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**An empirical analysis of the determinants of the
Rural Development policy spending for Human Capital**

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An empirical analysis of the determinants of the Rural Development policy spending for Human Capital*

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Abstract

The aim of the paper is twofold: to present a preliminary analysis of the distribution of the Rural Development (RD) expenditure for specific measures related to human capital across EU and to investigate which factors may explain the variation of intensity of spending between the regions. In particular, a descriptive analysis of the budget and of the expenditure for EU 27 will be presented. A linear regression model (OLS) is also presented in order to verify which factors weigh more in determining the spending decisions for the European regions. The analysis is carried out taking into account the EAFRD expenditures for the measures related to human capital for the period 2007-2008 at NUTS2 level.

Keywords: Rural Development, Human Capital, distribution of the Expenditure

JEL classification: Q18

1. INTRODUCTION AND MOTIVATION

An appropriate investment in training and human resource management is now a necessary goal of all policies and interventions aimed at economic and social development. The aim is to respond to the challenges that competitiveness and structural changes pose to all the economically and socially more advanced countries. In particular, for the EU Member States (MS), the challenge is stated in the European 2020 strategy for jobs and smart, sustainable and inclusive growth. The Common Agricultural Policy (CAP) will also contribute to the achievement of EU 2020 goal; furthermore, human capital is an horizontal issue both in terms of target to be pursued (employment and inclusion) and in term of means to attain the target¹.

One of the European priorities for the Rural Development (RD) policy is to contribute to a strong and dynamic European agri-food sector by focusing on the main concern of knowledge transfer, modernisation, innovation and quality in the food chain and priority sectors for investments in physical and human capital. Especially in front of the goal of competitiveness, it

* Authorship may be attributed as follows: sections 1, 4 and 5 to Materia; sections 2 and 3 to Camaioni.

¹ Regarding the target of the Eu2020, see European Council Conclusion on 17th June, 2010. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/115346.pdf
Regarding the new objectives guiding the CAP reform see the COM(2010) 672 final, "The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future".

becomes crucial to achieve an adequate level of technical and economic training and development, but also to define and apply strategies to increase human potential, physical capital and the quality of agricultural production. In particular, the strengthening of human capital is connected to interventions associated with the concept of generational change, training and information, set up and use of extension services.

The aim of the paper is therefore twofold: to present a preliminary analysis of the spatial distribution of the Rural Development (RD) expenditure for specific measures related to human capital across the EU regions and to investigate which factors may explain the variation of intensity of spending between regions. Taking into account the territorial dimension (NUTS2 level) in the analysis of the RD policy implementation and specific socioeconomic indicators provided by the Common Monitoring and Evaluation Framework (CMEF) allows to evaluate the relation between the policy and the regional development performance and strategies. However, the analysis proposed does not intend to evaluate the policy itself with regard to the indicators suggested by CMEF, but the relevance of these indicators with respect to the expenditure for the policy of human capital until 2008. The territorial analysis of Rural Development policy spending is particularly interesting if we consider the mid-term evaluation of the RD programmes (December 2010). As well as the analysis of the territorial distribution of those measures addressed to strength human capital is relevant with respect to the role the literature recognizes to this factor in affecting survival and growth (C. R. Weiss, 1999; T. Glauben et al., 2006), investment decision (W. E. Huffman, 1980) and productivity of farms (Maietta, 2004).

The paper is structured as follows: section 2 describes and analyses the Rural Development policy intervention for human capital and budget allocation; section 3 presents an analysis at NUTS2 level; section 4 presents an attempt to verify through an OLS estimation the relation between human capital spending and specific socio-economics indicators; section 5 concludes.

2. RURAL DEVELOPMENT POLICY INTERVENTION FOR HUMAN CAPITAL

In recent years, with the recognition of the propulsive role played by “knowledge intensive” activities, the concept of “human capital” has become increasingly important. Human capital is an important qualitative aspect of labour supply and plays a fundamental role in determining rates of inward investment, indigenous entrepreneurship, and capacity to generate or absorb innovations. Therefore, it has a knock-on impact upon rates of economic activity and employment (SERA, 2006)

In the RD policy framework, the generational change, training and education, and the advisory services are associated with the enhancement of human capital in order to pursue the objective of competitiveness (Axis 1): this implicitly recognizes that the power to change and innovate business and agriculture is closely linked to the component of the entrepreneurial dynamism, typical the younger generation (Materia, 2009). Specifically five measures of the

programming period 2007-2013 (Reg. 1698/2005) will be analysed in depth, taking into consideration the expectation of the European policy makers as stated in EU regulation:

- *measure 111 - Vocational training and information actions*: the rationale of this measure is that the economic, technological and environmental changes may result in a need for new skills of all people involved in agricultural, food and forestry activities. In order to obtain these new required skills, general, technical and economic training activities are financed in form of courses, seminars, demonstration projects, information sessions, workshops.
- *measure 112 - Setting up of young farmers*: in order to ensure the future of farmer's profession and to contrast the increasing ageing of agricultural labour force, the measure supports the setting up of young farmers (i.e. under 40 years old) in order to facilitate the initial establishment and the structural adjustment of their holding.
- *measure 113 - Early retirement*: this measure aims to facilitate the generational turnover by supporting the early retirement of farm worker. The measure is targeted to farmers of no less than 55 years old but not yet of normal retirement age transferring their holding.
- *measure 114 - Use of advisory services*: this measure aims at improving the sustainable management of holdings compensating the cost of the use of advisory services. The advisory service can cover many topics, in general it consists in assessing the performance of holdings (farm and forest) and identifying necessary improvements with regard to statutory management requirements and Community standards relating to occupational safety.
- *measure 115 - Setting up of management, relief and advisory services*: this measure aims to help farmers and forest holders to adapt, improve and facilitate farm management and to improve the overall performance of their holdings by enhancing the human potential. The intervention admissible under this measure can be distinguished in: management services (i.e. organising the outsourcing of part of the activities to manage a farm), relief services (i.e. organising temporary replacement of the farmer in case of sickness, absence or holidays by an external person) and advisory services (i.e. organising a structure of external consultancy to adapt the holders farm management).

2.1. Overview of the Human Capital in Rural Development Plans

For the entire programming period 2007-2013, 96.1 billion euro of European Agricultural Fund for Rural Development (EAFRD) are available for rural development policy, of which: 44.5% allocated to Axis 2 – Agro-environment, 33.6% allocated to Axis 1 – Competitiveness, 13.3% to Axis 3 – Diversification, 5.9% Axis 4 – Leader and 2% to Technical assistance. The measures related to Axis 1 could be aggregated in three main groups corresponding to the three sub-objectives: Human capital and knowledge transfer, Physical capital and innovation, Food and processing modernisation, Innovation and quality (Table 1).

Table 1 - The importance of Human Capital Budget (EAFRD) in the Axis 1

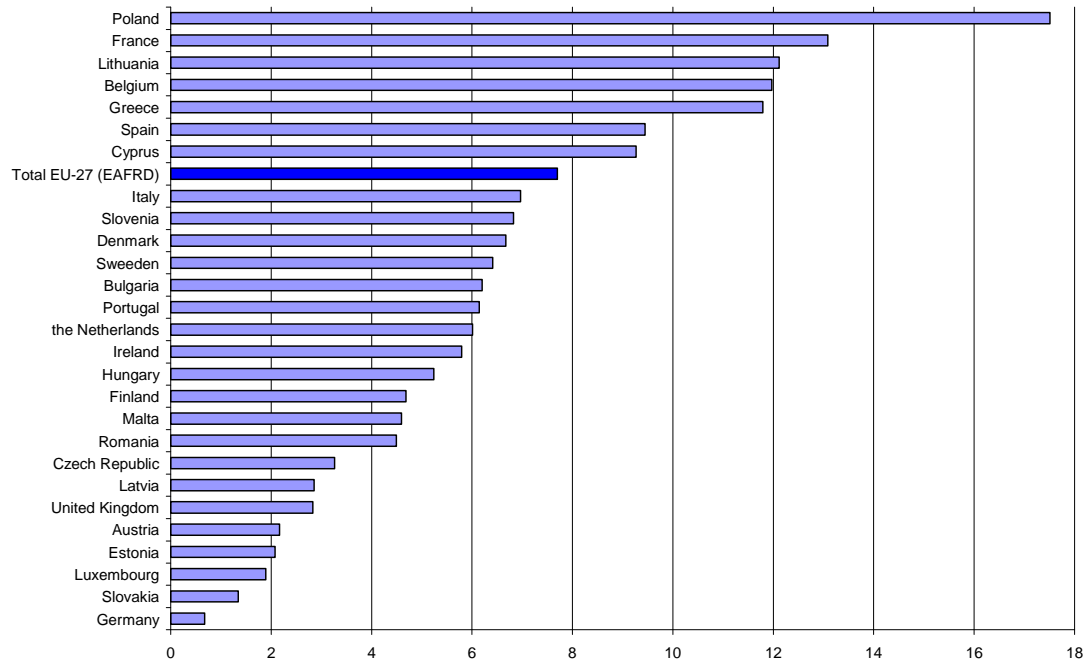
Measure code	Measures	EAFRD 2007-2013	
		mil €	%
111	Vocational training and information actions	1,086	3.4
112	Setting up of young farmers	2,900	9.0
113	Early retirement	2,855	8.8
114	Use of advisory services	461	1.4
115	Setting up of management, relief and advisory services	102	0.3
Human capital and knowledge transfer		7,404	22.9
121	Modernisation of agricultural holdings	10,627	32.9
122	Improvement of the economic value of forests	650	2.0
123	Adding value to agricultural and forestry products	5,660	17.5
124	Cooperation for development of new products	349	1.1
125	Infrastructure related to the development and adaptation ...	5,102	15.8
126	Restoring agricultural production potential	478	1.5
Physical capital and innovation		22,866	70.7
131	Meeting standards based on Community legislation	105	0.3
132	Participation of farmers in food quality schemes	297	0.9
133	Information and promotion activities	207	0.6
Food and processing modernisation, Innovation and quality		609	1.9
141	Semi-subsistence farming	995	3.1
142	Producer groups	328	1.0
143	Provision of farm advisory and extension services in BG, RO	132	0.4
144	Holdings undergoing restructuring due to the ref. of a CMO	16	0.0
Other Axis 1 measures		1,470	4.5
Total Axis 1		32,349	100.0

Source: EU Commission, 2010

At EU level, the measures addressed to investment in physical capital represents more than two thirds of the total Axis 1 expenditure. Considering the budget for human capital and knowledge transfer, the measures related to young farmers and early retirement collect almost the 80% of the resources assigned, while only few resources are left to vocational training and advisory services.

Analysing the relative importance of the human capital budget with respect to the entire budget for Rural Development policy for the period 2007-2013, it represents the 7,8% at EU level (Figure 1).

Figure 1- Relative importance of Human capital budget on total Rural Development policy



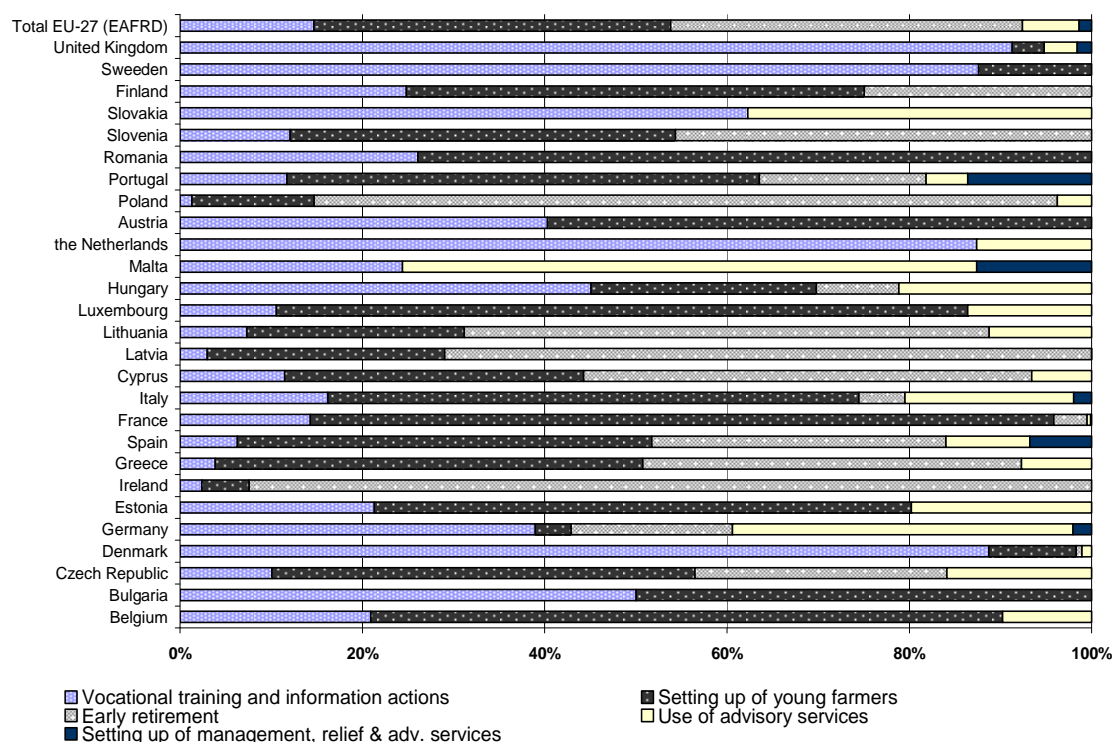
Source: EU Commission, 2010

The figure shows extremely different behaviour in terms of budget assigned to Human capital policy between countries. Only seven Member States (MS) are above the EU-27 average, in particular Poland and France. It is more interesting to observe the choices of the majority of the EU countries. In particular, eight Member States are going to invest in human capital measures less than an half of the EU average, such as Germany, Luxembourg, Austria and United Kingdom for the EU-15 and Slovakia, Estonia, Latvia and Czech Republic for the new MS.

To better understand the political choices related to this policy, the allocation of the budget between measures per each Member States is represented in figure 2, in which the 100% represents the total budget per each countries.

Over the 75% of the EU budget for human capital is covered by the measures addressed to stimulate generational turnover, such as early retirement and setting up of young farmers; 16% is addressed to vocational training and less than 10% is left to support the use of advisory services, the setting up of management, relief and advisory services.

Figure 2 – Member States allocation for Human Capital Measures



Source: EU Commission, 2010

Analysing figure 1 and figure 2, several divergences may be noted in term of budget allocation between measures, such as priorities selected, with respect to the EU average. United Kingdom, Sweden, Netherlands and Denmark, with their relative low budget allocated to human capital (figure 1) turn out to be characterized by the same financial and policy choice in relation to the measures: they invest over the 80% of the budget in training.

On the opposite, France and Poland invest significant part of their budget into measures related to generational turnover. It may be noted that those measures are “premium measures”, thus their spending is more based on some characteristics of the beneficiaries (i.e. age) rather than subjected to a behaviour or specific and reiterate actions. Hence we could suppose that measures related to generational turnover may be preferable to the other measures for managing authorities being under spending pressure, since “premium measures” are less complex to manage and less time consuming from an administrative point of view (Camaioni, Sotte, 2009).

Few resources are invested under the measures 114 (use of advisory services) and 115 (setting up of management, relief and advisory services) by most of countries, nevertheless Malta, Germany and Slovakia show a different choice. It is interesting to note that those countries can be characterized also by a less importance recognized both to human capital measures with respect to the total RDPs budget (figure1) and to the measures related to generational turnover. The picture emerging is that Member States with low budget profile on human capital tend to invest in measures more complex and time consuming at least from an administrative point of view, while to an higher budget profile corresponds a predominance of investment in generational turnover measures.

3. REGIONAL ANALYSIS OF HUMAN CAPITAL EXPENDITURE

Taking into consideration the EAFRD expenditure for the measures related to human capital as declared by the paying agencies for the years 2007-2008, many differences come out at Member States level. As stated above, the divergence between Member States in terms of spending (especially countries with low expenditure) either reflects some difficulties in terms of capacities of spending, or can be a consequence of the administrative nature of the measures that required more time to be accomplished (selection procedures, implementation of the training course or setting up of the advisory service) or of a legitimate political choice to implement firstly other RD measures².

The human capital expenditure and the intensities of spending per annual work unit in agriculture (AWU) and per number of holdings (Eurostat, Farm Structure Survey, 2007) are presented in table 2. The choice of the indicators is justified by the fact that the spending of the measures analysed depends more on the number of potential beneficiaries (AWU or number of holding) rather than the characteristics of the territory or the physical or economical size of the farms.

At EU-27 level, 649 millions of Euro have been invested in Human capital, of which 60% in the EU-15: in particular, the Continental regions seem to show the highest capacity of spending. From the one hand, these regions are also the most active with reference to the amount of expenditure per number of farms; from the other hand, the Northern regions spend more per every annual working unit than the other regions (in particular Ireland, Finland and Sweden). The Southern regions, instead, are far away from the volumes of expenditures per AWU and numbers of farms shown by the Continental and Northern regions.

However, it is worth noting that Spain and Italy (but also Sweden) are the only countries of the old Member States showing an intensity of spending per AWU greater compared to the intensity of spending per number of holdings. This might be a consequence of the structure of the agricultural (forest) sector characterized by an high number of small farms. Anyway the Mediterranean countries presents in average the lowest intensity of spending respect to all the other aggregates.

Looking at table 2, it is interesting to note the values of expenditure shown by France and Poland in comparison to the other countries. These countries present the highest budget allocation profile, and this may explain their intense spending compared to other Member States.

² Anyway, these concerns are out of the scope of the present analysis.

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Table 2 – Human Capital expenditure and Intensity of Spending per Member States

		HC Expenditure	HC Ex/ Awu	HC Ex/N. Holdings
		Mil. Euro	Euro	Euro
North	Denmark	10,2	181,7	227,5
	Finland	16,4	226,6	240,5
	Ireland	50,3	340,9	392,3
	Sweden	15,5	236,7	213,5
	United Kingdom	4,1	11,9	13,5
Continental	Austria	17,4	106,3	105,0
	Belgium	10,5	160,0	218,7
	Germany	6,1	10,0	16,4
	France	160,7	199,7	304,7
	Luxembourg	0,2	48,4	78,9
	Netherland	2,0	12,0	25,7
South	Spain	75,0	77,5	71,8
	Greece	0	0	0
	Italy	13,3	10,2	7,9
	Portugal	10,6	31,3	38,5
EU-12	Cyprus	0	0	0
	Czech R.	9,9	72,0	250,9
	Estonia	3,0	94,2	129,5
	Hungary	3,3	8,3	5,3
	Lithuania	3,8	21,4	16,7
	Latvia	0,3	3,3	3,2
	Malta	0	0	0
	Poland	230,8	102,0	96,5
	Slovakia	0	0	0
	Slovenia	5,5	65,8	73,1
	Bulgaria	0	0	0
	Romania	0	0	0
EU-27		649	55,5	47
EU-12		257	42,6	32
EU-15		392	69,1	69
<i>North</i>		<i>96,4</i>	<i>141,2</i>	<i>157,1</i>
<i>Continental</i>		<i>196,8</i>	<i>108,6</i>	<i>165,3</i>
<i>South</i>		<i>98,9</i>	<i>31,1</i>	<i>25,6</i>

National figures very often hide large regional disparity. If we map the intensity of spending for the 271 NUTS2 regions, per number of holdings (figure 3) and per annual working units (AWU) (figure 4), the general picture changes.

Figure 3 - Intensity of Human capital spending per number of Holdings

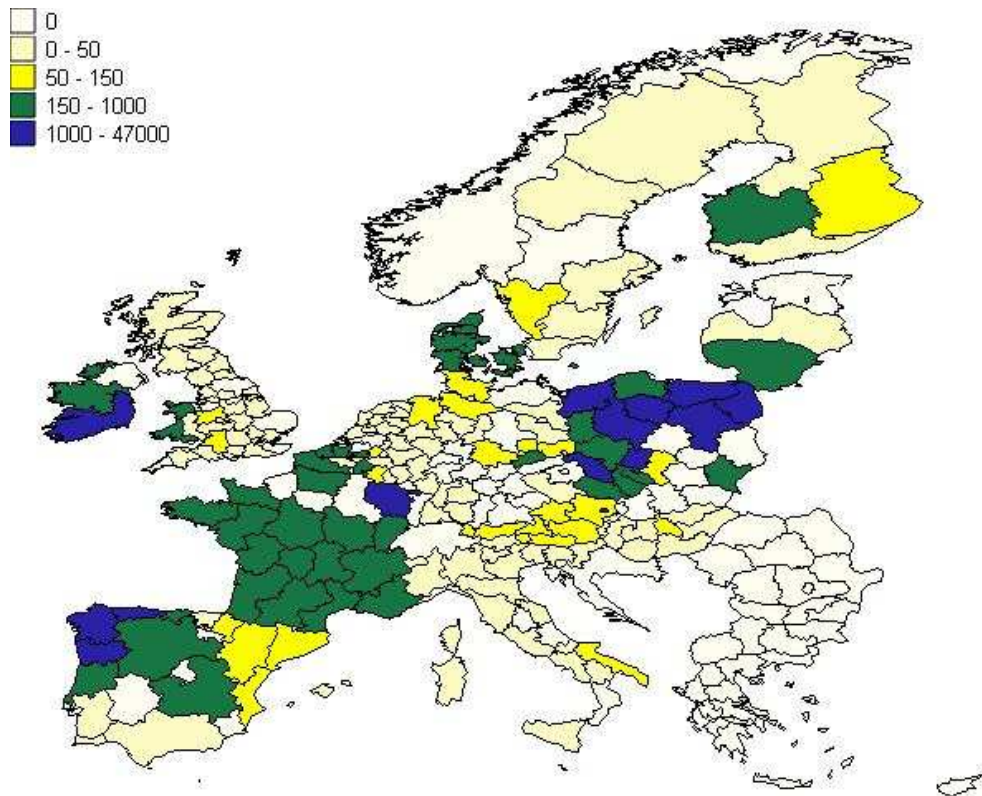
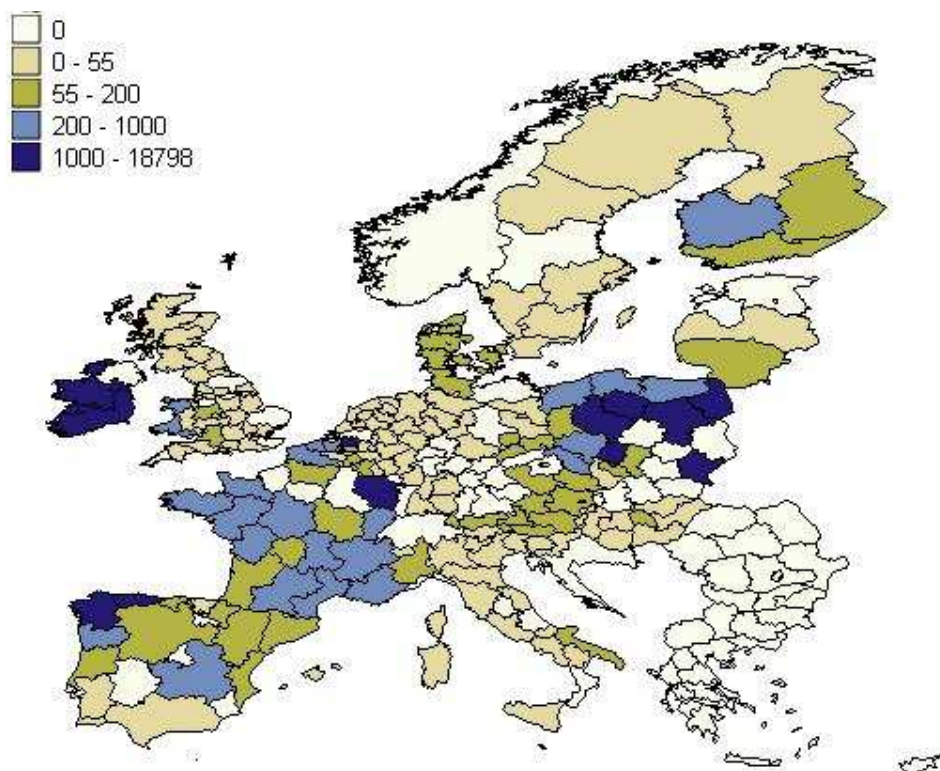


Figure 3 illustrates a great divergence between NUTS2 regions as well as within Member States. Great part of the NUTS2 regions shows an intensity of spending under 150 Euro per farms. Nevertheless, most of the regions of France, Spain, Ireland, Poland and Denmark shows the highest intensities per number of holding: in fact, they belong to the class between 150 and a thousand euro and to the highest class of the expenditure.

With regard to the highest class of intensity of spending, it is necessary to specify that while most of the NUTS2 regions belonging to this class of expenditure has an intensity of spending per holdings between a thousand and five thousand euro, two “outliers”, such as the province of Antwerp (Belgium) and Malopolskie (Poland), show respectively 47 thousand euro and 28 thousand euro spent per holdings, thus being the regions that spend more in absolute terms per holdings in Europe.

Investigating which factor best explain the different attraction of funds between the NUTS2 regions is crucial. For example, France, Ireland and Denmark present a more homogenous figure compared to Spain. In addition, excluding Spain, Poland and Lithuania, the Mediterranean countries and the New Member States appear to be the more lagging regions in term of spending and intensity of spending.

Figure 4 - Intensity of Human capital spending per AWU



Also considering the intensity of spending per annual work unit, the picture confirms a divergence between regions. Most of the European regions shows an intensity of spending under 200 euro and confirms the NUTS2 belonging to France, Spain, Ireland and Poland as the most active. Also in this case, the regions with the highest intensity of expenditure are Antwerp (Belgium) and Malopolskie (Poland) with respectively 19 thousand euro and 17 thousand euro per annual work unit, but they could still be considered as outliers compared to the class of expenditure they belong to. Figure 4 also shows that if we consider differences in intensity of spending per AWU, France, Spain and Poland do not show significant homogeneity.

4. THE EMPIRICAL ANALYSIS

The prevailing literature provides little support for the analysis of the determinants of the regional spending decisions for the policy of human capital in the European Union. In this last step of the analysis, therefore, we try to assess which factors might determine the differences between regions in terms of spending for the policy of human capital and whether they really explain the actual distribution of expenditure that emerges from the statistical and descriptive analysis. To this purpose, a set of relevant socio-economic indicators related to the measures analysed will be selected from the baseline indicators as established in the Common Monitoring Evaluation Framework (CMEF) in order to better understand the different distribution of the expenditure.

An estimation through a linear regression model (OLS) is therefore presented in order to verify which indicator weigh more in determining the 2007-2008 human capital spending (thousand of euro) for the NUTS2 regions of the 27 European Member States.

4.1. Indicators used in the CMEF and variables adopted

The Common Monitoring and Evaluation Framework (CMEF) provides a single framework for monitoring and evaluation of all rural development interventions for the programming period 2007-2013³. The indicators are also included in annex VIII of Commission Regulation 1974/2006 laying down detailed rules for the application of Council Regulation 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). There are five types of indicators referred to in the CMEF: baseline, financial, output, results and impact⁴.

According to our purpose, we will focus our attention only on the baseline and the impact indicators related to human capital. In particular, for the specific policy analysed, we select the following measures of socio-economic "development": the GDP per capita in Purchasing Power Standards (PPS) (EU-27 = 100); the labour productivity in agriculture; training and education in agriculture; age structure in agriculture. For what concerns the impact indicators, we refer to the labour productivity in agriculture as the ratio between the gross value added in primary sector and the number of agricultural working units.

More specifically, the variables we decide to consider in the estimations regarding the socio-economic development of the regions are the following:

- **GDP_PPS_PC**: it represents the indicator of GDP per capita in Purchasing Power Standards (PPS)⁵ (EU-27 = 100). We could expect a negative relationship between spending for human capital and GDP: the rationale is that a policy would focuses more on human capital where the GDP is lower. This could be explained by the need to increase the labour factor, to enhance the younger (agricultural) generations, to ensure productivity gains by the leverage of human capital. It is also true that the richest regions tend to be more populated, thus more funds attracting in consideration of the highest number of potential beneficiaries the measures of human capital are targeted to.

³ http://ec.europa.eu/agriculture/rurdev/eval/index_en.htm

⁴ *Baseline* indicators relate to the general socio-economic context of the programme area (context-related baseline indicators) and to the state of the economic, social or environmental situation in direct relation with the wider objectives of the programme (objectives-related baseline indicators). *Financial (input)* indicators refer to the budget and other resources allocated to the programme. *Output* indicators measure the activities directly realized within the programme. Finally, *result* indicators measure the direct and immediate effects of the intervention and provide information on eventual changes that have taken place. Impact indicators refer to the benefits of the programme both at the level of the intervention but also more generally in the programme area. They are linked to the wider objectives of the programme.

⁵ Purchasing Power Standard (PPS) is the artificial common reference currency unit used in the European Union to express the volume of economic aggregates for the purpose of spatial comparisons in such a way that price level differences between countries are eliminated. Economic volume aggregates in PPS are obtained by dividing their original value in national currency units by the respective PPP.

- **GVA_AGR**: this is the Gross Value Added in the primary sector. The impact of this variable on the decision of spending for human capital is not univocal. Where the primary sector shows a lower GVA, we could expect from the one hand a greater investment in human capital, from the other hand this may mask a poor presence of agriculture in the regions, consequently a lower demand for financial volumes dedicated to agriculture.

The other variables refer to training and education of the farmers and agricultural managers, to the age structure, the labour force and the labour productivity in agriculture:

- **MANGER_EDU_AGR**: it is the percentage of managers with basic or full agricultural training and is a proxy of the “training and education in agriculture” indicator. The impact of this variable is not univocal, and it can not be determined *a priori*: on the one hand, where there is a low level of training, we could expect a lower volume of spending for formation and human skills; on the other hand, managers without training and education could demand for more advisory services, and so the volume of resources devoted to human capital could be greater.
- **AGE_RATIO_35_55**: this variable represents the “age structure” indicator. It is the ratio between the number of farmers under 35 and the number of farmers over 55. Also in this case its influence can not be determined *a priori*: on the one hand, we could expect that spending on human capital is greater where the young are lacking in order to stimulate their activity and to attract them; however, on the other hand, it is precisely the presence of young people that means greater demand for human capital and thus greater expenditure for this policy.
- **AWU**: it represents the labour force in agriculture. Where the working units are numerous, the investment for the policy of human capital is expected to be greater.
- **LAB_PROD**: this is the agricultural labour productivity expressed by GVA/AWU. Also in this case the expectation is not univocal. The greater the productivity, the greater would be the demand for measures and so the greater the spending for human capital. But, a lower productivity may require a greater investment to improve the human capital, their skills and life conditions.

Table 3 - Variables adopted in the empirical investigations

VARIABLE	DESCRIPTION	CMEF INDICATORS
GDP_PPS_PC	GDP per capita in Purchasing Power Standards (PPS) (EU-27 = 100)	Economic development
GVA_AGR	Gross Value Added in primary sector (millions of euro)	
MANGER_EDU_AGR	Percentage of managers with basic or full agricultural training	Training and Education
AGE_RATIO_35_55	Ratio between the number of farmers under 35 and the number of farmers over 55 (percentage)	Age structure
LAB_PROD	Labour productivity (GVA/AWU)	Labour productivity
AWU	Labour force	Annual working units

4.2. Results

The estimations are conducted through the classical linear regression model, that is, through the ordinary least square (OLS) estimator⁶.

The empirical analysis aims assessing which, how and to what extent the variables listed in the previous table and selected from the CMEF condition the choice of the European regions about how much to fund the human capital policy and how these variables may explain the concentration and the distribution of human capital spending.

A first estimation has been conducted in order to verify if the GDP and the labour productivity (two of the specific indicators directly provided by the CMEF) have a significant effect on the dependent variable, the spending at NUTS2 regions level. The variables included seem to be not significant: the GDP and the labour productivity (GVA/AWU) seem to have together no impact on the decision of spending. Only the age ratio and the percentage of managers with a basic or full agricultural training show in this first attempt a significant effect; however, the variable related to the percentage of managers with agricultural training has a negative sign, thus indicating that more funds are addressed where the level of education is lower. Moreover, the R^2 of the model, i.e. the proportion of variability in the data set that is accounted for by the model⁷, is very low (0,19). It follows the consideration that at the regional level there are other variables, in any way related to the information provided by CMEF, which are significant in the decision of spending.

A second attempt of estimation, therefore, has been conducted taking into consideration the GDP indicator, but not the labour productivity: the independent variables, therefore, were the GDP, the GVA, the number of working units, the age ratio and the percentage of managers with a basic or full agricultural training. The R^2 of the model has increased (0,39) and also the

⁶ We decide to present for this paper only the results of the most significant estimation.

⁷ R^2 is a statistic that gives some information about the goodness of fit of a model. In a regression, the R^2 coefficient is a statistical measure of how well the regression line approximates the real data points. An R^2 of 1,0 indicates that the regression line perfectly fits the data.

significance of the variables has increased. The only variable that does not seem to influence the dependent variable is the GVA.

Consequently, another attempt of estimation has been conducted, taking into account besides the GDP, GVA and the age structure variables (used in the previous models) also the utilized agricultural area (UAA), the number of farms per every region (**FARMS**), and dummy variables included in order to take account of both territorial specificity (**RURAL**: rural or urban region following the OECD classification. It assumes value 1 if the region is prevalently or intermediary rural, 0 if it is an urban region) and the peculiar region (**CONVERG**: convergence or competitive region⁸. The dummy assumes value 1 if the region is convergence or phasing out, 0 if competitive and phasing in).

Table 4 reports estimated coefficient of the last model proposed and analysed, the one more significant:

Table - CLR estimates (standard errors in parenthesis)			
VARIABLES	COEFFICIENT (STD ERROR)		P> z
GDP_PPS_PC	45,81 (15,63)	**	0,004
GVA_AGR	-2,023 (0,702)	**	0,004
AWU	0,158 (0,026)	**	0,000
AGE_RATIO_35_55	134,51 (36,31)	**	0,000
UAA	0,002 (0,000)	**	0,001
FARMS	-0,076 (0,021)	**	0,001
RURAL	-18,55 (887,5)		0,983
CONVERG	337,43 (1205,9)		0,780
CONS_	-6873,2 (2212,2)	**	0,002
Number of observations:		212	
R ² :		0,4588	
Adj R ² :		0,4375	
** denote statistical significance at 5% confidence level			

On the one hand, the age ratio of the regions (% under 35/over 55) evidently remains the main factor of influence for this type of policy: it is the variable with the greatest impact (in

⁸ According to the Dec. 2006/596/CE.

absolute value) on the dependent variable. This variable shows a positive sign: the greater the ratio, the greater the number of young people. On the other hand, however, also other elements matter: it emerges that the regions that spend more for the human capital are those where there are more agricultural working units and where the utilized agricultural area is greater. These variables show, in fact, a positive and significant effect.

The fact that a region is rural, in contrast, does not show a significant effect: the relative dummy (RURAL), however, show also a negative sign. It seems that also being a convergence region does not influence the spending decision. The relative dummy is not significant; however, it is positive. The number of farms, in contrast, is significant but negative thus indicating that a high number of farms, *ceteris paribus*, implies a lower volume of resources devoted to this kind of policy. We may explain this finding supposing that the greater the number of holdings, the lower the amount devoted to them.

With regard to the GDP of the European regions, it emerges that a region showing a high GDP apparently incurs a greater spending for the human capital policy; the opposite holds true for the GVA indicator. It is quite surprising if we consider that we are analysing a policy devoted to the primary sector. Presumably, a lower level of GVA becomes an indicator of lower relevance of the primary sector in the regions considered.

5. CONCLUSIVE REMARKS

The paper has presented an analysis of the spatial distribution of the Rural Development (RD) expenditure for specific measures related to human capital across the EU regions. An important advance has been the attempt to investigate through a linear regression model which factors may better explain the human capital spending between NUTS2 regions.

Although the relevance of the human capital issue in light of the construction of a strong and dynamic European agri-food sector, the budget dedicated to this policy is relative low (7.8%) with respect to the entire budget for the Rural Development policy for the period 2007-2013. Over the 75% of the EU budget for human capital is covered by measures addressed to stimulate the generational turnover (early retirement and setting up of young farmers), and only 16% is addressed to vocational training, being the remaining share invested in advisory services.

The analysis of the spatial distribution of the spending for human capital demonstrates that there is no homogeneity between the EU countries. The picture emerging is that Member States with a lower budget profile on human capital tend to invest in more complex and time consuming measures (such as vocational training), while countries allocating more funds to the human capital policy invest more in generational turnover measures (recognized as “premium” measures: early retirement and setting up of young farmers).

The empirical estimations demonstrate that at regional level the variable strictly associated to human capital as suggested by the CMEF are not relevant.

Rather, other variables, in any way related to agriculture, are relevant in the decision of spending: the age structure and the number of working units are obviously relevant, in fact, they

reflect the target of the beneficiaries the measures analysed are addressed to. But also the utilized agricultural area, as indicator of the importance of agriculture in the regions, and the number of holdings have a great impact.

The authors wish to extend this analysis to a longer series of data covering several years in order to better test the relevance of the CMEF indicators in explaining the different distribution of the spending. Furthermore, it would be more appropriate to repeat the analysis distinguishing by measures. A longer series of data would allow us also to apply an estimation by GWR techniques, in order to test the spatial effects.

REFERENCES

- Camaioni, B. (2009). PSR in Italia. Stato di avanzamento e realizzazione. In Sotte, F. (ed.), *La politica di sviluppo rurale 2007-2013. Un primo bilancio per l'Italia*. Quaderni Gruppo 2013, 17-55.
- Glauben T., Tietje H., Weiss C. (2006). Agriculture on the Move: Exploring Regional Differences in Farm Exit Rates in Western Germany. *Jahrbuch für Regionalwissenschaft*, Volume: 26, 1.
- Huffman W.E. (1980). Farm and off-farm work decisions: the role of human capital, *The Review of Economics and Statistics*, Volume: 62, 1.
- Maietta O.W. (2004). Crescita della produttività e capitale umano nell'agricoltura italiana, *QA Rivista dell'Associazione Rossi-Doria*, Fascicolo: 4.
- Materia, V.C. (2009). Politica per la formazione e l'assistenza tecnica. In Sotte, F. (ed.), *La politica di sviluppo rurale 2007-2013. Un primo bilancio per l'Italia*. Quaderni Gruppo 2013, 57-80.
- SERA (2006). Study on Employment in Rural Areas. Final Deliverable.
- Weiss C. R. (1999). Farm growth and survival: econometric evidence for individual farms in Upper Austria, *American Journal of Agricultural Economics*, Volume: 81.