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Rural Areas and Gross Domestic Product in Some Countries of the Mediterranean Sea Basin

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Abstract: The transition from an agricultural productivist to a post productivist model has implied a change about the function and role of rural areas, that have an active part in reducing, through the multifunctionality, the social and economic exclusion in the countryside. This paper studies by a quantitative approach in some countries of the basin of the Mediterranean Sea which variables have been pivotal to improve the agricultural Gross Domestic Product (GDP) and per capita GDP over 8 years. The study has pointed out as there are relentless discrepancies among rural and urban areas in terms of income and its distribution.

Keywords: rural areas, urban areas, panel data, rural population, Human Development Index

JEL Classification: Q10, R12

Introduction

Rural areas are able to carry out a very important function for environmental protection and also for a fair social economic development against poverty, social exclusion and environment degradation through the multifunctionality and in the same time by production of positive externalities (Galluzzo, 2010a, 2010b). The multifunctionality is pivotal both to guarantee a fair income to farmers and moreover to protect rural territories afterwards the transition from a productivist paradigm in the primary sector, based on the quantity of agrarian production rather than quality, towards a post-productivist model (Ilbery, 1998). This has meant a radical change in the role of farmer which is became the main actor in protection the rural environment. The multifunctionality has fuelled a growth of the sense of belonging to a rural community; it has also had a meaningful action in order to reduce the social exclusion of people living in rural areas and, in the same time, multifunctionality has raised the

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level of mutual collaboration with other stakeholders and political parties, involved in an active development of rural areas, lowering the exclusion of rural population in political decision processes (O'Hara, 1998). This has implied a deep and brisk change in the agricultural culture, economic behaviour and political stance towards the countryside because the farmer is at present considered as a new kind of pillar in rural development planning and a protector against social exclusion with specific functions on protecting rural space; thus, the farmer has to be taken into account in all decision-making aspects of rural development planning. In the European Union, the main and foremost consequence of multifunctionality has been to put at the centre of the stage of rural policy and governance the farmer such as an active part in rural development. Hence, farmers have played a pivotal role in addressing specific actions to improve the sense of belonging of rural communities, during planning process in local contexts, and also in lessening the sense of marginalization and exclusion in political choice path of local areas.

An important role to promote the rural space linking and embedding it to the food, tradition, people, culture, heritage and other aspects of the countryside, is ascribed to certified quality food able both to improve the socio-economic development of rural territories (Wilson and Whitehead, 2012) and also to stimulate the pride of being active part of an agrarian and rural community, where the role of primary sector is vitally important to get better the general living conditions and the sense of belonging to a rural community. Anyway, the European Union, during the debate around the rural development plan 2000-2006, called Agenda 2000, gave to the multifunctionality a specific role and function in an international legal framework thus, the farmer has became the main actor in the rural development and it has singled out as the dweller able to protect the rural space, using public funds, financial support and other several grants, fundamental to produce positive externalities (Henke and Salvioni, 2008). In fact, the European Community allocates specific funds to put into practice many actions, by the Common Agricultural Policy (CAP), to protect rural space through the agro-tourism and green tourism, to diversify the production by rural arts and crafts and farmers' markets and to give a quantitative value to the multifunctionality, which in general does not have got a conventional market, by an economic compensation throughout single payment schemes both in the first and also especially in the second pillar of the CAP. The purpose of these financial and economic interventions by Common Agricultural Policy has been to increase the level of farm income, stabilizing the fluctuations in prices, and to reduce rural depopulation. Many criticisms and solutions about the role of subsides paid by the European Union, called green boxes during World Trade Organization negotiations, have been discussed and argued against and in favour of this kind of agrarian subsides, because they are decoupled by quantitative of production and by quality of production. For many people, this has implied to give money not linked to the yield of productions, with the effect of distorting the price of many commodities in the international mar-

ket, and to be a sobering issue for political and technical decision makers and government institutions (Daugbjerg and Swinbank, 2007; Swinbank, 2008). Somebody has argued positively in favour of green box subsides, which are not linked to the level of production, but they are able both to protect the rural territories, by a partial compensation of positive externalities, and also to improve the development of agriculture in rural areas (Sharma, 2004) by a new young generation of farmers, which moving from urban areas to the countryside, needs of agricultural grants and supports to settle farms and to protect the environment against rural depopulation and social exclusion.

The transformation of the role of countryside has implied: a development of diversification inside the farm activities and a growth of off-farm activities put into place inside and outside rural spaces (Kinsella, *et al*. 2000). In many cases, nowadays for farmers it is not possible to manage new challenges and to survive with only an exclusive agricultural activity such as cultivation or livestock, because farmers require to implement and to diversify gross revenues both by developing other farm-based activities (farmers' market, agro-tourism, green economy, etc.) and also by renewing utterly the core business with the aim to become an active part in rural process and to lessen the social-economic marginalization and exclusion of rural population from the countryside as well (Van der Ploeg J.D. *et al*, 2002).

In general, among urban and rural areas there has been a strong dichotomy that has implied a huge discrimination and differentiation in terms of economic development and welfare between these two geographical spaces. During the last century this differential is increased with the consequence to sharpen socio-economic diversities and drawbacks of rural areas, enlarging dissimilarities among rural and urban territories in economic in terms of Gross Domestic Product (GDP) and level of service.

The analysis of GDP is considered a tool very powerful to estimate the growth of a country and in the same time it is something useful to improve the general living conditions and other standard living parameters which have been explained and argued by Okun throughout Okun's law (Ghosal, 2004). In general, the main result of an increase of GDP is an expansion of employment rate; even if, the primary sector is not directly involved in a growth of labour force and the rate of expansion of employment in agriculture is slower than in secondary sector and or in tertiary industry. Secondly, the growth of GDP has soared emigration processes from the countryside to urban areas, reducing the level of poverty and increasing the level of education, skill and training in the primary sector and in rural space (Galluzzo, 2012).

Positive effects tightly linked to the progress of level of wealth and welfare in the rural areas are an improvement of GDP and a growth in terms of Human Development Index (HDI); the consequent effects of an improvement of Gross Domestic Product are an upgrade of social-economic performances, in terms of poverty reduction, and an economic development in rural poor areas with a high level of per

capita wealth. Recent studies have pointed out an indirect relationship in all above mentioned variables thus, a growth of GDP does not imply a meaningful improvement of HDI (Ghosal, 2004). To estimate the value of general living conditions in rural areas it has used the value of Human Development Index in different analysed countries following the definition and the parameters published by The Economist, that produces every year a book called The World in Figures in which it is possible to compare the level of general and economic development of many states in the world.

The main goal of this paper was to analyze in rural areas of some countries, located in the basin of the Mediterranean sea, characterized by enough interesting trade exchanges, (Italy, Greece, Egypt, Algeria, Morocco, Turkey), whether there is an interrelation among wealth, in terms of GDP, that is not in terms of purchase power parity, but only in terms of per capita GDP, agricultural GDP and total Gross Domestic Product yielded by all analysed countries and other independent variables, tightly linked to the general living conditions in rural areas, such as rural and urban population, labour force in the primary sector, Human Development Index, GDP and growth rate of Gross Domestic (Tab. 1). Indeed, Gross Domestic Product is a proxy variable to estimate the general living conditions in the countryside because, a rural depopulation from the countryside is directly linked to the best conditions and an high level of income in urban areas, which is able to attract people and to foster the rural emigration from rural territories and to get worse the level of welfare and wealth in the countryside.

Methodology

To compare the socio-economic situation in different analysed rural areas, over the eight year time of observation from 2002 to 2009, located in some countries of European continent and Euro zone, it has been used a quantitative approach through a statistical multiple regression model applied to a balanced panel data, because in each cross section there were not missed observations (Verbeek, 2006).

The panel data approach is a good tool to reduce and to explain the heterogeneity in units of observation (Gujarati, 2011) and it is very powerful to analyse the most significant changes during the time of study in these countries, estimating the effects inside and outside different groups or clusters of states (Baltagi, 2011) using, in the same time, the main information inside and between groups and reducing consequently the statistical error term. The panel data is able to estimate the value of heterogeneity which is not possible to observe; moreover, it has the great advantage both in reducing the statistical error and also in leaving out statistical variables with the direct effect to define unbiased parameters in the multiple regression model.

In general, the function of a linear panel data model is written in algebraic terms in this way (Asteriou and Hall, 2011):

$$Y_{it} = a + \beta \mathbf{X}_{it} + u_{it} \quad (1)$$

Y_{it} is the dependent variable
a is a constant
β is a vector of parameters
$\mathbf{X}_{it}$ are independent variables
u_{it} is the statistical error
t stands for the time periods of observation that is 1, 2, 3, …..T
i are the analysed section that is 1, 2, 3, ….N

Basis assumptions, to use a fixed effect model are that the statistic error ε_i has conditional average zero that is $E(u_i \mid X_i) = 0$ and the error is independently and identically distributed from their combined distribution (Gujarati, 2011; Verbeek, 2006).

In this paper, it has estimated some parameters and relationships among several socio-economic variables, using a fixed panel data model instead of using the random effect panel data.

The fixed effect panel model (FME) used to value parameters has had the advantage to estimate as every independent variable (x) does not have any relationship with error terms hence, the independent variables are exogenous and they are not linked to the past and to the present value of error variable; the FME was an unbiased model to estimate the main and foremost differences in each analysed countries and their effects and features in the model (Verbeek, 2006) that has meant in mathematical terms:

$$E(y_{it} \mid x_{it}) = x'_{it}\beta \quad (2)$$

A fixed effect model has implied that there have been differences among all analysed variable in all countries due to differences in the constant thus, the exogeneity has been linked to the individual effects only and independent variables do not depend on the past, present and future value of statistical error (Verbeek, 2006). The Hausman test has been used to decide between fixed effect panel data and random effect panel data was the best (Verbeek, 2006; Asteriou and Hall,2011). In general, a high value of Hausman test is a good index to prefer a fixed effect panel data rather than random effect model; in fact, a high value of Hausman test has meant as the model has fitted well and it has also been able to demonstrate a statistical difference between these two approaches -fixed effects versus random effects- (Asteriou and Hall, 2011). In this short study the fixed effect panel data model has pointed out as there have not had some effects analysing statistical errors by specific test.

In this paper, it has used three different paradigms, to analyse the level of wealth in rural areas by GDP, changing the dependent variable. The first statistical model in fact has considered as dependent variable agricultural GDP over the time 2002-2009. In the second model the analysed dependent variable has been per capita GDP, with

the aim of estimating which kind of independent variables have contributed to its forming. The last third regression model has valued what independent variables have acted on the total Gross Domestic Product growth during the time.

Results and Discussion

In terms of per capita Gross Domestic Product, Italy and Greece have been under the average level of Euro Zone regions and, during the time, there has been a significant increase of per capita GDP in all analysed countries even if, Egypt and Morocco have pointed out a value of GDP fifteen times higher than the average value in Euro regions (Graph 1). Egypt, Morocco and Turkey have underlined the best performances in terms of increase in percentage of GDP growth, which was above 5% per year, compared to the level of Euro Zone Regions GDP growth that, instead, have pointed out a steady increase in terms of national Gross Domestic Products (Graph 2).

In Italy and in Greece there has been an expansion of rural population as well as in Euro Zones countries, but in other states located in the basin of Mediterranean Sea, changes in rural population has been almost different: a steady population in rural territories has been pointed out in Egypt; Algeria and Turkey instead have dropped in rural population but in Morocco the inhabitants in the countryside has increased (Graph 3).

To analyse the effect of a development in viable general living conditions, in socio-economic terms, using the Human Development Index, and the people living in rural areas one has used a logarithmic transformation of dataset. The aim of this logarithmic transformation was to reduce the quantitative differentials in the dataset simplifying the comparison among variables and their excessive variance. It seems that there has not been an indirect correlation between rural population and an increase of HDI (Graph 4) thus, an improvement in the living conditions has not brought about a change in terms of inhabitants in rural areas.

During the observation time, from 2002 to 2009, the analysis has showed as in the countries of the basin of Mediterranean Sea there has been a meaningful incidence of the rural population on urban population with some significant effects in terms of Gross Domestic Product, which was able to guarantee a stronger growth, over the time, compared with the average of the expansion of GDP in all countries located in the European Zone; in fact, in these countries, except Italy, due to the financial bubble and economic downturn, the growth rate of Gross Domestic Product was above 3% and it was strongly connected with a meaningful increase of Gross Domestic Product in the primary sector.

In general, the panel data model was very useful to analyse and to compare the development in rural areas even if fixed effect panel data model has been better than

the random effect model (REM) because the p value, estimated by Haussman test, has not been statistically significant in the REM panel model. This has fortified the initial hypothesis of this research, according to which, the fixed effect panel model is more consistent and it fitted well than random effect model to define the main interrelation among the statistical variables. This is particularly true, as in this paper, if the aim of the research is to analyse some effects in groups of states.

The first regression model by the estimation of parameters, using the fixed random effects panel data, has underlined as the agricultural GDP was not correlated with the independent variable per capita GDP (Tab. 2). The density of population, both in rural areas and also in urban zones, are two independent variable directly correlated to the Gross Domestic Product in the primary sector. The Human Development Index, that is an indicator to value some conditions of development and welfare in the country, combining few parameters and aspects as diffusion of literacy skills, life expectancy and income, calculated by the weekly magazine The Economist, has pointed out as there has been a direct correlation on the dependent variable agricultural Gross Domestic Product, thus this index has underlined and appraised some positive and direct effects of this index on the economic development in rural territories of each country. The agricultural GDP has directly been correlated with the general growth of the Gross Domestic Product, produced in all countries of the area of study, and with the total GDP obtained in all analysed nations. A positive correlation has been found out between the dependent variable agricultural Gross Domestic Product and the independent variable working population in the primary sector, which has validated that there is a very strong ability of agricultural areas, where it is strongly significant the incidence of labour force in the primary sector, to contribute to the overall growth of Gross Domestic Product. In the same way, the main results of this first simulation have showed as in rural territories there has been an increase of literacy skills, education level and general living condition with the consequence to get better the economic level of development of rural territories, evaluated in terms of agricultural GDP. The value of R^2 and adjusted R^2 have pointed out a good consistency of the model able to value 99% of variance. The coefficient of determination R^2 and the adjusted R^2 have pointed out a value of 0.99 that means the regression model fits well the statistical data and the adjusted R^2 has demonstrated also the model is a good prediction and a good explanation of the regression model on the total variation.

In the second simulation the coefficient of determination R^2 and the adjusted R^2 have pointed out a value of 0.93 and 0.88, that means the regression model fits well the statistical data, even if there has been a drop of adjusted R^2, due to an increase of variable included in the fixed model panel data (Tab. 3). The fixed effects panel data approach has pointed out as independent variables Human Development Index and total GDP have had some positive effects on the per capita GDP, but the independent variable urban population has not had a direct effect in increasing the growth of per

capita GDP. This last dependent variable has indirectly been correlated with the level of population living in the rural territories, which is decreased during the time of observation. This result has demonstrated, in the short period of study, as in all analysed countries, characterized by a significant percentage of Gross Domestic Product made by the primary sector on the total national GDP, and by a high percentage of manpower working in agriculture, there has been a spatial and territorial differentiation among urban areas and rural areas and, moreover, rural zones have not been able to increase per capita Gross Domestic Product, with the consequences to enlarge the rural-urban income gap and discrimination.

In the third simulation by fixed effect panel data the coefficient of determination R^2 and adjusted R^2 have pointed out a value of 0.99 that means the regression model fits well the statistical data in spite of increasing of variable included in the fixed effect model panel data. The third simulation has investigated what kind of independent variables have had an effect on the development of total Gross Domestic Product, made by different economic sectors, produced in all analysed countries (Tab. 4). The main results have underlined as the independent variable agricultural GDP has statistically had a significant and direct effect on the total GDP. This quantitative model, instead, has demonstrated that there has been a negative correlation, among independent variables rural population and urban population and the dependent variable total Gross Domestic Product; this means as an increase in people living in the urban space, associated with a drop in the people living in the countryside, has diminished the level of economic development in terms of GDP. In the same time the fixed effect panel data has underlined such as a decrease in labour force in the primary sector has been able to improve the level of total GDP. During the time of observation in all countries, between the independent variables HDI and growth of GDP there has been a strong interconnection due to an improvement of general and socio-economic features; anyway, this progress in standard living conditions has been tightly connected to a fall in total GDP, due to other issues in the economic downturn period of time. This model has, therefore, confirmed as the growth of total Gross Domestic Product in the area of study has been correlated, in a negative way, to the independent variable population, living in the rural areas, and to the manpower working in agriculture.

Conclusion

This study has underlined the main and foremost role and function of rural areas and the agricultural sector to increase general income; even if, the paper has pointed out a lot of discrepancies both among rural areas and urban areas in terms of income (per capita GDP and total GDP) and also about its production and distribution. In the same time the quantitative approach has underlined an unequal distribution of GDP

in all compared nations both member of the European Union and also in the others situated in the basin of the Mediterranean sea.

In general an improvement of Human Development Index has made an improvement on the level of agricultural GDP and per capita GDP with a negative impact on the level of total GDP which has decreased. Anyway, in the future it is pivotal to improve the level of skills in rural areas with the aim to reduce socio-economic discrimination and to get better technologies and techniques of production in rural territories, giving few changes to the farmers to leave the countryside and staying there to produce positive public externalities by multifunctionality and rural protection. For new comers nations in the next process of enlargement of the European Union (EU) some funds, grants and subsides assigned by EU are important to bar the rural emigration and to lessen it avoiding to unbalance the relationships between rural and urban territories because the level of opportunities, per capita GDP and income are in favour of big urban aggregates rather than small rural villages or towns, due to a low level of amenities and job opportunities.

The rural population has act in a positive way to better the agricultural GDP level and during the time of observation in rural areas there have been meaningful effects to get better per capita GDP and total Gross Domestic Product. In this case, the role of public institutions is to promote actions and measures to keep people in rural territories, steaming the emigration from rural spaces of people towards urban areas, shantytowns and big cities, which are able to draw the rural population. The negative effect is that rural population leave definitely the countryside, emigrating in peripheral areas, with the consequence to get worse general living conditions and the level of household incomes in improvised shantytowns, close to the outskirts, compromising the access to public services and to a good level of socio-economic welfare and general services such as school, transport, education.

The role of political institutions is to pay more attention towards rural areas and to pay out them specific subsides which are both a result and also a mean to recognize a positive role and function of farmers in protecting the rural space and to produce wealth and environmental security in the countryside, with positive effects in favour of urban territories. This implies to allocate a fair and economic compensation to the farmers and towards their multifunctionality put into practice through positive externalities, that do not have a codified market.

The rural cooperation, by cooperative credit banks and specific actions of micro credit, can have a positive role to stimulate the development of economic activities in rural areas, slackening the marginalization of agrarian spaces intensifying, in the same time, the sense of being an active part in development of environmental and socio-economic processes in the countryside, emphasizing the sense of belonging to a rural community and finally to be a liable and active player in the protection of rural space and its governance.

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Table 1. Definition of socio-economic variables used in the quantitative model by Panel Data

Variable	Definition of Variable	Value/Measure
PCGDP	Per capita GDP	(000) $
AGDP	Agricultural GDP	(000) $
TGDP	Total GDP	(000) $
HDI	Human Development Index	-
GGDP	Growth of GDP	%
RP	Rural Population	(000) citizens
UP	Urban Population	(000) citizens
WFA	Labour Force in Agriculture	(000) of workers

Source: The Economist, Il Mondo in cifre, different years

Table 2. First simulation using fixed effect panel data

	Coefficient	Std. error	t value	p-value	Significance
Constant	-1,0209e+011	1,5046e+010	-6,7864	<0,00001	***
GGDP	3,52853e+09	9,87773e+08	3,5722	0,00180	***
PCGDP	-125496	204982	-0,6122	0,54696	ns
HDI	5,75258e+08	1,01236e+08	5,6823	0,00001	***
UP	7,11777e+08	1,45428e+08	4,8944	0,00008	***
WFA	3,48894e+08	7,47435e+07	4,6679	0,00013	***
TGDP	0,0159249	0,000880828	18,0794	<0,00001	***
RP	3941,37	1018,25	3,8707	0,00088	***
Dependent variable: AGDP					
R^2	0.99				
Adjusted R^2	0.99				
F (13, 21)	395.49				

ns not significant; significance *** 1%

Source: our elaboration on data The Economist Il Mondo in cifre different years

Table 3. Second simulation using fixed effect panel data

	Coefficient	Std. error	t value	p-value	Significance
Constant	-38015	17354,4	-2,1905	0,03991	**
GGDP	-415,264	989,786	-0,4195	0,67908	ns
HDI	788,94	158,359	4,9820	0,00006	***
UP	-176,037	117,209	-1,5019	0,14801	ns
WFA	46,2782	118,445	0,3907	0,69994	ns
TGDP	3,72348e-09	1,42982e-09	2,6042	0,01656	**
AGPD	-8,81752e-08	8,04428e-08	-1,0961	0,28544	ns
RP	-0,00123619	0,000481454	-2,5676	0,01794	**
Dependent variable: PCGDP					
R^2	0.93				
Adjusted R^2	0.88				
F (13, 21)	21.52				

ns not significant; significance ** 5%; significance *** 1%

Source: our elaboration on data The Economist Il Mondo in cifre different years

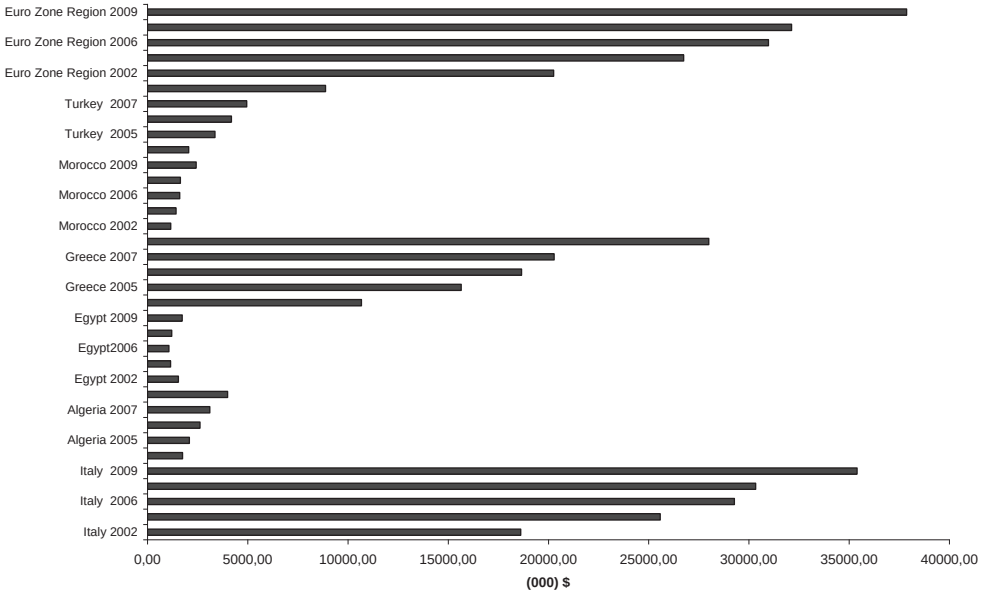
Table 4. Third simulation using fixed effect panel data

	Coefficient	Std. error	t value	p-value	Significance
Constant	5,3259e+012	1,07068e+012	4,9722	0,00006	***
GGDP	-2,2854e+011	5,48231e+010	-4,1762	0,00039	***
HDI	-2,6566e+010	9,66659e+09	-2,7421	0,01190	**
UP	-3,8534e+010	1,06315e+010	-3,6263	0,00149	***
AWF	-2,0914e+010	3,28841e+09	-6,3804	<0,00001	***
AGDP	60,0702	3,81062	15,7639	<0,00001	***
RP	-186030	68287,7	-2,7242	0,01239	**
Dependent variable: TGDP					
R^2	0.99				
Adjusted R^2	0.99				
F (13, 21)	320.10				

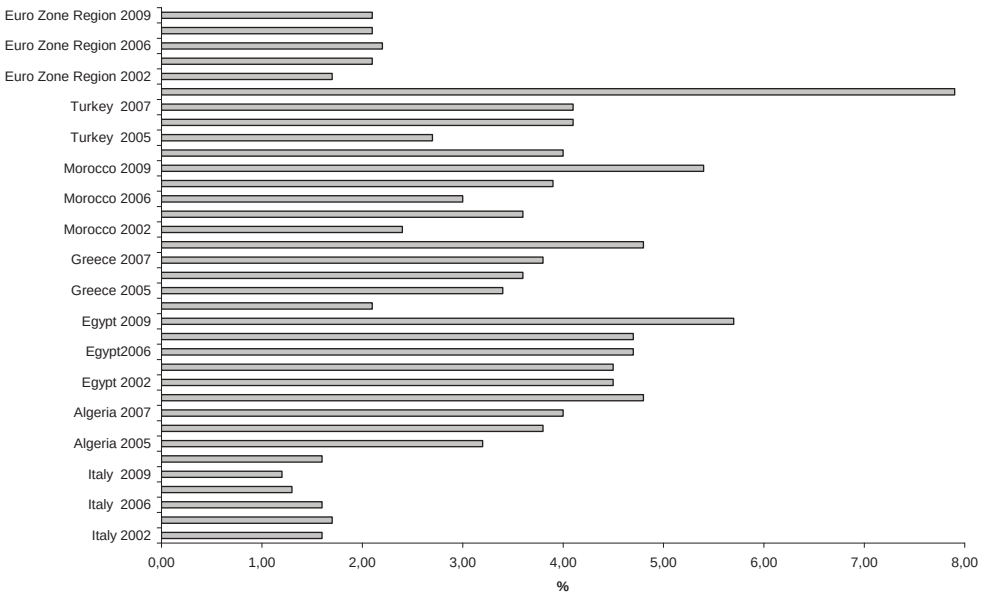
significance ** 5%; significance *** 1%

Source: our elaboration on data The Economist Il Mondo in cifre different years

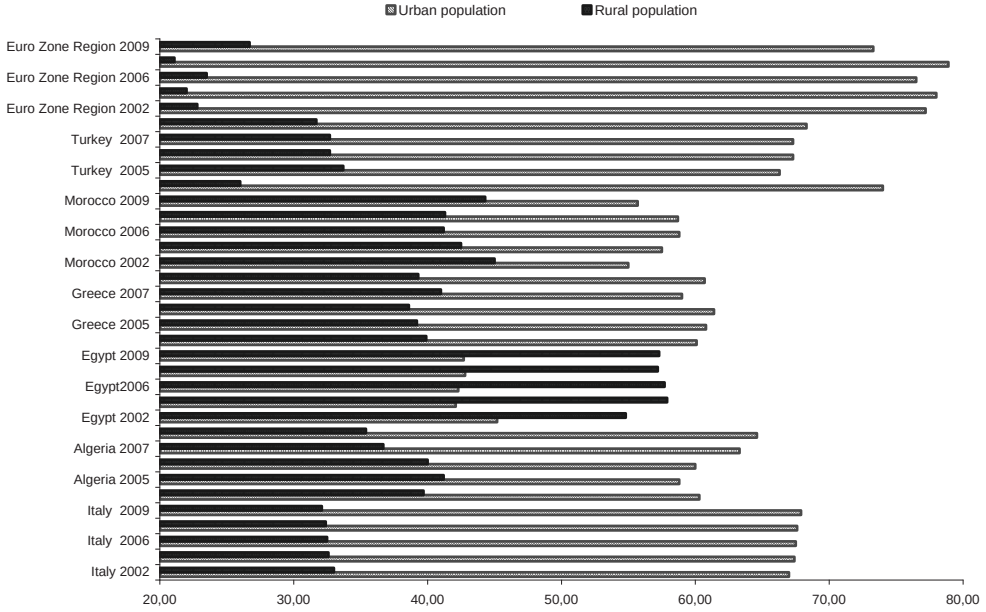
Graph 1. Per Capita GDP in analysed countries during the time *(Source: The Economist Il Mondo in cifre different years)*



Graph 2. Percentage of GDP growth in analysed countries during the time *(Source: The Economist Il Mondo in cifre different years)*



Graph 3. Population living in analysed countries and in Euro Zone area and its progress over the time (*Source: The Economist Il Mondo in cifre different years)*



Graph 4. Foremost relationships between rural population and Human Development Index during the time *(Source: The Economist Il Mondo in cifre different years)*