Business Survey as a Tool for Manufacturing Branches Performance Assessment. Applicability evaluation

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Abstract

The goal of the paper is an evaluation of the performance of manufacturing branches of the Polish economy. Two approaches have been applied. In the first approach data from state statistical reports have been used. Single variables have been combined into the composite indicator, which has become the evaluation criterion. Business surveys were used as the evaluation criterion in the second approach. The resulting orderings of individual branches have been compared. The aim of the comparison was the credibility assessment of business survey as a tool for the evaluation of branches’ performance. The results obtained indicated the existence of significance discrepancies. The sources of these discrepancies have been detected. It has been stated that the results of business survey depend on attitudes caused by country’s current political and economic condition. The attempt has been made to narrow orderings differences. In order to do so the data from the surveys has been adjusted by introducing the correction parameters. The parameters values were determined in the optimization procedure (local search).

The scope of the research is determined by the data availability. Polish state statistical system collects information according to the NACE Classification (Nomenclatures des Activitiees de Communite Europeene). In this system four levels are represented: sec-

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tions, units (divisions), groups and classes. From the author’s point of view, one of the most important areas is the manufacturing sector – the section D in the NACE classification. This determined the area of this study. The study was conducted on units (division) level.

The evaluation has been made as an introductory step in the project of the construction of free of charge and accessible via-Internet database providing business and economic information needed by Small and Medium Size Enterprises managers. Additional goal of the database construction is providing the information base for the determination of the manufacturing branches attractiveness from the point of view four potential users (firms managers, investors, credit managers in banks and local politicians). Depending on the end–user of the research results, for the evaluation of the Polish manufacturing sector performance – appropriate set of indicators (variables describing firms performance) will be provided.

Key Words: Business Surveys, Composite Indicator, Comparative Analysis, Linear Ordering

JEL Classification: M21, C42, C43.
1 Introduction

For management, and for investment decisions in particular, it is crucial to have assessment of present economic situation and forecast for the future. Such information for macro-scale is prepared by governmental agencies as well as the business research centers. From the enterprises’ point of view – the same questions arise on the micro-economic level. The whole economy approach is to general, managers in the firm needs to know what situation in his branch is to be expected, he needs also to compare his performance with other enterprises acting on the same market (the branch is understood as section, unit (division), group or class in NACE Classification).

Because of that – present and future situation of different branches in Polish economy have been analyzed. For that purpose the multivariate statistical analysis framework was used. An attempt has been made to find an assessment criterion – simple and easy to use, allowing accurate measurements. The task was to develop framework to assess individual branch performance. Additionally – to put firms performance on the wider background – allowing comparisons with performance of other, similar branches – a method for ranking of branches is introduced.

The official statistical data is most frequently used base for branch performance evaluation. Problem with such data is fact, that they are available with considerable time gap (in Poland after four months). This makes the forecasting process very difficult and forecasts turn out to be outdated. The second problem with official statistics is that there is no individual indicator, which may be considered as the performance criterion. It means that the use of official statistic in branches performance assessment process needs several adaptations.

Alternatively, the business survey data may be used. The advantages of business survey data are immediate availability and the relative simplicity of collecting the necessary information. One have to bear in mind that the information gathered in the business survey expresses the opinion of managerial staff about the situation of their own companies. The reliability of the evaluation depends on the managers’ qualifications, including their abilities to avoid excessive optimism or pessimism. The question arises to what extent the opinions formulated in the business survey accurately describe situation of the firms in that branch.

Assuming that the managers can evaluate the situation of their own enterprises, the results of business surveys should correspond with those obtained from statistical reports. This hypothesis has been examined. For that purpose a composite indicator for branch performance measurement was proposed and it became a criterion for the further evaluation. The variables included into the composite indicator were taken from official statistics (statistical reports). It has been assumed that the data coming from the reports can be considered as objective and reliable, and that they reflect the real situation, or at least they measure it for all enterprises in the same way. Although it is possible that it is not an ideal measure, it evaluates each branch in the same way.
2 The scope of research

The research was carried out on data gathered according to the NACE (definition: NACE – General Nomenclature of Economic Activities in European Community Member Countries). For the evaluation of the Polish manufacturing sector performance the source data for the branches from the statistical reports and business surveys collected by the Polish Central Statistical Office have been used. The quarterly data, covering period from January 1996 until December 2001, for 20 divisions of Section D (Manufacturing) was used. In table 1, divisions of section D are presented.

### Table 1. Specification of divisions of section D: manufacturing

<table>
<thead>
<tr>
<th>Division</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Manufacture of food products and beverages</td>
</tr>
<tr>
<td>16*</td>
<td>Manufacture of tobacco products</td>
</tr>
<tr>
<td>17</td>
<td>Manufacture of textiles</td>
</tr>
<tr>
<td>18</td>
<td>Manufacture of wearing apparel and furriery</td>
</tr>
<tr>
<td>19</td>
<td>Processing of leather and manufacture of leather products</td>
</tr>
<tr>
<td>20</td>
<td>Manufacture of wood and wood, straw and wicker products</td>
</tr>
<tr>
<td>21</td>
<td>Manufacture of pulp and paper</td>
</tr>
<tr>
<td>22</td>
<td>Publishing and printing</td>
</tr>
<tr>
<td>23</td>
<td>Manufacture of coke, refined petroleum products and derivatives</td>
</tr>
<tr>
<td>24</td>
<td>Manufacture of chemicals and chemical products</td>
</tr>
<tr>
<td>25</td>
<td>Manufacture of rubber and plastic products</td>
</tr>
<tr>
<td>26</td>
<td>Manufacture of other non-metallic mineral products</td>
</tr>
<tr>
<td>27</td>
<td>Manufacture of basic metals</td>
</tr>
<tr>
<td>28</td>
<td>Manufacture of metal products (except machinery and equipment)</td>
</tr>
<tr>
<td>29</td>
<td>Manufacture of machinery and equipment</td>
</tr>
<tr>
<td>30*</td>
<td>Manufacture of office machinery and computers</td>
</tr>
<tr>
<td>31</td>
<td>Manufacture of electrical machinery and apparatus</td>
</tr>
<tr>
<td>32</td>
<td>Manufacture of radio, television and communication equipment and apparatus</td>
</tr>
<tr>
<td>33</td>
<td>Manufacture of medical, precision and optical instruments, watches and clocks</td>
</tr>
<tr>
<td>34</td>
<td>Manufacture of motor vehicles, trailers and semi-trailers</td>
</tr>
<tr>
<td>35</td>
<td>Manufacture of other transport equipment</td>
</tr>
<tr>
<td>36</td>
<td>Manufacture of furniture; other manufacturing</td>
</tr>
<tr>
<td>37*</td>
<td>Waste management</td>
</tr>
</tbody>
</table>

* These divisions have been skipped over in the research: divisions 30 and 37 because of the lack of data, division 16 due to different ways of presenting data in data sources.

Source: on the basis of NACE.
3. The methodological framework

3.1. The composite indicator criterion

For the purpose of the performance assessment several variables describing all aspects of the firm's activity were exploited. The descriptive variables were chosen in such a way that they had to discriminate objects and simultaneously not duplicate the contained information. In Polish statistical system reports containing data necessary for calculation of such a component (descriptive) variables are collected and available once a quarter.

After the initial analysis – six variables were chosen – in parentheses the variable nature is stated, (for details see Kwiatkowska et al. [2001a], and [2001b]):

- \( X_1 \) – the dynamics of incomes from sale in fixed prices from January 2002 – chain base index – analogous period of previous year = 100% (stimulant).
- \( X_2 \) – the cost of obtaining income from total activity (destimulant).
- \( X_3 \) – the profitability rate of net turnover in % – the ratio of net profit (or loss) to income from total activity (stimulant).
- \( X_4 \) – the liquidity: quick ratio – the ratio of current assets minus inventory to current liabilities (nominant with recommended value range \([1.0; 1.5]\)).
- \( X_5 \) – the liquidity: current ratio – the ratio of current assets to current liabilities (nominant with recommended value range \([1.2; 2.0]\)).
- \( X_6 \) – the ratio of investment – the ratio of investment outlays to income from sale (stimulant).

The stimulant is a variable whose higher value is preferable or positively assessed. The destimulant is a variable whose lower value is preferable or positively assessed. The nominant is a variable, which should possess a recommended value or a value from the recommended range.

In order to avoid negative values, the data of the variable \( X_3 \) have been modified by adding the constant value equal to opposite to minimal observed in the dataset.

Depending on the variable nature, the appropriate normalization formula was used. Normalization formulas were constructed in such a manner, that they fulfill following requirements:

- Normalized values are in the range \([0; 1]\).
- Normalized variables have a stimulant nature (i.e. the higher value is preferable).
- Normalized variables sustain discrimination ability.

Table 2 shows the normalization formulas.
### Table 2. The normalization formulas

<table>
<thead>
<tr>
<th>The nature of the variable</th>
<th>Normalization formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulant</strong></td>
<td>$z_{jt} = \begin{cases} \frac{x_{jt}}{d_g(x_{jt})} &amp; \text{for } x_{jt} &lt; d_g(x_{jt}) \ 1 &amp; \text{for } x_{jt} \geq d_g(x_{jt}) \end{cases}$</td>
</tr>
<tr>
<td><strong>Nominator</strong> with recommended value range $[x_{i,\text{min}}, x_{i,\text{max}}]$</td>
<td>$z_{jt} = \begin{cases} 1 &amp; \text{for } x_{i,\text{min}} \leq x_{jt} \leq x_{i,\text{max}} \ \frac{x_{jt}}{x_{i,\text{min}}} &amp; \text{for } x_{jt} &lt; x_{i,\text{min}} \ \frac{x_{i,\text{max}}}{x_{jt}} &amp; \text{for } x_{jt} &gt; x_{i,\text{max}} \end{cases}$</td>
</tr>
<tr>
<td><strong>Destimulant</strong></td>
<td>$z_{jt} = \begin{cases} \frac{d_i(x_{jt})}{x_{jt}} &amp; \text{for } x_{jt} &gt; d_i(x_{jt}) \ 1 &amp; \text{for } x_{jt} \leq d_i(x_{jt}) \end{cases}$</td>
</tr>
</tbody>
</table>

$x_{jt}$ – value of the variable $X_j$ in $j$-th division in the period $t$,  
$z_{jt}$ – value of the normalized $i$-th variable for division $j$ in the period $t$,  
$d_g(x_{jt})$ – ninth decile of the variable $X_j$ in the period $t$,  
$d_i(x_{jt})$ – first decile of the variable $X_j$ in the period $t$,  
$x_{i,\text{max}}, x_{i,\text{min}}$ – the value of upper / lower limit of the recommended value range for nominant,  
$i$ – number of variable; $j$ – code of division; $t$ – number of period.

Source: own findings.

A few words of argument are needed to discuss the choice of the normalization formulas used for stimulant and destimulant. Most commonly used transformation formula resulting in $[0; 1]$ range of the normalized values is ratio transformation where for the scaling factor (value) – the maximal value (for the stimulant) or minimal value (for the destimulant) is used. The extreme values are taken from the analyzed dataset. Unfortunately – in the situation where extreme values in the dataset vary substantially from the rest of the values in this dataset, such a transformation results in very low variation of the normalized values. In the dataset used for the Polish manufacturing branches attractiveness analysis, described phenomenon occurred quite often.

After some experiments with different quintiles, as a remedy, for the scaling factor the ninth decile for stimulants, and the first decile for the destimulants were chosen. Apart from the fact, that applied solution guarantee fulfillment of the requirements,
which have been formulated earlier, the problem with some data, which may be false (errors in data?) is avoided.

The value of the composite indicator $Z$ for each division and period was calculated according to the following formula:

$$Z_{jt} = \sum_{i=1}^{m} Z_{ijt} \cdot W_i$$

Where:
- $z_j$ – value of the composite indicator in period $t$ for division $j$,
- $Z_{ijt}$ – value of the normalized $i$-th component variable in period $t$ for division $j$,
- $w_i$ – weight ascribed to $i$-th component variable, $w_i \in (0,1)$, $\sum w_i = 1$,
- $i$ – number of the component variable, $i = 1, ..., m$,
- $j$ – code of division (NACE Classification)
- $t$ – number of the period, $t = 1, ..., n$.

The composite indicator has the nature of a stimulant, with values in range $[0; 1)$. Finally the values of indicator $Z$ were used as the assessment criterion of manufacturing branches.

### 3.2. Business survey criterion

In this approach, the results of business surveys that are conducted and published by the Polish Central Statistical Office were used. They contain the opinions of chief executives of manufacturing enterprises – the opinions are aggregated on the level of divisions. They are published in the form of answers’ balances in percents. All these balances have the nature of stimulants, which are normalized, with values in the interval $[-100\%, 100\%]$. In our research, in order to guarantee comparability with composite indicator $Z$, the monthly data from business surveys were aggregated to quarterly data.

For the evaluation of individual branches the questions concerning the situation on a given period and on the future were used. The balances of answers to the questions about the assessment of the business situation of their own enterprise ($S$) and forecasts of business situation ($S_F$) were analyzed. The balances were calculated as difference between the percentage of positive replies (good situation) and the percentage of negative replies (bad situation). In order to be able to answer such questions, a manager has to formulate an overall evaluation of the situation in all performance areas of his (her) enterprise. Because of that, one may expect that formulated answer reflect true condition of the enterprise. However, managers find it very difficult to conduct such an evaluation.
4. The approaches’ comparison

For particular branch, the correlation coefficient was used as an assessment criterion of similarity results obtained for composite indicator Z and index S or S_F. Convergence appraisal was checked. The comparison has been done for the same quarter as well as for the case where business survey results lead official statistical results (lead of one and two quarter were used). The values of correlation coefficient are presented in table 3 and 4.

Tab. 3. Comparison of the performance evaluation results based on composite indicator Z and index S. Correlation coefficient values

<table>
<thead>
<tr>
<th>Division</th>
<th>Time lead</th>
<th>15</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>0.12</td>
<td>0.47</td>
<td>0.18</td>
<td>0.42</td>
<td>0.30</td>
<td>0.13</td>
<td>0.27</td>
<td>-0.08</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>0.18</td>
<td>0.46</td>
<td>-0.06</td>
<td>0.41</td>
<td>0.40</td>
<td>-0.07</td>
<td>0.53</td>
<td>-0.15</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>0.33</td>
<td>0.44</td>
<td>-0.38</td>
<td>0.15</td>
<td>0.27</td>
<td>-0.12</td>
<td>0.30</td>
<td>-0.35</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
<td>0.48</td>
<td>0.77</td>
<td>0.49</td>
<td>0.29</td>
<td>-0.17</td>
<td>0.13</td>
<td>0.24</td>
<td>0.39</td>
<td>-0.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>-0.20</td>
<td>0.70</td>
<td>0.33</td>
<td>0.21</td>
<td>-0.18</td>
<td>0.01</td>
<td>0.22</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
<td>-0.60</td>
<td>0.63</td>
<td>0.23</td>
<td>0.22</td>
<td>-0.33</td>
<td>0.15</td>
<td>0.07</td>
<td>-0.05</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Source: own computation.

Tab. 4. Comparison of the performance evaluation results based on composite indicator Z and index S_F. Correlation coefficient values

<table>
<thead>
<tr>
<th>Division</th>
<th>Time lead</th>
<th>15</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>-0.35</td>
<td>0.09</td>
<td>-0.18</td>
<td>-0.01</td>
<td>0.11</td>
<td>-0.21</td>
<td>0.36</td>
<td>-0.18</td>
<td>-0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>-0.38</td>
<td>-0.17</td>
<td>0.20</td>
<td>-0.13</td>
<td>-0.15</td>
<td>-0.07</td>
<td>0.22</td>
<td>-0.09</td>
<td>-0.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>-0.01</td>
<td>0.37</td>
<td>0.36</td>
<td>0.07</td>
<td>0.26</td>
<td>-0.30</td>
<td>-0.01</td>
<td>0.13</td>
<td>-0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
<td>-0.26</td>
<td>0.38</td>
<td>-0.04</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.19</td>
<td>-0.17</td>
<td>0.51</td>
<td>-0.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>0.87</td>
<td>0.28</td>
<td>0.13</td>
<td>-0.12</td>
<td>0.05</td>
<td>0.23</td>
<td>0.14</td>
<td>0.29</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28</td>
<td>0.25</td>
<td>0.32</td>
<td>0.17</td>
<td>0.12</td>
<td>0.45</td>
<td>-0.03</td>
<td>0.23</td>
<td>0.24</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Source: own computation.

Correlation coefficients’ values indicate that both managers’ assessment and their forecast of firms’ situation vary substantially from official statistics evaluations. Because the values of coefficients for pair S_F and Z were smaller than for pair S and Z further analysis was conducted only for pair S and Z.
Low values of the correlation coefficient in tables 3 and 4 indicate that business survey cannot be used as the credible assessment tool for individual industry. To overcome this weakness – an attempt has been made to assess relative situation of individual branch with comparison to all other branches. To do this all divisions of section D have been sorted in descending way. First ordering resulted from using value of composite indicator Z as the sorting criterion. Second ordering came from using an index S as the sorting criterion. Divisions were sorted for each quarter of every year under consideration. The ordering results of individual branches for both approaches were compared. It means that the ranking results obtained by using value of composite indicator Z as the sorting criterion with those based on S were compared.

The similarity of obtained orderings was examined in two ways:

- by comparing the ordering of all the branches in a given month – for this purpose, Spearman’s coefficient of rank correlation was applied:

\[
\rho_t = 1 - \frac{6 \sum_{j} d_{jt}^2}{k(k^2 - 1)}
\]

- by comparing the locations, which have been occupied by a given branch in a given period – for that the differences between the locations occupied by a specific branch in individual quarter were calculated and then the arithmetic mean for absolute values of those differences were calculated – for the whole scope of branches:

\[
d_t = \frac{1}{k} \sum_{j} |d_{jt}|
\]

where:
- \( \rho_t \) – value of Spearman’s rank correlation coefficient in period \( t \),
- \( d_{jt} \) – difference between the location occupied by division \( j \) in period \( t \),
- \( d_t \) – average value of absolute differences \( d_{jt} \) in period \( t \),
- \( k \) – number (amount) of the analyzed divisions.
The outcome of the analysis indicates existence of significant differences. In figure 1, Spearman’s coefficients of rank correlation for the ordered pair in the particular quarters are presented. A large number of Spearman’s coefficients was not significant at the level $\alpha = 0.01$. Additionally – it appeared that the average differences of the location $d_t$ were high. The mean value of $d_t$ ($\bar{d}$) was 3.90. Such a high value proved low similarity of both approaches.

5. The proposal for the correction of assessment results based on business surveys

5.1 Method

In this discussion, the assessment results based on the composite indicator Z were treated as objective (true). It has been assumed that the cause of large differences in the results is the inaccuracy in managers’ evaluations. Because of that an attempt to narrow the diversity of orderings was undertaken. For this purpose the evaluations resulting from business surveys were modified (corrected).

It seems that managers are doing systematic errors in their evaluations. The cause of these systematic errors is an inability of objective view of the impact of the changes in the environment on their enterprises’ situation. One may call this inability excessive optimism or excessive pessimism. For the purpose of elimination this exces-
sive optimism or pessimism impact the correction parameters were introduced for each branch.

The parameter value was determined by means of optimization methods. Local search (LS) method was used. It starts with the following matrix $S$:

$$S = [s_{ij}]_{n \times k},$$

where: $s_{ij}$ – the value of the index $S$ in period $t$ for division $j$,

$t$ – the number of period, $t = 1, ..., 24$,

$j$ – the code of division,

$n$ – the number of the analyzed periods, (24);

$k$ – the number of the analyzed divisions, (20).

Then the matrix $X$ was calculated:

$$X = [x_{ij}]_{n \times k}, \quad (t, j, n, k \text{ - the symbols as earlier}),$$

where:

$$x_{ij} = \begin{cases} a_j \cdot s_{ij} \text{ for } s_{ij} \geq 0 \\ b_j \cdot s_{ij} \text{ for } s_{ij} < 0 \end{cases}$$

where: $a_j, b_j$ – values of correction parameters for excessive optimism or pessimism for the division $j$.

The starting values for determining values of the parameters $a_j$ and $b_j$ were set to 1. In the next steps, these parameters were changed by the value $\pm 0.1$. The task was to minimize the value of $\bar{\sigma}$. Proposed procedure indeed allows for minimizing the value of $\bar{\sigma}$, however it is able to `jump' out of local minimum thanks to the probabilistic acceptance of changes that increase value of $\bar{\sigma}$.

5.2 Results

In table 5 the average values of Spearman’s coefficient of rank correlation $\rho$, the percent of $\rho$ coefficients which were significant at the level $\alpha = 0.01$ and the average differences of the location $\bar{d}$ before and after correction are presented. As the result of the implementation of the correction procedure the average value of Spearman’s coefficient increased from 0.606 to 0.787, the percent of significant coefficient raised from 66.7% to 100%, the average differences of the location $\bar{d}$ decreased from 3.9 to 2.5.
Table 5. The average values of Spearman’s coefficient of rank correlation $\rho$, the percent of significant coefficient $\rho$ and the average differences of the location $\bar{d}$ before and after correction

<table>
<thead>
<tr>
<th>Comparison pair</th>
<th>$\rho$ before</th>
<th>$\rho$ after LS</th>
<th>% of $\rho$ significant before</th>
<th>% of $\rho$ significant after LS</th>
<th>$\bar{d}$ before</th>
<th>$\bar{d}$ after LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite indicator Z</td>
<td>0.606</td>
<td>0.787</td>
<td>66.7</td>
<td>100</td>
<td>3.9</td>
<td>2.5</td>
</tr>
<tr>
<td>and the index S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own computations.

Figure 2. Spearman’s coefficients of rank correlation for the orderings based on composite indicator Z and index S – after correction

Remark: critical value for the coefficient on the level of significance $\alpha = 0.01$ equals 0.564.
Source: own computation.

5.3 Correction parameters analysis

For the analysis of the correction parameters introduced in this procedure the values of the parameters $a_j$ and $b_j$ were calculated. All values obtained for each of 20 analyzed divisions are shown in the table 6.
Tab.6. Values of correction parameters $a_j$ and $b_j$ for particular branch

<table>
<thead>
<tr>
<th>Division</th>
<th>15</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a_j$</td>
<td>1.1</td>
<td>1.2</td>
<td>1.9</td>
<td>0.3</td>
<td>0.9</td>
<td>0.1</td>
<td>0.6</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$b_j$</td>
<td>1.3</td>
<td>1.4</td>
<td>1.1</td>
<td>0.3</td>
<td>0</td>
<td>0.9</td>
<td>0.1</td>
<td>0.6</td>
<td>0</td>
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</tr>
<tr>
<td>Division</td>
<td>26</td>
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<td>28</td>
<td>29</td>
<td>31</td>
<td>32</td>
<td>33</td>
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<td>36</td>
</tr>
<tr>
<td>$a_j$</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>$b_j$</td>
<td>0</td>
<td>1.9</td>
<td>0.4</td>
<td>0.9</td>
<td>0</td>
<td>1.3</td>
<td>0.4</td>
<td>0.8</td>
<td>2.3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source: own computation.

Depending on the value of the correction parameters $a_j$ and $b_j$ it is possible to identify several typical situations (interpretation). Such an interpretation may be treated as an attempt to measure quality of managers’ judgments. Provided that:

- $a_j \approx 1, b_j \approx 1$ – it may be understood that managers’ opinions are accurately describing real situation of their firms,
- $0 < a_j < 1$ – managers overreact in their opinions, i.e. they show excessive optimism in their judgments as a reaction based on positive market signals,
- $0 < b_j < 1$ – managers overreact in their opinions, i.e. they show excessive pessimism in their judgments as a reaction based on negative market signals,
- $a_j > 1$ – shows that managers underestimate importance of market signals: i.e. they show excessive pessimism in their judgments as a reaction based on positive market signals,
- $b_j > 1$ – means that managers underestimate importance of market signals: i.e. they show excessive optimism in their judgments as a reaction based on negative market signals,
- $a_j = 0, b_j = 0$ – indicate instability of managers’ judgments, i.e. managers are not able to unambiguously describe current and future situation,
- $a_j < 0, b_j < 0$ – opinions given by managers show the false direction of changes, i.e. they expect deterioration of the situation whilst the real situation improves and vice versa.

The analysis of the values of correction parameters $a_j$ and $b_j$ shown in the table 6 gives very interesting picture of the way Polish managers react on the market signals in 24 quarters of last six years. First feature is that when situation of the firm was considered as favorable (good) – managers stayed on the ground of reality; they showed neither excessive optimism nor excessive pessimism. This conclusion comes from the fact that for most of the branches the values of parameters $a_j$ were equal or almost equal to one.
On the other hand, in the case when situation of the firm was considered as unfavorable (bad) – managers reacted in the differentiated way. Out of twenty analyzed industries (divisions), in 7 branches managers underestimate importance of market signals; i.e. they show excessive optimism in their judgments although negative market signals \( b_j > 1 \). In 9 branches managers overreact in their opinions, i.e. they show excessive pessimism in their judgments as a reaction on negative market signals \( b_j < 1 \). In 4 branches managers were not able to unambiguous describe current situation \( b_j = 0 \).

The evaluation of applicability of business survey in Poland as a tool of manufacturing branches performance assessment has been made as an introductory step in the project of the construction of database providing business and economic information needed by Small and Medium Size Enterprises managers in Poland.

The database will be free of charge and accessible via-Internet. As a target group of the database users the managers of SMEs from manufacturing sector are identified. Enterprises managers may need also to evaluate their performance in comparison with other firms in the same branch or with other branches. Apart from them some additional users may be listed.

First of them are investors seeking investment possibility, among them investors from abroad – they can not apply standard selection procedures used normally in such a situation – capital market is not fully developed, information flow is not effective enough, advisory agencies have no experience.

The next type of people, who may be interested in such an information are bank managers deciding of credit portfolio construction, credit applications evaluation etc.

Important users of discussed information are politicians active in local governments. They have to decide which branches to promote in their region, which investments to attract, and which type of skills to teach in local schools and in retraining centers.

In accordance with above, the foreseen goal of the database construction is providing the information base for the determination of the manufacturing branches attractiveness. Depending on the end user of the research results (firms managers, investors, credit managers in banks and local politicians) – for the evaluation of the Polish manufacturing sector performance – appropriate set of indicators (variables describing firms performance) will be used.

In the database there will be two sources of the raw data. First type of the data will collect quarterly reports from the enterprises on activity data. The second source of the data will be the monthly and the quarterly business surveys.

On the other hand, some additional, specialized branch indicators showing current and forecasted situation, position (ranking, rating) are planned for this database. To produce rankings and clustering, the multivariate statistical analysis framework will be used. Apart from the information on the low level of aggregation, some typical macro-economic information may be looked for, among them are external factors like: popula-
tion trends, political developments, family income development, national-economic trends, the level of inflation, the rate of unemployment, etc.

Since the raw data may not be published (because of confidentiality), the aggregated and modified information have to be produced. To guarantee that those processed information provides optimal benefits for the users – two measures have been taken. First of them was the survey, which was conducted in SME’s managers’ group to determine the information needs for small and medium size firms in Poland (for details see Dziechciarz et al. [2001]). As a second measure the interactive module in the database is planned – in this module, the end user will have the possibility to define individual design of the aggregated data, indices or indicators.

7. The conclusions

To conclude, it seems that when thinking about the economic condition of Polish manufacturing branches, it is worth taking into consideration both objective (coming from statistical reports) and subjective (from business surveys) evaluations. Nevertheless, one has to remember that subjective evaluations only deserve recommendation if the managers are sufficiently well qualified. This means that it is assumed that they are able to correctly evaluate the situation of their own enterprises. As the results of the conducted research have shown, we cannot consider the analytical abilities of Polish managers as satisfactory. Therefore, evaluations from the business surveys should rather be treated as the expression of the current mood, which may be influenced by media reports, political events or current developments in their own enterprises.

The presumption has been adopted, that the main reason of significant discrepancy between rating results based on statistical reports (composite indicator Z) and business survey (index S) is the inability of Polish managers to avoid excessive optimism and/or pessimism. To eliminate the impact of this factor on the ordering results – correction parameters $a_j$ and $b_j$ were introduced. The obtained improvement of orderings conformity justifies applied approach.

The severe assessment of the Polish managers ability to evaluate accurately the real situation of their firm have to be eased. It is not the sole reason of significant differences between rating results based on statistical reports (composite indicator Z) and business survey (index S). Important issue is the scope of data. Only 10% of manufacturing enterprises take part in business surveys. In contrast, the statistical reports encompass all manufacturing enterprises.
References


