Spis treści

Summaries

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THE FINANCIAL CONVERGENCE OF WARSAW AND NEW YORK STOCK EXCHANGE IN INFORMATION REVOLUTION ERA

1. Genesis

The existence of market as a place of changing transactions is the result of the beginning of rise economy based on money. Many historians define the time as a period of beginning Carthage Empire. The Carthage was found in IX century before Christ and Phoenicians established this state – city in North Africa (today the land belongs to Tunisia). Carthage tradesmen was well – known in ancient times as a great businessmen and thousand years ago they knew valuable papers what confirmed gold quantity in their vaults [Ciejpa-Znamirowski 2000, p. 36]. Some other historians prove that real beginning of free (or almost free) market system is involved with XVIII century after Christ because in this age many financial markets were found, but with the other side process was connected with creating and growing of new financial institutions – stock exchange markets.

In present time (after years) stock – exchange markets (where many valuable papers are written – down) are belong to capital market and that market is the part of financial markets. According to simple understanding definition market is the place where human beings execute transactions to change one product in other good(s) or money. According to P.A. Samuelson market is the place where suppliers and buyers affect to themselves in order to determine the quantity and price of goods. Some markets are in real places but other are organized in Internet or by phones [Samuelson 2007, p. 599]. In detailed conception we divide markets in real and financial markets [Nowak 1998, p. 11]. Real markets are divided in production factor and consumptive goods and services markets and financial markets are divided in money, capital, currency and derivatives markets [Jajuga 2006, p. 11]. Capital markets are divided in bank deposits, valuable papers, bank credits and out of bank financial tools markets [Nowak 1998, p. 11]. Two questions are important: what are the similarities between different stock exchange markets and what we can suppose about convergence process; what is the nature of these actions?

2. Stock exchange market – economic criterions of progress

Fair criterions of progress can help to understand degree of stock exchange market development. Very important is growth of degree of fluency market as an ability to exchange one good to other in data time. Goods can be as for example financial instruments quoted in stock exchange market. Financial instrument is the contract regulating economic and legal dependence between two sides [Jajuga, Kuziak, Markowski 1998, p. 12]. Fluency on stock market is frequently identified as turnover (in money) quoted in particular time by brokers.

Capitalization growth degree is the next criterion of progress; the value is product of number stocks and their market price [*Powszechna encyklopedia…* 2006]. Degree of capitalization of exchange has influence on her perception by national and foreign investors. They are observing historical data relating with this economic indicator (marked for whole exchange market and individual sectors, branches, and even individual companies) it can give premise to undertaking more far decisions. Such kind of treatment is close to technical analysis which it makes observes of graphs with historical statistic data (according to many investors it helps to make good investments in the future).

Third criterion deals with foreign investments in polish stock exchange market. It is allowed to calculate coefficients what concern to foreign capital investments in stocks and I think that is possible to measure what part of investments is being made by individuals or corporations. Vast share of big investors can indicate that stock market is more predictable because such investors are usually interested in long term investments.

Next criterion of progress is involved with attractiveness of stock markets for foreign companies. It can be give a question: how many foreign corporations would like to sell their shares on our market? If the quantity of these firms is relatively wide then we can suppose that our market is mature and has big ability to make develop. Other criterions concern to number and value of transactions per session. If the quantity and value of transaction is relatively big and making progress from session to session, investors can think that stock market has a potential to growth and many of them is willing to make new investments.

Of course the observation of change of value above mentioned coefficients cannot be made only for one stock exchange market. If it want to make credible calculations and analyzes that should compare at least two markets (criterions: number and value of transactions). In present article it will compare two stock exchange markets: New York Stock Exchange and Warsaw Stock Exchange.

3. Two stock exchange markets

History of Warsaw Stock Exchange (WSE) is equal complicated as history of Poland. WSE was found on May 12, 1817, but selling and buying of shares was be-

ginning really in second half of XIX century [Internet 4]. Between the time of I and II World War existed stock exchange markets in many other Polish cities except of Warsaw: Catovice, Cracow, Lvov, Poznan and Vilna also, but most important was Warsaw indeed (about 90 per cent of turnovers). In 1938 was quoted many kinds of valuable papers, for example: bonds, stocks, shares etc. After II World War existence of WSE wasn't necessary because of changing political system. The economic reforms was prepared by prof. Leszek Balcerowicz and Jeffrey Sachs and consisted with 10 laws what made possible reconstructing in Poland both real and financial market. In 1991 Warsaw Stock Exchange was re – found. Revolutionary solution was accepted: valuable papers quoted on the market were only virtual papers (dematerialization process) and begun as only electronic value. First quotation was begun on April 16, 1991 and 5 privatized companies hugged: Tonsil, Próchnik, Cables, Exbud and Wedel (state on 27 July 2007 in table 1).

Table 1. Number of companies quoted on WSE (July 27, 2007)

	Polish companies	Foreign companies	Together
Basic market:	280	16	296
Parallel market:	12	0	12
Together:	292	16	308

Source: [Internet 3].

New York Stock Exchange (NYSE) history was completely different from WSE. NYSE was found in 1872 by 24 New York stockbrokers. Brokers and traders had signed documents under plane - tree and their contract were called the Buttonwood Agreement [Internet 7].

Table 2. World Stock Exchange Ranking (capitalization in billions US$)

	Big 10 (2006) and WSE		Changes of capitalization in per cent (2006 to 2005)
1	**NYSE Group**	**15421,2**	**13,1**
2	Tokyo Stock Exchange	4614,1	1,9
3	Nasdaq Stock Market	3865,0	7,2
4	London Stock Exchange	3794,3	8,8
5	Euronext	3708,2	22,5
6	Hong Kong Exchanges	1715,0	63,1
7	TSX Group	1700,7	14,3
8	Deutsche Bőrse	1637,6	20,0
9	BME Spanish Exchanges	1322,9	23,3
10	SWX Swiss Exchange	1212,3	20,0
34	**Warsaw Stock Exchange**	**148,8**	**41,7**

Source: my own elaboration based under [Internet 11].

NYSE exists without break from over 135 years and accumulates over 80 per cent shares turnover in USA . Of course many other valuable papers are noted on NYSE, for example: bonds (private and treasury), shares, bills, currencies. There are over 2700 companies shares quoted on NYSE and now is going to be much more because of agreement with Euronext, (in 2007). The fusion brought to begin the largest market of quotations in world [Internet 2]. The following table 2 shows the ranking of world stock exchange markets (yet before fusion NYSE and Euronext) under in relation to degree of capitalization and degree of changes.

Is this possible to compare two stock exchange markets, so different under relation to turnovers and quantity of quoted valuable papers? What is the similarity and visible differences in both these markets (Warsaw and New York)?

4. Structures' similarity analysis

Comparing two markets with diametrically different scale of activity can call some difficulties connected with methodology. It is important to make our calculations for the same sections of time (necessary condition). The following table 3 shows the value of two economic variables (average number and value of transactions per stock exchange daily session).

NYSE and WSE are such different like David and Goliath indeed. The scale of investments activity is of course different in these markets but economics sciences have various mathematic methods to make right comparisons. The coefficient of changeability shows that number of transactions per 1 session is different between NYSE (about 1,10) and WSE (0,91). What does it say? The changeability of transactions number in NYSE in comparison of WSE is probably similar and we can consider why (maybe we can observe the same sort of investors behavior on two markets in the same time). Of course I can also calculate the coefficient of correlation between the economic variables; result: 0,832. The result can indicate that correlation between transactions number is significant and I concern that general dynamic of the processes in two stock exchange markets are very similar.

Next economic variable: value of transactions in NYSE value of transactions coefficient of changeability results 0,589 and the same coefficient in WSE results 1,208. That means Polish stock exchange market characterizes rather unstable value in comparison to NYSE. The reason can be involved with Polish market immaturity (many new corporations are found in privatization process and sell their shares in WSE). Very curious method to make structures' similarity analysis is coefficient of structures' similarity. Economic mathematicians have special formula for the method:

$$\omega_p = \sum_{i=1}^{k} \min(\omega_{1i}, \omega_{2i}) \ \ \text{dla } \omega \in (0, 1].$$

Table 3. Average (annual) number and value of transactions per stock exchange market daily session

Year	New York Stock Exchange		Warsaw Stock Exchange	
	number of transactions per 1 session	value of transactions [mln US$ per year]	number of transactions per 1 session	value of transactions [mln US$ per year]
1991	107139	1520164,00	877	22,19
1992	120142	1745466,40	1233	128,91
1993	183525	2274447,10	10175	3687,22
1994	194853	2454241,60	25352	9609,39
1995	232388	3082916,10	7730	5379,25
1996	295855	4063654,60	9025	9848,37
1997	405337	5777601,50	14048	13546,33
1998	539046	7317948,50	14365	15207,48
1999	671307	8945205,00	17417	17074,71
2000	800392	11060046,00	14919	25018,83
2001	1324628	10489322,50	12512	15189,02
2002	2147859	10311155,70	11358	12433,31
2003	2868067	9692316,20	12228	17763,13
2004	1747593	11657729,54	15464	36709,14
2005	2334453	14525266,07	19275	53783,15
2006	3410748	17140578,29	43791	110046,73
2007*	5859400	10282964,42	66294	85766,91
Standard deviation	1516004,747	4590999	15853,99	30652,71
Average	1367219,529	7784766	17415,47	25365,53
Coefficient of changeability	1,10882321	0,589741	0,910339	1,208439

* Apply to the end of June 2007.

Source: my own elaboration based under: [Internet 10; 9; 6].

When ω_p is closer to 1 then structures of studied population are more similar [Ostasiewicz, Rusnak, Siedlecka 2006, p. 34]. Tables 4 and 5 have resulted of structures' similarity measurements for New York Stock Exchange and Warsaw Stock Exchange according to our two criterions (average number of transactions and value of transactions per session per year).

The coefficient of structure similarity for average number of transactions (per session per year) results 0,76 (table 4). The high value of structures' (0,76) and correlation coefficient (0,83) means that it can observe high correlation between two exchange markets (NYSE and WSE) under in relation to number of transactions. The fact of similarity according to time period is very significant for example: it

Table 4. The coefficients of structure (average number of transactions per session per year)

Year	The coefficients of structure		Minimum
xi	w_{1i} NYSE	w_{2i} GPW	(w_{1i}, w_{2i})
1991	0,00	0,00	0,00
1992	0,01	0,00	0,00
1993	0,01	0,03	0,01
1994	0,01	0,09	0,01
1995	0,01	0,03	0,01
1996	0,01	0,03	0,01
1997	0,02	0,05	0,02
1998	0,02	0,05	0,02
1999	0,03	0,06	0,03
2000	0,03	0,05	0,03
2001	0,06	0,04	0,04
2002	0,09	0,04	0,04
2003	0,12	0,04	0,04
2004	0,08	0,05	0,05
2005	0,10	0,07	0,07
2006	0,15	0,15	0,15
2007	0,25	0,22	0,22
$\sum$	1,00	1,00	**0,76**

Source: my own calculations based on statistic data from both NYSE and WSE Stock Exchanges [Internet 10; 9; 6].

Table 5. The coefficients of structure (average value of transactions per session per year)

Year	The coefficients of structure		Minimum
xi	w_{1i} NYSE	w_{2i} GPW	(w_{1i}, w_{2i})
1991	0,01	0,00	0,00
1992	0,01	0,00	0,00
1993	0,02	0,01	0,01
1994	0,02	0,02	0,02
1995	0,02	0,01	0,01
1996	0,03	0,02	0,02
1997	0,04	0,03	0,03
1998	0,06	0,04	0,04
1999	0,07	0,04	0,04
2000	0,08	0,06	0,06
2001	0,08	0,04	0,04
2002	0,08	0,03	0,03
2003	0,07	0,04	0,04
2004	0,09	0,09	0,09
2005	0,11	0,12	0,11
2006	0,13	0,26	0,13
2007	0,08	0,20	0,08
$\sum$	1,00	1,00	**0,73**

Source: my own calculations based on statistic data from both NYSE and WSE Stock Exchanges [Internet 10; 9; 6].

can be observed that largest growth of average transactions' number per session per year (NYSE and WSE) was in year 2006 and 2007 (from January to June). It can be suggested that two markets are growing in similar style and maybe have similar dynamic progress. The coefficient of structure similarity for average value of transaction per session per year (table 5) results 0,73. It can be observed for both stock exchanges relating essential similarity also especially from 1994 to 1997 year and also from 2004 to 2005 year (the values in columns are same or almost the same).

5. Conclusions

The origin of capital markets is always involved with system of free market rules. Existing of real free market is frequently depended on convergence. The convergence (according to W. Kopaliński) is the similarity of organisms from different

systematic groups or the similarity of cultural products, formed independently from different nations [Kopaliński 1999, p. 277] . The convergence process is also the fact in world of finances: convergence as a process of progressing similarity. The similarity can rely on process of dynamic processes homology for example almost the same share of transactions value and their quantity per session yearly (look at table 4 and 5). Other statistic variables like for example: coefficient of changeability for average transactions number indicates that changeability of transactions quantity is little bigger on NYSE than on WSE (1,10 vs. 0,91). The reasons of this can be for example: NYSE is much more liquid market than WSE and there is much more capital movements than on WSE (table 3). But the convergence can follow as a penetration rule. Money from NYSE can easy flow to Warsaw and from Warsaw because we (as a country) have free flow of capital rules. Without free flow of capital rules the convergence process could be much more difficult.

Different but important problem applies to value of capital invested on WSE market by foreign investors. Foreign investors participation is contained in compartment <0,38891; 0,6949> for years 1997 to 2006. It indicates for vast interesting of foreign capital (the most often American). The growing flow of foreign capital on Polish stock exchange market makes situation that Polish market is more sensitive on situation in America and the convergence process between two markets go on. In 2000 year when economic situation for branch of Intelligence Technologies branch in USA was collapsed the same trend was transferred to Poland and all other European stock exchanges. Fall in New York called out negative influence on markets of countries in transformation (such how Poland). We can in such situation tell about negative influence of process of convergence on Polish market.

Other aspect of convergence applies to legal form of stock exchanges functioning. Warsaw Stock Exchange market was found under Paris Stock Exchange market law but other practice (like for example the code of good practice) is connected to New York Stock Exchange rules. In my opinion that is very good for WSE because it accelerates so called process of good convergence, many investors can make better decisions and earn bigger money with lower risk.

Recapitulating, present economy what is based on knowledge and information more and more economic convergence and similarity is the fact. Investors can observe deep dependence between markets as (for example) time and kind of reaction for economic and political accidents. Of course free capital flow and more and more larger access to modern sources of information cause that financial investments much easier than earlier in the past. Growing volume and value of transactions indicate that investments are more and more popular and good for investors. Many of them are big retirement investments found what are diversify their investment portfolio in the aim to generate up their profits. We as a future retired employee should be careful of because we are not sure how convergence process will be seen in the future.

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FINANSOWA KONWERGENCJA GIEŁDY PAPIERÓW WARTOŚCIOWYCH W WARSZAWIE I GIEŁDY PAPIERÓW WARTOŚCIOWYCH W NOWYM JORKU W ERZE INFORMACYJNEJ REWOLUCJI

Streszczenie

Rynki kapitałowe mają ogromne znaczenie zarówno dla firm, które pozyskują na nich środki finansowe, jak i dla państw, których system polityczno-ekonomiczny oparty jest na dominującej roli

własności prywatnej oraz na regułach wolnorynkowych. Era rewolucji informacyjnej zapoczątkowana w połowie XX w. stworzyła nowe narzędzia, które oddziałują na światową ekonomię w sposób pośredni i bezpośredni. W artykule autor udowadnia, iż rozwój społeczeństwa informacyjnego spowodował zmiany w funkcjonowaniu rynków finansowych, które z punktu widzenia inwestora mogą mieć charakter zarówno pozytywny, jak i negatywny. Podstawowe pytania stawiane w tekście dotyczą problemów związanych z konwergencją lokalnych rynków kapitałowych (tego, czy w ogóle ona istnieje).

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