

The financial security of sales in small- and medium-sized enterprises in Poland

JAN ZWOLAK

Faculty of Economic and Legal Sciences
Department of Economic
University of Natural Sciences and Humanities
ul. Żytnia 17/19, Siedlce,
POLAND
jan.zwolak@yahoo.com

Abstract: - This study aims to determine the elasticity of ROS with respect to the financial contribution of business enterprises, the EU Operational Fund, and the EU Market and Capital Support Fund in Poland in 2014–2020. The elasticity of profit margins with respect to the enterprises' financial contribution is 1.9, i.e. almost twice the potential rate of 1. The elasticity of ROS with respect to EU funding as a means of financial security is negative. However, the average rate of increase in aggregate ROS (30%) will be ensured by the average rate of increase in ROS from the enterprises' own financial contribution (15%), the EU Operational Fund (15%), and the EU Market and Capital Support Fund for SMSEs in Poland in 2014–2020 (24%).

Key-Words: -ROS (profit margin/return on sales); financial safety/security; EU funds/funding; SMSE (small and medium sale enterprise); model.

1 Introduction

As a qualitative category of economic efficiency (or effectiveness), profitability (or return) is the whole purpose of running a business enterprise. Profitability forcibly eliminates any symptoms of irrational expenditure and necessitates searching for efficient and effective methods. This category is used as an instrument with which to rationalise the operations of an enterprise as a system. Profitability, as a function of purpose or objective, enables the application of economically rational criteria to market-based business decision-making.

ROS, as an economic evaluation of the decisions made in the course of running a business enterprise, is an important basis for assessing its financial security. It is also the basic category in assessing the efficient (and economical) management of the enterprise as a whole. ROS has a positive causal relationship with return on the total assets (ROTA), return on equity, and return on active capital (fixed and working).

The present study aims to verify the regressive dependencies of ROS on the own financial contribution of business enterprises, the EU Operational Fund, and the EU Market and Capital Support Fund for SMSEs in Poland in 2014-2020. The study additionally aims to indicate the marginal and average returns of own financial contribution, the Operational Fund and the Market and Capital Support fund that comprise the financial security of business enterprises.

This study is based on the hypothesis that the Operational Fund and the Market and Capital Support Fund, although they perform different financial security functions, will essentially increase business enterprises' own financial contributions in the relative increase in ROS in SMSEs in Poland in 2014–2020.

Section 2 reviews the literature on managing capital and its impact on aggregate profitability. The methodology is discussed in Section 3. Section 4 contains and discusses the econometric analysis. Lastly, Section 5 presents the conclusions.

2 Literature review

A number of scholars have conducted studies on introducing capital into business enterprises under various conditions of growth and development. Eljelly (2004), who demonstrates that the relationship between profitability and the cash replacement cycle (liquidity) is negative, is especially relevant to this study. Eljelly also points out that enterprises vary considerably with respect to liquidity (measure). Deloof (2003), on the other hand, shows that those enterprises that devoted a large amount of cash investment to capital injection at the appropriate time caused capital to have a significant influence on increased profitability. The research of this author is based on correlation and regression calculus and is therefore scientific in character. The same research methodology was applied by Shin and Soenen (1998), who also found

a negative relationship between the net length of an enterprise's business cycle and its profitability. Lazaridis and Tryfonidis (2006) determined the statistically significant ratio between profitability, calculated using operating profit, and the cash replacement cycle and its components (accounts receivable). These studies likewise have a scientific character. They show that enterprises can attain profitability by managing the cash replacement cycle appropriately, and by maintaining each constituent part of the cycle (receivables accounting) at its optimum level. Falope and Ajilore (2009) found a significantly negative relationship between net return and the average period of a given aggregation, the turnover (in days), the mean payment period, and the cash replacement cycle in the enterprises they analysed. However, they did not find any significant changes in the effects of capital injection between large and small enterprises.

Capital injection through appropriate management is quite a sensitive area in financial management (Joshi 1995). The chief executive management of an enterprise only partly determines its profitability. The point is that an increase in profit at the expense of financial liquidity can result in serious solvency problems, and even lead to bankruptcy. Extending credit, however, can stimulate sales, as it enables customers to assess the quality of products before making payments (cf. Long, Malitz and Ravid, 1993; Deloof and Jegers, 1996). The theoretical model proposed by Merville and Tavis (1973) shows that investing and financing of decisions is connected with injecting capital to produce, as the components of any influence of optimal policies of other enterprises. The model offers structural solutions enabling a group of managers to resolve the complexities of their lending policy for planned short-term financing. Comprehensive studies conducted by Shin and Soenen (1998) have documented a strong reverse relation between the efficiency and profitability of capital in U.S. industry. This reverse relation is supported by Deloof (2003), Lazaridis and Tryfonidis (2006), and Garcia-Teruel and Martinez-Solano (2007). Furthermore, various divergences appear among the last mentioned authors regarding the impact of the various components of capital injection on the profitability of enterprises.

Ganesan (2007) tested ROTA and ROS as dependent variables. Managing the efficiency of working capital apparently has a negative relationship with ROTA and ROS in industry. On the other hand, Raheman and Nasr (2007)

demonstrated that there is a strong negative relationship between working capital and its profitability. This is because of the bifurcation between total assets and financial assets. There is also a negative relationship between financial liquidity and profitability, although this is still a currently used ratio, where the most important measure is liquidity (variable), as this affects profitability. There is a positive relationship, however, between the size of the enterprise and its profitability. In their study of industrial enterprises, Smith and Begemann (1997) confirmed that the bifurcation of funding streams was the reason for the negative relationship, as was the case with total assets and financial assets vis-à-vis business profitability.

EU funding functions as financial security, without directly impacting the trend in the market decisions being made. This is confirmed by the studies of Goodwin and Mishra (2006). L.A. Zaporozhtseva is of the opinion that the financial security of an enterprise should be assessed on the basis of return on assets (ROA) or ROS. Bottazzi et al. (2008), by contrast, point to the need to examine the relationships between the three crucial dimensions of an enterprise, viz. productivity (efficiency), profitability, and growth. This last study indicates that there is a relationship between the degree of capability (productivity) and the benefits from profitability (or yield) in enterprise growth and development. In order to examine these effects, Cooley and Quadrinni (2001), and Cabral and Mata (2003), drew on several theoretical studies to map out some ideas to help formulate certain formal models of enterprise dynamics. For their part, Kaplan and Zingales (1997; 2000) claim that at the end of the day, liquidity is merely a measure of production capacity to generate a product, so that procedures and internal resources may be included. What this indicates is that cash flow can probably be considered a dispensable measure of mechanisms of this sort. Hence, Bottazzi et al. (2008) propose that the amount of credit be assessed as a general variable controlling the financial conditions of enterprises. This constitutes a measure of the inclination to provide external finance. Moreover, the synthetic variable used as the amount of credit is simultaneously a measure for capital markets and for the financial security of business enterprises. It may be a function of an enterprise's productivity and profitability.

The above research results have been adopted as the substantive basis for the present study. A curvilinear regression model using the following

measures is proposed: ROS (commercial profitability) as a function of the enterprise's own contribution (to raise finance); the EU Operational Fund; and the EU Market and Capital support fund for SMSEs in Poland.

3 Research methodology

The main purpose of running a business enterprise is to increase value. Constantly increasing profit is a partial aim. The absolute value of profit renders its comparison within a set of enterprises difficult. Hence, of all the different relationships between profit and basis of reference, ROS (revenue), also referred to as commercial profitability in the literature, has been selected. ROS is the ratio of profit on sales to revenue on sales * 100%. The ratio is determined by the industry and the nature of the operations pursued. The higher the ratio, the better for the enterprise, since the revenue on sales can earn greater profit.

The ability of the capital invested to generate profit on sales relative to the revenue earned from sales, is taken to be the profitability of SMSEs in 2014, and is used as a dependent variable.

The class of enterprises under study can be assumed to represent a proportion of developmental opportunities (Brant, 1990). This development, however, cannot be expected to be linear, but rather curvilinear. Econometric verification extends to examining the response of ROS to the EU Operational Fund and the EU Market and Capital Support Fund, and obviously to the indispensable own financial contribution of enterprises in 2014–2020.

All the variables in Cobb-Douglas type function models are discrete random variables. Moreover, these variables represent finite sets (encompassing the whole of Poland) and express regression curves. They illustrate the shape of the dependencies between features, and thus the way in which the values between the sets under study are associated. This justifies using a Cobb-Douglas type curvilinear power regression to identify the regressive dependence of ROS on the enterprises' own financial contribution, the EU Operational Fund, and the EU Market and Capital Support Fund for individual Polish voivodeships (regions) in 2014–2020.

The empirical variables for the Cobb-Douglas type model were selected using the matrix of logarithmic correlation coefficients. The variables for the model were selected on the basis of the principle of a strong correlation between the independent variable and the dependent variable,

and a weak correlation between the independent variables. The numerical calculations were performed using the SPSS program.

4 Results and discussion

Sets of empirical data of SMSEs and EU financial funds in Polish voivodeships in 2014–2020 (N=16) constitute the subject of this study. It is important that a dependent variable be adopted and defined in any study on financial security.

ROS is not only necessary to fund development by creating the potential to make future profits in the long term, but also to finance ongoing business operations (the aim of management). However, it is not the absolute value of a positive financial result, but the ratio of profit on sales to revenue on sales that evidences the effectiveness of an enterprise. The same profit can be made at varying levels of resource implementation and scales of economic activity. A decrease in ROS leads to the financial symptoms of endangered continuity of business operations, and net loss. ROS is therefore an important measure of an enterprise's financial security.

In the event of very poor production results, an enterprise can draw on the support of EU funding (Hill 2012). Direct and indirect support comprise a complex system known as the financial safety network for enterprises. This network consists of direct payments, e.g. the EU Operational Fund, disassociated from, but connected with, production decisions made in response to market needs. Indirect financial security, guaranteed by the EU Market and Capital Support Fund, while disassociated, influences market orientation.

The linear correlation (Pearson's correlation) between the variables ROS and revenue on sales in the enterprises under study is -0.912 (or -0.923 with a variable number of enterprises) at a significance level of 0.01 (reversibly). At the same time, the Pearson correlation coefficient (r) for: the dependent variable, ROS (Y4), and the independent variable, Own Financial Contribution of Enterprises (x1), is -0.829 ; the independent variable, EU Operational Fund (x2), is -0.869 ; and the independent variable, EU Market and Capital Support Fund (x3), is -0.884 ; at a significance level of 0.01 (reversibly). These Pearson correlation coefficients (r) are all negative, and contribute nothing to the selection of variables for the model. Aczel (1989; 1993) presents the methods of selecting and matching explanatory variables. He emphasises two important criteria: the increasing value of the adjusted determination coefficient R^2 ; and the admissible significance level range of 0.00–

0.05, which determines whether the inclusion of an explanatory variable in the model is admissible. These quality criteria for good regression are

satisfied by the Cobb-Douglas type estimated model of curvilinear regression as shown in Table 2.

Table 1 : Parameters of features of the variables for SMSEs in Polish voivodeships in 2014 and 2014–2020.

No.	Specification	Measure	Symbol	Arithmetic mean	Range, min./max.	Coefficient of variation(%)
1.	Return on sales in 2014	PLN Mio.	Y4	0.5	0.21–0.97	50.00
2.	Own financial contribution of enterprises (2014–20)	EUR Mio.	x1	390.6	181.2–694.7	29.05
3.	EU Operational Fund (2014–20)	EUR Mio.	x2	1952.9	906.1–3473.6	34.74
4.	EU Market/Capital Support Fund (2014–20)	EUR Mio.	x3	143.7	45.3–484.2	80.45

Source: *Rocznik statystyczny województw* [Statistical Yearbook for Voivodeships], Central Statistical Office [GUS], Warsaw, 2015; *Regional Operational Programmes for 2014–2020*, Ministry of Development of the Republic of Poland, Warsaw, 2014.

The data specified in Table 1 show that the range of ROS (Y4) reveal its considerable diversity across voivodeships. A comparison of the internal variability between the variables reveals that ROS exhibits an indirect differentiation among the variables of the feature in the distribution. The least internal differentiation of the feature in the distribution appears in Own Financial Contribution and EU Operational Fund for the voivodeships and their enterprises. The most internal differentiation of the feature in the distribution appears in the EU Market and Capital Support Fund in 2014–20. For this EU fund, the values of the features of the units (elements) are most dispersed around the mean. This suggests that the role of the variable in shaping the financial security of business enterprises in the voivodeships will be the most important.

The curvilinear regressive dependence of the variables under study are broken down in Table 2.

The data in Table 2 specify the regressive dependence of ROS (Y4) on the own financial contribution of enterprises (x1), the EU Operational Fund (x2), and the EU Market and Capital Support

Fund (x3). These variables (x1, x2, and x3) explain the variability in ROS in 90% of cases. The variability in ROS can be explained using the determination coefficient (R^2): a value greater than 0.9 indicates a very good explanation of the financial security of enterprises (Neumark, Tinsley and Tosini, 1991). Moreover, the greater the value of R^2 , the better the fit to the empirical data and the greater the confidence in the regression model. The strength of the correlation, expressed by the multiple correlation coefficient (R) between ROS and the own financial contribution of enterprises, the EU Operational Fund and the EU Market and Capital Support Fund, as the positive square root of R^2 , is 94.87. The standard errors in the regression coefficients (parameters) are less than 50% of their absolute values. The absolute t-test values are several times greater than those of the regression coefficients, while the significance levels of the regression coefficients are in the range 0.00–0.03. The above statistical evaluations of the regression coefficients (parameters) indicate that they can be of use in the present econometric analysis.

Table 2: Power regression of ROS (Y4) for own financial contribution of enterprises (x1), EU Operational Fund (x2), and EU Market/Capital Support Fund (x3) in 2014–2020.

a*	Regression coefficient			Standard error				Test t				R^2 , adjusted
	x1	x2	x3	a	x1	x2	x3	a	x1	x2	x3	
244.7	1.9	-2.1	-0.4	1.05	0.78	0.61	0.09	5.24	2.45	-3.41	-4.55	0.90

Source: Own calculations.

a* - absolute term, de-logarithmised.

The significance level is in the range 0.00–0.03.

The regression coefficients and the function parameters at x_1 , x_2 , and x_3 , determine the elasticity (elasticity coefficients) of ROS with respect to the own contribution of enterprises (x_1) and EU funds (x_2 and x_3) (financial security). Solow (1956) explains that they are elasticities of Y4 with respect to x_1 , x_2 , and x_3 . According to J.B. Clark's marginal theory of distribution, they represent the proportions of the enterprises' own contribution (in obtaining EU funding) (x_1) and the EU funds (x_2 and x_3) in the ROS of the enterprises under study.

ROS (Table 2) is most elastic with respect to enterprises' own financial contribution (1.9). This regressive dependence is almost twice the potential possibility of an elasticity of 1. This moreover means that a 1% increase in ROS, with the other financial funds held constant, corresponds to a 1.9% increase in implementing enterprises' own contribution. The above elasticity coefficient expresses the relation between the relative change in ROS and the relative change in own financial contribution that caused it. The elasticity of ROS with respect to the EU Operational Fund is negative (-2.1), as it is with respect to the EU Market Fund and the EU Capital Support Fund (-0.4). Changes to the relationship between enterprises' own financial contribution and the EU funds (Operational and Market and Capital Support) are mainly caused by changes in the makeup of ROS in the enterprises under study.

Targeted financing from the Operational Fund and the Market and Capital Support Fund can get

the enterprises under study to put up a great deal of their own money (PLN). This is the multiplier effect of EU expenditure. The greatest multiplier effects can be expected from those expenditures that lower the costs of production and services, and generate positive ROS results, and those that activate the utilisation of manufacturing capacity. Smith and Begermann (1997) showed that current activities were bifurcated by the funding stream, and that a negative relationship with ROS is apparent. This explains why, in the present study, the operation of EU funding as financial security is bifurcated by the various functions performed: the Operational Fund and the Market and Capital Support Fund, i.e. for the internal and external workings of the enterprise. Consequently, the elasticity of ROS with respect to these funds is negative, and therefore contradictory. It should be added that any decision to implement the Market and Capital Support Fund will be framed by the environment in which the enterprise operates (Rostášová and Chrenková 2010).

It is essential to determine ROS in 2014 – within the scope of variability of enterprises' own financial contribution, the EU Operational fund and the EU Market and Capital Support Fund. This has been used to determine the marginal and mean profitability of the above independent variables for SMSEs in Poland. The marginal and mean returns on the enterprises' own financial contribution (in EU funding) are broken down in Table 3.

Table 3: Marginal and mean return on sales vs. enterprises' own financial contribution, 2014–2020.

ROS (Y4) PLN Mio.	Enterprises' contribution (x_1) EUR Mio.	Profitability (return):	
		average PLN/EUR	marginal PLN/EUR
0.14	238.3	0.00057	0.00108
0.20	295.3	0.00069	0.00131
0.28	352.3	0.00081	0.00154
0.38	409.3	0.00092	0.00176
0.48	466.3	0.00104	0.00198
0.60	523.3	0.00115	0.00219
0.73	580.3	0.00127	0.00241
0.88	637.3	0.00138	0.00262

Source: Own calculations based on the data in Tables 1 & 2.

Marginal and mean profitability (Tables 3, 4, and 5) are mutually proportional owing to the permanent elasticity of ROS with respect to own financial contribution, the EU Operational Fund and the EU Market and Capital Support Fund in the enterprises under study.

As the enterprises' own financial contribution increases (Table 3), marginal ROS from that contribution increases more than mean profitability, which increases at a slower pace, while overall profitability increases ever more rapidly for the enterprises under study in 2014–2020. The above

dependencies occur in the entry zone of irrational management, which points to considerably

dynamic growth and development for these enterprises in the future.

Table 4: Marginal and mean ROS vs. EU Operational Fund in 2014–2020.

ROS (Y4) PLN Mio.	EU operational fund (x2) EUR Mio.	Profitability (return):	
		average PLN/EUR	marginal PLN/EUR
0.98	1191.4	0.00082	-0.00172
0.62	1476.7	0.00042	-0.00089
0.43	1762.0	0.00024	-0.00051
0.31	2047.3	0.00015	-0.00032
0.24	2332.6	0.00010	-0.00021
0.19	2617.9	0.00007	-0.00015
0.15	2903.2	0.00005	-0.00011
0.12	3188.5	0.00004	-0.00008

Source: Own calculations based on the data in Tables 1 & 2.

Within the scope of the EU Operational Fund (Table 4), marginal profitability is negative. This results in a sharp fall in mean profitability, as well as a decrease in aggregate profitability, for the enterprises under study. This explains why the operational fund is made use of within the completely irrational management zone, i.e. ROS

when this fund is implemented in 2014-2020. It should be added that SMSEs in Polish voivodeships can obtain support from the Operational Fund for investing in new machinery, increasing energy efficiency, renewable energy sources, IT, R&D, and scientific cooperation. These support areas are mainly connected with production and products.

Table 5: Marginal and mean ROS vs. EU Market and Capital Support Fund in 2014–2020.

ROS (Y4) PLN Mio.	EU Market and Capital Support Fund (x3) EUR Mio.	Profitability:	
		average PLN/EUR	marginal PLN/EUR
0.41	94.07	0.0044	-0.0017
0.35	142.84	0.0024	-0.0010
0.31	191.61	0.0016	-0.0006
0.28	240.38	0.0012	-0.0005
0.26	289.15	0.0009	-0.0004
0.25	337.92	0.0007	-0.0003
0.23	386.69	0.0006	-0.0002
0.22	435.46	0.0005	-0.0002

Source: Own calculations based on the data in Tables 1 & 2.

When the EU Market and Capital Support Fund increases (Table 5), marginal profitability is negative. This results in a fall in mean profitability, and a decrease in aggregate profitability for the enterprises under study. The decrease in aggregate profitability is less than 50%. This indicates that making use of the Market and Capital Support Fund falls within the completely irrational management zone, as ROS decreases by as much as 50% when applying this fund. It should be noted, however, that the fund acts as a means of financial security for an enterprise's market activities, i.e. in

the sphere where the enterprise generates sales revenue and a return thereon.

The aggregate profitability of an enterprise is the accumulation of the financial results achieved through its various activities. The level (and growth rate) of profitability remains determined by the ROS of all the various types of activities carried on by the enterprise, and also determines the makeup of aggregate profitability. The growth rate within the range of extreme values for individual variables is broken down in Table 6.

Table 6: Average growth rate of ROS (Y4), enterprises' own contribution (x1), Operational Fund (x2), Market and Capital Support Fund (x3), and marginal and mean profitability (%).

Specification	% Table 3	% Table 4	% Table 5
ROS (Y4)	30.60	-25.57	-8.31
Enterprises' own contribution (x1)	15.09		
Operational Fund (x2)		15.10	
Market and Capital Support Fund (x3)			24.47
Profitability:			
– marginal	13.48	-35.34	-26.40
– average	13.48	-35.34	-26.40

Source: Data specified in Tables 3, 4 & 5. Calculated using the geometric average.

From the data in Table 6, it follows that the average growth rate of aggregate ROS (over 30%) can be ensured by an average growth rate in the ROS from enterprises' own financial contribution (over 15%) at marginal and mean rates of return of over 13%. Financial security will further be ensured by the average ROS growth rate from the Operational Fund (over 15%) and the Market and Capital Support Fund (over 24%). However, the average aggregate ROS growth rate of these financial funds is negative. Moreover, the growth rate of marginal and mean profitability is likewise negative for the Polish enterprises and voivodeships under study in 2014–2020.

5 Conclusion

The hypothesis, according to which the EU Operational Fund and the EU Market and Capital Support Fund, despite fulfilling different financial security roles, will nevertheless significantly increase an enterprise's own financial contributions in the relative increase of ROS for SMSEs in Poland in 2014–2020 (1.9), has been confirmed. Activities carried on by making use of the EU Operational Fund and the EU Market and Capital Support Fund will bifurcate and have a negative relationship with ROS because of the different functions these funds perform. This is evidenced by the negative elasticity of ROS with respect to these EU funds, which comprise the financial security of enterprises. Several studies have shown that the aggregate ROS for 2014 (30%), which was the result of implementing enterprises' own financial contribution (15%), the EU Operational Fund (15%) and the EU Market and Capital Support Fund (24%), will ensure an average growth rate of aggregate ROS in excess of 54%. The financial security from implementing the EU funding under study, however, will constitute a mean growth rate of more than 39%. This study will be complemented by a future study on the growth rate of the enterprise category and the growth rate of

ROS from using the above EU funds for SMSEs in Poland in 2014–2020.

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