



**Agricultural Academy
Institute of Agricultural Economics**

**Input-output modeling to assess the impact of the
CAP on small farms efficiency in Bulgaria**

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**The Conference: “CAP and the competitiveness of the Polish and European food
sector” 26-28.11.2014г. Warsaw**

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1. Introduction

- **Having in view small farmers (SF) place and role in almost all EU countries, the EC support their transformation in viable agricultural structures;**
- **One of the main focuses in the new program period 2014-2020 is the small farm sustainable development;**
- **The report is based of the project's results “Social-Economic Sustainability of the Semi-Subsistence Farms ” , IAE, 2010;**
- **Observed farms are divided into 3 groups:**
 - **farms, specialized in field crops;**
 - **farms, specialized in perennial crops and farms,**
 - **specialized in breeding of ruminants (without horse and donkeys).**

1. Introduction

- **The purpose is to assess the impact of the CAP on small farms (SF) in Bulgaria;**
- **Research tasks:**
 - **Revaluation the quantitative relation between the factors of agricultural production (input) in SF and the received output;**
 - **Subsidy impact on farm gross production level (M 141);**
 - **Establish dependence of the economic size by the gross production level;**
 - **Determining the share of SF, which is expected to be economic viability (over 4 ESU under M 141).**
 - **Data of the FADN from Ministry of Agriculture and Forestry are used for the implementation of production function method .**

1. Introduction

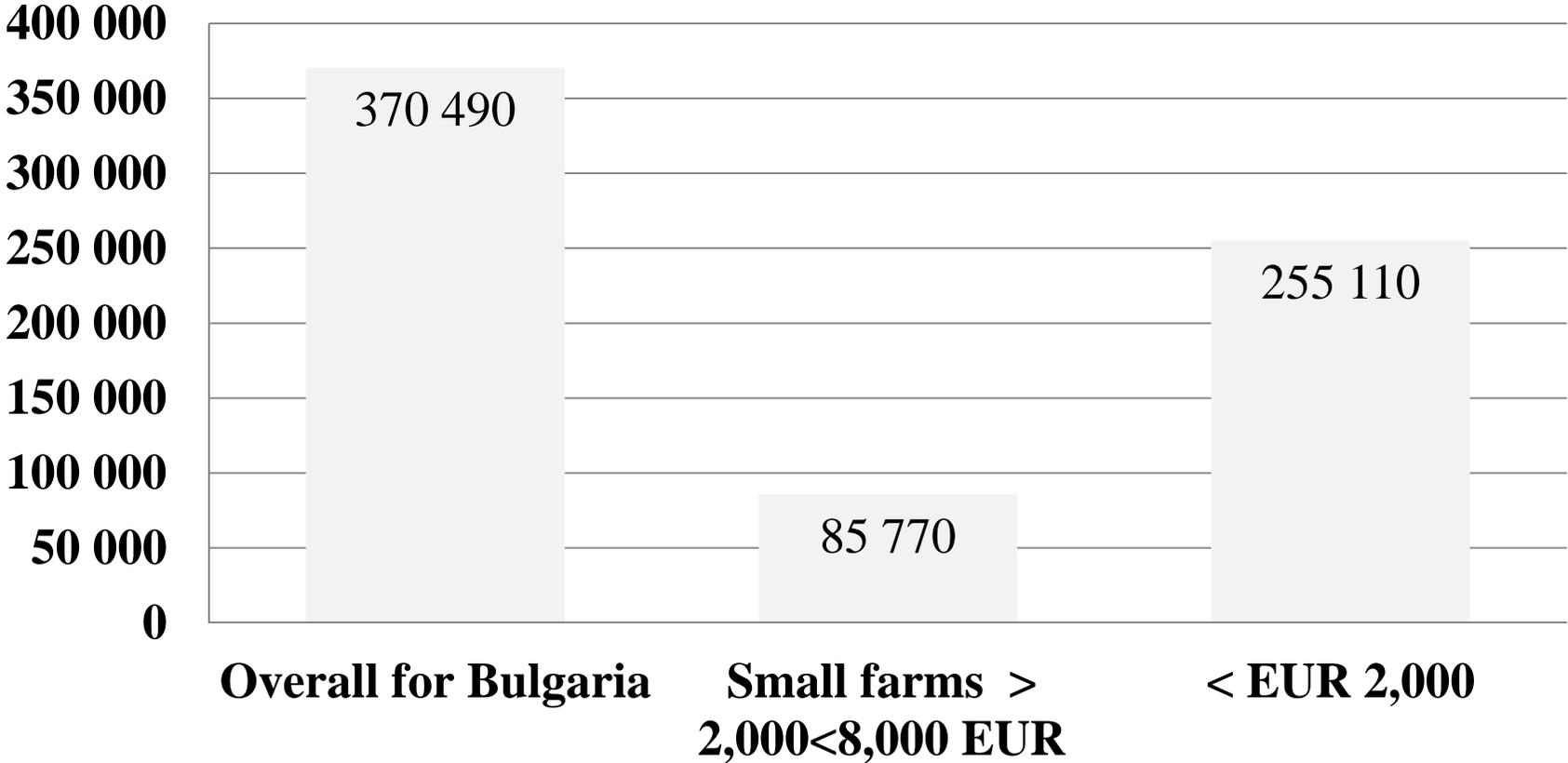
Table 1 Number of farms by year

	2005	2007	2010	2005/2010
Bulgaria	534,610	493,130	370,490	-30,7%
Small farms:	153,900	119,590	85,770	-44,3%
<i>SOV from EUR 2,000 to 3,999</i>	<i>108,720</i>	<i>81,490</i>	<i>59,480</i>	<i>-45,3%</i>
<i>SOV from EUR 4,000 to 7,999</i>	<i>45,180</i>	<i>38,100</i>	<i>26,290</i>	<i>-41,8%</i>

Source: the Agrostistics and Strategies Directorate with the MAF.

1. Introduction

Farms numbers, 2010



Source: the Agrostistics and Strategies Directorate with the MAF.

2. Methodology and data

Applied methods:

- 1. Cobb – Douglas production function;**
- 2. Regression and correlation analysis;**
- 3. Method of statistical groupings.**

2. Methodology and data

Cobb – Douglas production function is presented by following equation :

$$Y = A * L^{\alpha} * K^{\beta} * Z^{\gamma} * u, \quad \text{where:}$$

***Y*- is the agricultural production quantity in terms of value;**

***L*- is the labour input in the production (the total labour cost, used in the farm, including the paid and unpaid labour), assessed in hours;**

***K*- is the capital input (the value of the long-term investments as machines and equipment, buildings etc.) at the end of the year;**

***Z*- is the cultivated land in ha;**

***A*, α , β and γ are parameters;**

***u* is the stochastic fluctuation.**

2. Methodology and data

The parameter A measure the production function efficiency.

When $\alpha + \beta + \gamma > 1$ there is an increasing efficiency with the production increase.

If $\alpha + \beta + \gamma < 1$ there is respectively decreasing efficiency from the production volume change.

3. Results - from the Cobb – Douglas production function implementation

Table 2

Type of small farms	Production functions parameters				
	Parameter A	Parameter α	Parameter β	Parameter γ	Degree of return
Field crops	46,34	0,381	0,252	0,241	0,873
Perennial crops	41,72	0,593	0,079	0,105	0,697
Ruminants	4,134	0,573	0,069	0,08	0,65
All small farms	11,06	0,494	0,122	0,197	0,813

Source: Own calculations

3. Results

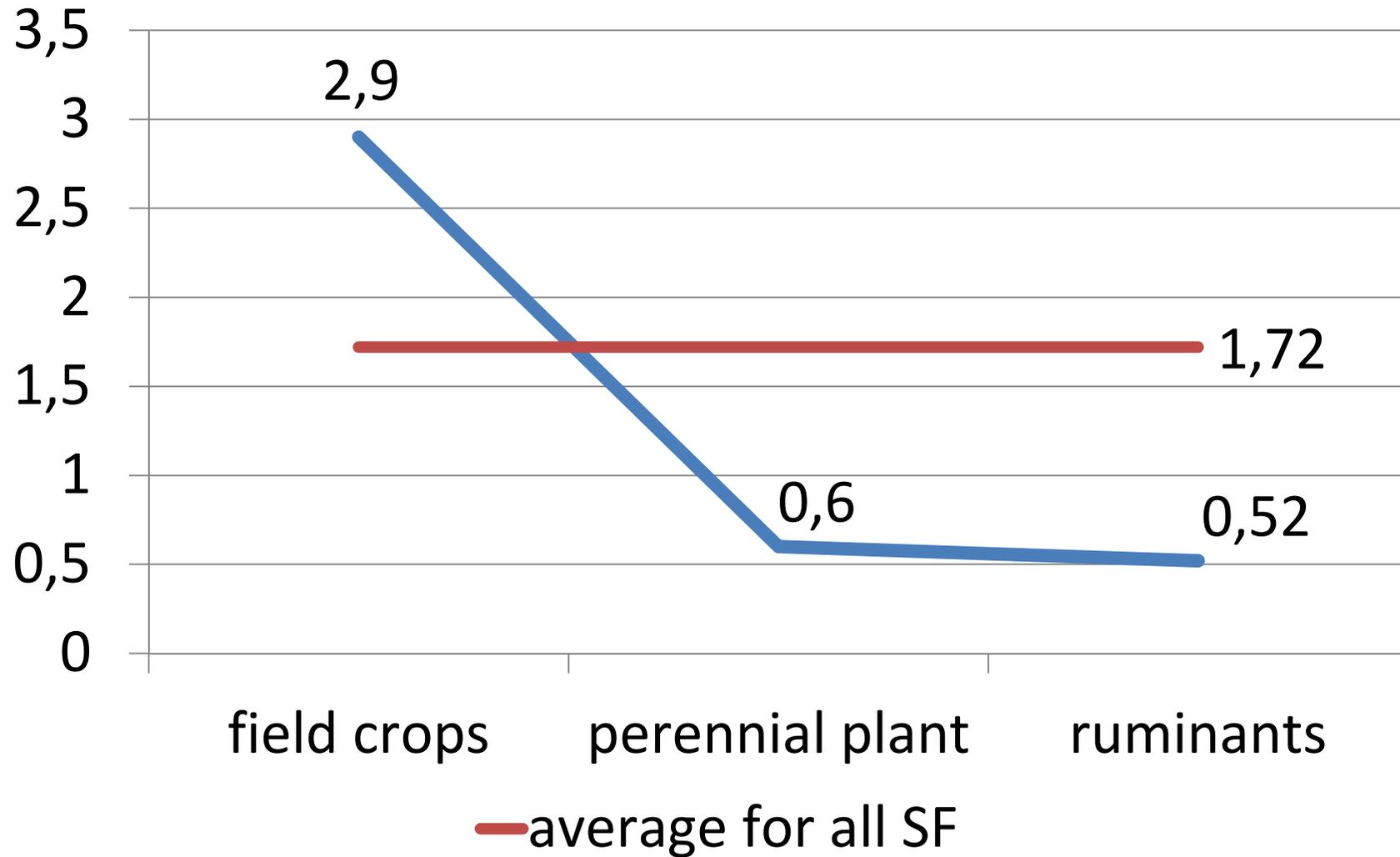
- **If the investments in fixed capital for the field crops grow of 1 %, the gross output will increase of 0,252%;**
- **For all small farms this increase would be of 0,197%;**
- **For all small farms, as well for these specialized in the different productions the sum of elasticity coefficients is under 1;**

3. Results

- There is a negative return of the invested fixed production means in the small farms;**
- The lowest degree of return is for the farms breeding ruminants;**
- This trend is the least expressed for the farms specialized in field crops production;**
- The efficiency of the invested fixed capital is lower than the efficiency of the invested labour;**
- The low fixed funds' efficiency is due to the insufficient intensity of effective technique and technologies for the production.**

3. Results

Fig.1. Growth rate of gross production for small farms (%)



Source: Own calculations

3. Results

- Independently of the production orientation, the expected change of gross production level after the first year of the subsidy receiving is slightly below 2 %;**
- It is expected this subsidy to have favorable impact on farms specialized in field crops growing;**
- Almost on the same level, much below the average for all the small farms farms is the expected gross production increase in farms with perennial crops and livestock.**

3. Results

Relationship between economic size and gross production is given by the following equation:

$$\text{E.S} = 0,154 * \text{G.P} , \text{ where}$$

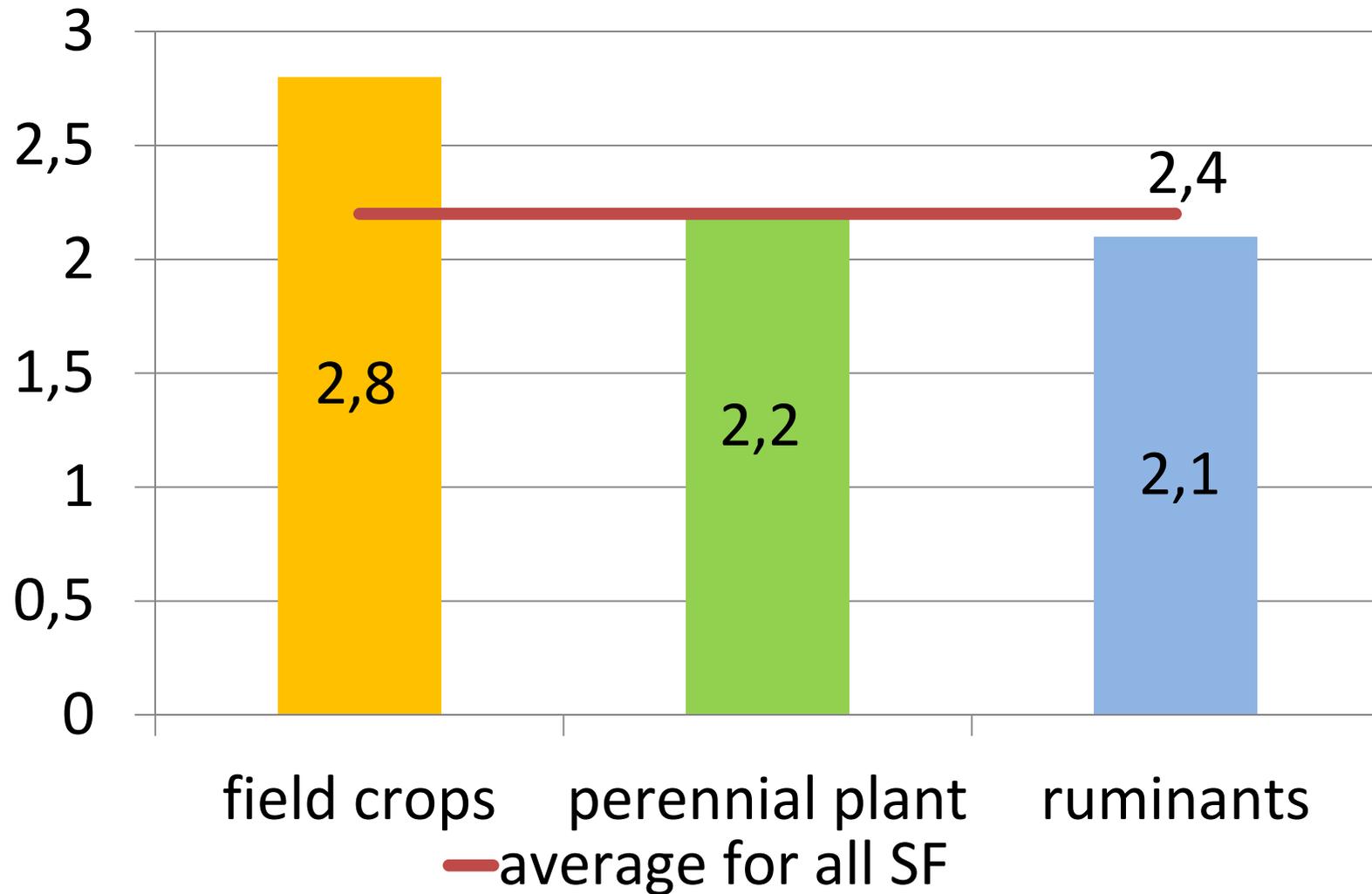
E.S measure the economic size

G.P is the level of gross production

The resulting regression model is sustainable enough from a statistic point of view (coefficient of Fischer $F=332,42$). The coefficient **R reached **0,82** and indicates the presence of the very strong conditionality of the gross production.**

3. Results

Fig.3. Expected share of the economically viable SSF(%)



Source: Own calculations

4. Conclusions

- ✓ **Relatively bigger differences between these specialized semi-subsistence farm groups in connection to the impact of possible changes of the used capital amount on the final production results;**
- ✓ **General characteristic for all examined farm types is the bigger sensitive to the changes of labor resources than to fixed capital changes;**

4. Conclusions

- ✓ Expectations for lower small farms recovery, which make them insufficiently effective and non-profitable, have been unfortunately justified;**
- ✓ For all examined farms groups, the impact of Measure 141 application will be insufficient, aiming their transformation in viable and market oriented production units;**
- ✓ From the analysis can be concluded that in the new programming period there is a need of a new approach for solving the problems of small farms;**

4. Conclusions

- ✓ First they should not meet the same stringent requirements as the large farms when they are applying for individual support measures;**
- ✓ Secondly, the use of financial support must be reorient mainly in investment projects;**
- ✓ Their performance will lead to a renewal of their main productive capital with innovative solutions that will increase the rate of return and their production and economic efficiency;**

5. Support for small farms in 2014-2020

- **New Development Rural Programme (DRP) contains thematic subprogram with a budget of 82 million EUR intended for small farmers;**

- **There are three main measures in which small farmers can apply for funding under the thematic subprogram. These are:**

- *Agricultural development*

- *Investment and*

- *Consulting Services*

- **According to MAF about 80,770 small farms will be eligible for these schemes because they qualify for funding.**

5. Support for small farms in 2014-2020

- **Scheme for annual and single grant of € 1,250 for small farmers according to the Development Rural Programme (DRP) in 2015-2020;**
- **A single support from € 1,250 / year can not be a real market and production incentives in agriculture, but rather will be implemented social effect will be most noticeable for residents in the most backward rural areas;**
- **Direct payments will reach the smallest producers in a more easy way to reduced administrative burden;**

Thank you for your attention!