

# INTERDEPENDENCE OF INTERNATIONAL CAPITAL MARKETS

**Suzana Baresa**<sup>1</sup>  
**Sinisa Bogdan**  
**Zoran Ivanovic**

## **Abstract:**

World financial centers have an impact on the economies around the world. This particularly applies for the U.S. equity market. Transactions which are performed on the U.S. market define market trends in most of the world's financial markets, the only question that arises "is to what extent". Purpose of this research is to define and quantify the relationship of the U.S. capital markets, and market equity securities selected on world stock markets. This research will explain the concept of capital markets, its divisions and legislation. The research part is based on quantifying relationship of the U.S. equity market index on the indices of the London Stock Exchange, the Tokyo Stock Exchange and the Zagreb Stock Exchange.

*Keywords:* Capital Market, Zagreb stock exchange, stock market indices.

*Jel Classification:* G10, G15

## **INTRODUCTION**

Capital markets are one of the most important concepts of the modern economic system. Transactions executed on the global capital markets have an impact on overall economic developments around the world. Therefore it's very important to understand the mechanisms of trading on capital markets, their role and recognize their impact on the everyday life. Capital markets are a subspecies of the financial markets. Financial markets except capital market consist of money market and foreign exchange market. Basic difference between the capital markets and money markets and foreign exchange markets, is in the maturity of the traded securities. On the money markets traded securities typically mature within twelve months. Cvjeticanin states that capital markets are "one part of the financial market in which long-term transactions are performed,

---

<sup>1</sup> **Suzana Baresa**, PhD student, Teaching and Research Assistant; **Sinisa Bogdan**, PhD student, Teaching and Research Assistant; **Zoran Ivanovic**, PhD, Full Professor: University of Rijeka, Faculty of Tourism and Hospitality Management Opatija, Croatia.

especially for longer period than twelve months" (2004, 19). Capital markets have a long range of functions, and as most essential Bernard J. Foley stated that the capital market is "mechanism that allows the transfer of funds that can be invested by economic agents with surplus to those with financial shortages" (1998, 6). According to that statement the operation of the capital market funds are channeled into undervalued sectors that subsequently are developing. On the capital market the supply and demand are meeting and, based on that meeting—security price is formed. In this context, the authors Vinko Belak and Zeljana Aljinovic Barac say "if demand is higher due to the supply, prices increase, and if the offer exceeds demand, prices fall" (2008, 2). Capital markets primarily operate through the trading of securities. There are two basic types of securities traded on capital markets: equities and debt securities. Under the term equity securities there are included stocks with all corresponding subdivisions emitted by corporations, while the debt securities include bonds, securities whose issuers may be states, local authorities and companies. Investors with excess funds invest in securities with aim to earn a profit, and the issuers receive the funds needed for business operations. The development of the financial markets has led to the emergence of various ways of securing the funds necessary for the business operation and growth of the company, which is part of the same; the above-mentioned financing by issuing debt and equity securities. Depending on the company, strength, capability and expectations, management selects the mode of financing that is the most appropriate at a given time. The capital market is constantly evolving and, as stated by Richard A. Brealey, Stewart C. Myers and Alan J. Marcus "every day appear new channels of financing" (2007, 29). The strongest and most developed capital market is certainly American capital market. Trading volume, liquidity, and all other aspects of the U.S. capital markets makes the focus of the world economic system. Impact of the U.S. capital markets is felt throughout the world, the only question which arises is in what extent. Capital market is complex system that is usually divided into two main groups: the primary market and the secondary market.

### **Basic division of capital market**

Basic division of capital market is on primary and secondary capital market. The primary capital market represents a segment of the capital market where issuers are for the first time offering a particular security to the public. Marijan Cvjeticanin defines the primary capital market as „securities markets where these securities are issued for the first time, regardless of whether they are bonds or stocks“ (op. cit., 44). In the primary market initial public offering of shares are listed if the company obtains capital with equity securities. Through the IPO securities are for the first time offered to investors who are interested in investing in stocks that are the subject of an initial public offering. Initial public offering, stock company does with the help of investment bank or brokerage house (*underwriter*) signatory conducting the process for the commission. In this case the bank that conducts the process of redeeming stocks at an agreed price and sells them to interested investors in the capital market.

After the initial public offering of securities that are listed in the primary capital market, securities continue to trade on the secondary capital market. Investors who bought securities in the primary market have the opportunity to sell the same in the secondary capital market to gain the profit or to get the funds. According to Frederic. S.

Mishkin, "The New York and American Stock Exchange and NASDAQ (National Association of Securities Dealers Automated Quotation System), on which is traded with previously issued shares, are the best-known examples of secondary markets, although the bond market, where the buying and selling of previously issued bonds of large corporations and the U.S. government, in fact, have a higher volume of trade" (2010, 26). The secondary capital market is most developed segment of the capital market in where are an enormous number of transactions traded each day. Secondary capital market is also a complex concept that requires clarification and division. According to Ivanovic "secondary market of securities may be: strictly formalized (security exchange) or less formalized, over-the-counter market—OTC, the third market and fourth market" (1997, 362). Way of trading on the stock market involves two basic ways: direct interaction of broker on the stock exchange floor and via networked computers. Direct interaction brokers on the floor (Open Outcry mode) imply loudly calling out the price between participants. So brokers who execute orders for purchase shout the price at which they are willing to buy a security (bid price). On the other hand, traders who want to sale securities they shout about the price at which they are willing to sell the same (ask price). The difference between the price at which they are willing to buy one and another according which they are willing to sell is called the spread. Over the counter market (OTC market) is a network system through which the securities are traded directly between brokers. This system is fully computerized so that there is no direct confrontation between brokers in physical space. Trading takes place entirely in a computer system that is not localized to one place. The best known and most developed market over the counter is the American NASDAQ. It is a market that has since its establishment became increasingly important segment of the U.S. equity market. Perhaps the most interesting securities traded in this market are equity securities of small companies that do not meet the conditions for trading on a strictly formalized the U.S. capital markets (New York Securities Exchange). Thus securities traded on the NASDAQ market are often equity securities that are issued by relatively young corporations which will face with imminent growth. Investment in such securities carries high risk, but also the possibility of high profits if the company achieves business success and growth in the future.

### **Capital market law**

Capital markets must operate in a transparent manner and must respect the legislation of environment in which they operate. Only through such a way of doing business basic conditions can be provided for the market development and attracting participants. The primary goal of any regulatory body of the capital market is to protect investors, market participants who make up that market. Without the protection of investors there is no market. For each case of damaging investors culprit will answer in accordance with the law conducted by the regulatory authority. Any damage of the market participants negatively affects not only the capital market but its role in the economic system. According to Ivanovic "main objective of the rules that protect investors is: disclosure of all vital facts relating to the new issue of securities, and the publication of at least the minimum information that, after the purchase, issuers must submit to the owners of securities" (ibid., 364). Legislation of capital markets applies to entities that trade in

securities and carry out orders while trading for their own or someone else's account. The interest of the customer whose order is executed must always be at the first place.

In the territory of the United States regulatory authority of the capital market is known under the name of the U.S. Securities and Exchange Commission (the SEC). SEC was created and began acting when the great economic crisis (1929–1933) pointed great volatility of the market and pointed the need of protecting investors who are seeking quick profits while following the questionable information. Buying on credit and engaging the investment of which they know little contributed to the development of the events that followed. Ante Gasparovic stated that "the idea of investing in the stock market, driven primarily by a desire for quick and large profits, infected tens of millions of Americans who were invested in securities on the stock market everything they had, unfortunately even more than that, they borrowed from banks to believing in their investment" (2001, 63). Considering the fact that the U.S. capital market plays a major leadership role in the world, the regulation of such a significant market is even more important. As basic tasks SEC stated: protection of investors, maintaining fair trading, orderly markets and facilitate the flow of capital (2014). In the Republic of Croatia, the regulatory body is the Securities Commission which was established under the Act on the issuance of the Securities in 1996. In the formation of a regulatory body, U.S. Securities and Exchange Commission served as a reference model. In the context of the Croatian capital market regulation there should be mentioned other bodies which are involved also in the process of regulation. These bodies are Central Depository & Clearing Company Inc., Croatian competition agency, and the Croatian financial services supervisory agency. Central Depository & Clearing Company Inc. according to Ante Gasparovic CDCC by its operations provide investors a guarantee that the clearing and settlement processes will take place with full legal certainty that there will not be "short circuit" between buyers and sellers of securities" (op. cit., 71). CDCC contributes to safety and minimize possible errors that are possible when doing business in the capital market. Croatian competition agency was established in 1995. she is governing rules in the open market for all participants. Through its work this regulatory authority creates an environment in which all market participants can operate in the same conditions, especially while paying attention to small businesses that may be in unfair market position in relation to large companies. Croatian financial services supervisory agency is an agency established in 2006 whose tasks include monitoring the capital markets and operations of the same. Among many other tasks, CFSSA monitors the operations with securities exchanges, investment funds, licensed brokerage houses, insurance companies, submits reports related to its activities and warns the investor community on possible irregularities in the operations if they exist.

## **WORLD CAPITAL MARKETS**

World capital markets have recorded significant growth over the past two decades, especially in the 90s of the last century. On entering the new millennium, the value of the U.S. stock market indices went up precipitously on the basis of attractive, but also greatly overrated equity securities of internet companies. Strong growth, was followed by a market correction that was very bad for investment funds and many investors. Anthony Saunders and Marcia Millon Cornett stated that "since 1994. till the end in 2001. shareholder value was increased by 140% (increasing to 170% since 1994. till

the end of 2000. In 2001, its stock value has lost 13.6% in the downward phase of the U.S. economy) "(2006, 218). The U.S. capital market was considered, and it is still regarded, as major world capital market. According to Marijan Cvjeticanin "it can be said that transactions executed on the stock exchanges determine the prices of securities in the whole world and affect almost all global economic developments" (op. cit., 51). The processes of globalization have led to a thickening of the world, and its most important role this process may have had in the sphere of finance. Globalization erases the boundaries between the economic systems of cross-linking them in a huge, interconnected structure. With the U.S. equity market, led by the NYSE, other world financial centers began to strengthen its position as a relevant global financial headquarters. Tokyo Stock Exchange, London Stock Exchange, and Frankfurt Stock exchange are today most important financial centers, but these centers can't take the lead. Leading financial center is still in America.

### **U.S. equity market**

The U.S. equity market is the most influential world capital market. The symbol of the U.S. capital market is a stock exchange in New York. This is one of the world's oldest stock exchanges; the statute was enacted in 1817. NYSE strength and liquidity are unquestionable. Frederic S. Mishkin and Stanley G. Eakins state that "the average daily volume in 1998 was 712.7 million shares, with a total number of 100 billion of shares which were traded during the year " (2005, 243).

Listed companies on the NYSE, must meet minimal requirements. Mishkin and Eakins stated that the company must "have at least 2,000 shareholders, each of whom owns 100 shares or more, there must be a minimum of 1.1 million shares which can be traded publicly, earnings before taxes \$2.5 million at the time of listing on the stock exchange with at least \$2 million in earnings before taxes in each of the previous two years, the market price of public shares of \$ 100 million or more " (loc. cit.). Brokers, market makers and others who work on the NYSE floor are called members of the stock exchange. Zoran Ivanovic said that "there are 1,366 members of the NYSE stock that pays such places (seats)" (op. cit, 372). To reach this position they buy that place or position on the NYSE. Price of the seat in the New York Stock Exchange is payable in multimillion amounts. Marijan Cvjeticanin, states that "in the stock market today is trading with more than 4,000 largest and best-known American companies" (op. cit, 51). As mentioned, over the counter market in the United States is known by the acronym NASDAQ. Mishkin and Eakins stated that NASDAQ System "shows the current cost of supply and demand of approximately 4,000 securities that are actively traded. The total volume on the NASDAQ is in generally slightly lower than on the NYSE, however, the volume of NASDAQ is in the rise and occasionally it exceeds the volume of the NYSE"(op. cit., 244). This proves that the NASDAQ OTC securities market is becoming increasingly more important part of the world economic system. With the NYSE and the NASDAQ in the context of the U.S. capital markets should be also mentioned the American Stock Exchange (AMEX); American Stock Exchange. Requirements that companies must meet if they want to be listed on the American Stock Exchange are not rigorous as in the case of the NYSE rules. According to the authors Mishkin and Eakins "there are around 700 companies which are traded on AMEX " (loc. cit.).

### Other relevant world capital markets

On the territory of the United Kingdom, London Stock Exchange plays the main role considering the capital markets. According to the London Stock Exchange (2014) history of the stock market begins in 1801. London Stock Exchange is one of the oldest world's stock exchanges. London has a long tradition as financial center and therefore occupies an important position in the world system of capital market. Today on the London Stock Exchange investors trade with about 3,000 companies, except the London Stock Exchange, major stock exchanges are located in Paris and Frankfurt. Among the other world markets securities a special attention deserves Tokyo Stock Exchange and according to Frederic S. Mishkin and Stanley G. Eakins they stated that "it is the most active stock exchange in the world" (op. cit., 424). Increasingly important role in the capital markets have the emerging markets they are expected to make significant growth in the future and what makes the good choice for long term investment. The stated capital markets are becoming increasingly important world markets.

Croatian capital market on a global scale is a relatively young and poorly developed capital market. The center of the Croatian capital market is Zagreb stock exchange. ZSE as an institution has a long history. Author Ante Gasparovic said that "the history of the Zagreb Stock Exchange dates back to the early twenties of the twentieth century, after the First World War. In 1918 Zagreb stock exchange was founded the, where except securities other goods were traded also. These goods were: raw materials, currencies, precious metals, etc." (op. cit., 95). The Great Depression in twenties or thirties in XXth. century hit the ZSE which then cease trading in securities. After second World War ZSE completely stops with business, mostly for ideological reasons. ZSE continues with business in 1991 year. Ante Gasparovic writes that "the ZSE reopened its doors in July 1991st, it was founded by 25 banks and insurance companies who deem necessary and justified to invest their funds in the stock market resuscitation, as the epicenter of the capital market" (loc. cit.). ZSE recorded daily turnover, which is compared to the developed world capital markets negligible, and as such, the capital market of the Republic of Croatia attracts foreign investors.

**Table 1.** Monthly trade Report by month in 2013 (in HRK million)<sup>2</sup>

Month	Stocks		Bonds		Structured products		Total Turnover
	Turnover	Percentage	Tunover	Percentage	Tunover	Percentage	
January	319,2	74,3	98,9	23,0	11,6	2,7	429,6
February	634,6	85,5	42,3	9,9	19,6	4,6	426,5
March	268,3	82,1	41,0	12,6	17,4	5,3	326,7
April	206,5	79,8	22,9	8,8	29,4	11,4	258,8
May	267,6	86,6	27,9	9,0	13,5	4,4	309,0
June	358,1	90,9	21,5	5,5	14,5	3,7	394,1
July	278,1	77,1	71,0	19,7	11,7	3,2	360,8
August	165,0	81,5	25,8	12,7	11,6	5,7	202,4
September	199,1	59,2	122,8	36,5	14,6	4,4	336,6
October	115,5	81,6	41,6	15,1	9,1	3,3	276,2
November	188,6	85,7	23,0	10,5	8,3	3,3	276,2
December	220,2	82,8	37,4	14,1	8,2	3,1	265,9
In total	3060,9	80,4	576,1	15,1	169,6	4,5	3.806,7

<sup>2</sup> Source: Zagreb stock exchange, *Trade Overview in 2013*.

In the mid of nineties individual securities traded on the ZSE have achieved significant success and then the Croatian capital market attracted many investors, both domestic as well as foreign. Crisis, called "Asian tigers" in 1997th year broke the trend of strengthening international activities in the Croatian capital market. In the context of the Croatian capital market there must also be mentioned the former Varazdin stock exchange. Varazdin stock exchange in the Republic of Croatia was organized as over-the-counter market. Ante Gasparovic said that "Varazdin stock exchange was established in March 1993 as first Croatian regulated public market" (ibid., 108). Varazdin stock market had, in relation to the ZSE, lower requirements for listing securities of particular companies on market. Varazdin stock market certainly helped to develop young Croatian capital market. Varazdin stock exchange was merged with the Zagreb Stock Exchange in 2007.

### **Stock market indices**

Stock market indices are important indicators of the capital markets. These are values that are calculated considering the price movements of securities on certain capital market. Stock market indices have the crucial importance for market analysts who say in which direction is market moving and what kind of mood prevails among investors which are active in the market. Stock market indices are commonly used measures for equity and debt securities, and can be calculated for each sector, the group stocks, according to a market where securities are listed and a number of other parameters.

Each stock exchange has a stock index that indicates the movement of the stock market as well, and very often the stock markets calculate several market indices with a purpose to cover as largest part of the market as they can. The most famous stock market indices today are certainly those who point to the U.S. market movements of capital markets, in particular from the group of Dow Jones indices. According to Ivanovic there are several Dow Jones indices: Dow Jones Industrials Average-DJIA, which tracks the 30 most representative (blue chip) U.S. industrial companies; Dow Jones Transportation Average; Dow Jones Utilities average, which is based on the 15 stocks of companies that are engaged in providing various community services; and Dow Jones composite average, which is a combination of three previous indices and includes 65 classes of shares "(op. cit, 383). Another important index that indicates the movement of the U.S. capital market is the S&P 500 index. Marijan Cvjeticanin, states that "the S&P 500 index covers stock prices of 500 famous American companies and, as such, serves as an excellent barometer for all U.S. stock market" (ibid., 90).

Among the other major world stock market indices there are: FTSE 100 London Stock Exchange index, the DAX; Frankfurt Stock Exchange index, CAC 40; Paris Stock Exchange Index, Nikkei 225; Tokyo Stock Exchange index, Hang Seng; Hong Kong Stock Exchange index. The index of the Zagreb Stock Exchange is called CROBEX, and it is calculated from the 1997.

## THE RELATIONSHIP AMONG THE U.S. STOCK MARKET INDEX ON THE WORLD STOCK MARKET INDICES

U.S. equity market with its power has unquestionably strong influence on world financial centers. Transactions executed on the U.S. capital market literally dictate the trends that will occur at the international level. With the aim of quantifying the link between the U.S. capital markets and international financial centers for this research we used data that tracked the movement of the U.S. market index and the index of equity securities of certain equity securities of selected world markets securities. In terms of quantifying these connections there would be used statistical methods of correlation analysis and Pearson's correlation coefficient ( $r$ ). In the context of these statistical method Jasna Horvat and Josipa Mijoc state that the "correlation deals with the correlation variable" and "examines the degree of association between two variables" (2012, 472).

Correlation coefficient will be measured by Pearson method to find at which extent the U.S. stock market reflect the movements of the equity securities rest of the world. The authors Jasna Horvat and Jasna Mijoc (*ibid.*, 476) suggest the following formula Pearson correlation coefficient, which will be used in the calculation:

$$r = \frac{n \sum_{i=1}^n x_i y_i - \sum_{i=1}^n x_i \sum_{i=1}^n y_i}{\sqrt{(n \sum_{i=1}^n x_i^2 - (\sum_{i=1}^n x_i)^2) \times (n \sum_{i=1}^n y_i^2 - (\sum_{i=1}^n y_i)^2)}}$$

The result which is obtained through the Pearson correlation coefficient can range from -1 to 1. If the result is negative he points to negative correlation between the observed variables.

The negative correlation indicates that, according to words of Jasna Horvat and Joseph Mijoc, "linear increase in the first variable which corresponds to a linear decline in other variables, and it is characterized by the correlation coefficient whose value is less than 0 and greater than -1" (*ibid.*, 477). A positive correlation has a value between 0 and 1, and indicates that the increase in the first (independent) variables causes the growth of the other (dependent) variables. If the value of the correlation coefficient is closer to -1 or 1, the stronger the connection is. If the result is in the range of -0.3–0.3, the correlation is weak. The result is interpreted as the positive or negative sign which defines the direction, and the number defines the strenght of result. The calculation will use the index S&P 500 as an indicator of U.S. equity securities markets, and it will be compared with the indices: FTSE 100 (London Stock Exchange), Nikkei 225 (Tokyo Stock Exchange) and CROBEX (ZSE). The calculation will be taken with quarterly closing values for the period 2000–2013.

### The relationship between the S&P 500 and the FTSE 100 index

The link between the U.S. capital markets and the English capital market should be strong due to the fact that the New York and London, are the world's most important capital markets. The level of turnover on the London Stock Exchange shows the international importance of this market, and it leaves open to influence from the world's most powerful capital markets, the U.S. market.



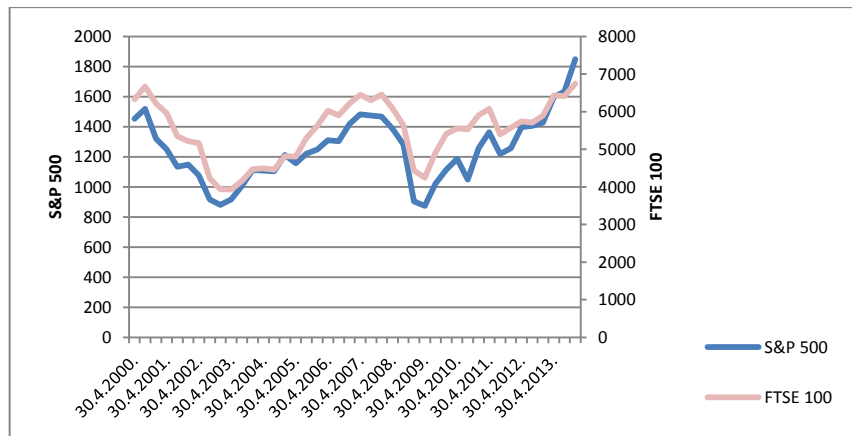
Concluding the quarterly value of the S&P 500 and the FTSE 100 Index in period 2000–2013.

**Table 2.** Concluding quarterly values of the S&P 500 and the FTSE 100 index in period 2000–2013<sup>3</sup>

Date	S&P 500	FTSE 100
30.04.2000.	1,452.43	6,327.43
31.08.2000.	1,517.68	6,672.66
31.12.2000.	1,320.28	6,222.46
30.04.2001.	1,249.46	5,966.95
31.08.2001.	1,133.58	5,344.97
31.12.2001.	1,148.08	5,217.35
30.04.2002.	1,076.92	5,165.58
31.08.2002.	916.07	4,227.28
31.12.2002.	879.82	3,940.36
30.04.2003.	916.62	3,926.00
31.08.2003.	1,008.01	4,161.10
31.12.2003.	1,111.92	4,476.90
30.04.2004.	1,107.30	4,489.70
31.08.2004.	1,104.24	4,459.30
31.12.2004.	1,211.92	4,814.30
30.04.2005.	1,156.85	4,801.70
31.08.2005.	1,220.33	5,296.90
31.12.2005.	1,248.29	5,618.80
30.04.2006.	1,310.61	6,023.10
31.08.2006.	1,303.82	5,906.10
31.12.2006.	1,418.30	6,220.80
30.04.2007.	1,482.37	6,449.20
31.08.2007.	1,473.99	6,303.30
31.12.2007.	1,468.36	6,456.90
30.04.2008.	1,385.59	6,087.30
31.08.2008.	1,282.92	5,636.60
31.12.2008.	903.25	4,434.17
30.04.2009.	872.81	4,243.71
31.08.2009.	1,020.62	4,908.90
31.12.2009.	1,115.10	5,412.88
30.04.2010.	1,186.68	5,553.29
31.08.2010.	1,048.33	5,525.22
31.12.2010.	1,257.64	5,899.94
30.04.2011.	1,363.61	6,069.90
31.08.2011.	1,218.89	5,394.53
31.12.2011.	1,257.60	5,572.28
30.04.2012.	1,397.91	5,737.78
31.08.2012.	1,406.58	5,711.48
31.12.2012.	1,426.19	5,897.81
30.04.2013.	1,597.57	6,430.12
31.08.2013.	1,632.57	6,412.93
31.12.2013.	1,848.36	6,749.09

By analyzing data from a table the growth pattern of the index FTSE 100 is increased as the value of the S&P 500 index increase. Data are graphically shown in continuation:

<sup>3</sup> S&P indices ([www.spindices.com](http://www.spindices.com)); London stock exchange ([www.londonstockexchange.com](http://www.londonstockexchange.com))



**Figure 1.** S&P 500 and the FTSE 100 stock index in period 2000–2013<sup>4</sup>

Figure 1 clearly shows the relationship between the S&P 500 and the FTSE 100 stock index. It can be noted that FTSE 100 Index tracks the movement of the S&P 500 index. Substituting the values from the table 2 in the Pearson correlation coefficient, provided the result of  $r = 0.90$ . This result indicates a strong positive correlation between the index of the U.S. market equity securities and equity securities index of the British market.

#### **The relationship between the S&P 500 and the Nikkei 225 index**

Tokyo stock exchange is the most developed Asian capital market. The level of turnover indicates the importance of the international securities market. As such, the movement of the Nikkei 225 index of the Tokyo Stock Exchange should also reflect the movement of U.S. capital markets as the world's most powerful capital market. As a sign of the U.S. capital market again it will be taken the S&P 500 Index of equity securities and the Nikkei 225 Index, which reflects on the movement of the Japanese market equity securities.

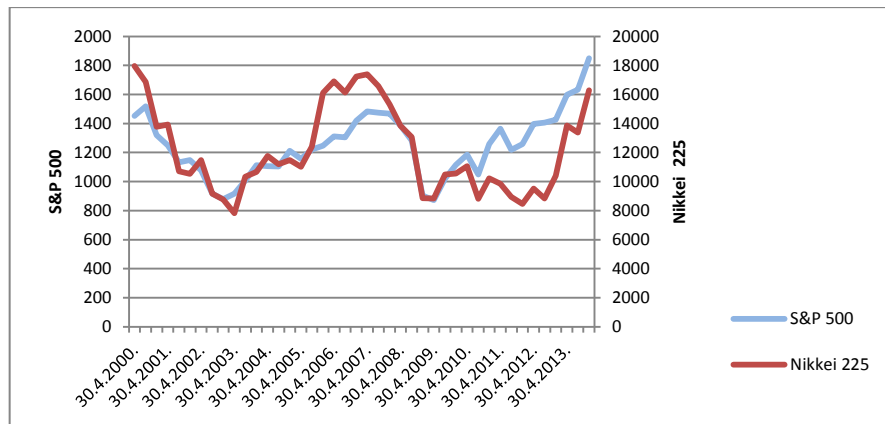
<sup>4</sup> S&P indices ([www.spindices.com](http://www.spindices.com)) and London stock exchange ([www.londonstockexchange.com](http://www.londonstockexchange.com))

**Table 3.** Final quarterly value of the S&P 500 and Nikkei 225 indices in period of 2000–2013<sup>5</sup>

Date	S&P 500	Nikkei 225
30.04.2000.	1,452.43	17,973.70
31.08.2000.	1,517.68	16,861.26
31.12.2000.	1,320.28	13,785.69
30.04.2001.	1,249.46	13,934.32
31.08.2001.	1,133.58	10,713.51
31.12.2001.	1,148.08	10,542.62
30.04.2002.	1,076.92	11,492.54
31.08.2002.	916.07	9,169.30
31.12.2002.	879.82	8,758.95
30.04.2003.	916.62	7,831.42
31.08.2003.	1,008.01	10,343.52
31.12.2003.	1,111.92	10,676.64
30.04.2004.	1,107.3	11,761.79
31.08.2004.	1,104.24	11,184.53
31.12.2004.	1,211.92	11,488.76
30.04.2005.	1,156.85	11,008.90
31.08.2005.	1,220.33	12,413.60
31.12.2005.	1,248.29	16,111.43
30.04.2006.	1,310.61	16,906.23
31.08.2006.	1,303.82	16,140.76
31.12.2006.	1,418.3	17,225.83
30.04.2007.	1,482.37	17,400.41
31.08.2007.	1,473.99	16,569.09
31.12.2007.	1,468.36	15,307.78
30.04.2008.	1,385.59	13,849.99
31.08.2008.	1,282.92	13,072.87
31.12.2008.	903.25	8,859.56
30.04.2009.	872.81	8,828.56
31.08.2009.	1,020.62	10,492.53
31.12.2009.	1115.1	10,546.44
30.04.2010.	1,186.68	11,054.4
31.08.2010.	1,048.33	8,824.06
31.12.2010.	1,257.64	10,228.92
30.04.2011.	1,363.61	9,849.74
31.08.2011.	1,218.89	8,955.20
31.12.2011.	1,257.6	8,455.35
30.04.2012.	1,397.91	9,520.89
31.08.2012.	1,406.58	8,839.91
31.12.2012.	1,426.19	10,395.18
30.04.2013.	1,597.57	13,860.86
31.08.2013.	1,632.57	13,388.86
31.12.2013.	1,848.36	16,291.31

A chart showing data expressed in Figure 2 is resulting with clearer overview of data.

<sup>5</sup> S&P indices ([www.spindices.com](http://www.spindices.com)); Tokyo stock exchange ([www.tse.org.jp](http://www.tse.org.jp))



**Figure 2.** S&P 500 Index and the Nikkei 225 index in the period of 2000–2013

Analyzing figure 2. indices S&P 500 and Nikkei 225 it can be concluded that both indices match the movement but at certain time periods, divergence can be noticed. It points to factors independent of the U.S. stock markets affect the Japanese market equity securities and to a greater extent than in the relationship between the U.S. and London stock markets. Substituting the data from Table 3 in the formula of Pearson's correlation coefficient obtained result was  $r = 0.67$  indicating a moderate correlation with positive direction that leads to the conclusion that the U.S. capital market has an impact on the movement of the Nikkei 225 Index of Japanese stock market, but in weaker correlation than with FTSE 100.

### **The relationship between the S&P 500 and the Crobex Index**

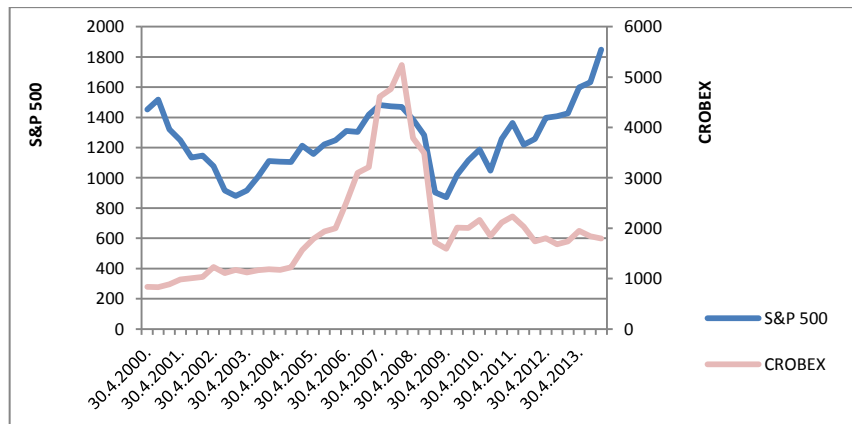
In the case of comparing the movement of S&P 500 Index and the Croatian capital market leads to interesting problems of the financial markets. Croatian capital market is underdeveloped at the world scale and irreverent market with negligible international relevance. If we take the data from Table 1 and compare it with the data of the world's most developed capital markets leads to this conclusion. Therefore, the expected impact of weaker global capital markets on the Croatian capital market.

**Table 4.** Final quarterly value of the S&P 500 Index and CROBEX Index in preiod 2000–2013<sup>6</sup>

Date	S&P 500	CROBEX
30.04.2000.	1,452.43	834.49
31.08.2000.	1,517.68	829.14
31.12.2000.	1,320.28	890.01
30.04.2001.	1,249.46	980.97
31.08.2001.	1,133.58	1,008.98
31.12.2001.	1,148.08	1,034.72
30.04.2002.	1,076.92	1,231.26
31.08.2002.	916.07	1,110.19
31.12.2002.	879.82	1,172.58
30.04.2003.	916.62	1,120.26
31.08.2003.	1,008.01	1,169.11
31.12.2003.	1,111.92	1,185.13
30.04.2004.	1,107.30	1,175.49
31.08.2004.	1,104.24	1,226.72
31.12.2004.	1,211.92	1,565.81
30.04.2005.	1,156.85	1,788.53
31.08.2005.	1,220.33	1,933.95
31.12.2005.	1,248.29	1,997.53
30.04.2006.	1,310.61	2,513.61
31.08.2006.	1,303.82	3,099.53
31.12.2006.	1,418.30	3,209.48
30.04.2007.	1,482.37	4,613.11
31.08.2007.	1,473.99	4,760.39
31.12.2007.	1,468.36	5,239.03
30.04.2008.	1,385.59	3,792.72
31.08.2008.	1,282.92	3,495.02
31.12.2008.	903.25	1,722.25
30.04.2009.	872.81	1,593.57
31.08.2009.	1,020.62	2,009.02
31.12.2009.	1,115.10	2,004.06
30.04.2010.	1,186.68	2,161.26
31.08.2010.	1,048.33	1,848.06
31.12.2010.	1,257.64	2,110.93
30.04.2011.	1,363.61	2,233.97
31.08.2011.	1,218.89	2,033.92
31.12.2011.	1,257.60	1,740.21
30.04.2012.	1,397.91	1,800.76
31.08.2012.	1,406.58	1,679.95
31.12.2012.	1,426.19	1,740.39
30.04.2013.	1,597.57	1,948.39
31.08.2013.	1,632.57	1,841.41
31.12.2013.	1,848.36	1,794.28

By analyzing the data from Table 4 there can be seen appreciable differences in the movement of related indexes. By plotting there is clearer insight into the presented data.

<sup>6</sup> S&P indices ([www.spindices.com](http://www.spindices.com)); Zagreb stock exchange ([www.zse.hr](http://www.zse.hr))



**Figure 3.** Graph S&P 500 Index and equity index in the period of 2000–2013<sup>7</sup>

Figure 3 clearly shows the differences in the movement of the S&P 500 and Crobex. There are certain forms of Crobex and S&P 500 that match, but much weaker compared to the analyzed FTSE 100 and Nikkei 225 indices. Calculating the data from Table 4 with the Pearson correlation formula, obtained result was  $r = 0.38$ . This value indicates a moderate positive correlation between the S&P 500 index and Crobex. This value is far lower than in previous analyzes the connection between the S&P 500 Index and the FTSE 100 Index and the Nikkei 225. This proves that the U.S. equity market has a lower impact on Croatia which is less developed and low liquid capital market in comparison to London and Tokyo stock exchange.

## CONCLUSION

Research has confirmed the thesis that the U.S. stock exchange market is in strong correlation with world stock market indices. A strong relationship was observed between the S&P 500 and the FTSE 100. Weaker, but still moderately strong relationship was observed between the S&P 500 Index and the Nikkei 225 Index. Comparing the S&P 500 index with CROBEX confirmed the hypothesis that the impact of the U.S. capital markets is less felt at the less developed financial market, which have lower level of international importance. Less developed, low liquidity capital markets are interesting problem areas of finance. Especially because of predicting. Rules of the technical analysis do not apply to smaller capital markets. From the point here is that the level at which a particular market will feel the impact of the U.S. equity market directly depends on the development and importance of international capital markets watched. This research is only a starting point for future researches. Further research is needed to quantify in detail the relationship between the highly and less developed capital markets and to define their relationship.

<sup>7</sup> S&P indices ([www.spindices.com](http://www.spindices.com)) and Zagreb Stock Exchange ([www.zse.hr](http://www.zse.hr))

## REFERENCE

- Belak, Vinko, and Zeljana Aljinovic Barac. 2008. *Tajne trzista kapitala* [Secrets of capital markets]. Zagreb: BELAK EXCELLANS d.o.o.
- Brealey, A. Marcus, Stewart C. Marcus, and Alan J. Marcus. 2007. *Osnove korporativnih financija* [Fundamentals of Corporate Finance]. 5th ed. Zagreb: MATE.
- Cvjeticanin, Marijan. 2004. *Burzovno trgovanje: Prirucnik za investitore i analiticare* [Stock-trading: A guide for investors and analysts]. 2nd ed. Zagreb: Masmedia.
- Foley, Bernard J. 1998. *Trzista kapitala* [Capital Markets]. 2nd ed. Zagreb: MATE.
- Gasparovic, Ante. 2001. *Trziste kapitala u Republici Hrvatskoj: Zakonodavni i institucionalni okvir* [The capital market in Croatia: Legal and institutional framework]. Zagreb: Sinergija
- Horvat, Jasna, and Josipa Mioc. 2012. *Osnove statistike* [Fundamentals of statistics]. Zagreb: Naklada Ljevak.
- Ivanovic, Zoran. 1997. *Financijski menadzment* [Financial Management]. 2nd ed. Opatija: Hotelijerski fakultet [Faculty of hotel management].
- London Stock Exchange. 2014. *Company overview*. <http://www.londonstockexchange.com/about-the-exchange/company-overview/company-overview.htm> (accessed January 25, 2014).
- . 2014. *Indices: FTSE 100*. <http://www.londonstockexchange.com/exchange/prices-and-markets/stocks/indices/summary/summary-indices.html?index=UKX> (accessed January 25, 2014).
- Mishkin, Frederic S. 2010. *Ekonomija novca, bankarstva i financijskih trzista* [Economics of Money, Banking and Financial Markets]. 8th ed. Zagreb: MATE.
- Mishkin, Frederic S., and Stanley G. Eakins. 2005. *Financijska trzista i institucije* [Financial markets and institutions]. 4th ed. Zagreb: MATE.
- Saunders, Anthony, and Marcia Millon Cornett. 2006. *Financijska trzista i institucije: Moderno vidjenje* [Financial markets and institutions: A modern vision]. 2nd ed. Zagreb: Masmedia.
- S&P Dow Jones Indices. 2013. *Indices: S&P 500*. <http://us.spindices.com/indices/equity/sp-500> (accessed December 12, 2013).
- Tokyo Stock Exchange. 2013. *Stock price index—historical*. [http://quote.tse.or.jp/tse\\_n/quote.cgi?F=histidx/Ehistsearch](http://quote.tse.or.jp/tse_n/quote.cgi?F=histidx/Ehistsearch) (accessed December 12, 2013).
- U.S. Securities and Exchange Commission. 2013. *The Investor's Advocate: How the SEC Protects Investors, Maintains Market Integrity, and Facilitates Capital Formation*. [http://www.sec.gov/about/whatwedo.shtml#U288Q\\_mSyrk](http://www.sec.gov/about/whatwedo.shtml#U288Q_mSyrk) (accessed December 14, 2013).
- Zagreb Stock Exchange. 2013. *Pregled trgovine u 2013. godini* [Trading in 2013]. Zagreb: Zagreb Stock Exchange.
- . 2013. *Index CROBEX: Povijesni podaci* [CROBEX: Historical data]. <http://zse.hr/default.aspx?id=44101&index=CROBEX> (accessed December 13, 2013.)