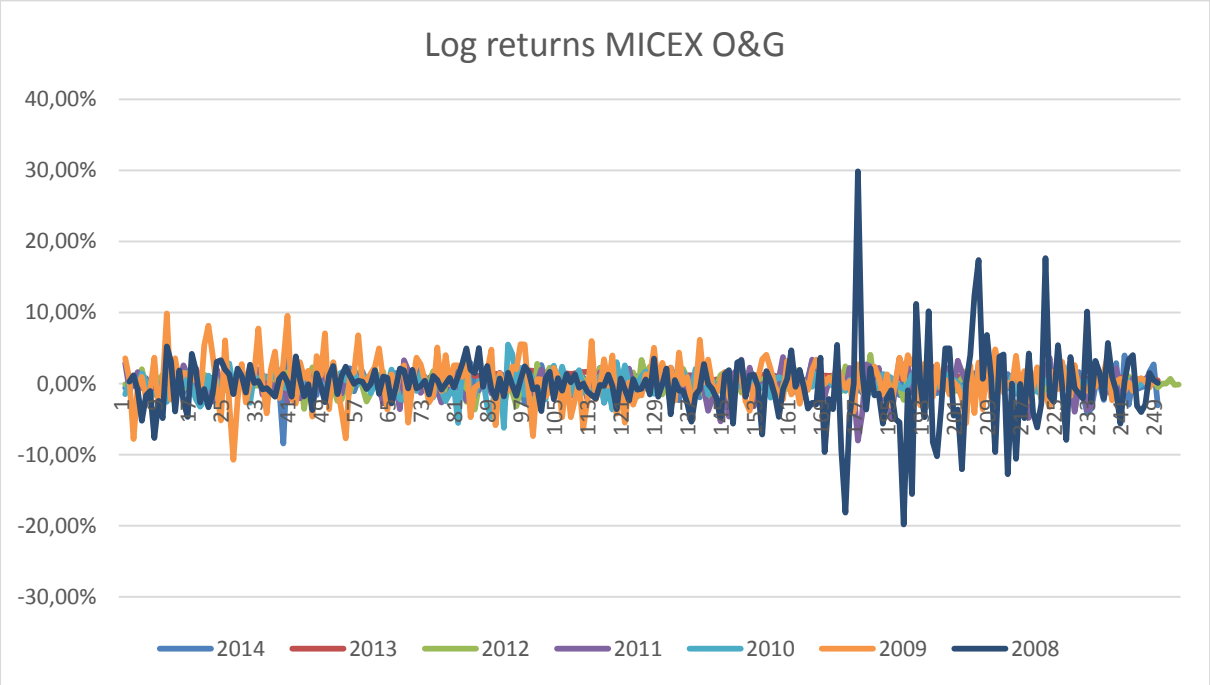
When it comes to annualized yearly volatility, the situation is slightly different. The differences are relatively smaller than in previous cases, and none of the indices can be pointed as the one performing better over the years. In 2008 O&G exhibited higher volatility than MICEX main (74% compared to 71%), similarly next year (here however the difference is very small, only 0.5%). In 2010, 2012 and 2014 the sub-index was less risk than main, but like in 2009, the differences were very small. In 2014, Oil & Gas annualized volatility was 22%, while MICEX scored 23.5%. These outcomes show that despite in previous years O&G was earning better than the main index, it was not always more risky.



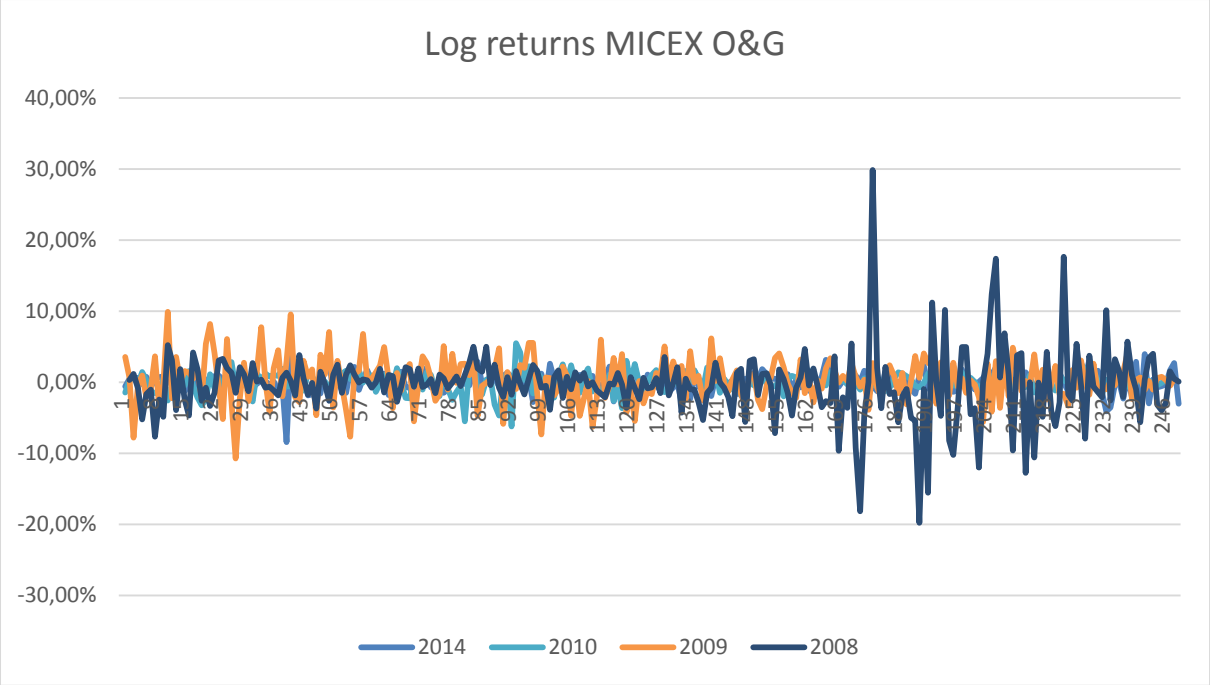
Graph 2715- MICEX Oil & Gas index closing prices

Graph 27 presents closing prices of MICEX Oil & Gas index throughout investigated years. The most characteristic years are 2008 and 2009, which exhibited strong trends. In older vintage, the index was almost constantly losing its value, starting from around 99th trading day of the year. Before that its closing prices oscillated around the same level, with slight changes. In 2009 the O&G index, despite short period in the middle of the year, was constantly gaining value, at a stable pace. The next years were much more stable. In 2010 there were practically no long-term trends that would have a major impact on the final year's price. In 2011 there

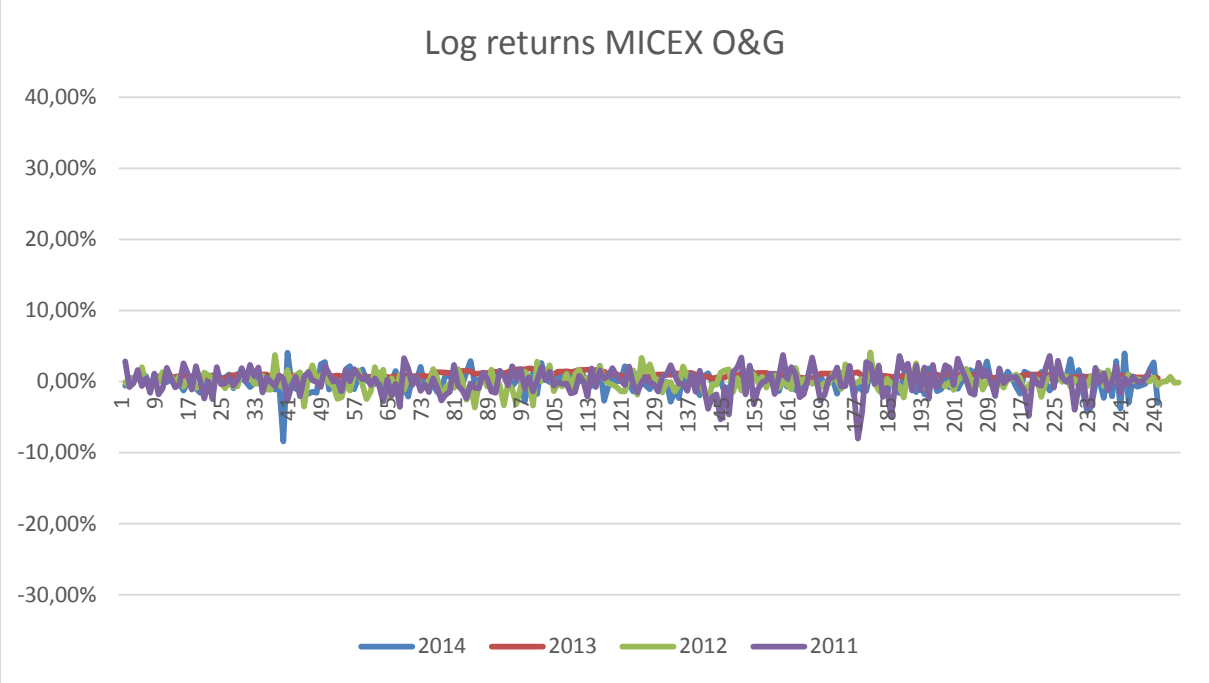
were several more dramatic jumps in index value, however when compared to the GFC years, it becomes clear that they were not that extreme. Vintages 2012 and 2013 are another very stable years. Both series exhibit very similar tendencies- in the first part of the year there was a slightly decreasing tendency, while in the second part- the index was slowly recovering and gaining its value. Finally, year 2014 is the most volatile of all investigated. There is no one or two clear tendencies throughout the year. Oil and Gas index experienced a lot of shifts in the direction of changes. This shows that 2014 was full of both, good and bad news for the investors.



Graph 168- MICEX Oil & Gas index daily log returns



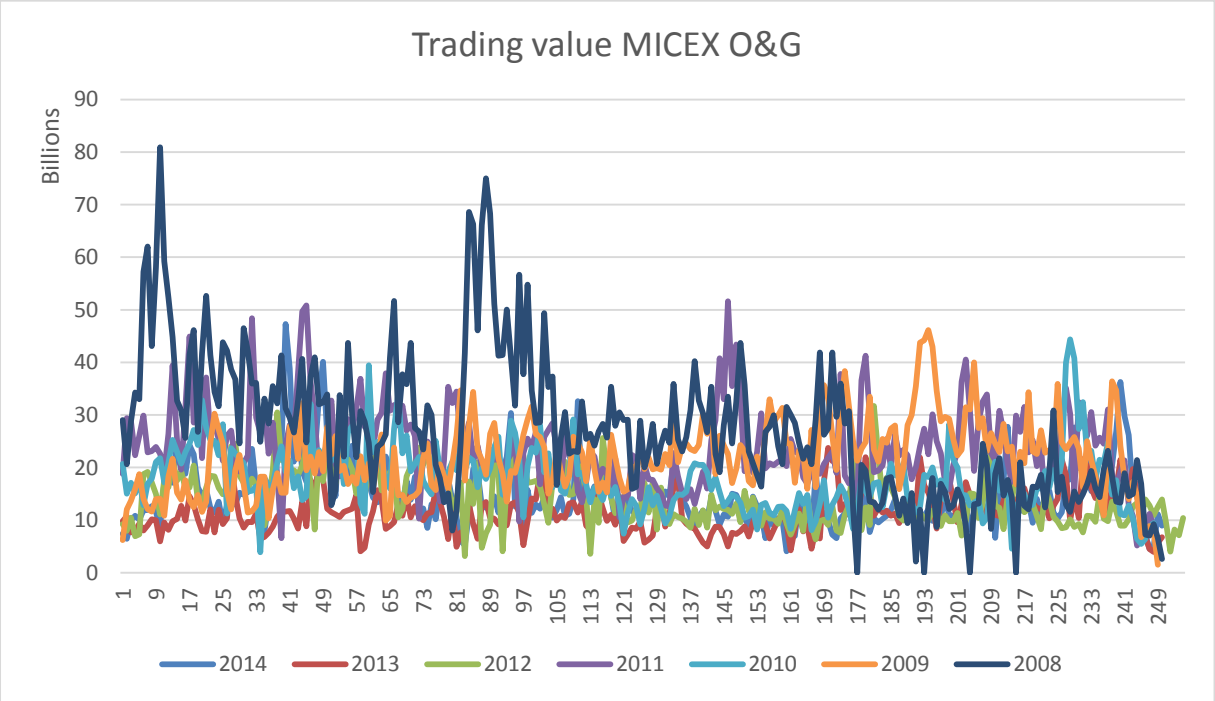
Graph 179- MICEX Oil & Gas daily log returns years 2008-2010 and 2014



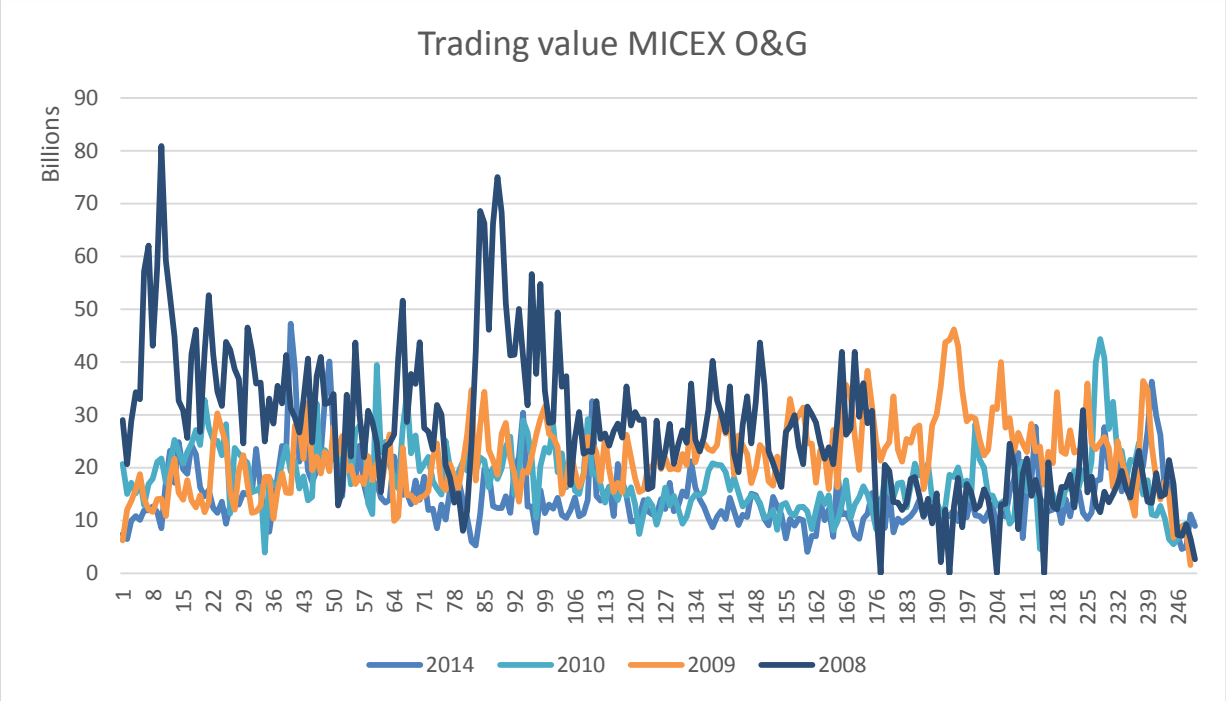
Graph 30- MICEX Oil & Gas index daily log returns years 2011 – 2014

Similarly to other indices, also in case of MICEX O&G the graph presenting daily log returns was divided into two other, which allows to present the data in a clearer way. Graph 29 presents years 2008 to 2010 and 2014. Obviously, 2008 was the most extreme year, with the biggest positive and negative returns, especially in second part of the year. Interestingly, the index gained +30% on one single day, which so far is the biggest log return from all investigated

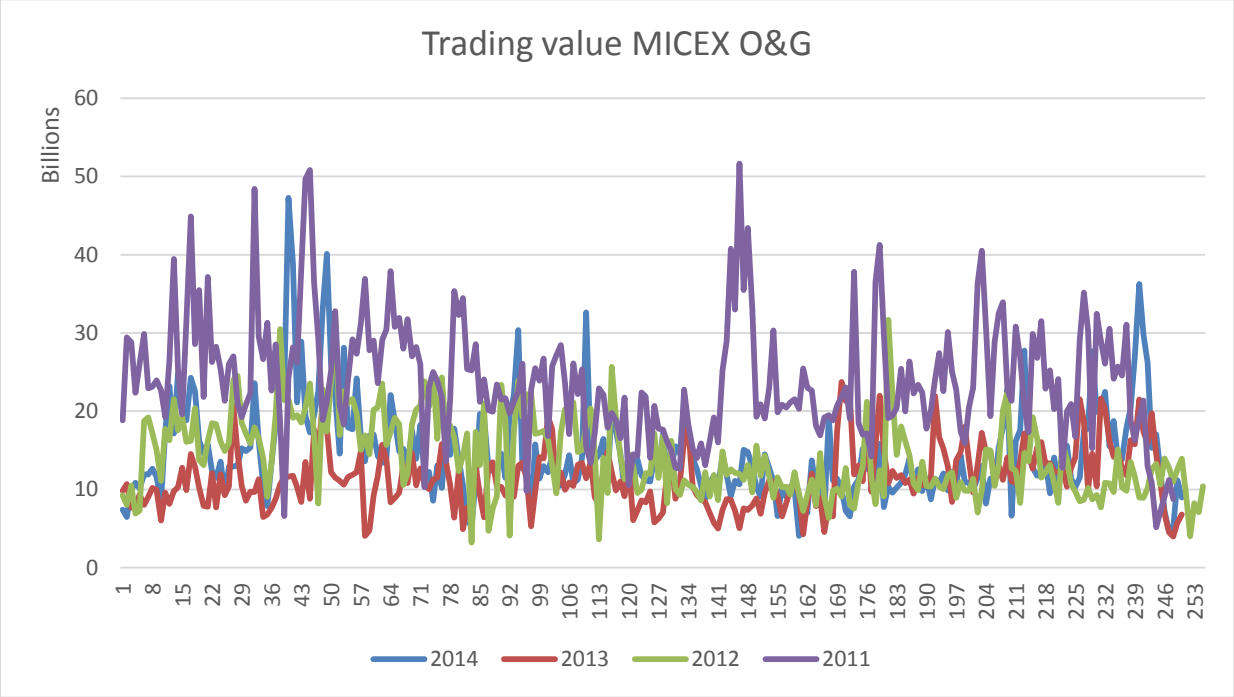
indices and vintages. There were also several days when the index gained almost 20%, and couple when it lost almost -20%. Compared to this vintage, all other are less extreme. Daily log returns from 2014 are practically unnoticeable when presented on one graph with years 2008 to 2010. This is different on Graph 30, which presents years 2011 to 2014. Although it is clearly visible that in most trading days it was 2011 when log returns were the biggest, during 2014 the index realized biggest loss and gain of all investigated time. What is also important to notice, is that during 2013 the index yielded only marginal returns, which makes this series almost impossible to distinct on the graph. Results presented on the graphs, prove first of all that it is hard to compare years 2008 and 2009 to other vintages. Results realized by Oil & Gas index were so extreme, that younger vintages fade away in this comparison. On the other hand, 2014 yielded some of the most extreme results of the remaining vintages, which confirms that it also has been full of interesting and dramatic information, however not as extreme as in the GFC times.



Graph 31- MICEX O&G Trading value years 2008-2014



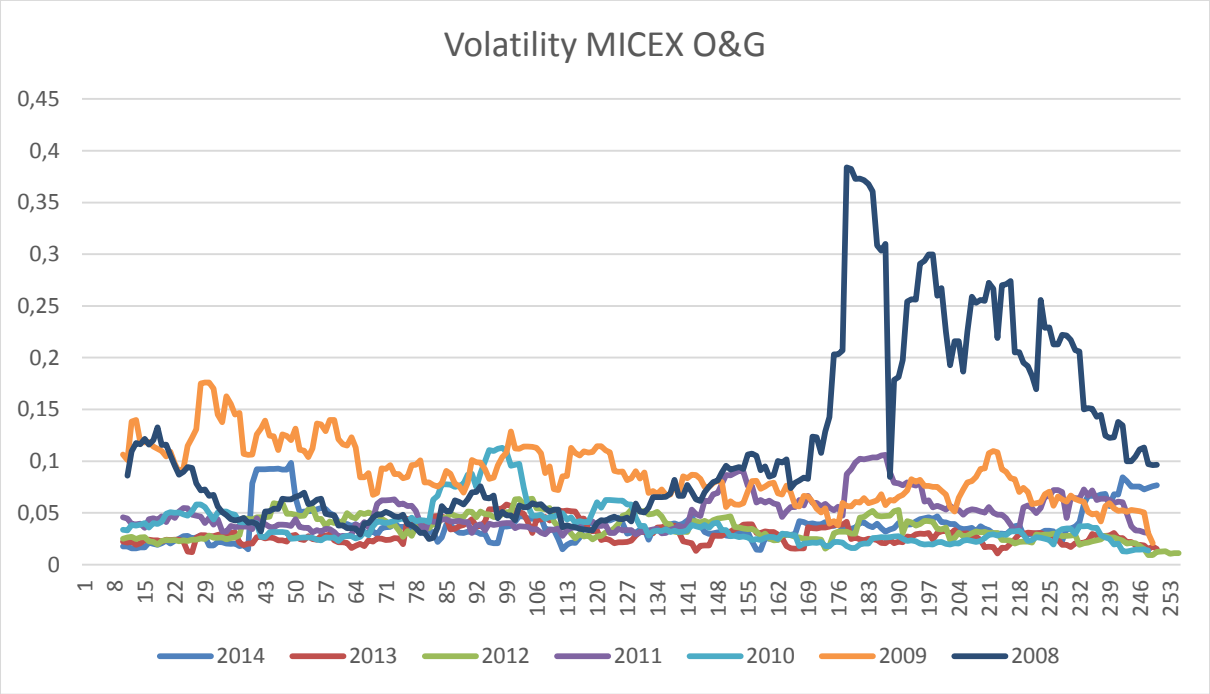
Graph 32- MICEX O&G Trading value years 2008-2010, 2014



Graph 33- MICEX O&G Trading value years 2011-2014

Graphs present trading turnover of MICEX Oil & Gas index during years 2008-2014. On the contrary to MICEX Financials index, in this case it is 2008 when the investors were most active, especially during first half of the year. Compared to other vintages, 2014 does not stand out- it was more active than 2013 and 2012, but during rest of investigated vintages, investors were trading more actively. As in cases of MICEX main and Financials, this index has also two

peaks, the first one between 40 and 57 trading day, and the second one in the end of the year. Interestingly, there are some peaks around 90-120 trading day, which was not observed in previously investigated indices. Anyway, it seems that the Ukrainian Crisis did not impact MICEX Oil & Gas in any noticeable way, other than one peak caused probably by Crimea Crisis. Compared to other vintages, 2014 does not stand out in terms of investors' activity on the market.



Graph 34- MICEX Oil & Gas index 10 days volatility

Graph 34 presents vintages' 10 days volatilities. It again becomes clear how extreme and outstanding were the first two years of analyzed period. In 2008 the volatility for long periods of time was above 20%, reaching 37%. 2009 was a lot less volatile, however compared to younger vintages, it still was far more risky, with volatility being almost constantly above the level of 5%, and for close to half a year over 10% On the contrary, rest of investigated vintages hardly ever reached more than 7%. Among them, the most volatile was 2011, which had several periods over 7% volatility. In 2014 the uncertainty faced by investors was very moderate- 10 days volatility reached more than 5% only twice during the year, for very short periods. In 2012 and 2013 this parameter did not reach 6% even once, which shows how stable and calm these years were for the index. Also 2010 was a relatively stable year, with only one period when volatility jumped above 5% and reached 11%. Generally, Graph 32 shows that 2014 was one of the least volatile vintages, far less than risky than 2008, 2009 and 2011 and comparable to 2010. On the other hand, after 2 years of a very stable market, the volatility has again increased,

probably during the social, political and economic turmoil, which will be discussed in the next sections.

3.6 WIG Ukrainian

	2014	2013	2012	2011
Average daily log return	-0,29%	-0,12%	-0,04%	-0,15%
Yearly volatility	38,75%	24,12%	22,17%	24,11%
Average daily trading volume	1 115 754	674 059	515 264	297 919
Yearly log return	-72,47%	-28,38%	-9,48%	-25,39%

Table 5- WIG Ukraine index characteristics

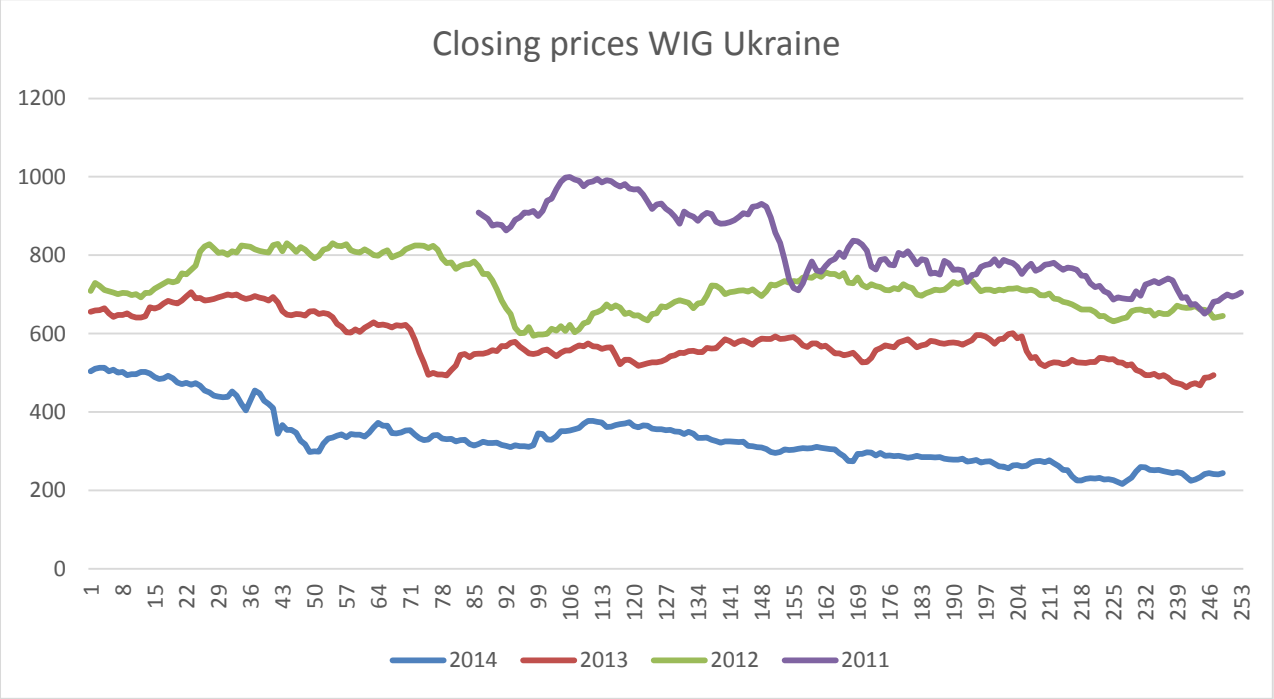
Table 5 presents the most important characteristics of WIG Ukraine index. It should be noted that data start from 4th of May, 2011, because at this date the index was set off. Due to this fact, there is less data, when compared to other investigated indices. Nevertheless, since the index gathers Ukrainian companies, quoted on Polish stock exchange, it should give an interesting and valuable insight.

The first discussed feature is average daily log return on the index. Interestingly, the index yielded negative results for its whole life. In the first year, 2011, it was losing -0.15% on daily basis. The next year, 2012, was slightly better, and the daily log return equaled -0.04%. In 2013, index daily losses again jumped above -0.1%, and equaled -0.12%. Finally, 2014 was undoubtly the worst year in index history. Average daily log loss was -0.29%, which is almost twice as much as second worst result. Basing on the tendency from previous years, it can be concluded, that losses in 2014 are not caused by the Ukrainian Crisis. However, their size can be strictly linked to the turmoil. This will be investigated in next chapters.

Next investigated value is yearly log return, calculated as in previous cases. It should be noted that in case of 2011, the return is calculated between 4th of May and 31st of December. In its first year, WIG Ukrainian lost more -25% of its initial value. The next year, as in case of average log returns, was slightly better, and resulted in loses equal to -9%. The following, 2013 again was very negative, and the index realized -28% of loses. Finally, 2014 was more than twice as bad as second worst. Yearly log return in that year equaled -72%. This shows how dramatic was the year for Ukrainian companies quoted on Polish market. Interestingly, these results are much worse than UX's figures. However, this might be caused by small number of quoted stocks, with two of them having dominating the assigned weights.

Average daily trading volume is the next investigated feature of WIG Ukraine, and so far the most interesting. This is because despite negative results of the index and political turmoil in 2013 and 2014, this value has been sharply increasing over the period of past 4 years. It began with 298k trades daily in 2011, and almost doubled its size in the next year, reaching 515k trades daily. In 2013 it again grew to 674k, which is a smaller surge than previously. Finally, in 2014 daily amount of trades averaged at 1,116 M, which is again almost twice as much as in previous year. It seems that none of the dramatic events from Ukraine influenced trading volume negatively, rather helping it to grow.

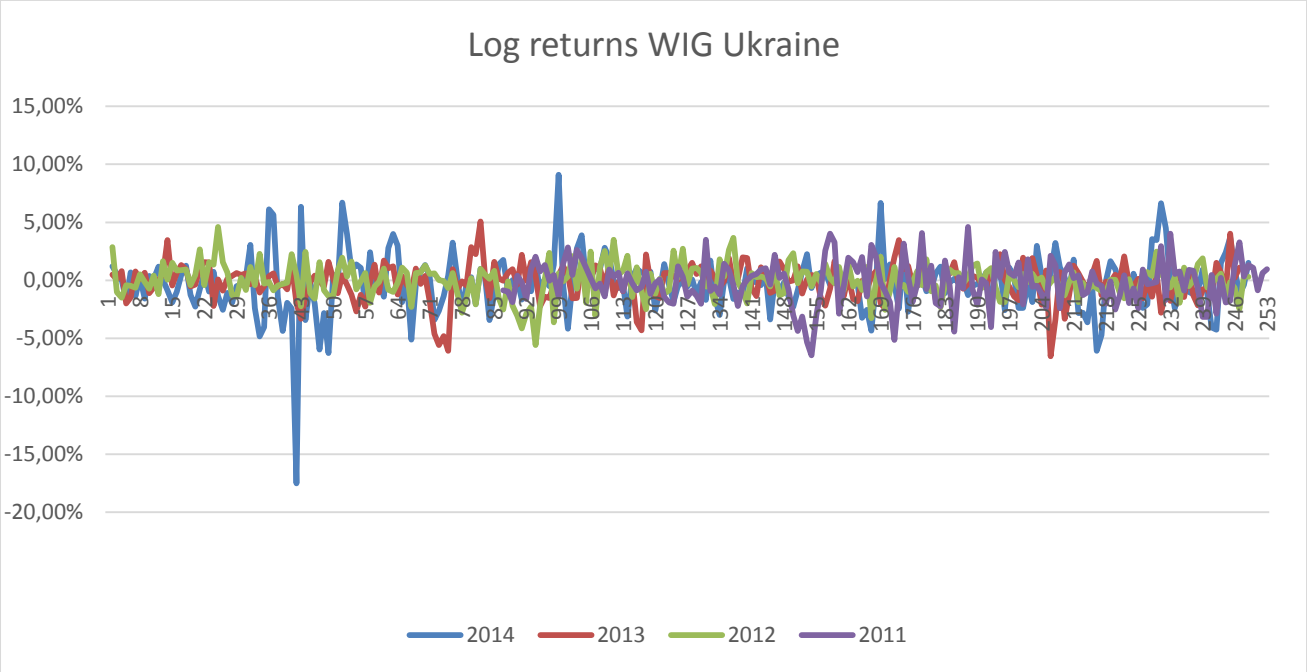
Finally, annualized volatility was calculated. Over the years 2011 to 2013, market risk was stable, and kept similar values: 24% in 2011, 22% in 2012 and again 24% in 2013. However, situations changed in 2014, when annualized volatility surged to 39%. This shows how uncertain the investors were in the last year, when compared to all previous vintages. Again, it is very likely that also this value has been influenced by the crisis, but it will be investigated in the next sections.



Graph 35- WIG Ukraine index closing prices

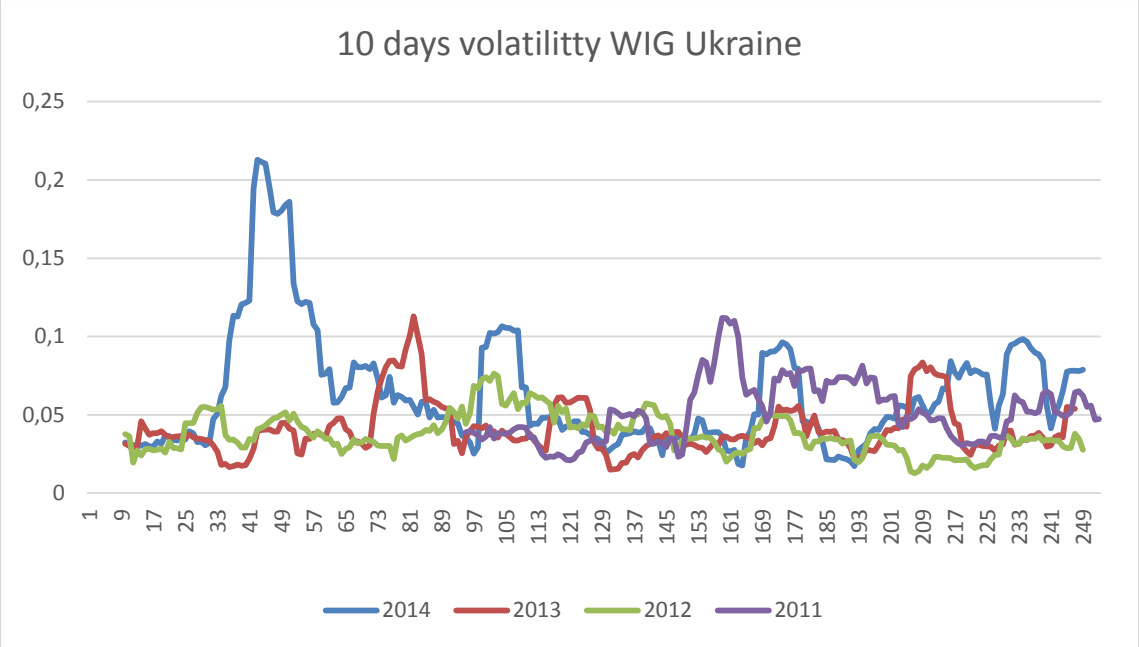
Graph 35 presents closing prices of WIG Ukraine index. It is clearly visible, that during its whole history, the index was declining. Hardly ever it grew, and when it did- then only for several days. The exception here is year 2012, when it was increasing its closing prices for the period between approximately 97th trading day to 160th. Other than that, it has been mainly

losing its value. What is clear, basing on Table 5, is that the worst year was 2014. During that time, index value was gradually declining. Interestingly, all vintages experienced huge losses between 40th and 100th trading day, and during other days were losing small values. Another characteristic of closing prices trends that can be concluded from this graph, is that even though 2014 has been the worst year in index history, there dramatic decline in value during that year was smaller than in previous years, in which the index performed better.



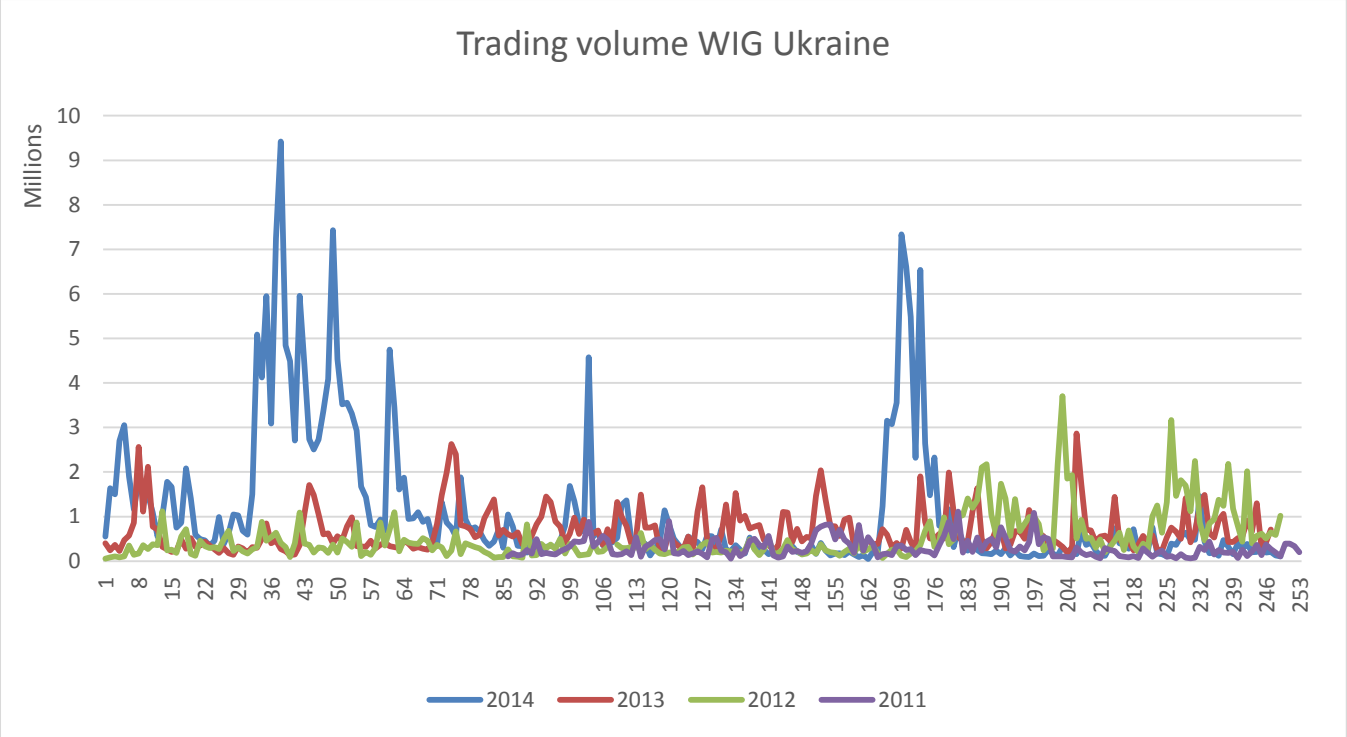
Graph 36- WIG Ukraine daily log returns

Graph 36 presents daily log returns of WIG Ukraine index. Unlikely previous chapters, there is no need to split this graph into 2 separate ones. During 2014 the index experienced biggest losses and gains, this is without any doubt. This is especially in the first case: in one day it lost more than -17%, while the worst result for years 2011-2013 was -6%. 2014 also had the biggest gains of all investigated vintages, reaching over 5% couple times. In other years, the index has not reached 5% daily log return even once. Interestingly, also 2013 exhibited some interesting log returns. The biggest loss, -6.55% and the biggest gain 5.07%, are bigger than any results realized in 2011 and 2012. This shows that for WIG Ukraine 2013 was not as calm as for other investigated indices. On the other hand, this index was not used until mid-2011 which means that we are not able to compare its performance with the most extreme years in this study: 2008 and 2009.



Graph 37- WIG Ukraine 10 days volatility

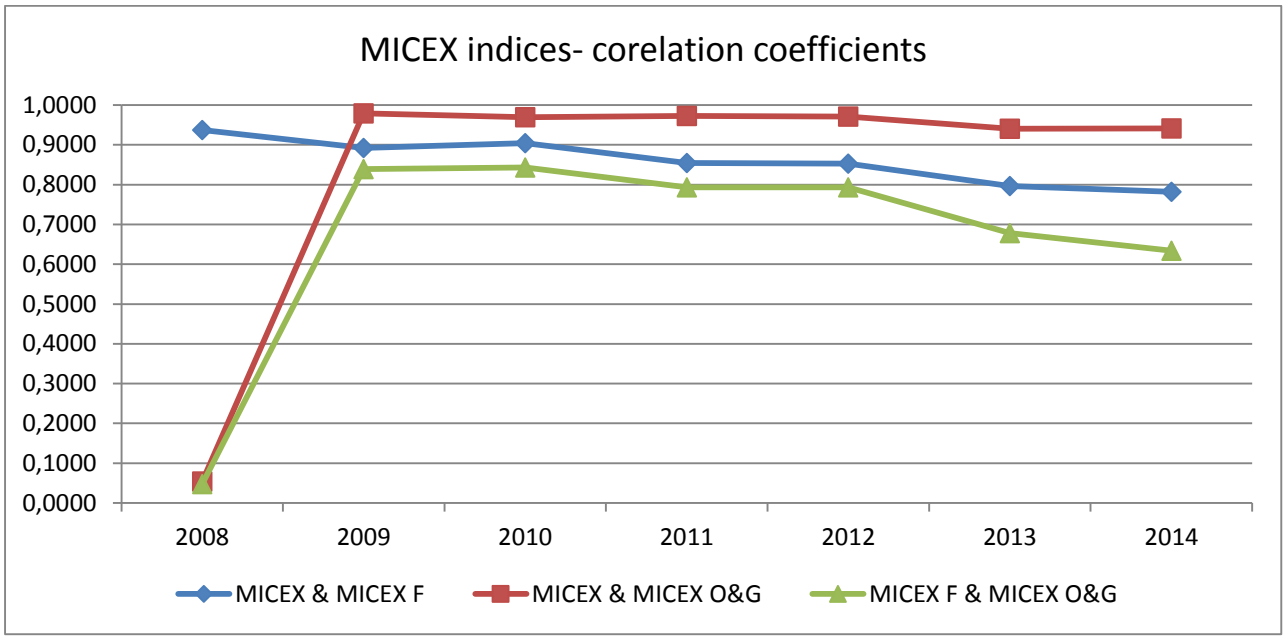
Graph 37 presents results of 10 days volatility for WIG Ukraine index. All investigated vintages, apart from 2012, exhibited several jumps of the volatility. The most extreme were performed in 2014, when the parameter reached above 20%, and was constantly over 10% for approximately 30 days. In other parts of the year, volatility had 3 more peaks and jumped to 10%. The market was also insecure during last 30 trading days, when the volatility level was almost constantly above 7%. Compared to 2014, 10 days volatility yielded less extreme results, for example in 2011, market risk peaked to 11%, and stayed above 5% for a short period of time. In 2013 there were several peaks, but volatility surged above 10% only once. Also, the period before end of the year was risky, which might be caused by the events marking the kick-off of the Ukrainian Crisis. Generally, compared to previous years, 2014 was far more volatile, and realized some of the highest results. However it again should be noted, that due to young age of the index, there is no possibility to check, how it would react during the GFC in 2008-09.



Graph 3818- WIG Ukraine daily trading volume

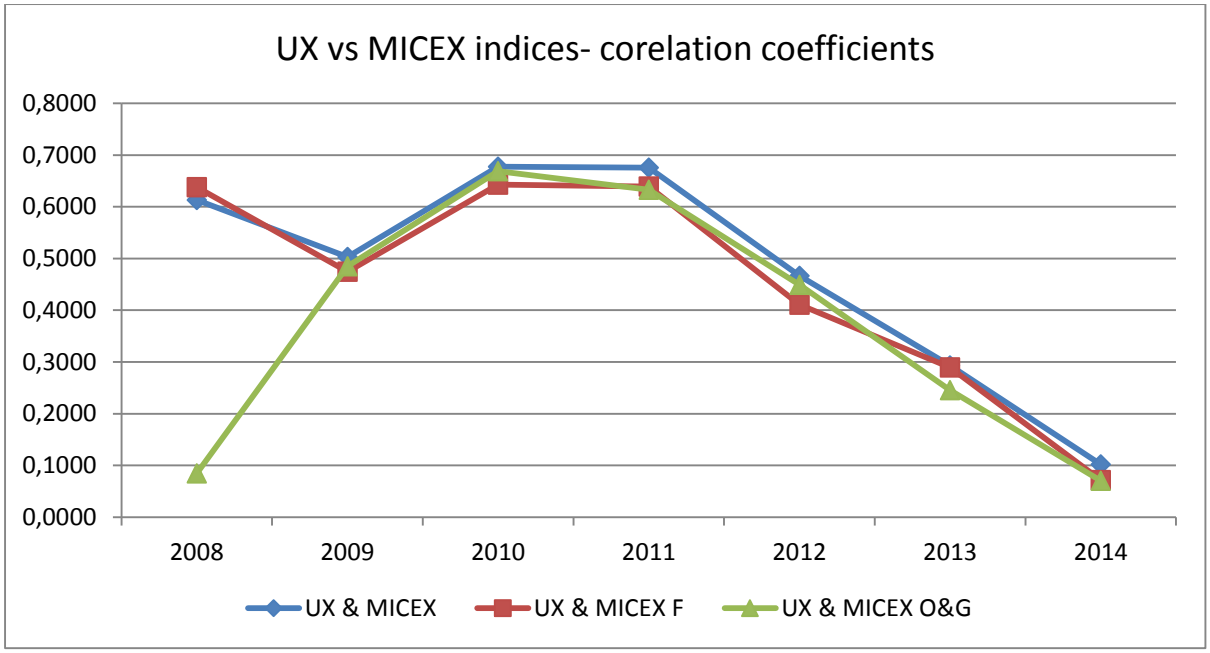
Graph 38 presents daily trading volume of WIG Ukraine index since the beginning of its history. In 2011, the year of its creation, the index was not actively traded- the amount of settled contracts jumped only once above 1,000,000 in a single day. The situation changed in the next year, 2012. During that year, for the first 160 trading days, the volume was also very low, comparable to previous year. However, investors became much more active during last 70 trading days of 2012, when the volume surged above 3,000,000 twice, and couple of times above 2,000,000 and 1,000,000. This tendency stayed active in 2013- although there more settled no more than 3,000,000 contracts on a single day, there were many days when volume was above 1,000,000. 2014 should yielded the most extreme results. In the beginning of the year, volume surged to the level of 9,400,000 contracts settled on a single day, and was above 2,500,000 constantly for a period of 30 days. Later during the year, volume surged to 4,000,000 and 7,000,000 and stayed above 3,000,000 for several days. What is especially interesting in 2014, is that between periods when the volume surged to enormous levels, investors were very inactive, and the volume was below 1,000,000 for long periods. However, it is clear that in 2014 there were some events that caused extreme reactions of investors. This will be investigated in the next sections.

3.7 Correlation



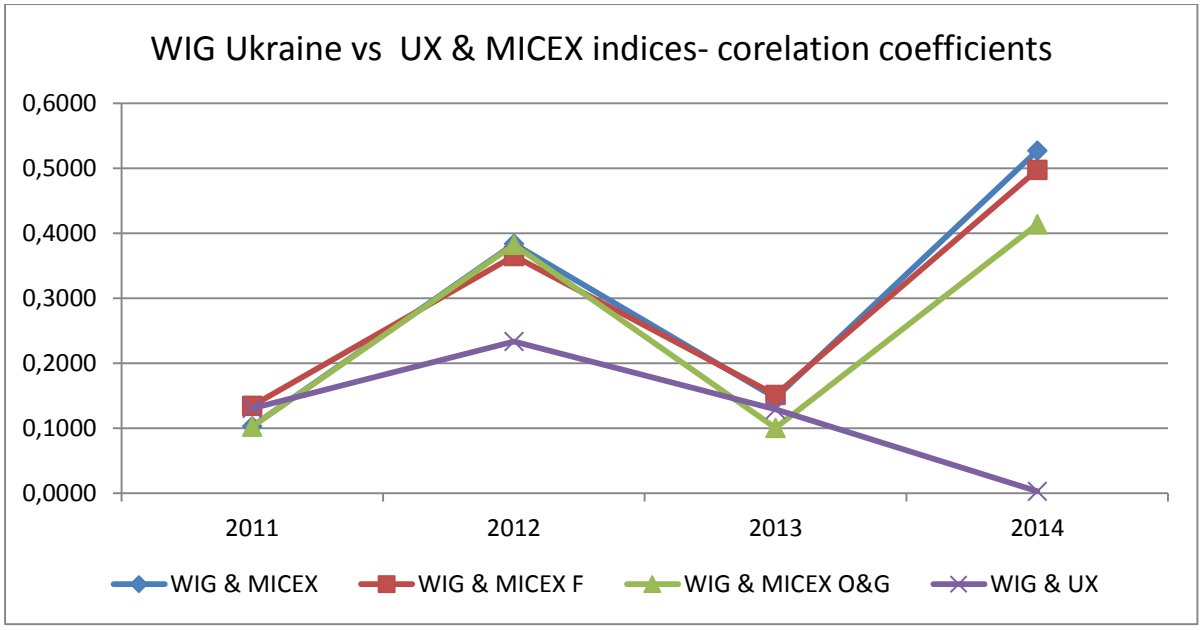
Graph 39- Correlation coefficients of MICEX indices

Graph 39 presents values of correlation coefficients between daily log return of MICEX indices, from 2008 to 2014. The graph confirms that generally MICEX indices exhibit consistent tendencies. Starting from 2009, correlation between all indices was gradually decreasing. The biggest changes took place in 2013, especially in case of relationship between MICX Financials and Oil & Gas indices. Important finding of this analysis is the fact that Ukrainian crisis did not influence trends that were followed by correlation coefficients in previous years and that differences between coefficients between indices remained stable when compared to 2013. The decrease of coefficients values is rather not be linked with Ukrainian crisis. Moreover, the data do not suggest that the crisis did not boost declining trends in any way. An interesting feature can be observed in year 2008, when the correlations between Oil & Gas index and remaining two was almost negligible, equal to approximately 5%. At the same time, the coefficient between MICEX main and Financials indices was at the highest level of all investigated years. It can be concluded that the GFC, which started in 2008 did not impact Oil & Gas industry as Financials and the whole market. However, this is not the subject of this study.



Graph 40- Correlation coefficients of UX and MICEX indices

Graph 40 presents values of correlation coefficients between daily log return of UX and MICEX indices, from 2008 to 2014. Relationships between the indices exhibit one common trend since 2009. What was to be expected, based on previous graph, in 2008 Oil & Gas industry presented completely different behavior than the remaining two MICEX indices. However, after correlation coefficients for all investigated indices reached their peaks in years 2010-2011, their values began to sharply decline, starting from 2012. In 2014 all coefficients hit their all-time-low (during years included in the analysis). Only in case of MICEX main, the correlation coefficient with UX reached more than 10%. In the remaining two cases, correlation was below 10%. Despite the fact that, with one exception, coefficients between UX and MICEX indices were very close to each other, the main MICEX index exhibited the highest degree of correlation (apart from 2008). This shows that, regardless of the correlation level, the whole Ukrainian market resembles main Russian market gradually better then sector markets. What is an unexpected finding, is the fact that the Crisis did not reverse or influence in any other way the trends that were exhibited by indices in previous 3 years. If the trend continues, it is likely that correlation coefficients will soon become zero or negative. There is no indication that the ongoing conflict between Ukraine and Russia will somehow impact the declining trend. As stated before, findings of this analysis are surprising, because first of all it was rather expected that before 2013 correlation coefficients would remain on similar, stable levels, yet this was not the case. Additionally, the trend followed by indices over past years was not impacted by the events resulting from the crisis.



Graph 41- Correlation coefficients of WIG Ukraine and other indices

Graph 41 presents values of correlation coefficients between daily log return of WIG Ukraine and UX and MICEX indices, from 2011 to 2014. The correlation between WIG and MICEX indices is far more volatile than in case of UX, and it does not follow any certain trend for moiré than 1 year. When compared to 2013, in 2014 correlation between WIG and MICEX indices sharply inclined, reaching more than 50% for MICEX main index. After drastic decrease of their values in 2013, this could be perceived as an impact of Ukrainian crisis (although opposite to expected). However, given the fact that in 2012 the coefficients values was completely different than in 2011, it is difficult to draw any certain conclusion. On one hand, trend opposite to 2012's could result, or at least be boosted by the events from Ukraine, but on the other hand- this might be as well caroused by WIG Ukraine specific characteristics, which are visible in years 2011 to 2013. As long as we have made no original assumptions regarding the relationship between WIG Ukraine and MICEX indices, using common sense it could be expected that the crisis should impact correlation between these indices rather negatively than positively. Given all this information, one should not draw any conclusion regarding impact of the Ukrainian Crisis on the correlation between WIG Ukraine and MICEX indices. When it comes to correlation coefficient between WIG Ukraine and UX indices, the results are much more surprising. In 2014 the correlation between these two indices went practically to 0.

3.8 Abnormal returns

In order to better investigate how the markets were impacted by the Ukrainian crisis, we decided to include the analysis of indices' abnormal returns for 2014. Abnormal returns, according to Brealey, Myers and Allen are calculated as the difference between actual returns and expected returns:

Abnormal index return = actual index return – expected index return

In other words, this figure shows how what part of the returns is not to be attributed to general market movements, but is specific to the given stock (or index). Due to the fact, that in this research all analysis are based on stock indices representing whole markets (MICEX and UX) or its sub-sectors (MICEX Oil & Gas, MICEX Financials, WIG Ukraine), we adjusted the approach and used MSCI World Index as the market. The index covers large and medium companies from 23 developed markets across the world, covering approximately 85% of market capitalization in each country. It has 1643 constituents. Despite the fact that the index does not cover Russia, Ukraine nor Poland, it is the most suitable global index that can be used for the purpose of this paper.

In order to calculate the abnormal returns, we have to know actual and expected returns from 2014. Additionally, because of low returns that MSCI yielded in 2014, we are also employing the 2013 realized returns. This is done in order to achieve more CAPM results, which makes it easier to analyze these results and compare them with reality. The first type is already known, and has already been used in this paper. To identify the expected returns, Capital Asset Pricing Model (CAPM) approach is employed:

Expected risk premium of index = beta x expected risk premium on the market

$$r_{expected} - r_f = \beta \times (r_m - r_f)$$

$$r_{expected} = r_f + \beta \times (r_m - r_f)$$

Where:

$r_{expected}$ - expected return on the index

r_f – risk-free rate

β – beta, defined as index sensitivity to the market

r_m- return on the market

For the purpose of this paper, several assumptions and calculations have been made. First of all, we are looking at the indices from the point of view of an investor being able to invest on various international markets. Because of that, risk-free rate was calculated as 2014 average yield to maturity of 10 yr German Bonds. Beta of each index was calculated as:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2}$$

Where:

β_i – index' beta

σ_{im} – Covariance between index returns and MSCI World Index returns, calculated for the period of 2012-2013

σ_m^2- Variance of MSCI World Index returns, calculated for the period of 2012-2013

MSCI 2013 log return	**18,43%**
MSCI 2014 log return	**2,08%**
r_f	**1,24%**

Table 6- Market data

Table 6 presents numerical values of CAPM inputs: in 2013 MSCI log return was equal 18,43%, in 2014: 2,08%, while average yield to maturity on German bonds equaled 1,24%. Pulling these figures into the equation resulted with calculating expected returns of all investigated returns, which are presented in table 7:

	Beta	Log returns 2014	Expected returns (from MSCI 2014)	Abnormal Returns (from MSCI 2014)	Expected returns (from MSCI 2013)	Abnormal Returns (from MSCI 2013)
MICEX	0,15	-4,86%	1,36%	-6,22%	3,84%	-8,70%
MICEX FINANCIALS	0,17	-22,57%	1,38%	-23,95%	4,14%	-26,71%
MICEX OIL & GAS	0,15	3,97%	1,37%	2,60%	3,87%	0,09%
UX	0,53	13,70%	1,68%	12,02%	10,37%	3,33%
WIG UKRAINE	0,67	-72,47%	1,80%	-74,27%	12,81%	-85,28%

Table 7- CAPM inputs and results

Table 7 presents also results of Beta calculations of each index. Generally, beta values are rather low, especially for MICEX indices. For MICEX Main and MICEX Oil & Gas indices, beta is equal to 0.15, while for MICEX Financials it is equal to 0.17. This shows that Russian

market is rather remote from world's markets, when it comes to behavior. As for the Ukrainian indices, both UX and WIG Ukraine exhibit significantly higher beta values- for the first one beta equals 0,53, while for the second one 0.67. Basing on the MSCI returns from 2014, all indices are expected to yield small positive returns in 2014. The highest expected return was achieved by WIG Ukraine and equals 1.80%. However, basing on MSCI returns from 2013, all indices should yield significantly higher returns. Again, the expected return is achieved by WIG Ukraine, and equals 12.81%. In both cases MICEX main index yields the smallest expected returns, however MICEX Oil & Gas exhibits almost equal scores.

MICEX main index exhibits moderate, as for the investigated sample of indices, deviations of actual returns from expected returns: -6.22% (for 2014 MSCI) and -8.70% (for 2013 MSCI). Basing on this result, it can be interpreted that the impact of Ukrainian Crisis on this index was rather gentle, when compared to other indices. It has underperformed the global market as well CAPM expected returns. However, bearing in mind the amount of negative information coming from Russia in 2014, and the fact that painful sanctions on Russian economy have been introduced by the EU, USA and other western countries, the deviation from expected returns is surprisingly small. Additionally, it is important to remember that not only western countries sanctioned Russian business, but also the country itself put sanctions for western economies. Despite the fact that in this way Russia tried to face the pressure, these actions also back-fired to Russian companies. This stand-alone figures show that the main Russian market remained rather immune to the country's huge involvement in the Ukrainian Crisis and the consequences resulting from it.

MICEX Financials exhibited second worst result of all investigated indices, and yielded -24% of abnormal returns, when MSCI 2014 returns were employed, and -27% when MSCI 2013 returns were used in the calculations. While the main Russian market proved not to be impacted by the crisis heavily, the financial industry underperformed its expected returns a lot. It can be concluded that sanctions, both those imposed by the West on Russia, as well as those working the other way around, as well as the uncertainty resulting from Russia's engagement on Ukraine caused the investors to value financial stocks a lot less than they were expected in normal market conditions.

MICEX Oil and Gas is on the contrary to Russian financial industry, since it has yielded positive abnormal returns, which means that it has outperformed CAPM expectations. From MSCI 2014 figures, MICEX O&G exhibited 2.6% abnormal returns, while for 2013 figures

0.09%. Despite the fact that abnormal returns are only slightly higher than 0, these are very interesting findings, given the fact that in 2014 Russian oil industry was hit with the sanctions, uncertainty coming from Ukraine and what is even more with plummeting oil prices. While the model expected the index to decrease in value in 2014, it in fact was able to rise by almost 4%, proving that the Crisis, sanctions and other factors did not influence it in a negative way. Moreover the index not only outperforms CAPM expected returns, which do not have information about political and economic environment, but it is also ahead of our expectations.

UX is another index that outperformed the expected returns. In case of MSCI 2014 returns, UX abnormal returns are equal to 12%, while for 2013 data: 3%. This information is even more unexpected than result yielded by MICEX O&G, because Ukraine, its society, industry and economy seems to be impacted by the crisis much more that Russian. Surprisingly, the investors did not react to the crisis negatively. What is more, even without information about the crisis (MSCI World on basis of which expected returns are calculated did not value information about the crisis much) UX expected returns were negative. Positive abnormal returns of this index prove that the investors acting on Ukrainian market do not react to the Ukrainian Crisis as negative as CAPM expected. UX also exceeds our expectations.

Finally, WIG Ukraine yielded -74% of abnormal returns (MSCI 2014) or -85% (MSCI 2013). This information is very interesting, given the very positive result of UX index. After all, both indices gather Ukrainian companies. UX exhibits biggest realized losses of all investigated indices, while it has least negative CAPM expected returns. This phenomenon can lead to a conclusion that investors acting on Polish market, but investing in companies located in Ukraine, tend to react to news coming from there in much more extreme way than it is case of investors acting directly in Ukraine. Very high negative abnormal returns show that those investing in Ukrainian companies listed in Poland perceive the crisis as a very serious and potentially dangerous phenomenon.

To sum up, analysis of abnormal returns, calculated using Capital Asset Pricing Model approach yield some interesting findings. First of all, it is surprising to see how big difference there is between UX and WIG Ukraine indices. While the first one yielded high positive abnormal returns, the second one exhibited them highly negative. This shows that perception of the crisis is affected heavily by the geographical location of investors and the stock exchanges where indices are listed. Secondly, separately from the first conclusion, it is unexpected to find UX abnormal returns to be positive, despite the turmoil and problems

Ukrainian companies and society encounter. Finally, positive abnormal returns of MICEX Oil & Gas index are also a surprising finding, given the amount of troubles this industry encountered in 2014.

3.9 Event study

The presented approach is not the only one that could be used to asses abnormal returns. There is a number of other methods to investigate how given unanticipated events impact index value, that is event studies. In the paper Measuring Security Price Performance, Brown and Warner (1980) investigate and compare three different models of performance assessment: mean adjusted returns model, market adjusted returns, and market and risk adjusted returns. The first model assumes that any security i has a constant expected return K_i. The abnormal return in this model is the difference between observed and expected return. Hence, the model is consistent with CAPM. The idea underlining market adjusted returns model is the assumption that for any set of different securities, expected returns of each of them are equal to each other, across the whole set, but a given security does not have to have constant expected returns. Under the assumption that all securities exhibit systematic risk equal 1, this model is also in line with CAPM. Finally, market and risk adjusted returns model link security's expected returns with return on a minimum variance portfolio of risky assets, which is uncorrelated with market portfolio. The authors state that in each of investigated models actual returns will be different from expected from time to time. Nevertheless, under the assumption of efficient markets, realized returns cannot differ from expected systematically. What is more, authors also imply that for each discussed model, measures of abnormal returns has an unconditional mean equal 0 (so they are unbiased). What is also pointed out is that there is a number of different approaches to defining and measuring abnormal returns, depending on the type of Asset Pricing model applied. Brown and Warner also provide an explicit summary of each performance measure. In case of the first model, they concentrate on investigating, whether the returns in month 0, which is directly after the event which is abnormal, are statistically significantly different from the months around the event. For market adjusted returns model, they take into account the market movements that happened simultaneously with the events the underlying index has experienced. The model tracks the difference between the investigated index and the market. The last analyzed model employs both methods- security's systematic risk and market movements.

One of the most interesting outcomes of the study is discovering the fact, that the least complex method, mean adjusted returns model performs similarly well as other two, more advanced and

complicated models, when it comes to detecting the abnormal events in case they were present. However, when researchers are unable to precisely identify the time during which abnormal event took place, and the most precise estimation of the time window covering the event is as wide as 11 months, performance of the models falls drastically. Interestingly, performance of the simplest methods is among the most outstanding. The authors point out that it often is the case that abnormal events exhibit clustering. This means that events causing abnormal returns happen at the same time or one shortly after another. This additional feature resulted in discrimination of the methods, and the simples one performed significantly worse, than those that included market information. Another important conclusions to be drawn from the research is that the choice and proper use of market index type is very important for the outcomes. In the basic procedures, equally weighted index was used, however the paper includes also value-weighted index. For the second case, some of the methodologies, like control portfolio (type of two-factor model) method had problems with proper detecting of abnormal behavior.

To wrap up this paper, it is safe to say that there is no one method which is better than the others. In fact, the authors proved that in many cases more complicated methods are not helping the researcher to achieve more precise results, and that the simplest model- mean adjusted returns are doing a good job. However, from the point of view of our research, it seems that this method might not be the best choice. This is because the time Ukrainian Crisis is full of abnormal and unanticipated events, which leads to their clustering. As Brown and Warner proved, in case of time clustering of the events (occurs when unanticipated events take place in short span of time), the simplest investigated model has some problems with proper calculation of abnormal returns.

3.10 Summary

Chapter 3 investigates how behavior of 5 stock exchange indices has changed with regard to the Ukrainian Crisis. These are UX- Ukrainian Stock Exchange index, WIG Ukraine- Warsaw stock exchange index, consisting of Ukrainian companies listed on Polish stock exchange, MICEX, MICEX Financials, MICEX Oil & Gas- three indices of Moscow Stock Exchange, respectively: main index, financial companies index and finally oil and gas companies. In this chapter, several characteristics of each index were investigated- log returns (yearly, daily, average), closing prices, volatility and trading volume. The main point was to compare results from 2014 with previous years (2008-2013), and basing on that- to check, whether Ukrainian Crisis had any confirmable influence on selected markets. In case of UX index, the results achieved in 2014 are less extreme than in case of previous years- log returns are close to 0,

whereas previously (not taking 2013 into account), they had more extreme values. The same characteristics are exhibited by trading volume and volatility. What follows, closing prices also remained stable, when compared to previous vintages. It can be concluded, that despite dramatic events taking place in Ukraine throughout the whole 2014, Kiev stock exchange did not react negatively to them. It is visible, that Global Financial Crisis from 2008-2009 impacted the index much more dramatically. However, even when compared to later years, it is clearly visible, that the index behaved in much less extreme ways, which can be perceived as a surprising finding. In case of MICEX, 2014 was quite similar to UX. The vintage was relatively calm, when compared to other years. There were some periods of increased volatility, especially around Crimean Crisis (February/March 2014), but it was far from getting close to figures achieved in 2008 and 2009. Similarly to UX, it seems that Ukrainian Crisis did not influence MICEX main index in any apparent way. The situation is slightly different in case of MICEX Financials. This index yielded more extreme figures that MICEX main, but still smaller than during years 2008-09. On the other hand, when compared with years 2010-13, it is clearly visible Ukrainian Crisis (probably mainly the sanctions imposed on Russian financial sector) had a major impact on the index. MICEX Financials took severe loses in 2014, as well as far more volatile than in previous years. This can be easily attributed to the role Russia plays in the conflict. The last MICEX index, Oil and Gas, seem to be the most stable of all. Volatility and log returns were close to 0, which is very calm compared to previous years. This is surprising, given sharply decreasing oil prices, as well as the Ukrainian Crisis, and reactions of Russia's western partners. It seems that either none of listed issues influenced the market, or they outweighed each other. Finally, the chapter also investigated WIG Ukraine index. It has to be noted, that the history of the index is shorter than others, and started in 2011. However, it seems that impact of Ukrainian Crisis is best visible in case of this index. Its value has gone down sharply, while the volatility was high compared to previous years. Also trading volume was higher, however due to the fact that the index exhibited growing trend of this feature over past years, it cannot be determined if 2014's high volume can be related to the crisis. To wrap it up, it seems that Ukrainian Crisis impacted only WIG Ukraine and MICEX Financials in any visible, negative way. Other indices remained immune to the events, at least in long-time horizon.

Another insight into long-term impact of the Ukrainian crisis is provided by the next part of this chapter, which describes relationships between all investigated indices. Conclusions from these analysis can be shortly summarized. First of all, relationship trend between MICEX,

MICEX Financials and MICEX O&G indices has not changed since 2009. Year by year correlation coefficients between these indices declined, and 2014 was not different from previous years. The trend was kept, and there is no evidence that Ukrainian Crisis could impact relationship between these indices. Similar conclusions can be drawn for relationships between UX and investigated MICEX indices. The trends followed by indices starting in 2011 have not changed, and now are close to 0. The decrease in correlation coefficients in 2014 could be seen as an effect of the crisis, but given that the declining trend is older than one year, this is rather not the case. Moreover, there is no evidence that the crisis has impacted pace of the trend. Finally, relationships between WIG Ukraine and other investigated indices were analyzed. What is very surprising is lack of correlation between WIG Ukraine and UX. Starting from 2012 the coefficient was declining, and in 2014 it practically reached 0. Given this figures, it is clear that Ukrainian Crisis did not influence this relationship. On the contrary, there is evidence that relationships between WIG Ukraine and MICEX indices could be boosted due to the crisis. After 2013, when the correlations were relatively low, in 2014 they grew to 40% – 50%. However, it should be noted that they followed similar pattern in years 2011 – 2013, when first they surged only to decline in 2013. Nevertheless, WIG Ukraine relationships with MICEX indices are only that show some evidence of possibly being impacted by the Ukrainian Crisis.

Calculating 2014 abnormal returns of each investigated index using Capital Asset Pricing Model was another way of identifying the possible impact that Ukrainian Crisis had on the markets. The most striking finding is huge difference between indices of Ukrainian companies-WIG Ukraine (high negative abnormal returns) and UX (positive abnormal returns). These findings lead to a conclusion that perception of the crisis, even if the point of view are politically the same, is different because of the geographical point of view. Furthermore, it was unexpected to find out that UX exhibited positive abnormal returns, even in case when country was facing hard times. Finally, Russian MICEX Oil & Gas index also surprise with high abnormal returns, given the problems this industry and the whole country encountered in 2014.

In order to complete information on how the abnormal returns can be tracked, the article "Measuring Security Price Performance" was reviewed, outside of the literature review part of this paper. The paper gave an insight into how different models used for abnormal returns calculation perform. The bottom line is that in most of the cases the simplest model, mean adjusted returns methodology performs as good as other, more complicated approaches. However, in case of our research it seems that it is not feasible to use, due to the fact that it

performs poorly when encounters time clustering of abnormal information, which seems to be the case during Ukrainian Crisis.

4. Short term analysis

4.1 Methodology

In order to identify the expected influence of each event described in time-line, a certain scoring framework had to be developed. It was decided, that the best way to do it, was creating 3 categories that would describe 'magnitude' of each information coming from Ukraine or related to the crisis. The 3 categories are:

- Positive (+)
- Neutral (0)
- Negative (-)

Before describing, what each category means, it has to be noted that each information will have 2 categories assigned- from Ukrainian point of view and from Russian point of view. This means that there are 9 combinations of categories that can be used to describe each news.

Detailed description of each category:

- Plus- an event that should bring political, social or economic benefits to one of the countries. In case of Ukraine, positive political events are understood as those that help the country to regain its stability, increase cooperation with western countries and not destabilizing its relations with Russia (and the other way around) and those that help to keep the territorial integrity together. Positive social events are those, that to decrease negative effects of the crisis suffered by Ukrainian society. Finally, positive economic events are those that are expected to help Ukraine in stabilization of its economic situation. From Russian point of view, positive political events are understood as those, that help Russians in extending their political domination over Ukraine, and those that help in keeping positive relations with western partners. Positive social event is identified when Russian society can benefit from it, and economic- when financial markets, companies and the state can benefit financially. It should be noted, that types of events do not necessarily have to be the same for Ukraine and Russia- for example a positive political event for Ukraine, can be regarded in economic terms in Russia. Moreover, each event can be assigned to more than 1 category.
- Neutral- as in previous case, events can be divided into three subcategories: political, social, economic. Neutral events are those that should not cause any explicit result for

Ukraine or Russia and can be regarded as positive, neutral or negative for the other country. They can be actions taken by internal governments or one of other involved sites of the conflict.

- Negative- these are events, which theoretically should cause opposite effects than positive events. Generally, these are the events that destabilize political, social or economic situation in Ukraine or have negative impact on Russian plans. These are also the events that amplify the conflict in eastern Ukraine, rather than extinguish it.

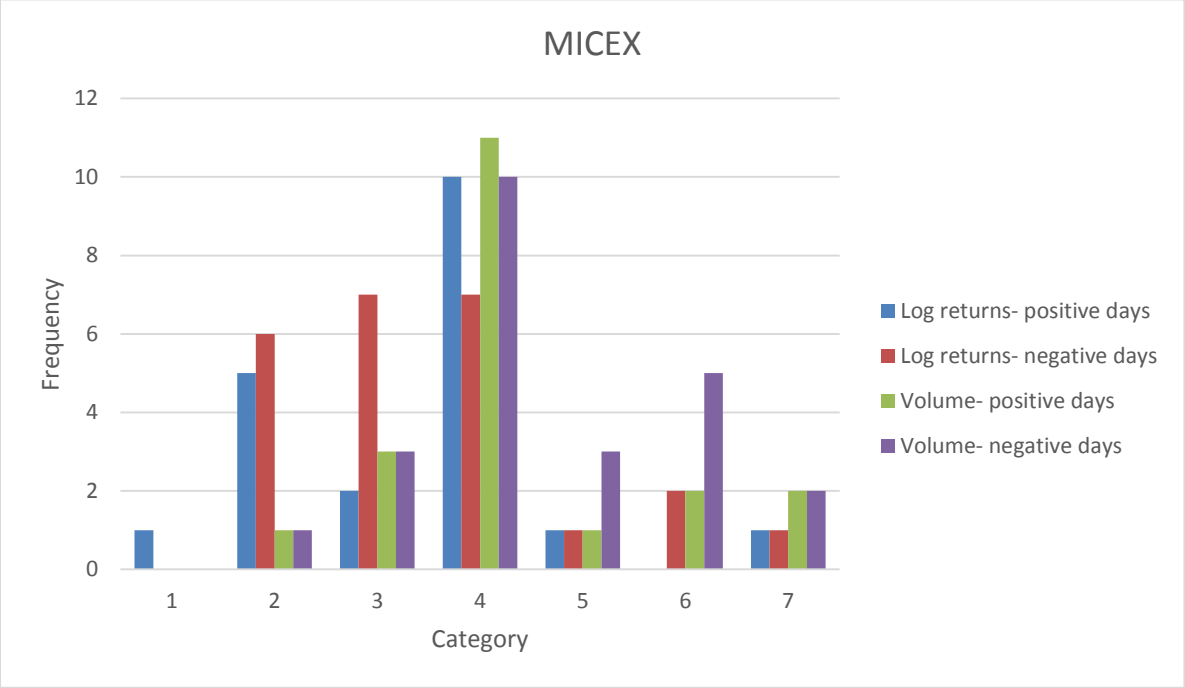
In order to identify, how strongly markets reacted to events selected from the time-line, three measures were investigated: daily log-returns, daily trading volume and 10-days volatility. They were selected, because their analysis give an insight into behavior of the markets and show, how the investors reacted to the news- whether they increased their market activity, how they perceived the information (positively or negatively) and whether they were stable in their judgments or changed them often For each of them 2014 average value was calculated. Next, there were 7 categories developed, that describe how far from calculated average, given day's values are. Boundaries of the categories are calculated as a multiplication of standard deviation of the given parameter in 2014. The value, based on which days are assigned to categories was calculated as the difference between given day's parameter value and 2014's average. The categories assigned to each measure of each investigated day are as follows:

1 Much lower
2 Significantly lower
3 Lower
4 The same
5 Higher
6 Significantly higher
7 Much higher

Basic parameter used to calculate boundaries is 2014's standard deviation of each measure. This is because of several reasons. First of all, as an outcome, there is a smaller chance that the results will be somehow biased by my point of view, than in case of fixed boundaries. Furthermore, applying standard deviation allows to easily adjust the categories for other years, if it was necessary. Finally, all three parameters- volatility, log-returns and trading volume are easily comparable, since the division is done relatively to their yearly performance and not on a fixed, arbitrarily chosen figures.

It the upcoming paragraphs, there are also used graphs presenting changes in 10-days volatility during investigated dates. The methodology behind these graphs is slightly different than in case of log-returns and volume graphs. First of all, for analysis of changes in volatility, there are used values for 4 trading days preceding date of the event, as in case of log-returns and volume- day of the event and the next date. This method is used, because volatility is calculated over the period of 10 days, so by analysis including 4 days any possible noise caused by volatility jumps prior to the event date are visible and can be excluded. To create volatility graphs, the following method was applied: first, similarly to log-returns and volume analysis, each date was assigned to a specific category. Second, average category was calculated for the four days preceding the event. Next, differences between category of day of the event and the average and the day after the event minus the average were calculated. Volatility graphs present frequency of appearing of each difference in the given group (e.g. MICEX – 'positive' days). As a result, it is possible to easily investigate what kind of changes (positive, negative, dramatic or small) in 10-days volatility resulted from the events and with what frequency.

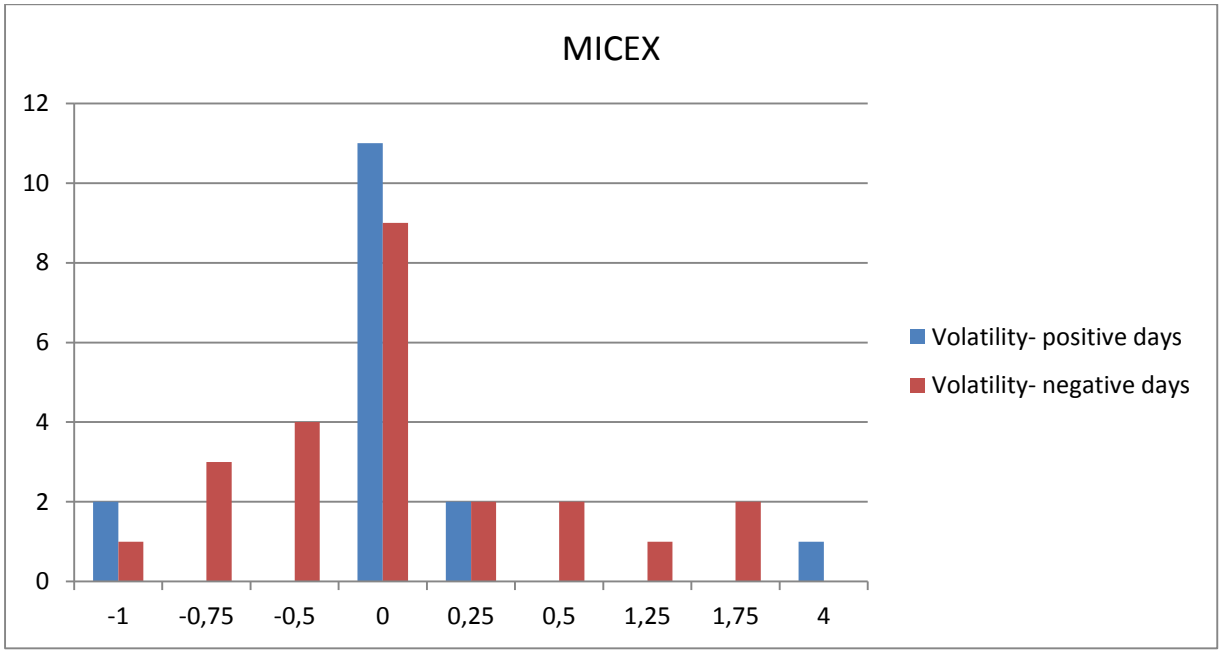
4.2 Results



Graph 42- MICEX positive & negative days frequency (log-returns and volume)

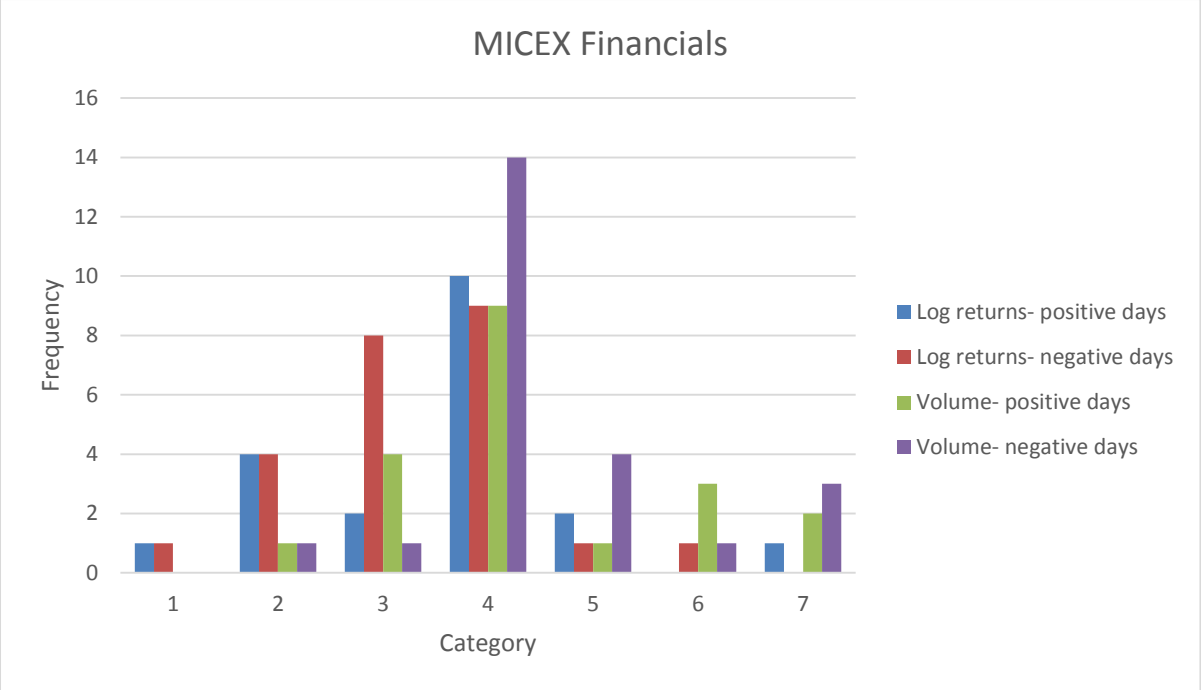
Graph 42 presents distribution of investigated days divided into categories for MICEX index. The first conclusion to be drawn is that majority days in all cases fall into category 4, which means that they exhibit the most mild changes. The only case when days are more evenly spread among different categories are log returns in negative information days- most of the

cases fall into categories 2-4, where the frequencies are practically equal. This can suggest that news negative for Russia can cause some negative movements in daily log returns. When it comes to log returns during positive days, majority of cases in concentrated in category 4. It can be concluded, that positive days do not have any visible impact on the daily log returns of MICEX index. Trading volumes, which also were investigated on Graph 42 tend to exhibit slightly different tendencies, depending on type of the day. During negative days, trading volume on most cases does not change, but there is a considerable amount of caseds when it is slightly increased. On the other hand, during positive days volume stays the same, and there are only few cases when it changes. Generally, it can be said that MICEX index does not react to positive information with changes of daily log returns or trading volume and that is some cases it reacts to negative information.



Graph 43- MICEX positive & negative days frequency (volatility)

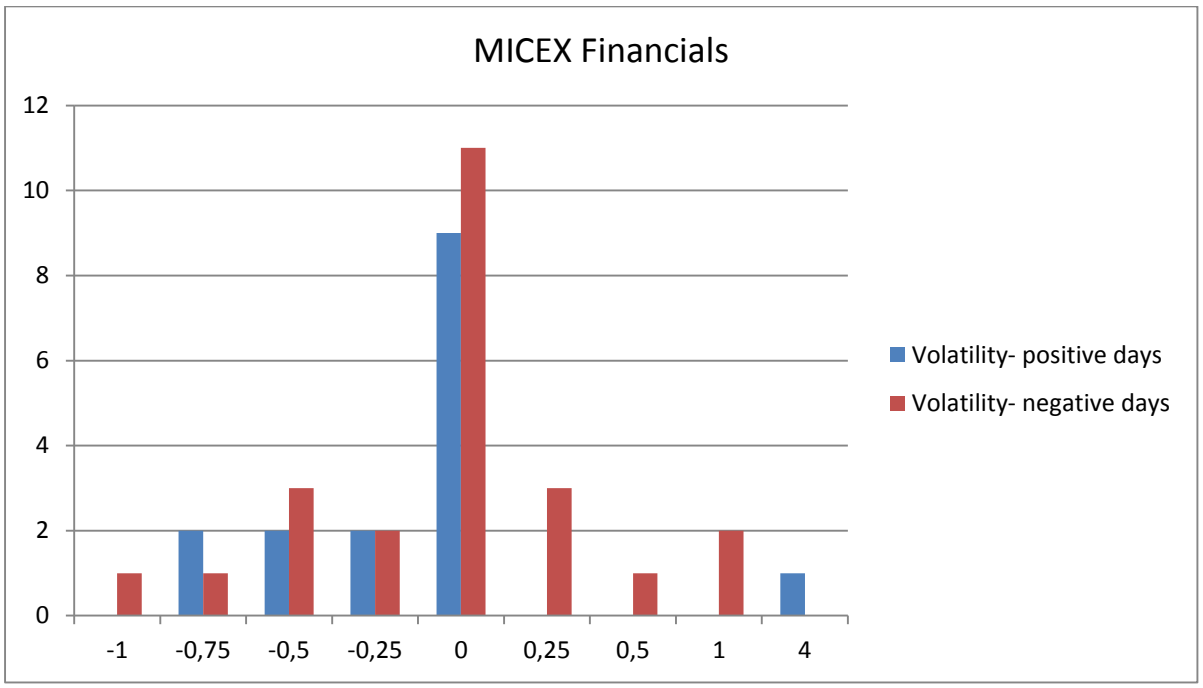
Graph 43 presents analysis of category changes for 10-days volatility of MICEX index. It is likely that in overwhelming amount of days, the volatility has not changed its category, after both positive and negative events (from Russian point of view). There is only huge jump recorded- 4 categories after a positive information. This means that market volatility had sharply increased during that time, which means that the risk also went up. What follows is that, despite the fact that given event can be perceived as a good information from the point of view of Russian politics, the market treated it as a potential risk. Other than that, there were some changes by 1-2 categories, but generally the volatility was not influenced by any kind of news.



Graph 44- MICEX Financials positive & negative days frequency (log-returns and volume)

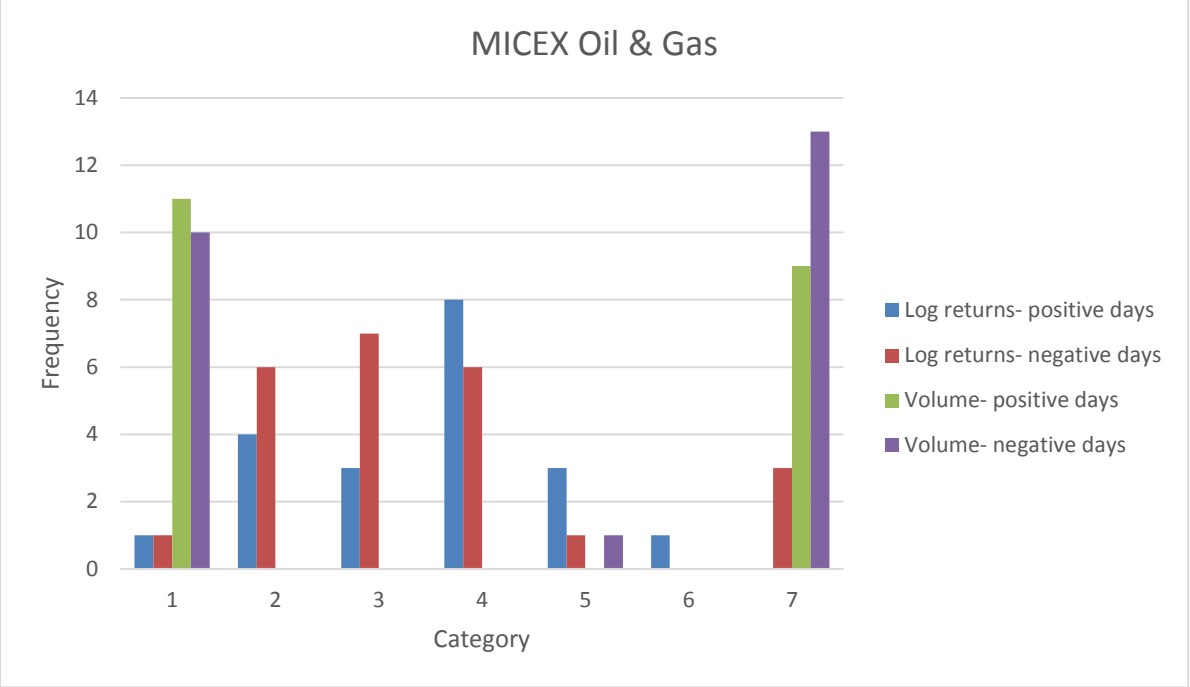
Graph 44 presents distribution of investigated dates divide into categories for MICEX Financials index. In case of trading volume for 'negative' days, majority of cases fall into category 4, which means that during these days volume did not vary from 2014's average. However, there is a number of days, when volume was higher than average, which suggests that for some news investors may increase their activity on the market. In case of trading volume over 'positive' days, it again, as in case of MICEX, gathers majority of cases in category 4, which suggests that positive news do not influence daily trading volume of MICEX Financials index. Analysis of log returns during positive news days show that majority of cases is concentrated around neutral category no. 4. There are several cases of index underperforming the average value and a few when it outperforms the average. The results are similar to the main MICEX index, however concentrated around neutral values slightly more. Again, the surprising finding is that despite the positive value of news, MICEX Financials performs rather worse than on average. Analysis of log-returns during 'negative' days show that investigated index underperforms the average, which is in line with expectations and similar to the main index performance. However, what is worth to point out is that in case of Financials index, on the left side of the graph frequencies on the categories gradually increase. There is a small number of days when the index outperformed the average, however a conclusion that MICEX Financials reacts negatively to negative news can be drawn. This is in line with findings of analysis of the main MICEX index. Another finding coming from this graph, is that regardless

of the ‘magnitude’ of news (whether it is ‘negative’ or ‘positive’ day), MICEX Financials tend to react negatively or neutrally (there are more cases of negative reactions than neutral, but on the other hand there are 3 groups for underperformance and only one for neutral behavior) rather than positively. In fact, there is a huge discrepancy between categories 1 to 3 and 5 to 7 (20 cases in ‘negative’ categories compared to 5 cases in ‘positive’). These findings may suggest that investors are either neutral to any kind of news, or expect that any news will cause negative effects for the markets.



Graph 45- MICEX Financials positive & negative days frequency (volatility)

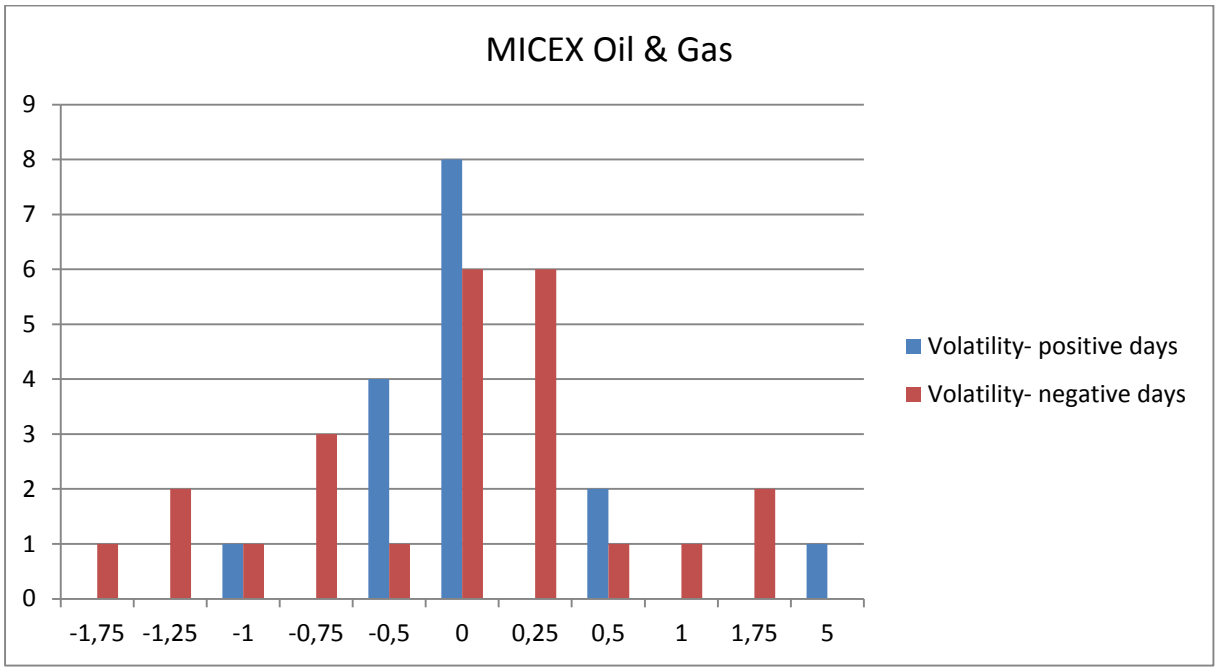
Graph 45 presents analysis of category changes for 10-days volatility of MICEX Financials index. Similarly to MICEX main index, majority of cases is gathered in neutral point of the scale, which means that there were no changes in volatility category resulting from any kind of news. As in previous case, there is one huge jump in the categories (increase by 4), which is caused by the same positive information. The increase took place during the next trading day after the event, with a weekend between them. This means that volatility might be influenced also by events that took place over the weekend. Other than that, MICEX Financials volatility was in general not influenced by any information related to Ukrainian crisis.



Graph 46- MICEX O&G positive & negative days frequency (log-returns and volume)

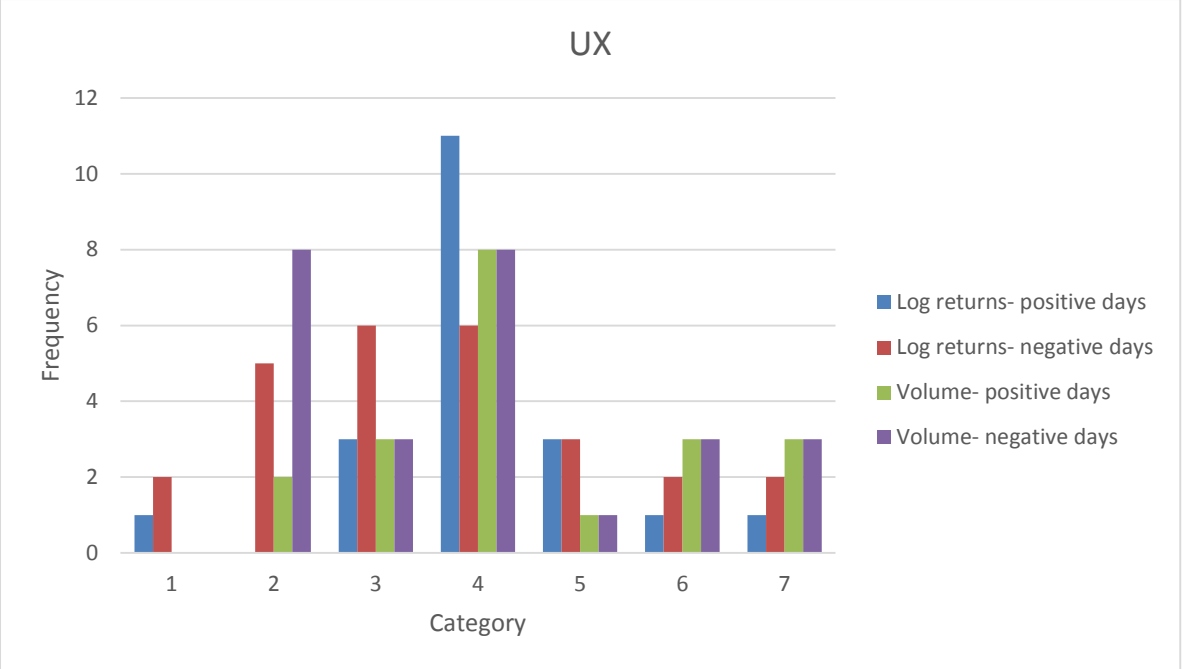
Graph 46 presents distribution of investigated dates divide into categories for MICEX Oil & Gas index. Before moving on to any further analysis of this index, it is worth noticing how different from previous two investigated indices are distributions in case of Oil & Gas. It is only one series ('log returns- positive days') that has the biggest size in the middle of the scale. In case of volume in 'negative' days, the distribution is divided practically between two most extreme categories- 'much lower' and 'much higher'. There is only one day, when the volume had different category assigned (no. 5). In majority of cases, trading volume outperformed 2014's average, however sizes of both populations are close to equal. In case of volume during 'positive' days, the tendency is close to identical to the case of 'negative' days, with one difference- small majority of days as assigned to category 1, rather than 7. These results suggest that in case of Oil & Gas index, investors react with dramatic changes in activity to news of any 'magnitude', that related to Ukrainian Crisis. Similarly to MICEX main index, majority of days was assigned to either neutral or 'negative' categories, showing that investors react negatively even to news good for Russia. In case of log-returns during 'negative' days, MICEX O&G is the first index for which there are more days in a single 'negative' category than in neutral category. It can be concluded, that investors involved in Oil and Gas stocks are reacting more strongly to negative news, than in case of other two indices. As in previous cases, O&G exhibits much more days, both 'positive' and 'negative' in the negative categories than in 'positive' ones. Additionally, the index exhibits bigger difference between sum of days in

'negative' categories when compared to neutral category (MICEX O&G: 22 to 14, MICEX Main: 21 to 17, MICEX Financials: 20 to 19). This finding again proves that MICEX O&G reacts most dramatically and negatively of all investigated MICEX indices.



Graph 47- MICEX O&G positive & negative days frequency (volatility)

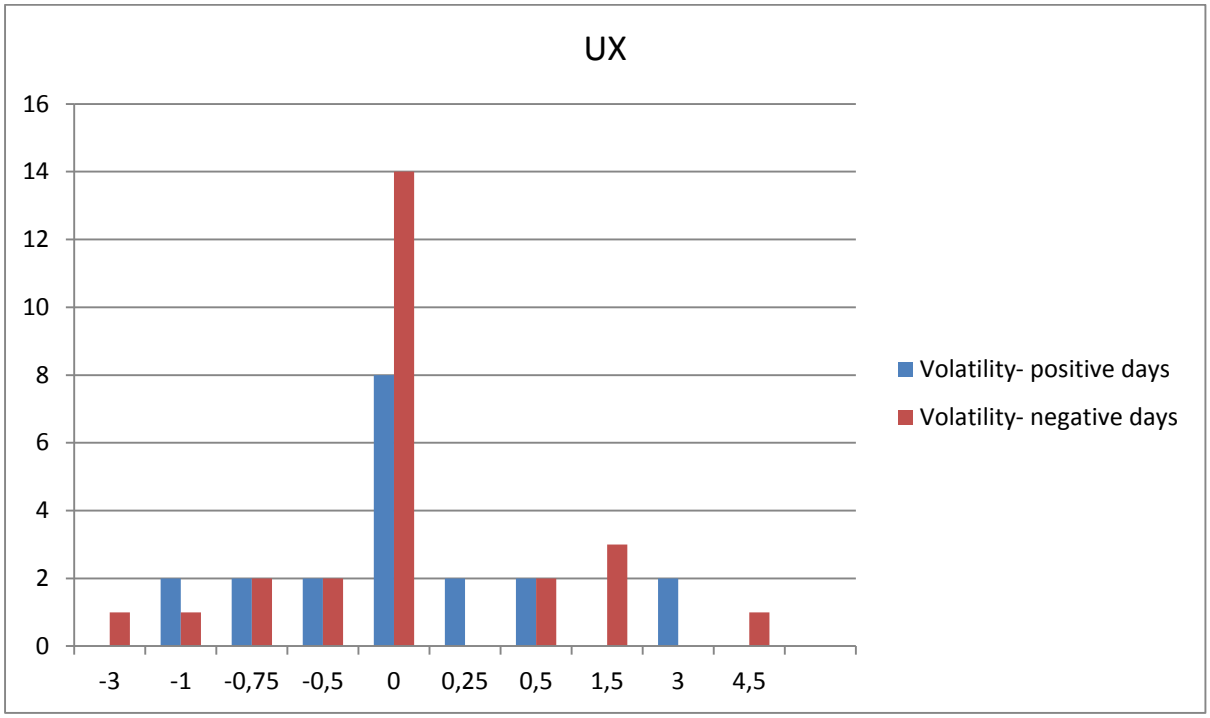
Graph 47 presents analysis of category changes for 10-days volatility of MICEX Oil & Gas index. Generally, the volatility follows pattern set by other parameters of this index, and varies from tendencies presented by MICEX and MICEX Financials indices. Most of the dates still fall into middle of the scale, and do not exhibit any changes. However, these are fewer cases than for previously investigated indices. More days are spread on the scale, showing that there were some changes in volatility categories (even though very small). Another proof of increased sensibility to the news is the fact, that there is one jump equal to 5 categories (for the same date volatility of MICEX and MICEX Financials hanged by 4 categories). Although MICEX O&G is slightly more sensible to the news coming from Ukraine, 10-days volatility is still quite stable.



Graph 48- UX positive & negative days frequency (log-returns and volume)

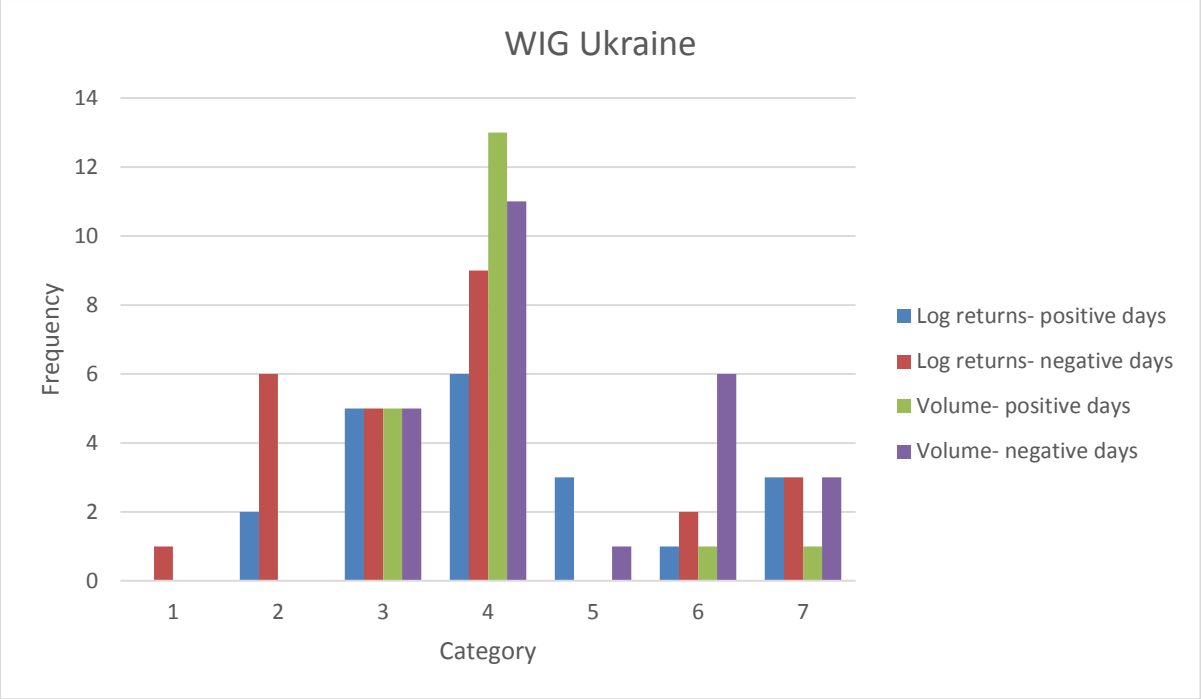
Graph 48 presents distribution of investigated dates divide into categories for UX index. What is interesting in this graph, is the similarity in distributions of 'Volume- positive days' and "Volume- negative days' series. Both series are visible in all categories, despite no.1, and in numbers 3 to 7 they have exactly the same size. Only in category 2 there is clearly a higher number of negative days, but this is due to total number of days included in the analysis. Both series, especially the one consisting of 'positive' days, gather most of the cases in category 4, while other categories have low frequencies. For 'positive' days, the majority of sample is distributed over outperforming and neutral categories, which shows that news that are good from Ukrainian point of view, imply increased volume. On the contrary, in case of 'negative' days, the majority is spread around underperforming and neutral categories, which can be interpreted as investors being less willing to trade, when the bad news come public. Investigating series of log-returns during 'positive' days shows that overwhelming majority of cases is gathered in category 4, which means that UX index remained neutral to good news. What is interesting is that when 'neutral' cases are not taken into account, there are more days gathered in outperforming categories, rather than in underperforming. This is a phenomenon that has not been exhibited by any of MICEX indices. It can be concluded that investors active on Ukrainian market, when there is positive information available, tend not to react, or to react positively to it. Log-returns during 'negative' days are spread more evenly, especially around categories from 'much lower' to 'the same'. There is relatively big difference between the amount of days when investors reacted negatively to bad news and when they reacted positively

to news of the same ‘magnitude’. These figures are in line with expectations, and might mean that political and social situation in Ukraine has more direct impact of the main stock index (UX) than it is in case of Russia and MICEX. Finally, when ‘positive’ and ‘negative’ days in categories 1 to 3 and 5 to 7 are summed up, the difference between headcount of the first group is higher than of the second, but the difference is not as high as for MICEX indices. Furthermore, if the fact that there are more ‘negative’ dates in the analysis is taken into account, the difference appears to be even smaller. What can be concluded, is that investors tend to react in expected ‘direction’ (with regard to ‘magnitude’ of the news), while in case of MICEX indices they tended to ‘favor’ underperforming the average.



Graph 49- UX positive & negative days frequency (volatility)

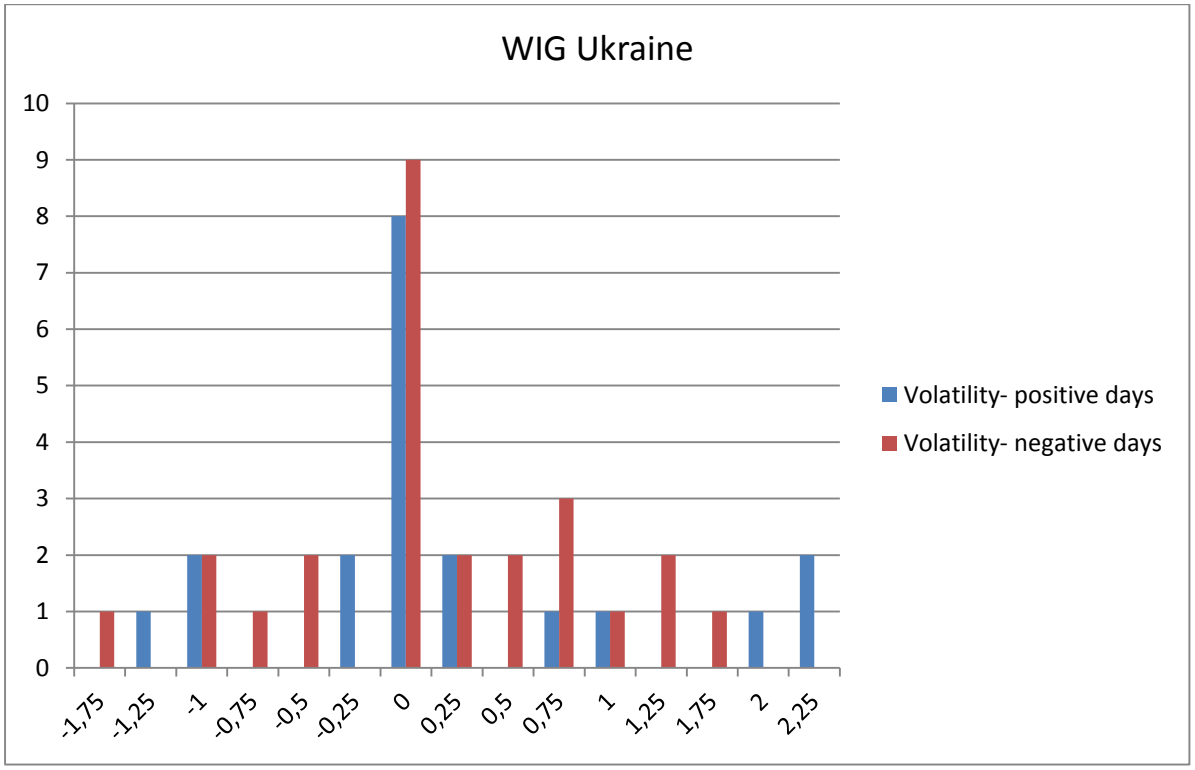
Graph 49 presents analysis of category changes for 10-days volatility of UX index. As in previous cases, there were many days when there was no change in the category. However, in more cases than previously category changed by more than 2, with shifts reaching from -3 to 4,5. In addition, the days when category changed were spread more evenly on the scale, and when summed up, there was more of them than days of no change. This suggests, that generally UX volatility was slightly more sensible to events and news, than MICEX index. Especially during ‘positive’ days this phenomena can be observed, as there are much more days when the volatility changes its category then when it did not.



Graph 50- WIG Ukraine positive & negative days frequency (log-returns and volume)

Graph 50 presents distribution of investigated dates divide into categories for WIG Ukraine index. The first observation made basing on this graph, is that distributions of all groups tend to be remote from normal. However, it is the fact that in all cases, biggest size of category is for the neutral one. This is best visible for 'volume- positive days' series, in which case huge majority of days is gathered in category no. 4. If the neutral category is not taken under consideration, the investors tend to react with rather smaller than average trading volume. On the other hand, all cases of underperformance are in category no.3 which means that they are close to being neutral. In case of trading volume during 'negative' days, although the most cases are in neutral category, there are substantially more days gathered in categories 5-7, which proves that investors acting in Poland, investing in Ukrainian stocks, increase their activity when there are bad news coming from the conflict zone. What is interesting is that despite the fact that investors acting on WIG and UX should perceive events from common view point, and that they invest in companies acting on the same market, they perceive bad news differently and act in opposite manners- UX decreases volume, while WIG Ukraine increases. Investigation of 'log returns- negative days' series informs that WIG Ukraine tends to decline, when there are pessimistic news coming from Ukraine. While when single category is taken into account, the most cases are in neutral one, if 'negative' and 'positive' categories are summed up, it is clear that in most cases investors react negatively. Only during very few days the reactions were positive, but this is in line with what was expected and with the findings

for UX index. In both cases uncertain political and social environment caused declines on the markets. In case of log-returns during 'positive' days, the tendency seems to be also in line with my view, however not as strongly as in case of 'negative' dates. Most of the 'positive' days are gathered in categories 5-7, which proves that investors react positively to good news, and the index outperforms 2014's average. Furthermore, these findings are also in line with what has been found for UX index. In general, analysis of UX and WIG Ukraine indices prove than the geographical location of the market influences tendencies in changes of trading volume, but it does not influence daily log-returns changes. Finally, summing up all days in categories 1-3 and 5-7 again shows that there is a substantially smaller difference between these two groups than for MICEX indices, and what follows that investors tend to react in a positive or negative ways with similar frequencies.



Graph 51- WIG Ukraine positive & negative days frequency (volatility)

Graph 51 presents analysis of category changes for 10-days volatility of WIG Ukraine index. As it is visible on the chart, the spread of category changes is considerably smaller than in case of UX index- it ranges from -1,75 to 2,25. On the other hand, there almost every point on scale between these values has a small population. What results from that, is smaller amount of days when there was no change in volatility category. It can be concluded that WIG Ukraine exhibits larger than UX amount of small volatility swings, but it does not swing so dramatically. This

is another phenomena that supports findings from previous paragraphs- although both indices 'describe' the same market, the geographical location of stock exchange matters for the behavior of the index and patterns it follows.

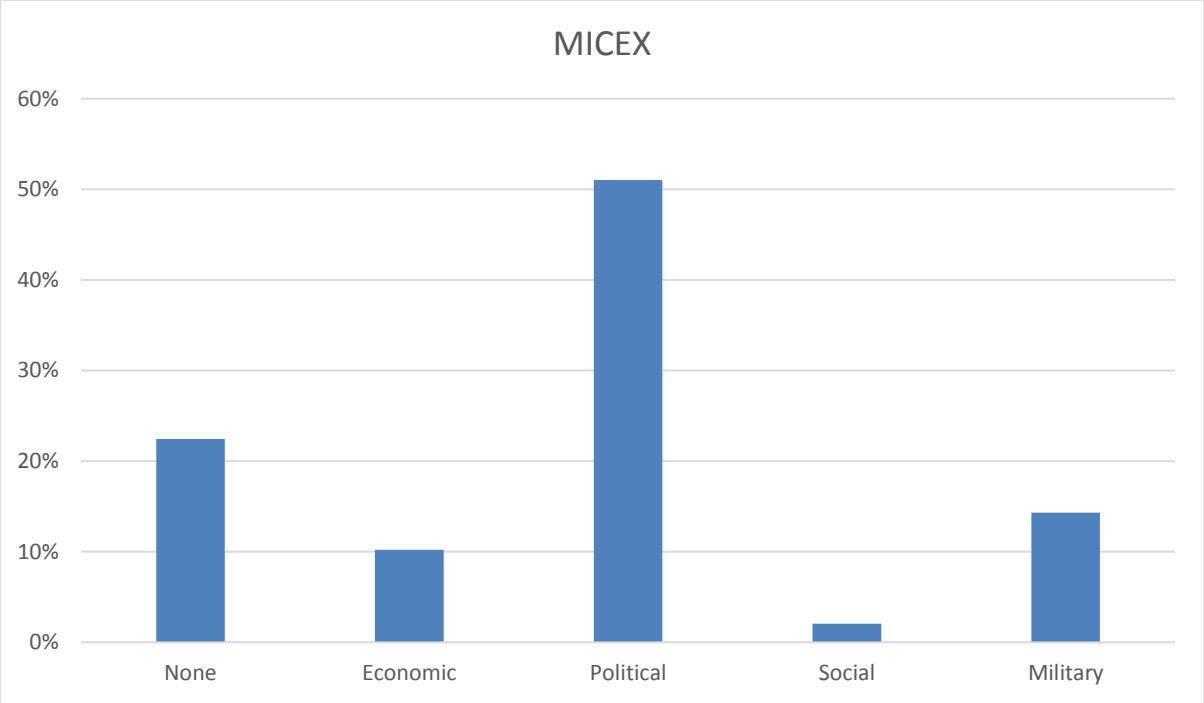
4.3 Extreme dates

This chapter presents information that can be retrieved from investigation of the most extreme values of various measures of the indices that are of interest in this paper. The following measures are subject of analysis: log returns, volatility and trading volume. The dates (in year 2014) when indices presented the biggest values were selected (additionally, dates when indices yielded the most negative log returns were also selected for the analysis) and reasons behind these market movements were investigated. This was done, by checking what kind of events could influence the values of the measures. For each group (positive log-returns, negative log-returns, volatility, and trading volume) top 10 scores of each index were selected. Next, the dates were compared with the time-line in order to identify what events could possibly influence the markets. The events from the time-line (full list of events used for this analysis is available in the appendix) are divided into 4 groups for the purpose of this chapter:

- Economic- events that are important for country's current economic situation and that can influence it in future. In this group, there are both, country's internal and external events influencing the economy (e.g. internal- factories in eastern Ukraine, that had to seize operations due to armed conflict; external- sanctions imposed on Russian companies by the EU).
- Political- events that influence political stability of a country, its role in the world or possibilities of cooperation with another countries. As previously, they can be internal (e.g. Ukrainians electing pro-western Petro Poroschenko for president) and external (e.g. EU signs the association agreement with Ukraine).
- Social- these are all events, that in some way influence everyday life of Ukrainians (or Russians), but cannot be assigned to previous categories, or that should be divided into more than just one category, due to their complexity and a wide range of impacts they can have on a given country.
- Military- these are all events that are important to a country (in case of this paper this is mainly Ukraine) with regard to the army, ongoing armed conflict or to soldiers. However, these are not only events happening 'on the battlefield'. This category can be assigned also to events that are e.g. described also as political (e.g.

France declines to provide Russia with Mistral-class amphibious, which has a political background, but direct effects for Russian army).

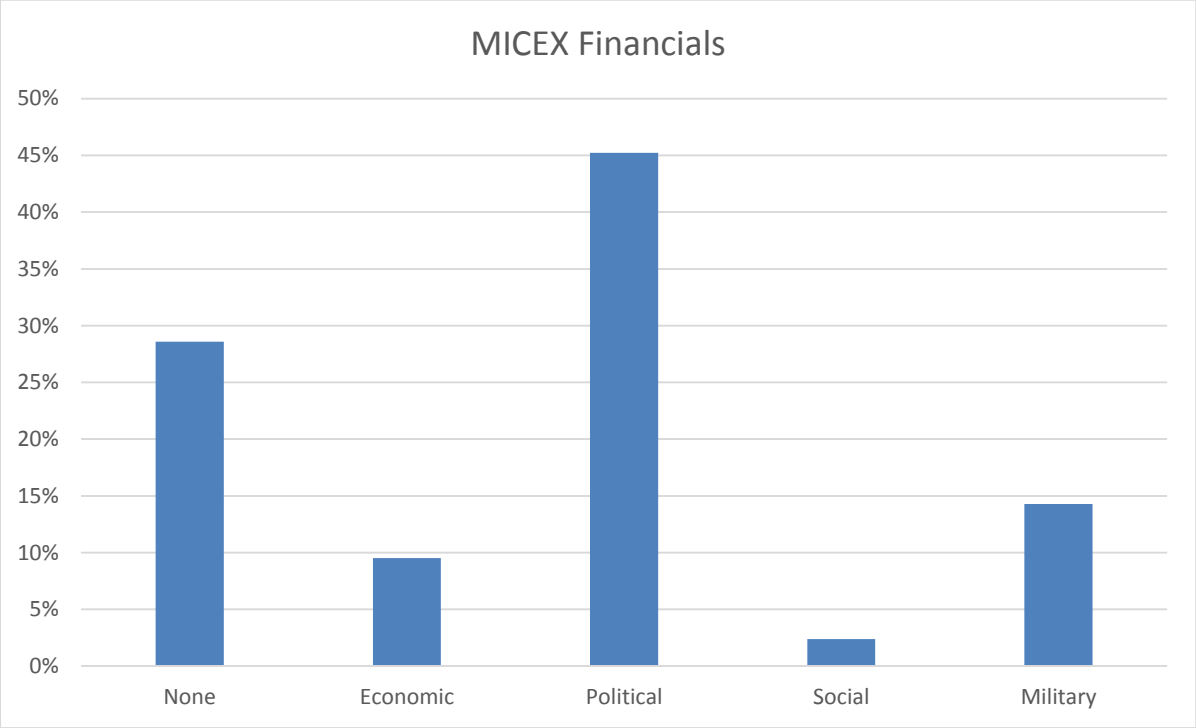
As it was stated in previous paragraphs, it is possible that one event can be assigned to several groups. This was forced by the complexity of the conflict, international relations and the mutual interpenetration of all described issues in the modern World. Assigning events to just one category would lead to oversimplification of the analysis, which could not be regarded as conclusive. Moreover, during or just before some dates selected for this chapter, there were no events that were related to the Ukrainian conflict and could cause any reaction of the markets. It was decided, that for such cases there is 'none' group created. In order to make all graphs equally informative, they present share of a given group in the total amount of groups assigned for given market index (as percentage).



Graph 52- MICEX events types percentage share

Graph 52 presents division of events that could cause movements in MICEX index. More than 50% of the events were assigned to 'political' group, hence it is the biggest group of all. The second biggest group is 'none' which means that more than 20% of most extreme movements in MICEX cannot be linked to any event related to Ukrainian crisis. Interestingly, third biggest group of events in 'military', which is slightly bigger than 'economic'. These results show that Russian stocks are dependent mainly on political decisions of country's and foreign officials. Furthermore, military events are also, to certain extent, dependent on the politicians. Only small

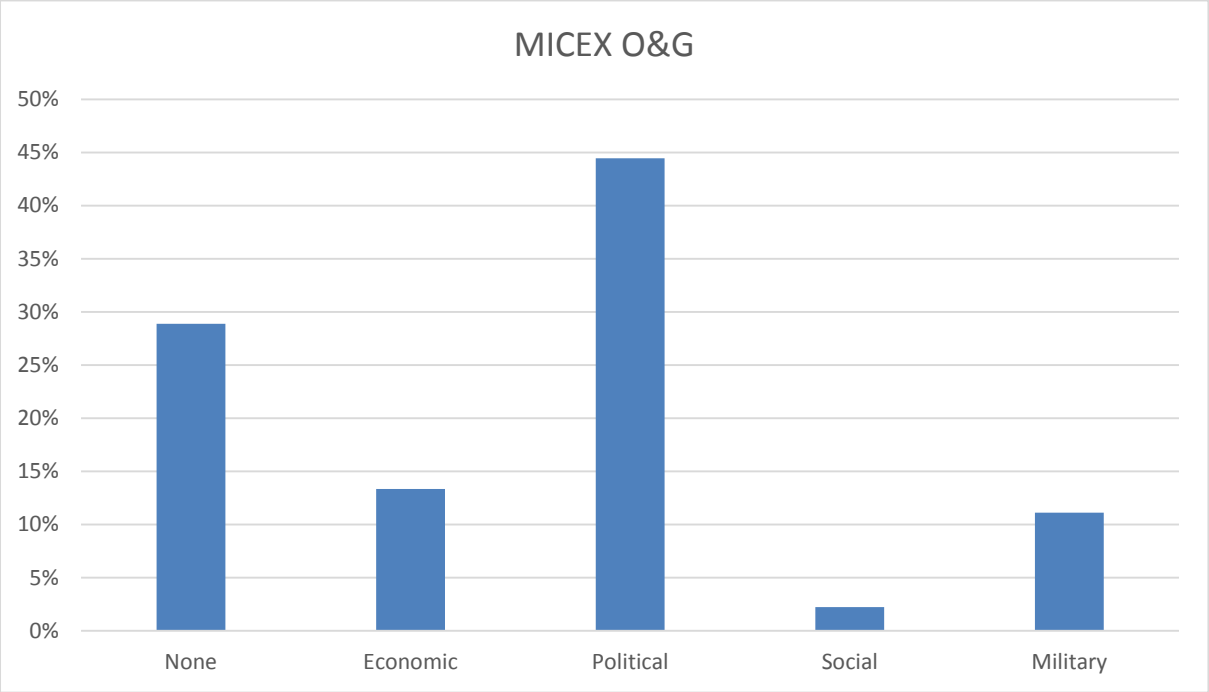
part of the movements can be said to have economic foundations, which shows that despite the fact that there is a free market regime in Russia, politics influence the markets a lot. There are very few dates, which can be linked to socially important events. However, this might be caused by the fact that the time-line was created basing on Ukrainian point of view, so the situation of Russian society was not a subject to deeper investigation and analysis. Huge share of dates, which do not have any reasons behind the movements, can result from the fact that in 2014, especially second half, Russian market was hit by declining oil prices. This tendency had nothing to do with Ukrainian crisis, but influenced Russian market heavily. This should explain big size of 'none' group.



Graph 53- MICEX Financials events types percentage share

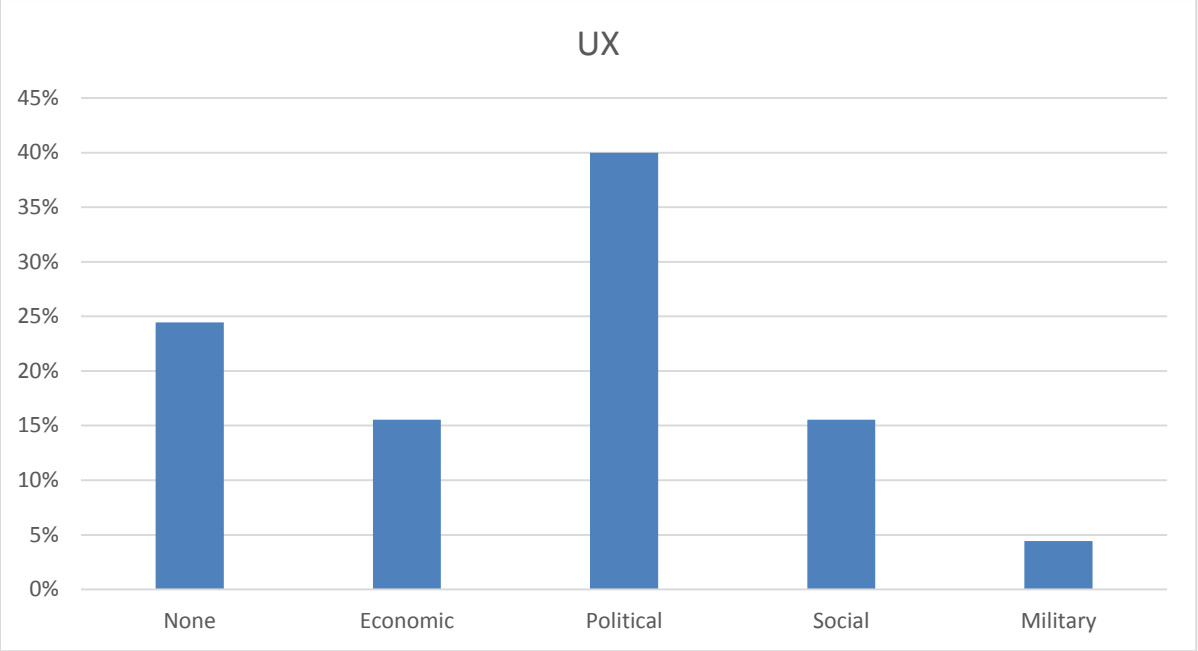
Graph 53 presents division of events that could cause movements in MICEX Financials index. The index presents pattern similar to MICEX main- most of the cases fall into 'political', 'none' and 'military' categories. However, the proportions are slightly different, and there are more events assigned to 'none' group than to 'political'. This suggests that Russia's financial industry, when compared to the whole market, was more sensible to events not related to Ukrainian crisis. However, political events still form the biggest group of all, and if the 'non' group is not taken into account, all other groups of events sum up to a smaller number of cases than 'political' alone. However, the difference is smaller than in case of MICEX main index, which can suggest that financial companies, although heavily dependent on politics, generally

are less sensible than the whole market. Interestingly, shares of military and economic groups have not changed, which means that financial industry is influenced by economic situation in the same way as all other industries. This is an unexpected finding.



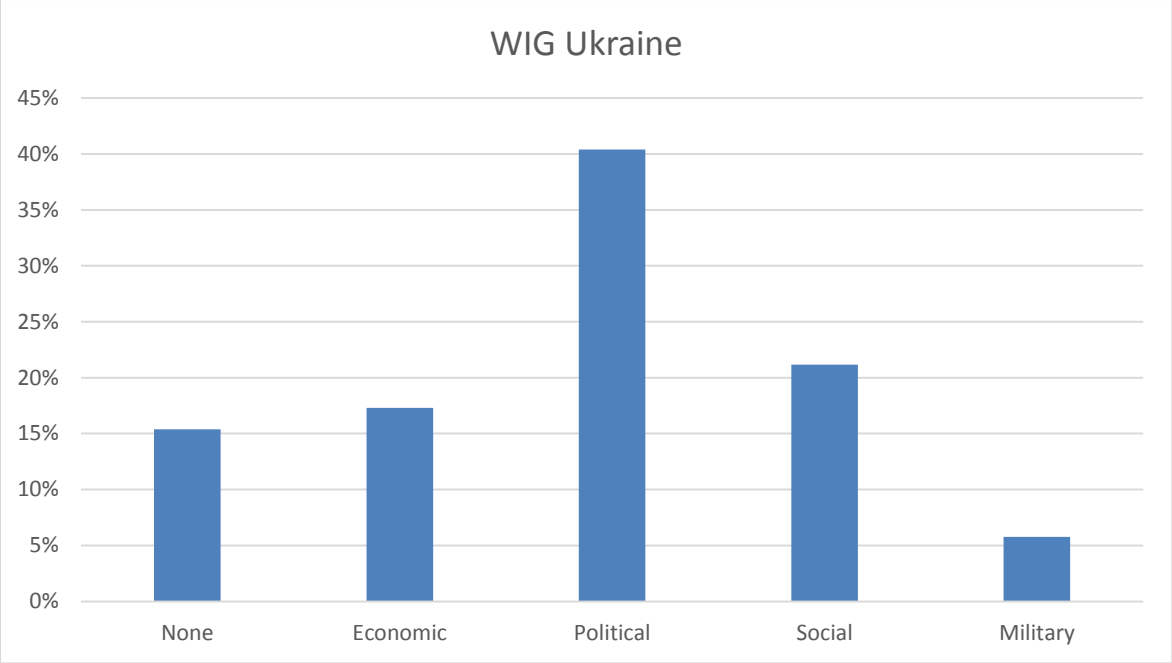
Graph 54- MICEX O&G events types percentage share

Graph 54 presents division of events that could cause movements in MICEX Oil & Gas index. Clearly, this index presents tendency similar to previous ones. The biggest group is again 'political' and second biggest- 'none'. They both have proportions similar as in case of MICEX main and financials. What is interesting, is the fact that for O&G third biggest group is 'economic', which is slightly bigger than 'military'. It can be concluded, that Ukrainian crisis is more influential in case of oil & gas companies than financials of the whole market. This might be caused by the fact that first of all Ukraine is a major client of Russian energy companies, and in 2014 there was some turmoil about the gas prices Ukraine was willing to pay, which could cause anxiety on the market. Second of all, huge part of gas sold by Russia to EU countries is transported via Ukraine, which means that flow of this commodity can be easily influenced by situation in this country. What follows, financial situation of Russia O&G industry is to certain extent dependent on Ukraine. However, as in previous cases, 'politics' group has the biggest share, which confirms that like in previous two cases, Oil and Gas industry is depended mostly on political decision made by local and foreign governments (at least in case of the Ukrainian Crisis).



Graph 55- UX events types percentage share

Graph 55 presents division of events that could cause movements in UX index. The general pattern is similar to this exhibited by MICEX indices. The biggest share goes to 'political' group and the second biggest to 'none' group. What is different is the fact that groups 'social' and 'military' switch their places (compared to MICEX). It can be concluded that for UX index 'economic' events are equally important as 'social', and that the index is equally sensible to them. As it was stated before, crisis time-line was prepared rather from Ukrainian point of view, so there are more 'social' events important for Ukraine than for Russia included in the analysis. This may impact the difference in size of 'economy' category between MICEX and UX, however not entirely. This difference also means that generally UX index is more sensible to economic news and events than Russian MICEX. It is also slightly less dependent on political events, which shows that Ukrainian investors are bound to react in a more expressive way to economic and social than to political events, which a positive information about the Ukrainian market, compared to Russia.



Graph 56- WIG Ukraine events types percentage share

Graph 56 presents division of events that could cause movements in WIG Ukraine index. The first observation to be made, is the fact that 'none' category is no longer second biggest, as it was in all previous indices. The biggest category is still 'political', which has 40% (equal to UX case). For the first time in this analysis, second biggest category is 'social'. This is an interesting finding, showing that Polish investors, investing in Ukraine stocks, perceive local social situation as an important factor for the markets and they do it more willingly than local Ukrainian investors. Also 'economic' group is bigger than in case of UX, however the difference is small. Information coming from this graph show that first of all in case of movements in WIG Ukraine index are caused by the events related to Ukrainian crisis more often than in case of UX. This might mean either Polish investors have more serious approach to the crisis than Ukrainians, or that investors located in Ukraine have a better access to information, which are not so widely available to Polish investors. Another interesting finding is that if Ukrainian and Russian indices are compared, it is clear that in Ukraine politics have smaller influence on the markets than in Russia.

	UX	WIG	MICEX	MICEX Financials	MICEX O/G
UX	x	18	11	10	12
WIG	18	x	14	12	14
MICEX	11	14	x	19	22
MICEX Financials	10	12	19	x	19
MICEX O/G	12	14	22	19	x

Table 8- Amounts of common days

Table 8 presents numbers of days overlapping between different indices, identified in the analysis. The first column of the table describes UX index. Each cell informs how many days when UX features reached their most extreme values match other indices most extreme dates. This does not mean that dates when UX had its second biggest log-return is matched with a day when any other index had its second biggest log return. The table rather shows how many common days in two sets of dates (e.g. UX and WIG) there are. What was to be expected, the biggest amount of common dates is when UX is compared with WIG Ukraine. This shows that both indices not only exhibit similar trends in responding to events, but in a number of cases they react gustily to the same events. UX shares also a smaller number of common dates with MICEX indices (the biggest amount with MICEX O&G). This shows, that in approximately 25%-30% of cases the same events resulted in distinct reactions of both Ukrainian and Russian markets. What is interesting, is that in all MICEX cases, UX has fewer common dates than WIG Ukraine, which could suggest that the second one has a better relationship with Russian markets. In case of WIG Ukraine, there is a number of days that match with MICEX indices- their equal amount for MICEX and MICEX O&G (14 days each) and a little bit less for MICEX Financials (12 days). What can be concluded is that there is some interrelation between these indices, which is slightly more visible than in case of UX. The next chapter should support this thesis, and show what is the nature of these relationships. Finally, MICEX index, unsurprisingly, shares the biggest amount of common days with its sub-indices. This phenomenon was to be expected, however only 22 out of 40 (in case of O&G sub-index) dates are common, which in fact is less than expected.

4.5 Summary

Chapter 4 includes a huge dose of analysis regarding behavior of the following stock indices: MICEX, MICEX Financials, MICEX Oil & Gas, UX, WIG Ukraine. Analysis can be described

as short-term, since they are based only on year 2014, and focus on selected dates. First analyzed index was MICEX. In general, Ukrainian crisis did not impact this index in any particular way. During both positive and negative days, the trading volume was not impacted and did not move far from the average. The same goes for daily log returns, although in this case there are some interesting observations. During or shortly after days with events or information positive for Russia, MICEX exhibited some negative log returns. On one hand this is unexpected, since events having a positive effect on country should also positively influence local market. On the other hand, it might be the case that Russian investors believe that in this conflict if there is something positive going on for Russia, it is automatically negative for western countries. What follows is that they might expect worse cooperation and more sanctions from EU and USA, hence more difficult environment on their local market. An interesting finding is also the fact that when days of negative news are investigated, there are some decreases in the 10-days volatility of MICEX. Analysis of events that took place during or shortly before the most extreme days for features like log-returns, volatility or trading volume show, that MICEX is mainly dependent on political kind of decisions and news. Next biggest factor influencing the index is military information, while economic news impact it only rarely. MICEX Financials analysis give outcomes slightly different than in previous case. First of all, trading volume was slightly increased during days with negative type of information. This might mean that investors are less willing to trade, when the situation becomes slightly more uncertain. Similarly to MICEX, Financial industry sometimes reacted negatively to positive information or events. Finally, there is no evidence that 10-days volatility was influenced in any way by the Crisis. As in previous case, categorization showed that Financials was mostly influenced by political and military events, however on slightly fewer dates than MICEX main index. MICEX Oil & Gas exhibit features much different than previous two indices. Firstly, trading volume during both positive and negative days is divided between most extreme categories. This shows that investors have completely different patterns of behavior, when compared to previous two indices and are either highly active or highly inactive during days with any kind of information from Ukraine. Interestingly, for both categories of days, there are approximately as many high-volume days as low-volume days, which makes it difficult to identify any pattern followed by those investing in Oil & Gas industry. What is also worth to note, is that rest of index features, log returns and volatility are very stable and do not vary much from average yearly values. It can be concluded that in case of O&G, information coming from Ukraine impact only investors will to trade, but not their perception of the situation. As in previous cases, Oil & Gas industry is influenced mainly by

political information, but the second place is taken by economic, not military, information. This might mean that energy sector is more than financial or whole market sensible to economic environment. The next investigated index was UX. Unlikely MICEX indices, in this case log-returns acted as expected before investigating- during positive days, the index was outperforming its yearly average, while during negative days- it was underperforming. This shows that the Crisis has a direct short-term impact on the investors, and that positive events cause them to react also positively, while negative events cause anxiety in their perceptions. Interestingly, none of the other measures- volatility nor volume was influenced by the events taking place. Again, the categorization showed that UX was mostly impacted by political news, however substantially less than MICEX indices. Economic and social events played the same role, while military information was neglected. The last index that was analyzed is WIG Ukraine. The initial expectation was that it should give results similar to UX. Surprisingly, this is not the case. In fact, some of the results are opposite to those exhibited by UX (in case of trading volume). WIG volatility was also further from the average than for UX. Only in case of log-returns both indices showed similar outcomes, which means that during positive days WIG grew, and during negative days it declined. Analysis of types of events influencing the index are also similar to what was discovered for UX- the main factor were political news, and then social and economic news. It can be concluded, that for indices which relate to the same market, their different geographical locations result only in different volume and slightly different volatilities.

5. Summary

Ukrainian Crisis has started in late 2013, but it got serious in early 2014, when country's president, Mr. Yanukovych was forced to step down, due to his pro-Russian policy. In the months that followed, Russia took over the control on Crimea, strategically important region on coastline of Black See. In eastern Ukraine a regular civil war has started and did not finish until now (May 2015). Separatists are believed to be supported by Russian forces. While Ukraine is struggling with the war, its economic situation is also getting worse. The conflict that started from minor pro-EU demonstrations in Kiev has resulted in world-wide confrontation between USA and EU, supporting Ukraine, and Russia. Despite all negative social, economic and political implications that are caused by the conflict, there is an opportunity to develop academic knowledge basing on the available data and extreme, unusual circumstances. I have decided to investigate whether Ukrainian conflict impacts some the financial markets of countries involved in it. The selected indices were Ukrainian UX, Russian MICEX main, MICEX Financials, MICEX Oil & Gas and finally Polish WIG Ukraine. However, before analyzing these indices, it was essential to investigate current academic knowledge on the topic. Due to the fact, that Ukrainian Crisis is 'young' there is no available literature on it. For this reason, I decided to research literature on more general topics of relationships between information, financial markets and investors behavior, while being aware of the limitations this approach has. Next, analysis of empirical data gathered from all indices was divided into two parts, each having another two sub-parts. At first, the aim was to identify long term trends (basing on vintages from 2008 to 2013) followed by each index, and then compare them with their performance in 2014. The aim of this part was to check, whether Ukrainian Crisis influenced long-term behavior of investigated indices. Second step of long-term analysis was identification of relationships between indices during years 2008-2013, and comparing them with 2014 outcome. The idea behind this part was to check, whether political and economic downturn in relationships between Ukraine, Russia and EU could be seen also in case of financial markets. Additionally, abnormal returns of each index was calculated, in order to apply another way of identifying the possible impact of the Crisis on performance of the markets. Furthermore, other approaches to event studies were described, for the purpose of future research and giving broader information on the topic. While the first part of this paper was dedicated to long-term trends exhibited by selected indices, its second part focuses on their short-term features. First the most important events that took place during the crisis (most important from points of view of Ukraine and separately- Russia) were identified, and then investigated, what was markets' response to them. Second, in order to create a complete image

of markets short-term responses, dates when indices exhibited most extreme values of their characteristics (daily log-returns, trading volume, volatility) were selected and checked, whether these events can be linked to information coming from Ukraine or related to the crisis. There is a number of conclusions drawn from the research paper, which will be described below. Furthermore, this chapter will also provide information on limitations of this research, as well as suggestions and ideas on what can be done in future, in order to broaden the academic knowledge of this topic.

6. Conclusions

The literature review, carrying a wide range of academic articles and research papers, allowed me to draw several conclusions that are important for understanding the Ukrainian Crisis and the impact it has on financial markets better. Many authors agree that financial markets are dependent on the events taking place in real economy, and its social and political environment. It is the case, that markets are influenced not only by events taking place in their country of origin (for example- Polish WIG index is influenced not only by events taking place in Poland), but also by information coming from foreign countries or markets. This happens mainly with smaller markets, being influenced by the biggest and most important markets, both world-wide and locally (for example in case of Poland that would be US and German markets). Markets all over the world are integrated, which means that events from one of them are likely to have an impact on markets all over the world. These findings suggest that it is justified to expect Ukrainian Crisis impact firstly local Ukrainian market and what follows foreign markets, at least those in close geographical proximity. However, researchers are inconsistent in terms of specifically what factors impact markets. There are findings suggesting that these are mostly monetary news that cause any reaction. On the other hand there are some authors suggesting that non-monetary information impact stock markets. What is common for them, is the fact that they mention only macro-economic factors, which are presented in a form of certain numbers. Unfortunately, because of this feature, these findings have limited applicability to this paper. This is because this research focuses on non-measureable events, rather than on information presented in numbers. However, social, political and military events taking place during the crisis do not leave Ukraine's economy unharmed, hence they can indirectly impact markets. What is also important for better understanding of the results of empirical research in this paper, is getting to know how the investors tend to behave and how they make decisions. Overreaction, underreaction and conservatism- these are some of the patterns that investors can

follow, and that can be exhibited during this crisis. The first one, overreaction occurs when after a period of, for example, good news, any new information perceived as good tends to be overvalued by investors. Underreaction happens when investors do not value the information high enough. Conservatism describes those investors, who tend to update their pricing models slowly, and do not rush with using newly available information for their purposes. Listed patterns may come useful in understanding behavior of investors acting on selected markets. The important finding of most of reviewed articles and research papers is that investors do follow certain trends and patterns, and that they do not act chaotically. Generally, results of the literature review point out that there is a good chance that Ukrainian Crisis has a certain impact on stock indices from Russia, Ukraine and Poland, as well as on the investors acting on these markets.

Long term analysis, conducted in the first part of data analysis, provided a number of findings and conclusions, often surprising with regard to initial beliefs and findings of the literature review. The first investigated index was UX (listed on Kiev Stock Exchange). The initial belief was that Ukrainian Crisis, impacting heavily country's economy, politics, social and military environment and relationships with its neighbors, would also impact long-term trends exhibited by the index. As it was found, during years 2008-2014, the most extreme vintages were 2008-2009, so years of Global Financial Crisis. Year 2014 was far less notable, in fact it did not show any extreme features. UX closing prices remained stable throughout the year, and yearly log return was equal to 13,7%, while average daily log return 0,04%. Annualized volatility remained on moderate level, while trading volume was low compared to most of the other vintages. These results prove, that the crisis did not impact index performance in 2014. Given all the dramatic information coming from Ukraine, this is highly unanticipated outcome of the research. It seems that investors acting on Ukrainian market might either underreacted, remained conservative or optimistic. The first option, underreaction would mean that they were used to negative information, and did not treat the crisis seriously enough. This is unlikely, given the fact that even though Ukrainian market was not doing good in the past years, country's situation was not as difficult as in 2014. It seems to be more likely that investors remained conservative, and did not want to include the information in their models too fast, or that they simply did not find the crisis to be threatening their assets. However, if they remained conservative, it would be possible to notice the negative information included into index pricing at some point in time. Since there was no sudden decline of UX value, it seems that third option is the most probable. Despite my expectations and findings of researchers stating

that internal situation of the country influences local market, Ukrainian investors did not react negatively to the crisis. What follows, UX has not changed its long-term trends because of the turmoil. The crisis has also not influenced long-term trends in relationships between UX and other investigated indices- correlation coefficients with all other indices are close to 0, but given the trends that were present during previous years, this is not unexpected and there is no evidence that the crisis influenced that.

The second investigated group of indices were MICEX indices, namely MICEX main, MICEX Financials and MICEX Oil & Gas. Analysis showed that the most extreme vintages during investigated period in case of all three indices were 2008 and 2009. In 2014, both main and Oil & Gas indices were stable when compared to previous years, and did not exhibit signs of being impacted by the crisis. Their all analyzed features remained on moderate level when compared to previous years and did not exhibit any dramatic changes of long-term trends. Slightly more impact can be seen in case of MICEX Financials index, which exhibited major losses and relatively high volatility. This can be attributed to sanctions, implemented by western governments, aimed in Russian financial institutions. Because of the sanctions, Russian financial sector found itself in a difficult position, which caused investors to react negatively. However, in case of the remaining two indices, it is clear that the Crisis did not impact them in any important way. It can be concluded, that Russian investors did not see Ukrainian Crisis and its outcomes as a threat to Russian economy or political and social life. In 2014 trends in relationships between MICEX indices have not changed due to the crisis. During several years correlation coefficients were slightly declining, and 2014 was not different in this aspect. In terms of long-term trends, only MICEX Financials was slightly influenced by Ukrainian Crisis and its outcomes. Rest of the investigated Russian indices remained immune to it.

The last investigated market was Polish WIG Ukraine, consisting of Ukrainian companies listed on Warsaw Stock Exchange. Analysis of long-term trends in this case are slightly less reliable, because the index is relatively young and was created in mid-2011. Surprisingly, it gives most explicit response to the crisis of all investigated indices. Value of the index has decreased sharply in 2014- yearly log return was equal to -72%, which is almost 3 times as high as second biggest during analyzed vintages. The year was also very volatile for this index, much higher than in previous years. These findings show, that Polish investors were most concerned about the situation in Ukraine, far more than Ukrainians or Russians. A very interesting finding of this analysis is the difference between WIG Ukraine and UX. It can be concluded that there is a difference in how investors perceive the conflict, given their

geographical location. Those located in the country which is directly involved in the conflict, perceive it as less serious and threatening, than these investors who are located outside of the country, but are also interested in its situation. This is also confirmed by the fact that correlation coefficient between WIG Ukraine and UX was close to 0 in 2014, showing no relationship between these indices. Interestingly, relationships between WIG Ukraine and MICEX indices have changed their trends and correlation coefficients grew in 2014 while declined in 2013. To sum up, WIG Ukraine and Polish investors have shown the most significant response to the Ukrainian Crisis of all investigated indices.

Long-term analysis include also abnormal returns calculation. Findings from this part of the research are striking, however in line with previous findings and results from short term analysis: WIG Ukraine yields highly negative abnormal returns, while UX- highly positive. The conclusion is that even in case when investors look at the crisis from the same point of view in political terms, their geographical location makes the difference in their decisions. Surprisingly, market located in Ukraine performs significantly better, which shows that investors from Ukraine view the situation much better than those from outside of the country. Furthermore, MICEX Oil & Gas performs surprisingly well, given the problems Russia encountered with its western partners and oil prices.

Another conclusion to be drawn from this part of the paper is that there are several methods that can be used for event study and calculating abnormal returns, however in most cases the simplest method, mean adjusted returns methodology is as good as more complicated models. However, it seems that Ukrainian Crisis is one of the few exceptions, and because of the events clustering more complicated and advanced model should be employed in order to achieve satisfactory results.

Second part of the research was devoted to analysis of short-term behavior of UX, MICEX, MICEX Financials, MICEX Oil & Gas and WIG Ukraine indices. The approach was to check, if during days of the most important events in Ukraine, the markets responded to them with some extreme movements. The next step was to check, whether the most extreme movements on the markets could be linked to events taking place in Ukraine. In case of MICEX index, there were observed no explicit short-term impacts of the crisis. It can be seen that sometimes, after news positive for Russia, the index reacted negatively. This can be explained, if local investors feared that events positive for Russia made the cooperation with their western partners even harder. It could be also caused by foreign investors acting on Russian market. In

case of MICEX Financials there was some reaction in trading volume and log-returns, however it was not important. Only MICEX Oil & Gas reacted in an interesting way- many events caused extremely high or extremely low trading volume. Analysis of UX index showed, that the crisis had a direct short-term impact on investors- positive events caused positive returns and vice-versa. The same feature was exhibited by WIG Ukraine, however in case of trading volume both indices reacted in contrary ways. This short wrap-up shows, that only UX and WIG Ukraine were impacted on short-term basis by the crisis. This means that investors acting on these markets reacted quickly and expressly to the crisis. At the same time, Russian investors did not make any hasty moves and decisions. The last part of this research shows that all investigated indices were mostly dependent on political decisions, made by both sides of the conflict. In case of Russian indices, second most important reason for extreme movements was group of military decisions, while in case of UX and WIG these were social and economic events. This comparison shows how different are markets in Russia, Ukraine and Poland. What is important to notice, is that in all cases (despite WIG Ukraine) second biggest amount of extreme days could not be assigned to any event related to the crisis.

The research conducted in this paper has its limitations. The main limitation results from the fact that gathered data are low-frequency. Basing on high-frequency data, it would be possible to draw more precise conclusions. However, given the amount of information, it seems that analysis of high-frequency data would be very time-consuming. Another limitation of this paper is the fact, that the crisis is still ongoing. Being able to gather data from the whole time of the crisis would make the conclusions more reliable and valid. However, it is not certain how long it will last and how to identify the end of it. Finally, it has to be pointed out that even though the research was designed and conducted with all the care and precision, some assumptions were made on subjective basis. It is possible that other researchers could view some things (especially division of the events) differently. I believe that this can be the point for future research- providing several points of view on the same events would surely enrich academic literature on this topic. Another reference on future research is, as stated at the beginning of this paragraph, gathering high-frequency data. In addition, it would be interesting to see how other markets (foreign exchange, commodities, bonds, etc..) reacted to this crisis.

7. Appendix A

7.1 Ukrainian Crisis time line

November 21, 2013- Ukrainian government broke preparations for signing of Association Agreement and Deep and Comprehensive Free Trade Agreement with the EU, turning itself to Moscow

November 22, 2013- Moscow reacted positively to Ukrainian decision, EU and USA negatively

December 1, 2013- Riots in Kiev start, crowds demand President Yanukovych to step down. Day earlier the police violently dispersed the protests. Estimates of people taking part in the protests vary, from 300,000 to million. Yanukovych asks the protesters to keep calm.

December 16, 2013- Following meetings of top politicians of Ukraine and Russia, Presidents declare that Russia will support Ukraine with $15 billion loan and 33% discount on the price of gas imports. Analysts from all over the world wondered about what agreement was made between the presidents, which resulted in help from Russia.

January 16, 2014- Ukrainian parliament passed harsh anti-protest legislation: "unauthorized installation of tents, stages or amplifiers in public places in Ukraine [will] be punished by a fine of up to $640 or by up to 15 days in detention" and "people and organization who [provide] facilities or equipment for unauthorized meetings [will] be liable to a fine of up to $1,275 or by detention of up to 10 days." It also establishes punishments for the "dissemination of extremist information and slander" and the wearing of a "mask or face-covering," presumably like those worn by many protestors.

February 16, 2014- anti-government protesters vacated the building of Kiev's city hall that was occupied for past 3 months. Same thing happened to government buildings in western Ukraine. This was a part of amnesty deal announced 2 days earlier (after 6 protesters killed and 234 jailed). However, protesters still demanded President Yanukovych to step down

February 18-20, 2014- 88 people killed during protesters march on the Parliament. Escalation of the violence occurred when Parliament was considering restoration of Ukraine's 2004 constitution. Two sides of the conflict accused each other of using snipers firing at unarmed civilians. EU and US leaders called Ukraine President to deescalate the conflict. In the same

time Mr. Putin said that Ukraine must take ‘urgent measures to stabilize the situation and suppress extremis and terrorist attacks’

February 21, 2014- after overnight negotiations, opposition leaders signed a settlement agreement with the president. Under its terms, earlier presidential elections were to take place and constitution from 2004 was to be restored. In last days there were more than 100 casualties. There was a amnesty for all protestors and release of Yulia Tymoshenko.. In a phone call between President Obama and President Putin, the two leaders “exchanged views of the need to implement quickly the political agreement reached today in Kyiv, the importance of stabilizing the economic situation and undertaking necessary reforms, and the need for all sides to refrain from further violence.”

Same day evening, president Yanukovych is reported to flee Kyiv. Some reports told that he travelled to eastern Ukraine, others that to Russia. Some of the protestors were not willing to agree for the deal with president- Right Sector, ultranationalist group did not want to lay down arms.

February 23, 2014- the Ukrainian parliament appointed the speaker of the parliament, Oleksander Turchynow, as interim president. A new parliament was to be set up on February 25th and presidential elections were set for May 25th. Several old ministers were dismissed. Protesters broke into Yanukovych’s residence to find incredible amounts of wealth. Yanukovych own party distanced itself from the president, for cowardly fighting. Yanukovych however treated himself as a president. Situation in eastern Ukraine was much more tense, where pro and anti-Maidan protesters clashed in Odessa. In Donetsk crowd called Maidan supporters ‘fascists’ and cheered for Russia.

In phone call with his Russian counterpart, US secretary of state expressed USA’s strong support for Maidan. In response Russia said that opposition deviated from the agreement and continued to place its bet in violence. Putin and Merkel agreed that this is in their own countries’ interests to keep the peace in Ukraine. Russia recalled its ambassador to Ukraine and froze the second purchase of $2 billion Ukrainian Eurobonds.

February 25, 2014- the city council of Sevastopol, Crimea appointed pro-Russian businessman a mayor. Thousands of people rallied on pro-Russian protests. They demanded separation from Ukraine and closer ties to Russia. Police chief said his department is not going to follow

‘criminal’ orders from Kiev. Ukrainian authorities called all of this a serious threat of separatism.

February 27, 2014- Crimean parliament speaker announced that they were preparing a referendum, on ‘the widening of the authority of the autonomous republic of Crimea’. He stressed that this parliament was the only remaining legitimate authority in Crimea. Thousands were supporting, shouting ‘Putin is our president’.

February 28, 2014- Crimean parliament forms a new government, with pro-Russian politic as a prime minister. The parliament’s speaker said that Crimea is not going to separate from Ukraine and that he didn’t know who the troops occupying Crimea were. Early that morning several hundred unidentified troops took control over Simferopol and Sevastopol airports. During the day, other strategic locations were taken by the troops. Initially, Russians denied that the troops were their. However, later Russian foreign minister informed Kiev that he had moved Russian soldiers from their bases to ‘protect fleet positions’. He also denied Ukraine’s request for bilateral consolations regarding Crimea’s situation, because it was ‘the result of recent internal political processes in Ukraine’.

March 5, 2014- despite the efforts taken by USA and other countries, the negotiations between Russia and Ukraine that were to take place in Paris didn’t occur. This is mainly because Russia did not recognize Ukraine’s foreign minister as legitimate (as well as the whole government).

March 6, 2014- Crimean parliament votes to leave Ukraine and join Russia. They asked Russia to lunch the procedure of Crimea becoming part of Russia, decided to nationalize all state-owned enterprises and conduct a referendum on Crimea’s future. They didn’t want to talk to the government in Kiev, because they did not agree it was legitimate. Still, there were Ukrainian troops in Crimea. Russia put a blockade of Ukrainian war ships, and started massive air defense drills less than 300km from Ukrainian border.Ukrainian prime minister stated that the referendum in Crimea will be illegitimate and urged Russian government not to support those who claim separatism in Ukraine. Chairman of Rada (Ukrainian Parliament) and acting president stated that Crimean government was invalidated. Russia supported Crimea and Duma (Russian Parliament) started preparations for incorporating Crimea. President Obama did not support the referendum in Crimea calling it unconstitutional and violating international laws. He announced signing an executive order to put sanctions ‘on individuals and entities responsible for violating the sovereignty and territorial integrity of Ukraine’. EU countries also prepared their own prospect of sanctions, however they remained split on the strictness of them-

Poland and Lithuania demanded much more painful sanctions. The US house of Representatives passed a bill that would provide Ukraine with $1 billion in loan guarantees. They also sent six F-15 fighters to help NATO Baltic sea patrols. NATO decided to suspend cooperation with Russia across variety of fields.

March 7, 2014- Gazprom chairman state that Ukraine must settle its $1.89 billion gas bill and pay for current deliveries, or the supply may be cut off. This shutoff would affect EU deliveries. Heads of Russian federation council and state Duma publicly reaffirmed Russia's support for the referendum. Ukrainian PM was willing to engage into talks with Russia, provided it would call its troops back from Crimea. OSCE observers were once more not allowed to enter Crimea.

March 8, 2014- in conversation with Russia foreign minister, secretary of state said that if Russia continues military escalation and support to Crimea's referendum, it would close any available space for diplomacy. Obama reaffirmed the US commitment to NATO umbrella protection on a conference with presidents of Latvia, Lithuania and Estonia. Ambassadors of Poland, Slovakia and Czech republic asked us to approve us natural gas exports to these countries.

March 10, 2014- The World Bank announced plans for $2 billion for Ukraine funding. NATO starts reconnaissance flights over Poland and Romania, but not Ukraine (only NATO countries)

March 11, 2014- Crimean parliament declares independence from Ukraine and states, that if people vote in favor of joining Russia in the referendum, it would join. Forces in Crimea, supported by Russians, shat down all flights to Crimea from Ukraine, leaving only those from Moscow.

March 12, 2014- Obama meets Ukraine PM. They discussed ways of peaceful solution of Crimea situation. The Senate Foreign Reactions Committee approved a package of aid for Ukraine and sanctions against Russia, $1 billion loan to Ukraine, $50m for democracy building and $100m for increased security cooperation. G-7 and European parliament issued strong statements opposing the upcoming referendum in Crimea.

March 13, 2014- one person dies after clashes in Donetsk between pru-Kiev and pro-Russia. German chancellor stated that Russia risks massive damage politically and economically if Crimea's situation remains unresolved. Russia stated that it's prepared to impose symmetrical sanctions in the west takes that route. OECD suspended accession talks with Russia, giving no reason.

March 14, 2014- talks between Kerry and Lavrov failed to resolve the conflict. Following talks, both men spoke to the media, where Kerry called for "action and not words" from Russia and "after much discussion, the foreign minister made it clear that President Putin is not prepared to make any decision on Ukraine until after the referendum on Sunday." Foreign Minister Lavrov stated that "we will respect the expression of the will of the Crimean people in the upcoming referendum. The Russian Federation does not and cannot have any plans to invade the southeastern regions of Ukraine." EU is preparing to impose sanctions on a number of Russian politicians and businessman, because of the planned Crimea's referendum.

March 15, 2014- Russia vetoed the UN resolution, that would declare Crimea's referendum invalid. It was the only UNSC country to do so, even China abstained from the vote. US ambassador to UN said that Russia "used its veto as an accomplice to unlawful military incurios". Russian forces seize gas distribution station outside Crimea. Ukraine stated that they reserve the right to use all necessary measures to stop the military invasion by Russia. Ukrainian troops took defense positions between Crimea and the mainland.

March 16, 2014- Crimea voted to join Russia. Frequency- more than 80% in favor- 96.8%. pro-Russian protesters stormed couple of buildings in Donetsk. Obama said that the referendum will never be recognized by the USA and international community. Putin stated that the voting was fully consistent with international law. EU leaders stated that the referendum is illegal and illegitimate and its outcome won't be recognized.

March 17, 2014- Crimean parliament once again declared independence from Ukraine, petitioned to join Russia and called international community to recognize Crimea as an independent state. Neither USA nor EU states did so. EU announced that together with Ukraine they will sign an agreement of closer political cooperation. Putin issued a decree on the recognition of the Republic of Crimea, which recognized Crimea as sovereign and independent country. Moscow is planning to support Crimea with $410 million of financial assistance. Another personal sanctions were imposed on Russia, however not touching Putin's closest advisors.

March 18, 2014- Russian and Crimea's leaders signed a treaty, reunifying Crimea with Russia. Merkel and Obama agreed to impose additional costs on Moscow and push for diplomatic solution. Putin announced that draft law formally unifying Russia and Crimea will the

submitted to the parliament today. Ukrainian soldier gets killed by military forces of Russia and pro-Russian separatists. Ukrainian soldiers were allowed to use deadly force in self defense.

March 19, 2014- Ukrainian navy headquarters in Crimea were overtaken, rear admiral was detained. Ukraine announced that it would withdraw its troops from Crimea. It also announced that is going to leave commonwealth of independent states, impose visa regime on Russia and conduct military exercises with USA and Britain.

March 20, 2014- Obama stated that there will be another sanctions imposed on Russian officials, as well as on individuals and entities that provide material support to Russian government. He also informed on issuing an executive order, that allowed for sanctions against major sectors of Russian economy. On the same EU officials announced plans to impose another sanctions. Also Russians plan to impose sanctions on US and EU officials. Senator McCaine I proud to be sanctioned by Russians.Both Fitch and S&P cut Russia's credit rating outlook to second lowest grade: BBB. Moody's rate : Baa1. That was due to Russia's period of economic stagnation, which has worsened during the crisis. there are numerous reasons for this: Rubel falling 9% against dollar in 2014, GDP growth in 2014 was projected to be below 1% and material risk of another sanctions. Even before additional sanctions on Russia were announced, the Russia economy was in a perilous position. In early March, the ruble hit a new low against the euro and dollar, forcing the Russian Central Bank to intervene to the tune of $10 billion in reserves to bolster the currency. According to the Central Bank, Russia's foreign currency and gold reserves have already fallen from $509.6 billion to $493.2 billion this year. The additional sanctions were expected to negatively impact both the Russian stock market and currency markets.

March 21, 2014- EU and Ukraine sign the core provisions for Association Agreement, committing Ukraine to greater economic and political cooperation with EU. Putin signed laws that formally complete the process of admitting Crimea and Sevastopol into Russia.

March 22, 2014- pro-Russian rallies in Donetsk. Local government of Donbass region stated discussions aimed in pushing for referendum similar to the one which occurred in Crimea. Russia publicly supported the adoption of a federal constitution that would give eastern regions of Ukraine bigger economic and political autonomy. Russian forces took control of Belbek airbase in Crimea. The Ukraine insisted that military bases captured by Russians remain under Ukrainian control. New sanctions imposed by USA, quick reaction from the Russians.

March 23, 2014- commander of US and NATO forces in Europe stated that there is "there is absolutely sufficient force postured on the eastern border of Ukraine to run to Transnistria if the decision was made to do that" and that "Ukraine's east is under threat". In response, Russian deputy defense minister denied that there is a buildup of Russian forces on border with Ukraine. Pro-Russian protests in eastern Ukraine intensify.

March 24, 2014- Ukraine orders its troops to withdraw from Crimea. Earlier that day, Russian forces rallied another naval base. Russia is expelled from G-8. G-7 countries plan to meet in Brussels instead of Sochi, what was previously planned. Russian ministry of economy announces that in Q1 of 2014, the capital flight from Russia would near $70 billion.

March 26, 2014- anonymous sources within the US intelligence said that Russians had gathered about 30,000 soldiers close to Ukrainian border, which is much more than needed.

March 27, 2014- Ukraine gets another $14-18 billion IMF deal, 'in return for tough economic reforms'. The agreement came after 3-weeks long fact-finding mission in Ukraine, which assessed true state of its economy. Prime minster Yatsenyuk pushed through legislation that increases gas prices for 50%. Tymoshenko announced she would run for presidency. UN general assembly voted that Crimea referendum was invalid. House of representatives and the senate passed another help for Ukraine and sanctions on Russia.

March 28, 2014- in a phone call with President Putin, Obama stated that diplomatic solution to the crisis will be not possible if Russia doesn't pulls back its troops and does not take any steps to further violate Ukraine's territorial integrity and sovereignty."Former Ukrainian president Yanukovych called for similar referendums (to Crimean) throughout Ukraine. Russia stated to pull back form agreement with Ukraine, regarding black sea fleet in Crimea.

March 29, 2014- minister Lavrov stated that Russia has no plans of crossing Ukraine's borders. However, they are going to protect the rights of Russians and Russian-speaking people in Ukraine, using all available political, diplomatic and legal means. Klitschko dropped out from presidential elections, he supported Poroshenko. According to a report from Reuters, Russia diplomats threatened representatives from a number of states both in the former Soviet space and around the world with retaliatory measures ahead of a UN General Assembly vote on the legitimacy of the referendum in Crimea. Diplomats, who spoke off-the-record, stated that the threats were not specific but that "it was clear that […] retaliatory measures could include steps such as expelling migrant workers from Russia, halting natural gas supplies or banning certain

imports to Russia." The countries that were threatened reportedly include Kyrgyzstan, Tajikistan, Moldova, and a number of African states.

March 30, 2014- 4 hours long meeting between Kerry and Lavrov did not result in anything but promise for more talks.

April 1, 2014- NATO suspends cooperation with Russia (all practical civilian and military). Russia has eliminated a discount on natural gas imports to Ukraine, raising the price by $117 per 1000 cubic meters to $385.5. House of Representatives passes another $1 billion loan, $150m direct help to Ukraine and another sanctions for Russian officials.

April 3, 2014- Gazprom announced that another discount would end for Ukraine, raising the price to $485 for 1000 cubic meters.

April 5, 2014- Ukraine is threating Russia that it will take Moscow to international court of arbitration over gas prices.

April 6, 2014- Pro-Russian crowds attack governmental buildings in eastern Ukraine. Donbas People's uprising wants the 'Donetsk republic' to join Russia. Crowds take over weapons from regional security service office.

April 7, 2014. People's republic of Donetsk asks Russia to send 'peacemakers' over.

April 8, 2014- Ukraine fails to pay the debt to Gazprom. Russia may ask Ukraine to pay up-front for the gas deliveries, while leaving the gas transit through Ukraine to Europe untouched. This posts a huge threat that gas will be not delivered to EU. Ukrainian forces conducted an anti-terrorist action in Kharkiv, after protesters seized local government buildings. Russia warns that further use of force will lead to civil war.

April 12, 2014- Pro-Russian protesters seizes another buildings in eastern Ukraine. They aim for referenda similar to the Crimean one.

April 13, 2014- UNSC holds an emergency meeting, but without any conclusions. Russia says it's now the responsibility of the west to prevent civil war in Ukraine.

April 14, 2014- Ukraine asks UN peacekeepers to join the anti-terrorist operation in the East.

April 15, 2014- Ukrainian army clashes with pro-Russian forces, as the anti-terrorist operation begins. USA supports Ukraine, but EU remains divided on sanctions.

April 16, 2014- NATO increases its presence in the Baltic states, US administration is preparing another sanctions on Russia, targeted at Russian individuals.

April 20, 2014- NYT publishes photos confirming that in eastern Ukraine there are Russian militaries involved. US Department of State calls the evidence convincing.

April 21, 2014- US announces another assistance package to Ukraine, equal to $50m.

April 22, 2014- Pentagon sends 600 soldiers to Poland and Baltic States, to participate in 'infantry exercises' with host countries.

April 23, 2014- in TV interview, Sergey Lavrov compares situation in Ukraine to Russian invasion on Georgia in 2008, which rises fears that the situation will happen again. Russia-Ukraine emergency energy talks begin. Together with EU officials they meet in Moscow to discuss the prices of gas, and conditions of supply.

April 24, 2014- Russia begins new military exercise close to Ukrainian border.

April 25, 2014- G7 countries condemn Russia and agree on imposing additional sanctions.

April 28, 2014- Kharkov mayor shot. White House announces another sanctions imposed on closest Putin's coworkers.

April 30, 2014- IMF approves $17 billion help for Ukraine. It was conditional on adoption by Ukraine of meaningful, difficult economic reforms.

May 1, 2014- IMF stated that events in eastern Ukraine may force some changes to the help package. "The unfolding developments in the east and tense relations with Russia could severely disrupt bilateral trade and depress investment confidence for a considerable period of time, thus worsening the economic outlook." It goes on to say that "a long-lasting disruption of relations with Russia" or "a loss of economic control over the East that reduces budget revenue would require a significant recalibration of the program and additional financing, including from Ukraine's bilateral partners.

May 2, 2104- Merkel and Obama and threaten with further sanctions.

May 5, 2014- in Odessa, there were 30 pro-Russian casualties and 4 government soldiers.

May 6, 2014- 47-nation council of Europe, including Russia and Ukraine, met and discussed in Vienna. No decisions were made.

May 7, 2104- Russian president calls pro-Russian separatists to postpone upcoming referendum on Donetsk region. Also, Putin has stated that Russia withdrawn its troops from Ukrainian border.

May 8, 2014- Separatists, despite Putin's advise, hold the referendum in Donetsk and Luhansk, 6.5 million

May 11, 2014- Referenda held, with incredibly high turnout and support for independence and self-rule. EU ad Ukraine call referendums a farse.

May 12, 2014- Following the 'successful' referenda, People's Republic of Donetsk asked Putin to be absorbed into Russia. Kremlin has been silent on this, expressing only respect for the referendums, but with no commitment.

May 13, 2014- Russia bans sale of RD-180 to USA. Russia was a sole provider of these rocket engines to United Launch Alliance, a joint venture of Lockheed Martin and Boeing, which is a sole supplier of rockets to Pentagon. Each engine is valued at $11-$15 million. Moreover, Russia will reject US requests to extend operation at international space station.

May 15, 2014- Thousands of mobilized steelworkers d took control of city and ousted the separatists from Mariupol. All of them are employed by companies owned by Rinat Akhmetov, Ukraine's richest man. Day before Akhmetov opposed separatists: "I strongly believe that Donbass can be happy on in united Ukraine".

May 17, 2014- Second round of national dialogue takes place in Kharkiv, including representatives of the Government and eastern Ukraine. Chairman of Luhansk region said that referendums are the will of people.

May 19, 2014- There has been an improvement in the gas situation between Russia and Ukraine, but nothing has been agreed on. Prices for the period from November to March will be cleared up, but they will stay the same for April, May and June.

May 25, 2014- Petro Poroshenko wins Ukrainian presidency, as expected. Vitaly Klitschko on has won the election for mayor of Kiev. In Donetsk region there were open only 20% of polling stations, with voting turnout of only 11.8%. In Donetsk there was no single polling station open.

May 30, 2014- According to U.S. secretary of defense Russia has pulled back most of their troops from Ukrainian border.

June 4, 2014- president Obama calls on all free nations to help Ukraine in response to Russia's aggressive actions. US won't accept annexation of Crimea.

June 5, 2014- Obama and Cameron stated that if Putin won't stop actions aiming in destabilizing Ukraine, their countries will impose sectoral sanctions on Russia.

June 6, 2014- Poroshenko and Putin met during D-day celebrations. Both agreed that negotiations have started and presented goodwill. Also Obama and Putin meet face to face.

June 7, 2014- US vice-president, Joe Biden announces assistance summing up to $8 million to Moldavia and $5 million to Georgia. These are mainly administrative aims.

June 11, 2014- Russia has offered Ukraine a discount in Gas price, from $485 to $385, but it was refused. Ukraine wants the discount to be $268. Putins accuses them of sabotaging the talks.

June 13, 2014- Ukraine has presented an offer that it would pay the $2 billion gas debt, given that interim gas price is set at $326.

June 16, 2014- Russia stopped gas flow to Ukraine, despite the offer. Gazprom announced that Ukraine will receive gas only for payments made in advance.

June 17, 2014- Gas pipeline explodes in Ukraine, due to terrorist attack. Ukraine blames Russia and pro-Russian separatists.

June 18, 2014- Poroshenko announces temporary unilateral ceasefire.

June 20, 2014- US extends sanctions to pro-Russian figures in eastern Ukraine.

June 24, 2014- Putin asked the Upper House of parliament allow to use Russian Forces in Ukraine.

June 26, 2014- USA and EU have both prepared a package of targeted sectoral sanctions against Russia, if they won't take back their support to pro-Russian separatists. The sanctions target defense, high-technology and financial industries and possibly energy sector.

June 27, 2014- Ukraine and EU sign association agreement.

July 1, 2014- Poroshenko ends ceasefire and starts anti-terrorist operation to liberate eastern Ukraine.

July 7, 2014- Rebel forces fortify Donetsk and destroy bridges leading to the city over highways.

July 10, 2014- EU diplomats confirm that there are new economic sanctions planned to be imposed on 11 individuals involved in the crisis more.

July 17, 2014- Malaysia Airlines flight from Amsterdam to Kuala Lumpur shot down over eastern Ukraine. Ukraine Interior Ministry stated, that the plane was hit by missiles fired from BUK rocket launcher. Pro-Russian separatists claimed that they shot down Ukrainian military plane.

July 19, 2014- Kiev accuses pro-Russians separatists of moving bodies and destroying evidence of the plane crash. The government claims that separatists do it with help coming from Russia.

July 22, 2014- EU met for the first time after downing MH17 flight, and agreed to accelerate preparation of sanctions.

July 24, 2014- US officials stated that Russia is firing artillery to Ukraine from its area, and is going to provide separatists with new, more powerful artillery. After Svoboda and UDAR parties withdraw from the government coalition, prime minister Yatsenyuk resigns from his position. This forces new elections to come sooner.

July 25, 2014- Another sanctions agreed by the EU. This time they are on civilian and military technology, future arm sales, Russian financial markets and energy sector, excluding natural gas.

July 31, 2014- Ukrainian parliament rejects prime minister's resignation. Out of 450 members of the parliament, only 16 voted to accept his resignation. Also, the budget proposal was fully accepted.

August 5, 2014- Russia begun to buildup its forces at Ukrainian border: 45,000 soldiers, 160 tanks, 1,360 armored vehicles, 192 Russian warplanes, and 137 military helicopters have been deployed along the border supplemented by self-propelled artillery and multiple rocket launchers. US officials have warned that Russia could launch a cross-border assault with little to no warning.

August 6-7, 2014- Russia, in response to West's sanctions, has imposed sanctions itself: beef and cattle import ban against Romania, other food items from Ukraine, Moldova and Australia, EU and USA, Norway, Canada.

August 12, 2014- Russia plans to deliver 280 trucks with humanitarian help for people in Ukraine. However, everyone is afraid that the trucks will not be carrying food and other aids, but weapon and help for the separatists.

August 12, 2014- The convoy diverts from the scheduled route.

August 19, 2014- Petro Poroshenko is said to meet Putin next week in Minsk.

August 22, 2014- Russian convoy crossed the Ukrainian border. Government in Kiev states that this is an invasion.

August 23, 2014- The convoy leaves Ukraine. German Chancellor promised to provide Ukraine with about $690m in aid. Poroshenko calls it the beginning of Merkel plan to restore the infrastructure of Donbass.

August 25, 2014- Poroshenko dissolves (legally) the parliment, due to collapse of the government coalition. They are to be held in late October.

August 26, 2014- Putin meets Poroshenko in Misnko. During the meeting the key issues under discussion were a possible ceasefire in eastern Ukraine and control of the border between Ukraine and Russia. Following the talks, President Poroshenko stated that, "A roadmap will be prepared in order to achieve, as soon as possible, a ceasefire regime which absolutely must be bilateral in character." A statement released by the Press Office of the President highlighted the "closing of the Ukrainian-Russian border to prevent the movement of armored vehicles, mercenaries and ammunition," as a key issue.
President Putin focused on economic cooperation and the need to resume dialogue on energy issues. In a statement after the meeting, Putin said that the discussants focused on "the impact of signing by Ukraine of the EU Association Agreement within the context of its cooperation with the Customs Union states." During an interview Putin also added that, "Both President Poroshenko and I feel that we need to renew our dialogue on energy, including the gas issue. Frankly, this is a difficult issue, it is in a deadlock, but we still need to talk about it. We agreed that we will renew those consultations."

August 27, 2014- Ukrainian spokesperson stated that Russia has increased its military activity close to Ukrainian border.

August 29, 2014- Ukraine announces that it will pursue NATO membership.

September 2, 2014- In private conversation with Jose Barroso , Putin stated that if he wanted, he could be in Kiev in 2 weeks.

September 3, 2014- France suspends Mistral Ship deal with Russia. It was supposed to deliver two mistral-class amphibious warships to Russia, total worth $1.7b.

September 5, 2014- President Poroshenko announced cease-fire in Ukraine. Following meetings in Minsk, Belarus between representatives of the Ukrainian government and the pro-Russian separatist forces, President Petro Poroshenko announced that a cease-fire has been reached in Ukraine. It is set to go into effect within hours at 6PM local time. The full details of the agreement have not yet been released, though reports indicate that the agreement consists of 14 points covering a range of issues including exchange of hostages, the creation of a humanitarian corridor, and other issues. According to reports, the exchange of captives is likely to begin tomorrow and a working group will meet on Monday to work through other issues relevant to the agreement, most importantly the political issues at place in eastern Ukraine.

September 8, 2014- EU announces new sanctions, targeting most important energy companies from Russia: Gazprom, rosneft and transeft. Also: Oboronprom, United Aircraft, and Uralvagonzavod..

September 11, 2014- Gazprom cuts deliveries to Europe: Poland announces that the deliveries were cut by 20%, Austria- 15% and Slovakia- 15%.

September 16, 2014- Ukraine Ratifies Association Agreement with EU.

September 24, 2014- NATO spokesperson stated that they have seen a significant movements in Russian forces present on Ukraine, which are being withdrawn back to Russia.

September 25, 2014- Speaking at a press conference in Kyiv, Ukrainian President Petro Poroshenko put forward an ambitious vision for further Ukrainian integration with Europe. This “Strategy 2020” would have Ukraine apply for EU membership in just six years following a period of rapid economic and political reform. “We must not walk but run this path of huge

changes," he said and later stating that "we have a full right to knock on this door," referring to the EU.

October 2, 2014- the World Bank predicts that Ukraine's GDP will decrease by 8 percent in 2014 and by 1 percent in 2015. This is mainly to the disruptions in Donetsk and Luhansk regions, which account for 1/6 of Ukraine's gdp.

October 3, 2014- Statoil is going to sell small volumes of gas to Ukraine (short term). However, it is going to cover critical lacks of gas for Ukraine.

October 8, 2014- Russia passes law that allows it to seize foreign-owned assets, including those, covered by immunity provisions.

October 16, 2014- Putin states that due to risks with gas transportation in Ukraine, Russia may be forced to decrease the supply.

October 17, 2014- Russia and Ukraine made progress in resolving the ongoing gas dispute between the two countries during meetings in Milan on Friday. The same could not be said, however, for the larger issue of the crisis in Ukraine and Russia's role in it.

According to President Petro Poroshenko, he and President Putin "agreed on the main parameters of the [gas] contract," though he later noted that "we could not reach any practical results." President Putin too pointed to progress in that area, though he said that Ukraine's repayment of its $4.5 billion gas debt to Moscow remained an open question.

October 18, 2014- Russia and Ukraine agree on price of $385 per 1000 cubic meters of gas until the end of March.

October 21, 2014- Ukraine has to pay Gazprom part of the outstanding debt, as well as pay in advance for gas deliveries in November and December (until October 29th).

October 23, 2014- Rebels from People's Republic of Donetsk announced end of ceasefire. They aim in taking over more cities.

October 24, 2014- Ukraine and Russia have finally reached consensus during gas talks. President Putin said that he hopes that the talks will be resolved soon.

October 26, 2014- Ukraine votes for new parliament. Pro-western parties win: President Poroshenko's bloc take 23%, People's Front (prime minister's party) take 21, Self Reliance- 13%. Elections were free and fair, however not all Ukrainians could vote- especially those in the eastern part of the country.

October 31, 2014- Ukraine and Russia resolve the gas issue. Ukraine has to pay for past deliveries and the past debt, before Russia transports new deliveries of gas.

November 5, 2014- Ukraine stops to pay pensions, benefits and other social subsidies to the regions controlled by Separatists. However, the government did not state that it would stop to deliver gas and electricity.

November 10, 2014- Central Bank of Ukraine held a special meeting to discuss actions regarding rapid Hrivna decline. They agreed they would not allow the currency to decline below 16 per USD.

November 14, 2014- Merkel – Putin talks confirmed to be continued for a long time, despite the rumors saying that they did not contact.

November 16, 2014- Russian media showed photos that were supposed to confirm that the downing of MH17 was caused by Ukrainian army. International analysts stated that photos are fraud. Putin left G-20 earlier than expected, probably because of being unwelcomed by other leaders. Obama says that Russians are supplying guns and ammunition to Separatists.

November 17, 2014- EU imposes another sanctions, but only on the separatists, Russia was untouched this time. Ukrainian President confirms that Ukraine, despite it wants peace, is prepared for war.

November 21, 2014- In Ukrainian parliament pro-western countries set-up a coalition to form a government. They have 288 seats out of 421

November 22, 2014- Ukraine officials said that there are 7500 Russian soldiers in eastern Ukraine.

November 28, 2014- French President Hollande stated that due to Russian involvement in Ukrainian crisis, France will not deliver the first Mistral-class ship. France was going to fulfill $1 billion contract with Russia, but changed after pressure from other EU countries and USA.

December 5, 2014- President Poroshenko said that it is equally important to defend Donetsk airport, as it is to defend the whole Ukraine.

December 6, 2014- Putin and Hollande meet in Russia to discuss the crisis. Putin said that he hopes that the cease-fire will be reached. Moreover, he stated that Ukraine's territory is not integral, but Russia strongly supports it.

December 8, 2014- After 6 months of break, Russian gas flows to Ukraine. Ukraine and Separatists agreed to meet for ceasefire, and have "day of silence" the following day.

December 11, 2014- Ukraine Prime Minister stated that, without another $15 billion help from western partners, the country is likely to go into default within next weeks.

December 14, 2014- President Obama is to sign "Ukraine Freedom Support Act of 2014", which promises Ukraine help up to $350 million, consisting of weapons, ammunition and drones. What is more, the bill includes additional sanctions on Russian economy (which will be applied if Gazprom hold gas deliveries).

December 27, 2014- Putin agreed to support Ukraine with coal and electricity, as a sign of goodwill.

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