ISSN 2392-1641

Economics and Business Review

Volume 1 (15) Number 4 2015

CONTENTS

ARTICLES

BOOK REVIEWS

Poznań University of Economics Press

Paper based publication

ISSN 2392-1641

POZNAŃ UNIVERSITY OF ECONOMICS PRESS
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Printed and bound in Poland by:
Poznań University of Economics Print Shop

Circulation: 300 copies

Economics and Business Review, Vol. 1 (15), No. 4, 2015: 69–83
DOI: 10.18559/ebr.2015.4.5

Business tendency survey data. Where do the respondents' opinions come from[1]?

Sławomir Kalinowski,[2] Małgorzata Kokocińska[2]

Abstract: The article deals with the topic of business tendency survey data. The aim of the article was to research whether the respondents' opinions reflect the variability of factors influencing the economic situation of enterprises. For the research the business tendency surveys of Central Statistical Office of Poland in 2000–2015 for manufacturing industry have been used. Based on the outcome of earlier research a general hypothesis has been assumed which states that the opinions of enterprises'[3] containing qualitative variables are substantially influenced by quantitative variables which are based on the economic situation of businesses. The research has been done using the methods of time series analysis (Census II and Hodrick-Prescott filter) and the interdependence analysis method (Pearson correlation coefficient with time lags and Granger causality test).

Keywords: business fluctuations, business tendency survey, qualitative data, business performance measures.

JEL codes: E320.

Introduction

A business tendency survey is considered to be a tool to examine the situation of the economy on the basis of the rational expectations concept [Muth 1961]. According to this there is a relationship between the variability of economic reality with the opinions and approaches of business entities being the most important subjects of this reality. Hence the interest in business tendency surveys and their relationship with the variability of the economic dynamics is increasing. In Great Britain the first surveys were conducted amongst the companies of the Confederation of British Industry. They started in 1958 [Klein and

[1] Article received 29 December 2014, accepted 15 September 2015.

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[3] Those answering questions in the Central Statistical Office's business tendency surveys are managers or entrepreneurs. In the article they are defined as respondents.

Moore 1981a]. The first business tendency surveys in Germany were carried out in 1965 [Striegel 1965]. They combined the opinions of enterprises from the manufacturing sector and consumers. In the following years the research included other sectors of the economy.

Similar research started in Poland in the Institute of Economic Development of the Warsaw School of Economics in 1993. Basing their results on two independent attempts were made simultaneously to build a synthetic business tendency indicator [Stanek 1993; Matkowski 1993] according to the methodology used in the EU. The other institutions in Poland which conducted or still carry out business tendency surveys are the Central Statistical Office, Ipsos-Demoskop and The Institute of Research on Market Economy [Matkowski 2002]. It is worth mentioning that the Poznan University of Economics was also an important research centre as far as the application of qualitative variables as elements of the leading indicators forecasting economic growth [Rekowski 2003].

The objects of lasting interest were the relationships between the results of the surveys and the variability of quantitative data describing the situation of the economy. If the results of the surveys are intended to forecast the economic situation we have to be sure that the opinions of managers and consumers reflect actual economic processes.

The paper is put together as follows. Section 1 reviews the literature on the informational capacity of business tendency surveys' qualitative data. Section 2 presents the methodology and the data used. Empirical results are presented and discussed in Section 3. Chapter 4 was devoted to the regression analysis verifying the variables selection. Conclusions are drawn in the next Section.

1. Results of previous research

The research into the influence of quantitative variables on the qualitative variables from business tendency surveys has been done ever since the latter have been used to forecast the fluctuations of economic dynamics. One of the first was the study by Jochems and De Wit [1959]. Its results confirmed the usefulness of qualitative data to forecast economic dynamics. In another early research Theil used the regression approach in order to compare the qualitative data from the „Munich Business Test" with quantitative data [1952]. The outcome was also positive for the prognostic capacity of qualitative variables.

An important thorough study comparing qualitative with quantitative data was the research by Klein and Moore published in two articles[1981a, 1981b]. They tested the outcome of business tendency surveys carried out amongst the companies incorporated in the Confederation of British Industry. In the first article they showed the research results into the coordination of business ten-

dency cycles in the UK economy and the results of the surveys concerning the volume of new orders. Using the method of turning points they carried out research which enabled them to conclude from the evidence presented that surveys of respondents' views on new orders can assist greatly in assessing current economic developments. All of the companies that they examined conformed closely to the growth cycles in the UK economy and to quantitative data on the volume of new orders.

In the second article Klein and Moore examined the qualitative data on inventories, profits and business confidence expressed in the answers to the question: „are you more, or less, optimistic than you were four months ago about the general business situation in your industry"?[4] The evidence in the second study demonstrated that in every case the net balances from the survey, whether in original or cumulated form, conform closely to growth cycles in the UK.

Another important research carried out at the time was a study by Carlson and Parkin. It created one of the standards of the method of research into the interrelations of qualitative and quantitative data [1975]. It is based on the probabilistic approach. It was used by Müller whilst examining the information content of qualitative survey data [2009]. This study was based on data analysis from particular companies. The author, contrary to other approaches, did not use the data aggregated for the whole sector. He compared qualitative and quantitative data for each company separately. The main research comprised almost 13 thousand monthly observations in the period of 04.2005–11.2006. „The analysis of firm-level data on quantitative and qualitative questions presented in this paper allows more direct tests of the rationality assumption. It has shown that survey responses are very reliable. This outcome can be taken as strong support for the basic assumption of quantification methods applied to qualitative survey data" [Müller 2009, p. 9].

An example of research showing the predictive ability of qualitative data for the Polish manufacturing sector are the studies carried out by Research Institute for Economic Development [Adamowicz, Dudek, and Walczyk, 2002; Adamowicz, Klimkowska, and Walczyk 2011]. The outcome of the studies was the acceptance of the usefulness of quantitative variables for the short term forecast of the production sold by industry. In particular the RIED business indicator (general index elaborated by the Institute) and „expected production" have revealed their prediction power.

All the research presented has indicated the substantial prediction power of qualitative data from business performance surveys. This study concentrates on how real processes in companies and their vicinity are reflected in the respondents' replies. The other distinctive feature of this research the consideration of a much wider spectrum of quantitative variables.

[4] These issues correspond with qualitative variables I, OM, GES i FES from the study presented here.

2. Qualitative and quantitative variables. Research hypotheses

The period of the analysis is 2000–2015. All the variables used in the research are based on quarterly data. Such a uniform time period has been used because of the lack of accessible monthly quantitative data. The results of business tendency surveys were calculated as arithmetic means from the three monthly data respectively. Similarly monthly data on the employment in manufacturing industry were adjusted. Quarterly indices of prices of sold production were calculated as a geometric mean from the respective monthly data.

All the variables expressed in monetary units were changed into a series of fixed prices from the first quarter of 2000. All the time series of qualitative and quantitative variables were subjected to seasonal adjustment with the help of Census II with correction due to unusual events. The series of variables under the influence of long term trends were checked using the Hodrick-Prescotta filter [Hodrick and Prescott 1997]. It referred to GDP, the sold production of industry and manufacturing industry employment. In the last phase the indices of variables were calculated dividing the value from a given quarter by the value from the analogical quarter of the previous year.

Six qualitative variables were examined. They come from business tendency surveys conducted by Polish Central Statistical Office:
- *GES* – current, general economic situation of a company,
- *FES* – forecast economic situation of a company,
- *I* – current level of inventories of a company,
- *R* – level of receivables of a company,
- *P* – current ability of a company to pay its liabilities,
- *FP* – future ability of a company to pay its liabilities.

The respondents can choose from one of three replies to answer the question about the current situation of a company (GES):
a) good,
b) satisfactory,
c) bad.

In the case of the question about the predicted situation of a company (FES) the respondents should consider a three-month-perspective. They can choose from one of the three answers:
a) it will improve,
b) it will be the same,
c) it will worsen.

The values of these qualitative variables are calculated as the difference between a relative number of a. answers and the relative number of c. answers. The number of b. answers is omitted [Walkowska 2011]. The original time series of the variables GES and FES, in order to eliminate the calculation problems with indices of negative values, have been linearly transformed by adding 100%. The basis for the variable I value was the question from the business tendency sur-

vey about inventories. It says: "what is the current level of available stocks in your company?". The respondents can choose from one of the following replies:
a) too high,
b) appropriate to demand,
c) too low.

The values of the qualitative variable I are calculated based on the indices equal to the difference between the relative number of the c. replies and the relative number of the a. replies. In conformity with the intention of the survey the a. answer is supposed to indicate the deterioration of the economic situation resulting in the lower demand for the products of a company. If we adopt such an interpretation we have to exclude the possibility of choosing the first answer in a situation of stock mismanagement, irrespective of the business tendency. In other words we reject instances in which the stocks are too high because the management of companies have overestimated the growth in demand for their products.

The question from the survey concerning the variable R reads: „how is the level of your general receivables in your company changing"? Respondents can choose from one of the following answers:
a) it is increasing,
b) it remains constant,
c) it is decreasing.

The way in which the questions and the replies are formulated does not make it possible to reflect the influence of economic fluctuations on the level of a company's receivables. The fact that the term "general receivables" does not exist in the terminology of financial reports can be ignored. Unfortunately we cannot accept the mistake in the question about the level of receivables nor about the promptness of their collection. In general the level of receivables increases if revenue increases and it decreases if the sales are falling. The improvement in the business tendency brings about the increase of sales revenues resulting in the increase of receivables. The index "the level of receivables of a company" (dependent upon the *R* variable) published in the business tendency survey results, is counted as a difference between the percentage share of the respondents who chose the c. answer and those who chose the a. answer. So its positive value means that those whose receivables decreased outnumber those with a rising level. The question should deal with the promptness or waiting time for the incoming payment. Then no problems of interpretation will arise.

The issue of liabilities on deliveries is dealt with in two questions. One is about the current situation, the other about the future. The opinion on the current situation is expressed by the answers to the following question: "how is your company's ability to pay financial liabilities on an ongoing basis changing?":
– it is improving,
– it is the same,
– it is getting worse.

The index „the ability to pay financial liabilities on an ongoing basis" used as the basis to calculate the P variable, is calculated as the difference between the percentage share of respondents choosing a. answer and the respondents choosing c. answer. This reflects correctly the way in which economic fluctuations can influence a company's ability to meet its liabilities. The positive value indicates economic acceleration and the negative means a slowdown.

The other factor from the indices examining the opinions of respondents on the payment of liabilities, deals with forecast. It is the basis used to build the *FP* variable. Here the respondents answer the question: "how will your company's ability to meet financial liabilities change in the following three months"? They can choose from the same set of answers as in the previous question. Also, as far as this element of the survey is concerned, the accuracy of the formulation and the ease of interpretation of the can be considered.

The set of quantitative variables will contain the macroeconomic data of the Polish economy and the financial parameters of companies of the Polish manufacturing industry:[5]

- *GDP* – business cycle of gross domestic product,
- *OM* – operating margin,
- *IPS* – business cycle of manufacturing industry production sold,
- *IE* – business cycle of manufacturing industry employment,
- *IPI* – manufacturing industry price index,
- *IT* – inventory turnover in days (average for manufacturing industry),
- *RT* – receivables collection period in days (average for manufacturing industry),
- *PT* – payables payment period in days (average for manufacturing industry).

The procedure of using quantitative variables has already been presented. We have only to indicate that a substantial positive influence is expected of the quantitative variables *GDP*, *IPS*, *IE* and *IPI* on the qualitative variables *GES* and *FES*. The issues connected with the definition of the applied financial indicators should be explained in more detail. The first is the operating margin (*OM*). In order to avoid the possibility of calculating the changes from negative values, the values of the indicator were increased by one:

$$OM = \frac{S}{OC} = 1 + \frac{EBIT}{OC},$$

where:

OM – operating margin,

[5] The data source was two publications by the Central Statistical Office: *Biuletyn Statystyczny* [*Statistical Bulletin*] and *Wyniki finansowe podmiotów gospodarczych* [*Financial Performance of Enterprises*].

S – sales revenues,
OC – total operating costs,
$EBIT$ – earnings before interest and taxes.

The bigger the value of the variable OM the better the economic situation of the company. This variable should positively influence the qualitative variable GES.

The second is the inventory turnover in days. It has been defined as:

$$IT = \frac{\overline{I}}{OC} \cdot 90,$$

where:
IT – inventory turnover in days,
$\overline{I}$ – average level of inventory (the arithmetic mean from the beginning and end of a quarter),
OC – quarterly total operating costs.

The increasing value of the IT indicator means rising problems with sales. Its increase can mean economic slowdown. One can expect a negative correlation between the value of IT and the values of qualitative variables GES and I.

The third financial indicator whose volatility should influence the opinion on the economic situation of the company is the receivables collection period in days:

$$RT = \frac{\overline{R}}{S} \cdot 90,$$

where:
RT – receivables collection period in days,
$\overline{R}$ – average level of receivables (arithmetic mean from the beginning and end of the quarter),
S – quarterly revenues from sales.

The higher the value of the indicator, the longer the time between the moment of sales and the time of collection of the receivables due for this sale. Normally the extension of this period means problems with cash availability in the time of economic downturn. It is possible to formulate a hypothesis about a negative relationship between the values of the RT variable and the value of the qualitative variable GES.

Due to the incorrect formulation of the question about receivables it is difficult to formulate a hypothesis about the factual relationship between the qualitative variable R and the quantitative variable RT. The prevailing fall in the level of receivables in companies cannot be linked with a shortening of the period of collection of receivables. If sales revenues fall faster than receivables the time of the collection is longer. Such a situation often occurs in a situation of the economic slowdown.

According to the general rule used by the authors of the research, the rise of the qualitative indicator means an improvement in the business tendency. It should then expect a negative relationship between the variable *RT* and the values of the qualitative variables *GES* and *R*.

A quantitative variable dealing with the ability to meet liabilities is the payables payment period in days

$$PT = \frac{\overline{P}}{OC} \cdot 90,$$

where:

PT – payables payment period in days,

$\overline{P}$ – average level of short-term liabilities on deliveries and services (arithmetic mean from the beginning and end of a quarter).

In periods of economic acceleration one should expect a decrease in the value of this indicator, in times of economic slowdown, the payment period of liabilities will be longer. The deciding factor is the change in cash accessibility which strongly depends on economic dynamics.

The research hypothesis in the area of the reflection of the actual situation in respondents' replies about the payables payment ability, shows the negative correlation between the quantitative variable *PT* and the values of the qualitative variables *GES*, *P* and *FP*.

Table 1. Expected signs of Pearson's correlation coefficients

Variables	*GDP*	*OM*	*IPS*	*IE*	*IPI*	*IT*	*RT*	*PT*
GES	+	+	+	+	+	–	–	–
FES	+	+	+	+	+	–	–	–
I	+	+	+	+	+	–	–	–
R	+	+	+	+	+	–	–	–
P	+	+	+	+	+	–	–	–
FP	+	+	+	+	+	–	–	–

The summary of the considerations about the relationships between quantitative variables (columns) and qualitative (lines) is included in Table 1. It is necessary to emphasise that the signs in line *R* were selected based on the general rules for the formulation of survey questions and the calculation of qualitative indices, consisting of a positive relationship between economic dynamics and the survey results. It is worth mentioning that the expected signs of correlation inside the set of qualitative variables are positive because of the uniformity of the relationships with quantitative variables.

3. Empirical research results

The research was carried out using by two methods. Firstly, the cross correlation coefficients for qualitative and quantitative variables were calculated. These values were considered statistically significant, in which case the probability of accepting the zero hypothesis about the lack of correlation is smaller than the significance level $\alpha = 0.05$. Such instances are marked in red in the tables. In the second stage of the research the Granger causality test [Granger, 1969] was used to find the reasons for the different answers to a survey question. Here the level of significance equal $\alpha = 0.05$ was also taken.

Table 2 shows the correlation coefficients of the variable *GES* and the quantitative variables applied with no time shifts and with 1 to 4 quarterly time lags. Time lags mean that quantitative precede qualitative data. For example a two quarter time lag means the relationship between *OM* from the first quarter and the *GES* from the third quarter of the same year.

The values *r* from the first line indicate the accordance with the assumed hypotheses. In the case of variables *GDP*, *OM* and *IPS* the correlation is strong. For the variables *IE*, and *RT* it is moderate and weak in the rest of the cases.[6] However it is worth underlining that for the lags in 1–4 quarters the correlation of the variables *GES* and *IT* rises to moderate. In almost each instance the correlation is statistically significant.

Table 2. Correlation coefficients *r* between qualitative variable *GES* and quantitative variables with quarterly lags

Lags	*GDP*	*OM*	*IPS*	*IE*	*IPI*	*IT*	*RT*	*PT*
0	**0.6808**	**0.6503**	**0.6605**	**0.5295**	**0.3528**	**–0.3341**	**–0.5190**	–0.2595
1	**0.5567**	**0.7404**	**0.6459**	**0.3290**	**0.2823**	**–0.5014**	**–0.5620**	–0.2125
2	**0.3263**	**0.7259**	**0.4737**	0.0858	0.1639	**–0.5745**	**–0.4462**	–0.1513
3	0.0316	**0.6221**	0.2027	–0.1435	0.0216	**–0.5561**	–0.2490	–0.0868
4	**–0.2757**	**0.4595**	–0.0794	**–0.3184**	–0.1316	**–0.4861**	–0.0653	–0.0382
r_{was} ranking	5	1	3	6	7	2	4	8

The lag of the series of quantitative variables by one quarter has strengthened the power of the correlation relationship in case of the variables *OM*, *IT* and *RT*. Unfortunately a weaker relationship has moved the variable *IE* to the class of weak correlations. Almost all the correlations of the variable *GES* with

[6] The classification of the correlation intensity was taken after: [Green, Salkind, and Akey 2000].

the quantitative variables lagged by one quarter were statistically significant, excluding *PT*. The analysis of the further lags up to four quarters has demonstrated a strong or moderate correlation of the opinion on "the current general economic situation of a company" (*GES*) with the operating margin (*OM*) and inventory turnover (*IT*). Moreover the variable *GES* is strongly correlated with the changes in production sold of manufacturing industry (*IPS*) from the previous quarter. Significant moderate correlations for the lags by two quarters occur also in the case of the variables *RT*, *IPS* and *IT*. In the last case the statistical significance was maintained for the lag by three quarters.

For the general evaluation of the potential influence of quantitative variables on respondents' opinions about the current situation of their companies a mean weighted coefficient of statistically significant correlations was built:

$$r_{was} = 0.4r_{t-1} + 0.3r_{t-2} + 0.2r_{t-3} + 0.1r_{t-4},$$

where:

r_{was} – mean weighted coefficient of statistically significant correlations,
r_{t-i} – statistically significant correlation coefficient with a quantitative variable lagged by i quarters (with a sign compatible with the hypothesis formulated previously).

Thus the calculated weighted means enabled the creation of a ranking of the significance of quantitative variables for the respondents' opinions shown in the last line of Table 2. The variables *OM*, *IT*, *RT* and *IPS* have potentially the most important significance for the respondents' opinion about their current financial situation. Variables *IPI*, *IE* and *PT* are least reflected in these opinions.

The differences in the significance of variables connected with current asset management meant the need to compare the quantitative variables *IT*, *RT* and *PT* with their corresponding qualitative variables *I*, *R*, *P* and *FP*. Inventory turnover was very significant in the opinion about the current economic situation of companies (*GES*). The collection period of receivables (*RT*) was slightly less significant. In case of the time of payables payment (*PT*) the relationship was marginal. Based on these observations and the general rule of question formulation in survey research, it is possible to form a hypothesis about a negative correlation between the pairs of variables *IT* and *T*, *RT* and *R*, *PT* and *P* also *PT* and *FP*. The strongest relationship can be expected in case of inventories, whereas it is moderate in case of receivables and the weakest in case of delivery liabilities.

The hypothesis about the lack of negative correlation between the variables *I* and *IT* can be rejected for all the quarterly lags. Respondents take into account the changes in inventory turnover in the last four quarters whilst answering the question about inventory. At the highest level it refers to the quantitative variable lagged by one and two quarters.

Table 3. Correlation coefficients r between qualitative variables *I*, *R*, *P*, *FP* and corresponding quantitative variables with quarterly lags

Lags	*I* and *IT*	*R* and *RT*	*P* and *PT*	*FP* and *PT*
0	**–0.4772**	**0.4767**	–0.0323	–0.0973
1	**–0.6454**	**0.4116**	–0.0323	–0.1067
2	**–0.6527**	0.2392	–0.0004	–0.0808
3	**–0.5605**	0.0409	0.0517	–0.0127
4	**–0.4378**	–0.1210	0.0940	0.0622

Unfortunately the authors' reservations concerning the formulation of the questions about receivables were fulfilled in the contrary to the expected correlation sign of the variables *R* and *RT*. Although the variable *RT* lagged by one quarter was moderately correlated with the variable *R* in a statistically significant way, the relationship, contrary to the intention of the authors of the survey, was positive. The negative correlation in the relationship of the quantitative variable *RT* with the variables describing the current economic situation of companies (*GES*) led us to expect a negative correlation of the variables *R* and *RT*, similarly in the case of the qualitative and quantitative variables describing the inventories.

The correlation between the quantitative variable *PT* and the qualitative variables *P* and *FP* to the lags of two quarters, shows compatibility with the hypothesis formulated earlier. Unfortunately the strength of the relationship is small or demonstrating the lack of correlation. We can make no statement about the statistical significance. One can suppose that the opinions concerning the ability to meet liabilities is not associated with its promptness. In other words managers and entrepreneurs do not associate the actual lengthening of the liabilities payment time with a worsening of the potential ability in this area.

The relationships between the quantitative and qualitative variables have been also examined by the Granger causality test. A one-sided zero hypothesis has been analysed, which shows that the chosen quantitative variables are not the cause of quantitative variables in the Granger sense. I In this research the level of significance was assumed to be $\alpha = 0.05$.

The analysis of causality in the Granger sense confirmed the statistically significant influence of the variables *OM*, *IT*, *IPS*, *RT* and *IE* on the respondents' opinions about the general current economic situation of their companies (*GES*). Except for the receivables turnover and industry production sold, the causality of the listed quantitative variables showed one quarterly lag. A new phenomenon was a statistically significant causation of cyclic changes in gross domestic product (*GDP*) for the lags of 2, 3 and 4 quarters. This factor in the Granger causality test turned out to have the biggest influence on the respond-

Table 4. Following variables do not Granger cause *GES*

Lags	*GDP*		*OM*		*IPS*		*IE*	
	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value
1	2.4882	0.1207	**14.2434**	**0.0004**	0.4704	0.4958	**16.7966**	**0.0001**
2	**14.7178**	**0.0000**	1.3532	0.2677	**5.7385**	**0.0057**	0.4260	0.6554
3	**13.3584**	**0.0000**	1.8468	0.1516	2.2225	0.0979	1.2589	0.2993
4	**9.1954**	**0.0000**	0.9721	0.4324	1.9754	0.1149	1.1476	0.3469
Lags	***IT***		***RT***		***PT***		***IPI***	
	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value
1	**18.9200**	**0.0001**	2.6112	0.1120	0.4834	0.4899	1.2962	0.2600
2	0.3183	0.7288	**4.2300**	**0.0201**	0.6273	0.5382	0.5251	0.5947
3	**3.9210**	**0.0141**	1.9485	0.1347	0.8188	0.4900	1.5002	0.2267
4	1.5458	0.2057	1.1798	0.3328	0.3178	0.8645	1.6528	0.1781
Lags	***I***		***R***		***P***		***FES***	
	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value	F-statistics	p-value
1	1.9694	0.1663	**4.9061**	**0.0311**	**28.1153**	**0.0000**	**33.9372**	**0.0000**
2	**4.5114**	**0.0158**	**3.2565**	**0.0468**	**3.9927**	**0.0246**	2.2871	0.1121
3	1.7600	0.1677	2.1770	0.1032	**4.0481**	**0.0122**	**6.0859**	**0.0014**
4	1.4072	0.2473	1.6736	0.1732	1.9049	0.1265	**2.8869**	**0.0331**

ents' evaluations, who appeared to be strongly under the influence of announcements about the macroeconomic situation.

The Granger causality test did not allow a rejection of the hypothesis about the lack of influence of *PT* and *IPI*. The time of liabilities payment and the index of prices of sold production were characterized by weak results as well as in the correlation analysis.

To check the coherence of the qualitative variables the causality of qualitative variables *I*, *R*, *P* and *FES* for the variable *GES* were examined. It became apparent that the opinion about the level of inventory from two quarters ago, the opinion about the ability to meet liabilities from a quarter or two ago was the cause, in the Granger sense, of the changeability of opinions about the current economic situation of companies. One cannot say the same about the opinions on the level of receivables. Again this is due to the incorrect formulation of the survey question. Between the variable *GES* and the variables *I* and *P* a statistically significant positive correlation was noted ($r_I = 0.6917$ and $r_P = 0.7981$ respectively). The cohesion of the answers to the survey questions is very high. At the same time the same relationship for the variable R, although statistically significant, has a negative sign and only a moderate power ($r_R = -0.5612$). All

the other qualitative variables are characterized by a statistically significant positive correlation.

The Granger causality test revealed the coherence of the answers of the respondents to the questions about the economic situation of companies. It turned out that the respondents' opinions about the future economic situation of companies in the coming three months (*FES*) cause the changing of opinions about the actual situation in the next quarter (*GES*).

The hypothesis about the lack of a correlation between the underlying quantitative variable describing the level of companies' economic activity (*IPS*) and the quantitative variables linked by net working capital (*IT*, *RT* and *PT*) can be rejected. In each case the correlation was statistically significant and had a negative sign, compatible with the theoretical expectation ($r_I = -0.4320$, $r_R = -0.6591$ and $r_P = -0.2991$ respectively). The lack of a relationship between the quantitative variables could not be the reason for the lack of importance of the variable *PT* on the opinions about the current and future economic situation of enterprises.

4. Regression analysis

In order to check the explanatory power of the quantitative variables indicated as far as the qualitative dependent variable GES is concerned two regression functions were estimated. First with the explanatory variables chosen using the correlation method and the second using the outcomes of the Granger causality tests. The explanatory variables that were correlated or appeared in the regression equation with the opposite sign from the theoretical point of view were excluded.

The correlation analysis indicated all quantitative variables with the exception of PT. For almost every variable the highest correlation coefficient was for one quarter time lag. Only for inventory turnover during two quarters was the time shift taken into account. The result was:

$$GES_t = -7.9880 + 2.7857GDP_{t-1} + 6.2180OM_{t-1} + \varepsilon.$$

The determination coefficient $R^2 = 0.7349$. The value of the measure is satisfying. All the explanatory variables' parameters are statistically important at the significance level $\alpha = 0.001$.

The Granger causality test excluded the following time series from the set of possible explanatory variables: *PT* and *IPI*. He variables *OM*, *IE*, *IT* were taken with a one quarter time lag and the variables *GDP*, *IPS* and *RT* with two quarters. The model is:

$$GES_t = -7.6182 + 1.2298IE_{t-1} + 7.3999OM_{t-1} + \varepsilon.$$

The determination coefficient is also satisfying ($R^2 = 0.6559$) All the explanatory variables' parameters are statistically important at the significance level $\alpha = 0.001$.

In both models the operating margin is the main explanatory variable. It is coherent with the correlation ranking outcomes. The Granger test revealed the importance of industry employment, which was confirmed by the presence of the variable in the second model.

Conclusions

The study conducted has shown that managers and entrepreneurs generally reflect the changeability of the quantitative data describing the financial situation of their companies in their opinions. The Granger causality test has revealed an exceptionally strong influence of the information about the changes in *GDP* on their opinions concerning their company performance. The role of the variable is also underlined by the first regression model. A strong influence of the exogenous quantitative variable which is forecast on the basis of qualitative variables raises a question if we deal with a depending loop. The volatility of *GDP* strongly influences opinions about the economic situation of companies, which in turn is used to predict economic dynamics.

The research identified endogenous quantitative variables which, in a statistically significant way, influence respondents' opinions about the current and future economic situation of their companies. The analysis of correlations with time lags has revealed the influence of operational profitability, inventory turnover, the receivables collection period and manufacturing industry production sold. Industry employment, the price index of sold production and turnover period of payables were characterised by a weaker relation.

The Granger causality test has reduced to five the number of endogenous quantitative variables having influence on the evaluation of companies' current economic situation. These variables were: operational profitability, industry production sold, manufacturing industry employment, inventory and receivables turnover.

The regression analysis revealed the exceptional explanatory power of the operating margin. This quantitative variable appeared in both models as the factor with the highest influence. The respondents, when asked about the general economic situation of their companies, mostly have in mind operational profitability.

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