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Enterprise Bankruptcies Versus Selected Macroeconomic Aggregates and Financial Indicators

Upadłość przedsiębiorstw a wybrane agregaty makroekonomiczne oraz mierniki finansowe

Keywords: bankruptcy of enterprises; tax revenues; financial indicators of enterprises

Słowa kluczowe: upadłości przedsiębiorstw; bankructwa przedsiębiorstw; wskaźniki finansowe przedsiębiorstw

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Introduction

Entrepreneurs, while conducting business activities, are exposed to various risks. Clearly, the key risk is the insolvency of a given business entity, which, *de facto*, means a business failure and a loss of resources. However, entrepreneurs' failures often do not arise from their wrong decisions, but rather from external conditions and economic crises in particular. The research carried out so far on bankruptcy prediction models provides mostly warning information in the context of concrete business entities. Is it possible to identify microeconomic variables or aggregated financial indicators concerning enterprises that would enable predicting a potential increase of bankruptcies of business entities? This issue is the main research aim of the paper. On this basis, the following hypothesis was posited: there is inter-dependence

between changes of the number of enterprise bankruptcies and some macroeconomic aggregates and enterprise financial indicators. The study used the methods of desk research and statistical analyses (descriptive and correlation).

1. Literature review

Bankruptcies of enterprises are a natural phenomenon in the economy, and they are the subject of a number of scientific studies [DelliSanti, Wagner, 2018; Dec, 2017; Mitman, 2016; Mączyńska, Morawska, 2015; Rogowski, 2015; Antonowicz, 2015; Staszkiewicz, 2014; Altman, 1993]. In this paper, the concepts of bankruptcy and insolvency are used interchangeably, although it is worth noting that bankruptcy is strictly an economic category, while insolvency is a legal one. The biggest influence on a decrease in production value is recorded in the case of big enterprises [Cumming, Fleming, 2015]. Bankruptcy is viewed as a process that aims at eliminating only economically inefficient entities [Yang et al., 2015; Koh et al., 2015; Campbell, 1996]. Enterprise bankruptcy has a lot of functions, particularly in removing ineffective business entities from the market.

Table 1 presents a comprehensive overview of some elements and attempts at formulating theories on bankruptcies.

Table 1. Elements of bankruptcy theory in selected economic theories

Theory	Authors	Elements of bankruptcy theories
Neoclassical theory	W.S. Jevons, C. Menger, L. Walras, A. Marshall	Bankruptcy is a consequence of withdrawing from maximizing profits. This phenomenon affects the change in involvement of costs and, therefore, has a good effect on the economy.
Theory of entrepreneurship	J. Schumpeter	Bankruptcy of inefficient and non-innovative enterprises is a precondition for the development of the economy as a whole. Therefore, bankruptcy is beneficial for the economy.
Institutional currents	T.B. Veblen, W.C. Mitchell, J.R. Commons, J.M. Clark, G. Myrdal, J.K. Galbraith	The scale and pace of insolvency processes in the economy are conditioned by the quality of the institutional infrastructure of bankruptcy. However, bankruptcy due to transaction costs and agency problems may adversely influence micro- and macroeconomic scales.
Managerial theories	W.J. Baumol, R. Marris, O.E. Williamson	Avoiding bankruptcy is a prerequisite for achieving managers' objectives. Bankruptcy excludes benefits for managers. Bankruptcy of a given firm is also unfavourable for owners and other entities affiliated with that firm.
Biological theories	M.T. Hannan, J.H. Freeman	Bankruptcy is one of the natural components of a company's life cycle.
Theory of shareholder value	T. Copeland, T. Koller, M.C. Jensen	Maximizing share value guarantees the survival of an enterprise in the long term. Bankruptcy excludes maximizing share value; therefore, it is unfavourable for owners.

Theory	Authors	Elements of bankruptcy theories
Creditors' bargain theory of bankruptcy	T.H. Jackson	Bankruptcy and the whole insolvency proceedings from declaration of insolvency to creditors being repaid area kind of system that would reflect the agreement between particular creditors of a company.
Normative theory of business bankruptcy	A. Schwartz	The model presents the relationship between the efficiency of the bankruptcy system, at the cost of company capital, and its ability to realize projects.

Source: Own study based on Pieńkowska [2005, p. 27], Schwartz [2005, p. 1221], and Jackson [1982, pp. 857–907].

The correlations between enterprise bankruptcies and selected macroeconomic aggregates have already been investigated [Nam et al., 2008; Santoro, Gaffeo, 2009; Bruneau et al., 2012]. However, enterprise bankruptcy may result from mistakes made by managers and may not be dependent on external factors at all [Dec, Masiukiewicz, 2016; Eckbo et al., 2016]. If so, a simple analysis of aggregated data may prove insufficient, requiring an individual approach towards a specific case.

2. Methodological notes

To investigate correlations of a number of bankruptcies in the years 2004–2015, figures and macroeconomic indicators were chosen on an annual basis that are elaborated and published mainly by the Central Statistical Office and the National Bank of Poland. The variables include, *inter alia*:

- gross domestic product in current prices,
- state budget revenue (total tax and non-tax revenue),
- revenue from CIT (corporate tax),
- revenue from VAT (tax on goods and services),
- business cycle indicator (synthetic indicator of economic situation),
- direct economic investments, and
- number of business entities deregistered from REGON database (without natural persons).

An additional and essential group covers figures and indicators illustrating the economic and financial situation of non-financial enterprises in Poland:

- cash liquidity ratio (relationship of short-term investments to short-term liabilities),
- quick liquidity ratio (relationship of short-term investments and short-term receivables to short-term liabilities),
- current liquidity ratio (relationship of entity current assets – stocks, short-term receivables, short-term investments and short-term prepayments – to short-term liabilities),
- short-term liabilities (without special funds, the total liabilities due to deliveries and services, and also the whole or a part of the remaining liabilities, that become mature within twelve months of the balance sheet date),

- long-term liabilities (total liabilities with residual maturity over a year at the balance sheet date, except liabilities due to deliveries and services),
- total operating income (amounts received and receivable),
- gross financial result (profit or loss – the sum of financial results on sales of products, goods and materials on the other operating activities and financial transactions),
- net financial result (profit or loss received after reducing gross financial result by mandatory charges on account of income tax from legal and natural persons as well as other payments under separate regulations),
- cost ratio (relationship of tax deductible cost from total operating to the total operating income),
- expenditure (financial or in-kind inputs that aim at producing new fixed assets or improvement, e.g. reconstruction, extension, development or modernization) of existing items of tangible property, and also inputs in the so-called first equipment),
- gross turnover profitability ratio (relationship of gross financial result to the total operating income), and
- net turnover profitability ratio (relationship of net financial result to the total operating income).

These data concern business entities keeping business accounts in which the number of persons employed is over 49, but they do not include universities individual healthcare units, cultural institutions with legal personality and economic entities classified by PKD 2007 (the Polish Classification of Economic Activities) as "Agriculture, Forestry, Hunting and Fishing" and "Financial and Insurance Activity".

Due to the problem of access to shorter periods for each variable, annual data were used to extend their scope to the maximum. The pilot research carried out here will be followed by the selection of the most likely diagnostic variables, which will require examination of their properties and application of complex statistical tests.

3. Examination of correlations between a number of enterprise bankruptcies and selected variables in 2004–2015

Table 2 shows correlations between the extent of enterprise bankruptcies, selected macroeconomic variables and financial indicators.

The strongest correlation was indicated between the number of enterprise bankruptcies and the size of state revenues from CIT. Its level obtained -0.583 means high correlation (by J. Guilford's scale). The value calculated in this case, $p = 0.047$, is lower than the assumed significance level ($p < 0.05$). Hence, the obtained correlation coefficient is significant. Out of the remaining correlations, the relatively strongest appears to be the one between the number of enterprise bankruptcies and the size of direct foreign investments (-0.491 mean correlation) as well as the number of enti-

Table 2. Correlations between a number of enterprise bankruptcies and selected variables in the years 2004–2015

Variable	Correlations;Marked correlation coefficients are significant where p < 0.05000 N = 12
	Enterprise bankruptcies
Gross domestic product	0.0521
	p = 0.872
Business entities deregistered from REGON	-0.3932
	p = 0.206
Revenue from CIT	**-0.5830**
	p = 0.047
Revenue from VAT	-0.1719
	p = 0.593
Cash liquidity ratio	-0.0815
	p = 0.801
Quick liquidity ratio	-0.1501
	p = 0.641
Current liquidity ratio	-0.1818
	p = 0.572
Short-term liabilities	-0.0211
	p = 0.948
Long-term liabilities	0.1711
	p = 0.595
Business cycle indicator	-0.2892
	p = 0.362
Total operating income	0.0121
	p = 0.970
Gross financial result	-0.1051
	p = 0.745
Net financial result	-0.0785
	p = 0.808
Cost ratio	0.1342
	p = 0.678
Expenditure	-0.1877
	p = 0.559
Net turnover profitability ratio	-0.0968
	p = 0.765
Direct foreign investments	-0.4910
	p = 0.105
Gross turnover profitability ratio	-0.0743
	p = 0.818

Source: Author's own study.

ties deregistered from REGON (correlation 0.39). For other variables, correlations were lower than 0.3 (weak correlations), and part of them did not exceed 0.1 – slope correlations with the relation to the gross domestic product at the level of 0.052, cash liquidity ratio – 0.080, gross turnover profitability ratio -0.074, the net turnover profitability ratio -0.097, the net financial result -0.078, short-term liabilities -0.021, and the lowest with the total operating income – 0.012.

Table 3. Analysis of the correlation between enterprise bankruptcies and revenues from CIT

Variable X and Variable Y	Correlations;Marked coordinates of correlation are significant where p < 0.05000										
	Mean	St. deviation	r (X, Y)	r2	t	p	Significant	Stable Y	Slope Y	Stable X	Mean
Revenue from CIT	22330.04	4238.036									
Enterprise bankruptcies	723.83	192.320	-0.583024	0.339917	-2.26927	0.046628	12	1314.627	-0.026457	31629.65	-12.8477

Source: Author's own study.

The coefficient of determination is 0.34, which means that the variability of the enterprise bankruptcy number is justified by variability of revenue from CIT only in 34% of cases (Table 3). The materiality level for statistics is -0.046, which means that the coefficient of correlation differs significantly from 0. Therefore, the null hypothesis about the lack of relationship between the number of enterprise bankruptcies and revenue from CIT can be rejected (Tables 4 and 5).

Interestingly, the statistical analysis of the enterprise bankruptcy number and the number of business entities deregistered from the REGON database did not prove any relationship, as it might seem obvious.

Table 4. Descriptive statistics of the enterprise bankruptcy number and the number of entities deregistered from the REGON database in 2004–2015

Variable	Descriptive statistics							
	Mean	Mean geom.	Median	Aggregate	Minimum	Maximum	Std. deviation	Variable coordinates
Enterprise bankruptcies	723.8	699.2	732.00	8686	411	1116	192.32	26.57
Entities deregistered from REGON	18097.3	17441.5	16828.50	217167	11728	30958	5540.44	30.62

Source: Author's own study.

The value of the correlation coefficient between the number of enterprise bankruptcies and the size of entities deregistered from the REGON database was -0.39, which proves a moderate linear relationship between these variables.

Table 5. The analysis of a linear correlation between the enterprise bankruptcy number and the number of entities deregistered from the REGON database

Variable X and Variable Y	Marked correlation coefficient is significant where p < 0.05000										
	Mean	St. deviation	r (X, Y)	r2	t	p	Significant	Stable dep.: Y	Slope dep.: Y	Stable dep.: X	Mean
Entities deregistered from REGON	18097.25	5540.437									
Enterprise bankruptcies	723.83	192.320	-0.393	0.154	-1.352	0.206	12	970.84	-0.0136	26296.4	-11.327

Source: Author's own study.

The coefficient of determination is only 0.15, which means that variability of the enterprise bankruptcy number is only in 15% justified by the variability of the number of entities deregistered from the REGON database. The materiality level *p* for the statistics is 0.206, which means that the coefficient of correlation does not significantly differ from 0. Hence, there are no grounds to reject the null hypothesis that there is no relationship between the number of enterprise bankruptcies and the number of entities deregistered from the REGON database.

Therefore, the analysis of correlation did not confirm any significant relationship between the number of enterprise bankruptcies and the selected variables. A linear relationship was only indicated in the case of revenue from CIT. Undoubtedly, the remaining relationships should be subject to a detailed analysis and expert evaluation if only for the nature of those variables (time series).

Summary

Enterprise bankruptcy still represents a broad research area, which is also proven by the analyses carried out in this paper. The difficulty in finding any relationship between a number of business unit bankruptcies and selected macroeconomic aggregates as well as financial indicators showed how incomplete the statistics of bankruptcies are in Poland. A lot of companies go bankrupt and cease to exist with no insolvency proceeding. Consequently, there is a shortage of data for a comprehensive evaluation of this phenomenon. Undoubtedly, there should be more emphasis on involvement of experts and insolvency practitioners in monitoring this problem and identifying negative signals from the company's environment. Inadequate and incomplete figures

may not inhibit further research or the use of other tools to limit possible growth in the number of enterprise bankruptcies. Those companies that disappear from the market beyond legal proceedings should also be the subject of further detailed research.

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Upadłość przedsiębiorstw a wybrane agregaty makroekonomiczne oraz mierniki finansowe

Artykuł dotyczy problemu bankructw i upadłości przedsiębiorstw w Polsce. Przedstawiono wybrane aspekty teoretyczne zjawiska bankructw przedsiębiorstw. Zostały przeanalizowane zależności pomiędzy liczbą upadłości podmiotów gospodarczych a wybranymi wielkościami makroekonomicznymi oraz wybranymi wskaźnikami finansowymi przedsiębiorstw w okresie 2004–2015. Analiza korelacji potwierdziła istnienie związku liniowego pomiędzy liczbą upadłości przedsiębiorstw a dochodami z podatku CIT.

Enterprise Bankruptcies Versus Selected Macroeconomic Aggregates and Financial Indicators

The paper deals with the bankruptcy of enterprises in Poland and the main theoretical aspects of bankruptcy of enterprises in particular. The author analysed correlations between the number of bankruptcies of business entities and selected macroeconomic figures and financial indicators of enterprises in the period 2004–2015. The correlation analysis confirmed the existence of a linear relationship between the number of bankruptcies of enterprises and income from CIT.