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State subsidies and their impact on business

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ABSTRACT
The effect of market regulation tools on business is a complex phenomenon, and the impact of such regulation could be both positive and negative. The enhancement of the positive effect is a scientific task which requires a systematic approach. In order to find a solution to this problem it is necessary: a) to identify the relevant factors; b) to make a coherent evaluation of these factors and their influence on the phenomenon under investigation; c) to establish the optimal form and extent of the SRB (State Regulation of Business) tool required for the achievement of the desired results. The study analyses aims of economic regulation and business management from the point of view of a state. The research focuses on problems caused by state subsidies for business enterprises as one of the forms of SRB. The research also aims to enhance the effectiveness of business regulation. The main objects of this study are: state subsidies for business enterprises as a form of state intervention in the market and the possible correlation between the characteristics of subsidies and their impact on business. The evaluation presented in this study proved that EU subsidies have had a direct positive influence on the expected effect. The analysis revealed that rate of subsidies has had a higher effect on SRB impact than the size of funding.

KEY WORDS
state subsidies, EU financial aid, multicriteria evaluation methods, expert assessments

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Introduction

STATE REGULATION OF BUSINESS AND INFLUENCE ON THE EFFECTIVE FUNCTIONING OF A MARKET

The regulation of the state economic policy is one of the major tasks of the government in order to ensure the economic stability and regular functioning of market economy (Martinkus, Žilinskas, 2008). The overall aim of the state regulation of business (SRB) is the adjustment of market processes with the view of the sustained well-being of the society. In other words, state intervention has to have a clear aim – to be beneficial to the society. The achievement of this aim is impossible without state intervention, or it will take much longer time without state intervention, or the benefits gained will be less significant.

When the market regulation is too lax or when state intervention is too intrusive, the efficiency of the market (in its most common sense) decreases. The level of the effect of state regulation on general economic efficiency is defined in Fig. 1. We can see how important it is to regulate state interventions in the market economy.

The task of the present work is to define the level of market regulation (in this work it is state subsidies for business) and its limits that ensure the greatest benefits offered by regulation. With the view of the greatest effect of intervention, the employment of projected regulation tools should undergo a thorough evaluation.

In most economically developed countries the valuation of the regulation tools employed by the government is commonplace. However, different counties use different methodologies for creation

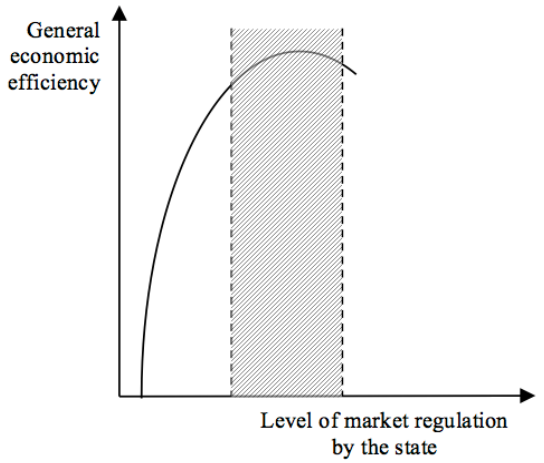

Fig. 1. Efficiency of state economy and the level of government regulation

of business regulation tools;, a single perfect method for assessment of the effect of state interventions on the functioning on the market does not exist.

The object of scientific research in the article is state subsidising of enterprises as a form of state intervention in the market functioning. The main aim of the research is to determine the effect of state subsidies on business. The study is based on findings of the previously published studies on the EU financial aid to business (Ginevičius et al., 2008).

The research methods employed in the present study include complex, multiple criteria, comparative analysis, aggregation, synthesis, simulation, statistical analysis, a representative survey of expert evaluation (formalized surveys) and other methods. The reference sources used in the paper include the materials offered by the official international organizations, scientific databases, as well as the material from the scientific literature.

1. Economic research and valuation of state subsidising on business

One of the SRB forms is the state aid to enterprises. State interventions have a certain effect on the functioning of the market. For some enterprises, this effect is motivating, while the position of the competitors of the above mentioned enterprises is infringed. However, due to the imperfections of the market, the aid provided by the state could be and is used as a tool to decrease market distortions. It is mostly used as a factor promoting enterprises to engage in the activities which they normally ignore.

Though the volume of the state aid in the EU member states has been decreasing since the end of 1990, the state aid constitutes a significant proportion of the GDP generated in the EU. The provision of aid by the state aims at tackling the problems arising in the market that the market itself is unable to solve without external intervention.

The monitoring of the state aid in the EU is closely supervised. The EU member states are invited to evaluate the intervention very carefully before the aid is accepted with the intention to verify whether the intervention is the most suitable and effective way to tackle the problems related to the existing market imperfections. Systematic evaluation of the Cohesion Policy commenced subsequent to signing of the Single European Act in 1987. In conformity with the provisions of the Act, the EC started applying the established standards for the evaluation of financial aid: specific and measurable objectives were identified and certain agreements regarding the evaluation methods were achieved. After the reform of the EU Structural Funds in 1988, evaluation of the effect of structural tools became compulsory. As per regulations, the ex-ante, on-going and ex-post evaluation of a programme has to be carried out to produce an indication of the effect of the programmes (Hagens et al., 1994). According to the estimations of the EC, this resulted in about 300 independent studies in 1992. All studies concluded that assistance of the Cohesion Policy had a substantial effect on the growth in the added value of regions as well as on the level of employment. Nevertheless, Bachtler and Michie (1995) referred to such evaluations as very subjective. They identified additional evaluation problems such as incoherence of evaluation in different countries or regions and differences in the quality of such studies. The international audit company Ernst & Young (1996) has also criticised the studies for incompatible evaluations. In response to critical remarks, the EC introduced even stricter evaluation procedures. Simultaneously, they started a research into evaluation procedures which employ simulation methods for the evaluation of the macroeconomic effect of the Cohesion Policy (European Commission, 1999).

As evaluation of the structural aid is one of the functions of the EU funded programmes there have been more studies and articles published on the topic. (Sisäasiainministeriö 1996a, 1996b, 1997; Eskelinen et al., 1996; Forsström, Mustonen, 1996). In 1996, authors of the study on the financial aid for business which was carried out in Finland focused on five types of effect on business: distortion of competition, safety of supply, social outcomes, impact on technologies, and the environment.

Systematic evaluation of EU finding programmes was also a major part of the EC initiative (in 2000) aiming at sound and efficient management. Apart from the internal management reforms, the sound and efficient management initiative of 2000 was aimed at increasing cooperation with the EU member states and improving programme evaluation and monitoring.

The number of available evaluation methods has been growing together with the increasing number of evaluations of the EU Cohesion Policy and Structural Funds (Alexe, Tatomir, 2012; Munteanu, 2012; Vadasan, 2012; Jaliu, 2012; Gómez-García et al., 2012). Methods used for evaluation include case studies, method of computable general equilibrium and econometric methods (Bradley et al., 2003). Beutel (2002) used the input-output method in his analysis of the effect on the macroeconomic level (in East Germany and Mazzogiorno Region in Italy) as well as on the national level (in Greece, Ireland, Portugal and Spain). Pellegrini et al. (2013) used a non-experimental comparison group method, the regression discontinuity design and a novel regional dataset for 1994-2006 to evaluate the impact of the EU Regional Policy on economic growth. Their findings show a positive impact of the EU Regional Policy on economic growth. Another method of regional modelling, based on the income-expenditure model, was offered by Treys (Treyz, 1993; Fan et al., 2000). Other researchers have developed their own evaluation methods for quantification of the effects resulting from the injection of the Structural Funds, for example Monrobel et al. developed a model, which is considered a neoclassical version of the Walrasian equilibrium, modelling production sectors on perfect competition, full use of production factors and the clearing of all markets of goods (Monrobel et al., 2013). The main advantage of evaluation methods based on the macroeconomic modelling is the possibility to evaluate the policy effect comparing it to scenarios without intervention (Bradley et al., 2003).

Some econometric models for evaluation of the Structural Funds are based on the growth of regressions (Ederveen, 2003). These methods are used for the analysis of information on regions. De la Fuente and Vives (Fuente, Vives, 1995) evaluated the effect of the European Regional Development Fund as well as other state subsidies for infrastructure and education on the income level in different EU regions. In their analysis, they used a small simultaneous equation model and the decomposition method. The studies confirmed the success of the EU policy in the convergence of the EU regions.

There were a lot of studies carried out in Lithuania too (Evaluation of Changes …, 2011; Report on the Implementation ..., 2011). They aimed to evaluate the financial aid of the EU Structural Funds to Lithuania (including the direct financial aid to business) as well as its effects. The Ministry of Economy of the Republic of Lithuania commenced a research on the Most Effective Forms of Financial Support to Business from the European Union Structural Funds (The Most Effective ..., 2007).

In summary, taking into consideration all of the findings of the above mentioned studies, it can be stated that evaluations of the EU financial support as well as other research into state regulations of business are mostly focused on the effect of aid. The evaluations only consider whether the financial aid was provided or not. The above studies do not analyse how different specifications of the financial aid – such as the size or the rate of co-funding – influence the effect of funding.

Both state regulation of business and the aid from the Structural Funds (as one of the forms of state regulation of business) and their effect on business are multipurpose and complex phenomena. A great number of models and their criticism only confirm the fact that a single and universally accepted approach for evaluation of such phenomena simply does not exist. Depending on the questions raised during evaluation, and seeking a greater credibility and accuracy of results, different approaches can be applied.

Due to the fact that the financial aid is multipurpose and complex, it is impossible to define the subsidies provided to business enterprises and their effect on business if we use just one or two criteria. To have a more detailed evaluation of the phenomenon under consideration, it is necessary to significantly increase the number of descriptive indicators. During the evaluation process, it is also necessary to consider the importance of individual indicators (that is the indicators are not of equal significance), (Tamošiūnienė et al., 2006). It is possible to get a more objective answer to the question on the effect of financial aid on business when the issue is considered from several aspects rather than just one dominating aspect. In order to identify the conditions determining the positive influence of the financial aid and to identify the appropriate volume of such aid it is essential to distinguish the criteria for the definition of the financial aid as such.

2. Complex valuation of state subsidising effect on business

Only after the criteria defining the state subsidies and the criteria defining their effect are merged into common derivative indicators it becomes possible to carry out the complex evaluation of subsidies and their effect: to establish the relationship between the aid and its effect, to identify the spheres where the aid was most efficient, also to identify the characteristics of the aid which have the determining influence on the effect of the aid. The use of multicriteria evaluation methods enables us to evaluate various indicators defining the object under investigation in a complex way.

In conformity with the provisions of legal acts of Lithuania and the EU stipulating the EU aid for enterprises, four areas of activities of enterprises which were subsidised from the structural funds during the period of 2004-2006 may be defined:

- development of production,
- development of services,
- research and development (further on – R&D),
- staff training.

Further empirical research will be based on the investigation of subsidies for enterprises in the above mentioned areas. The main object under investigation is subsidies and their effect as well as the relation between the form of subsidies and their effect (Fig. 2).

Seven criteria defining subsidies for enterprises were selected by the authors for further evaluation.

Two questionnaires were compiled. One questionnaire was designed for subsidised businesses while another was designed for experts working in the field of the EU aid provision. There were two representative surveys carried out on the basis on these questionnaires. 150 small and medium business (SMB) industrial enterprises (members of the Lithuanian Confederation of Industrialists) were surveyed. Another representative survey addressed the experts in the EU aid provision. 10 experts from the Ministry of Finance, Ministry of Economy, Lithuanian Confederation of Industrialists, private consulting agencies operating in the field of the EU aid provision participated in the survey. The establishment of significance of the criteria used in the survey of enterprises was based on the information obtained from the questionnaire.

The findings of the study were processed using the multicriteria evaluation methods. In order to make the evaluation more comprehensive, the authors used two evaluation methods for the analysis of the results: Simple Additive Weighing (SAW) method which is not very sophisticated and the TOPSIS method which is a more profound one (Ginevičius et al., 2008).

In the cases when the enterprises included at least one criterion scored 0 and the VICOR method produced indefinite results, it was found to be inadequate for the research and was not used further. The summarised multicriteria values of aid indication are given in Tab. 1.

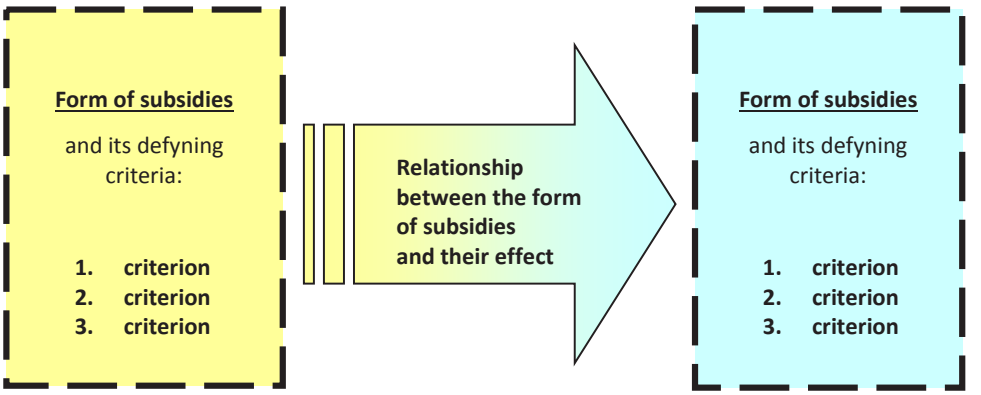

Fig. 2. Relationship between state subsidies and their effect

As the evaluation seeks to establish the interdependence of subsidies and their effect, criteria that would define the effect of subsidies have to be identified. Fifteen criteria defining the effect of subsidies for enterprises were selected by the authors for further evaluation.

The summarised multicriteria values of aid effect indication (obtained using multicriteria methods) are given in Tab. 2.

In order to compare the results obtained using different multicriteria methods, a correlation analysis was made and the places of enterprises compared.

Tab. 1. Summarised multicriteria values of aid indicators

Enterprises	Multicriteria Evaluation			
	SAW		TOPSIS	
	Multicriteria value	Place	Multicriteria value	Place
1	0.0404	8	0.320	6
2	0.0447	5	0.261	17-19
3	0.0355	14-15	0.261	17-19
4	0.0348	18	0.274	13
5	0.0280	22	0.270	15-16
6	0.0417	7	0.337	5
7	0.0346	19	0.243	20-21
8	0.0355	14-15	0.270	15-16
9	0.0349	17	0.289	8-9
10	0.0376	11	0.222	22
11	0.0525	4	0.321	4
12	0.0375	12	0.282	11
13	0.0359	13	0.280	12
14	0.0703	3	0.458	3
15	0.0852	1	0.471	2
16	0.0401	9	0.295	7
17	0.0269	23	0.219	23
18	0.0305	20-21	0.284	10
19	0.0251	24	0.212	24
20	0.0387	10	0.289	8-9
21	0.0353	16	0.271	14
22	0,.801	2	0.504	1
23	0.0428	6	0.261	17-19
24	0.0305	20-21	0.243	20-21

Source: (Ginevičius et al., 2008).

Tab. 2. Summarised multicriteria values of aid effect indicators

Enterprises	Multicriteria Evaluation			
	SAW		TOPSIS	
	Multicriteria value	Place	Multicriteria value	Place
1	0.0349	17	0.309	17
2	0.0462	10	0.375	12
3	0.0446	11	0.379	11
4	0.0379	16	0.343	15
5	0.0247	19	0.204	21
6	0.0410	13	0.357	14
7	0.0503	7-8	0.425	7
8	0.0891	1	0.567	1
9	0.0406	14	0.387	10
10	0.0330	15	0.315	16
11	0.0598	3-5	0.458	3-5
12	0.0598	3-5	0.458	3-5
13	0.0598	3-5	0.458	3-5
14	0.0162	23	0.138	23
15	0.0185	22	0.148	22
16	0.0540	6	0.443	6
17	0.0128	24	0.091	24
18	0.0445	12	0.371	13
19	0.0241	20	0.232	19
20	0.0276	18	0.247	18
21	0.0503	7-8	0.412	8
22	0.0604	2	0.473	2
23	0.0469	9	0.401	9
24	0.0229	21	0.224	20

Source: (Ginevičius et al., 2008).

Tab. 3. Comparison of the results of the multicriteria evaluation (correlation)

Comparative Methods	First Group Indicators	Second Group Indicators
	Coefficient of Determination Value	Coefficient of Determination Value
SAW and TOPSIS	0.86	0.94

Tab. 4. Comparison of the results of the multicriteria evaluation (places)

First Group Indicators		Second Group Indicators	
Place of Enterprise SAW method	Place of Enterprise TOPSIS method	Place of Enterprise SAW method	Place of Enterprise TOPSIS method
1	2	1	1
2	1	2	2
3	3	3-5	3-5

The results of the analysis are given in Tab. 3 and Tab. 4.

As it can be seen from the above, the results obtained applying both methods are very much alike. Values obtained during multicriteria evaluation are used further on for the analysis of the relationship between subsidies and their effects. Multicriteria values defining subsidies and their effects produced by different valuation methods are grouped and presented in Fig. 3.

After the evaluation of the effect of subsidies and with regard to the nature of various activities subsidised by the EU, we can draw the conclusion that the greatest effect was achieved when the aid was provided for the development of production and R&D – the values of derivative indicators of the effect of subsidies in these areas are the highest. Training projects occupy the third place. Due to significant differences related to general trends of subsidies and their effect on the one hand and very small sample on the other hand, the investigation was not carried out.

During the research into the influence of different criteria of subsidies on their effect, it was established that not the absolute size of subsidies but their rate had the greater effect.

As the rate of subsidies indicates the subsidised share of project value, we can assume that the higher the rate of subsidies, the greater effect of subsidies is going to be achieved.

In the case of the projects related to the development of production, within the range of relatively low rate of subsidies (40-60%), the

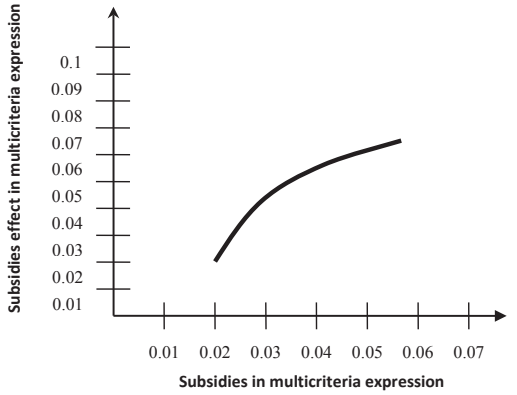

Fig. 3. Subsidies effect to companies, SAW method (coefficient of determination 0,38)

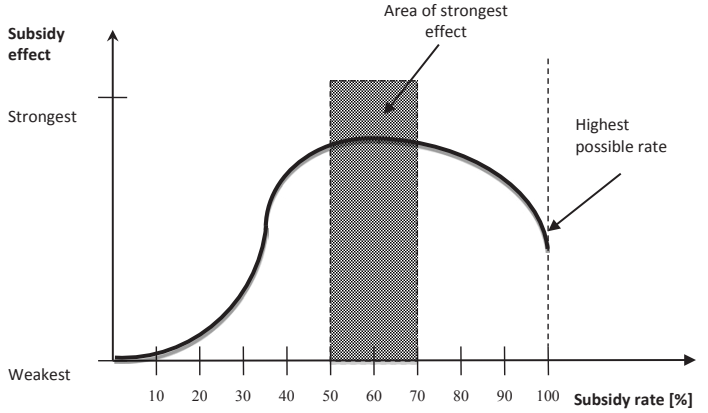

Fig. 4. Corrected theoretical correlation between subsidy rate and subsidy effect

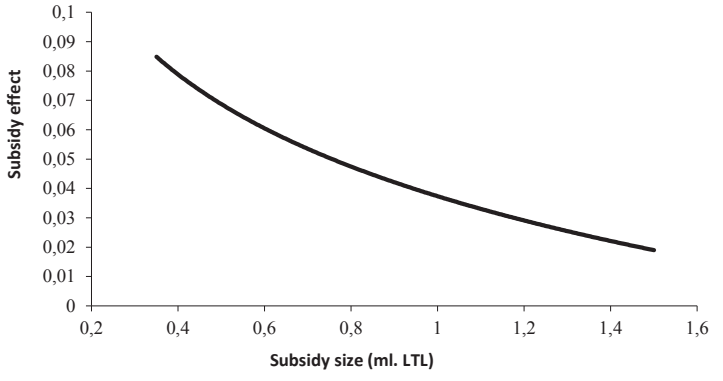

Fig. 5. Size of subsidy and aid effect in the field of qualification development (SAW method), (coefficient of determination 0,81)

growing rate of subsidies had a positive effect on companies' determination regarding the implementation of a project and, simultaneously, on the effect of subsidies. However, in the case of staff training projects, where the rate of subsidies was higher (60-100%), the growth of the rate of subsidies had no beneficial influence on the effect of subsidies. Within this range, the effect of the growth of the rate of subsidies was the opposite – the effect of subsidies was decreasing. We can draw the conclusion that the greatest effect on subsidies is achieved when the rate of subsidies is 50-70% (Fig. 4.).

The graphic relationship between the size of subsidies and their effect (in multicriteria expression) is presented in Fig. 5. The assessment was made employing various multicriteria valuation methods. Due to bigger sample, the analysis is limited to areas of staff training and development of production.

The analysis of the size of subsidies and their effect indicated the reverse relationship between the size of subsidies and their effect in the area of staff training. In the case of subsidies for the development of production, the absolute size of subsidies had no noticeable influence on the effect of subsidies. Taking into consideration the above, we can draw the conclusion that the size of subsidies as such has no significant influence on the effect of aid (especially on the motivating effect). When the size of subsidies is growing, the rate of subsidies is decreasing. When expenditure is growing, the effect of subsidies remains unchanged. The greatest established subsidy effect was in the area of staff training and it was achieved when the size of subsidies varied between LTL 200,000 (EUR 58,000) and LTL 500,000 (EUR 145,000). In the case of subsidies for the development of production, the greatest effect was achieved when the size of subsidies varies between LTL 0.5 mln (EUR 0.145 mln) and LTL 2 mln (EUR 0.579 mln) (Fig. 5 and Fig. 7).

When drafting the regulations on aid provision and trying to reach the greatest subsidy effect, the size of subsidies for enterprises should be limited and should not exceed LTL 500,000 (EUR 145,000) per one enterprise. We also suggest differentiating the size of subsidies in the area of the development of production with regard to the size of the enterprise. The size of subsidies for the SMB enterprise should not exceed LTL 2 mln (EUR 0.579 mln).

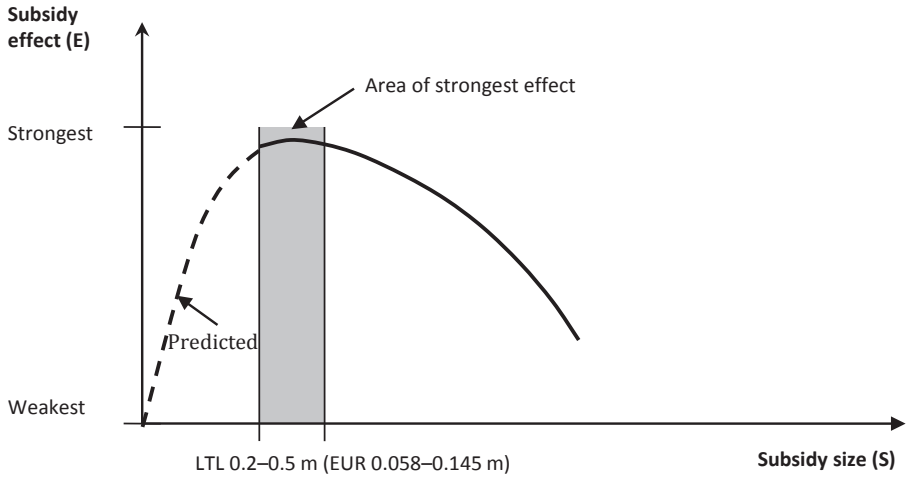

Fig. 6. Relationship between subsidy intensity and subsidy effect in the case of qualification development

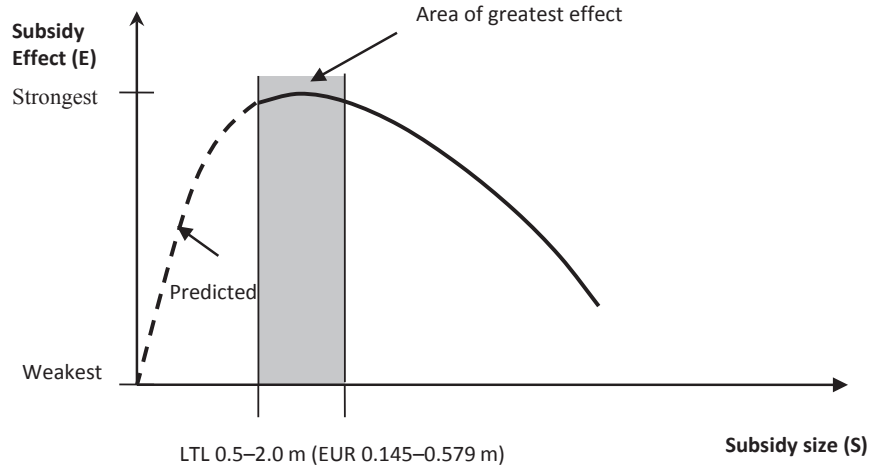

Fig. 7. Relationship between subsidy intensity and subsidy efficiency in the case of production development

The findings of the research, the identified principles of aid provision and the measures proposed may be applied to increase the effectiveness of other SRB tools. The generalised model for valuation of SRB is presented in Fig. 8.

The model of the valuation of the effect of SRB used in this work may be successfully used for valuation of the effects of various tools or for establishing the relationship between the nature of SRB and its effect.

Conclusions

The systemic analysis of the reference sources in the scientific literature suggests that valuation of SRB tools is rather problematic due to the complexity of the market and the multi-purpose nature of state interventions. Therefore, valuators have to take into consideration a wide range of influencing factors, and in order to use them for valuation purposes, a comprehensive and objective system of indicators is required.

The systemic analysis of scientific literature both on SRB and the EU aid provision indicates that the evaluation of the ES aid programmes, like other research into SRB, is mostly focused on the effect of subsidies or the peculiarities of administration. They are also targeted at the effect of aid. Other studies of the effect of the EU aid also do not have an explicit answer to the question how the different characteristics of subsidies (for example size, rate) influence the effect of subsidies.

The assessments of subsidies and the effect of subsidies carried out employing multicriteria valuation methods as well as the established

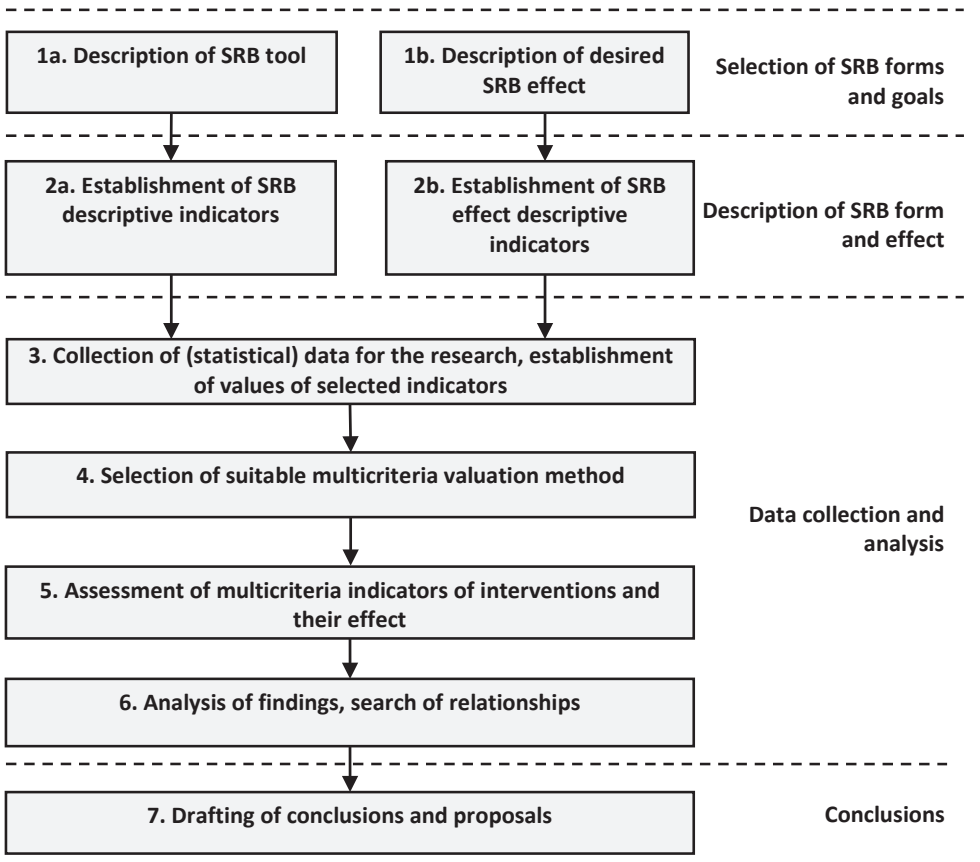

Fig. 8. Model for evaluation of the effect of state regulation

correlation coefficients let us believe that subsidising has had a direct beneficial effect. Based on the evaluation of the effect of subsidies and with regard to the different nature of the areas of activities subsidies by the EU, we can draw the conclusion that the greatest effect was achieved subsidising the development of production and R&D – the values of the derivative indicators of the effect of subsidies in these areas were the highest. Staff training projects took the third place.

During the investigation of the influence of different subsidy criteria on their effect, it was established that it is not the absolute size of subsidy but the rate of subsidy that has a greater effect. In order to have a greater effect, it is recommended to have the subsidy rate no less than 50%, and it should be 50–70%.

The analysis of the size of subsidies and their effect indicated the reverse relationship between the size of subsidies and their effect in the area of staff training – the higher the size of subsidies, the lower their effect. In the case of subsidies for the development of production, the absolute size of subsidies had no noticeable influence on the effect of subsidies. We can draw the conclusion that the size of subsidies as such has no significant influence on the effect of aid (especially on the motivating effect); when the size of subsidies is growing, the rate of subsidies is decreasing – when expenditure is growing, the effect of subsidies remains unchanged. The greatest established subsidy effect was in the area of staff training and it was achieved when the size of subsidies varied between LTL 200,000 (EUR 58,000) to LTL 500,000 (EUR 145,000). In the case of subsidies for the development of production, the greatest effect was achieved when the size of subsidies varies between LTL 0.5 mln (EUR 0.145 mln) to LTL 2 mln (EUR 0.579 mln).

When drafting the regulations on aid provision and trying to reach the greatest subsidy effect, the size of subsidies for enterprises should be limited and should not exceed LTL 500,000 (EUR 145,000) per one enterprise. We also suggest differentiating the size of subsidies in the area of the development of production with regard to the size of the enterprise. The size of subsidies for the SMB enterprise for the promotion of specific activity should not exceed LTL 2 mln (EUR 0.579 mln).

The model of the valuation of the effect of SRB used in this work may be used for valuation of the effect of various instruments or seeking to establish the relationship between the nature of SRB and its effect.

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