

IMPACT OF CAP FINANCIAL SUBSIDIES ON RURAL DEVELOPMENT AND EMIGRATION IN BULGARIAN RURAL AREAS

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Abstract

Bulgaria has suffered of an intense and continuous phenomenon of rural depopulation considering that the population has a level of per capita income lower two times and half than the average European value. The purpose of this paper was to assess if the financial subsidies allocated by the Common Agricultural Policy (CAP) both in the first and also in second pillar have reduced the permanent emigration. The quantitative methodology has used the Farm Accountancy Data Network dataset from 2007 to 2015. In the first approach, the linear regression model has estimated main correlations among emigration and payments allocated by the CAP, in particular towards disadvantaged rural areas. In the second phase, it has used the Structural Equation Model aimed at investigating in a path analysis the main cause-effect relationships between CAP and permanent emigration. Findings have pointed out the positive role of the financial subsidies allocated by the CAP in reducing the emigration even if outcomes have pointed out a not univocal interpretation of the effect of the CAP's two pillars and few measures of intervention. For the future, it is important to support financially Bulgarian farms and mostly some of them located in disadvantaged rural areas.

Key words: multiple regression model, structural equation model, rural depopulation, socio-economic marginalization, Bulgaria

Introduction

Bulgarian rural areas, such as other new member states of the European Unions, have suffered of a significant phenomenon of rural emigration in particular afterwards the collapse of the Communist regime (Davidova, 1991). According to this author, this has implied a pivotal intervention of national, European and international authorities aimed at improving the productive, socio-economic and agricultural fabric in new comer European states during their transition from a centralized economy to an open one (Galluzzo, 2015a; 2015b; 2016a; 2016b; 2017; Davidova, 1991; Peneva and Kopeva, 2010). In order to assess the impact of the Common Agricultural Policy (CAP) towards farmers, the European Commission by the Council Regulation 79/65 has set up since the early 1960s a survey analysis, called Farm Accountancy Data Network (FADN), on a sample of farms. These latter farms have got a level of standard income, as specified by the Commission in the Regulation 1242 published in 2008, in terms of economic size threshold, equal for Bulgarian farms to 2,000 Euro. The FADN dataset consists of lots of agricultural holdings active in the European Union with an agricultural area near approximately to 1 hectare and with a well-defined level of income and output. The purpose of the FADN is also to estimate the impact of financial subsidies allocated by the first and second pillar of the CAP to farmers hence, using this dataset by a quantitative approach it has been possible to assess the impact of financial subsidies disbursed by the European Union in reducing the rural emigration from the Bulgarian countryside. The perspective of this research is to suggest to policy makers several useful information in reducing the socio-economic marginalization in

Bulgarian rural territories by a re-allocation of payments and aids and a new planning phase in the next seven-year time of planning of the Common Agricultural Policy after the 2020.

Literature review

The transition from a centralized economy towards an open one in 1989 has implied an harsh, demanding and intense change from an exported oriented market to an imported one with worsening effects on the Bulgarian economy where lots of people live with a poor level of income (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008). According to these two authors, the agriculture is the most important economic source in the Bulgarian national income even if poorer is the region higher is the impact of the primary sector towards the national added value. Before the enlargement of the EU, lots of Bulgarian farms got by nation authorities specific and direct payments and subsidies linked to the level of production of some specialized crops (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008). The consequences have been an arising permanent depopulation in small rural villages due to higher level of unemployment, a decreasing level of income and inefficient farms which need of specific support and aids in getting better their productive infrastructures (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008; Galluzzo, 2015b). Before the accession to the European Union in 2007 socio-economic findings about rural development and economic growth in Bulgaria have highlighted a significant dichotomy among rich and large farms and poor small subsistence farms and positive has been the role of financial subsidies in increasing efficiency and competitiveness by the financial allocation of SAPARD funds and another financial tool (Bachev, 2008; Rizov, 2006).

Afterwards the enlargement of the European Union in 2004 and in 2007 pivotal has been the role of some financial resources allocated by the European Union such as SAPARD and LEADER+ even if sometimes unclear have been the effects towards the whole agricultural context (Gorton et al., 2009; Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008; Peneva and Kopeva, 2010). The role of financial subsidies in supporting the rural development and in reducing the emigration from the rural areas in Bulgaria and also in other central and eastern countries, where are scattered lots of subsistence farms not oriented to the market, has pointed out their own not efficient impacts due to a modest dimension of farms, a poor level of income and enterprises not market oriented (Kostov and Lingard, 2002; Mathijs and Noev, 2014). As a consequence of these territorial and socio-economic unbalances, proposals and priorities in a holistic path of rural development have to suggest towards local and European authorities some milestones aimed at making this policy more suited to their main features and tasks which have to be faced with specific strategies as proposed by other authors before the enlargement of the EU with a different allocation of public expenditure aimed at increasing the total budget (Gorton et al., 2009; Bach et al., 2000). In general, the level of income is a fundamental variable in increasing the economic growth in the target of a whole socio-economic convergence growth with some negative impacts of subsidies in agriculture in increasing the farmer's income even if the land dimension is one of the most crucial and stressing variable able to effect on the level of income and it is sensitive for farmers (Bivand and Brunstad, 2005; Bartolini and Viaggi, 2013).

Lots of authors have addressed their studies in assessing the impact, role and function of financial subsidies disbursed by the CAP in contrasting the out emigration and in improving the standard living conditions in the countryside (Burrell, 2009; Galluzzo, 2016a; 2016b; 2017). In Europe, comparing two different seven-year time rural development programs, both in 2007-2013 and also in 2014-2020, there has been an increase of financial resources to bottom-up measures, such as those proposed in the LEADER initiative, and in improving the quality of life in the countryside in a perspective

of environmental protection also considering the precession phase and the enlargement of the EU (Harizanova and Stoyanova, 2012; Burrell, 2009; Dwyer et al., 2007). Several Bulgarian scholars have suggested a different allocation of economic resources taking into account several downsides and socio-economic unbalances among Bulgarian regions, giving a priority towards specific targets addressed in implementing competitiveness of farms and a growth of job opportunities in rural areas by the LEADER initiative or in other measures of rural development (Harizanova and Stoyanova, 2012). According to these two authors, the LEADER initiative is considered one of the most important tool in reducing the marginalization of rural areas such as direct payments can also act directly on the level of farmers income.

During the programming phase 2014-2020, the eastern European countries have insisted for an increase of financial subsidies on the second pillar of the CAP and for a different redistribution of funds aimed at stimulating the rural development (Zahrnt, 2011) instead of stimulating a growth of financial payments in the first pillar. By contrast, Bulgaria has pointed out a significant incidence of the payments disbursed by the second pillar. Compared a threshold of GDP per capita proposed by the European Union, equal to 100%, Bulgarian people are under this value because citizens have got a 39% only and this situation gets worse in the rural areas; hence, the allocation of new economic resources for the rural development should consider the role of agriculture in protecting rural space by a new reallocation and a reflection of specific policies in favour of rural areas (Zahrnt, 2009). In fact, common opinion consider that rural territories play a fundamental role in the socio-economic growth, environmental protection and economic development (Czyzewski et al., 2011), slackening the permanent emigration from the countryside.

Aim of the research

The purpose of this research was to assess by a quantitative method the main relationships among permanent emigration from Bulgaria and the impact of financial subsidies allocated by the Common Agricultural Policy both in first and also in the second pillar. In the first stage of this research the goal was to asses the main relationships, by a multiple regression model, among emigration and some economic variables such as farm net income, total assets and financial subsidies allocated by the CAP. The second step has assessed by a path diagram in the framework of the Structural Equation Model (SEM) the cause-effect relationships among the above-mentioned variables.

In this analysis, the source of data has been made by the main findings published by the Farm Accountancy Data Network since 2007 to 2015 and by the statistical of population published by the Bulgarian Institute of Statistics.

Methodology

In order to investigate in depth the main relationships among the dependent variable rural depopulation in terms of permanent emigration from Bulgaria and the independent variables as subsidies allocated by the first and second pillar of the Common Agricultural Policy, farm net income, specific financial subsidies allocated by the second pillar of the CAP, total assets and farm net income per annual working unit (AWU) produced by a sample of farms part of the FADN dataset since 2007 to 2015, it has used a multiple regression model, estimating parameters by the Ordinary Least Square.

The estimation of regressors has used the software STATA 13 and in its algebraic form of matrix, the multiple regression models can be so expressed (Verbeek, 2006):

$$y = X\beta + \varepsilon$$

where y is the dependent variable and ε is the statistical error but both are vectors with n -dimensions; X is a matrix of independent variables which has a dimension $n \times k$.

In analytical terms, the multiple regression model in its general formulation can be written in this way (Asteriou and Hall, 2011; Baltagi, 2011; Verbeek, 2006):

$$y = \alpha_0 + \alpha x_1 + \beta x_2 + \gamma x_3 + \delta x_4 + \varepsilon_{jt}$$

y is the permanent emigration from Bulgarian countryside

α_0 constant term

x_1, x_2, x_3, x_4 independent variables such as farm net income, financial subsidies allocated by the II pillar of the CAP and total financial subsidies allocated by the Common Agricultural Policy, total assets and farm net income per annual working unit

$\alpha, \beta, \gamma, \delta$ are estimated parameters in the model

ε_{jt} term of statistic error.

Table 1. Main correlations among some investigated variables in Bulgarian farms part of FADN dataset at 5% of significance with a star.

	Farm net income	Total assets	CAP total subsidies	LFA payments	Rural development plan payments	Decoupled payments	Single area scheme payments	Emigration
Farm net income	1.00	0.44*	0.71*	0.21*	0.51*	0.61*	0.57*	-0.13*
Total assets	0.44*	1.00	0.63*	0.07	0.46*	0.54*	0.53*	-0.03
CAP total subsidies	0.71*	0.63*	1.00	0.39*	0.73*	0.89*	0.85*	-0.08
LFA payments	0.21*	0.07	0.39*	1.00	0.39*	0.45*	0.43*	0.17
Rural development plan payments	0.51*	0.46*	0.73*	0.39*	1.00	0.62*	0.61*	0.02
Decoupled payments	0.61*	0.54*	0.89*	0.45*	0.62*	1.00	0.96*	-0.14*
Single area scheme payments	0.57*	0.53*	0.85*	0.43*	0.61*	0.96*	1.00	-0.18*
Emigration	-0.13*	-0.03	-0.08	0.17	0.02	-0.14*	-0.18*	1.00

Source: author's elaboration on data FADN published on the website http://ec.europa.eu/agriculture/rca/database/database_en.cfm and Bulgarian National Institute of Statistic

According to many authors, the basic assumptions to use a multiple regression model are (Asteriou and Hall, 2011; Baltagi, 2011):

- 1) statistic error u_i has conditional average zero that is $E(u_i|X_i) = 0$;
- 2) (X_i, Y_i) , $i = 1, \dots, n$ are extracted as distributed independently and identically from their combined distribution;
- 3) X_i, u_i have no fourth moment equal to zero.

There is no correlation among regressors and random noise if the value between β expected and β estimated is the same; furthermore, in order to analyze if there is also heteroscedasticity on standard errors in the multiple regression model, in this research it has used White's test on the error terms (Verbeek, 2006).

The Path Analysis is closely linked to the multiple regression model aims to de-structure multiple variables in multiple survey plans of estimation in order to assess the direct and or mediated effects of the variables included in the model within of the method called Factorial Confirmation Analysis (Jöreskog, 1969; 1970; Jöreskog & Goldberger, 1975; Jöreskog et., 1979; Di Franco, 2016). The main assumptions in the model are based on the existence of a causal nexus that links some variables evaluated through some indexes of fit with the purpose to verify the significance and goodness of the model. Structural equation models, however, provide information on the causal processes between all variables investigated, also by a decomposition into a correlation model of parameters and covariances existing between study variables in a path diagram (Fig. 1). The arrows indicate the link between the investigated variables; coefficients 1 represent the effects of ξ on the two x variables in the model while δ_1 and δ_2 and γ are the useful coefficients for assessing the presence of a randomness and links between variables (Ingoglia, 2013).

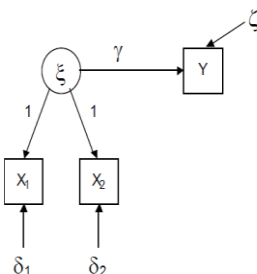


Figure 1. A simply representation of the Structural Equation Model

Source: Own calculation

Results and discussion

The variable farm net income in Bulgarian farms has pointed out, at a level of 5% of statistical significance, direct correlations with the variables total assets, total subsidies allocated by the CAP and financial subsidies disbursed in the CAP's second pillar in order to support rural development (Tab. 1). An indirect correlation has been highlighted between the variables emigration and farm net income hence, poorer are the areas in terms of income higher is the rural depopulation in terms of permanent emigration. In general, the level of total assets correlates directly to the level of financial support allocated by the Common Agricultural Policy. The variable emigration has been sensitive to the other

investigated variables; in particular it indirectly correlates with the variables farm net income and direct payments allocated by the first pillar of the CAP. Findings in this case seem to corroborate the positive and direct role of payments in reducing the permanent emigration from the countryside.

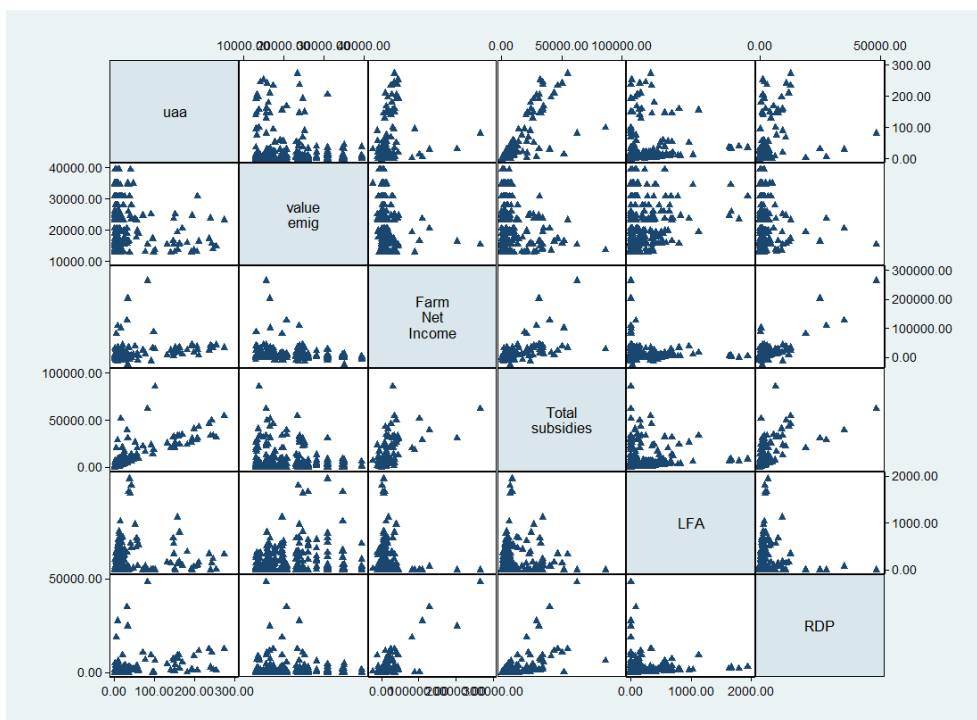


Figure 2. Main distribution and relationships among some investigated variables in Bulgarian farms part of FADN dataset

Source: author's elaboration on data published on the website http://ec.europa.eu/agriculture/rca/database/database_en.cfm and Bulgarian National Institute of Statistic

The scattered plots comparing some variable such as usable agricultural area, emigration, farm net income, total subsidies allocated by the common agricultural policy, payments allocated in favor of disadvantaged rural areas (LFA payments) and financial aids disbursed in the second pillar of the CAP has pointed out a direct correlation between usable agricultural area and total subsidies allocated by the CAP and farm net income (Fig. 2). Not so clear is the relationship between emigration and all economic variables. By contrast, total CAP subsidies and financial aids allocated by the second pillar of the CAP appears to be correlated to the value of usable agricultural area. This implies the importance of the European Union in stimulating some expansions of agrarian surface with positive effects on the efficiency and on the income of farmers. Small farms with a modest agricultural surface seem to get significant level of LFA subsidies which are a positive financial stimulus for

small farms. Not so significant is the impact of total subsidies allocated by the CAP and the emigration instead significant is the role of payments towards disadvantaged rural areas. The multiple regression model has highlighted a direct correlation among the dependent variable permanent emigration and the variables farm net added value per annual working unit, total assets and financial subsidies allocated in favour of disadvantaged rural areas (Tab. 2). The level of R^2 and adjusted R^2 have pointed out as the model is able to explain more than 62% of the variance. Findings have corroborated as the emigration is typical of disadvantage rural areas which benefit from the specific financial supports allocated by the European Union in farms characterized by a significant diffusion of workforce. The permanent emigration correlated indirectly with the variables decoupled payments, single farms payments and farm net income; hence, poorer is the farm net income higher is the emigration and an increase of decoupled payments and single farm payments are able to reduce the emigration from Bulgaria. Not significant has been the impact of financial subsidies paid by the European Union in the second pillar of the Common Agricultural Policy and by the whole CAP which corroborates a target action of direct or indirect payments in reducing the emigration from the Bulgarian countryside.

Table 2. Main findings in the multiple regression model. Dependent variable emigration

<i>Independent variable</i>	<i>Coeff.</i>	<i>Std. Err.</i>	<i>T value</i>	<i>significance</i>
Decoupled payments	-1.224	0.583	-2.10	**
Single farms payments	-0.621	0.569	-1.09	n.s.
Farm net income	-0.4153	0.068	-6.62	***
Farm net added value per AWU	3.160	0.255	12.35	***
Total assets	0.026	0.005	4.64	***
CAP total subsidies	0.157	0.186	0.84	n.s.
Subsidies allocated by the second pillar of the CAP	0.162	0.311	0.52	n.s.
LFA subsidies	19.293	2.596	7.43	***

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data published on the website
http://ec.europa.eu/agriculture/rica/database/database_en.cfm and Bulgarian
National Institute of Statistic

Table 3 shows the correlations among farm net income, dependent variable, and variables with a nexus or a direct impact on the level of income. The usable agricultural surface, the total output, the farm net value per each annual working unit, the financial subsidies allocated by the rural development plan have pointed out a direct correlation with these above-mentioned variables; hence, small farms as a consequence of modest agrarian capital have a poor level of farm net income and produced output. In the same time, findings have underlined as the total subsidies allocated by the CAP have not affected on the level of

income in Bulgarian farms. In general, rich areas have pointed out the highest level of farm net income as corroborated by the poorest level of less favoured areas payments allocated by the CAP towards these disadvantaged territories. The level of R^2 and adjusted R^2 have highlighted values close to 0.82 that implies as the model explains more than 80% of variance and fit well with the theoretical hypothesis.

The multiple regression model with the aim to assess the impact of financial subsidies allocated by the CAP stratified in function of the different financial items forming the first and second pillar on the level of Bulgarian farmer's income has highlighted as total subsidies, payments disbursed by the rural development plan correlate directly to the farm net income (Tab. 4). This explain as the financial subsidies allocated by the CAP act directly on the income of farmers. Decoupled payments and LFA subsidies indirectly correlates to the farm net income; hence, farms located in disadvantaged rural areas have benefited directly of these payments with the purpose to improve partially the level of income. The level of R^2 and adjusted R^2 have pointed out as the model of multiple regression fits well explaining more than 70% of variance.

Table 3. Main findings in the multiple regression model.
Dependent variable farm net income

<i>Independent variable</i>	<i>Coeff.</i>	<i>Std. Err.</i>	<i>T value</i>	<i>significance</i>
Usable agricultural area	137.877	62.106	2.22	**
Total output	0.071	0.010	6.67	***
Farm net value/AWU	1.717	0.180	9.54	***
Total assets	-0.017	0.005	-3.11	***
Total subsidies	0.065	0.163	0.40	n.s.
LFA subsidies	-5.319	2.089	-2.55	***
Rural development Plan subsidies	2.564	0.213	12.04	***
Decoupled payments	-1.657	0.586	-2.83	***
Single area payments	-0.491	0.476	-1.03	n.s.

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data FADN published on the website
http://ec.europa.eu/agriculture/rca/database/database_en.cfm

**Table 4 Impact of financial subsidies allocated by the CAP
by the multiple regression model. Dependent variable farm net income**

Independent variable	Coeff.	Std. Err.	T value	significance
CAP total subsidies	1.012	0.156	6.48	***
LFA subsidies	-4.225	2.543	-1.66	*
Rural development plan subsidies	3.398	0.248	13.66	***
Decoupled payments	-1.741	0.579	-3.01	***
Single area payments	0.821	0.582	1.41	n.s.

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data FADN published on the website
http://ec.europa.eu/agriculture/rca/database/database_en.cfm

Findings of structural equation model have highlighted as the index of fit is adequate; in fact, the $\chi^2(4)$ has been 0.18 with a p value close to 0.99. Outcomes have pointed out as the emigration correlates with the variables total subsidies allocated by the Common Agricultural Policy, financial payments disbursed by the second pillar of the CAP, labour input, level of taxation, investments, decoupled payments and direct financial supports in favour of disadvantaged rural areas. With a level of significance between 5-10% has been assessed a correlation and an indirect relationship between animal rearing in farms and emigration hence, the specialization of farms might be a good opportunity in reducing the rural depopulation. Furthermore, outcomes have underlined a direct relationship between LFA subsidies and emigration and an indirect correlation between emigration and funds allocated by the second pillar of the CAP; hence, the emigration is typical of disadvantaged poor rural areas towards which have to be implemented measures of farms' diversification financed by the rural development plan.

Fit indexes have corroborated as the model in the path analysis is adequate to explain the main relationships among investigated variable; in fact, RMSEA has been lower than 5% which implies as the model explains more than 95% of variance with a p value under 5% equal to 0.99; the Tucker-Lewis index (TLI) and the Comparative Fix Index (CFI) have been close to the optimal threshold of 1.

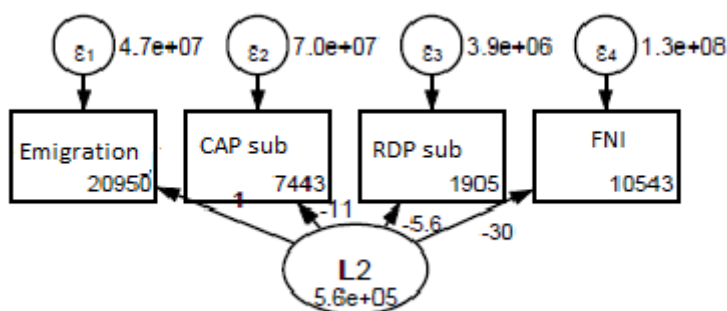


Figure 3. Main findings of the Structural Equation Model in Bulgarian farms part of FADN dataset

Source:author's elaboration on data published on the website http://ec.europa.eu/agriculture/rca/database/database_en.cfm and Bulgarian National Institute of Statistic

Figure 3 shows the main outcomes of the Structural Equation Model (SEM), considering as the latent variable (L2) is a parameter of rural development in Bulgarian countryside. In general, the index of fit such as the RMSEA has pointed out a value of 0.06 under 0.10 which implies as more than 94% of variance is explained by the SEM.

Conclusion

The role of financial subsidies allocated by the Common Agricultural Policy have had a different impact towards Bulgarian farms. In particular, payments in favour of disadvantaged rural areas have benefit of this financial support reducing the out emigration from the countryside and this has been similar to other findings assessed in other European countries where farms are characterized by modest plots of lands scattered in different rural villages.

Furthermore, financial subsidies allocated by the second pillar of the CAP have had a positive and direct impact in improving the quality of life in Bulgarian farm, then the efforts of the nation authorities should be addressed to an improvement of financial and legislative initiatives able to increase the endowment of social capital and infrastructures in rural areas even if the main constraint is the dimension of farms that does not allow incisive investments in re-modernization of the productive context.

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