

THE COMPARATIVE ANALYSIS OF SMALL BUSINESS DEVELOPMENT LEVELS IN THE REGIONS OF THE RUSSIAN FEDERATION AND COUNTRIES WITH THE ADVANCED MARKET ECONOMY

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Key words: small business, parametrical methods, not parametrical methods, stochastic front model, translogarithmic function, the parameters odeli, statistical parameters, estimation of efficiency, comparative analysis, efficiency of development of small business.

The article illustrates the small business development and formation in Russian regions and United States of America. There is a brief review of methods based on construction efficiency border. The stochastic frontier model is formed by means of the translogarithmic function and statistical indicators for 1997-2006, showing the small business development levels in the regions of Russian Federation and United States of America. The program Frontier Analysis is created for the estimation of the small business development efficiency and carrying out of the comparative analysis. As a result, the regions - leaders and outsiders on the small business development level are revealed.

In conditions of market economy the small business is the integral part of economic system. From one side, it is specific sector of economy, in which the material welfare are created at minimal use material, power, natural and manpower, and another side of this, is a sphere of self-realization and self-maintenance of the citizens within the framework of free enterprise activity within the limits of the rights, given by the Constitution of the Russian Federation.

At a state level the importance of small business is emphasized in the appropriate documents. So, in the Concept of long-term socio-economic development of the Russian Federation to priority directions of state policy in the field of development of business carry: a) decrease of costs, connected with an entrance on the market of the new enterprises and an output from the market of the legal persons, stopping the activity; b) assistance to increase of efficiency of corporate management, contract ability and transparency of corporations; c) re-structuring of infrastructural monopolies, creation of the mechanism of effective state management by natural monopolies; d) maintenance of a competition in the markets and creation of effective mechanisms of antimonopoly regulation; e) formation of system of progress of favorable investment image of the country and its regions; e) creation of modern system of technical regulation, support of development of the national standards, formation of mechanisms of voluntary certification and confir-

mation of accordance; f) assistance to development of small business; g) assistance to development and increase of a role of institutes civil society¹.

Intensification of processes of development and support of small business has resulted to growth of volumes of the information, necessary for its successful functioning, and it has caused necessity of application of modern methods of the analysis for estimation of efficiency of development of small business and substantiation of ways of its increase. As such methods it is possible to allocate methods, based on construction of border of efficiency.

At the given approach the efficiency of development of small business in region is estimated by its comparison with "ideal" region, where the small business is extreme advanced and optimal the image uses resources, available at its order. The set (hypothetical) such absolutely effective region has received the name of border of efficiency. The given approach allows receiving a quantitative estimation of efficiency of development of small business in region, accepting meanings in an interval from 0 up to 100 %.

The construction of border of efficiency is a difficult task. Most frequently used methods are the following:

- 1) not parametrical methods:
 - ◆ analysis of an environment of the data (Data Envelopment Analysis, DEA);
 - ◆ model of the analysis of an environment of the data for free accommodation (Free Disposal Hull, FDH);

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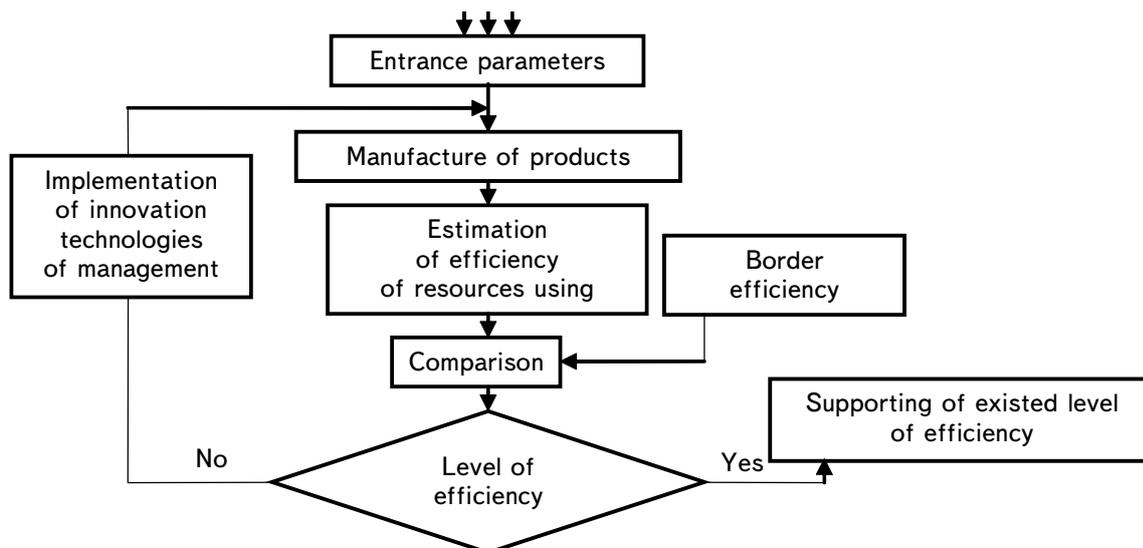


Fig. 1. Definition of efficiency of development of small business on the basis of model DEA

2) Parametrical methods:

- ◆ model without restrictions on distribution of efficiency (Distribution Free Approach, DFA);
- ◆ the analysis on the basis of wide border (Think Frontier Analysis, TFA);
- ◆ stochastic frontier analysis (Stochastic Frontier Analysis, SFA).
- ◆ модель анализа оболочки данных со свободным размещением (Free Disposal Hull, FDH).

(reflecting set of entrance and outlet parameters of concrete region), that any other points and their linear combinations do not surpass border in development of small business (at the same consumed resources) and do not use smaller quantity of any resource (at the given level of development). DEA-border represents a broken line, connecting set of the best regions, and the technical efficiency is defined by the formula.

The method of the analysis of an environment of the data (DEA), for the first time considered Charns, Cooper and Rodes in 1978 year is referred to not parametrical methods². A Basis DEA is the theory of linear programming. The border of efficiency considers set such of points

$$T_{\theta} = \frac{\sum_{j=1}^m w_j}{\sum_{i=1}^n w_i},$$

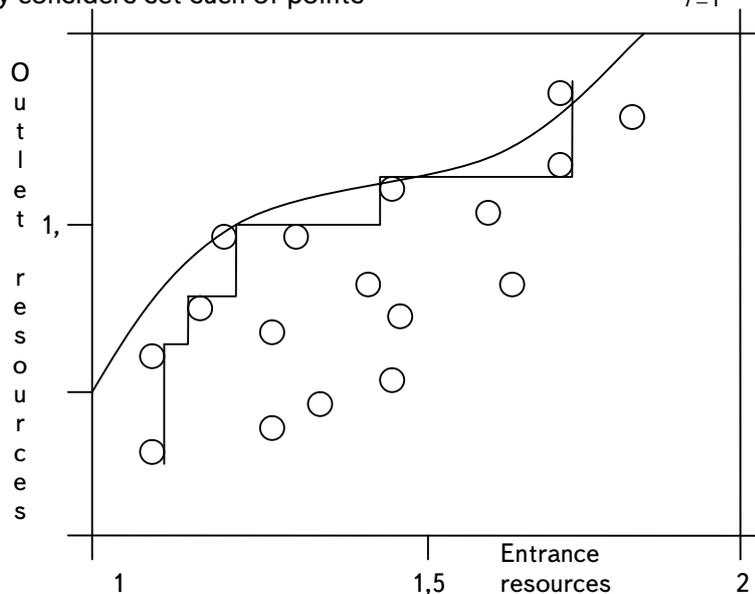


Fig. 2. Graphic interpretation FDH-model*

Source: <http://www.quantlet.com/mdstat/scripts/stf/html/stfhtmlnode77.html>.

where T_j - technical efficiency; T_j^* - weighed target parameters; w_j - weighed entrance parameters.

Thus, the given approach does not require the precise specification of the form of border of efficiency and can be graphically interpreted as follows (figure 1).

The model of the analysis of an environment of the data with free accommodation (FDH), formulated by Deprin, Simar and Tulkens in 1984, is modification of model DEA. The opportunity of linear combinations of sets of entrance and outline parameters lays in a basis DEA that assumes presence of absolute interchangeability of resources. In model FDH, on the contrary, the absolute absence of interchangeability is supposed, therefore border of efficiency has a step kind, formed by crossing of vertical and horizontal lines for each of considered combinations of entrances and outputs (figure 2).

Advantage of not parametrical methods of construction of border above parametrical methods is the absence of the primary assumptions about the form of border of efficiency and distribution of inefficiencies for regions of Russian Federation (except 100 % of efficiency of points, determining border).

Lacks of not parametrical methods in compare parametrical methods are the base assumption of absence of casual mistakes, and also the strict calculation of meaning of efficiency, that causes of using of additional techniques for testing a hypothesis about the importance of the received estimations and influence of the various factors.

The method of construction of model without restrictions for distribution of efficiency (DFA) is referred to parametrical methods. The given statistical model is based on the stochastic approach to definition of border. DFA requires the specification of a functional kind of border of efficiency, and also uses the assumption that the inefficiency of development of small business in region remains constant with current of time, while the influence of random factors grades and converges to zero. DFA does not require the strict assumptions of the law of distribution of inefficiencies. Thus, DFA-model is constructing on the basis of the panel data and is modification of models with random effects.

The stochastic model on the basis of wide border (TFA) uses only assumption about the

functional form of border, not imposing additional restrictions on distribution of inefficiencies and casual component. The model is based on allocation from all sample two quartiles, with the highest and lowest parameters of efficiency. Thus, the deviation of parameters of concrete region from these quartiles is considered as display casual component, and the fluctuation appreciated efficiencies between quartiles is an estimation of inefficiency.

Let's consider more in detail last of the given method of construction of border (SFA), as the statistical technique of an estimation of efficiency of development of small business in region submitted in the given work, is based on stochastic frontier model.

Stochastic frontier model was formulated by Aigner, Lovell, Schmidt³ and Meeusen, van den Broeck⁴ in 1977 for the first time and was widely used in industrial analyze⁵. Features of model are construction of border of efficiency on the basis of the given specification of its functional form and direct inclusion in model of a casual component. In stochastic frontier model we can include two components of the casual member: a) reflecting influence of random factors; б) reflecting an inefficiency of development of small business in region (strictly not positive). The laws of distribution of a casual component of inefficiency get out by the researcher and are set by the specification of model.

Basis of a technique is the consideration of region as difficult system with a set of entrance parameters (used resources) and outlet parameters (level of development of small business). The method is based on the basic situations of the theory of set of industrial opportunities, border of this set and theory of production functions.

Advantages of application stochastic frontier of the analysis are manyfactors character of model, comparative of the received estimations of efficiency, objectivity of a method, probable approach to measurement of efficiency, and also opportunity of testing of various hypotheses.

The basic lack of model is the necessity of the precise specification of the functional form of border of efficiency and law of distribution of inefficiencies. In both cases, the lack of the precise specification is eliminated by using of the flexible functional forms and not trivial laws of distribution.

As the functional form at the specification stochastic frontier model in the given

Table 1

Entrance parameters		
x_j	Value	$\ln(x_j)$
Average payroll number of workers of small business, thousand of people	222,3	5,4

work the function of a kind is used translogarithmic function:

$$F(x,\beta) = \beta_0 + \sum_{i=1}^N \beta_i \cdot \ln(x_i) + \frac{1}{2} \cdot \sum_{i=1}^N \sum_{j=1}^N \beta_{ij} \cdot \ln(x_i) \cdot \ln(x_j), \beta_{ij} = \beta_{ji}$$

where $F(x,\beta)$ - production frontier; β - vector of unknown estimated parameters, determining a level of efficiency of development of small business; x_j - vector of the factors, ensuring development of small business (entrance parameters); x_j - meaning of parameters, reflecting a level of development of small business (outlet parameters); N - quantity of regions.

The given functional form is one of most widespread in the practical appendices of sto-

chastic frontier analysis. Translogarithmic function is square-law for the arguments, allows tak-

ing into account not monotonous dependences of outlet parameters from entrance. Also advantages of the given function are it linearity to transformed variable and rather small quantity of estimated parameters.

On the basis of the considered method, and also statistical parameters, reflecting levels of development of small business in regions of Russian Federation and states of USA for period 1997-2006 years, the program Frontier Analysis for an estimation of efficiency of development of small business in regions of Russia and

Table 2

Outlet parameters		
x_j	Value	$\ln(x_j)$
Turnover of small business, million of rubles	436129	12,8
Investments to basic capital of small business, million of rubles	3052	8
Balanced finance result of activity of small business, million of rubles	5911	8,6

Table 3

Name of region	Average value of efficiency for period, %
Samara region	80,65
Sverdlovsk region	79,94
L Krasnodar region	79,79
e Rostov region	76,44
a Tumen region	74,01
d Nigegorodsk region	73,78
e Chelyabinsk region	73,38
R Republic Bashlortostan	73,22
Novosibirsk region	72,18
Republic of Tatarstan	72,17
Republic North Ossetia - Alania	48,18
O Kabardino-Balkaria Republic	45,08
u Republic of Adygeya	43,54
t Karachaevo-Circassian Republic	40,87
s Republic of Altai	38,46
i Jewish Autonomous Region	36,78
d Republic of Tuva	33,99
e Republic of Kalmykia	32,01
r Chukot Autonomous Area	31,21
Republic of Ingushetia	27,95

Table 4

realization of the comparative analysis with states of USA was developed.

On an example of the Samara region we shall consider calculation of efficiency of development of small business for 2006. The mean-

ings of entrance and outlet parameters are reflected in table 1, 2

contains in a numerous layer of the petty owners, by virtue of mass, appreciably determining socio-economic and partly political level of development of the country. The small sizes of the small enterprises, their technological, pro-

Name of state	Average value of efficiency for period, %
Texas	99,81
Florida	99,57
Illinois	98,42
Pennsylvania	98,04
Ohio	98,97
Michigan	98,81
North Carolina	98,47
Georgia	97,41
Massachusetts	96,41
Montana	93,18
Hawaii	72,97
Rhode Island	72,87
South Dakota	70,18
Delaware	69,29
Vermont	27-38,81
Federal region of Columbia	62,16
North Dakota	62,11
Alaska	66,49
Wyoming	66,99

The meaning of frontier for the Samara region, received by aggregating of all private means of a vector of estimated parameters, in 2006 was made 84,8 % from border of efficiency. In table 3 are shown the regions of Russia with most and least effective development of small business. It is necessary to note, that Moscow, St.-Petersburg and Moscow region are excluded from sample, as the estimations are not typical for all set of regions of Russian Federation.

In table 4 are shown the results frontier analysis, which has been carried out for states of USA, where the states California and New York were excluded from sample.

It is necessary to note, that stochastic frontier analysis is not self-sufficient, though gives rather complete information about efficiency of development of small business in region. Therefore results stochastic frontier analysis is necessary for using in aggregate with multymeasured comparative analysis.

Thus, the research of development and formation of small business is labour-consuming and significant process, as the small business

development of the country. The small sizes of the small enterprises, their technological, pro-

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⁵ Philip Andrew Stevens. Accounting for Background Variables in Stochastic Frontier Analysis [an Electronic resource] / National Institute of Economic and Social Research, Dean Trench Street, Smith Square, London, SW1 3HE, UK. Discussion Paper Number 239. 2004. May. A mode of access: <http://www.niesr.ac.uk/pubs/dps/dp239.pdf>.