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A CRISIS AND A THREAT *VERSUS* THE FINANCIAL SECURITY ASPECTS OF A GOING CONCERN

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The paper focuses on the phenomenon of a business failure and the assessment of the degree of the financial security of Polish companies, mainly industrial entities, during the period of the economic transformation (1990-2013), with special attention paid to the last economic crisis (2007-2013). With regard to the theoretical and cognitive aspects of the presented issues, attention is paid to corporate crises, the types of crises and their causes as well as the identification and quantification of the symptoms of deteriorating financial conditions. In its empirical dimension, the paper aims to measure the degree of the financial security of Polish industrial companies as well as the trends and dynamics of changes and the corresponding interdependencies. Additionally, the author presents the characteristics of industrial mezzo-structures from the perspective of their stability and the frequency of the movement of objects (changes to ranging positions). Finally, the paper confirms that the degree of financial security can be seen as a symptom of changes to macroeconomic business cycles.

Keywords: corporate crisis, risk management, financial security, early warning systems

JEL Classification: G 33

INTRODUCTION

The contemporary economy is characterized by the turbulent business environment and the fast-paced and radical character of changes - it is becoming increasingly unstable. The dysfunctionalities of the economy resulting from its changes increase the risk of corporate crises and the likelihood of business failures. Exposure and vulnerability to corporate threats take diversified forms and can be presented as a model. It should be assumed that a corporate crisis is not a deviation from the normal state or a form of aberration - it is an inherent characteristic of business activities and a component of risk management processes. Corporate crises are characterized by their complexity and the fact that they result from a combination of several factors which take the form of a chain of events and cause-effect relationships as well as distinct routes of escalation. The factors leading to crises are either exogenic or endogenic in character, with the major role played by internal factors, especially management errors. The identification of threats based on the Early Warning System (EWS) makes use of a number of various methods and tools. The identified measures

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quantify anticipated early warning signals, acting as predictors of threat.

With regard to the theoretical and cognitive aspects, the paper focuses on corporate crises and their types, the reasons for their occurrence and the identification and quantification of the symptoms of the deterioration in companies' financial standing. The empirical research studies are to achieve the following objectives, namely to:

- measure and assess the level of the security of Poland's industrial companies and the trends and dynamics of changes;
- determine the impact of correlations between financial security and the percentage of insolvency procedures; and
- identify the characteristics of the analyzed sample in terms of the stability and frequency of the movement of objects.

The identified objectives constitute a basis for formulating three research hypotheses, which are verified in the course of the empirical research:

H1: The value of the measure of court-filed bankruptcy cases is correlated with changes to their percentage in relation to the core business, and industrial companies are characterized by higher-than-average values;

H2: There is a reversely proportional correlation between the value of a financial security measure and the percentage of court-filed bankruptcy cases, and the degree of financial security is a symptom of business cycle changes (GDP) in a proportional correlation; and

H3: An economy's mezzo-structure demonstrates stability with relatively unchangeable concentrations and the dominant representation of traditional types of the activity.

The assessment of financial security is based on a logistics regression model reflecting the likelihood of a threat to a going concern and the risk of business failure.

THE ESSENCE OF A CORPORATE CRISIS, ITS DETERMINANTS AND SYMPTOMS

Companies operating in the real economy are affected by regulation and are vulnerable to crises caused by external conditions and factors. These factors occur in the immediate environment (the microenvironment) and a more remote environment - the mezzo- and macroeconomic environments. Other factors are related to an organization itself. Deteriorating conditions have a negative impact on companies and can lead to crises.

A crisis in a macroeconomic approach can be treated as a stage of a business cycle and an effect of the changing pace of economic growth. A business cycle is described as the recurring and irregular fluctuations of the pace of economic growth. The explanations of such fluctuations are offered by a number of economic theories, including the monetary theory (M. Friedman), J. A. Schumpeter's innovation concept, von F. A. Hayek's overinvestment theory, A. C. Pigou's psychological theory and W. D. Nordhaus's political theory.

From the microeconomic perspective, crises can also be viewed in different ways, depending on various schools of and trends in the science of companies. Generally, crises result from unplanned events that disrupt or threaten normal business operations. They can be seen as the occurrence of negative changes in business activities and poor performance which, importantly, affect all company operations, posing a threat to a going concern. An analysis of crises is based on the assumption that they represent a phase in companies' life cycles. C. K. Prahalad and G. Hamel refer to a crisis as a turninge point between the two phases (in terms of quality) of corporate expansion, and J. Argenti (1976), and O. P. Kharbanda and E. A. Stallworthy (1985) define the major types of corporate lifecycle stages. L. E. Greiner (1972) identifies development stages and the stages of crises that follow.

Companies vary in terms of their exposure and vulnerability to threats. C. F. Smart, W. A. Thomson and I. Vertinsky (1978) propose a model which describes companies' vulnerability to a crisis. The explanatory variables include three groups of factors

causing a crisis, while the dependent variable is described by vulnerability to a crisis combined with market efficiency (Smart *et al*, 1978). In the case of Polish economic conditions, the level of exposure and vulnerability is very high - both in organizational and financial dimensions. A number of empirical research studies suggest that it results from the uncertainty and changeability of Polish companies' strategic potential - the factors which may lead to crises. In addition to that, the on-going process of parallel transformations increases the risk and uncertainty of business operations, the effect of which is even greater in the context of the current economic slowdown. Also, the area of strategic management - which is of key significance in the conditions of economic slowdown - is generally disregarded by Polish companies. It enhances strategic uncertainty and leads to the so-called domino effect (Mączyńska, 2011).

A company's crisis is currently believed not to be the case of a deviation from its normal business operations (the case of „aberration") but rather an inherent feature of the economic activity. It represents the area of risk management which aims to secure a company's operations and retain its value. A review of the concepts which explain the phenomenon of corporate crises indicates that crises can lead to both negative effects (a possible business failure) and positive ones - a threat of a crisis can also be seen as a development opportunity. This idea is confirmed by L. E. Greiner and W. H. Stahehle - who claim that corporate development is stimulated by a crisis. The condition between stabilization and chaos - on the verge of chaos - is a normal and desirable condition, leading to effective corporate operation (Foester's theory of order out of chaos).

From the time perspective, i.e. from the moment of the occurrence of the first symptoms to the outbreak of a crisis, two types of crisis can be defined: a sudden crisis (circumstances which occur without a warning and leading to a shock) and a smoldering crisis (the occurrence of new problems and symptoms - a lasting process); a sudden crisis can lead to after-shock effects - a smoldering crisis.

The determinants of crises are defined by authors as various types of factors originating from various sources (Table 1). Undoubtedly, corporate crises are complex phenomena caused by a combination of

Table 1 The determinants of corporate crises according to the selected authors

Authors	Determinants of a crisis
R. Kaplan, D. Norton	• a low activity in the area of strategic management • a lack of correlation between the use of resources and strategy • a lack of correlation between a motivating system and goals • a lack of understanding of the company vision and strategy assumptions
C. F. Smart, W. A. Thomson, I. Vertinsky	• variables related to the competition and the environment • the characteristics of the executive staff • organizational attributes
P. F. Drucker	• a failure of products on the market • an assessment of the situation based on accrual - non-cash methods • inefficient management manifesting itself at the time of rapid expansion • falling into a routine at the time of stabilization
S. Slatter, D. Lovett	• external: economic downturn, competition, unfavorable price changes • internal: poor management, ineffective financial control, high costs, poor marketing, overtrading, acquisitions, the financial policy

Source: Author, according to: Kaplan & Norton, 1996; Smart *et al*, 1978; Drucker, 2006; Slatter & Lovett, 2001.

several factors forming a sequence of cause-effect events and marking a distinct path of escalation if appropriate measures are not taken in due time. The factors causing crises can be exogenic or endogenic in character. A number of authors (including J. Argenti, S. Slatter, D. Lovett, I. I. Mitroff, E. I. Altman and H. Albach) claim that endogenic factors are of key significance, especially poor management. Moreover, most companies failing as a result of crises record positive financial results but scarce financial resources (Altman, 1983; Argenti, 1976).

The symptoms of a crisis occur as a result of external and internal factors leading to crises and, in a similar manner, differ in character and do not occur separately from other symptoms. In most cases, the symptoms of a crisis are defined as a company's failures affecting its general condition, especially in the economic and financial areas. The corporate value is frequently referred to as a dependent variable in the context of symptoms. However, a corporate crisis is a vague concept - it is „felt" but it is difficult to describe the quantitative dimension of its symptoms (Obłój, 1987).

AN EARLY IDENTIFICATION OF THREATS TO COMPANY OPERATIONS

In their integrated company expansion model B. Quinn and K. Cameron note that the ability to counteract crises is as important as the ability to predict and prevent them (Quinn & Cameron, 1983). Therefore, companies must develop and implement solutions enabling them to diagnose indications of a crisis - the so-called Early Warning Systems (EWS). They are tools for optimizing risk as part of quantitative risk management methods (Crocford, 1982).

The EWS is generally classified from the point of view of who creates it and who it is designed for, or from the perspective of the selection of tools and assessment methods (Altman & Narayanan, 1997; Platt & Platt, 2002). The EWS should be seen as one of the areas of assessing a company's economic and financial condition. Its objective is to reveal the symptoms of a deteriorating situation, but it does not identify any corrective measures. It is also justified to say that the EWS in the context of its objectives should not be viewed as a bankruptcy prediction method.

In identifying threats, the EWS makes use of a number of tools applied in technical, economic and financial analyses as well as statistical methods used in predicting financial threats, going concern issues and bankruptcy prediction. The identified measures quantify early warning signals, thus becoming threat predictors. According to H. I. Ansoff (2007), such systems make use of three types of information: alarm signals, deviations from standards and weak signals (weakly structured) (Lam, 1985).

General trends in research studies indicate an increasingly complex and advanced character of analytical processes. A more significant role is played by statistical methods, which are commonly used and continuously developed. The EWS methods are usually classified on the basis of the character of the analyzed factors and the manner of formulating conclusions. The first criterion distinguishes quantitative, qualitative and mixed methods, while the second one distinguishes logical deductive and empirical inductive methods. According to C. Zavgren (1983), the classification of the methods is based on solutions employing a discriminant analysis (one- and multiple variable models) and a conditional probability (multiple variable models). Thus, it is the area exclusively represented by empirical inductive methods, commonly regarded to be appropriate ones.

Among the methods distinguished on the basis of the character of factors, the most frequently used ones include a financial ratio analysis and scoring models (with one synthetic measure) as well as multi-criteria models (quantitative and qualitative models). Because the effectiveness of one-measure financial analysis is often questioned, it is advisable to use the economic concept of Economic Value Added (EVA), the Shareholders Value Added (SVA) and the Market Value Added MVA. This concept is based on the fundamental goal of a company's operations - an increased corporate value should increase owners' benefits (Kaczmarek, 2014). Research studies conducted in the Polish business environment indicate the lack of

a statistically significant correlation between the above measures and financial threats to a going concern and the risk of a business failure.

Logical deductive methods use a financial analysis in assessing a company's condition (quantitative and qualitative assessments and hierarchical systems). Empirical inductive methods are examples of comparative analyses based on statistical methods (an analysis of the groups of threatened and non-threatened companies). Depending on the number of variables, these methods are referred to as one- or multivariable methods, whereas their major characteristic is efficiency (the ability to identify threatened and non-threatened companies). Additional benefits include a possibility of planning activities in advance, testing in stable conditions and a proper identification of critical conditions.

The development of econometric modelling in the prediction of financial threats to corporate operations originates from the first works of W. Rosendal and P. J. Fitzpatrick - they developed a pair-based comparative analysis (a threatened *versus* non-threatened entity). C. L. Merwin applied the methods of a profile analysis and the arithmetic mean for groups of objects, while W. H. Beaver verified the usefulness of financial ratios in threat prediction. This area of research was also undertaken by P. Weibel, who proved that an increased number of explanatory variables did not lead to significantly better results in risk assessment.

The works of these authors are classified as those representing one-measure methods (the so-called dychotomic tests), while further research focused on the multi-measure threat prediction methods. The dominating methods include a multi-measure discriminant analysis, with a great contribution made by the logit model. It allows for detecting a financial threat or a threat to a going concern and the risk of failure. The multiple discriminant analysis was developed by E. I. Altman, who - working individually or in cooperation with other researchers - developed a number of models (Z-score) for listed and other companies, for developed and emerging markets (developing) (Altman, 1983; Altman, 1993).

THE MEASUREMENT OF CORPORATE FINANCIAL SECURITY IN ASSESSING THE ECONOMIC TRANSFORMATION IN POLAND

A multi-aspect, holistic understanding of an economy and its processes is reflected in the extensive research of the Polish economic transformation - a unique process in terms of systemic changes and related economic policies. In this approach, an economy, understood in its broad sense, includes mutually interlinked elements constituting a system of reforms - a cause-effect sequence.

A transformation process is characterized by a wide range of complex relationships which describe and affect an economy - their simultaneous occurrence creates a picture of a number of parallel transformations. The introduced changes aim to ensure effective and sustained economic growth, and the specific goals are as follows (Kaczmarek, 2012a):

- structural changes,
- increased competitiveness,
- restructuring and privatization, and
- improvements in and stabilization of company finances.

Development is a process of changing structures - gradual changes result in improvements, achieving higher standards and increasingly complex and more effective forms of an activity. Development - leading to a greater complexity - is a process taking place in time, and the dynamics of structural changes are described by the changeability of development stages observed in the course of time. Qualitative changes are related to the use of intensive factors, and considering the fact that quantitative changes (growth) do not occur independently of qualitative changes, growth is regarded to be an integral part of development along with mutual relations between respective changes. Development as a dynamic process can be considered from the perspective of the dynamics of the volume and structural changes as well as effectiveness. Assuming that structural changes and effectiveness describe qualitative changes, and volume changes

describe quantitative changes, conclusions can be formulated with regard to the development of a given structure.

The objective of the Polish economic transformation is to ensure sustained economic growth through an effective use of available resources - the replacement of conditions by factors. Therefore, the key processes describing and affecting efficiency are the ones that help achieve the specific goals of the transformation process (Kaczmarek, 2012b):

- structural changes,
- increased competitiveness,
- restructuring,
- increased financial security,
- value creation.

The assessment of a financial threat, a going concern threat and the bankruptcy prediction models offered in the literature - from the perspective of the objectives and scope of research into economic transformations - indicate the necessity of developing a new analytical model. In creating this model, apart from the use of innovative methods and tools, a different approach was adopted with respect to the definition of the obtained result. It is defined as the extent of financial security and the activities aimed at counteracting financial threats related to a going concern and a possibility of business failures. The objective of this change was to define a stimulant in the model for assessing the effects of the economic transformation. It provides a synthetic description of the financial condition of entities, groups of entities and economic mezzo-structures.

The logistic regression model was estimated for the needs of assessing the degree of financial security. This measure has two distinct characteristics:

- it allows for analyzing differences in and the dynamics of the financial condition of entities and groups of entities (the components of the economic structure); and
- it relativizes the result of this analysis in relation to a threat of business failure.

The estimated model of financial security is presented in Table 2, according to the adopted methodology.

The values of this measure range from 0% to 100%, with higher values indicating higher probability of

Table 2 The parameters of the estimated financial security model

Name of indicator	Symbol of indicator	Transformation of indicator	Assessment of parameter
Absolute term	-	1	- 0.70
Asset productivity ratio	W_1	$Z_1 = (W_1 - 1.89)/1.09$	- 0.42
Self-financing ratio	W_3	$Z_2 = (W_3 - 0.39)/0.31$	- 0.93
Short-term debt ratio	W_6	$Z_3 = (W_6 - 0.47)/0.27$	+ 0.65
Asset operating profitability ratio	W_{19}	$Z_4 = (W_{19} - 2.94)/13.46$	- 0.73

$$SBF = \left(1 - \frac{1}{1 + exp\ [-(-0{,}70 - 0{,}42\,Z_1 - 0{,}93\,Z_2 + 0{,}65\,Z_3 - 0{,}73\,Z_4)]}\right) \bullet 100\,\%$$

Model	Number of threatened companies	Number of non-threatened companies	Sensitivity	Specificity	AUC
SBF	426	1,936	82.4%	82.1%	0.894

Source: Kaczmarek, 2012b

maintaining financial security within the period of one year. It allows for a quantitative description of changes to financial security in a dynamic approach as well as for comparisons of various types and groups of companies. The existing models offered in the literature do not have such characteristics. The values of the model's estimated efficiency measures confirm its high prediction potential, which qualifies the model for conducting empirical research (Kaczmarek, 2012c).

THE EXTENT AND STRUCTURE OF BUSINESS FAILURES IN POLAND

The response stage of crisis is characterized by visible difficulties in a company's operations, posing a threat to its economic existence. It is the last stage at which a crisis can be overcome - otherwise, a company faces a business failure. It usually results from a long-lasting financial crisis - a smoldering crisis.

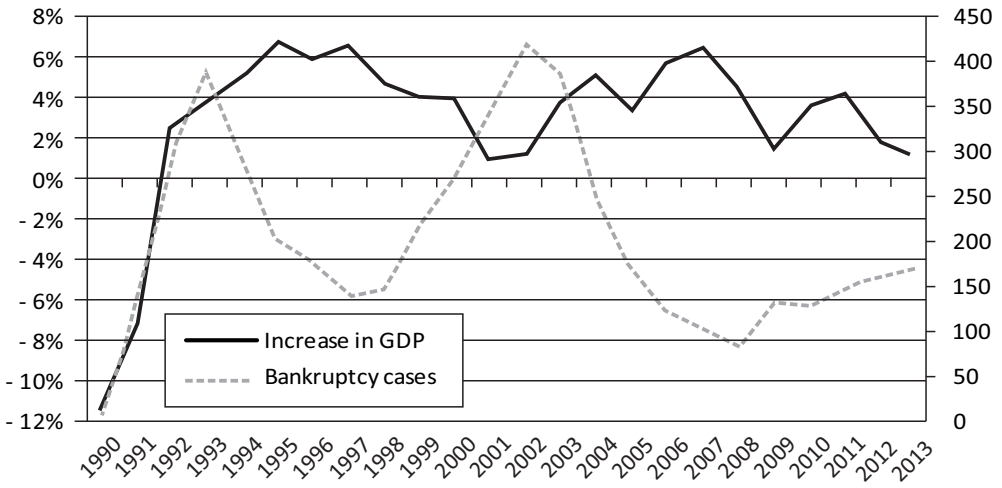
Failure/bankruptcy is a legal term for a company's crisis from the perspective of insolvency and recovery procedures, in which insolvency (a *sensu stricto* failure, bankruptcy filed in a court) is the key idea. In a broad perspective, a business failure is an economic phenomenon resulting from an entrepreneur's right to freely carry out business activities and the acceptance of business risk which can lead to a loss of foundations for independent corporate activities - a company's failure (a *sensu largo* failure, economic distress). It can result from two types of factors (economic and financial), corresponding to the respective types of failure: economic distress and financial distress. A business failure as an economic condition is referred to by some authors as bankruptcy (to distinguish it from the Polish legal term), which makes it difficult to understand the concept in the context of international law. Moreover, the context of insolvency law is broader - it also includes recovery procedures.

Business failures can also be considered in a macroeconomic dimension. The number of companies which file bankruptcy is regarded as one of the symptoms of deteriorating macroeconomic conditions. It is seen as a barometer of economic soundness and government policies implemented in the spirit of the two trends of economic theory related to business failures - positive and normative theories (Schwartz, 2005). The results of the conducted study point to a correlation between the current business cycle and the number of failing companies; this correlation is much stronger for advanced (stabilized) economies than for developing ones (characterized by weak economic conditions) due to a number of economic distortions.

The first three years of the Polish transformation represent a period of the transformational recession - the radical implementation of stabilization programs, the rapid decreases in the GDP and a great number of business failures, mainly those of state-owned companies (Figure 1). The 1993-2008 period records the triple occurrence of the above phenomena: an increase in the GDP - a decreased number of court-filed bankruptcy cases, a decrease in the GDP - an increased number of bankruptcy cases (the correlation coefficient $r = -0.71$, $P < 0.05$). The period of the economic slowdown in Poland, caused by the 2008 global financial crisis, is characterized by the lower intensity of the previously observed phenomena.

It can be concluded that the pace of the GDP growth in 2010-2013 was not high enough to counteract the effects of the crisis, which is reflected in the increasing percentage of bankruptcy cases as of 2008. Even if the expected GDP growth in 2014 reaches the level of approx. 2.5%, it can be a pessimistic scenario for the sector of non-financial institutions in Poland (accounting for more than 45% of the GDP and nearly 53% of value added). It is only a considerable and sustained increase in the GDP values that can decrease the number of business failures (a 3.5% increase in the GDP is an empirically proven threshold value).

The 2008 crisis started in the financial sector, which, by its very nature of avoiding risk, transferred the crisis to the company sector by restricting its lending activities. It hindered corporate growth, while a decrease in consumer and mortgage loans reduced household demand. The beginning of 2008 was marked by the first indications of deterioration in companies' condition in Poland. A considerable decrease was recorded in sales revenues, the value of assets and, in particular,



Notes: GDP (%) (the left axis); the percentage of court-filed bankruptcy cases per 10,000 companies (the right axis)

Figure 1 The GDP growth and the percentage of the court-filed bankruptcy cases in Poland in 1990-2013

Source: Author, based on: The Statistical Yearbook, GUS Warszawa, retrieved on August 10, 2014, from http://www.stat.gov.pl; Raport wniosków o upadłość/ Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014), from http://www.coface.pl

investment activities. Companies' financial results were unsatisfactory, many of them running a deficit. The number of companies and their staff decreased.

The number of business failures increased - this trend started in 2007, accelerating rapidly as of 2009 (Figure 2). The number of failure-related settlements increased, accompanied by an increasing number of company liquidations - restructuring processes were implemented in the unfavorable business conditions.

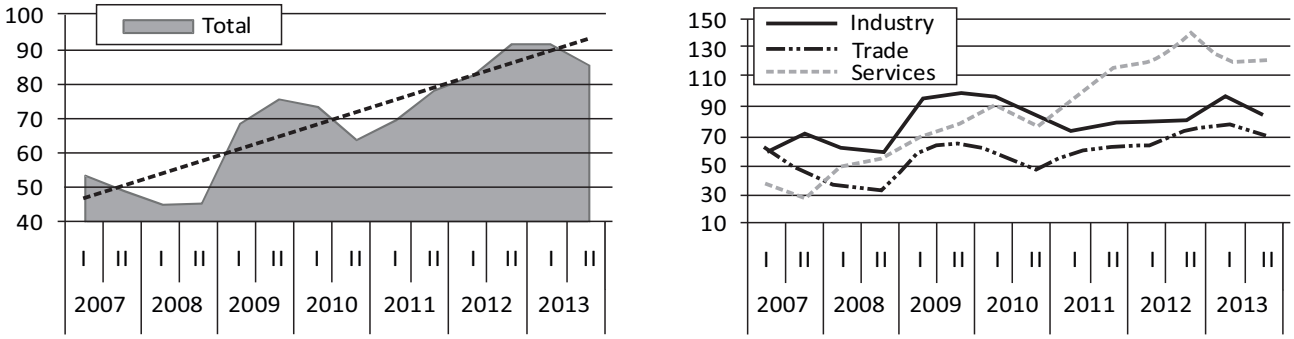
An analysis of the concentration values[1] of the court-filed bankruptcies indicates that it is at above-average levels in industrial companies up to the end of 2010, while trading companies record lower-than-average values in the entire analyzed period. Service companies are characterized by a steady increase, reaching above-average levels as of 2009.

The concentration values of the court-filed bankruptcies are related to the companies' core activities. The relatively low fluctuations and the absence of increasing trends are recorded by trading activities, with the peak values occurring in 2009 and 2013. Increased values are recorded in industrial activities (the highest levels in 2009-2010, and another negative trend in the first half of 2013). The highest concentration values are recorded in the service sector (a visible increase starting in the middle of 2008). Because of the high share of the construction sector, the concentration values reach record levels as of 2010.

THE DEGREE OF FINANCIAL SECURITY - POLISH INDUSTRIAL COMPANIES

Similarly to the above analysis of corporate failures, the estimated model can be applied in assessing the degree of financial security in the economy's institutional sector (divided into production, trading and service activities). The key role in production activities is played by industrial activities, accounting for nearly 94% of value added in production activities[2], hence its significance in the conducted study.

The beginning of the Polish systemic transformation (1990-1993) is marked by a rapid decrease in the



Note: Per 10,000 companies, figures for six-month periods

Figure 2 The percentage of the court-filed bankruptcy cases in Poland in 2007-2013

Source: Author, based on: Raport wniosków o upadłość/Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014, from http://www.coface.pl; System Gospodarka, Pont Info Warszawa, retrieved on August 8, 2014, from http://www.pontinfo.com.pl; Fijorek, Kaczmarek, Kolegowicz & Krzemiński, 2014

financial security of production activities, including industrial and trading companies (unlike the service sector). The subsequent years are characterized by short-term improvements in companies' financial condition. The year 1997 marks the beginning of a rapid downturn in all types of activities. A breakthrough process started in 2002 (the pre-accession period and accession to the EU in 2004), characterized by relatively stable business conditions. Deterioration in economic conditions was recorded in 2008 (the financial crisis). The negative trend prevailed in the service sector in the subsequent years (Figure 3). An in-depth analysis

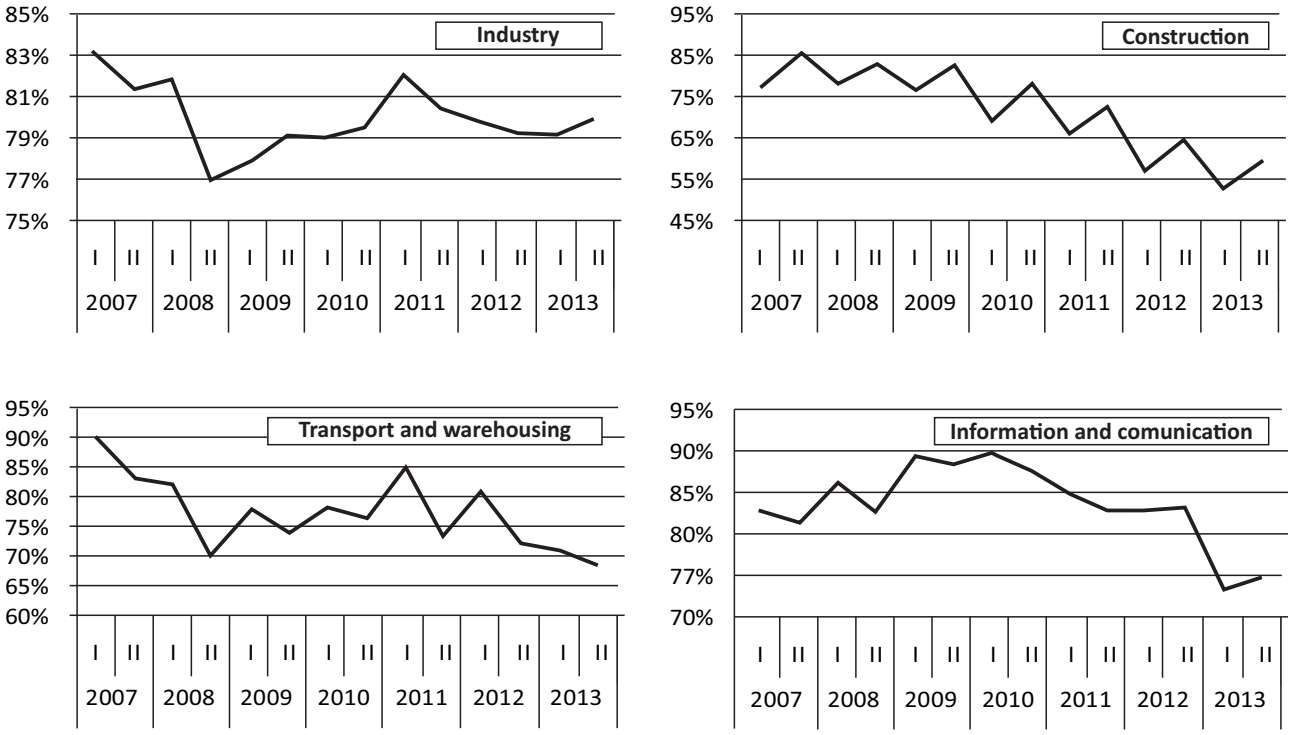
Figure 3 The degree of financial security - industrial, trading and service companies in Poland in 1990-2013 (%)

Source: Author, based on: Raport wniosków o upadłość/Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014, from http://www.coface.pl; System Gospodarka, Pont Info Warszawa, retrieved on August 8, 2014, from http://www.pontinfo.com.pl; Fijorek, Kaczmarek, Kolegowicz & Krzemiński, 2014

of financial security by economic sections (PKD) at the beginning of the financial crisis indicates that, in 2008-2009, the crisis affected industrial companies, followed by transport and warehousing activities. In later periods, the indications of the crisis were recorded in construction-, information- and communication-related activities. The most disturbing changes hit the construction industry, in which considerable fluctuations of financial security absolute values were recorded as of the middle of 2010 (the lowest financial security values amongst all PKD sections). Following the distortions in the second half of 2008, industrial companies recorded improved the values of financial security. Business cycle fluctuations are also recorded in transport and warehousing activities, with disturbing negative trends in the last two years. The highest degree of financial security is recorded in information and communication companies, being also negatively affected as of the middle of 2010 (Figure 4).

An in-depth analysis of PKD industrial sections (30 out of the 69 economic sections) includes an assessment of their ranging position. The assessment is negative - the changes that occur retain the economy's industrial mezzo-structure. Attention should be paid to a small number of changes to the highest and lowest ranging positions. It can be concluded that PKD sections with the highest and lowest degree of financial security tend to retain their respective positions (Kaczmarek, 2012b).

The identification of PKD industrial sections with high financial security values is based on a synthetic



Note: Financial security figures for 6-month periods

Figure 4 The degree of financial security in the selected sections of Poland's national economy in 2007-2013 (%)

Source: Author, based on: Raport wniosków o upadłość/Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014, from http://www.coface.pl; System Gospodarka, Pont Info Warszawa, retrieved on August 8, 2014, from http://www.pontinfo.com.pl; Fijorek, Kaczmarek, Kolegowicz & Krzemiński, 2014

measure comprising the assessment of the two categories - average ranging positions and their changeability expressed by a standard deviation (Figure 5).

The Industrial PKD sections characterized by a relatively high and stable degree of financial security include the following: metal ore mining; manufacture of basic pharmaceuticals; generation and supply of electricity, earth gas, water vapor, hot water, etc; oil and earth gas mining; manufacture of chemicals; manufacture and processing of coke and petroleum refined products; manufacture of paper and related products.

The PKD sections with the lowest degree of financial security and high changeability are as follows: manufacture of textiles; manufacture of electrical equipment; coal and brown coal mining; manufacture of computers, electronics and optical devices; manufacture of transport equipment.

In conclusion, the PKD sections occupying high ranging positions in the economy's mezzo-structure and characterized by large concentrations and stable positions are represented by traditional business activities.

Correlations between measures related to business failures in their economic and legal dimensions cannot

88	77	41	32	42	70	49	45	6	3	6	10	6	38	72	69	67	66	64	70	64	58	45	39	35
95	93	80	90	84	86	93	94	85	78	45	33	94	89	88	89	89	92	81	93	85	92	95	92	95
94	89	85	71	82	86	93	95	93	82	90	79	75	76	91	92	96	98	98	97	96	95	98	95	98
97	93	79	56	59	88	77	77	74	60	74	67	68	73	79	81	84	90	91	89	83	83	83	83	83
90	77	51	61	62	72	69	66	64	56	60	64	73	70	76	79	79	79	80	80	83	80	77	80	77
96	95	91	86	87	87	78	89	92	86	83	83	85	81	71	61	52	57	79	76	82	81	80	81	80
85	41	25	19	29	56	61	57	54	50	46	50	59	60	74	74	78	65	64	70	64	71	80	71	80
92	69	70	64	66	75	71	72	68	61	54	54	57	70	76	70	73	80	53	61	72	88	79	88	79
85	37	19	7	13	46	58	46	41	30	35	22	39	38	59	70	72	78	58	35	40	52	59	52	65
91	72	65	68	72	74	67	68	55	47	61	59	69	74	85	84	83	85	80	78	76	79	81	79	81
94	87	76	66	65	91	82	75	72	66	75	78	78	75	87	80	82	84	82	80	81	80	71	80	71
89	79	61	71	66	73	76	76	73	77	77	73	73	72	81	83	82	83	86	74	74	76	77	76	77
96	82	87	85	92	93	82	82	82	69	69	70	74	83	95	93	88	90	84	81	84	82	83	82	83
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95	88	82	83	87	90	88	86	83	78	74	73	76	78	84	81	80	81	90	75	84	84	83	84	83
93	80	71	69	75	82	81	81	78	78	78	73	75	75	84	83	87	90	88	82	83	84	86	84	86
93	70	56	55	57	80	73	65	60	42	36	17	14	48	52	59	65	71	82	65	57	51	49	45	42
93	72	75	63	67	80	77	74	71	65	59	58	65	70	80	80	79	79	81	74	80	80	79	80	79
92	73	60	47	54	69	72	74	62	52	50	43	48	51	72	74	73	76	90	86	84	84	84	84	84
93	52	19	11	8	65	79	80	76	62	53	56	52	53	75	62	76	76	86	77	71	76	78	76	78
93	79	75	77	76	84	85	79	79	65	65	63	62	65	80	76	78	80	79	74	78	77	76	77	76
88	33	12	7	11	37	40	56	49	59	45	47	62	62	52	51	59	46	58	53	61	65	61	65	61
92	72	70	70	67	74	69	63	68	65	55	59	65	68	77	76	79	78	75	69	76	76	72	76	72
77	36	19	25	33	69	72	57	59	44	51	40	40	46	55	61	79	78	79	68	76	78	79	78	79
92	48	25	14	27	46	24	24	26	33	27	22	25	23	28	39	34	34	30	16	27	33	30	33	30

Figure 5 The PKD industrial sections by ranging position based on financial security and ranging position changeability in 1990-2013

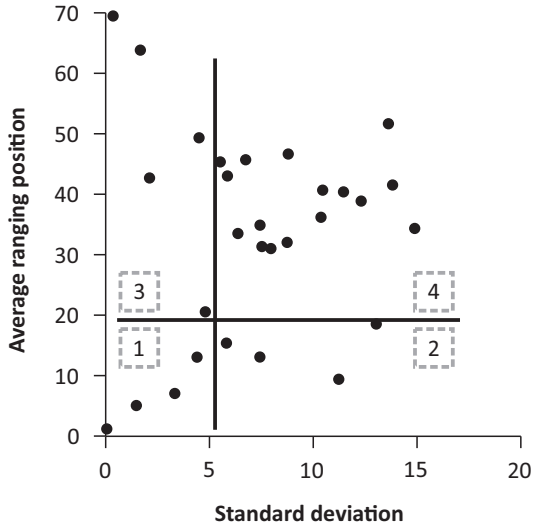


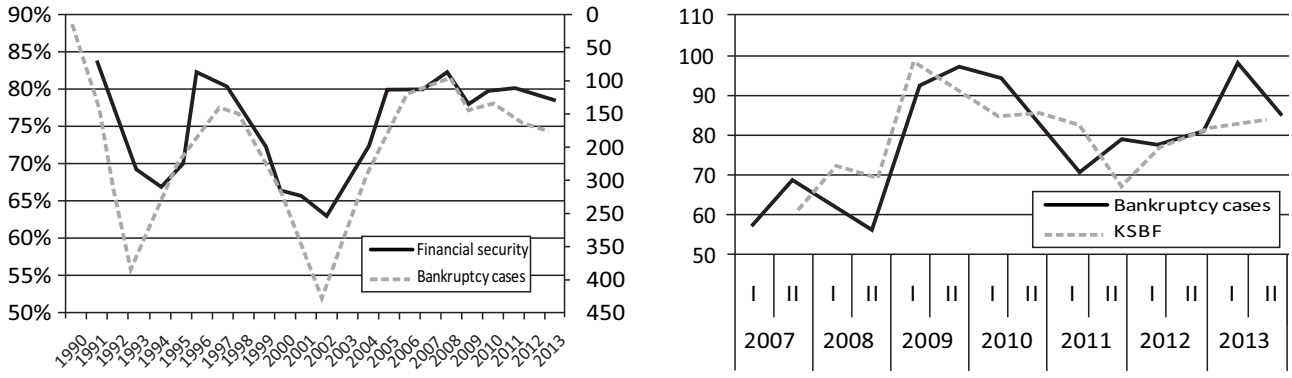
Figure 5 (Continued) The PKD industrial sections by ranging position based on financial security and ranging position changeability in 1990-2013

Source: Author, based on: Raport wniosków o upadłość/ Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014, from http://www.coface.pl; System Gospodarka, Pont Info Warszawa, retrieved on August 8, 2014, from http://www.pontinfo.com.pl; Fijorek, Kaczmarek, Kolegowicz & Krzemiński, 2014

be identified without distinguishing the content represented by these measures. The comparative analysis of financial security and court-filed bankruptcy cases indicates that the two categories are characterized by similar long-term (1990-2013, all companies) and mid-term values (2007-2013, industrial companies).

It is another argument in favor of the estimated financial security model. The assessment of the correlations is based on the correlation time series tests indicating that there is a strong and statistically significant correlation ($r = -0.78$, $P < 0.05$) between financial security and the number of the court-filed bankruptcy cases (for all companies).

The calculated time series allow for determining a calibration equation for the two measures, based on the linear quantile regression model (industrial companies, $r = -0.77$, $P < 0.05$). The calculated parameters create a linear equation for the median of the bankruptcy cases to financial security. It allows for a comparative analysis of companies with the use of the financial security measure scaled in units corresponding to the number of the bankruptcy cases (with the use of the calibrated financial security measure - the KSBF) (Figure 6).



Notes: The bankruptcy cases and financial security for all companies (left); the bankruptcy cases and the KSBF for industrial companies (right), the bankruptcy cases per 10,000 companies

Figure 6 The degree of financial security and the percentage of the court-filed bankruptcy cases in Poland in 1990-2013

Source: Author, based on: Raport wniosków o upadłość/Bankruptcy applications, Coface Warszawa, retrieved on August 14, 2014, from http://www.coface.pl; System Gospodarka, Pont Info Warszawa, retrieved on August 8, 2014, from http://www.pontinfo.com.pl; Fijorek, Kaczmarek, Kolegowicz & Krzemiński, 2014

CONCLUSION

In their theoretical and methodological dimension as well as from the perspective of empirical research, the conclusions and effects of the paper are as follows:

- The development and use of measures for a comparative analysis of trends and changes in the areas of financial security and corporate failures;
- The existence of a strong and statistically significant correlation between financial security and bankruptcy cases at the company level in the longer periods of time (1990-2013) and in the economy's mezzo-structure in the midterm (2007-2013);
- The correlations between financial security and the bankruptcy cases confirm the positive assessment of the effectiveness of the estimated model for assessing the degree of corporate financial security;
- The negative assessment given to changes to the Polish economy's industrial mezzo-structure in 1990 -2013 in terms of the ranging positions of the PKD sections;
- The industrial mezzo-structure is characterized by slight changes to the highest and lowest ranging positions of the PKD sections;
- The PKD sections with the lowest and highest financial security values demonstrate a relative stability in terms of retaining their positions;
- Traditional business activities rank the highest amongst the PKD sections;
- It is confirmed that the degree of financial security can be regarded as a symptom of changes to the macroeconomic business cycles described by means of changes to the GDP, and that the two measures are directly proportional ($r = 0.71$, $P < 0.05$).

The results based on the empirical research allow for a positive verification of the three research hypotheses formulated in the introduction to the paper. In the case of the first hypothesis, the negative assessment is attributed to changes in an economy's industrial mezzo-structure due to a higher-than-average concentration of court-filed bankruptcy cases. Similarly, the verification of the third hypothesis demonstrates a picture of an inappropriately formed industrial mezzo-structure. It is characterized by visible objects with high stability. Moreover, it is dominated by the traditional and financially secure types of the activity. The positive verification of the second hypothesis confirms the high efficiency of the estimated model for determining the degree of financial security. Thus, the model can be broadly used as a tool for assessing a company's financial condition (groups of companies - economic mezzo-structures), and the degree of financial security can be seen as a symptom of changes to macroeconomic business cycles.

The conducted research reveals a weakness of the estimated model - its limited content allowing for the interpretation of the obtained results. This measure describes the likelihood of maintaining a company's financial security without giving consideration to its economic potential. Further research at the theoretical, methodological and empirical levels aims to incorporate the assessments of possible business failures (a loss of financial security) into new estimated models. Results will be scaled on the basis of such categories as cuts in jobs, a decrease in sales revenues, a loss of value added, and a decrease in the flows of taxes and contributions to the state budget.

ENDNOTES

1 This measure is a relative assessment of the concentration of failing companies in a specific group of entities in relation to the total number of entities - the members of the analyzed group, and in relation to all companies in the national economy. Values greater than one indicate higher-than-average concentrations in a given group.

2 Industrial activities include the three sections of the Polish classification of economic activities (PKD): B - Mining, C - Industrial processing, D - Generation and supply of electricity, earth gas, water vapor, etc. Production activities also comprise Section E - Supply of water, waste and sewage management, re-cultivation.

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