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SME SECTOR ECONOMIC POSITION IN THE EU: INSIGHTS INTO LABOUR EFFICIENCY AND PROFITABILITY

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Summary. The paper presents the outcomes of the analysis of labour and profitability in micro, small and medium enterprises (SMEs) of EU countries. The analysis is based on the data provided by the EC Enterprise and Industry, covering the year 2008. According to the outcomes of regression analysis, the most important factors influencing SME profitability include: the productivity of expenses, the level of labour involvement in production, the share of added valuein incomes and labour costs. The most important factors influencing labour efficiency in the SME sector include: labour equipment and the shares of added value and production in incomes.

Key words: microenterprises, small enterprises, medium enterprises, SME sector, work efficiency, profitability, regression analysis

INTRODUCTION

A very high position of micro, small and medium enterprises (SME) is typical for the economies of most of the Member States of European Union (UE). The micro, small and medium enterprises are understood as businesses employing respectively <10, 10–49 and 50–250 people and whose annual turnover and/or total annual balance do not exceed respectively: 2/2, 10/10 and 50/43 millions of Euros [Commission… 2004]. The special meaning of the SME sector in the EU economy results from two premises. Firstly, the number of subjects of this kind determines their importance as the major employer and their influence on the labour market. Secondly, operating in the SME sector is commonly considered as a manifestation of proper competition and a major marker of entrepreneurship [Skowronek-Mielczarek 2003]. However, if one takes into account parameters other than the numbers of enterprises and the number of people employed, the meaning of the SME sector is not so homogeneous, as the sector is strongly diversified as regards tech-

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nological efficiency, economic efficiency and financial efficiency, both in particular EU countries and among them [Majewski 2005].

One of the most import ant determinants of SME economic position is labour efficiency and financial effectiveness measured as profitability. Labour efficiency is generally considered to be one of the most important development parameters of economies, as it leads to cost reduction, increase in supply of cheaper goods and services, makes the market more dynamic, which results in the increase in purchasing power of societies, their wealth and competitive abilities [Landmann 2004]. At the same time, the high rank of profitability results from three premises [Wędzki 2006]: first, profitability constitutes the base of evaluation for the accumulation of owners' capital in the context of VBM (Value Based Management), secondly, it expresses a function of aim of a company, thirdly, its analysis enables to identify the factors of capability to create values for company owners, perceived in the categories of balance sheet profit or residue profit.

The main purpose of the present paper is to analyse the variety of the level and factors influencing labour efficiency and SMEs profitability in EU countries. The analysis includes the latest economic and financial statistical data from EC database, published on EUROSTAT website [SME Performance… 2010].

METHODOLOGY

The analysis was based on decomposing the index of labour efficiency, measured as added value and decomposing the index of company income profitability, measured as net operating surplus. The index of labour efficiency was analysed as product of the added value index, the share of production value in total income, productivity of net material inputs and labour equipment measured as the value of material inputs calculated per employee according to the scheme below*:

$$LE = \frac{AV}{E} = \frac{AV}{P} \times \frac{P}{IT} \times \frac{IT}{M} \times \frac{M}{E}$$

$$LE = AVI \times PS \times IP \times LEq$$

where:
LE – labour efficiency [added value (AV)/number of employees (E)],
AVI – added value index [added value (AV)/production incomes(P)],
PS – production share in income [production income value (P)/ incomes total (IT)]
IP – input productivity [incomes total(IT)/material inputs (M)],
LEq – labour equipment [material inputs (M)/number of employees (E)],

* A number of different technological, economic and financial categories is used to measure labour efficiency in practice, e.g. global production, sold production, added value, operating profit [Ikeda and Souma 2008, Wiatrak and Ziętara 1978]. Generally, however, it is added value which is recognized as one of the most objective categories of evaluating companies' efficiency, widely used in evaluating labour efficiency [Wołodkiewicz-Donimirski 2009, Zarządzanie .. 1999]. Its nature and weight result mainly from the fact that it measures efficiency from the point of values added by human capital with regard to external material costs; it thus constitutes a major criterion of the ability to generate value for owners [Skoczylas, Niemiec 2003, Wędzki 2006].

In turn, due to the limited amount of information and their range in the databse of the EC Enterprise and Industry, [SME Performance… 2010], the analysis of profitability in SME in EU-27 countries was conducted basing on the decomposition of the profitability index measured as net operating surplus[**]. The index was presented as the product of input productivity, labour equipment measured as the value of inputs (indirect consumption) per employee, the labour consumption of production, the index of added value, the index of labour costs per hired employee and the index of entrepreneurs' salaries, according to the following scheme:

$$IcP = \frac{NOS}{P} = \frac{SI}{M} \times \frac{I}{E} \times \frac{E}{IT} \times \frac{AV}{IT} \times \frac{GOS}{AV} \times \frac{NOS}{NOB}$$

$$IcP = IP \times LEq \times Lc \times AVI \times LCI \times ESi$$

where:

IcP – income profitability [net operating surplus (NOS)/sales incomes (SI)]
IP – input productivity [sales incomes (SI)/total inputs (I)],
LEq – labour equipment [total input (I)/number of employees (E)],
LC – labour consumption of production [number of employees (E)/sales incomes (SI)],
AVI – added value index [added value (AV)/sales incomes (SI)],
LCI – labour costs incomes [gross operating surcharge (GOS) /added value (AV)]
ESi – entrepreneurs' salaries index [net operating surplus (NOS)/gross operating surplus (GOS)]

The indexes presented above, which constitute a cohesive and logical system of structural analysis of labour efficiency[***], were subject to statistical analysis by means of basic descriptive statistics. Moreover, a qualitative analysis of labour efficiency and profitability were conducted by means of stepwise regression, which use all factors in the models of decomposition of efficiency and profitability above as descriptive variables. The econometric model uses the data characterizing the particular factors in micro, small and medium enterprises within the frames of 45 detailed sections of the EU economy [NACE… 2009, Rozporządzenie 2006].

[**] The database of EC Enterprise and Industry includes information about companies, including SME, limited to a dozen or so economic and financial categories, not including balance sheet information. The data enables to estimate operating surplus according to the sequence: Added value = incomes total (global production) – indirect consumption costs; Gross operating surplus = added value – labour costs, Net operating surplus = gross operating surplus – entrepreneurs' salaries [SME Performance… 2010].

[***] The suggested structure of the cause-and-effect model of labour efficiency results from the range of data presented in the EU report SME Performance Review, on the basis of which the analysis was conducted. The report does not include data concerning balance sheet elements, which means it is impossible to use classical determinants of labour efficiency such as technological equipment, measured as assets, and in particular- fixed assets.

DIVERSIFICATION OF LABOUR EFFICIENCY IN THE SME SECTOR IN THE EU

Table 1 presents the level of work efficiency, measured as added value, according to the size of companies and in the arrangement of EU countries. The data shows that the efficiency of the SME sector (EUR 40.29k) is much lower than the efficiency of big enterprises (EUR 61.14k), mainly as a result of relatively low labour efficiency (EUR 33.20k) of the most numerous group of micro scale subjects. The differences are substantial and they do not only concern the economy of Denmark, whose labour efficiency, measured as added value, was higher in the SME sector (EUR 70.17k) than in big enterprises (EUR 64.47k), as a result of particularly high efficiency in microenterprises (EUR 95.67k). Moreover, taking descriptive statistics into account, it is possible to notice that the average picture of labour efficiency in the EU is a resultant of significant differences which occur from country to country.

The value of the variation coefficient, v_p, exceeding 50% in 2008, clearly depicts the differences in labor efficiency in the SME sector in the EU. Moreover, the applied statistical measures also show a clear right-sided asymmetry of the distribution of labour efficiency ($\overline{x} > Q_2$), which shows that over 50% of EU countries have higher efficiency than the average in the EU. However, as regards the first quartile (Q_1), companies in 25% of countries of the EU have very low efficiency, i.e. the relation of added value to the number of employees was lower or equal to EUR 19.3k. The countries include Bulgaria whose SME companies only had average efficiency of EUR 5.47k, but also Lithuania, Poland, Romania, Hungary and Latvia, whose companies had efficiencies between EUR 12 and 17k. As regards the third quartile, (Q_3), it is possible to notice that 25% of EU countries had efficiencies notably higher than the EU average and it amounted to EUR 54.7k or more. The most efficient companies in this group operated in Denmark, whose labour efficiency in the SME sector exceeded EUR 70k, i.e. it exceeded the average value for the EU by about 75%. SME businesses in the UK, Finland, Ireland and Luxemburg had added value per employee between EUR. 60.7 and 67.7k.

The contents of table 1 show a large differentiation of labour efficiency in the SME sector, which is particularly influenced by considerable differences in microenterprises (v_p = 53.2%). Generally, over 50% of EU countries can boast of efficiency of their microenterprises higher than the average efficiency in the EU and its distribution, similarly to that of the whole SME sector, is characterized by quite a remarkable right-sided asymmetry ($\overline{x} > Q_2$). However, as regards the first quartile (Q_1), the microenterprises in 25 EU countries had really low relation of added value to the number of employees, i.e. lower or equal to EUR 15.2k. The values are striking for enterprises in Bulgaria, Lithuania and Hungary, where average level of labour efficiency amounted to EUR 3. 7–9.7k and microenterprises in Poland, with labour efficiency of EUR 8.7k. Analysing the second quartile (Q_3), one can notice that microenterprises in 25% of EU countries had labour efficiency considerably higher than EU average, amounting to at least EUR 46.7k. The highest values can be observed for Denmark (EUR 95.7k) and Luxemburg (EUR 89.9k), but also Ireland, Finland, Great Britain and Sweden (EUR 53.4–59.9k)

The degree of variety among EU countries with regard to labour efficiency in small and medium companies was relatively lower, but still considerable (v_p = 40.7–46.5%). It

Table 1. Differentiation of labour efficiency in EU countries by size of enterprises in 2008 (value added per employees in thousands of EUR excluding financial companies)
Tabela 1. Zróżnicowanie wydajności pracy w krajach Unii Europejskiej według wielkości przedsiębiorstw w 2008 roku (wartość dodana na 1 zatrudnionego w tys. euro, bez przedsiębiorstw finansowych)

EU countries	Enterprise size					
	Micro	Small	Middle	Total SME	Large	Total
Austria	43.96	50.43	67.19	52.70	73.17	59.40
Belgium	42.20	60.51	79.42	56.75	83.94	65.75
Bulgaria	3.74	6.12	6.92	5.47	13.24	7.49
Cyprus	30.05	39.09	41.32	35.39	47.52	37.39
Czech Republic	15.50	20.37	24.21	19.40	33.44	23.95
Denmark	95.67	57.93	60.93	70.17	64.47	68.23
Estonia	17.48	18.32	23.40	19.73	22.52	20.33
Finland	57.87	60.22	71.63	62.75	80.11	69.75
France	48.60	51.37	55.15	51.25	66.98	57.28
Greece	18.05	35.30	43.32	24.90	63.14	29.85
Spain	29.52	39.61	49.14	36.54	61.35	41.99
Netherlands	34.78	51.18	65.23	47.59	59.29	51.43
Ireland	59.33	49.94	84.13	64.27	130.76	85.21
Lithuania	7.15	12.82	15.47	12.03	19.85	14.01
Luxembourg	89.91	58.90	58.62	67.69	76.67	70.68
Latvia	14.99	16.61	19.11	17.01	19.07	17.50
Malta	20.38	30.75	27.23	24.47	45.99	29.46
Germany	44.76	45.87	55.69	48.65	66.67	55.77
Poland	**8.69**	**18.63**	**21.12**	**13.73**	**28.42**	**18.30**
Portugal	13.28	22.45	29.82	19.19	41.02	23.24
Romania	12.21	15.11	15.02	14.11	33.77	21.28
Slovakia	23.27	22.11	20.45	21.73	31.16	25.93
Slovenia	21.05	31.46	30.00	26.61	36.40	29.84
Sweden	53.40	55.22	64.91	57.27	79.69	65.40
United Kingdom	56.51	56.81	71.30	60.75	71.84	65.76
Hungary	9.70	16.44	21.80	14.31	32.60	19.60
Italy	30.06	46.13	56.03	38.34	64.14	43.26
Descriptive statistics						
$\overline{x}$ (EU-27)	33.20	42.74	49.71	40.29	61.14	47.08
min	3.7	6.1	6.9	5.5	13.2	7.5
max	95.7	60.5	84.1	70.2	130.8	85.2
Q_1	15.2	19.5	22.6	19.3	33.0	22.3
Q_2	29.5	39.1	43.3	35.4	59.3	37.4
Q_3	46.7	51.3	62.9	54.7	69.4	62.4
v_p (%)	53.2	40.7	46.5	50.1	30.7	53.7

Source: Author's own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance... [2010].

was also the case when work efficiency measured as added value per employee oscillated between EUR 6.1k and 60.5k (small companies) and EUR 6.9–84.1 (middle companies). There are a number of causes of these dispersions, also relating to microenterprises, internally-based, such as entrepreneurs' decisions, but also external conditions on which entrepreneurs have little or no influence. Labour efficiency is a category of a high degree of synthesis, which is to a large degree decisive about the necessity to analyse it systematically, i.e. taking into account different structural arrangements of factors creating logical cause-and-effect connections.

Table 2 presents the structure of the cause-and-effect model of SME labour efficiency, obtained on the basis of decomposing this index, described in the introductory part of the present paper. Its analysis leads to the conclusion that the bigger the size of an enterprise, the lower the share of added value in incomes. The share of production incomes in incomes total remains relatively stable, the efficiency measured as the productivity of material inputs decreases and the equipment given to employees increases substantially; its level in small and medium enterprises is higher than in microenterprises by about 50 and 100%.

Table 2. Structure of casuse-and-effect model of labour efficiency by enterprise size estimated on the basis of 45 activity sections (NACE) in EU total in 2008 (excluding financial companies)

Tabela 2. Struktura modelu przyczynowo-skutkowego wydajności pracy według wielkości przedsiębiorstw oszacowana na podstawie 45 sekcji działalności (NACE) w UE ogółem w 2008 roku (bez przedsiębiorstw finansowych)

Statistics	Ratios of labour efficiency model				
	WWD	SP	PN	UP	WP
			Micro		
$\overline{x}$	0.429	0.664	1.398	0.083	33.20
v_p (%)	17.77	9.61	9.66	58.77	27.65
			Small		
$\overline{x}$	0.397	0.629	1.332	0.129	42.74
v_p (%)	19.59	6.34	8.86	45.99	22.24
			Middle		
$\overline{x}$	0.345	0.663	1.297	0.167	49.71
v_p (%)	25.92	5.25	10.02	57.82	22.20
			Total SME		
$\overline{x}$	0.389	0.652	1.340	0.118	40.29
v_p (%)	21.94	6.20	9.99	51.47	19.48

Source: Author's own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance… [2010].

To summarize, it is possible to say that as regards the analysed factors of labour efficiency, the SME sector is really diversified. Moreover, as regards the variation coefficient, considerable differences exist also within the particular classes of enterprise size. They mainly concern the equipment of employees and the share of added value in incomes.

It means that, first of all, these factors are main determinants of the level and variability of labour efficiency. The strength and direction of their influence can be described by appropriate quantitative methods.

QUALITATIVE ANALYSIS OF LABOUR EFFICIENCY FACTORS IN SME

Table 3 presents the indexes of linear fragmentary regression between the value of labour efficiency ratio and its descriptive statistically significant variables (at significance level $\alpha = 0.05$) and the beta ratios and determination ratio (β) and (R^2). These ratios create a basis to evaluate the strength and direction of the influence of the mentioned factors on the efficiency of labour efficiency in SME. The analysis of the parameters in the regression models from table 3 allows to draw the following conclusions:

1. With regard to all regression models, the following variables proved to be statistically significant: the added value ratio, the ratio of production share in incomes and the employees equipment. These variables explain, to a large degree, the variability of labour efficiency, both in particular size groups of enterprises (R^2 = 78.43–87.75%) and generally in the SME sector (R^2 = 80.44%).

Table 3. Linear regression coefficients and beta (β) between the ratio of labour efficiency (Y) and a statistically significant independent variables (X_i), estimated on the basis of the parameters of 45 section activities (NACE) in the EU total in 2008

Tabela 3. Współczynniki regresji liniowej i beta (β) między wskaźnikiem wydajności pracy (Y) a statystycznie istotnymi zmiennymi niezależnymi (X_i), oszacowane na podstawie parametrów 45 sekcji działalności (NACE) w UE ogółem w 2008

Independent variables X_i	Dependent variable Y			
	Enterprise size			
	Micro	Small	Middle	Total SME
	Regression coefficients			
X_1	260.76	181.78	332.65	281.53
X_2	52.90	91.89	134.29	76.30
X_3	–	–	–	–
X_4	174.41	246.90	269.23	219.38
Constant of equation	−121.15	−127.73	−224.11	−148.49
	β ratios			
X_1	0.449	0.569	0.451	0.455
X_2	0.367	0.524	0.347	0.370
X_3	–	–	–	–
X_4	1.065	1.048	0.943	0.946
	Coefficients of determination R^2 (%)			
R^2 (%)	79.72	78.43	87.75	80.44

Source: Author's own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance… [2010].

2. The estimated parameters of the regression function show that with regard to enterprises of all sizes, the increase in the share of added value in incomes positively influenced labour efficiency. As regards the absolute dimension, this factor was of greatest meaning in medium-sized enterprises and microenterprises, where an increase in the added value in incomes by one unit (1 percentage point) resulted in an average increase in labour efficiency by EUR 2.6 and 3.32 respectively.
3. The share production value in incomes, a marker of the profitability of production, proved to be an important determinant of labour efficiency in micro, small and medium companies. An increase in the value of the share by 1 per cent resulted, on average, in an increase of income profitability by EUR 0.52k (micro), 0.91k (small) and 1.34k (middle).
4. All types of companies have shown very significant relationship between efficiency and equipment of labour. An increase of labour equipment by one unit (EUR 1k) resulted, in absolute terms, in an increase in labour efficiency by EUR 0.17k in microenterprises and 0.27k in medium companies and 0.22k in SME in general.
5. As regards β ratios, measuring the indirect influence of the factors in question, the equipment of labour had primary meaning with respect to determining the level and variety of labour efficiency. As regards β, its strength of influence on efficiency was 2–3 times greater than the strength of other factors from the model.

THE DIFFERENTIATION OF PROFITABILITY IN THE SME SECTOR AMONG EU COUNTRIES

Table 4 presents the level of income profitability, measured as net operating surplus, by enterprise size and in the arrangement of EU countries. The data shows that generally, the SME sector has significantly lower profitability (6.84%) than the sector of big enterprises (9.55%), mainly due to relatively low profitability (4.32%) of the most numerous group of microenterprises. The differences in this respect are considerable and they do not only concern Germany, Denmark, Luxemburg and Great Britain, whose financial effectiveness, measured as operational surplus, was twice as high for SME than for big enterprises. Moreover, taking into consideration descriptive statistics, it is possible to notice that the average picture of financial effectiveness of the EU is the resultant of very serious differences between EU countries in this respect.

The value of the variation coefficient, v_p, ultimately shows considerable profitability differentiation in the SME sector in EU countries, as it amounted to 42% in 2008. Moreover, the statistics used also show a clear right-sided asymmetry of the profitability distribution ($\bar{x} > Q_2$), which shows that over 50% of countries can boast about profitability higher than the average profitability in the EU. However, in the range of the first quartile (Q_1), 25% of SME had actually lower profitability, i.e. the relation of operating surplus to incomes was equal to or lower than 4.1%. The following enterprises are included here: Hungarian (0.32%), Greek (1.53%), Slovenian (1.93%) and French (1.96%). In turn, taking the third quartile (Q_3) into account, it can

be noticed that 25% of EU countries have profitability higher than the average value for the EU and it was higher than or equal to 8.6%. The highest profitability in the SME sector were reached in Great Britain (almost 15%), followed by profitability in Malta (11.4%), Ireland (11.9%) or Cyprus (12.9%).

The data included in table 4 shows that the high level of differentiation of SME profitability is mainly influenced by a high ratio of operating surplus to incomes in the microenterprises sector (v_p = 114.5%). In general, in over 50% of EU countries the profitability higher than average and its distribution, similarly to the whole SME sector, was characterised by right-sided asymmetry ($\overline{x} > Q_2$). However, as regards the first quartile (Q_1), 25% of EU had unprofitable microcompanies, i.e. their ratio of operating surplus to incomes was equal to or lower than –1,0%. In this respect, microenterprises in Lithuania (–7.3%), Hungary (–7.1%), and Greece (–6.5%), Slovenia (–4.6%), Portugal (–4.4) and Poland (–3.1%) show the lowest values. Taking into account the third quartile (Q_3), it is possible to notice that the profitability of 25% microenterprises in the EU notably exceeded the average value for the EU and amounted to 6.2% or more. This group included microenterprises from Great Britain (17.4%), Denmark (17.7%) and also Germany (10.3%), Cyprus (10.6%), Ireland and Luxemburg (13.0%).

The profitability of small and medium enterprises was subject to much smaller differences in EU countries (v_p = 20.7–22.3%). However, even in the case the enterprises of that size, financial efficiency is measured as the index of operating surplus divided by incomes oscillated in a quite range of values, i.e. 3.3–15.8% (small companies) and 3.0–15.3% (medium-sized companies). It is caused by a number of internal factors, i.e., to a large extent, depending on entrepreneurs' decisions and their external conditionings on which the influence of entrepreneurs is generally limited. These factors also influence microenterprises. It is the case as profitability is influenced by, on the one hand, entrepreneurs' decisions in the area of assets and capital, the strategies of liquidity and sales, organization of production and the human capital they manage and, on the other hand, by macroeconomic and sector factors, connected with the periodicity of the economic situation, inflation-related processes, changeability of prices, economic, fiscal, exchange rate policies, competitiveness and the degree of modernity in the branch and demand fluctuations.

Profitability is a category characterized by a large degree of synthesis, which, to a large degree, determines the necessity to analyse it systematically, i.e. taking into account various structural sets of factors, creating logical chains of cause-and-effect links while using deterministic and stochastic methods.

Table 5 presents the structure of the cause-and-effect model of the income profitability ratio among SME, obtained after decomposing the ratio according to the description in the initial part of the article. Its analysis lets one arrive at the conclusion that as the company size increases, its effectiveness measured as input productivity falls down, labour equipment increases significantly; the level of the employment factor in small and medium-sized companies is higher when compared with microenterprises by 50% and 100% respectively. Moreover, the difference in labour equipment translate well into the level of labour consumption and, hence, affect labour

Table 4. Income profitability in the EU by size of enterprises in 2008 in % (excluding financial companies)
Tabela 4. Rentowność przychodów w krajach UE według wielkości przedsiębiorstw w 2008 w % (bez przedsiębiorstw finansowych)

EU countries	Size of enterprises					
	Micro	Small	Middle	Total SME	Large	Total
Austria	4.26	8.80	11.23	8.36	11.92	9.65
Belgium	0.50	5.40	7.21	4.24	6.72	5.21
Bulgaria	1.19	6.21	7.82	5.20	11.64	7.45
Cyprus	10.61	14.27	14.18	12.93	19.48	14.01
Czech Republic	–1.43	5.03	6.57	3.72	11.53	6.93
Denmark	17.67	7.30	5.86	10.45	6.19	9.04
Estonia	3.16	4.14	6.92	4.80	8.12	5.41
Finland	5.67	6.21	8.13	6.75	7.70	7.24
France	–0.65	3.61	3.02	1.96	5.43	3.50
Greece	–6.52	7.73	8.77	1.53	12.79	4.06
Spain	4.08	9.08	9.28	7.40	12.32	9.02
the Netherlands	3.07	7.28	7.31	6.25	7.45	6.70
Ireland	12.66	8.31	14.05	11.88	19.38	15.21
Lithuania	–7.33	5.78	7.91	3.96	9.10	5.73
Luxemburg	13.04	4.28	4.19	6.94	4.71	6.04
Latvia	5.43	9.57	10.90	8.85	10.73	9.23
Malta	6.67	15.83	15.31	11.36	26.20	15.68
Germany	10.34	8.60	8.64	9.04	7.01	7.98
Poland	**–3.16**	**8.58**	**9.62**	**4.45**	**12.74**	**7.84**
Portugal	–4.46	6.24	8.47	2.94	11.31	5.42
Romania	5.72	7.20	8.67	7.27	19.36	12.26
Slovakia	5.22	5.63	5.30	5.39	10.90	8.17
Slovenia	–4.62	5.37	4.75	1.93	8.11	4.21
Sweden	1.67	4.52	6.24	4.18	9.38	6.47
United Kingdom	17.37	13.31	13.84	14.71	14.02	14.36
Hungary	–7.15	3.35	5.75	0.32	9.85	4.24
Italy	0.31	7.39	6.09	4.20	8.15	5.35
Descriptive statistics						
$\overline{x}$(EU-27)	4.32	7.79	8.28	6.84	9.55	7.99
min	–7.3	3.3	3.0	0.3	4.7	3.5
max	17.7	15.8	15.3	14.7	26.2	15.7
Q_1	–1.0	5.4	6.2	4.1	7.9	5.4
Q_2	3.2	7.2	7.9	5.4	10.7	7.2
Q_3	6.2	8.6	9.5	8.6	12.5	9.1
v_p (%)	114.5	22.3	20.7	42.1	21.5	25.7

Source: Author's own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance… [2010].

Table 5. The structure of the cause-and-effect model of income profitability by enterprise size, as estimated on the basis of 45 activity sections (NACE) in the EU total in 2008 (excluding financial companies)

Tabela 5. Struktura modelu przyczynowo-skutkowego rentowności przychodów według wielkości przedsiębiorstw, oszacowana na podstawie 45 sekcji działalności (NACE) w UE ogółem w 2008 roku (bez przedsiębiorstw finansowych)

Statistics	Multipliers of the cause-and-effect model						
	SI/IT	IT/E	E/SI	AV/SI	GOS/AV	NOS/GOS	NOS/SI
				Micro			
$\overline{x}$	1.40	83.36	8.58	28.48	56.09	27.05	4.32
v_p (%)	9.66	58.78	41.79	19.98	19.21	76.07	95.56
				Small			
$\overline{x}$	1.33	128.58	5.84	24.95	34.70	89.93	7.79
v_p (%)	8.87	46.00	35.17	19.63	30.29	4.66	28.16
				Middle			
$\overline{x}$	1.30	167.29	4.61	22.91	36.77	98.36	8.28
v_p (%)	10.03	57.82	31.56	23.34	25.59	0.69	28.33
				Ogółem MSP Total SME			
$\overline{x}$	1.34	118.41	6.30	25.39	43.11	62.47	6.84
v_p (%)	9.99	51.48	37.13	21.98	23.11	14.73	26.98

Source: Author's own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance... [2010].

efficiency. Obtaining EUR 100k in microenterprises required the employment of 9 employees while it only required 6 and 5 employees in small and medium-sized enterprises respectively. The data presented also suggests that microenterprises, frequently due to a little involvement of material inputs, are characterized by relatively high level of added value share in incomes. The differences are not as strong, though, as in the case of employees' equipment measured by the level of material inputs. However, as a consequence of high labour consumption, a considerable part of added value is lost in microenterprises due to high costs of employment. The share of these costs amounted to 56% of added value in microenterprises while it reached the values of 34.7% and 36.7% in small and medium-sized companies respectively.

The data in table 5 also shows a relatively high level of microentrepreneurs' salaries, as compared with the generated surplus. The share of net operating surplus in gross operating surplus amounted to 27.1% while it amounted to 89.9 and 98.4 in small and medium-sized enterprises respectively. The accumulative capabilities of microcompanies are thus generally really low and no good development opportunities are created. To sum up, it is possible to conclude that as regards the analysed factors, the SME sector is highly differentiated. Also, referring to the variability coefficient, (v_p), differences exist even in types of enterprises. The differences mainly concern employees' equipment, labour consumption of production and labour costs. This means that thesse factors are the main determinants of profitability. Their strength and direction of influence can be defined by means of appropriate quantitative methods.

QUANTITATIVE ANALYSIS OF PROFITABILITY FACTORS IN THE SME SECTOR

Table 6 presents the ratios of linear stepwise regression coefficients of the general model, involving the values of the income profitability ratio, measured as net operating surplous and statistically significant descriptive variables (at significance level $\alpha = 0.05$), (β) coefficient and (R^2) determination coefficients. These coefficients are the basis for a synthetic evaluation of the strength and direction of the influence of the mentioned variables on the financial effectiveness of SME, measured as income profitability. The analysis of the parameters from table 6 of the parameters of structural models of regression enables to draw the following conclusions:

1. most variables from the regression models proved to be statistically significant and describe the changeability of income profitability, both in particular size-based groups of enterprises (R^2 = 91.27–97.12%) and in SME in general (R^2 = 89.42%),

Table 6. Linear regression coefficients and beta (β) between the ratio of revenue profitability (Y) and statistically significant independent variables (X_i), estimated on the basis of 45 section activities (NACE) in the EU total in 2008

Tabela 6. Współczynniki regresji liniowej i beta (β) między wskaźnikiem rentowności przychodów Y, a statystycznie istotnymi zmiennymi niezależnymi X_i, oszacowane na podstawie 45 sekcji działalności (NACE) w UE ogółem w 2008 roku

Independent variables X_i	Dependent variable, Y			
	Micro	Small	Middle	Total SME
	Regression coefficients			
X_1	11.760	0.322	2.658	0.157
X_2	–	–	–	–
X_3	−0.419	−0.423	−0.168	−1.444
X_4	–	0.514	0.446	0.747
X_5	0.455	0.281	0.324	0.175
X_6	0.026	–	–	–
Constant of equation	−32.421	−13.056	−17.265	−10.175
	β coefficients			
X_1	0.521	0.276	0.203	0.076
X_2	–	–	–	–
X_3	−0.114	−0.103	−0.049	−0.404
X_4	–	0.508	0.528	0.704
X_5	0.511	0.399	0.487	0.245
X_6	0.090	–	–	–
	Coefficients of determination R^2 (%)			
R^2 (%)	91,27	97,12	96,39	89,42

Source: Author´s own calculations based on the SME Performance… [2010].
Źródło: Obliczenia własne na podstawie SME Performance… [2010].

2. the assessed parameters of the regression function show that in all size-based groups of enterprises, an increase in the efficiency of inputs positively influenced profitability. As regards absolute values, this factor influenced microenterprises to the highest degree, where an improvement of efficiency of one unit translated into an average increase in profitability of over 11%.
3. the level of the labour consumption of production was negatively correlated with profitability. As regards each and every type of enterprise, its increase resulted in a decrease of profitability, particularly in micro and small enterprises, where employing an extra person resulted income profitability by over 0.4%.
4. the share of added value in incomes proved to be another important determinant in small and medium enterprises. An increase of this share of 1 percentage point resulted, on average, in an increase in income profitability of 0.44–0.51%,
5. regardless to company size, a connection could be observed between profitability and labour costs. An increase in the share of gross operating surplus in added value, i.e. A reduction of hired employees' wages, resulted in an increase in profitability of 0.28% in small companies and 0.45% in microenterprises respectively,
6. an influence of employees' salaries on income profitability was also clearly visible. Although salary reductions positively influenced profitability, its impact was really low in absolute terms,
7. as regards β coefficients, measuring the relative impact of the factors in question, effective use of inputs and labour costs were of primary meaning in microcompanies, while the ability to generate added value and labour costs were the most important determinants in small and medium enterprises.

SUMMARY

As regards to the number of enterprises and employment, the SME sector plays a vital role in EU economies. However, taking into account some of the most important criteria of technical, economic and financial efficiency, i.e. labour efficiency and profitability, the position of the sector is not as strong as it might seem.

Microenterprises stand out here in particular, as they represent really low levels of labour efficiency and profitability in general. The quantitative analysis of the causes of low labour efficiency shows that the factors to blame for low labour efficiency include poor labour equipment resulting in high labour consumption, increased ability to generate added value and increased preference of production to other business areas. The causes of low profitability include labour costs, labour-consuming production processes and relatively high ratio of employees' salaries to the generated operating surplus. It is thus generally possible to conclude that a development in the areas of efficiency and profitability requires systematic investments and their implementation, which, in the case of SME and microenterprises in particular, may prove difficult due to low accumulation capabilities and limited opportunities to use external sources of capital.

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POZYCJA EKONOMICZNA SEKTORA MSP W UNII EUROPEJSKIEJ Z PUNKTU WIDZENIA WYDAJNOŚCI PRACY I RENTOWNOŚCI

Streszczenie. W artykule zaprezentowano wyniki analizy wydajności pracy i rentowności w mikro, małych oraz średnich przedsiębiorstwach krajów UE. Analizę przeprowadzono na podstawie danych Komisji Europejskiej ds. Przedsiębiorstw i Przemysłu z 2008 roku. Według wyników analizy regresji do najważniejszych czynników kształtujących rentowność MSP należą: produktywność nakładów, pracochłonność produkcji, udział wartości dodanej w przychodach oraz koszty pracy. Natomiast do najważniejszych czynników kształtujących wydajność pracy w sektorze MSP należą: uzbrojenie pracy oraz udział wartości dodanej i wartości produkcji w przychodach.

Słowa kluczowe: mikroprzedsiębiorstwa, małe przedsiębiorstwa, średnie przedsiębiorstwa, sektor MSP, wydajność pracy, rentowność, Unia Europejska, analiza regresji

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