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2008-2009 and the Fortune Global 500 corporations – Looking for  
losers among the biggest – Exploratory study

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2008-2009 and the Fortune Global 500 corporations – Looking for  
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**Keywords:** financial crisis, economic downturn, corporations

**JEL: F23**

**Abstract**

The paper focuses on the influence of the financial crisis and economic downturn during years 2008-2009 on the world's 500 biggest corporations. The empirical data gathered from the Fortune Global 500 reports during years 2007-2010 are used in cluster analysis and descriptive statistics. The empirical research conducted by the authors allows to indicate that among the analyzed population exist significant differences in terms of their financial performance measured as return on revenues, return on assets and profit per employee. The discrepancies in this area grew during the crisis period. The reaction to the crisis among analyzed population in the first year of the crisis (which was characterized with a high level of

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uncertainty among enterprises), was different than in the next year (when the estimation of the risk associated with ongoing activities was easier). Among the companies that were most severely influenced by the crisis (their financial performance worsen the most) dominate companies operating in Airlines, Diversified Financials and Motor Vehicles and Parts industries.

The paper has been divided into five sections. Section 1 is devoted to a brief presentation of definitions and concepts of financial and economic crisis. Section 2 is focused on the methodology of the study. Section 3 is devoted to the assessment of the overall situation of the biggest global corporations in the period of the global financial and economic crisis. Section 4 presents the results of cluster analysis used to segment the biggest global corporations according to their performance and section 5 closes the paper with final remarks.

## **1. Introduction**

According to the literature, the financial crisis is a disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities (Mishkin 1992). The economic crisis in the simplest terms is a sharp drop in economic activity (production, employment, investment) (PWN 2010). The consequences of the contemporary financial crisis and economic downturn appeared in the global economy in a scale and scope not seen since the late 30s of the twentieth century.

The recent financial crisis and its consequences have become a topic of studies for many researchers. It has been analyzed among others from the perspective of its causes (i.e.: Purnanandam 2009; Allen, Carletti 2010; Merrouche, Nier 2010; Ngowi 2010), its influence on economies or industries (i.e.: Meyn, Kennan 2009; Brown, Lax, Petersen 2010, Kapuścińska-Przybylska 2011) or its implications (UNCTAD 2009a; Claessens, Dell’Ariccia, Igan, Laeven 2010).

From the microeconomic perspective the financial crisis and economic downturn can cause a decrease in generated revenues, a loss of market share and a general deterioration of profitability (Claessens, Kose, Terrones 2010). The extent of the negative impact of the financial and economic crisis was differentiated depending on the market (in a geographical and industry sense) in which particular companies were operating. However, the empirical research suggests, that the industries that were most severely influenced by the financial crisis and economic downturn were to a higher extent involved in international operations with a widely developed production network (OECD 2010, pp. 34).

The financial and economic crisis undoubtedly induced changes in the demand of corporations' customers and actions taken by the multinationals. It has found its results in actions taken by corporations. It is assumed that these actions can be observed by some of their operational data - the amount of generated revenues and profits, value of gathered assets and number of employed people. In the year 2009 in the global market operated ca. 82,000 of transnational corporations, that possessed about 810,000 of foreign subsidiaries. At the same time it is estimated, that the number of their employees in the year 2008 amounted to 77 Million (UNCTAD 2010, pp. 17). According to the data provided in the Fortune Global 500 report (Fortune 2009) the 500 of the biggest world corporation in 2008 employed ca. 56.43 Million of people, which at that time constituted around 73.29% of the transnational corporations workforce. Although, it is almost impossible to gather data concerning all the world's transnational corporations, it is possible and at the same time it seems interesting to observe the reaction of the world's biggest corporations to the financial and economic crisis during years 2008-2009. The observation of the impact of the financial and economic crisis on those enterprises is even more interesting when taking into consideration that those 500 firms, which constituted only around 6.0% of the total number of the world's transnational

corporations in 2009, was responsible for ca. 73% of the world's transnational corporations total employment.

The main research question of the study was whether within the world's 500 biggest<sup>1</sup> corporation there was a group of organizations which suffered<sup>2</sup> the most because of the global financial crisis and economic downturn. Furthermore, the authors wanted to indicate what was the industrial background of those corporations and what was their country of origin. To explore the issue authors used cluster analysis and descriptive statistics.

## **2. Methodology**

The herewith paper concentrate on qualitative research concerning the influence of the global financial crisis and economic downturn during years 2008-2009 and corporations. The study focuses on the 500 world's biggest corporations included in the Fortune Global 500 reports during years 2007-2010. During those 4 years the ranking included 622 different corporations. For each year 10 variables concerning particular company were collected, on the basis of which 3 additional variables were calculated. All together, in each year 6,500 variables were collected, which allowed to gather almost 26,000<sup>3</sup> variables in the database.

The span of time taken under investigation covers 4 years since achieving the mentioned before aim of the paper required a comparison between the pre-crisis and the crisis periods. The authors assumed that data concerning years 2006 and 2007 (derived from reports from the years 2007-2008) picture the situation of the analyzed population during the pre-crisis years, while the data concerning years 2008 and 2009 illustrate the crisis years.

As it was mentioned in the introduction the economic crisis in the simplest terms is a sharp drop in economic activity. The global financial crisis and economic downturn during years 2008-2009 undoubtedly induced changes i.e. in the demand of corporations' customers,

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<sup>1</sup> The companies are ranked by total revenues for their respective fiscal years.

<sup>2</sup> By suffered the authors understood a worsening of financial performance.

<sup>3</sup> In the year 2010 4 variables concerning General Motors were not available.

price<sup>4</sup> and available amount of money, etc. This has found its results in actions taken by the corporations. It is assumed that these actions can be observed by some of their operational data – i.e. the amount of generated revenues and profits, value of gathered assets and number of employed people.

In the herewith paper the influence of the financial and economic crisis during years 2008-2009 on the world's 500 biggest corporations was analyzed by taking 3 different perspectives. First, the overall situation was assessed with taking into considerations such factors as generated revenues, profits, assets, employment, changes of the CEO position, industry and country of origin of all analyzed corporations during years 2006-2009. In this part of the paper the authors used descriptive statistic as a main tool to summarize the data set gathered in the study. The main focus was put on year to year changes and their dynamics. The information gathered in this part of the study formed the basis of further quantitative analysis.

In the next part of the analysis the researchers focused on the perspective of industry and country of origin of the analyzed corporations. The authors used cluster analysis to identify industries and countries that were most severely<sup>5</sup> influenced by the crisis and those which were relatively better off. Cluster analysis classifies a sample of objects on the basis of a set of measured variables into a number of different groups such that similar subjects are placed in the same group (Everitt 1993). Since cluster analysis has no mechanism for differentiating between relevant and irrelevant variables the choice of variables included in a cluster analysis was underpinned by conceptual considerations. In the study the authors decided to use relative operational data concerning financial performance – return on revenues, return on assets and profit per employee. The choice of variables for this analysis was purposeful. The applied set of variables allowed to take into consideration 4 different nominal operational factors for each

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<sup>4</sup> Interest rates.

<sup>5</sup> Taking into consideration a particular set of criteria and analyzed companies.

company (revenues, profits, assets and employment), while highlighting the significance of profits as a background to comparison of financial performance. It was assumed that usage of the nominal factors of enterprises (simple revenues, profits, assets and employment) for this analysis would in a lesser extent allow to picture differences and similarities in the actual performance of the analyzed population. The conducted variance analysis showed that each of the applied variables differentiated the analyzed population in a statistically significant way. To generate a number of clusters the Ward's minimum variance technique was applied. The Ward method was chosen for the research since it aims at minimizing the loss of information, or the loss of homogeneity, that occurs by merging clusters. To answer the research questions the received results were supported with descriptive statistics.

### **3. The global financial and economic crisis and the Fortune Global 500 corporations – assessment of the overall situation**

The Table 1 presents data concerning revenues, profits, assets and employees of the 500 biggest global corporations for the years 2006-2009. According to the presented data in the year 2006 (assumed as a pre-crisis year) the analyzed companies generated revenues of over USD 20.90 Trillion, and in the year 2007 USD 21.40 Trillion (the year to year growth amounted to 2.4%). In the same period the total generated profits amounted to, respectively, USD 1.53 Trillion and USD 1.50 Trillion, which allowed to gain margin of profits at the level of 7.33% and 6.71%. In the year 2008 (assumed as a year when the crisis appeared) the analyzed enterprises booked a further increase of the revenues (increase by 7.69% comparing to the year 2007, and by 10.29% when comparing to the year 2006). However, at the same time there was a severe decrease in the level of generated profits (48.13% when compared to the year 2007, and 46.40% comparing to the year 2006). The return on revenue rate amounted to 3.26%, which constituted a decrease by 51.42% comparing to the year 2007. Additionally, there was a significant increase in the number of corporations that generated negative profits

(the increase amounted to 316.00% comparing to the year 2007 and to 511.76% when comparing to the year 2006), while the average losses for corporations generating negative profits decreased only by 11% comparing to the previous year. At the same time the average gains for enterprises generating positive profits decreased by 10.49% comparing to the year 2007. The value of assets of analyzed corporations in 2008 decreased by 5.22% comparing to the previous year, while the employment of those firms increased by 5.80%. Surprisingly, the increase in employment between years 2007 and 2008 was higher than in years 2006-2007 when it amounted to 2.60%. Nevertheless, as a result of the described above changes all the average relative factors (return on revenue, return on assets, profit per employee) deteriorated. The strength of negative changes was the highest for return on revenues (the decrease amounted to 51.42%), then profit per employee (-50.97%) and return on assets (-45.69%).

**Table 1**

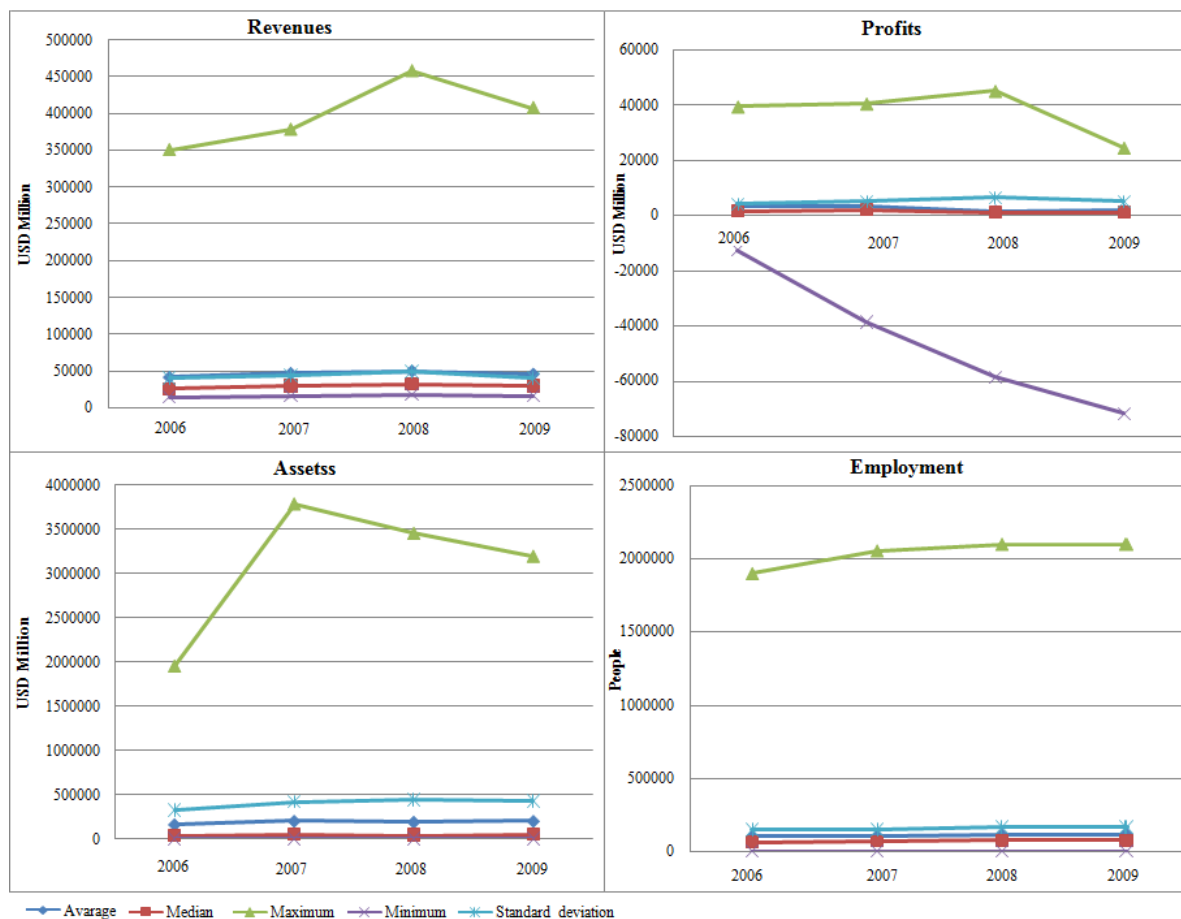
The overall characteristic of the population – years 2006-2009.

	2006	2007	2008	2009
<b>Total revenue (Million \$)</b>	20900340.7	23618475.1	25175468.5	23085071.2
<b>Total profits (Million USD)</b>	1533039.1	1584071.4	821710.4	960457.9
<b>Return on revenue</b>	7.33%	6.71%	3.26%	4.16%
<b>Total Assets (Million USD)</b>	85403841.6	105039372.0	99556218.0	104730119.8
<b>Return on assets</b>	1.79%	1.51%	0.82%	0.92%
<b>Total Employment</b>	52074639	53429807	56529818	57733125
<b>Profit per employee</b>	29439.26	29647.71	14535.86	16636.17
<b>Average revenue for all enterprises (Million USD)</b>	41800.68	42808.79	46102.63	41767.58
<b>Average profits for all enterprises (Million USD)</b>	3058.48	2993.64	1336.09	1749.85
<b>Number of enterprises generating negative profits</b>	17	25	104	72
<b>Average losses for enterprises generating negative profits (Million USD)</b>	-2610.62	-4905.56	-4344.86	-2923.60
<b>Number of enterprises generating positive profits</b>	483	475	396	423*
<b>Average gains for enterprises generating positive profits (Million USD)</b>	3265.88	3593.07	3216.10	2768.22
<b>Average Assets for all enterprises (Million USD)</b>	170807.68	210078.74	199112.44	209460.24
<b>Average Employment for all enterprises</b>	104149	106860	113060	115466

\*The 2010 report does not provide data concerning profits generated by General Motors.

Source: Own calculations based on data derived from Fortune Global 500 reports 2007-2010 (Fortune Magazine 2007, 2008, 2009, 2010).

In the year 2009 the total generated revenues decreased by 8.30% comparing to the previous year and amounted to USD 23.08 Trillion (a value similar to the amount generated in the year 2007). However, the total profit booked by the analyzed corporations amounted to USD 0.96 Trillion, which constituted an increase by 17.07% comparing to the previous year. Moreover, comparing to the year 2008 the number of enterprises that generated negative profits decreased and amounted to 72 enterprises (decrease by 30.77%). Additionally, the average losses for enterprises generating negative profits decreased in the mentioned period by 32.71%. However, the average gains for corporations generating positive profits decreased by 13.93%. In the year 2009 comparing to the previous year, the total assets' value of analyzed corporations increased by 5.20%, up to USD 104.73 Trillion (a value similar to amount gathered in the year 2007) and the employment increased by 2.13%. As a result of those changes all the mentioned before average relative factors improved. The strength of positive changes was again the highest in case of return on revenues (the increase amounted to 27.61%), then profit per employee (14.45%) and return on assets (12.19%).



**Fig.1.** The overall characteristic of the population – years 2006-2009.

Source: Own calculations based on data gathered from Fortune Global 500 reports

2007-2010 (Fortune 2007, 2008, 2009, 2010).

In case of revenues and profits generated by the analyzed corporations during years 2006-2009 a strong negative influence of the financial crisis and economic downturn is visible. However, it induced a slightly different reaction among analyzed population in the first year of the crisis (the year 2008), that was characterized with a high level of uncertainty among enterprises, than in the next year, when the estimation of the risk associated with ongoing activities was easier. In the year 2008 an increase in generated revenues was accompanied with a strong decrease in profits and a significant increase in the number of enterprises generating losses. In the next year the value of the booked revenues decreased, but at the same

time, profitability of analyzed population improved, while the number of corporations generating losses decreased.

As a consequence of the financial crisis the investment activity of the corporations was limited<sup>6</sup>. Therefore, many investments were canceled or suspended, and in some cases de-investments were made. According to the results of research conducted by UNCTAD (2009b) in the year 2008 85% of the world's transnational corporations decided to limit their level of investment. 79% indicated the global financial crisis as a direct reason. However, despite the limitation of investment activities in a short period, the corporations anticipated increase in their operations in a medium period (UNCTAD 2009b). This trends were reflected in the value of assets remaining under control of the world's biggest 500 corporations during years 2008-2009.

In case of information concerning changes of CEOs the analysis had to be conducted before aggregation of data. This meant that the data could be used only if the company was taken into consideration at least in two Fortune Global 500 reports during years 2007-2010. During the whole analyzed period in a particular enterprise not more than 3 changes of a CEO could be observed. In the first year in which the observation was possible (the year 2007) the analysis concerned 461 enterprises<sup>7</sup>. There were 72 changes of CEOs in this population. In the next year (2008) the analyzed population consisted of 414 corporations<sup>8</sup>, of which 79 changed their CEOs when comparing to the previous year. In the year 2009 only 378 companies could be observed and there were 69 changes of CEOs among them. In the analyzed population there was only one company in which 3 changes of CEOs were observed – these changes concerned only 2 people, who were exchanging each other on the CEO position year by year. In 177 corporations that were included in the report during years 2006-2009 CEOs were not

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<sup>6</sup> This was caused by difficulties in receiving loans, lower level of earnings, global economic downturn and related to them production overcapacity, as well as an increase in risk aversion.

<sup>7</sup> These companies were included in the Fortune Global 500 report from the year 2007 and from the year 2008.

<sup>8</sup> This means that in the Fortune Global 500 report in the year 2009 86 companies, that were included in the reports during years 2007 and 2008, were not present.

changed at all. At least 2 changes of the CEOs took place in 18 firms, and 1 change happened in 181 companies. All together, in the analyzed period, 200 corporations at least once changed their CEOs. Since in each year of the analysis the population had different size, it is important to notice that the changes concerned, respectively, 15.62%, 19.08% and 18.25% of analyzed populations. During such a short period it is very difficult to assess which of those changes were the consequences of natural succession processes and which were caused by perturbation related to the financial and economic crisis. Nevertheless, in the year 2008 the % of the concerned population increased by almost 4%.

From the national perspective, during the crisis period the number of corporations included in the report decreased in case of the USA (Appendix A). In the year 2007 the Fortune Global 500 report included 161 enterprises from the USA, a year later 152, and during years 2009-2010 only 140. During the years 2009-2010 also decreased the number of corporations included in the reports coming from Finland, Mexico, South Korea, Spain and Sweden. In cases of Australia, Germany and France in the year 2009 the number of enterprises included in the ranking increased, however, in 2010 it came back to the level from the year 2008<sup>9</sup>. A somehow reverse situation took place in case of the British companies – in 2009 their number decreased from the level of 37 to 28, but in 2010 it grew back to 31 enterprises. The biggest improvement in the described area could be noticed in case of Chinese and Japanese firms. The number of Chinese enterprises was increasing during the whole analyzed period – in 2007 there were 24 of them, and then respectively 29, 37 and 46. The number of the companies from the latter country grew in 2009 up to 68 from 64 in the previous year, and up to 71 in the year 2010. A relatively low nominal increase in the described manner could be also noticed in cases of Austria, Brazil, India, Italy, Russia, Singapore and Taiwan.

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<sup>9</sup> The situation may be related to currency exchange rate fluctuations and the way of calculation of revenues in the reports.

When taking the perspective of industry, the number of companies decreased the most in cases of corporations operating in Airlines, Banking, Motor vehicles and Parts and Trading industries (see Appendix B). The numbers of corporations included in the reports and operating in Airlines, Motor vehicles and Parts and Trading industries during years 2007-2008 amounted to, respectively, 7, 33 and 10. However, they decreased in 2009 and 2010, eventually achieving the level of, respectively, 4, 29 and 8. The number of corporations operating in the Banking industry included in the Fortune Global 500 report in the year 2007 amounted to 60. A year later it increased to 67, however in the year 2009 it went back to 62, and next year to 61 corporations. In the year 2010 also decreased the numbers of corporations operating in Specialty Retailers and Shipping industries.

In cases of Building materials, Glass; Metals and Mining, Crude-oil production industries in the year 2009 the number of enterprises included in the ranking increased, however, in 2010 it came back closely to or even below the level from the year 2008. It is worth highlighting that those industries seem vulnerable to demand shocks related to economic downturn. A somehow reverse situation took place in case of the companies operating in the Computer Services and Software; Computers, Office Equipment; Diversified Financials; Electronics, Electrical Equipment; General Merchandisers; Insurance: Life, Health (stock); Insurance: Property and Casualty (stock) industries – in 2009 their number decreased, but in 2010 it grew back to or above the level from the year 2008.

An increase in the number of corporations included in the reports could also be noticed in case of the following industries: Energy; Engineering, Construction; Aerospace and Defense; Food Production; Health Care: Pharmacy and Other Services; Insurance: Life, Health (mutual); Insurance: Property and Casualty (mutual); Petroleum Refining; Tobacco; Wholesalers: Health Care.

The presented above data do not allow to reject the assumption that the strength of influence of the global financial crisis and economic downturn on the situation of analyzed corporations was differentiated, among others, on the basis of industry and country of origin.

#### **4. The global financial and economic crisis and the Fortune Global 500 corporations – assessment of the situation from the perspective of clusters**

##### *4.1. Cluster analysis – an attempt to segment the biggest global corporations according to their performance*

As mentioned in section 2 the cluster analysis was conducted according to the Ward's minimum variance technique. The analysis was conducted for the years 2006 and 2009. The Ward's method provided us with the dendrograms which present the number of clusters (Figure 2 and Figure 3). The authors tried to identify segments of companies similar in terms of their financial performance measured by the return on revenue, return on assets and profit on employee.

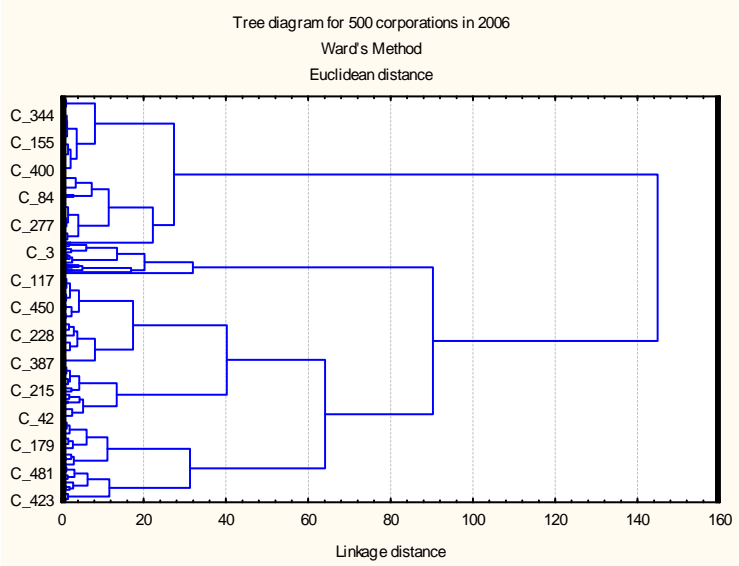
For both years the starting point of the analysis was a pre-computed distance matrix of all observations. Distance measures (inverse similarities) between objects<sup>10</sup> were adopted as the basis for the determination of these matrixes. The researchers used a hierarchical clustering which created a hierarchy of clusters for years 2006 and 2009. The applied algorithms for hierarchical clustering were agglomerative. Initially, the number of clusters equaled the number of corporations in the sample with each individual company forming one group. On their basis the smallest distance between particular units participating in the study was determined. Then the smallest values in the distance matrixes were chosen for, respectively, the year 2006 and 2009. In a next step, the Ward algorithm combined those two enterprises which were most similar to each other. Next, a distance for reduction of set of units was determined. The previously created clusters were combined into newly created

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<sup>10</sup> Distance is a measure of how far apart two objects are, while similarity measures how similar two objects are. For units that are alike, distance measures are small and similarity measures are large.

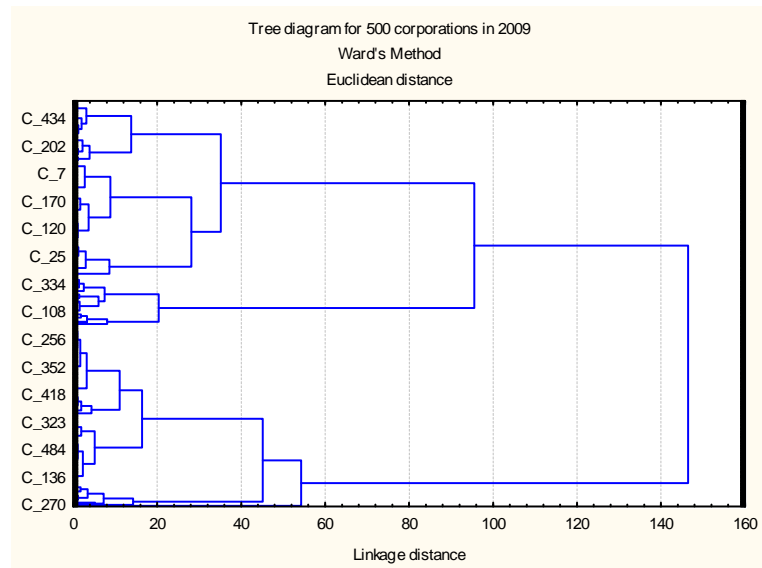
clusters. The described steps were repeated until all of the analyzed companies were combined in a 500-elemental clusters respectively for the year 2006 and 2009. At the end, after a series of successive mergers and a loss in homogeneity, all clusters were fused and all corporations belonged to one single cluster. On the basis of data for the year 2006 5 clusters were identified, and for the year 2009 8 clusters. However in case of the year 2009 one cluster included only Fannie Mae – a US corporation operating in the Diversified Financials market.

The created hierarchy of clusters are presented as dendrograms in the Figure 2 and Figure 3. The Figures represent a horizontal tree structures with single corporations as leaves, the final single cluster as the trunk, and the intermediate clusters as branches. The dendrogram for both years allowed to determine the Euclidean distances between the analyzed units.



**Fig. 2.** Hierarchical tree for the year 2006.

Source: Own study.



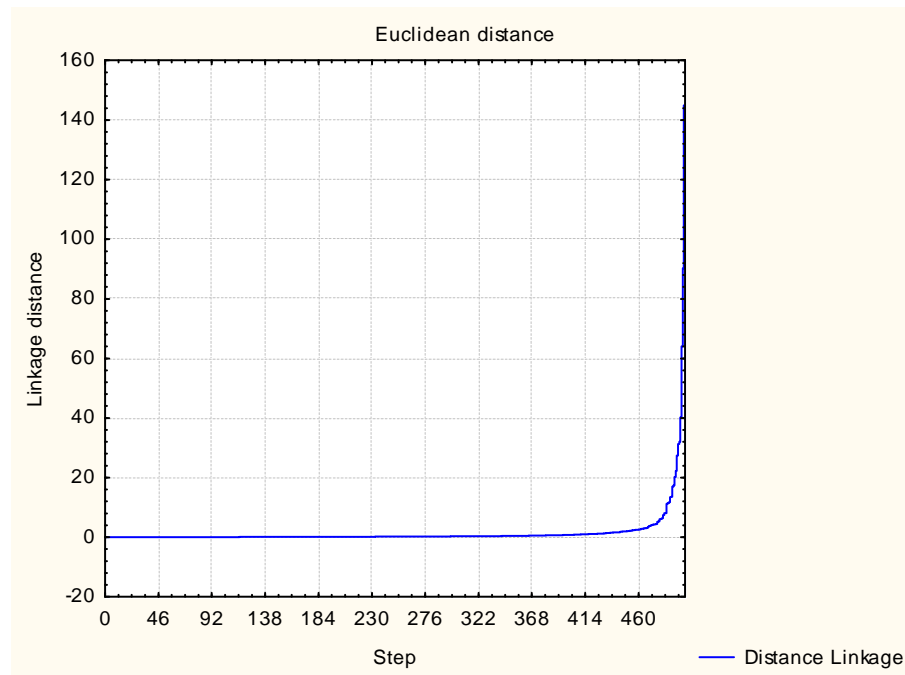
**Fig. 3.** Hierarchical tree for the year 2009.

Source: Own study.

As described before, the dendrograms were created with usage of Ward's method which joined corporations into clusters such that the variance concerning applied variables within a cluster was minimized. Each branch in the dendrogram represents a cluster, and the branches merge at nodes (linkages). The position of the linkage on the x-axis indicates at which distance level the mergers occurred. Distance is a measure of how far apart two clusters are.

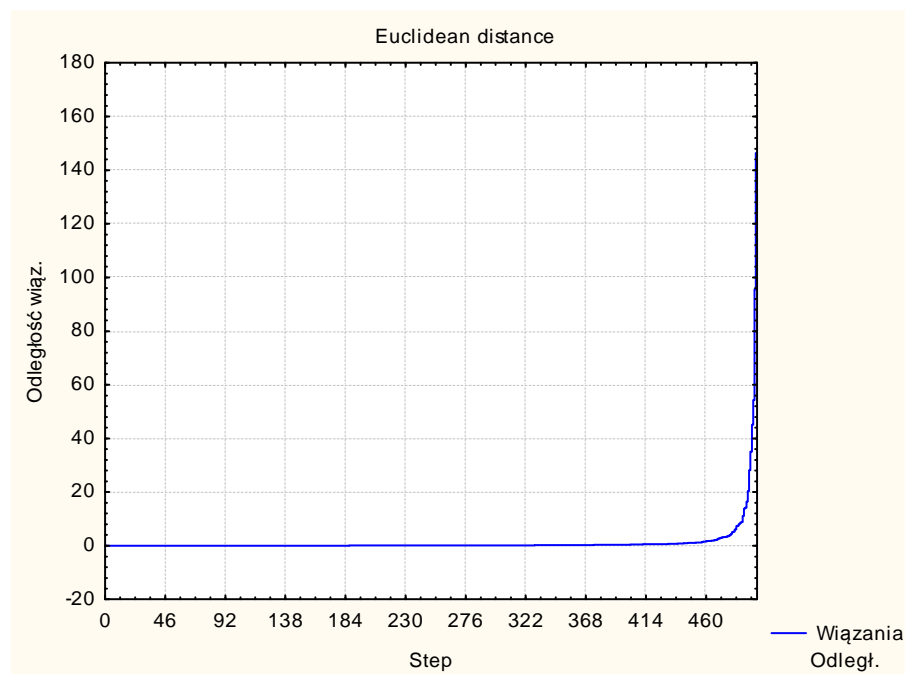
The applied so far methodology did not prescribe any particular number of clusters. To determine the appropriate number of clusters the researchers examined the fusion curves during the clustering processes. The received fusion curves are pictured in Figure 4 and Figure 5. The fusion curve gradually increases as clusters are merged. An appropriate linkage distance to be applied is the one showed just before a sudden upward jump occurs in the curve, illustrating a relatively high loss in homogeneity. The distances that were observed between analyzed corporations showed that the border value of those distances (the level at which the further merger of clusters should be withhold) for the year 2006 amounted to 34, while in the year 2009 amounted to 20. Above these values the distance between units was significant. At those levels the cluster extraction process was withhold. Above the mentioned

points the additional increase of the information (as a result of further clustering process) was little.



**Fig. 4.** The linkage distance of the clustering process (fusion curve) – the year 2006.

Source: Own study.



**Fig. 5.** The linkage distance of the clustering process (fusion curve) – the year 2009.

Source: Own study.

In order to check the differences between the variables in relation to the generated clusters the F test was applied. The F-values indicate whether the level of dispersion of a particular variable within one group is greater or smaller than in the underlying data sample<sup>11</sup>. It allowed to illustrate how strongly or weakly the particular variables differentiated particular clusters at the appropriate significance level  $p=0.05$  (see Table 2 and Table 3). According to the analysis of variance presented in Table 2 and Table 3 there are statistically significant differences among the identified clusters. The three financial variables differentiate the 5 clusters identified for the year 2006 as well as 8 clusters identified for the year 2009.

**Table 2**

Analysis of variance – the year 2006.

Specification	Between Clusters	df	Within Clusters	df <sup>12</sup>	F Test	Significance level
Return on revenues	1.25E+00	4	3.11E-01	495	69.6851	0.00
Return on assets	7.77E-01	4	1.94E-01	495	74.8590	0.00
Profit on employee	2.81E+12	4	7.03E+11	495	224.3503	0.00

Source: Own study.

**Table 3**

Analysis of variance – the year 2009.

Specification	Between clusters	df	Within clusters	df <sup>13</sup>	F Test	Significance level
Return on revenues	8.34E+00	7	1.22E+00	491	477.8307	0.000
Return on assets	8.64E-01	7	1.15E-01	491	526.6350	0.000
Profit on employee	1.46E+14	7	1.67E+13	491	613.8565	0.000

Source: Own study.

The conducted analysis of variance showed that each of applied variables differentiated the analyzed population in a statically significant way. The significance level and F-Values of

<sup>11</sup> If  $F > 1$  ( $F < 1$ ), then the group variance of variable is greater (smaller) than in the underlying entire data sample.

<sup>12</sup> The number 495 results from subtracting the number of clusters on the number of survey units for which complete data existed or  $500-5 = 495$ .

<sup>13</sup> The number 491 results from subtracting the number of clusters on the number of survey units for which complete data existed or  $499-8 = 491$  / As noted deficiencies of data related to General Motors.

all used variables were high for both years under investigation. In both years profit per employee most strongly differentiated particular clusters (F-Value in the year 2006 amounted to 224.3503 while in 2009 amounted to 613.8565). However, the F-Values for all applied variables are much lower for the year 2006 than for the year 2009.

The cluster analysis helped the authors to identify the losers in the years 2006 and 2009. Our question was whether there was a group of organizations which suffered the most because of the global financial crisis and economic downturn. What were the industrial backgrounds of those companies and what were their countries of origin? To explore the issues the authors used descriptive statistics.

#### *4.2. Inter-cluster analysis – identification of the losers' background*

The data obtained in the previous stage of the analysis and presented in section 4.1. were subjected to further treatment. The clusters received from the cluster analysis for the years 2006 and 2009 were evaluated on the basis of average values of the 3 relative operational data concerning financial performance – return on revenues, return on assets and profit per employee. Each of the clusters was given a qualitative evaluation. The evaluation was based on the comparison of average results between clusters created in the same year analysis. In case when at least 2 out of 3 variables that were taken into consideration were higher, the cluster received a better evaluation.

It is worth mentioning that the discrepancies between the average results of the identified clusters for the year 2006 were much smaller than in case of the year 2009. Additionally, in the year 2009 a higher number of clusters was generated. These can suggest that in the time of the crisis the discrepancies among the world's biggest corporations grew. As a consequence, the applied scale of cluster evaluation had to be wider in case of the year 2009 than in case of the year 2006. For the clusters from the year 2006 a 5-degree scale was created. The average results of those clusters were evaluated as: *Very bad, Bad, Medium, Good and Very good*. For

the clusters from the year 2009 an 8-degree scale was created. This scale included the scale applied for the year 2006, however, had 3 additional ratings. The average results of those clusters were evaluated as: *Outstandingly bad*, *Extremely bad*, *Very bad*, *Bad*, *Medium*, *Good*, *Very good* and *Extremely good*. The cluster evaluated as *Outstandingly bad* grouped only one US corporation operating in Diversified Financials market - Fannie Mae. The results of the evaluation process are presented in Table 4 and Table 5.

**Table 4**

Evaluation and average variable values for clusters generated for the year 2006.

	Cluster 1	Cluster 3	Cluster 5	Cluster 4	Cluster 2
<i>Evaluation</i>	<i>Very bad</i>	<i>Bad</i>	<i>Medium</i>	<i>Good</i>	<i>Very good</i>
<b>Return on revenues</b>	1.69%	7.48%	10.76%	13.01%	16.87%
<b>Return on assets</b>	2.01%	3.72%	10.19%	1.19%	12.83%
<b>Profit on employee</b>	9541.6	44257.8	52662.8	99596.5	304608.7
<i>Number of corporations in the cluster</i>	181	113	103	66	37

Source: Own study.

**Table 5**

Evaluation and average variable values for clusters generated for the year 2009.

	Cluster 8	Cluster 6	Cluster 7	Cluster 2	Cluster 1	Cluster 3	Cluster 4	Cluster 5
<i>Evaluation</i>	<i>Outstandingly bad</i>	<i>Extremely bad</i>	<i>Very bad</i>	<i>Bad</i>	<i>Medium</i>	<i>Good</i>	<i>Very good</i>	<i>Extremely good</i>
<b>Return on revenues</b>	-247.61%	-9.51%	0.63%	3.51%	7.53%	12.27%	11.78%	25.03%
<b>Return on assets</b>	-8.28%	-5.72%	0.46%	3.01%	5.59%	0.77%	9.66%	16.30%
<b>Profit on employee</b>	-11994833.3	-208449.0	10788.5	30074.7	52904.4	64387.1	67523.9	125634.5
<i>Number of corporations in the cluster</i>	1	26	197	100	74	42	44	15

Source: Own study.

The results of clusters from years 2006 and 2009, even when limited to clusters that were given the same qualitative evaluations during the assessment process, were worse in

case of the year 2009. Corporations grouped in the cluster evaluated as vary bad for the year 2006, generated higher average results than corporations grouped in this cluster for the year 2009. This means that the negative influence of the financial crisis and economic downturn was visible among all clusters, with one exception (cluster 5).

At this point of the analysis the clusters 8 and 6 from the year 2009 grouped corporations that were generating the lowest financial performance results among the analyzed population. Those groups did not have any counterparts in clusters generated in the year 2006 and they were indicated as most severely influenced by the crisis.

To point out the industries that had a high degree of presence in those clusters the authors compared the number of corporations operating in a particular industry in the clusters 8 and 6 with the total number of such corporations included in the report in the year 2010. The 27 corporations grouped in those clusters were operating in 15 different industries. However, only 3 industries were represented by more than 1 corporation, and at the same time they grouped more than 20% of the total representation of the industry. Therefore, they were indicated as industries most severely influenced by the crisis. These were: Airlines (75% of presence in clusters 7 and 8), Diversified Financials (33% of presence in clusters 7 and 8) and Motor vehicles and Parts (21% of presence in clusters 7 and 8).

The same procedure was implemented in case of the countries of origin. The corporations grouped in clusters 7 and 8 came from 9 different countries. Only 1 country was represented by more than 1 corporation, and at the same time it grouped more than 10% of the total representation of the country. 11% of the total number of the USA corporations included in the Fortune Global 500 report in 2010 were grouped in clusters 7 and 8. Therefore, the USA was indicated as a country of origin of corporations the most severely influenced by the crisis.

While looking closer at the industries identified as the most severely influenced by the crisis the authors found out that the reasons for their situations had quite different roots. In

case of Airline industry on average the revenues generated by companies included in the Fortune Global 500 report and operating in this industry grew in the year 2008 by 11.11% and in the year 2009 by 4.20%. At the same time the total number of corporations included in the reports decreased in the year 2008 from 7 to 6, and in the year 2009 to 4.

Strong negative influence on the profitability of companies from this industry had high level of oil prices, often wrong-way bets on the hedging of fuel purchases (<http://www.ft.com/cms/s/0/acace9ba-0e6e-11de-b099-0000779fd2ac.html#ixzz1RAT7xUx5>), adverse natural events (i.e. volcanic ash). However, experts note that the epicenter of the problem was the collapse in demand that resulted from the economic crisis - the financial crisis curbed passenger and cargo traffic (<http://www.wharton.universia.net/index.cfm?fa=viewArticle&id=1733&language=english>).

The situation was even worse than after the terrorist attacks of September 11, 2001. In the time of the economic downturn transferring of the additional cost to the final customers was difficult and sometimes impossible. Additionally a dramatic fall in demand could lead to a rise in unit costs that were not related to fuel, and which could not be cut proportionally (<http://www.wharton.universia.net/index.cfm?fa=viewArticle&id=1733&language=english>).

In 2008 and 2009 on average revenues of corporations (again included in the report) operating in the Diversified Financials industry, respectively, increased by 3.57% and decreased by 3.55%. The average profitability of the industry was decreasing during the whole analyzed period. In the year 2006 the average profit of a corporation operating in the industry and included in the report amounted to USD 6.11 Billion, while in the year 2009 it amounted to USD 13.21 Billion of losses. Bad results of the Diversified Financials industry are the consequences of the subprime products crisis and a direct result of the losses generated by Fannie Mae (over \$ 58.7 Billion in 2008 report and almost \$72 Billion in 2009 report) and Freddie Mac (over \$ 21.5 Billion in 2010 report).

In the case of the Motor Vehicles and Parts industry the low results were caused by long-term production overcapacity in developed countries and a global economic downturn. Not without significance was the situation of General Motors (the company booked over USD 38.7 Billion of losses in the year 2007 and USD 30.7 Billion of losses in the 2008). The fact that during the year 2008 and/or 2009 the leading car manufacturers<sup>14</sup>, regardless of their country of origin, generated losses confirms a difficult situation and turbulences occurring in the industry during the crisis.

## **5. Final remarks**

The presented research focused on the influence of the global financial crisis and economic downturn during years 2008-2009 on the world's biggest corporations. The main research question of the study was whether within the world's 500 biggest corporation there was a group of organizations which suffered<sup>15</sup> the most because of the global financial crisis and economic downturn. Furthermore, the authors wanted to indicate what was the industrial background of those corporations and what was their country of origin. To explore the issue the authors used cluster analysis and descriptive statistics.

The results of the cluster analysis presented in section 4 allow the authors to formulate some conclusions. The negative influence of the financial crisis and economic downturn during years 2008-2009 is visible among the world's 500 biggest corporations. In general it can be assumed that in the year 2009 analyzed corporations took actions aiming at adaptation to the conditions of crisis. The actions taken by the corporations improved their financial performance measured as return on revenues, return on assets and profits per employee. However, the mentioned reorganizations were not necessary related with

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<sup>14</sup> Among them were inter alia: General Motors, Toyota, Chrysler, Ford, Nissan, Peugeot, Fiat, Renault, Volvo, Mazda.

<sup>15</sup> By suffered the authors understood the worsening of financial performance.

employment downsizing, as the total employment of the analyzed population during years 2008-2009 increased.

Among the analyzed population exist significant differences in terms of their financial performance measured as return on revenues, return on assets and profit per employee. The discrepancies in this area grew during the crisis period. Among the companies that were most severely influenced by the crisis (their financial performance worsen the most) dominate companies operating in Airlines, Diversified Financials and Motor Vehicles and Parts industries. 40.74% of companies indicated as the most severely influenced by the crisis operated in those industries, the remaining 59.26% was dispersed in 12 different industries. At the same time, the country of origin of 55.56% of companies that were the most negatively influenced by the crisis was the USA.

An interesting enrichment of the presented above study would provide information concerning changes in the operations of analyzed companies in national and foreign markets. This would allow to take into consideration international and global actions coordination of those corporations. However, in the first half of the year 2011 this information was not available. The results from the presented analysis could also form a foundation for future research, that could identify and test clear hypotheses in the future.

### **Bibliography:**

- Allen, F., Carletti, E. (2010). The Global Financial Crisis: Causes and Consequences, *International Review of Finance*, 10 (1), 1-26.
- Brown, J.R., Lax, L.C., Petersen, B.C. (2010). Financial Market Crises and Natural Resource Production, *International Review of Finance*, 10 (1), 93–124.

- Claessens S., Dell’Ariccia, G., Igan, D., Laeve, L. (2010), *Lessons and Policy Implications from the Global Financial Crisis*, IMF Working Paper WP/10/44, International Monetary Fund, Washington.
- Claessens, S., Kose, A., Terrones, M.E. (2010). The global financial crisis: How similar? How different? How costly?, *Journal of Asian Economics*, 21 (3), 247-264.
- Fortune Magazine (2007). *The Fortune Global 500*, Fortune Magazine, Iss. July 23, 2007.
- Fortune Magazine (2008). *The Fortune Global 500*, Fortune Magazine, Iss. July 21, 2008.
- Fortune Magazine (2009). *The Fortune Global 500*, Fortune Magazine, Iss. July 20, 2009.
- Fortune Magazine (2010). *The Fortune Global 500*, Fortune Magazine, Iss. July 26, 2010.
- Kapuścińska-Przybylska, W. (ed.) (2011). *Reakcje rynków na kryzys*, Wydawnictwo Ce-De-Wu, Warszawa.
- Merrouche, O., Nier, E. (2010). *What Caused the Global Financial Crisis? —Evidence on the Drivers of Financial Imbalances 1999–2007*, IMF Working Paper WP/10/265, International Monetary Fund, Washington.
- Meyn, M., Kennan, J. (2009). *The implications of the global financial crisis for developing countries’ export volumes and values*, Overseas Development Institute Working Paper No. 305, Overseas Development Institute, London.
- Mishkin, F.S. (1996). Anatomy of a Financial Crisis, *Journal of Evolutionary Economics*, 2, 115-130.
- Ngowi, N.P. (2010). The current global economic crisis and its impacts in Tanzania, *African Journal of Business Management*, 4 (8), 1468-1474.
- OECD (2010), *Measuring Globalization. OECD Economic Globalisation Indicators 2010*, OECD, Paris.
- Purnanandam, A. (2009). *Originate-to-Distribute Model and the Subprime Mortgage Crisis*, Working paper, University of Michigan.

UNCTAD (2009a). *The Global Economic Crisis: Systemic Failures and Multilateral Remedies*, UNCTAD, New York and Geneva.

UNCTAD (2009b). *World Investment Prospects Survey 2009–2011*, UNCTAD, New York and Geneva.

UNCTAD (2010). *World Investment Report 2009: Transnational Corporations, Agricultural Production and Development*, United Nations, New York and Geneva.

<http://www.ft.com/cms/s/0/acace9ba-0e6e-11de-b099-0000779fd2ac.html#ixzz1RAT7xUx5>

<http://www.wharton.universia.net/index.cfm?fa=viewArticle&id=1733&language=english>,

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## Appendix A

**Table A**

Number of corporations included in the Fortune Global 500 reports 2007-2010 – country of origin.

	2007	2008	2009	2010
<b>Australia</b>	8	8	9	8
<b>Austria</b>	1	2	2	3
<b>Belgium</b>	5	5	5	5
<b>Belgium/Nederlands</b>	1	0	0	0
<b>Brazil</b>	5	5	6	7
<b>Canada</b>	15	14	14	11
<b>China</b>	24	29	37	46
<b>Denmark</b>	2	2	2	2
<b>Finland</b>	3	2	2	1
<b>France</b>	38	39	40	39
<b>Germany</b>	37	37	39	37
<b>Hungary</b>	0	0	1	0
<b>India</b>	6	7	7	8
<b>Ireland</b>	2	2	1	1
<b>Israel</b>	0	0	1	0
<b>Italy</b>	10	10	10	10
<b>Japan</b>	67	64	68	71
<b>Luxemburg</b>	0	1	1	1
<b>Malaysia</b>	1	1	1	1
<b>Mexico</b>	5	5	4	2
<b>Netherlands</b>	14	13	12	13
<b>Norway</b>	2	2	1	1
<b>Poland</b>	1	1	1	1
<b>Portugal</b>	0	1	2	0
<b>Russia</b>	4	5	8	6
<b>Saudi Arabia</b>	1	1	1	1
<b>Singapore</b>	1	1	2	2
<b>South Korea</b>	14	15	14	11
<b>Spain</b>	9	11	12	10
<b>Sweden</b>	6	6	6	5
<b>Switzerland</b>	13	13	13	13
<b>Taiwan</b>	6	6	6	8
<b>Thailand</b>	1	1	1	1
<b>Turkey</b>	1	1	1	1
<b>UK</b>	34	37	27	31
<b>UK/Netherlands</b>	1	0	1	1
<b>USA</b>	161	152	140	138
<b>Venezuela</b>	0	0	1	1

Source: Own calculations based on data derived from Fortune Global 500 reports 2007-2010 (Fortune 2007, 2008, 2009, 2010).

## Appendix B

**Table B**

Number of corporations included in the Fortune Global 500 reports 2007-2010 – industry.

	2007	2008	2009	2010
<b>Aerospace and Defense</b>	11	12	12	14
<b>Airlines</b>	7	7	6	4
<b>Apparel</b>	2	1	2	2
<b>Automotive Retailing, Services</b>	2	2		
<b>Banks: Commercial and Savings</b>	60	67	62	61
<b>Beverages</b>	4	5	5	5
<b>Building materials, Glass</b>	5	5	6	4
<b>Chemicals</b>	11	11	10	10
<b>Computer Services and Software</b>	3	5	4	5
<b>Computers, Office Equipment</b>	11	11	9	11
<b>Diversified Financials</b>	5	7	5	6
<b>Electronics, Electrical Equip.</b>	18	17	16	18
<b>Energy</b>	7	6	11	11
<b>Engineering, Construction</b>	11	14	18	17
<b>Entertainment</b>	4	4	5	5
<b>Food and Drug Stores</b>	22	22	22	22
<b>Food Consumer Products</b>	5	5	5	5
<b>Food Production</b>	3	3	4	5
<b>Food Services</b>	3	3	3	3
<b>Forest and Paper Products</b>	3	3		
<b>General Merchandisers</b>	9	8	6	9
<b>Health Care: Insurance and Managed Care</b>	5	5	5	5
<b>Health Care: Pharmacy and Other Services</b>	4	3	3	5
<b>Homebuilders</b>	2			
<b>Household and Personal Products</b>	4	4	4	4
<b>Industrial and Farm Equipment</b>	7	7	7	6
<b>Insurance: Life, Health (mutual)</b>	8	8	8	12
<b>Insurance: Life, Health (stock)</b>	20	19	14	19
<b>Insurance: Property and Casualty (mutual)</b>	2	3	3	5
<b>Insurance: Property and Casualty (stock)</b>	15	15	12	14
<b>Mail, Package, Freight Delivery</b>	10	7	6	6
<b>Metals</b>	14	13	20	16
<b>Mining, Crude-oil production</b>	11	12	13	8
<b>Miscellaneous</b>	4	5	6	10
<b>Motor vehicles and Parts</b>	33	33	30	29
<b>Network and Other Communications Equipment</b>	5	5	5	5
<b>Oil and Gas Equipment, Services</b>	2			
<b>Petroleum Refining</b>	39	39	49	40
<b>Pharmaceuticals</b>	12	12	12,0	12,0

<b>Railroads</b>	5	3	3	3
<b>Securities</b>	6	4		
<b>Semiconductors and Other Electronic Components</b>	3	3	3	3
<b>Shipping</b>	3	4	4	2
<b>Specialty Retailers</b>	12	10	10	9
<b>Telecommunications</b>	21	22	21	22
<b>Temporary Help</b>	2	2	3	2
<b>Tobacco</b>	4	3	4	4
<b>Trading</b>	10	10	9	8
<b>Utilities</b>	21	19	19	19
<b>Wholesalers: Electronics and Office Equipment</b>	2	2	3	2
<b>Wholesalers: Health Care</b>	5	5	6	6
<b>Wholesalers: Other</b>	3	3	3	3
<b>Pipelines</b>		2	2	2
<b>Internet Services and Retailing</b>			2	2

Source: Own calculations based on data derived from Fortune Global 500 reports 2007-2010 (Fortune Magazine 2007, 2008, 2009, 2010).