THE IMPACT OF THE GLOBAL FINANCIAL CRISIS ON THE SELECTED STOCK MARKETS

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Vplyv globálnej finančnej krízy na vybrané trhy cenných papierov

Abstract: *This paper deals with the global financial crisis and stock markets, in particular with the impact of the global financial crisis on the selected stock markets and relation between the global financial crisis and the stock markets. It briefly examines what transformed a significant, but a relatively mild financial disruption into a full-fledged global financial crisis. The global financial crisis was triggered not in stock markets but by bonds, debt not equity securities. The paper investigates how this influence was reflected in the stock markets. This paper works with the selected stock markets (with American, European and Asian stock markets) and selected indices Dow Jones Industrial Average (American stock market), Financial Times Stock Exchange 100 (European stock market) and Nikkei Stock Average (Japan stock market). To determine the extent of the global financial crisis and its impact on the stock markets is used its comparison in time. The paper investigates the development of selected indices over years 2000 – 2015.*

Keywords: *financial crisis, stock market, DJIA*

JEL Classification: E 44, G 01, G 19

1 Introduction

During the recent two decades we have witnessed considerable turbulences in financial markets. The global financial crisis resulted into "significant new regulatory response" in the USA and Europe. These factors led to a review of management and measurement of financial risk as well [3]. "The global financial crisis had dramatic impacts onto financial markets of many countries worldwide" [8]. Therefore, in this paper we investigate the impacts of the global financial crisis on the selected stock market in North America, Europe and Asia.

According to the liberals, the global financial crisis began to take shape already in the

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nineties, during the massive credit expansion in the United States. An important milestone was the bursting of the Internet bubble, combined with the terrorist attacks of 11 September 2001 in New York. This resulted in a decline in household savings, whereas the sharp decline of the stock market combined with a wave of mistrust led to a significant weakening of effective forces. It was in this situation, the Federal Reserve chose policy of cheap money (reduced key interest rate from 6.5% in 2000 to 1% in 2003). The aim of this expansionary monetary policy was to start economic growth through credit expansion. This policy led to the liberalization of attitudes to risk. Cheap loans seemingly helped to economic growth and triggered a real estate boom. The origins and conduct of the financial crisis in the USA was starting with the collapse of Bear Stearns hedge funds in the summer of 2007 and the bankruptcy of Lehman Brothers in September 2008 when already full-blown panic in financial markets through the revelation of the mortgage bubble about Freddie Mac and Fannie Mae. The liberals believe the market mechanism resolves the problem of crisis. Another point of view tries to find the reasons in greater depth [11]. Protagonists of this way see the main problems in two contradictions: economy-man and man-nature. Contradiction economy-man: it is a serious cause of inequality of income and wealth distribution. (Stiglitz sees the reason in asymmetric information [10]). According to this group, the great influence on the origin of the crisis had financialisation, i.e. the shift of focus from manufacturing to financial services, which leads to the growth of the share of debt to GDP.

2 Methodology

While working on theoretical part of the paper dealing with the global financial crisis, a secondary research of available literature dealing with given problematic was mostly work with online research databases (EBSCO, ProQuest, etc.), available books and journals in Slovak Economic Library and information on the Internet. We compared different authors and opinions, views on given problematic.

In the investigation of the impact of the global financial crisis on the selected stock markets, we used the data from the website https://finance.yahoo.com of three selected indices. This paper works with daily data from January 2000 to 1st October, 2015. The data analysis tool Excel was used to work with these data, e.g. finding out the largest one-day changes of indices between trading days, the highest and lowest index value level with function maximum and minimum. Excel helped also in constructing figures. The correlation among three selected indices was found by the Pearson correlation coefficient of closing prices index according to the formula (1) for three selected years during the global financial crisis and then for the whole period investigated.

$$r = \frac{\sum (x-\bar{x})\cdot(y-\bar{y})}{\sqrt{\sum (x-\bar{x})^2 \cdot \sum (y-\bar{y})^2}} \qquad (1)$$

Where:
r – Pearson correlation coefficient
x – variable1 (closing prices of index 1)

$\bar{x}$ – mean x value
y – variable2 (closing prices of index 2)
$\bar{y}$ – mean y value

2 The American, Japan and European Stock Markets and the Global Financial Crisis

The global financial crisis began in the *United States of America* and expanded worldwide. Stock prices began to fall in 2007, and even greater declines were observed in 2008. The value of the Dow Jones Industrial Average (DJIA) fell by a third and S&P fell by more than two fifths. “European stock markets and stock markets of developing countries have been affected even more.”[8] This fact was also mentioned in a research study on the Romanian capital market by Ameanum. He confirmed that the global financial crisis had a huge impact on the stock markets and in particular the stock markets of developing countries [2]. In their research works Fang and Lee [4] report that “financial contagion” spread from the stock markets of countries with a higher risk to the stock markets of countries with a lower risk.

European countries experienced the biggest financial disaster since World War II. Each country was affected differently. Steffens highlights the profound impact of the global financial crisis on the German economy and notes that the macroeconomic indicators show dramatic changes (decreases) in many areas [9]. Gardo and Martin argue that the global financial crisis had the effect of heterogeneous European countries and the countries of Central, Eastern and Southeastern Europe, while the countries with the highest economic imbalances, were affected the most. [6]

Different views on the impact of the global crisis on stock markets and the economy generally are encountered in cases with regard to *Asia*. Goldstein and Xie in their study came to the conclusion that the global financial crisis did not have a serious impact on developing Asia, as it had experienced with its own financial crisis in 1997 – 1998 [7]. However, Fidrmuc and Korhonen argue that the global financial crisis had a significant impact on the economy of Asian developing countries. Their study also points to a low degree of synchronization of economic development in developing Asian countries and the OECD countries [5]. Ali Afzal focuses primarily on the impact of the global financial crisis on the stock markets in Pakistan and India and the results of the research is that the global financial crisis had a slight negative impact on stock returns and increased volatility in the Pakistani and Indian stock markets. A stronger impact of the global financial crisis was recorded in the Indian stock market [1].

The global financial crisis started in the market for debt securities, bond market, but to a large extent was also reflected in the equity securities, stock markets. Among the top ten markets with shares around the world according to the report of the World Federation of Exchange [16] are New York Stock Exchange, Nasdaq, Japan Exchange Group, London Stock Exchange Group, Euronext, Hong Kong Stock Exchange, Shanghai Stock Exchange, Toronto Stock Exchange, Deutsche Borse and the ten closes with the Swiss Stock Exchange.

The latest available data are for 2013 and given the order to the situation of the size of the market capitalization of the various markets. We studied the impact of the global financial crisis on the American, European and Asian stock markets and their economies. Therefore, we investigate the impact of the global crisis on the stock markets of the United States, Europe and Asia. We choose one index, which represents the market, among the aforementioned geographical areas.

3 American Stock Market – Dow Jones Industrial Average

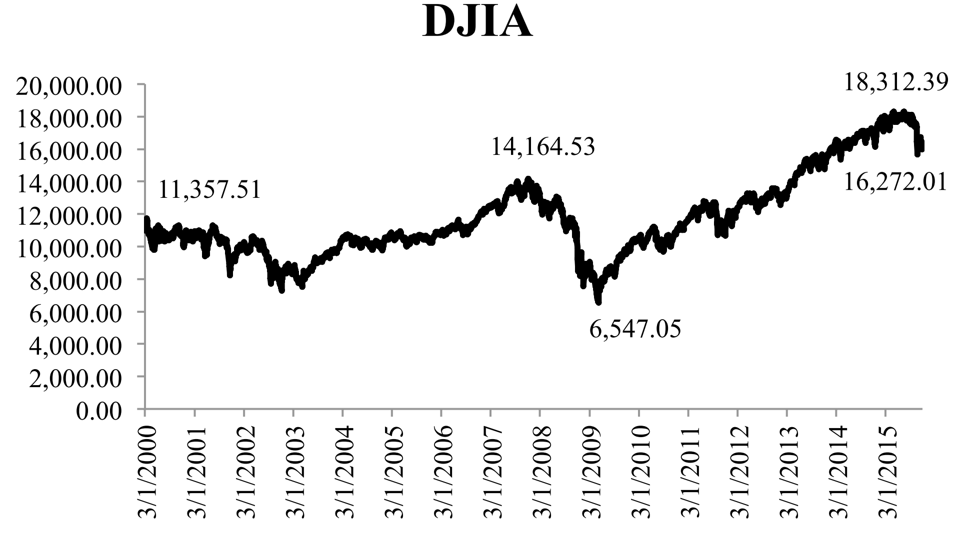
For the United States it is the Dow Jones Industrial Average (DJIA) "one of the best-known icons of American culture and among stock market observers around the world" [17]. With Dow Jones, Transportation Average and the Dow Jones Utility Average were the world's first market indicators.

DJIA is a price-weighted index and it is an index of thirty US "blue chips" (Well-known companies whose shares are included in the index, for instance Apple, Coca-Cola, IBM, McDonald's, Microsoft, Wal-Mart Stores.), i.e. stocks of large companies which are the best representatives of the US economy. The index covers all industries except transportation and utilities (those included in the other two indices mentioned above), and it is constructed in the US dollar (USD). The index was first introduced by Charles H. Dow on 26th May 1896.

At that time, however, the shares were not high-prized and investors preferred bonds. Today, the situation is different and shares are accepted as an investment tool by conservative investors as well. At the time of the first performance no one knew that this index will be the key measure of the US (national) economy. [17]

Figure 1

Development DJIA index from 2000 to 2015 (September)



Source: Own elaboration based on [20].

Precisely this indicator is often used in research studies, although some experts consider the standard measure of the performance of the US market index Standard &Poor's 500 (S&P500) because the shares included in this index represent a large proportion of the total capitalization of the US stock market. It is reported around 70–80% of the total capitalization of the US stock market.

If we want to look at the impact of the global financial crisis on the stock markets in North America, we look at the development of index DJIA, which is considered the standard measure of the performance of the US stock market (Figure 1). We followed the evolution of the closing prices of the DJIA index from 3thJanuary 2000 to 1stOctober, 2015 on a daily basis. The index value of3th January, 2000 reached 11357.51 points and the last observation date (1stOctober, 2015) the amount of 16272.01 points representing 1.4327 times the value of the first reporting day. The minimum value of the index reached on 9th March, 2009 and the maximum value was recorded on 19th May, 2015. From Figure 1and the daily values of the DJIA it can be seen that from 9th October 2007 the index started to decline, which is related to the global financial crisis. The largest absolute daily fall was recorded on 29th September, 2008 in absolute value 777.68 points which presents the decline from the previous day by 6.98%. The largest relative daily fall was observed for a couple of days later on 15th October, 2008. The decline of the index value compared with the previous day was 7.87%, representing an absolute reduction of 733.08 points. Justin the fall of 2008 was the bankruptcy of Lehman Brothers and the full outbreak of panic in the financial markets through the detection of the mortgage bubble about Freddie Mac and Fannie Mae. In assessing the value of the index, it is interesting that the largest absolute and relative growth was on 13th October that makes 936.42 points, 11.08%. Figure 1shows that the development value of the DJIA index was affected by the global financial crisis.

Table 1

Significant DJIA index values for the period (2000-2015)

03/01/2000	**09/10/2007**	**09/03/2009 min.**	**19/05/2015 max.**	**01/10/2015**
11 357.51	14 164.53	6 547.05	18 312.39	16 272.01

Source: own elaboration on the basis of [20].

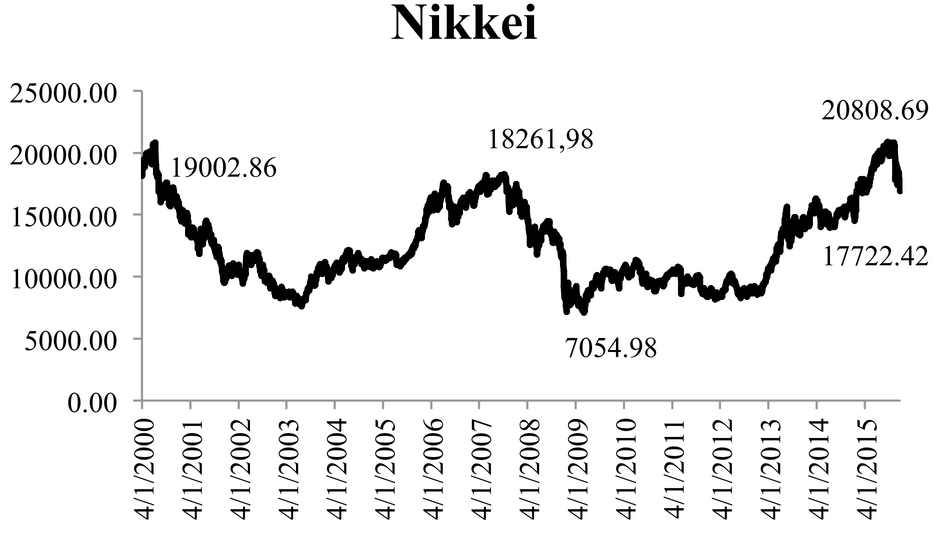
4 The Japan Stock Market – Nikkei Stock Average

The report of the World Federation of Exchange shows that the third largest stock market by market capitalization in the world is Japan Exchange Group. Japan Exchange Group was established on 1st January 2003as a combination of the Tokyo Stock Exchange Group and Osaka Securities Exchange. Leading and most representative index of Japanese stocks is *Nikkei Stock Average* (Nikkei 225). It is a price-weighted index composed of shares of 225 leading blue chips companies in the first section of the Tokyo Stock Exchange. It is the equivalent of the DJIA in the United States and is expressed in the currency of Japanese yen (JPY). It is used worldwide as a leading index of Japanese shares and is very popular especially among Japanese retail investors. The index is compiled from 7th September 1950 and was calculated back from 16th May, 1949. [13]

The impact of the global financial crisis on the stock market in Japan can be seen in the figure 2, which listed the development of leading Japanese stock index Nikkei 225. As with the DJIA, we monitored daily development of index from 4th January 2000 to 1st October 2015. The value of Nikkei index on the first day of the studied period was 19 002.86 JPY and the last day 17 722.42 JPY, representing 0.9326 times the level of the index in the first reference date.

Figure 2

Development Nikkei index from 2000 to 2015 (September)



Source: own elaboration on the basis of [20].

Compared with the DJIA we can see that the index is currently below pre-crisis levels. Index reached its lowest level on 10th March 2009 (a decrease compared to the value of 9th July, 2007 of 61.36%), and 7 054.98 and highest on 24th June, 2015 (an increase from the value of 9th July, 2007 14.27 %). (Compared to the American market: the relative decline was greater, the increase smaller.)

Table 2

Significant values Nikkei 225 index for the period (2000-2015)

04/01/2000	09/07/2007	10/03/2009 min.	24/06/2015 max.	01/10/2015
19 002.86 JPY	18 261.98 JPY	7 054.98 JPY	20 868.03 JPY	17 722.42 JPY

Source: own elaboration on the basis of [20].

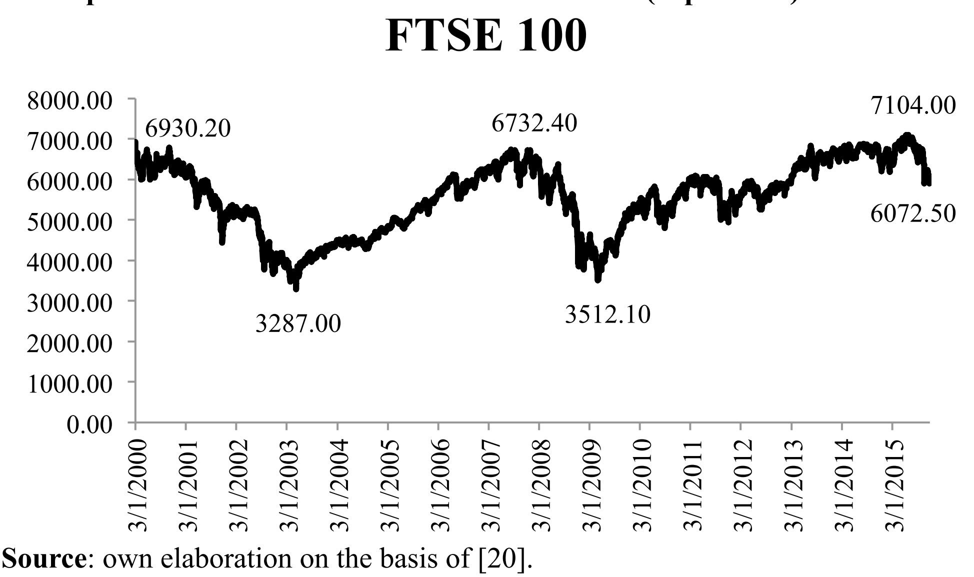
The largest one-day fall was recorded on 16th October, 2008; the index Nikkei 225 over the previous day, fell by 11.41%, which in absolute amount represents the fall of 1089.02 JPY. Conversely, the largest relative increase on Japanese stock market was on 14th October 2008. It is interesting to note that this increase came a day after the largest increase in US stock markets, and the same it is also in the case at reaching a minimum for the period. In Japan it was on 10th March 2009 and America on 9th March, 2009.

5 The London Stock Exchange – Financial Times Stock Exchange 100

The main index of the London Stock Exchange is Financial Times Stock Exchange 100 (FTSE 100). According to the report of the World Federation of Exchange, this exchange is the fourth largest by market capitalization in the world and the largest in Europe. FTSE 100 is a market-capitalisation weighted index, and it includes the shares of 101 companies (blue chips) in the United Kingdom by 30th January 2015. Well-known companies whose shares are included in the index are for example HSBC, Lloyds, Mark &Spencer, Royal Mail, Sainsbury, Vodafone. FTSE 100 "is part of the FTSE UK Series and is designed to measure the performance of the largest companies traded on the London Stock Exchange that pass screening for size and liquidity." [12]It represents about 80% of the market capitalization of the London Stock Exchange and is expressed in pounds sterling (GBP). It is a "free floating" index. The base value of the FTSE100was established at the level 1000on 3th January 1984. [15]

Figure3

Development of FTSE 100 index from 2000 to 2015 (September)



Source: own elaboration on the basis of [20].

Like the previous two indices, the index of the London Stock Exchange FTSE 100 is examined period from 3th January 2000 (the index on the first day of the investigated period 6930.20 GBP) to 1st October 2015 (the index value on the last day of the reporting period 6072.50 GBP). From the development of the index, which is shown in Figure3, we can see that its minimum value is not attained during the global financial crisis, but on 12th March 2003, at 3287 GBP. As it can be seen on the previous two figures 1 and 2, during 2002 and early 2003, there was a decrease in the indices of stock market. The reason may be "fears of war in Iraq, tensions in North Korea, corporate scandals and economic stagnation." [14] The lowest value during the global financial crisis FTSE 100 index reached on 3th March 2009 that is 3512.10 GBP, the highest value for the period on 27th April 2015 makes 7104 GBP. The largest one-day drop of the index was recorded on 10th October 2008, in relative exposure the value of the index compared to the previous day dropped by 8.85%, which in absolute terms represents a decrease of 381.70 GBP. Conversely, the largest increase occurred on 24th November in the same year of 9.84%, representing an increase over the previous trading day about 372 GBP. From Figure 3 we can see as well that the global financial crisis had an impact on the development of the FTSE 100, the main stock market index in London.

Table 3

Significant FTSE 100 index values for the period (2000 – 2015)

03/01/2000	12/03/2003 min. total	15/06/2007	03/03/2009 min.	27/04/2015 max.	01/10/2015
6 930.20 GBP	3 287.00 GBP	6 732.40 GBP	3 512.10 GBP	7 104.00 GBP	6 072.50 GBP

Source: own elaboration on the basis of [20].

All of the underlying index managed to get to the pre-crisis level and the development of the three indices after the global financial crisis can be seen in Figures 1–3

6 The comparison of the selected indices

The impact of the global financial crisis on selected markets was studied by the development of indices of selected stock markets of the world. From Figures 1–3, it can be seen that the values of all three indices, the US DJIA, the Japanese Nikkei 225 and London's FTSE 100 were affected by the global financial crisis. We followed the values of the indices from the beginning of January 2000 to the end of September 2015. The minimum values during the global financial crisis reached all indices in March 2009. All of the studied indices managed to reach the pre-crisis level. On the figures can be seen larger decreases of the indices between 2002 and 2003. These were caused by the stagnation of the economy, fears of war, tensions in some countries, and also corporate scandals. FTSE 100 even in this period reached its total minimum for the period.

The largest one-day decline in value recorded Nikkei 225 index that is 11.41% on 16th October, 2008. Just two days before there was the biggest one-day increase again of Nikkei 225 index by 14.15%. The most increasing linear trend was observed in the case of the US stock index DJIA.

Graphical illustration of a comparison of selected three indices of the global financial crisis period (2007-2009) can be seen in Figure 4. For greater clarity, we chose from the reporting period only the three most important years 2007, 2008 and 2009 in terms of the global financial crisis. Even so, the data in the figure are "condensed" because it works with data on daily closing prices of the indices. From Figure 4 we can conclude that the developed markets (US DJIA index, European index FTSE 100 and Japanese Nikkei 225 index) are evolving "in the same direction". That statement can be more accurately quantified by the correlation coefficients of closing prices of indices for three selected years (2007, 2008 and 2009). In Table 4 we can see that among all tested indices exists positive correlation. Currently, the interconnection of developed stock markets is at a high level so the correlation coefficients of closing prices of the studied indices show a strong dependence on the global financial crisis.

Table 4

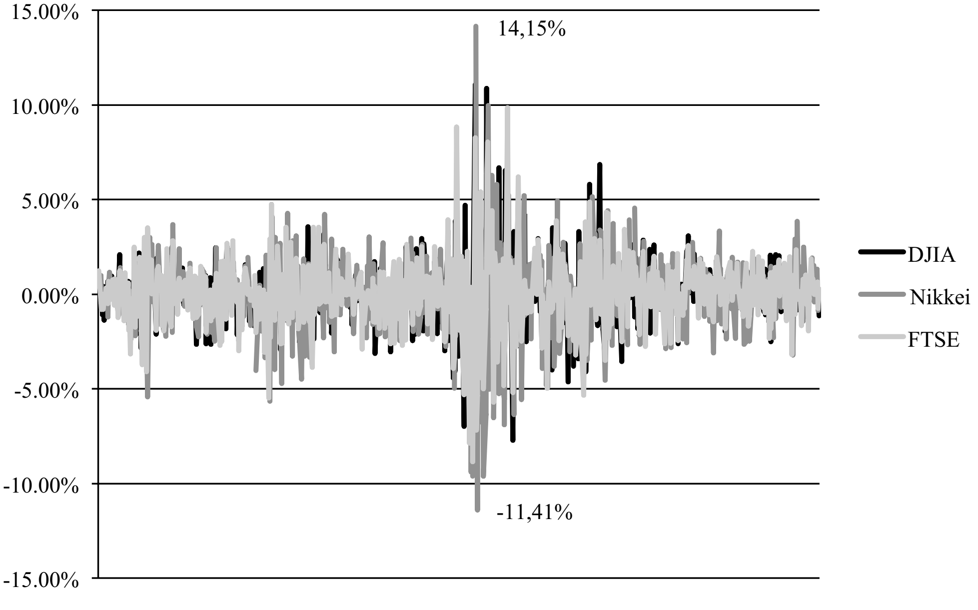
Correlation coefficients of closing prices indices studied (2007 – 2009)

	DJIA	Nikkei 225	FTSE 100
DJIA	1.0000	0.9566	0.9844
Nikkei 225	0.9566	1.0000	0.9477
FTSE 100	0.9844	0.9477	1.0000

Source: own elaboration on the basis of [20].

Figure 4

Development Index DJIA, Nikkei, FTSE for the period 2007–2009



Source: own elaboration on the basis of [20].

It is interesting to look at the correlation coefficients of closing prices of studied indices during the entire for years2000 to 2015. For a longer reviewed period, the correlation coefficients of closing prices of the monitored indices rather have a moderate correlation and the strongest correlation is between US indices DJIA and the European index FTSE100.

Table 5

Correlation coefficients closing prices indices studied (2000-2015)

	DJIA	Nikkei 225	FTSE 100
DJIA	1.0000	0.6055	0.7481
Nikkei 225	0.6055	1.0000	0.6706
FTSE 100	0.7481	0.6706	1.0000

Source: own elaboration on the basis of [20].

The global financial crisis caused great uncertainty in global stock markets. Over recent decades, there has been a steady increase in cross-border financial flows around the world. Activities of financial institutions and institutional investors have expanded geographically to channel funds from lenders to borrowers across national borders. The more stock markets have gained a cross-border orientation. A key role in the process of developing globalisation of financial markets was played by financial innovations and technological advances [18]. These are benefits associated with the globalisation of financial markets.

Globalisation has resulted in greater interconnectedness among markets around the world. And there are also risks associated with the globalisation of financial markets. The internationalisation of financial markets causes numerous occurrences of financial crisis. The risks to financial stability may be seen as mainly arising from market inefficiencies. Financial globalisation occurred in parallel with the rise of risky financial practice. [19] These problems and benefits can explain why three selected indices (DJIA, Nikkei and FTSE) are evolving “in the same direction”.

Conclusions

The impact of global financial crisis on the selected stock markets by investigating the development indices of these stock markets of the world was studied. The DJIA index (representative of the US stock market), FTSE 100 (European equities), and Nikkei 225 (Japanese stock market) were investigated. The values of all three indices were affected by the global financial crisis. The values of the indices we followed since the beginning of January 2000 to the end of September 2015. The minimum value during the global financial crisis reached all indices in March 2009, although the FTSE 100 met its minimum during the reporting period in March 2003. All of the underlying index managed to get to the pre-crisis level. In the figures of individual indices can be seen larger decreases of the indices between 2002 and 2003.

These were caused by the stagnation of the economy, fears of war, tensions in some countries and also corporate scandals. The most increasing linear trend was observed in the case of the US stock index DJIA. It can be concluded that the indices developed about the same. More accurately it reflects the correlation coefficient. During the reporting period (2000-2015) the correlation coefficients of closing prices of the underlying indices rather had a moderate correlation. Currently, the interconnection of developed stock markets is at a high level, so the correlation coefficients of closing prices of the underlying indices during the global financial crisis show a strong correlation.

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