Who receive rural development measures in Hungary?

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Abstract—

The paper investigates the selection mechanisms of rural development policy using a survey among farmers in the Southern Great Plain region characterising by the high level of unemployment and strong agricultural background. We focus on the farmers social-economic characteristics explaining of success of application for rural development subsidies employing selection and count models. Estimations show that the higher educated and older farmers more likely apply for rural supports, whilst the share of less favoured land affects negatively on the application for subsidy. We found selection bias in the success of application. Results imply that farmers with less favoured land less likely receive, whilst higher educated and older farmers more likely receive rural supports. Similarly, the share of less favoured area affects negatively for number of successful application both in terms of type and number of subsidy

Keywords— **rural development measures, selection models, count models**

I. INTRODUCTION

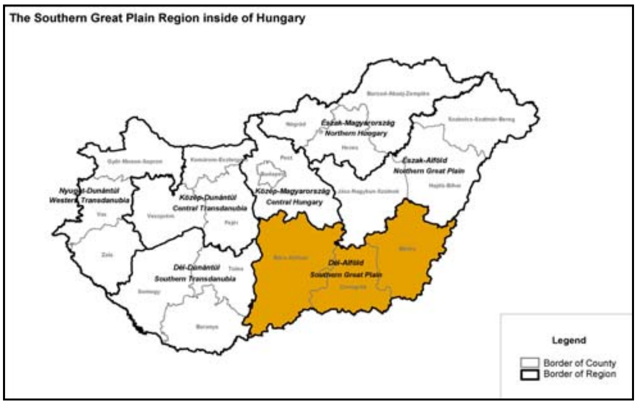
There is a wealth of literature on the effects of agricultural policy from various aspects (Gardner and Rausser, 2002). The mainstream research has identified the unintended consequences of agricultural policy for a long time. Recently, the policy analysis emphasizes the equity and targeting as operational criteria for policy evaluation (OECD, 1998). However there is less attention on the redistributive aspects of agricultural policy (Allanson, 2008). Literature on the CAP reform stresses the increasing role of second pillar during reform procedure. Common argument is that using rural development measures can avoid some unintended consequences of agricultural policy, especially the increasing inequality within agricultural sector. Farms' capability of income generation is the basis for making new investments providing ground for increasing competitiveness of farming. Two major factors of producing profits are (a) efficient use of resources, and (b) access to subsidies. It is a challenge for farms in new EU member states how to get more subsidies under CAP. Pillar 2 gives possibility for farms to be involved in rural development measures strengthening rural economy. However, it is a key issue, especially for farms in regions of good agricultural potential, how to take the advantages of different EU support programs. Farms have to apply for subsidies and applications have to go through an evaluation process. However the access to rural development supports is different from agricultural subsidy. While to get the latter one is more or less automatically, if farmers able to fulfil the eligibility requirements. This is not true for rural development measures. To receive rural development supports is more complicated procedure, including application, evaluation and screening etc.

Although, literature on rural development policy is also rich (de Janvry et al. 2002), but until now there is no research how and who can receive these subsidies. These issues have also implications for the redistributive effects of rural development policy. This paper is the one of first step to fill this gap. More specifically, the aim of the paper is to investigate the selection mechanisms of rural development policy using a survey among farmers in the Southern Great Plain region. We focus on the following issues. Who apply for rural development subsidies and who can receive rural development measures? The rest of the paper is organized as follows. Section 2 provides a brief description of the Southern Great Plain region including some basic facts on the distribution of rural development subsidies. Section 3 describes the survey design and the variables. The results are presented in section 4. The last section summarizes and offers some conclusions on the implications for the rural development policy in Hungary.

II. GEOGRAPHICAL AND ECONOMICAL CHARACTERISTICS OF THE SOUTHERN GREAT PLAIN REGION

The Southern Great Plain, the largest (NUTS2) region in the country, is located in the South and South-east of Hungary. The region consists of three (NUTS3) counties (Bács-Kiskun, Békés, and Csongrád), which include ten, eight and seven statistical micro-regions respectively [See Figure 1].

Fig 1: NUTS3 regions of Hungary



Source: Central Statistical Office (KSH)
Note: Dél-Alföld = Southern Great Plain

Despite its declining share, agriculture is dominant in the regional economy. Although, the Southern Great Plain accounts for only 9% of the total Gross Domestic Product (GDP) of Hungary, it accounts for 25% of the agricultural GDP. Agriculture's share of the regional GDP was 15% in 1995, and 9% in 2002. About 62% (965 000 hectares) of the region's arable land was cultivated by private holdings in 2000 (the year of the Agricultural Census). The Southern Great Plain's economic structure differs from the national average, particularly in the agricultural and service sectors. Industry's share in regional and national GVA is about equal but regionally agriculture is over-represented by 6.7%, and services are underrepresented by 5% compared to the national figures.

The per capita GDP for the Hungarian regions, with the exception of Central Hungary, achieved only 75% of EU average in 2002, the Southern Great Plain was at 40.4% of the EU average in terms of per capita GDP (on PPS) which put the Southern Great Plain at 242 out of the 254 regions comprising the EU. In the period between 1995 and 2003 the Southern Great Plain region had the lowest economic growth rate in Hungary. However differences in net average income are not as significant as the differences in GDP. The net average income of workers employed in the Southern Great Plain was 87% of the national average in 2003.

The migration margin was 1.1 per one thousand inhabitants. Previous decades were characterised by from-village-to-city migration but this tendency has now reversed and the population of some villages has increased, particularly in the agglomeration of Kecskemét and that of Szeged. These urbanised villages function as specific suburban zones.

The Southern Great Plain's settlement structure comprises provincial cities, market towns and large villages surrounded by homesteads. The percentage of people living in small villages is very low (2.5%). Most of the population (44.7%) lives in large villages with 2 000-10 000 inhabitants, and in provincial cities/market towns (20 000-50 000 inhabitants). In certain sub-regions there are no settlements with more than 10 000 inhabitants.

The region has the largest homestead system in Hungary. Following the regime change, people began moving to homesteads in certain parts of the region. According to a study of the Homokhátság micro-region, the main reason for families to move from the cities to homesteads was their social status (social migration). Families tried to improve their status by means of agricultural production and having a cheaper homestead lifestyle. However, without expertise and the proper means of production, there is little chance of profitability, which could lower the families' social status further.

The employment rate for people aged 15-64 in Hungary (56.9% in 2005) corresponds with the average employment rate in the ten new member states. However, it is significantly lower than the rate of 64% for EU-15. In 2004 the Southern Great Plain's employment rate for those aged 15-64, was 47.3%, compared to the national rate of 50.6%. In Hungary the low employment rate is not coupled with a high unemployment rate because of the high number of disability pensioners who are under retirement age.

The region's has a strong agricultural character the proportion of agricultural employment is the highest of all regions. Besides this, the ratio of people involved in the sector in some way (e.g. part-time farming or seasonal work) is 21.7%, second highest in the country behind the Northern Great Plain.

The proportion of the Southern Great Plain in agricultural subsidy is lower than in the agricultural GDP. In 2004-2006 this figure was 23 %. Similarly to national situation, the bigger farms are overrepresented in the agricultural support. Whereas the bigger farms have lower proportion in agricultural structure of the Southern Great Plain, the total amount of subsidy is lower than role of the region in the Hungarian agriculture. In 2004-2006 the farms over 50 ha had the 64% of agricultural subsidy in the region and 71 % in Hungary. Meanwhile the proportion of farms over 50 ha in all farms which had subsidy was only 6,6 % in the region and 7,3 % in Hungary. Subsidies of farms have increased significantly after 2004. One could expect that large farms may have got increasing share of supports during last years. Based on survey data it will be tested whether this hypothesis can be justified or it should be rejected.

III. SURVEY DESIGN AND VARIABLES

To obtain empirical data a survey has been conducted where questionnaires covered ten groups of questions on different aspects of applications for subsidies and influence of subsidies for farming performance. As many as four hundreds questionnaires were released, and, after being filled in received back. We were curious, what was the attitude of farms towards submitting applications for grants after 2003 when Hungary joined to the EU. Information was asked on agro-environmental, rural development as well as on production and processing related and other measures. On question dealt with whether individual or a joint application was submitted. Another group of questions aimed at getting answer on the success of application, and if it was accepted then was it an individual or a joint one. One question asked farmers/farm representatives to evaluate the influence of subsidies on farm development with special respect to increase in employment, investments, turnover and business relationship with trade partners both on input and output side.

Table 1 present summary statistics on the variables. Only 40 per cent of farmers apply for any type of subsidies, whilst only 29 per cent of total farmers received support. Farmers get maximum three types of subsidies; whilst the maximum number of support was six during the analysed period (after 2003). The average area of farms was 63.4 hectare, and the mean area of less favoured land amounted to 22.4 hectare. About two-thirds of farmers run the farm as family farm, and the share of part-time farm was about 7 per cent.

Table 1 Descriptive statistics of variables

	N	Mean	Std. Dev.	Min	Max
Dependent variables					
Apply for subsidy	267	0.40	0.49	0	1
Received subsidy	274	0.29	0.45	0	1
Number of type of received subsidy	274	0.35	0.60	0	3
Number of received subsidy	274	0.41	0.81	0	6
Independent variables					
Total land (ha)	274	63.41	101.29	0	659
Less favoured land (ha)	274	22.44	66,01	0	546
Age	274	2.68	1,14	0	7
Education	274	1.80	0.68	0	3
Part-time farm	274	0.07	0.26	0	1
Family farm	274	0.66	0.47	0	1

IV. RESULTS

Empirical analysis is implemented in the three stages. First, we focus on the importance of various factors in the choice of application for rural development subsidies employing probit model. Second, we investigate the factors explaining of success for receiving of rural development supports using probit model with sample selection. Finally, we analyse the factors determining how many and how many types of supports can get a farmer applying Poisson and negative binomial regression models.

A. Apply or not for rural development policy measures?

Basic results highlight that only a smaller fraction of farmers applied for any rural development subsidies. We can hypothesize that socio-economic factors of farmers can explain their choices for rural development measures. More specifically, we expect that size of farms, education level of farmers, age of farmers and size of less favoured land is positively related to the applications' intention, whilst being a part-time farm or a family farm affects negatively on their decisions. Therefore, we test the following model:

APPLICATION=α0+ α1Size+ α2LFA+ α3AGE+ α4EDUC+ α5PTIME+ α6FFARM (1)

The expected signs of the variables are as follows:

α1>0, α2>0, α3>0, α4<0 α5<0 and α6<0.

Dependent variable.

The dependent variable in our model is APPLICATION, is dummy variable taking value 1 if farmers applied for any subsidies, otherwiser it is zero.

Explanatory variables.

Size: total land in hectare.

LFA: share of less favoured area in total land (per cent).

AGE: 1: <35 years 2: 35-44 years 3=45-54 years 4=55-64 years 5: >65 years

EDUC: 1: Phd, 2:Masters, 3: BSc degree, 4: Secondary School, 5: Primary School

PTIME: is a dummy variable taking value 1 if farm is part-time, otherwis zero.

FFARM: is a dummy variable taking value 1 if farm is family farm, otherwis zero

Additionally, we test some alternative specifications concerning the non-linearity possibility for SIZE and AGE variables. We check whether being too large farms and too old farmers have any impacts on the application for subsidy, thus we add squared value of these variables to the model.

The estimated coefficients of probit model for application for subsidy are presented in Table 2. The estimation indicates that size of farms have unexpected sign, but it is insignificant. Surprisingly, the share of less favoured lands has negative and significant effects on the application for subsidy. It indicates that contrary to rural policy objectives, farmers with less favoured land less likely apply for rural development supports. In line with our a priori expectations the higher educated and older farmers more likely apply for rural supports. Interestingly, the effects of being part-time farms or family farms are not significant for farmers' decisions. Checking the robustness of our estimations, alternative specifications show that squared value of size measures does not have impact on the application; the results remain basically the same. Adding squared age variables to the model inflated the significance of the level of education and the age, but it is positive and significant. Most striking feature of the estimations is the share of less favoured land affects negatively on the application for subsidy.

Table 2 Application for subsidy

	APPLICATION			
SIZE	-0.000	0.001	0.000	0.001
SIZE2		-0.000		-0.000
LFA	**-0.248****	-0.250 **	**-0.193***	**-0.190***
EDUC	**-0.300****	-0.299 **	-0.204	-0.194
AGE	**0.138***	**0.134***	-0.205	-0.208
AGE2			**0.069***	0.069
PTIME	-0.220	-0.227	-0.194	-0.201
FFARM	0.109	0.106	0.218	0.217
constant	-0.405	-0.456	0.016	-0.039
N	247			
McFadden's R^2	0.038	0.0391	0.0433	0.0443
Correctly classified	58.30%	60.32%	59.11%	59.51%

Note :* p<0.1; ** p<0.05; *** p<0.01

B. Success of application

Next step we investigate the factors explaining the success of application for rural development measures. We use the same explanatory variables and same hypotheses. However, we should face to sample selection problem. We can observe farms who applied any rural policy supports, but we have no information about farmers who did not applied for subsidies. Thus we estimate the following probit model with sample selection:

Subsidy=α0+ α1Size+ α2LFA+ α3AGE+ α4EDUC+ α5PTIME

and for the selection estimation we assume that Subsidy is observed when we have:

APPLICATION=α0+ α1Size+ α2LFA+ α3AGE+ α4EDUC+ α5PTIME+ α6FFARM>0 (2)

Where Subsidy is a dummy variable taking value one if farmers received subsidies, otherwise zero. The likelihood-ratio test confirms the existence of selection bias.

Table 3 Success of application

	Subsidy	Application	Subsidy	Application	Subsidy	Application
SIZE	-0.001	0.000	-0.001	-0.001	-0.001	0.000
SIZE2				0.001		
LFA	-0.234	**-0.260****	**-0.222***	**-0.272****	-0.109	**-0.203***
AGE	0.120	**0.128***	0.122	0.120	0.116	-0.134
AGE2						0.055
EDUC	**-0.363 *****	**-0.308*****	**-0.367 *****	**-0.309*****	-0.240	**-0.246***
PTIME	-0.209	-0.248	-0.218	-0.255	-0.149	-0.228
FFARM		0.174		**0.203***		0.257
N	247					
censoredN	147					
LR test (χ2)	6.63***		7.33 ***		3.07*	

Note :* p<0.1; ** p<0.05; *** p<0.01

The estimation indicates that size of farms has expected sign without significance. Again, the share of less favoured lands related negatively and significantly to the application for subsidy. It implies that farmers with less favoured land less likely receive rural development supports. In line with our a priori expectations the higher educated and older farmers more likely receive rural supports. The impacts of being part-time farms or family farms are not significant for farmers' success. Sensitivity analysis highlights that squared size and age variables are not significant. The coefficients of LFA and EDUC remain significant with the same sign, whilst the AGE variables lost their significant in alternative specifications. Interestingly, coefficient of FFARM is positive and significant for augmented model with squared size implying that being family farm affects positively on the chance to get rural development subsidy.

C. Number of successful applications

In the final stage, we focus on the number of successful applications for rural development subsidies. We identify two aspects: number of type of support (Totalsub) including agri-environmental scheme, rural development measures, support for processing activity, production subsidy, others) and total number of subsidy (Subtotal). We apply count models for explaining how many times farmers have received various subsidies.

The Poisson regression model is derived from the Poisson distribution by allowing each observation to have a different value of the mean parameter μ. The standard assumption is to use the exponential mean parameterization

$\mu_i = \exp(x'_{ij}\beta)$, i=1,….N, (3)

where by assumption there are K linearly independent covariates, generally including constant (see more Cameron and Triverdi, 2005). One drawback of the Poisson model is that for count data the variance usually exceeds the mean, this feature is called by overdispersion. The negative binomial regression model addresses this failure of Poisson model by adding a parameter, α, that reflects unobserved heterogeneity among observations.

We use both Poisson regression models and negative binomial regression models. Then we test the overdispersion for the models to select the preferred model. Likelihood-ratio tests show that Poisson regression model is appropriate for model with dependent variable of the Subtotal, whilst negative binomial regression model for model with dependent variable of the Totalsub (Table 4). To easier interpretation we present the percentage change is (in) the expected count for a δ unit change in xk, holding other variables constant, computing the following way (Long and Freese 2006):

$$100\times\frac{E(y|X,x_k+\delta)-E(|X,x_k)}{E(|X,x_k)}=100\times\{\exp(\beta_k\times\delta)-1\} \quad (4)$$

Estimations show rather similar results for both number of subsidies and type of subsidies. The share of less favoured area has significant and negative impacts on the number of successful applications both in terms of types and number of subsidies. These negative effects are between 20 and 28 per cent. Interestingly, contrary to earlier results, the younger farmers receive more likely more subsidies for both specifications. The negative impacts of age fluctuate between 19 and 34 per cent. Squared age variables are negative and significant implying 44-46 per cent reduction the expected number of subsidies. Other variables are not significant. In short, alternative specifications do not alter the results considerably.

Table 4 Number of successful applications (per cent)

	Sub-total	Sub-total	Sub-total	Tot.sub	Tot.sub	Tot.sub
SIZE	-0.1	-0.1	0.0	-0.1	-0.1	-0.0
SIZE2		0.0			0.0	
LFA	-20.1 *	-20.1 *	-9.5	-28.1**	-28.3***	-20.1
AGE	-33.8 **	-33.8 **	-19.1 *	-34.4**	-34.3 ***	-20.6 ***
AGE2			-46.1 **			-43.9 ***
EDUC	6.7	6.6	13.9	0.4	0.4	11.5
PTIME	-36.4	-37.4	-35.7	-35.3	-35.2	-33.6
FFARM	-21.9	-21.8	2.7	-10.3	-10.0	14.5
N	254					
LR test ($\chi 2$)	16.41 ***	16.40 ***	13.79 ***	0.03	0.03	0.00

Note :* p<0.1; ** p<0.05; *** p<0.01

Where LR test is significant we present results based on negative binomial model, otherwise results based on Poisson regression model.

V. CONCLUSIONS

The paper investigates how can receive farmers rural development policy measures using a survey among farmers in the Southern Great Plain region characterising by the high level of unemployment and strong agricultural background. We focus on the farmers social-economic characteristics explaining of success of application for rural development subsidies employing selection and count models. Estimations show that the higher educated and older farmers more likely apply for rural supports. Contrary to rural development policy aims, the share of less favoured land affect negatively on the application for subsidy. We found selection bias in the success of application. Results imply that farmers with less favoured land less likely receive, whilst higher educated and older farmers more likely receive rural supports. Similarly, the share of less favoured area affects negatively for number of successful applications both in terms of type and number of subsidies. Surprisingly, we do not find evidence that size of farms, being part-time farm or family farm influence significantly on the application for support, the success of application and number of received subsidies.

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