
DETERMINING THE RELATION BETWEEN THE BUSINESS ENVIRONMENT AND COMPANIES SOLVENCY FACTORS IN THE POST – CRISIS PERIOD

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Abstract. *In scientific literature, there aren't clearly enough formulated reasons behind causing the solvency component elements changes that would help all companies to prepare for possible insolvency changes. Methods of analysis evaluate following variables: corporate income flows, liabilities amounts, short-term and long-term changes in assets, capital amount, their relative indicators. However, little attention is given to external environmental factors affecting the development of these indicators. The aim of this research is to establish the impact of business environmental factors for companies' solvency indicators. The business environmental impact assessment seeks to determine just the external – macroeconomic business environment influence for companies' solvency changes. After identifying the key changes of business environment factors and basic companies' solvency trends, variables were calculated the dependency was expressed in Pearson correlation coefficients. The evaluation of environmental factors, the main solvency indicators in the sector of warehousing and transport services companies and of the correlation relation determined a statistically significant relationship between companies' solvency and gross domestic product, inflation, the tax burden, shadow economy, corruption control, number of companies in the sector and interest rate changes. The study identified following dependencies: interest rates, the growth of inflation reduces the debt-to equity ratio, the decrease of the extent of shadow economy and the growth of corruption control increases companies' debt ratio value, an increased number of companies reduces companies' debt ratio values. The received statistical relationships and their evaluation of the reliability confirmed the study hypothesis about the statistical significance of the business environment economic factor effect for companies' solvency changes.*

Keywords: *warehousing and transportation services sector, the company's solvency, business environment factors, dependency of variables, Pearson correlation coefficients.*

1. Introduction

The changing economic growth rates, inflation, and an unstable environment all pose a challenge for companies operating within the market that seek to maintain a stable level of income or profit. Companies are not always able to properly prepare for environmental change and to assess the damage it causes for operation activities. The suspension of economic activities and the initiation of bankruptcy proceedings due to the critical solvency of a company negatively affect the socio-economic development of a

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country. Due to a decrease of the national economy growth, investors and creditors lose their invested funds. Meanwhile, rising corporate tax debts and payments of incapacities reduce the country's budget revenues. Some companies are facing solvency problems directly – due to an improper management of resources, planning, and an ignorance of environmental changes, while others do so indirectly – concerning the failures of latter companies to fulfill obligations.

The analysis of relevant scientific literature revealed that despite the multiplicity of the investigations of insolvency or bankruptcy prediction together with the adaptation of timely identification techniques for market companies operating in the Lithuanian field, the insolvent number of companies is decreasing only slightly. Krivka (2013) analyzed the impact of economic changes for corporate performance and emphasized the importance of identification in avoiding insolvency and bankruptcy. Silvanavičiūtė (2008) sought to identify insolvency caused by economic and social problems. Stundžienė and Blikiene (2012), Pridotkienė et al (2008), Grigonytė and Sūdžius (2009) analyzed the reasons that caused insolvency and payment risks based on bankruptcy prediction methods. Martirosianienė (2010) sought to identify the characteristics of a company's insolvency. Jasienė and Laurinavičius (2009) studied the main problems that arise for companies in credit risk management and evaluated their influence on the formation of corporate insolvency. The application of bankruptcy models for the identification of insolvency and their specifics in Lithuania were all studied by Charitonovas (2004) and Pridotkienė et al (2008). The studies of foreign scholars in literature, in contrast to the studies by Lithuanian economists, are frequently encountered in topics pertaining to insolvency and its causes rather than to bankruptcy analysis. Bemann (2005) compared different studies, identifying reasons for insolvency and the similarity of forecasts. Didenko and Miežels (2012), Bufford (2012) studied the substantial differences of insolvency cases in specific groups of companies. Within the scientific research of Davydenko (2012), the basic characteristics and differences of insolvency, illiquidity and the events of default consumption were identified. Nguyen (2005), Mackevičius and Sneiderė (2010), Altman et al (2011) studied the statistical methods and their application in the financial exhaustion, insolvency and bankruptcy prediction.

Models that are widely used in scientific studies are not suitable for the overall prediction of solvency decrease and for the purpose of obtaining significant results. Models require to be adapted individually for each company. It is assumed that there are not clearly enough formulated factors underlying solvency constituent elements changes that would help all companies to prepare for possible changes in solvency. Methods analysis evaluate corporate income flows, liabilities amounts, short-term and long-term changes in assets, capital amount and their relative indicators, but little attention is given to external environmental factors influencing the development of these indicators. Enterprises and their activity are constantly surrounded not only by an internal one, but

also by an external environment. Certain scientific studies emphasized the importance of the internal company environment, assessing the solvency of the companies' changes, relating it with inadequate management, the lack of financial and economic analysis. Changes of the external environmental, on the other hand, companies cannot control, so it becomes essential to assess its impact on the analysis, the impact of changes in the business environment to the company's financial activities, changes in solvency and the threat that insolvency poses to growth. The assessment of the impact by the external business environment allows companies to more easily identify business environment benevolence and the dangers of solvency changes.

In the modern business environment, the decrease of companies' solvency is influenced by different causes, which include the internal characteristics of a company, the external environmental factors and the macro-economic policy of the country. Companies cannot control the change of the external business environment, so its influence analysis becomes relevant in assessing how changes in the business environment impact the company's financial activities, solvency changes and the growth of insolvency risk. Without examining the effects of the external business environment changes on the financial performance of companies, it is problematic to assess whether or not the external business environment changes have statistically significant effects and how environmental influence can be identified and limited. **The research problem** is associated with the business environment factors and the lack of their impact identification. It affects corporate financial performance and solvency changes. Certain scientific studies emphasized the importance of the internal company environment, assessing the solvency changes, relating it with inadequate management and the lack of financial and economic analysis. Meanwhile, the external business environment impact assessment allows companies to more easily identify the benevolence of their business environment and assess the dangers posed by solvency changes. Given the lack of studies on the subject, the selected research directions becomes relevant.

The research aim is to establish a statistical connection between business environment factors and changes of solvency in the warehousing and transportation services sector companies. Business environmental impact assessment seeks to determine only the external – that is, the macroeconomic business environmental impact for changes in companies' solvency. Given the objective of the study, the internal causes of insolvency are not evaluated. The main external business environment factors have been chosen as independent variables:

1. Economic: GDP value and changes in Lithuania and the European Union, inflation, unemployment rate, the tax burden, the extent of shadow economy, the index of corruption control;
2. Market factors: the number of companies in the sector, the number of bankrupt enterprises in the sector and in Lithuania, interest rate changes and cargo turnover changes in the country;

3. Other factors: the index of political stability, the government's performance and the quality of government's management indices.

The methods used by authors are analysis, synthesis and abstraction of scientific literature data, the summary and comparison of results obtained from scientific literature and empirical research, statistical data reliability assessment methods, correlation and regression analysis.

2. Review of theory and literature

The business environment is defined as a complex political, economic, cultural, technical and social factor as a whole, affecting businesses and their operational efficiency. Meanwhile, the modern business environment is becoming increasingly complicated, global and no longer meets the equilibrium state (Stripeikis, 2008). Environmental monitoring of a country or a company (Vaiginienė, 2003 cites Lim et al) can be carried out using a three-level model: irregular (temporary) models, which are used when there is a crisis, periodic environmental assessment and regular models. Our analysis of relevant scientific literature identified that a permanent businesses environmental analysis helps to reduce the adverse impact of environmental changes and the environmental impact on the company's financial performance. One of the biggest reasons for the successful operation of companies is the ability to favorably accept changes of their environments. The need to assess environmental impact can be supplemented by the fact that while the occurring environmental factors are dynamic, the timeless ability of companies to assess environmental factors helps them prevent the financial and operating imbalance, perceived as a business risk (Žvirblis, Zinkevičiūtė 2008). The environmental evaluation of changes, the identification of emerging risks and opportunities helps companies gather information about the business environment, making it is easier to adapt in a changing environment. Country policy, implemented in a changing business environment, or the development of a successful economic activity can become a limiting factor or component of stemming. Therefore, the analysis of the main elements is gaining great importance. The business environment conditions are an important factor for the development and provide the essential guidelines for the change of macroeconomic environmental forecasting. It was found that the importance of the assessment of business environmental components is reflected through business environment factors and their variation analysis and the interdependence of the company's financial performance changes. This explains the situation that occurs when a growing number of insolvent companies, makes a potentially insolvent company pay more attention to financial analysis techniques, the assessment of its financial condition and the management of insolvency, so that the company could make the right operational decisions on time, avoiding the risk of insolvency. It is noted that the increased attention to environmental

changes is paid and its assessment is assigned only when economic recession occurs or the insolvency of companies grows rapidly.

According to research data, most companies rely on general economic conditions assessments, carried out by public or non-governmental institutions and organizations. JSC *Creditreform Lithuania* regularly summarizes the financial statements of companies in order to assess the credit risk of companies. The index, which evaluates the risk, according to the authors of *Creditreform Lithuania* reports, is calculated using the number of points from 100 to 600. It shows the companies capabilities to meet its financial obligations over the next 12 months. The calculated rating of the companies covers more than 47 000 companies, which are classified as large, medium and small businesses. The World Bank for environmental assessment applies the “Doing Business” business conditions benevolence valuation model. The business conditions benevolence evaluation is based on methodology (practical application of the methodology and results from the trial), while the report of the study consists of parts, analyzing the different regions of the world and their business conditions benevolence. Meanwhile, the magazine’s *The Economist* unit *The Economist Intelligence Unit* (EIU) conducts an annual business conditions (environmental) benevolence analysis which gives an opportunity for companies to consider the possible risks and plan activities related to foreign countries. The *Heritage* foundation economic freedom survey findings provide the concerned countries standings, prepared in accordance with the criteria of economic freedom, which is calculated by the ten defining factors of the evaluation results, forming the information about an individual’s fundamental right to manage their assets and benefit from it (Index of economy freedom, 2014). These methodologies include large-scale data in the various countries of the world. The indicators are calculated based on the data of the previous periods, some of which are rarely updated, and some accuracy is necessarily limited to the non-observed economic activity consequences. Therefore, factors affecting the business conditions benevolence list must be concise, and it should include only the most important factors. The use of these methods, assessing environmental effects on the financial results of operations is limited to certain general market trends. According to Stundzienė and Bliekienė (2012), the importance of environmental assessment methods is expressed by the relation between the macro environment and the performance assessment of a company, which can anticipate the development trend of companies’ performance indicators if the economic situation in the country changes. For the companies’ development, the macro-environment is more important, the analysis of which is performed as the forecasting of certain individual macroeconomic indicators.

Certain business environmental benevolence valuation models, developed by international organizations, are used for the assessment of international companies’ activities and their perceptible environmental influence. They show the environmental factors that may influence the overall business quality and success.

In scientific literature, the assessments of environmental impact dominate two major evaluation methods for the impact of the business environment on business activity – the qualitative and quantitative methods. The most common evaluations of business environment impact on the activities of individual companies or their groups found in relevant scientific literature are the following types of qualitative research methods of macro environment analyses: the PEST analysis (Žvirblis, Zinkevičiūtė, 2008; Kozlinskis, Guseva 2006), the PESTEL analysis (Žvirblis, Zinkevičiūtė, 2008), the SWOT analysis, the environmental dynamics analysis and the scenario analysis. The latter method allows to collect a large amount of information which is needed for the evaluation of impact done on companies' performance. It should be noted that for a business operating within the international market, the environment analysis is broadened with a social and political factors analysis. The PEST analysis involves four key aspects of the external business environment: political, economic, social and technological. This method is suitable for evaluation of an internationally operating company's macro environment, in this case involving the international political analysis of the situation, relations with the authorities, the regulatory environment, economic growth, inflation, the factors of production prices, currency fluctuations, changes in consumption and other aspects. Dockalikova and Klozikova (2014), while analyzing the analytical elements of PESTEL, distinguish that every element of the analysis has a certain pre-set weighting, which shows the analyzed factor's impact for the entity. According to the factors, coefficients can be distinguished into the essential environmental factors influencing changes in the financing activities of companies – tax policy, changes in purchasing power, social mobility, government support of technology development, the ability to control pollution processes and the government's regulatory policy impact. Distinguished factors cannot be the indicators of only one assessment, because depending on the business sector, the specificity, the surrounding environment, the impact of factors can increase or disappear completely.

The PEST and PESTEL analyses provide a general view of the company, the business environment or market surrounding environment and of the main influencing factors. These analyses differ because of the extent of valued aspects. The political and legislative (legal) factors shape the benevolence opportunities to identify a number of environmental changes in the future of regional policy. Companies in their practical work must follow the relevant decisions and legislation, understand how to operate with the specific requirements, foresee what will be the influence of one or another adoption of the law, how they will affect the manufacture of goods, services, commodities prices, the companies own cash flow and the insolvency threat to growth. Frequent political-legal environment changes create additional costs and restrictions for companies. Economic factors are a group of factors that have the greatest impact on the business environment and the companies' profit or loss. In this environment, distinguished factors

explain the means by which the government of a country affects the development or decline of its economy. Based on literary analysis, for the assessment of economic environment benevolence, usually selected are the following factors: economic growth, inflation, employment and other labour market characteristics, interest rate fluctuations, interest rate, investment climate, production factors price level, purchasing power, consumers and businesses disposable income amounts, the change of business cycle stages. Social factors are defined as cultural factors, reflecting the common interests of a country's population. The importance of social factors in assessing the business environmental impact for a company's solvency is emphasized in marketing aspects. Technological factors characterized as such: the current technology infrastructure, banking system specificities, mobile technologies, spread of the internet. Its features and advances in technology can have positive and negative effects on the region's business opportunities within the developed or the existing infrastructure. It is important to pay attention to changes in technology, innovation and the emergence of innovation possibilities, the budget for research and development management regulation. PESTEL analysis additionally includes environmental, economic or sustainable environmental and legal business environment regulatory aspects. Environmental factors assessed as a company's activity impact for environment and environmental development effect to company's long term activity. These factors are important because of the growing pollution and sustainable economic aspects. Environmental environment impact for businesses environment is related to the political-legal environment impact, due to ecological standards requirements for sustainable economic development and higher costs, both in technology application, and their non-use cases. Business environment impact on business activity was analysed as a competitive factor formation, or as the difficulties encountered in the market, reducing the profitability of companies, solvency if the company is unable to take certain actions for the following environmental factors impact reduction. The PESTEL analysis method repeats part of PEST analysis main methods aspects impact, additionally incorporating laws and environmental protection requirements changes impact for business activity.

Environmental dynamics and scenario analysis is distinguished in scientific literature as another environmental change affect valuation method. According to Kaziulionytė (2009), this method helps determine which power leads to changes in the environment. The application of this method confronted with a problem: the more often the forces are changing unpredictably, the harder it becomes possible to predict the situation around. It is assumed that the appropriateness of the method can be seen positively, only for the assess of a limited variability environmental forces and for a prediction of their variability in the future.

The SWOT analysis, according to Žvirblis and Zinkevičiūtė (2008), can be used to determine the company's conformity with the external environment. For an external

environment analysis, the environmental aspects of competitiveness are allocated to the opportunities and threats characteristics. The latter characteristic works as a business operations and strategic decisions restriction. In addition to these characteristics, the company's internal strengths and weaknesses characteristics are analyzed. Analyzed factors are used to evaluate the companies (branch, country) competitiveness compared with other companies (branches, countries). Macro environment effects on the financial results assessment can use part of the information obtained by this method as means of identification for the main test guidelines.

In order to complement the above-mentioned disadvantages of the methods, during the PEST analysis, on the basis of expert evaluations, predictable favorable and unfavorable factors are distinguished, and preliminary basic macro environment factors that affect a company's strategy are foreseen. When the analysis is performed together with the environmental dynamics analysis and scenario analysis, it is assumed that this method allows the prediction of a distinguished factor effect with its relative strength and trends. The qualitative research analysis, based on scientific publications and their presented research results revealed that in order to obtain additional information or evaluation of distinguished factors that affect size, during the survey the respondents are selected companies, but there is lack of studies in which the required number of respondents for the reliability of the study and for reflection of the general entirety features would be achieved. The latter features often depend not only on the researcher, but also on the respondents' indifference and interest in the test results and their reliability. Due to these reasons, data obtained by these methods may not adequately reflect the situation, so in most cases, in order to ensure the integrity of the study sample, such studies chose expert evaluation. In assessing the main environmental aspects that affect businesses and changes in its activity should be based not only on individual companies or certain expert's answers, but the statistically proven relationship between macroeconomic variables and company financial performance.

An analysis of scientific literature discovered that the quantitative methods assessing business environment that affect the companies' activity are not used very often due to rather complicated methodologies. In examining the potential environmental quantification methods, quantitative method is distinguished – that is, the multicriterial analysis. In this group distinguished are the following methods: Simple Additive Weighting – SAW method, Analytical Hierarchy Process – AHP method, Technique for Order Preference by Similar To Ideal Solution – TOPSIS method, and Complex Proportional Assessment – COPRAS method (Žvirblis, Zinkevičiūtė, 2008).

A qualitative study in assessing the business environment and the effect it does to companies' activity is the primary analysis of data. The main business environmental assessment stage in studies is distinguished as the quantitative evaluation of environmental factors, the influence of business entities performance results assessment

by the regression analysis method. In order to obtain the results reliability in the studies mentioned, methods which evaluate the environmental impact of business are classified in the ranking, classification, evaluation and optimization group of methods. By applying all of these methods, it is possible to get a reliable, comprehensive assessment of the business environment's both qualitative and quantitative aspects. According Krivka (2013), in order to increase the reliability of data, quantitative indicators from companies' financial statement and business environment changes are supplemented additionally adding qualitative elements obtained from business units during the survey. Not all companies' financial data may correspond to the real situation, having in mind the ongoing informal economic activity and its effect of non-inclusion in the financial statements. Survey results cannot avoid the human factor influence, so indicator results mentioned above should be evaluated carefully. Aggregate data are applied for estimating the situation in the national market, business efficiency, the relationship between companies' performance and business environment changes. According Stundžienė and Blikienė (2012) often environmental effects on companies' activity change assessment and, in addition to the already aforementioned methods, can be performed on a variety of relative statistical indicators calculations and comparisons. In that case, without changing the indicator, their comparison is used in the correlation and regression analysis to help assess the interdependence and connectivity of both variables as well as to forecast possible changes and their impact on the dependent variable.

The assessment of a country's macroeconomic environmental changes on companies' insolvency formation evaluates the following indicators: companies short-term and long-term solvency, turnover rate, and other individual aspects of the company's activities, as revenue, number of employees, workers' wages. According Pridotkienė and Pekarskienės (2008), for the foreign buyer, or in the international market, the country's environmental risk factor must be presented in a functioning business insolvency risk analysis. Meanwhile, the country's enterprises performance, efficiency analysis, compared with the country's economic changes and tendencies allows to identify critical points in economic development and to exclude certain macroeconomic trends that affect companies' financial instability, exhaustion and insolvency.

Taking into account the previous investigations and its effectiveness, a qualitative study possibility is rejected due to respondents' availability and due to the partial reliability of obtained results. In order to eliminate possible errors in qualitative research, this study uses indicators expressed in a quantitative expression. the usage of statistical methods is evaluated as a direct causal link between the distinguished factors which help eliminate from the study those independent variables that have no influence. The study determines a statistically significant relationship between the relevant variables and its result is a variables-dependent measure that helps predict the variables and their dependencies changes. An assumptions analysis of the general business environment

assessment showed that the business environmental assessment necessity is associated with the ability to quickly adapt in a changing business environment and avoid a solvency risk formed due to environmental changes. This analysis identified that the business environment assessment methods and results, provided by global or national organizations and used in companies' activities in seeking the effective adaptation in a changing environment, are valued with skepticism, concerning the data timeliness formed margin of errors. Qualitative PEST, PESTEL and other approaches for assessing environmental impact on company activities is the most commonly used form of study, but the reliability of results obtained by these methods is restricted because of data dependence on the researcher and the respondents prejudices to distinguish the essential factors. The latter methods and their results help identify environmental factors that impact the evaluated variable. The business environment methods practice analysis showed that the use of one method does not provide reliable research results. Considered accomplished environmental influences impact analysis of assessment methods, seeking the final results reliability, in the examined part environmental impact on companies' insolvency is evaluated by quantitative methods. The final environmental factors on companies' insolvency model are prepared on the basis of variables interdependence.

3. Determination of the statistical relation between business environment and solvency factors of warehousing and transportation companies

According to data gathered by *Creditinfo Lithuania* in 2014, usually companies from the warehousing and transport services sector are faced with insolvency problems and these companies experienced the biggest amount of bankruptcies. The analysis, covering all sectors of the Lithuanian economy and environmental factors that might affect the company's solvency changes, is extremely broad. Therefore, in order to obtain accurate and reliable results, not all companies operating within Lithuanian sectors were selected from the survey. A selected sector may reflect statistically significant solvency of the companies changes due to the impact of business environment.

The research sample of this research is the warehousing and transport services sector. The analyzed sector encompasses logistics, freight forwarding, warehousing, customs brokerage and other transport and its infrastructure-related services providing companies. For the research sample, the activity of chosen sector is influenced by the business macro environment and metadata environmental factors. It is assumed that the chosen factors of this sector's business environment that affect companies' insolvency identification and assessment have quite a lot in common as compared with the business environment of other Lithuanian companies.

After identifying the key factors of business environment changes and key subjects' solvency of the companies' trends, the variables were calculated and the dependency

expressed in Pearson correlation coefficients. Through the calculation of correlation coefficients, a presumption was made for data analysis and application of regression select only in case when the Pearson correlation coefficient show strong correlation between the variables, and the statistical p-value data confirm statistical significance ($p < \alpha$). Correlation coefficients calculation results based on the SPSS program, presented in Table No. 1.

TABLE No. 1. Business environmental factors and investigational solvency of the companies paired correlation

	Solvency Ratios	Debt ratio	Quick Ratio	Debt-to-equity ratio	Current Ratio
GDP billion. Lt	,470	-,401	,332	,248	-,257
Inflation in percent	-,126	,885**	-,527	-,843**	,080
The tax burden in percent	-,506	,853**	-,741*	-,711*	-,033
Direct tax burden in percent	-,585	,760*	-,770*	-,608	-,047
Indirect tax burden in percent	-,274	,593	-,610	-,552	-,004
Contributions to special funds burden in percent	-,367	,841**	-,568	-,711*	-,019
Unemployment rate in percent	,202	-,585	,276	,484	,046
Employed population in sector	-,254	,638	-,647	-,566	-,321
The extent of the shadow economy in percent	,446	-,758*	,566	,607	,074
Corruption Perceptions Index	-,393	,422	-,149	-,247	,454
Number of companies in sector	,485	-,757*	,472	,580	-,312
Cargo turnover in the country, billion km	-,146	,527	-,111	-,418	,149
Interest rate in percent	-,597	,796*	-,778*	-,634	-,096
Service sector confidence index	,475	,090	,614	-,127	,511
Control of Corruption Index	,479	-,858**	,648	,708*	-,064
GDP growth in the European Union, in percent	,284	-,086	,738*	,126	,819*

* The correlation coefficient reliability level 0,05

** The correlation coefficient reliability level 0,01

The correlation analysis revealed no statically significant linear correlation relationship existing between companies' solvency ratios and selected business environment factors. For that reason, these indicators dependency is not estimated.

The variable correlation analysis revealed that there is a statistically significant correlation between companies' debt ratio and the following environmental factors: annual inflation in the country (0,885), the tax burden (0,853), understood as contributions to special funds burden and direct tax burden, the scale of the shadow economy in the country (-0,758), increased number of enterprises in sector (-0,757), understood as a strengthening of the competitive environment, corruption control index in the country (-0,858), and interest rates for business entities granted loans (0,796). The growing interest rate, inflation and the tax burden influences the growth of companies' debt ratio.

The assumption is made based on a positive, strong correlative connection showing the correlation coefficients between the variables (see Table No. 1). Meanwhile, the growth of the shadow economy, corruption control and increased number of enterprises in sector is negatively correlated with companies' debt ratio values.

The quick ratio statistically significantly correlated with the direct tax burden (-0,770), and interest rate changes (0,778) and the EU's economic development (0,738), understood as an EU generated GDP growth rate. Among the direct tax burden, interest rate changes and the quick ratio was identified negative correlation connection. It shows that the growth of the above-mentioned environmental factors values decreases companies' capability with mobile current assets cover short-term liabilities. Variable dependency is explained by using its interest rates and the tax burden impact on companies' mobile quantity of the property. If the interest rate is growing, companies more difficult dare to borrow from banks to meet their operating capital requirements. Meanwhile, the tax burden reduces the company's cash flow through the costs of direct taxes. Due to the interest rate growth, the borrowing is restricted, and it reduces the company's operating capital, which may increase the relative value of the obligations, in this case related to the outstanding liabilities to creditors. EU economic growth is associated with higher business prospects. Among variables is set a strong positive linear relationship. The growth of EU generated GDP increases companies' quick ratio. Companies debt-to-equity ratio correlated with the inflation factor, between variables exists negative linear relationship (-0,843). When inflation increases, the debt-to-equity ratio value decreases; accordingly, contrary changes occur if inflation decreases. It is assumed that the rise of inflation in the country negatively affects the solvency of companies.

Established was a strong negative linear relationship (-0,711) between contributions to special funds burden and debt-to-equity ratio. The increase of tax burden decreases the general solvency of the company. A positive linear relationship (0,708) was determined among the corruption control index and debt-to-equity ratio. The more controlled corruption is in the country, the higher the possibility of the company's solvency. The correlation analysis showed that the change in the gross domestic product in the European Union, reflecting a common EU market environment benevolence to business, is positively correlated to company's current ratio (0,819). The growth of business environment benevolence in the European Union, increases companies' ability to cover liabilities in the current moment, from raised value of current assets, excluding inventories. The assumption is made about growing payments without delay, increasing the value of transactions in debt. They increase the mobile short-term asset value or reduce the value of short-term liabilities. Other factors in business environment and the company's current ratio are not interconnected. Received correlation coefficients show a weak or very weak relationship between the variables assessing the linear variables dependencies. According to results received, it is concluded that the Lithuanian

business environment has no statistically significant effect on the company's current ratio changes. It also does not affect the company's current assets, current liabilities and current liabilities covering short-term assets changes.

The correlation analysis revealed the following main environmental factors statistically significant correlating with solvency of the companies' indicators: inflation, tax burden (direct taxes and contributions to special funds), interest rate, the extent of the shadow economy, corruption control, the increased number of companies in the sector and the growth of EU generated GDP. It is assumed that the main statistically significant changes in the solvency of the companies are the related factors in certain aspects associated to the monetary market and its impact on companies' cash flows and property developments.

An analysis of the solvency of companies showed significant differences between the solvency of companies and the liabilities covering options. Given the abovementioned situation, it is assumed that different strengths of business environment changes impact solvency of the companies' indicators and insolvency formation depends on the size of the enterprises. Correlation coefficients estimates presented in Table No. 2.

Calculated correlation relationships between the factors of business environment, in the scientific literature identified as causes of insolvency, and the major companies relative indicators used to assess the solvency of firms are the following: debt-to-equity ratio and debt ratio. These solvency ratios selected during the initial analysis, as indicators which correlated with more than one of the environmental factors, assuming their sensitivity to the change of environmental factors. The correlation analysis showed that in micro businesses (by number of employees), the debt-to-equity ratio strongly correlated with the country's gross domestic product value (0,964), business enterprises direct tax burden (-0,807), the growth of companies' number in the sector (0,781). Companies debt-to-equity ratio is growing with increasing generated GDP value and number of enterprises in the sector. The situation is explained by an improvement of business environment conditions, which leads to greater economic growth and increasing entrepreneurship through new emerging companies. With an increasing direct tax burden, the general solvency of the companies decreases. An evaluation of the debt ratio and environmental factors correlative connection established that the growth of GDP and the number of businesses in the sector decrease the debt ratios. Correlation coefficients are -0,941 and -0,777. Direct tax burden and interest rate changes positively correlated with the debt ratio. The increase of listed environmental factors grows burden on companies due to rising cost of tax payments and restricted borrowing caused by rising interest rates. In small companies, where a number of employee's ranges from 10 to 19, the solvency ratios changes significantly correlated only with the GDP value and its changes. An analysis showed the opposite dependency than in the previous analyzed case. When the value of the GDP grows, corporate debt-to-equity ratio decreases, while the debt ratio increases.

TABLE No. 2. Business environment factors and solvency of the companies paired correlation detailing companies' groups by number of employees

	D/E 0-9	DR 0-9	D/E 10-19	DR 10-19	D/E 20-49	DR 20-49	D/E 50-249	DR 50-249	D/E 250+	DR 250+
GDP billion. Lt	,964**	-,941**	-,855**	,881**	,507	-,259	-,546	,694	,534	-,280
Inflation in percent	-,309	,319	-,034	,000	-,812*	,756*	,729*	-,716*	-,907**	,936**
The tax burden in percent	-,596	,633	,197	-,205	-,825*	,860**	,931**	-,883**	-,904**	,883**
Direct tax burden in percent	-,807*	,836**	,454	-,459	-,794*	,766*	,954**	-,962**	-,836**	,752*
Indirect tax burden in percent	-,497	,503	,300	-,309	-,586	,514	,734*	-,819*	-,763*	,825*
Contributions to special funds burden in percent	-,233	,281	-,189	,181	-,740*	,877**	,740*	-,593	-,808*	,837**
Unemployment rate in percent	,110	-,039	-,539	,571	-,694	,791*	,651	-,490	-,785*	,818*
Employed population in sector	-,231	,179	,510	-,515	,478	-,701	-,336	,130	,523	-,642
The extent of the shadow economy in percent	,181	-,237	,173	-,180	,697	-,871**	-,679	,525	,760*	-,827*
Corruption Perceptions Index	-,677	,631	,567	-,638	-,465	,179	,371	-,509	-,655	,432
Number of companies in sector	,781*	-,777*	-,536	,561	,743*	-,611	-,748*	,815*	,915**	-,793*
Cargo turnover in the country, billion km	,270	-,242	-,484	,470	-,388	,545	,205	-,044	-,547	,654
Interest rate in percent	-,692	,736*	,322	-,316	-,816*	,861**	,942**	-,897**	-,838**	,794*
Service sector confidence index	,586	-,629	-,457	,415	,064	-,142	-,514	,525	-,102	,164
Control of Corruption Index	,636	-,661	-,300	,311	,856**	-,829*	-,858**	,843**	,922**	-,871**
GDP growth in the EU in percent	,231	-,303	,036	-,074	,248	-,420	-,552	,441	-,117	,098

* The correlation coefficient reliability level 0,05

** The correlation coefficient reliability level 0,01

D/E – debt-to-equity ratio; DR – Debt ratio

The analysis of small companies, where the number of employees ranges from 20 to 49, found the debt-to-equity correlation with environmental factors and a statistically significant correlation was determined between the mentioned ratio and these environmental factors changes: negative linear correlation was observed for inflation (-0,812), direct taxes (-0,794) and contributions to special funds (-0,740) burden, interest rates (-0,816) changes, a positive linear relationship with changes in number of companies in the sector (0,743) and control of corruption index (0,856). Companies debt ratio statistically significantly correlated with the inflation (0,756), direct tax burden (0,766), companies paid income tax burden (0,791), interest rates (0,861). The increase of mentioned environmental factors grows companies' debt ratio. The dependency of changes is explained by the impact of identified factors for companies' cash flow limitation. The growth of interest rate grows companies' debt due to restricted access to borrow operating capital for development, and the growing burden of credit obligations over the floating rate. Companies debt ratio values grows when the amount paid to special fund increases. A negative linear relationship established between the scale of the shadow economy (0,871), corruption control index (-0,858) and company debt ratio. When shadow economy scale decreases, companies' debt ratio grows, accordingly changes corruption control index value.

In companies where the number of employees ranges between 50-250, the debt-to-equity ratio statistically significantly correlated with the inflation (0,729), direct tax burden (0,954), indirect tax burden (0,734), contributions to special funds burden (0,740), interest rate changes (0,942), number of companies in sector changes (-0,748) and corruption control index (-0,858). Accordingly, factors correlated with companies' debt ratio. In this case, the calculations of the correlation coefficients have not established a correlation relationship between the debt ratio and contributions to special funds burden. In all other cases, the mentioned factors connection from positive changes to negative and vice versa. In large enterprises (250 and more employees), solvency indicators and environmental factors correlation analysis determined those statistically significant correlations: a positive correlation connection between the debt-to-equity ratio and the shadow economy extent (0,760), number of companies in sector (0,915) (understood as the competitive environment) and control of corruption index (0,922). The growth of environmental factors quantitative expression increases companies' debt-to-equity ratio. The negative linear relationship established between the debt-to-equity ratio and inflation (-0,907), the tax burden falling upon the businesses (-0,904) and interest rates (-0,838). The debt ratio of companies strongly correlates but, in contrast, also correlates with the relevant environmental factors.

4. Conclusions

The assessment of business environment factors and solvency of the companies' indicators correlation dependency, identified following warehousing and transport services sector, business environment and solvency of the companies' indicators interdependence tendencies:

The extent of the shadow economy and its growth in medium-sized and large companies is directly related to the stability of companies' solvency.

The rise of interest rates reduces the opportunities for companies to borrow, which forms a negative business environment impact on changes in solvency of the companies' indicators. The threat of insolvency in companies is growing.

Larger companies with more employees are confronted more often with the burden of tax impact on solvency of the companies changes than small companies. In companies with more than 50 employees, the debt-to-equity ratio and debt ratio correlated with the tax burden reflecting environmental factors.

The general growth of national economy statistically significantly correlates only with small companies' solvency indicators. An established variables relationship leads to the assumption about the company's solvency stability when company's assets (long-term) and the amount of capital is sufficient for liability.

The growth of competition in the market, seen as an increased number of enterprises in the sector, positively correlated with the growth of the companies' solvency and debt reduction. The opposite trend seen in the group of medium size companies (50-250). It shows that growth of competition in the market in the relevant companies promote business development. As a result, companies' solvency indicators reflect in decreasing companies' debt, as well as decreasing the risk of losing solvency.

Corruption, as a company frustration-causing phenomenon, significantly correlates only with medium and large companies' solvency indicators. It is assumed that small companies do not face the corruption influence and are not able to influence the development of corruption.

There was no statistically significant correlation coefficients observed in the foreign environmental impact for warehousing and transportation services companies' solvency indicators.

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