Mendel University in Brno
Faculty of Business and Economics

Impact of Financial and Economic Crisis on Spain: Regional Aspects

Diploma thesis

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Acknowledgment

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Abstract

PALIČKOVÁ, Eva. *Impact of Financial and Economic Crisis on Spain: Regional Aspects* Brno, 2014. 117 p. Diploma thesis. Mendel University in Brno.

Thesis deals with impact of financial and economic crisis on all seventeen regions and two cities in Spain. The main purpose of the thesis is to find out, whether the crisis influenced the development of convergence or divergence between Spanish regions. First of all the complete overview of economic development on basis of the most important macroeconomic indicators during ten-year period for each region was done. Afterwards, the statistical method, Cluster analysis, was performed for two different time periods dividing crisis period, which facilitated diagrams capturing regional grouping and their movements during different crisis period. Additionally, the β-convergence analysis was performed. Also the β-convergence analysis was run in three different time periods, which results revealed nicely the evolution of convergence and divergence between Spanish regions during last ten-years marked by crisis situation.

Keywords

Crisis, Spain, convergence, divergence, β-convergence, Spanish regions, Cluster analysis, impact of crisis, macroeconomic indicators

Abstrakt

PALIČKOVÁ, Eva. *Dopad finanční a ekonomické krize na Španělsko: regionální pohled* Brno, 2014. 117 p. Diplomová práce. Mendelova Universita v Brně.

Diplomová práce se zabývá dopadem finanční a ekonomické krize na všech sedmnáct autonomních oblastí a dvě autonomní města ve Španělsku. Hlavním cílem práce bylo zjistit, zda krize ovlivnila vývoj konvergence nebo divergence mezi Španělskými regiony-tedy autonomními oblastmi. Nejprve byla provedena celková analýza ekonomického vývoje pro jednotlivé regiony, který byla založena na principu makroekonomických indikátorů za posledních deset let. Následně byla provedena Shluková analýza pro dvě rozdílné časové úseky, rozdělujíc období krize, jenž umožnilo sledovat vývoj shluků regionů a jejich pohyby během období krize. Dále byla provedena β-konvergence pro tři různé časové úseky, jejichž výsledky odkryly vývoj konvergence a divergence mezi Španělskými regiony za období deseti let poznamenaných krizí.

Klíčová slova

Krize, Španělsko, konvergence, divergence, β-konvergence, španělské regiony, Shluková analýza, dopad krize, makroekonomické indikátory

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1 Introduction

After a financial crisis that started at American financial markets a few years ago, no one expected that it would have a huge impact on the rest of the world. Unfortunately, it turned to be and no economy in the world could avoid problems and seemingly healthy and strong economies had to show their real power. I would like to call this event a "moment of truth" when world economies, especially in Europe, had to show real face and reveal truthful economic situation. At that point, world started to be aware of the fact that that it could turn out to be the most catastrophic economic event in the modern era of international economy. The crucial moment happened on September 15, 2007 when huge downswing in stock market occurred. And this was start of maybe the worst financial crisis in history of the world economy. It was obvious that in interconnected economies the crises would spread out of the United States of America to the rest of the world really fast. Especially, European countries were strongly exposed which is not a surprising thing since the US and EU economies belong to the biggest economies according to the World Bank. However, all members of European Union underwent the recession but some of the countries were doing worse than the others. For the first time, European Union faced serious economic problems of its members that were forced to reveal the true economic situation. EU tried to revive European banks by providing up to 2 trillion € for member states in needs and 164 billion € to fiscal crisis for Greece. European countries, nowadays so called "PIIGS" together with Cyprus, started to evince serious economic problems that endangered all Eurozone and European Union. Between these countries belongs also Spain. (1), (2)

Spain belongs to the Mediterranean periphery which was a lot underdeveloped until the last third of twentieth century in respect to the western countries. For example Spanish GDP per capita in 1950 was 2 397 $ which represented just 47.81 % of the GDP of Western Europe. Actually, the economic growth of these countries was predominantly made by foreign investments, thus is obvious that country as Spain, had to face serious problems, when the crisis appeared. (3) Spanish economy was in different situation respect to the other PIIGS countries. Public debt in 2007 was under 40 % and Spanish banks were solvent.

Nonetheless Spain is composed by seventeen regions that dispose by autonomy in sector as healthcare, social services and education. For that reason, Spanish regional budgets are significant, and they started to produce deficits. Annual growth of the gross domestic product of Spain, fall from 4.1 % (2006) to -3.8 % (2009) and currently is -1.2 % (2013, Eurostat). However, when we look stop looking at Spain in general and consider economic performance of particular regions[1], many of differences can be observed. Spain is composed by seventeen regions that are strongly differentiated as for example at level of gross domestic product, level of unemployment and sector level. It is given mainly by position of

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[1] For the purposes of this thesis every region is considered to be separate economic unit

a particular region in Spain, its historical background and by opportunities offered by this area. And that is why every region struggles in a different way in time of the economic crisis that had affected Spain. For instance, Spain faces a rapid increase of young long-term unemployment, which exceeded an incredible rate of 60 % (2013, INE[2]) in some regions and in Andalusia average unemployment reached 36 % in year 2013 (INE). At that point, strong disparities between Spanish regions can be observed in Spanish economy which showed up after year 2007. Every region recorded a growth of unemployment but in a different amount. Andalusia recorded highest unemployment in Spain, nevertheless the highest increase of unemployment between years 2007-2012 was in region Aragon where the unemployment rate in 2007 was 5.3 % and increased during the crisis year to 21.39 % [INE]. And finally, during these difficult times, Spanish Government was forced to reduce expenditures that have direct impact on employment, investments and after all on householders. In essence, it has a direct impact on behavior of regional governments, inhabitants, and on enlargement of disparities between regions.

   As I have mentioned above, the Kingdom of Spain is composed by seventeen autonomous regions and two autonomous cities. This division is actually given by historical background, especially by different languages and political and cultural traditions. Economic disparities between regions are highly significant. Three the richest and the most populated regions are Catalonia, Madrid, and Basque Country and in total, they comprise just around 10 % of the Spanish area. So other regions divide among themselves larger territory and often lower revenues. Frequent topic of debate is also the wealth redistribution. Some regions are not satisfied with amount of funds redistributed by central government, and feel they suffer the consequences and lose funds to support other poorer regions. This is one of the arguments why Spain had to face separatist attempts throughout the history. Currently and apart from economic issues, Spain has to solve rising separatist voices in Catalonia. The main reasons for separatist can be divided into four arguments where the leading motive is seen in economic power of Catalonia. For instance, GDP per capita for 2012 was 27 442 € and in the EU 28 it was 25 500 € and GDP per capita of Czech Republic is around 15 000 €. It is obvious that Catalonia inhabitants do not want to support as they say "inefficient state" and focus just on building their prosperous country. (4), (5)

   In this thesis I would like to briefly introduce economic situation of Spain and its performance before and during crises. Then I would like to analyze economic performance of individual regions and compare their performance in time of crisis. I would like to identify whether convergence/divergence Spanish region happened during this difficult times.

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[2] INE = Abbreviation for Spanish statistical office

2 Objectives of the thesis

The main goal of this thesis is to identify convergence or divergence between Spanish regions before and during economic crisis. Author will analyze the economic performance of all seventeen regions and two cities on basis of the macroeconomic indicators and will compare economic performance between themselves. Author will provide recommendation for Spanish government and for Eurozone which steps should be taken to improve the current situation.

Author will also answer question of the partial goal of this thesis, and so whether Spain is strongly hit by an economic crises and if it leads to deepen divergence of Spanish regions. To answer that question, author will use the cluster analysis to analyze development between Spanish regions. The analysis will be done for pre-crisis period and crisis period. Both cluster analysis results then will be compared, and indicated, whether Spanish regions converged or diverged during crisis period. Afterwards, the β-convergence analysis will be done, which will provide evidence how crisis changed evolution and catching up process between regions, and whether the crisis situation leads to the convergence or divergence between Spanish regions. Additionally, the results of all analysis will be compared and recommendation for improving current situation will be suggested.

3 Literature Review

This chapter provides a complete review of available scientific articles and litera-ture which have been used as framework in the practical part. Literature review provides insights into crucial issues of this topic such as financial and economic crisis, convergence, and overview of Spanish economic situation. In first subchap-ter called Financial and economic crisis, short introduction to the crisis origin and its impact on individual part of state economy can be found. In this section, it is described how crisis influenced development of countries and how the crisis showed up in the economy. Afterwards, subchapter about convergence and diver-gence among world will be introduced. This subchapter is dedicated to how the recent scientifically literature is looking at convergence and divergence question in an economy. In this section, different cases and situation of convergence and divergence in world can be found. Following subchapter provides overview of Spanish constitutional system of Spanish regions, which is important for better understanding of this topic. Subsequently the economic situation in Spain over last ten-years will be revealed, which provides relevant information for the prac-tical part of this work.

3.1 Financial and economic crisis

This subchapter is dedicated to the introduction of the core issue of this thesis which means to the financial and economic crisis that endangers Spain. Financial crisis was caused by bursting of the bubble in the real estate market that reached maximum between the years 2006 and 2008. So the global financial crisis is a consequence of American mortgage crisis that spread out of the USA and very quickly affected the rest of the world. Spain belongs to six countries, also called "PIIGS", that were hit the most by global economic crisis and their economies are struggling a lot. Global financial crisis, also called sovereign debt crisis, initiated in the United States of America, spread to the Europe, and caused substantial problems especially to six European countries including Spain. Ongoing debt cri-sis endangers Portugal, Ireland, Italy, Greece, Spain, and Cyprus. During years 2008 and 2009, industrial production fell rapidly and unemployment raised a lot. Business reduced its production and ceased to invest and banks stopped lend-ing money. Economy was caught in crises. But still, how has the crisis really af-fected economy of states and living of inhabitants? How have the countries expe-rienced the touch of crisis? How is it possible to deal with financial and economic crisis in a country? Answers on these questions can be found in appendix 2, which is dedicated to the impacts of the crisis on economy, which were already identi-fied. (6)

3.2   Convergence and divergence among the world

The economic and social cohesion are considered as one of the most important operational priorities of European Union which has been defined in the Treaty establishing European Communities. The key target of European Cohesion Policy is to create and promote growth-enhancing conditions that will lead to diminish disparities between regions and member states which means promoting convergence between EU regions. Nevertheless, is the convergence even possible? At that point, the hypothesis of this thesis can be made. It says that impact of the crisis would lead to decrease in convergence among Spanish regions. On the other hand, the impact of crisis would be the divergence.

Economic and financial crisis definitely has an impact on regional development and regional economic situation which creates framework for economic conditions of a country. Crisis in Eurozone area significantly affected states' resources and asymmetric shocks deepened the divergence among European regions. Once asymmetric shock hit countries in Eurozone they have fought against this inconvenient situation on their own. In other words, it is by fiscal policy which can throw country in recession. Eurozone countries have to fight with crisis which strongly hit their economies. Once any type of shock or crisis hits a country, it should be identified which sector is strongly affected because decrease in a crucial sector will extend divergence among regions and this country will move away from other countries and so the divergence will occur. As European Union identifies decrease of disparities between countries as crucial thing, this step should be firstly done at the national level. Crisis extends disparities and leads to "supposed" convergence of regions which before the crisis were at different economic level (it is meant that regions that were in group of economic better region during the crisis some of the regions they diverged and move to worst group and it can be thought that these regions from lower group converged to wealthiest region). However, in fact it is divergence from better group to worst group. What is the evidence of convergence and divergence in the world? To answer this question, we can take as example case of reunited Germany. When Germany was united there was a big difference between Eastern and Western regions[3]. However after a few years, the level was comparable with more booming western regions. The progress was represented by an immediate raise of GDP per capita by 60 %. In empirical studies, we can find that neoclassical paradigm of that regional convergence is dominated by circular and cumulative causation. Then we can also find assumption that economic convergence is the result of "automatic forces". Other study defines Convergence clubs that are pertained to level of international attainment. Group of countries are classified according income per capita, education level and so. The countries that are considered to be poor tend to converge

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[3] Eastern regions is an area that was occupied by Soviet at the end of WWII, declared as German Democratic Republic and was driven by planned economy. On the other hand, Western regions, is a geofigureical area, which was occupied by western allies [US, UK, FR] and the economy was organized under market capitalism.

towards one another and create convergence club at low level GDP per capita. For example "Mezzogiorno school" rules out altogether convergence in Germany and states that Eastern regions faced to serious problems in development that are related to deep-seated economic relations with higher income of Western regions. Then it was noted that progress of the economy in Eastern part of Germany was undermined by fiscal transfers from west to east which were meant to support incomes in Eastern regions. On the other hand, institutional "mismatch" in wage rate and productivity was identified which led to show disappointing performance of Eastern economy. It was speculated that eastern enlargement of the European Union would undermine economic growth and convergence of eastern regions with western ones because the labor force is much cheaper. Moreover, it was confirmed that "automatic forces" really lead to convergence over the time. And now, it is known as "New endogenous growth theory". It identified that capital movements among states and regions are used as primary instrument driving economic convergence. And convergence is considered to occur as poorer regions show higher rates of growth over time. The above mentioned occurs when capital in higher per capita income regions is subjected to diminishing returns. Capital moves out to the lower per capita income regions because they can expect relative increase in rates of output per unit of capital input as each addition to capital stock generates big additions to output when capital stock is small. Lower per capita income regions dispose of lower labor cost per unit that creates higher level of capital efficiency comparing with the labor cost of higher per capita income regions. And so, movement of capital works as the key and "automatic" forces drives regional convergence. In the theory, it can be found that economic convergence is obtained when differenced in rates of marginal returns to capital between regions is equal to zero. When this occurs it is supposed that income per capita would be equalized among regions. However, it can be deduced that economic convergence is purely market driven process. And if certain preconditions concerning function of market, including parameters for technology and preferences are met, market forces make regional convergence easier, even when state provides subsidies for lower income regions which creates market distortions. Another empirical study says that Beta and Sigma convergence is given by capital movements which moves from regions with higher per capita income, averting diminishing returns, to regions with lower per capita income where relatively higher rates of return can be found. When two regions at the same time are considered, the gap between them can be identified. Over the time, the Beta convergence is involved and the capital flow from regions with higher per capita income moves to the lower per capita income region. Therefore, the gap is reduced by this flow of capital to the region with higher capital efficiency. Meanwhile, the Sigma convergence causes the closing gap over the time in cross-sectional dispersion of per capita income or product. Thus, the flow of capital can be identified as main instrument to close the gap in GDP per capita among regions and it leads to Beta and Sigma convergence. It was also stressed out that neoclassical model provided probable explanation of convergence phenomena, with or without perfect capital

mobility and technological diffusion. Above mentioned found out that Beta convergence takes place in rate of 2 % per year, which is also called as "iron law of convergence". However in case of Germany the neoclassical assumption that diminishing returns to capital in higher income drove capital to lower income region in east did not came true. The capital flow between western and eastern regions in Germany happened, however it has not been driven by diminishing returns but by state funds which have raised the rates of return in the east relative to the west with the intention to induce interregional capital movement. During years of reunification of Germany, the need of rebuilding eastern economy was identified. So the state subsidies were used to support the flow of capital to lower income regions. Four forms of the state subsidies were used. First one used was tax write-offs for residential and non-residential construction. Second one was investment premium, which was direct state funding for a share of private investments. Third one were investment grants used for selected projects. And last subsidy used introduced in Germany is called Solidarity tax. This tax is levied from western citizens. It is permanent transfer that should equalize level of living in Eastern Germany. Second and third mentioned subsidies were provided from Germany's budget to states which redistributed it to the communities. Each of these instruments was used separately at the start of unification with collective strategy to move capital from high wage region to the low wage region. However, the capital flow is difficult to find in statistics and for this purpose it is better to use capital efficiency as an indicator since it points out the direction of capital flows. Concerning case of Germany, the capital efficiency did rise during first half of nineties and after 1994 it started to decline. Although, it should be underlined that state subsidies were gradually removed. Nevertheless when the convergence is so distant to be completed, some unforeseen factors, for example wars, can appear to stop the convergence. The mysterious Godot probably appears when the Beta convergence value falls below iron law. So if the case of Germany is considered, when the growth rate in per capita in eastern regions was below level of regions in west the Beta convergence should be arithmetically ruled out and when the rate is below iron law, the Godot convergence should be considered. (7). (8), (9), (10), (11)

On the other hand, it was expressed, that divergence among regions would be caused by Monetary Union because this whole process could undermine single currency program. The whole process of adopting a common currency with unification of monetary policy could end up thanks to strengthening regional divergence. Once the process of European integration towards single unified market and monetary union has started, the impact on regions is empirically evident. Moreover, it remains unknown how long it takes before the regions adjust to such process. In literature, the two different theoretical concepts can be found. Firstly, theory about regional development states that market process lead to the convergence of regional per capita incomes over the long run time period. Secondly, theory which is drawing close to classical work of Myrdal and Kaldor states the opposite. Therefore, market processes generate persistent and cumulative differences in per capita income between regions. Still it has to be considered that no

of this theoretical concept directly mark the impact of economic and monetary integration on regions and each of these concepts has its critics. Additionally, if the industry in region is specialized across a currency area, asymmetric demand shocks will tend to average out across region and all industrial sector. So the region would not have to undergo changes in term of trade as often as less diversified economy. When the regions face the different form of sector specialization they will also differ in trade openness and so their perceptiveness to competitive shock changes. And also, the regional specialization is connected with high regional instability when demand shocks appeared which can lead to the regional inequalities in growth and inflation pressures. It should be pointed out that growth regression approach involves bias towards identifying convergence so growth regression model is only related to the region growth and does not allow explicitly inter-regional interactions and co-dependence in growth over time. It is important to mention that the EU regions should be defined in terms of economic processes to create regional convergence or divergence. Because regional division in NUTS2 or NUTS3 regions in more administrative than functional. However, it remains questionable, whether it is suitable to use NUTS2 or NUTS3 for regional convergence and divergence analysis because they are neither economically homogeneous entities, nor "self-contained" in terms of labor market. For example for highly urbanized regions, big cities they can have large commuter hinterlands which distort regional differences in output and value-added relative to resident population. Additionally, it was identified that employment evolution in US among years 1950-90 has been strongly divergent with highly positive cumulative relative growth in western and southern sun-belt oil states and strongly negative cumulative relative growth in New England, The Middle Atlantic coal states, and rust belt states of industrial Mid-West. It brings evidence that employment shocks are quite asymmetric in the US. So the adjustments of states are through movement or better migration of labor. These migration movements of labor force prevent opening up of persistent regional disparities. However, they have permanent effect on regional employment growth path. And for this reason, when the region experiences with adverse shift in demand for its products, the employment rate drops and unemployment rate rises and it is trigger of labor out-migration rather to create job opportunities, wage cuts or capital inflow. Considering the fact that the labor force in EU has lower mobility than in the US, the demand and technological shocks among EU regions will have large and longer lasting effect on regional employment and unemployment disparities. It was revealed that also states in the Europe evince that there is no regional convergence in employment growth and the regional employment evolution among EU-16 in mid 1970s has been strongly divergent. Result is one of sustained regional differences in employment growth rate across Europe over the time. In this respect, European regional employment evolution appears to not be dissimilar to those for US states. It has been estimated that fast growing regions are situated in the center of Europe and they evince considerable differences in employment growth between regions. Some of these regions recorded net job growth more than 25 % during years 1975-98. On the other hand, regions in southern Italy and much of

Spain have seen fall their employment base in absolute term. Moreover, regional differences in industrial structure account for only small portion of these variations in job growth across EU, which suggest that other differential endogenous and localization effects are main factors at work. (12), (13)

When new technologies were introduced as endogenous variable into growth model, it has started the debate about economic convergence. Majority of the debate focused on evolution of regional disparities in Europe. They stated that convergence rate is around and below 2 % per year. However, declared slow regional convergence among Europe is at odds with endogenous growth models, with new economic geographical models stressing that different outcome are possible according to initial conditions of single region. It is empirically given that many regions in central Europe raised and European periphery, north and south showed some static or decline in index scores. First possible explanation of this could be that certain models overlook factors that change perception of the process of convergence or divergence. This was tested and data from 110 regions of EU in time period 1977-1993 were used. At first sight of analysis it seemed that figure reproduced same results so the regions with higher GDP per capita grow with higher pace than other regions. Thus the regression line confirmed presence of catch up trend. Nevertheless, the model cast doubt. The most conspicuous is evident national influence over regional growth. Region among one country tend to evince same levels of GDP growth. More detailed analysis about influence of national dimension put national convergence on question. It can be supposed that lagging regions are catching up on advanced regions and it can be expected that lagging regions will converge to level of advanced regions within every country. However the analysis showed that it is not like that every time. This is the case of Portugal. Lisbon was the wealthiest region in Portugal and also the fastest growing one. On the other hand, there were regions with lower growth rate deeply below Portuguese average. And the same case evidenced also Denmark and Belgium. The most important fact is that the capital cities grew with faster pace than other regions. Selection of measurement of convergence can biased perception of level of convergence. The use of GDP measured in ECUs produced annual level of convergence around 1.2 %. However, when the purchasing parity power was used instead of GDP measurement significantly different results were achieved. In this case, the level of convergence decreased significantly. It has to be said that convergence decreased. However, the size of residuals exceeded normal distribution. Hence the convergence hypothesis is less supported when the PPS are used. In that case, PPS analysis was able to provide more reliable indication of how regional growth have evolved. It also has to be mentioned that there is possibility of spatial autocorrelation. It means that regional values can be correlated data of neighboring regions and especially regions within one country. Spatial autocorrelation presents very important bias in perception of dataset and so level of convergence. It violates elementary conditions of independence among observations and it can generate bias of estimates of error term. And this implies that it is necessary to run test to identify spatial autocorrelation. (14), (15)

This capture reflected evidence about convergence and divergence, which happened in the world. This is crucial capture for purpose of this thesis, which aim is to identify the convergence or divergence among Spanish regions. Many scientists tried to identified, whether the convergence is happening among the countries. There is one evidence about successful convergence in Germany, which was achieved also due to high national recognition. However there is lack evidence about regional convergence or divergence, which is important for successful achievement of European Union goal, which is convergence among members. The previous capture revealed, how the convergence and divergence happened in the world and put important questions, whether the crisis situation could change direction of Spanish regions and lead to divergence. The following capture will reveal economic situation of Spanish economy during ten-year period and it will provide evidence about the crisis in Spain, when it was hit by crisis and how much.

3.3 Spanish economy

Considering fact that Spanish economy belongs to the fifth largest economy in European Union and it is thirteenth largest in the world, it is clear that good performance of this economy is not important only for the Spanish government and their citizens but also for the EU and the rest of the world. Since the end of crisis of 90s, the expansive sustainable growth was characteristic for the Spanish economy. Nevertheless, the year when world crisis erupted was marked significantly in the Spanish economy throwing it into big recession which lasts up until now. Decline in GDP in 2012 was marked by decrease in expenditure of public administration which led to decline in private consumption, reduction of employment, wages, and investments. However, OECD analysis from September 2014 confirmed that Spanish economy returned to the moderate growth followed by protracted recession and the main thing is that sovereign spreads have fallen sharply. This significant turnaround represents important reforms to strengthen banking sector, ECB movements, improvements of public finance sustainability, and reform to improve product and labor markets. Spanish economy nowadays faces the challenge to improve economic growth and significantly reduce the unemployment. This can be gained thought productivity and competitiveness of Spanish products and services that would help to reduce external debt. So the main challenges for Spanish government are to deal with enhance labor market institutions and policies which would lead to decline in unemployment rate. Then to decrease public and private sector debt. And finally, Spanish government should do some reforms to promote entry and growth of business. Decline of public debt is a long thorny path, however current consolidation path should allow that. The weak point of Spanish economy is that tax base it too narrow and over reliant on labor taxes. Banking sector underwent reforms and banks have been recapitalized. However, it has to be underlined that banks profit is really low and non-performing loans are high and private sector still remains highly indebted. Additionally, Spanish business sector is characterized by high fragmentation with

many small enterprises with low productivity. In Spain only a few of medium and large enterprises can be found. Therefore, Spanish export is covered by a tiny fraction of enterprises. Small and medium-sized enterprises export less and their exports is mainly concentrated in Europe. Moreover, starting a business in Spain is more difficult than in other OECD countries. It is given by immense of regulations which are also regionally and locally fragmented. Especially services sector has high entry requirements. (16), (17), (18)

3.3.1   Important determinants of Spanish economy

This section is dedicated to the overview of development of Spanish economy and its performance over ten-year period which includes pre-crisis period and the crisis itself. The most significant macroeconomic indicators were chosen to provide a complete overview of Spanish economy in order to understand and see the impact of economic and financial crisis on the economy. Figures 1, 2, 3, 4 and 5 cover macroeconomic situation, fiscal, unemployment and business sector policy.

- **Macroeconomic indicators**

    The most important indicators were chosen to outline the economic performance in Spain. The first one can be seen in figure 1 which shows GDP and Private consumption expenditures in the period of 2001-2013 [Index, 2001=100]. It is clear that Spanish economy has been strongly hit by economic crisis which reduced GDP and private consumption. Spanish GDP evidenced moderate increase in the first half of 2013, mainly due to increase of confidence followed by adoption of key reforms and by announcement of ECB president about outright monetary transactions. Notable attention belongs to the fact that Spanish GDP fell from 125 billion € to 115 million € meanwhile other observed countries lost around five million €.
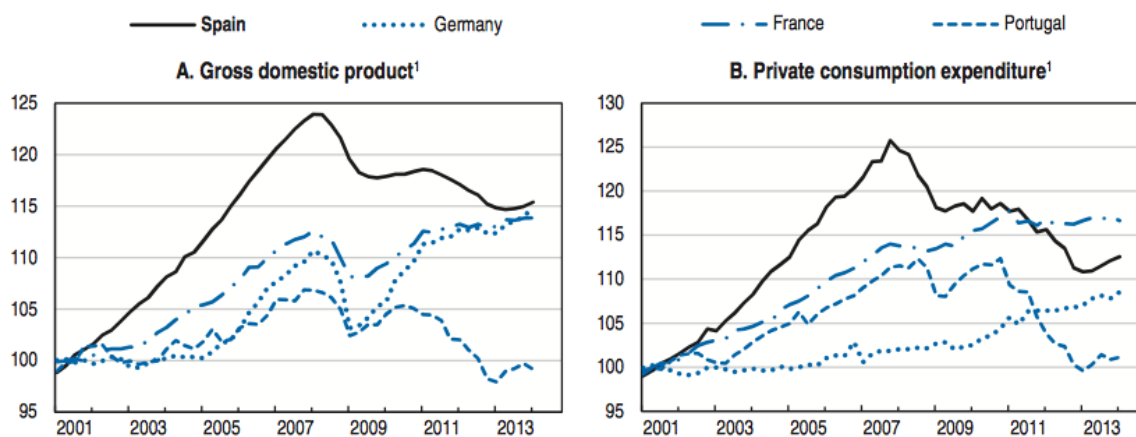
Figure 1: Gross domestic product and private consumption expenditures since 2001-2013
Source: OECD economic surveys, (16)

On the other hand, figure 2 represents export performance and unit labor cost of above observed countries. It can be found out that Spanish export fall significantly since 2003 and over the first year of crisis. Only France experienced worse performance in export than Spain. The second figure provides a very interesting finding as well. Labor cost rose significantly in Spain until year 2009. The cost of labor rose also when the crisis entered in Europe. It provides a clear evidence about rigidness of Spanish labor market.
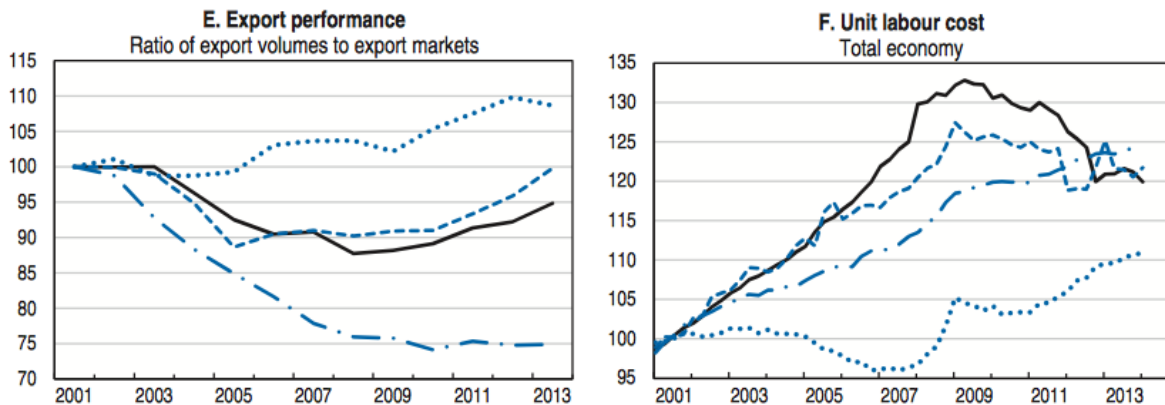
Figure 2: Export performance and unit of labor cost since 2001-2013
Source: OECD economic surveys, (16)
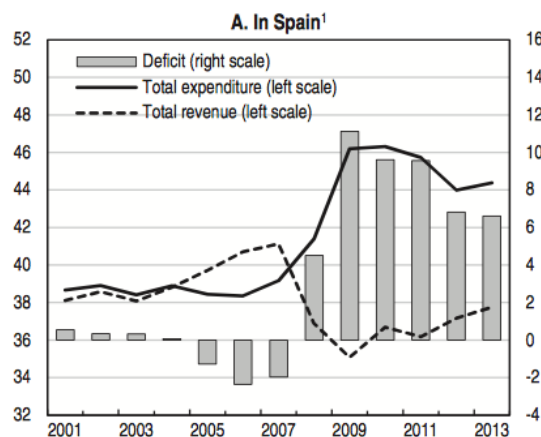
Figure 3: Indebtedness in Spain since 1999-2013
Source: OECD economic surveys, (16)

Additionally, figure 3 provides insight into household debt and debt of non-financial corporations. It is evidenced from first figure that is Portugal tightly followed by Spain and significantly increased their debts. Especially in period 2005-2009 and during crisis, the amount of debt became more constant. During the crisis year, also debt of non-financial corporates in Spain rose significantly. However, it has to be stressed out that during last year they experienced decline of this indebtedness.

As it can be seen in figure 4, both household debt and debt of non-financial corporation have increase dramatically during years 1999-2008. The crisis has stabilized level of both debts. The reason is that during the crisis both companies and households do not want to increase their debt and they prefer to hold their cash.
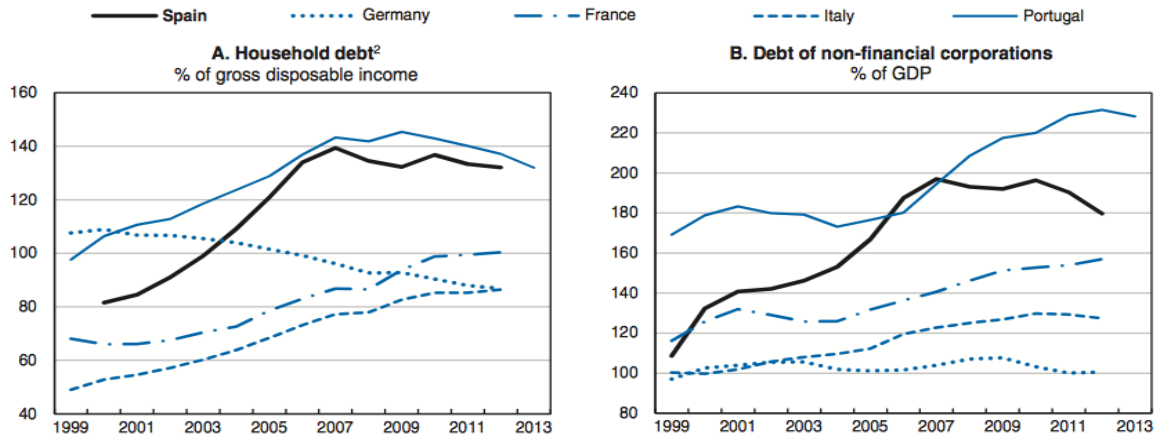
Figure 4: Debt reduction since 1999-2013
Source: OECD economic surveys, (16)

Moreover, figure 5 presents lending to non-financial corporates in Spain. Unsur-prisingly, the worst situation is for the construction sector which also declined its portion in GDP by 5 % over last ten years (see the sector structure below). Bad situation in lending is also in the area of real estate services which on the other hand increased its portion in GDP since 2003 up until now.
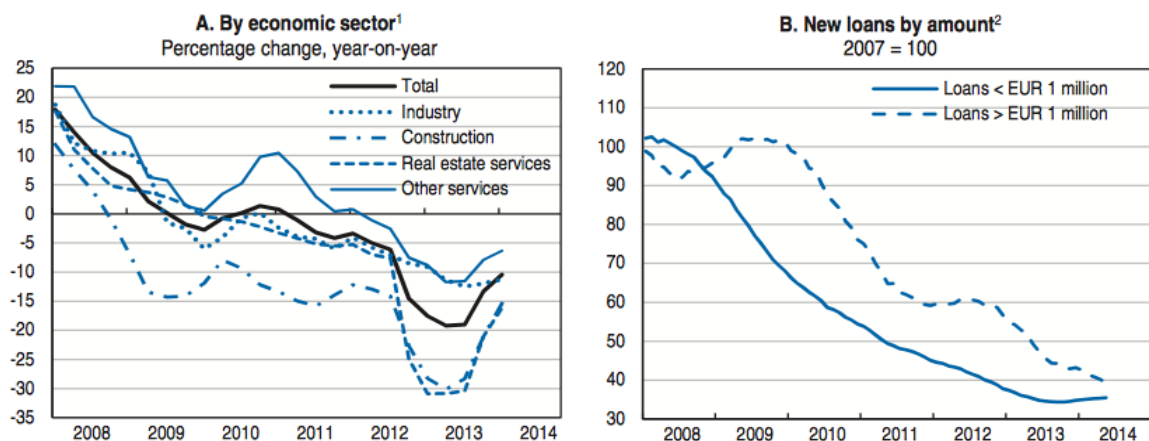
Figure 5: Lending to non-financial corporations since 2008-2014
Source: OECD economic surveys, (16)

Comparison of taxes revenues in percentage of total tax revenue over the world can be seen in figure 6. Very interesting point to stress out are labor taxes in Spain, which provides almost 60 % of all tax revenue and moves Spain into group

of countries with highest labor tax revenue. It should be underlined that this tax revenue of labor belongs to the highest in Europe. Meanwhile the taxes on immovable property gains around 3 % of tax revenue.
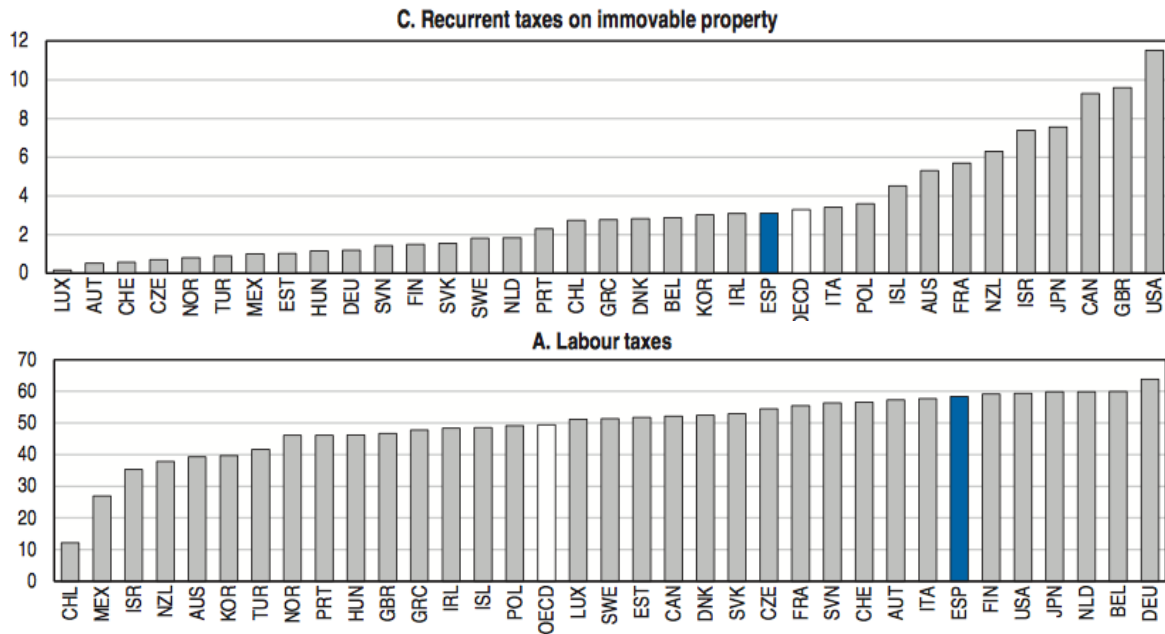
Figure 6: Taxation in % of total tax revenue
Source: OECD economic surveys, (16)

Figure 7 shows the development of labor market in Spain. Before the crisis erupted, unemployment rate in Spain performed almost same rate, as was the average in Euro area. However, after year 2007 unemployment rate more than doubled and reached an incredibly high level of 25 %. Same effect, however the opposite, can be seen in figure with employment rate.
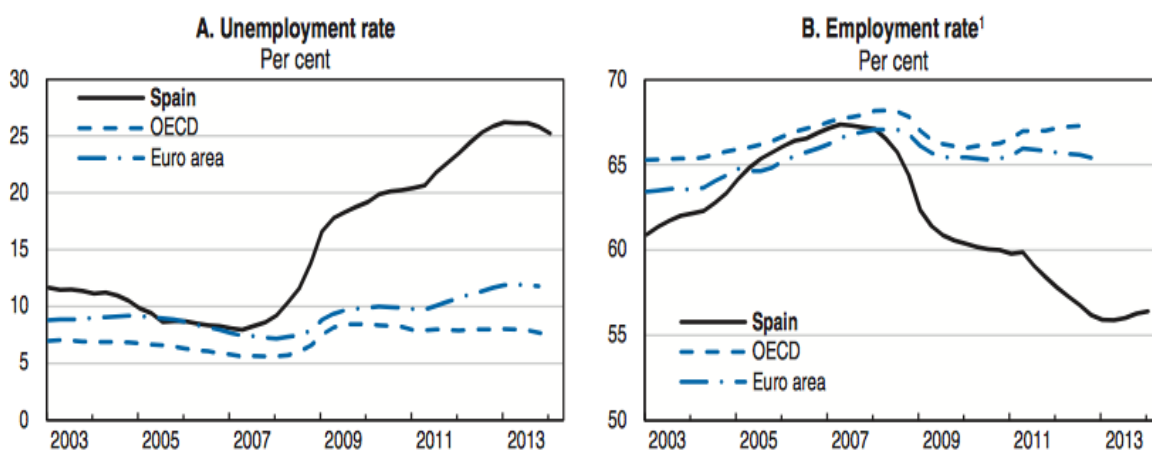
Figure 7: Development of employment and unemployment in Spain
Source: OECD economic surveys, (16)

Figure 8 and 9 outline barriers into entrepreneurship among the world. The index scale presents 0-6 from least to most restrictive country. Grey roller means year 2013 and blue triangle year 2008. In both figures Spain belongs to very restrictive countries which even after the crisis did not make easier to enterprises to enter into business. Also barriers in services sector are high even if this sector creates 74 % of national GDP in 2013.
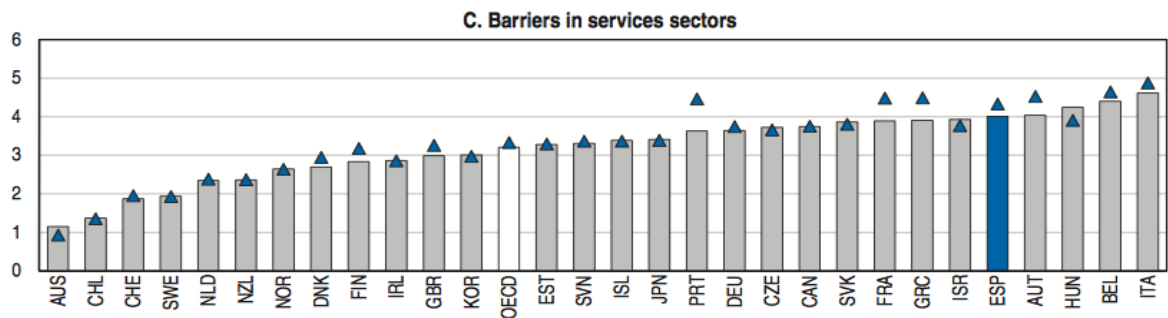
Figure 8: Product market regulation indicator: Barriers in services sector
Source: OECD economic surveys, (16)
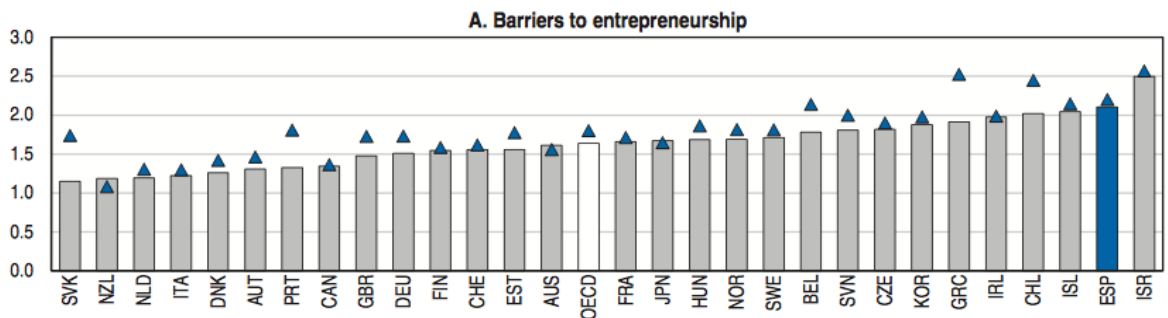
Figure 9: Product market regulation indicator: Barriers to entrepreneurship
Source: OECD economic surveys, (16)

- **Sector structure of economy**

It is evident from figure 10 that Spanish economy is heavily determined by the services sector. Second most important sector belongs to industry followed by construction and the lowest part is held by agriculture (including forestry and fishing). Eleven-year comparison of sectors reveals their development. Portion of third sector in Spanish economy increased during ten years period (since year 2003 until 2013) by almost 10 % and strengthened its already strong position and importance for Spanish economy. Meanwhile construction decreased, with re-spect to the year 2003 and year 2013, to 6 %, which is huge gap probably given by crisis. Loss of 2 % monitored industry and agriculture 1 %. [Index, 2003=100]
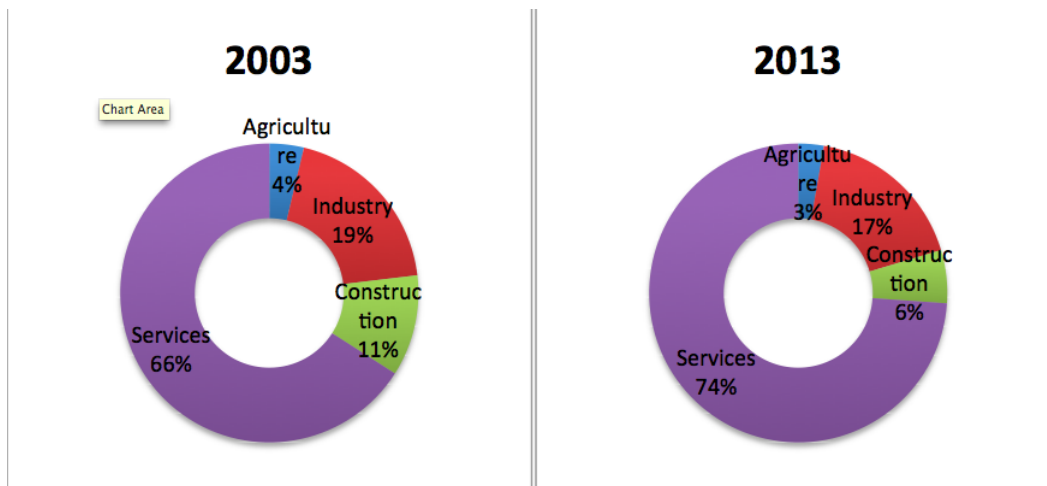
Figure 10: Sector structure in Spain 2003 and 2013
Source: own calculation, appendix, (19)

Following figure 11 represents eleven-year development of components of the services sector. This biggest portion is held by trade, transportation and hospitality, which is responsible for 35 % of Spanish services sector. Second most important part of services sector is represented by public administration, health care and education with 24 % in year 2003. During observed period since year 2003 until year 2013, the most powerful sector including tourism decreased by 2 %. Meanwhile real estate activities gained 5 % in service sector. According to figure 10 and 11 it is important to underline that construction sector declined significantly over years 2003 and year 2013, whereas in service sector real estate activities increased by 5 % during observed period. However other components of service sector gained or lost around 1-2 % during eleven-year observation.
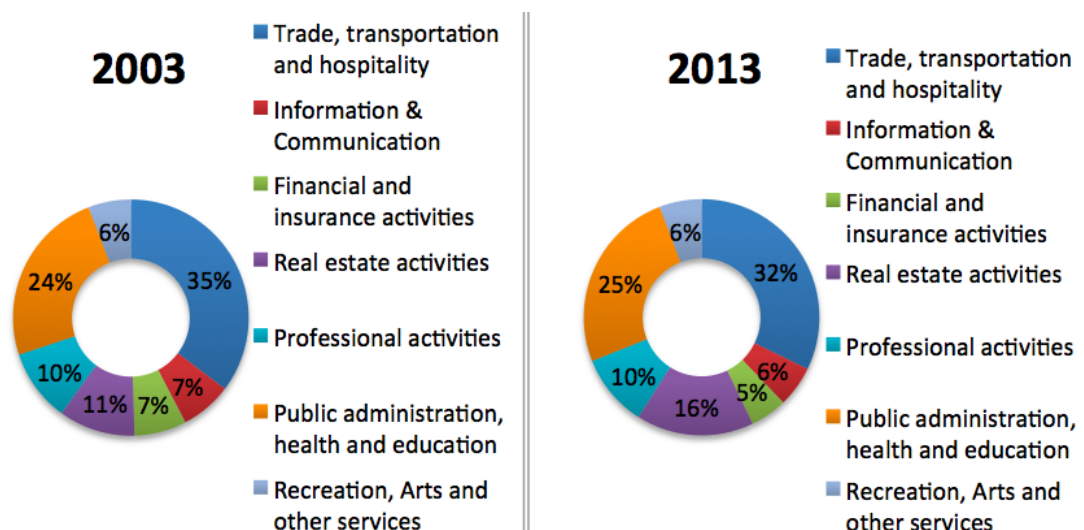
Figure 11: Components of service sector in 2003, 2013
Source: own calculation, appendix, (19)

Overview of Spanish economy helps better understand the needs of Spanish regions and inseparable component of this overview is of course also macroeconomic analysis of regions before and during the crisis which was made in following part of the thesis.

- **Macroeconomics analysis of regions before and during crisis**
  In order to understand the economic performance of the country , it is important to look at the country's economy in global and look at the results of the macroeconomic indicators because only complete overview of country's economic performance provides the most important information on whether the state is struggling with unhealthy economy or whether the country's economy is doing well. Macroeconomic stability plays crucial role in country's growth, and is related with financial globalization and development. However the growth can be stopped or decreased by events in world or inside the country that subsequently influence the economic performance and can lead to the divergence inside of the country and with other countries. The negative growth is a bad sign for every country and it should point out the government that the country is leading, or already is, in recession, which also extend current problems inside the country and enlarge the chasm of convergence between states. (20) (21)

  For the purpose of this thesis, the most important economic variables were chosen to analyze current situation of Spanish regions with emphasis on macroeconomics indicators such as GDP, GDP per capita, growth rate and unemployment rate. The main reason is to understand the economic situation of Spain and its regions, and whether the crisis had an impact on their economic performance and which part of economy sustained the bigger loss. Afterwards, the results of the macroeconomic indicators will be used to calculate, whether the convergence or divergence occurred among Spanish regions.

  In this section, economic performance of all Spanish regions during ten-year period will be compared. This stretch of time is divided into two parts. First part comprises data before the crisis hit Europe, namely the period of 2004 - 2008. Second part includes years when the crisis started to spread in Europe, namely 2009-2013. It implies that I will be able to compare economic performance of each Spanish region and follow the development under crisis conditions. For better orientation in Spanish region map of Spanish regions can be found in appendix 1. In attached CD there can be found all calculations and data for macroeconomic analysis.

- **Gross domestic product**
  The most important economic indicator is the gross domestic product. It measures performance of economy, and so productive activity. Usually it is defined for specific geographic area such as country and specific period of time. Macroeconomic variably is used to watch economic stability, and so managers, economists and politicians carefully observe its evolution. When the comparison of GDP over time period is done, we are able to discern two reasons why GDP increases or decreases. First one is that country's economy performs more real

economic activity. Second reason is that prices in economy rose for same amount of economic activity or that prices rose faster than created economic value. (22)

For the purpose of the thesis the detailed description of table 1 and 2 can be found in appendix 3. Between both tables there can be found the summary of both observed periods.

Table 1: Gross domestic product, adjusted from inflation, by regions before crisis years 2004-2008 in million €

Region/ Year	2004	2005	2006	2007	2008
Andalusia	116 021	122 137	127 487	132 000	129 857
Aragón	26 078	27 257	28 589	30 226	30 245
Asturias	18 003	18 943	19 952	20 759	20 648
Baleares	20 869	21 793	22 768	23 651	23 673
Canarias	33 874	35 184	36 346	37 440	36 801
Cantabria	10 232	10 726	11 146	11 615	11 568
Castilla and León	44 982	46 576	48 139	50 098	49 278
Castilla La Mancha	28 903	30 616	32 237	34 053	34 039
Catalonia	158 047	164 041	171 418	177 719	175 169
Valencia	82 586	86 429	90 955	94 393	93 716
Extremadura	13 629	14 347	14 799	15 425	15 378
Galicia	43 626	45 864	48 158	50 401	50 448
Madrid	148 713	155 135	162 907	169 236	168 594
Murcia	21 492	22 890	24 096	25 326	25 389
Navarra	14 181	14 783	15 352	15 910	15 929
Basque country	50 901	53 118	55 617	57 691	57 729
Rioja	6 298	6 584	6 906	7 210	7 218
Ceuta	1 191	1 224	1 270	1 319	1 325
Melilla	1 066	1 103	1 149	1 175	1 178
NATIONAL TOTAL	841 294	879 398	920 020	956 360	948 899

Source: Own processing, data Spanish statistics office, (23)

When the level of increase in pre-crisis period is compared with level of decrease in crisis period, it is clear that regions with smaller amount of GDP were doing better because they raised their GDP by 18 % of total GDP. On the other hand, regions with big amount of GDP as Catalonia, Madrid and Andalusia increased by 13 % their GDP in pre-crisis period. However the crisis period (years 2008-2013) has been worse for the smaller regions, namely region Asturias and Murcia, because they recorded the biggest loss of 17 % of their GDP which is really strong intervention to the regional administration and to economic activities. It can be also supposed that such a big loss of GDP brought high unemployment and labor migration from small regions to big and more stable regions such as Madrid or Catalonia. However, the most significant loss of GDP for Spain were recorded in regions that generate 50 % of total Spanish GDP, namely in Andalusia, Catalonia,

and Madrid. They lost 12-14.9 % of their GDP and region Valencia, which is found in the middle of first and second group, recorded loss of 17 % of its GDP. And so, above described data represents extreme loss of GDP, which all regions had to deal with.

Table 2: Gross domestic product, adjusted from inflation, by regions after crisis years 2009-2013 in million €

Region/ Year	2009	2010	2011	2012	2013
Andalusia	124 664	121 383	117 695	112 792	110 597
Aragón	28 964	28 503	27 683	26 422	25 796
Asturias	19 534	19 248	18 678	17 771	17 130
Baleares	22 709	22 055	21 584	21 017	20 841
Canarias	35 071	34 687	33 843	32 607	32 227
Cantabria	11 120	10 948	10 601	10 179	9 904
Castilla and León	47 829	47 091	45 989	44 079	42 766
CastillaLaMancha	32 785	31 769	30 847	29 344	28 780
Catalonia	168 742	166 386	161 483	156 320	153 976
Valencia	88 492	85 998	82 594	79 260	77 836
Extremadura	14 985	14 719	14 092	13 289	12 955
Galicia	48 858	48 314	46 495	44 905	44 146
Madrid	166 212	160 582	156 628	150 354	146 576
Murcia	24 160	23 805	22 589	21 626	21 072
Navarra	15 465	15 343	15 081	14 423	14 040
Basque country	55 327	55 146	53 907	51 635	50 204
Rioja	6 915	6 833	6 638	6 371	6 210
Ceuta	1 318	1 302	1 246	1 182	1 163
Melilla	1 177	1 156	1 112	1 056	1 037
NATIONAL TOTAL	915 057	896 023	869 669	835 448	818 071

Source: Own elaboration, data INE (23)

- **Gross domestic product per capita**

GDP per capita is an indicator of economic activity that is used for measurement of economic wellbeing, or better standard of living of inhabitants of given country. Actually GDP is everything what given country produces in a year and GDP per capita takes production of that country and divides it by country's total population. (24)

In case of Spanish regions, GDP values of every single region are used and divided it by its number of citizens (for calculation see attached CD). GDP per capita allows comparison of country's prosperity, in this case of regions, with different population sizes. And so, it can provide good prospective on evolution of regions in Spain. In this section, GDP per capita of European countries are also included, for purpose of comparison the economic wellbeing of single Spanish

regions to level of different state. In Table 3 the evolution of GDP per capita for all Spanish regions in the pre-crisis period can be seen. At first sign it is obvious that Spanish regions demonstrate different level of living standard of its inhabitants. Detailed description of both tables can be found in appendix 3. Between the tables the summary of both periods can be found.

Table 3: Gross domestic product per capita by regions before crisis 2004-2008 in €

Region/ Year	2004	2005	2006	2007	2008
Andalusia	14 780	15 559	15 985	16 378	15 832
Aragón	20 550	21 479	22 379	23 311	22 794
Asturias	16 721	17 594	18 528	19 314	19 116
Baleares	21 227	22 167	22 744	22 948	22 065
Canarias	17 210	17 876	18 211	18 480	17 727
Cantabria	18 196	19 075	19 620	20 278	19 872
Castilla and León	17 915	18 550	19 080	19 814	19 269
CastillaLaMancha	15 255	16 159	16 684	17 222	16 661
Catalonia	22 594	23 450	24 026	24 647	23 787
Valencia	17 600	18 419	18 922	19 323	18 633
Extremadura	12 575	13 237	13 622	14 152	14 009
Galicia	15 794	16 604	17 401	18 179	18 120
Madrid	24 935	26 011	27 114	27 827	26 882
Murcia	16 089	17 136	17 584	18 193	17 803
Navarra	23 895	24 909	25 508	26 259	25 677
Basque country	23 955	24 998	26 066	26 935	26 762
Rioja	20 919	21 869	22 541	23 335	22 735
Ceuta	15 825	16 265	16 744	17 215	17 118
Melilla	16 280	16 838	17 183	16 916	16 493
NATIONAL TOTAL	19 073	19 937	20 578	21 158	20 558

Source: Own elaboration, data INE (23), (25)

When results of GDP per capita for both periods are compared, it is clear that even the pre-crisis period had increasing trend. The impact of the crisis was really huge and left regions in worst wellbeing conditions than ten years ago. It is evident that not all regions reacted in same way but just one region did finish with the worst level of GDP per capita, namely Galicia. In 2013, this region slightly overcame its level of GDP per capita from year 2004. The rest of Spain recorded an extreme loss in GDP per capita which was increasing during the period of first five-years. They concluded observed period with decreased GDP per capita. The worst situation is for Melilla which lost 23.91 % of GDP per capita when the level from 2004 and 2013 is compared. Melilla is followed by Valencia with 13.51 %.

Table 4: Gross domestic product per capita by regions during crisis 2009-2013 in €

Region/ Year	2009	2010	2011	2012	2013
Andalusia	15 015	14 500	13 971	13 348	13 103
Aragón	21 527	21 159	20 563	19 579	19 149
Asturias	17 999	17 751	17 271	16 495	16 037
Baleares	20 730	19 940	19 390	18 774	18 747
Canarias	16 669	16 373	15 913	15 392	15 211
Cantabria	18 872	18 486	17 873	17 141	16 733
Castilla and León	18 658	18 398	17 975	17 313	16 972
CastillaLaMancha	15 752	15 140	14 582	13 829	13 698
Catalonia	22 573	22 148	21 418	20 647	20 384
Valencia	17 369	16 824	16 140	15 452	15 221
Extremadura	13 593	13 294	12 703	11 992	11 734
Galicia	17 474	17 269	16 633	16 144	15 960
Madrid	26 024	24 863	24 135	23 137	22 566
Murcia	16 702	16 283	15 366	14 667	14 314
Navarra	24 526	24 089	23 488	22 376	21 785
Basque country	25 471	25 316	24 676	23 544	22 907
Rioja	21 495	21 194	20 553	19 687	19 283
Ceuta	16 749	16 157	15 122	14 073	13 816
Melilla	16 023	15 205	14 171	13 064	12 388
NATIONAL TOTAL	19 575	19 056	18 429	17 676	17 358

Source: Own elaboration, data INE, (23), (25)

Growth rate of GDP

The GDP growth rate is considered as the most important indicator of economic health. When GDP growth is positive, it means, that economy of given country is expanding, and so job positions, business investments and personal incomes will grow. Slowing down of GDP growth rate has impact on business, which will stop make investments, which has impact on employment. Negative growth rate of GDP means that economy is heading towards to recession. The optimal GDP growth rate is sustainable. Economists agree, that healthy GDP growth rate is in range from 2 %-3 %, however less than 4 %. If the economy deals with GDP growth rate is above 4 % (or above optimal rate) it means that there is an asset bubble or inflation. (26), (27)

Detailed description of both periods can be found in appendix 3. Between both tables the comparison of both observed periods can be seen.

Table 5: Growth rate by regions before crisis 2005-2008

Region/ Year	2004*	2005	2006	2007	2008
Andalusia	-	5,27	4,38	3,54	-1,62
Aragón	-	4,52	4,89	5,73	0,06
Asturias	-	5,22	5,33	4,04	-0,54
Baleares	-	4,42	4,48	3,88	0,09
Canarias	-	3,87	3,30	3,01	-1,71
Cantabria	-	4,83	3,91	4,21	-0,40
Castilla and León	-	3,54	3,36	4,07	-1,64
CastillaLaMancha	-	5,93	5,30	5,63	-0,04
Catalonia	-	3,79	4,50	3,68	-1,44
Valencia	-	4,65	5,24	3,78	-0,72
Extremadura	-	5,27	3,15	4,23	-0,31
Galicia	-	5,13	5,00	4,66	0,09
Madrid	-	4,32	5,01	3,89	-0,38
Murcia	-	6,50	5,27	5,11	0,25
Navarra	-	4,25	3,85	3,63	0,12
Basque country	-	4,35	4,71	3,73	0,07
Rioja	-	4,54	4,88	4,40	0,12
Ceuta	-	2,78	3,75	3,82	0,46
Melilla	-	3,43	4,21	2,22	0,32
NATIONAL TOTAL	-	4,53	4,62	3,95	-0,78

Source: Own elaboration, data INE, 2004* initial year, (23)

Comparison of growth rate for ten-year period gives an evidence of the crisis in Spain and different reaction of Spanish regions. The period of first five-years was characterized by positive growth rate, however increases were diminishing. In 2008, first ten regions experienced a negative growth rate. Year 2009 turned out to be a year when all regions recorded a negative growth rate and crisis entered to Spain with full power. The crisis period is characterized by an increasing negative growth until 2012. Catalonia was sensitive to crisis in first year. Although during following years the negative growth was increasing, the negative growth rate was not as high as in Andalusia and Madrid. Thus it can be said, that the Catalonian's economy started to get better more than its "competitors" from first group. Madrid was doing worse than Catalonia because in 2013 it still recorded a decline in GDP of -2.51 %. However also the rest of Spain recorded decline of GDP until year 2012. Next year, the decline became smaller in whole Spain.

Table 6: Growth rate by regions during crisis 2009-2013

Region/ Year	2009	2010	2011	2012	2013
Andalusia	-4,00	-2,63	-3,04	-4,17	-1,95
Aragón	-4,24	-1,59	-2,88	-4,56	-2,37
Asturias	-5,40	-1,46	-2,96	-4,85	-3,61
Baleares	-4,07	-2,88	-2,14	-2,63	-0,84
Canarias	-4,70	-1,10	-2,43	-3,65	-1,16
Cantabria	-3,87	-1,55	-3,18	-3,97	-2,71
Castilla and León	-2,94	-1,54	-2,34	-4,15	-2,98
CastillaLaMancha	-3,68	-3,10	-2,90	-4,87	-1,92
Catalonia	-3,67	-1,40	-2,95	-3,20	-1,50
Valencia	-5,57	-2,82	-3,96	-4,04	-1,80
Extremadura	-2,55	-1,77	-4,26	-5,70	-2,51
Galicia	-3,15	-1,11	-3,76	-3,42	-1,69
Madrid	-1,41	-3,39	-2,46	-4,01	-2,51
Murcia	-4,84	-1,47	-5,11	-4,26	-2,56
Navarra	-2,91	-0,79	-1,71	-4,36	-2,66
Basque country	-4,16	-0,33	-2,25	-4,21	-2,77
Rioja	-4,21	-1,18	-2,86	-4,02	-2,53
Ceuta	-0,53	-1,20	-4,32	-5,08	-1,64
Melilla	-0,11	-1,78	-3,81	-5,08	-1,80
NATIONAL TOTAL	-3,57	-2,08	-2,94	-3,93	-2,08

Source: Own elaboration, data INE, (23)

- **Unemployment rate**

Is an indicator that measures level of unemployment, which is given by labor force of country's inhabitants divided by number of unemployed people. In unemployment rate are counted people that actively searching for a job, the people that gave up to search they are not counted anymore and for that reason, the real unemployment rate should be higher. It is evident, that unemployment rate is important gauge of joblessness, and so, also of economy's growth rate. The unemployment rate belongs to the lag indicators, which can measure impact of economic events. It means that when recession enter to economy it last some time to have impact on unemployment rate, because employers are reluctant to lay people off and they have to work on layoff plan. And the same is valid also in opposite direction. And thus, this indicator can be considered as confirmation what already other economic indicators showed. (28)

Detailed description of both periods can be found in appendix 3. Between both tables of both periods can be observed.

Table 7: Unemployment rate of Spanish regions before crisis for year 2004-2008

Region/ Year	2004*	2005*	2006	2007	2008
Andalusia	-	-	12.62	12.76	17.73
Aragón	-	-	5.52	5.30	7.29
Asturias	-	-	9.16	8.41	8.50
Baleares	-	-	6.44	7.16	10.16
Canarias	-	-	11.62	10.45	17.25
Cantabria	-	-	6.46	5.96	7.16
Castilla and León	-	-	8.11	7.13	9.62
CastillaLaMancha	-	-	8.84	7.66	11.67
Catalonia	-	-	6.49	6.47	8.89
Valencia	-	-	8.33	8.74	11.99
Extremadura	-	-	13.31	12.98	15.35
Galicia	-	-	8.35	7.57	8.64
Madrid	-	-	6.30	6.24	8.61
Murcia	-	-	7.88	7.54	12.44
Navarra	-	-	5.37	4.72	6.83
Basque country	-	-	7.16	6.22	6.63
Rioja	-	-	6.11	5.77	7.90
Ceuta	-	-	21.49	20.99	17.43
Melilla	-	-	13.59	18.21	19.99
NATIONAL TOTAL	-	-	8.45	8.23	11.25
*no data available					

Source: Own elaboration, data INE, 2004* and 2005* no data available, (29)

When the data of unemployment rate for both selected period are compared, it is evident that crisis proved its power. In pre-crisis period, the unemployment rate was under 10 % and just some regions experienced with higher level of unemployment. Year 2008, all regions except three regions, recorded an increase of unemployment. 6+In 2011, the national average of unemployment rate overcame level of 20 % and at the end of the observed period it raised up to an extreme value of 26.09 %. At that time, almost six regions got above 30 %. These regions include also very important regions that generate significant portion of national GDP, such as Andalusia which holds the third position in total GDP and Valencia with level of GDP reaching around 80 billion €. Evidence about severe situation can be seen when the data of GDP and unemployment rate are compared. For example, Andalusia is struggling with an unemployment rate of 36.22 %. At that point, I would like to stress out that Andalusia belongs to the three most important regions generating the most GDP in Spain. So it is clear that situation in Andalusia will influence whole Spain. Catalonia generates the biggest portion of Spanish's GDP and records unemployment rate around 23 % in 2013. During past five

years, its unemployment had and increasing trend. The unemployment rate in Catalonia increased during the observed period from 6.49 % to extreme 23.12 %.

Table 8: Unemployment rate of Spanish regions during crisis for year 2009-2013

Region/ Year	2009	2010	2011	2012	2013
Andalusia	25.24	27.77	30.13	34.35	36.22
Aragón	13.05	14.96	17.07	18.67	21.39
Asturias	13.42	15.92	17.84	21.83	24.13
Baleares	17.92	20.12	21.86	23.17	22.26
Canarias	26.01	28.60	29.28	32.58	33.73
Cantabria	12.00	13.70	15.29	17.80	20.44
Castilla and León	13.98	15.80	16.86	19.80	21.75
CastillaLaMancha	18.88	21.22	23.08	28.58	29.97
Catalonia	16.22	17.66	19.16	22.51	23.12
Valencia	20.76	22.86	23.99	27.19	28.05
Extremadura	20.63	22.97	25.08	33.08	33.87
Galicia	12.44	15.32	17.26	20.53	22.04
Madrid	13.86	15.84	16.33	18.53	19.76
Murcia	20.32	22.87	24.99	27.61	28.98
Navarra	10.84	11.90	12.99	16.16	17.93
Basque country	11.34	10.69	12.35	15.60	16.58
Rioja	12.64	14.15	17.21	20.58	20.04
Ceuta	18.55	23.92	27.71	37.02	34.84
Melilla	23.49	22.78	22.39	26.92	32.52
NATIONAL TOTAL	17.86	19.86	21.39	24.79	26.09

Source: Own elaboration, data INE, (29)

Comparing macroeconomic indicators were found out three important things. The first is the Spanish regions can be distributed into three groups that are experiencing similar economic performance. The first group includes regions Madrid, Catalonia and Andalusia. These regions generate more than 50 % of Spanish GDP. Second group consists of Valencia, Basque Country, Castilla and Leon and Galicia. Remaining regions create third group. All groups responded to crisis in same way. Moreover, the macroeconomic analysis provided evidence about the crisis in Spain. The crisis significantly influenced already year 2008. And due to this evidence the different redistribution of pre-crisis and crisis period was suggested for Cluster and β- convergence analysis. Additionally, results of macroeconomic analysis provided proof about tough situation among Spanish regions. Level of GDP declined below the level from the year 2004. Region Catalonia declined its GDP level in 2013 by 14 % with respect to the pre-crisis year 2007. Catalonia declined by 4 % its GDP below the level of year 2004. The same scenario is valid also for region Madrid. All Spanish regions had increasing trend of GDP

per capita during the pre-crisis period. For example Galicia increased its GDP per capita by 14 %. Regions Madrid, Catalonia and Andalusia increased their GDP per capita by 5-7 %. Nevertheless, touristic regions such as Baleares, Canarias and Melilla experienced the lowest increase in GDP per capita. The crisis influenced the level of GDP per capita that started to decline immediately. The worst situation experienced region Melilla, where GDP per capita declined by 22.69 %. For the pre-crisis period was characterized increasing trend of growth rate around 3-4 % for all Spanish regions. During the year 2008, majority of Spanish regions, such as Catalonia, Madrid and Andalusia experienced decline in GDP growth rate. During the years 2009 - 2011 the decline of GDP growth rate was around 1- 5 %. Although the Spanish statistic office did not provide data about the unemployment rate during years 2004 and 2005, available data provided important evidence about development of unemployment rate among Spanish regions. In year 2008, the unemployment rate increased for example in Andalusia by 7 %. During the crisis period the unemployment rate increased dramatically in all Spanish regions. Now, in year 2013 the average unemployment rate increased to 26.09 %. Five regions exceeded 30 % of unemployment rate. Eleven regions have the unemployment rate above 20 % and just three regions above 15 % of unemployment rate. This analysis provided important evidence about the presents of crisis among Spanish regions. The crisis significantly influenced economic performance of all Spanish regions. Since it was discovered that crisis hit Spain already in year 2008, the practical part could have been adjusted accordingly. This section provided important background information about economic performance of individual Spanish regions, which helped to see similarities in groups of regions.

4 Methodology

First the review of up-to-date relevant scientific literature and studies was made. The literature review provides stylized facts for the practical part of this work. During the review of literature the insight into Spanish constitutional system of region was done. It can be found in appendix 4. At the beginning, the macroeconomic analysis of all seventeen Spanish regions and two cities was made. This analysis employed the most important economic indicators, which were available and monitored by Spanish national statistical office INE. As the observed economic indicators belong GDP, GDP per capita, GDP growth and unemployment rate. In attached CD there can be found all raw data and calculation used for macroeconomic analysis, Cluster analysis and β-convergence. Year 2004 was indicated to be the initial year for observed ten-year period. Before the analysis started, all values were adjusted for inflation. Subsequently, the data set was divided into two five-year parts. First five years 2004-2008 were considered as pre-crisis period and second five-years 2009-2013 were considered as crisis period. Results of economic indicators for both observed periods were then compared. Statistical method cluster analysis was chosen as crucial analysis of this work. For the purpose of this analysis, additional variables were added to explain initial question of the model. GDP per capita, GDP growth, unemployment rate, agriculture, manufacturing industry, extractive industry, construction, retail, finance, public administration, tax on product and gross value add (and so all components included in Spanish GDP) were chosen as the main variables. According to the results of previous analysis of macroeconomic indicators, two time periods were suggested. Macroeconomic analysis based on five-year time period revealed that economy results in 2008 were already influenced by the crisis. Due to this fact, an additional model was proposed. Subsequent model was based on four year pre-crisis period (2004-2007), four years of the beginning of crisis (2008-2011), and last two years of the crisis (year 2012-2013). The year 2014 could not be involved due to unavailable data. These two models were analyzed according to the results of individual economic sectors and these results were compared together with results of cluster analysis. It was necessary make an average of all variables for each period. Then the data set of both models was used for cluster analysis. For cluster analysis, it was essential to use statistical software Statistica which facilitated all calculations needed. Once the data set was uploaded into the software, it was necessary to test data for correlation. According to the test, all sector variables demonstrated high correlation. As all these variables are components of Spanish GDP, it is logically that they are going to be dependent on each other. However this correlation would not influence results of the analysis so the data were allowed for the cluster analysis. Once the data set was prepared, the hierarchical clustering was chosen according to the statistical literature. In next step, it was necessary to choose rule of clustering. Ward method was identified as the best option for the analysis. It was chosen due to highest cophenetic correla-

tion coefficient with lowest delta criterion and also due to best results, which reflected the reality in the best way. Subsequently, it was necessary to run different time-period in Statistica. Two above suggested models were enriched by a third model which provides an easier decision-making process about the correct model. Third model was divided also into two parts. First part was consisted by four years before the crisis hit Spain, namely 2004 - 2007. Second part included six years of the crisis in Spain. Once the cluster analysis was done for all three models, the decision about best time period model had to be done. According cluster analysis results, as the best options were indicated two models, namely the five-year model and 4-4-2 year model. Model with four years of pre-crisis period and six years of crisis was indicated as not appropriate because the different number of years influenced results. In five-year model, there is some influence of crisis however the result is almost same as in the best 4-4-2 year model. This model provided best overview of development of crisis among Spanish regions. Nevertheless it was decided that for the best purpose of the work, both models will be kept and differences will be described in discussion and result part. Additionally, cluster analysis was enriched by PCA analysis for both selected models. As second crucial analysis of the thesis was indicated β-convergence which is used by European Union to determine whether regions have converged or diverged. For this analysis it was required to employ two variables, namely GDP growth and GDP per capita. According to the β convergence formula, it was necessary to estimate α and β. Necessary estimation was facilitated by employing software Gretl which provided values for α and β. According to the statistical theory, data set was represented by panel data. Subsequently, panel model of random model was run. Since the variables were insignificant, it was necessary to insert time dummies to improve model significance. Once time dummies were added all variable became significant according to the p-value with 95% of explanatory level, and so, values of α and β could be used for β convergence formula. The β- convergence analysis was run at three different time sections in same logic as it was made in Cluster analysis. First section indicated situation before the crisis, second the crisis period and third section revealed situation after ten years.

5 Practical Part

This chapter provides a complete overview about sector structure of Spanish regions and consists of important results of cluster and β- convergence analysis. Firstly, the development of sectors in Spanish regions is provided. Sector division is made for both models, namely for five year model and for 4-4-2 year model. Every sector is observed separately and commented. At the end of the model, the overall evaluation is made. Subsequently, the cluster analysis can be found. Also, cluster analysis sub-chapter is divided into two sections according the selected models. Each result is commented separately and at the end of the model the overall evaluation model results can be found. Then, last sub-chapter provides results of the β- convergence analysis which reveals whether the Spanish regions tend to convergence or divergence during the crisis period.

5.1   Sector division of Spanish economy in times of crisis

This sub-chapter evaluates the development of the Spanish sectors in each region during the ten-year period. For purpose of the Cluster analysis, two models are employed in this analysis. Both models are based on evaluation of all Spanish sectors which contributes in Spanish GDP. As the components of Spanish GDP include more sectors, just one name of sector was selected. Individual components of Spanish GDP are following. Agriculture includes also fishing and forestry. Extractive industry represents mining, quarrying, electricity, gas, and other. Manufacturing industry includes all manufacture production in Spain. Following sector represents construction in all Spanish regions. Sector called Retail covers all services provided in Spain as for example wholesale, retail trade, accommodation and food services, communication and so. Sector called finance covers also insurance activities, real estate activities and support service activities. Public administration comprises also defense compulsory, social security, education, health and social work activities. Last sectors included in Spanish GDP represents tax on products less subsidies. At first model which divides observed ten-year period in two five-year periods will be analyzed.

5.1.1   Five year model

This part provides an overview of development of sector division in Spain. This model is divided into two period of time, and so, five-years before the crisis and then five-years during the crisis in Spain. Pre-crisis period contains average of years 2004 until year 2008. The crisis period is created by average values of years 2009 until 2013. First sector describes development of Agriculture in Spanish regions. Followed by remaining Spanish regions.

- **Agriculture**

In figure 12, it can be seen that region Andalusia is definitely the region which contributes with biggest amount of agriculture into Spanish GDP. Region Andalusia represents 26 % of all Spanish agriculture before the crisis entered in Spain. Other important agricultural regions are Castilla Leon and Castilla La Mancha which held 13 % and 10 % of agricultural. However, also Galicia and Catalonia contributed to Spanish agriculture, but with less than 10%. The crisis had an impact on region Andalusia which represents the biggest part of agriculture in Spain and the level of part held by this region decreased by 4 %. All Spanish regions recorded decrease in agriculture production. In average the decrease during the crisis period was around 1 and 2 %. Nevertheless decrease of total agriculture sector respect to the pre-crisis period is 15 %. It should be underlined at this point that according the Spanish statistics office, agriculture contributes to total GDP of Spain by only 3 % during the crisis period as it was mentioned in chapter regarding Spanish economy. Thus decline of this sector is not important for total Spanish budget However it is important and it has impact on regions which are highly occupied with agriculture.
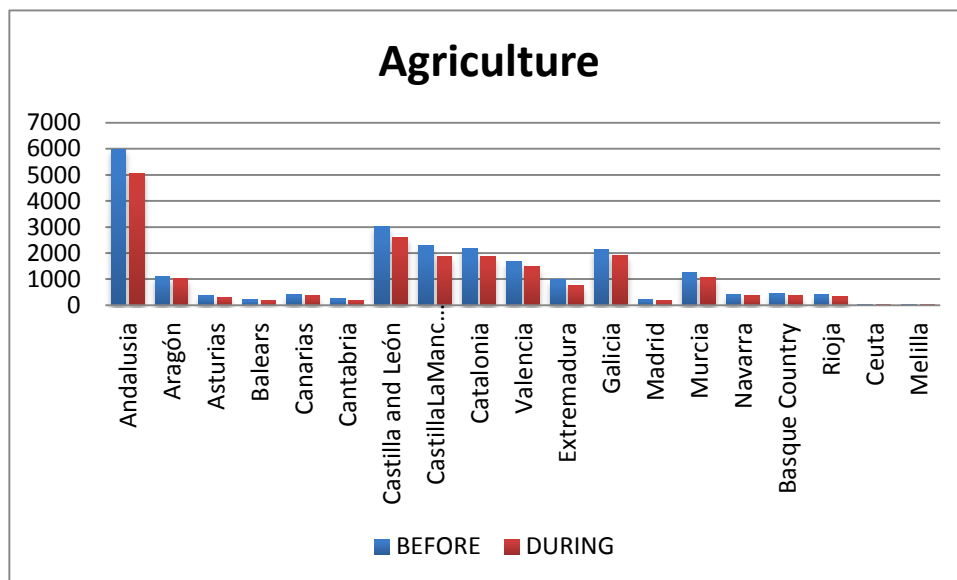
Figure 12: GDP of agriculture sector among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Extractive industry**

The most important region for Extractive industry is without any doubts Catalonia which can be understood from the figure 13. Catalonia kept 23 % of this industry in Spain in pre-crisis period. Then there are other six important regions in this industry but they represent significantly lower part in the sector. Between these regions belong Madrid, Castilla Leon, Basque Country, Andalusia, Valencia and Galicia. These regions contribute between 12 % and 6 % to Spanish GDP in Extractive industry. The crisis impact can be seen almost in all regions. Catalonia experienced the biggest decrease during the crisis, namely - 3 %. Other industries

decreased on average by 1 %. The total average decrease of this industry with respect to the pre-crisis time was 8 %. All industries held in Spain 19 % of total GDP. During the crisis, revenues and engagement of these industries declined by 2 % which can be observed in extractive and manufacturing industry as well.
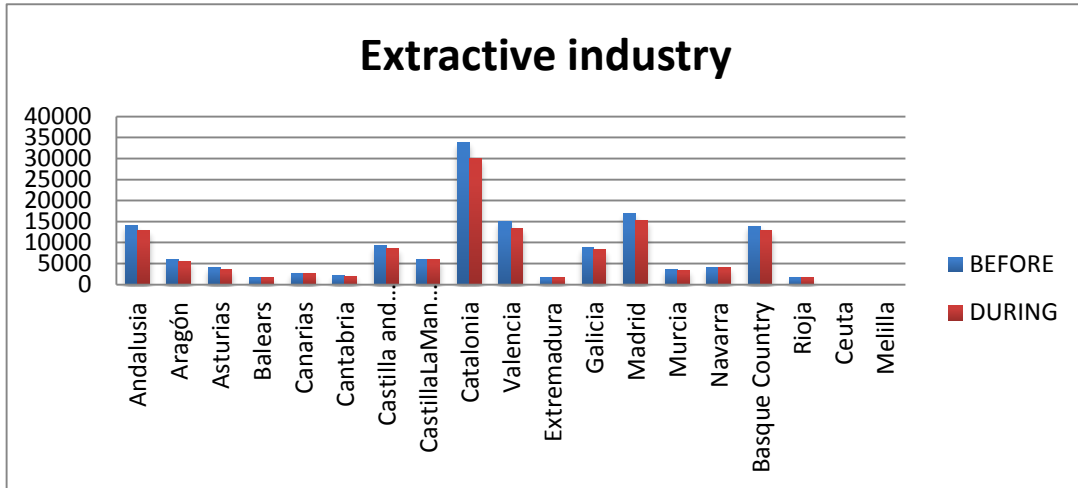
Figure 13: GDP of extractive industry among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Manufacturing industry**

In figure 14, it is obvious that Catalonia is the most powerful region also concerning manufacturing industry. Precisely it generated 25 % of GDP in this sector during the period before the crisis. Other four regions oscillated around 10 % of total contribution of this industry in Spanish GDP. These regions are Madrid, Valencia, Basque Country, and Andalusia. The rest of regions contribute into this industry by low percentage around 6 % - 0.01 %. During the crisis, the region with biggest contribution into GDP of this sector, Catalonia, decreased its contribution by 14 %. However, the impact of the crisis is visible among all Spanish regions. The group with other four important regions in manufacturing industry recorded decrease during the crisis period on average by 2 %. In total, the manufacturing industry lost on average 14% with respect the initial period.
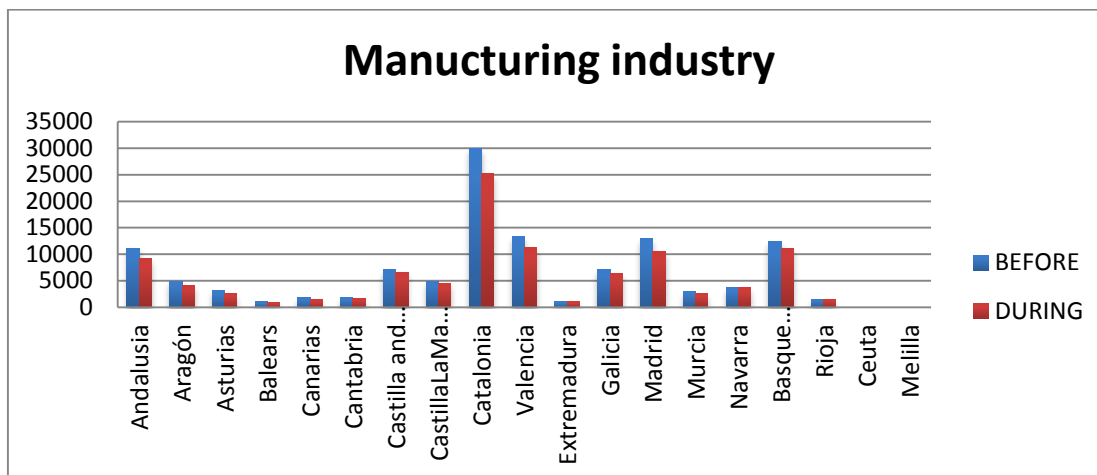
Figure 14: GDP of manufacturing industry among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Construction**

In figure 15, distribution of construction can be seen. Catalonia and Andalusia held in pre-crisis period 16% followed tightly by Madrid with 15 %. Other important region in this industry is Valencia with 11 %. The rest of Spain contributed into this industry between 6 % and 0.2 %. Construction is considered as measure when crisis enters into country and it has to be said that big decreases were recorded in Spain between years 2009 and 2013. The most significant regions experienced a large downswing in construction sector. Madrid followed by Andalusia lost on average 5 % with respect to the previous period. Catalonia and Valencia lost only "just" around 4 %. However, all Spanish regions were hit by a decline in construction and in total this sector lost incredibly high portion of 29 % with respect to pre-crisis period. Construction contributed to the total GDP by 11 % in pre-crisis period, however the crisis declined the total contribution in GDP to only 6 %.
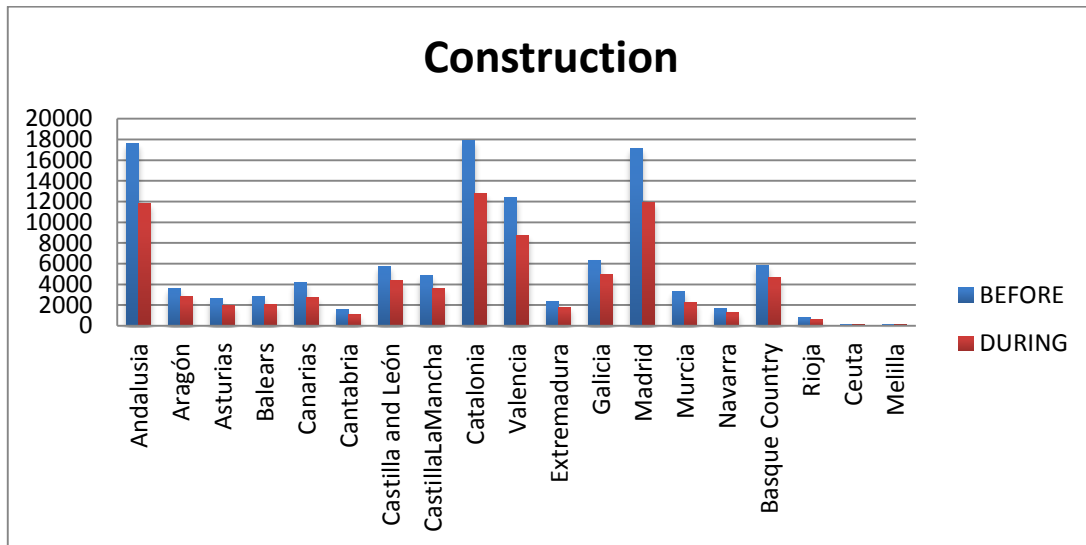
Figure 15: GDP of construction sector among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Retail**

Retail contributes with biggest amount into Spanish GDP and it represents 66 % of total GDP in pre-crisis period and it raised up to 74 % during the crisis. It means that services presents substantial part of Spanish economy. It can be seen in figure 16 that crisis did not have such a huge impact on this sector as in previous cases. The most important regions for this sector are Madrid followed by Catalonia. They represent 40 % of this sector in Spain. Other important regions in retail are Andalusia and Valencia. However, it has to be mentioned that also small regions which are specialized in tourism such as Baleares islands and Canarias also contribute with a significant amount around 6 % but for example big region Catalonia is obviously mote important. For all regions except Baleares and Canarias, it is valid that this sector kept growing also during the crisis. Nevertheless, this is not true for touristic areas as in Canarias and Baleares. It implies that these touristic regions recorded decline in tourists which may be forced according the crisis time postponed their vacations or they did not chose such an expensive area or shortened their vacations. In conclusion it needs to be said that crisis was the most sensitive to them and it maybe just declined their growth.
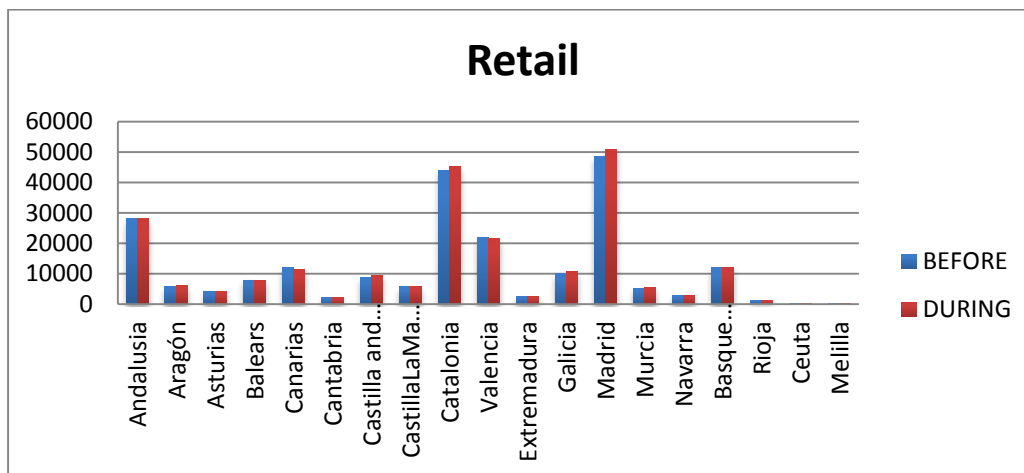
Figure 16: GDP of retail among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Finance and insurance**

This sector is dominated by two regions, namely Madrid and Catalonia which can be clearly seen in figure 17. Together, they amount more than 40 %. Other important regions in Finance are Andalusia then Valencia and Basque Country. The rest of fourteenth regions oscillate around 5 % and less. Also in this case, impact of crisis is not as much obvious. The crisis period decreased growth in this sector, however on average it kept growing by 1 % or less among all Spanish regions.
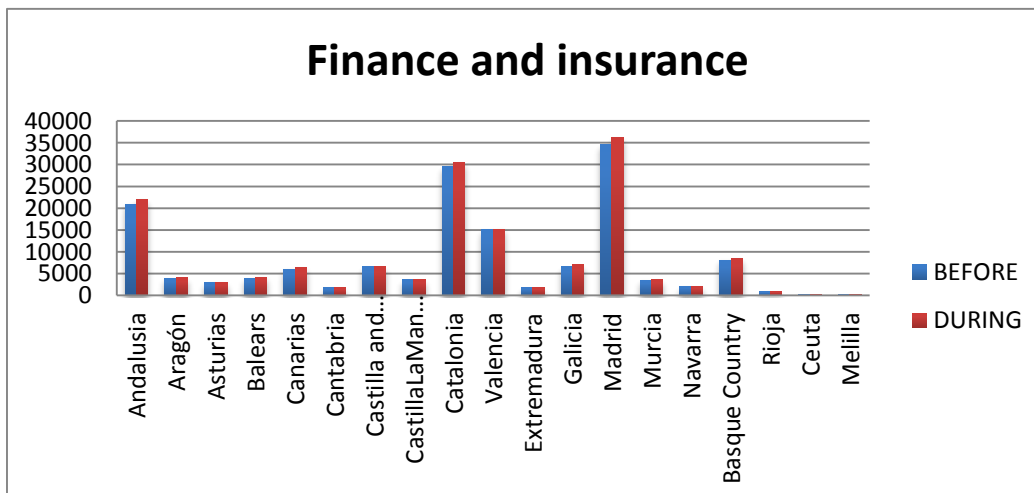
Figure 17: GDP of finance and insurance sector among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Public administration**

From figure 18 it is clear that Madrid holds the most important position in this sector. However, Madrid is closely followed by Andalusia and Catalonia. Other important region is also Valencia. It is obvious that crisis put in challenge

all regions and also countries around the world and it happened also in Spain. Public administration rose during the crisis. Spanish regions increase in this sector by 1 - 2 % on average during the crisis.
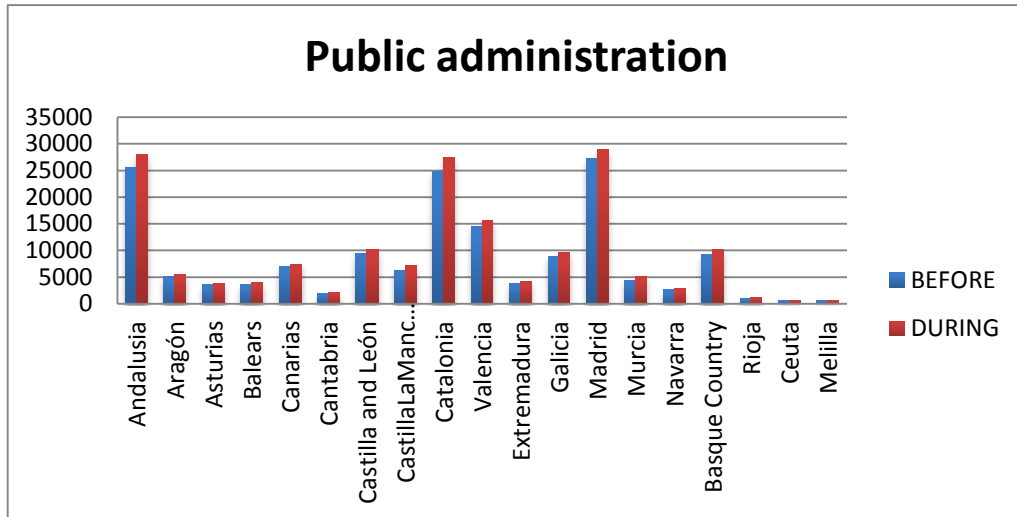
Figure 18: GDP of public administration sector among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Tax on product[4]**

According figure 19 it can be said that before the crisis entered into Spain, Catalonia was collecting highest amount of tax on product in entire Spain. However, Catalonia was closely followed by Madrid and Andalusia. Valencia, Basque Country, Castilla and Leon, and region Galicia belong among other regions with higher collection of this tax. Rest of the Spanish regions collect smaller part of this tax with respect to the other regions. According to the results describing the level of tax on product during the crisis period, all Spanish regions reacted in the same way. On average, all Spanish regions decreased level of collected tax on product by 23 %. This decrease can be nicely observed in regions with high collection of the tax, namely in Catalonia, Madrid, and Andalusia. Figure 20 provides nice evidence production and consumers reacted on the crisis situation in Spain.

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[4] Tax on products are taxes that are payable per unit of some good or service produced or transacted. The tax may be a specific amount of money per unit of quantity of a good or service, or it may be calculated ad valorem as a specified percentage of the price per unit or value of the goods and services produced or transacted. As a general principle, taxes in fact assessed on a product, irrespective of which institutional unit pays the tax, are to be included in taxes on products, unless specifically included in another heading.
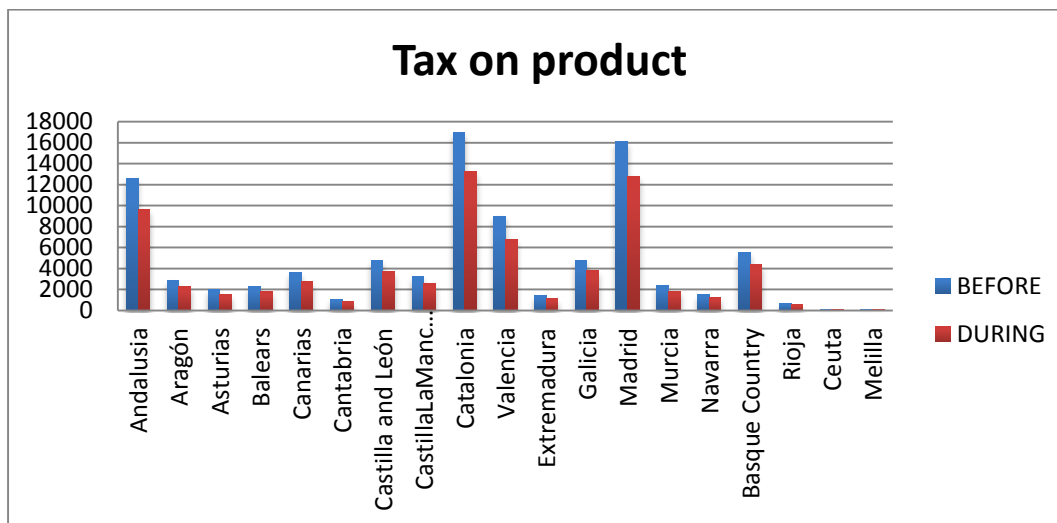
Figure 19: GDP of tax on product among Spanish regions in million €, five-year model
Source: Own elaboration, INE

- **Gross value added**

In figure 20 it can be observed how Spanish economy measures in economics the value added to goods and services produced in their area, namely the gross value added. Catalonia is region with highest added value on goods and services produced in Spain and it is followed by Madrid and Andalusia. These three regions represent almost 50 % of this sector in Spain. From the figure 20, it is clear that pre-crisis period was doing better and producing more than during the crisis. All regions slightly decreased their averages during the crisis and in total gross value added declined by 3 % with respect to the previous period.

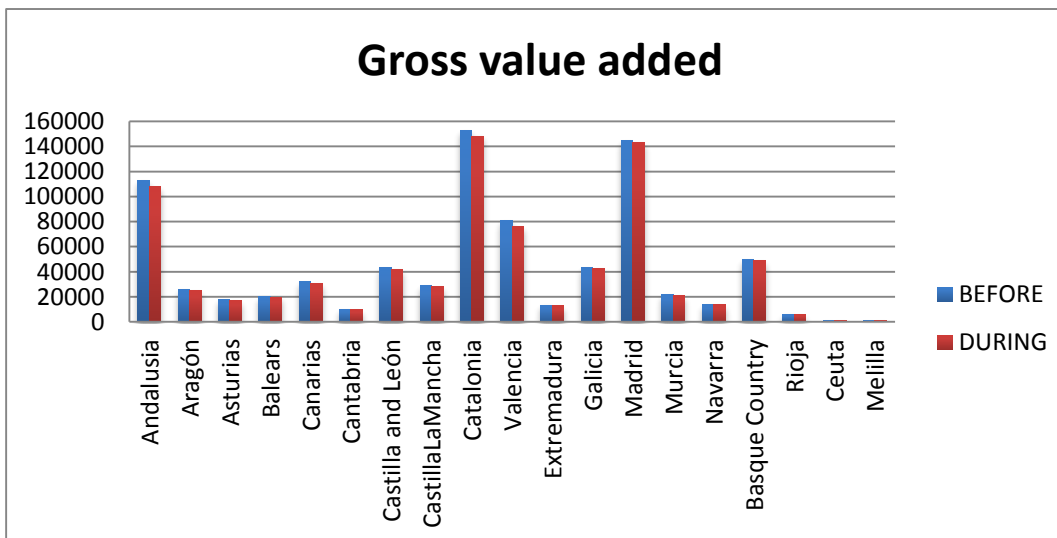
Figure 20: GDP of gross value added among Spanish regions in million €, five-year model
Source: Own elaboration, INE

This paragraph summarizes the five-year model. Catalonia and Madrid represent the most important regions in all sectors of Spanish economy. These two regions are followed by Andalusia then by Valencia and Basque Country. The most significant region in agriculture is Andalusia which contributed 26 % into this sector in pre-crisis period. However, the impact of the crisis decreased production in agriculture as well. Andalusia declined its production by 16 %, Basque Country by 25 %, and region Melilla which has a really low production in agriculture declined by 59%. Nevertheless, it has to be underlined that agriculture is a specific sector dependent on weather conditions which also could also significantly influence production in individual regions. Anyway, it can be assumed that production in agriculture could decrease due to lower demand. During the crisis, people face the fear of losing job so they can demand products with lower price and quality. According to the macroeconomic analysis, the average unemployment during the crisis period raised incredibly, so this assumption could be confirmed. Not only agriculture but also both industries (extractive and manufacturing) experienced decline during the crisis period. It should be underlined that Catalonia is the most important region in industry followed by Madrid and Andalusia. During the crisis, extractive industry declined by 8 % and manufacturing industry declined by 14 %. The crisis has affected the sector of constructions the most. The most significant regions in this sector are Catalonia, Andalusia, and Madrid. During the crisis, all regions suffered by huge loss. Andalusia lost 34 %, Canarias 35 %, and Madrid 31 %. In total, Spanish construction declined by 29 %. It is good to note that also not industrial regions such as Canarias suffered from a huge decline in this industry. It can be given by the fact that also in retail this highly touristic region decreased its numbers. It implies that people decreased their vacations in Canarias so as retail declined, hoteliers stopped also building new hotels for tourists who are no longer coming. Finance together with public administration on the other hand increased during the crisis however tax on product declined in all regions probably due to decrease in production.

5.1.2   The 4-4-2 year model

This model was created to better evaluate impact of the crisis on different sectors in Spain. This type of year division was created to see impact without any distortion because it is evident that crisis entered Spain immediately, meaning in 2008. For this reason, year 2008 is considered as first crisis year. Thus, ten year period is divided into three sections. First section contains years 2004 - 2007 and is considered as pre-crisis period. Second four year period represents a period when crisis entered in Spain and impacted every citizen. This period contains years 2008 - 2011. Last section which is still considered as the crisis period is when the first crisis shock was already gone. The last section contains only two years, and so, year 2012 and 2013. The year 2014 could not be included into thesis, due to not data available. Also as in previous case, all Spanish sectors will be evaluated and consequentially used for evaluation of cluster analysis.

- **Agriculture**

As it was mentioned in previous model, the most agricultural region in Spain is without any doubts Andalusia. From figure 21, development of agricultural in all Spanish region during different time sections can be nicely seen. In the pre-crisis time, regions were doing much better than nowadays. It is clear that all regions declined their production during this ten-year period. Agriculture declined during the first four years of crisis by 13 %. The most important region, Andalusia, decreased its production by 3 % with respect to the previous period. During the first crisis period all regions declined its production, however small agricultural production regions decreased their production by 1 %. However, the other two years of crisis recorded other decrease of agricultural production in Spain. Andalusia decreased its production by other 2 %, which means 5 % with regard to the first period. Region Castilla and Leon, Castilla La Mancha, Galicia, Catalonia decreased their production by 2 %. All these regions belong to the regions with higher production than the rest of Spain, however much lower than Andalusia. Spanish agriculture decreased its production by 21 % with respect to the first pre-crisis period. Nevertheless, the most important thing to underline is that financial and economic crisis surely does not have a direct impact on agricultural production. Agriculture is dependent on the weather and other circumstances which are crucial for production. The crisis can have an impact on domestic production in an indirect way when companies decrease wages or they fire employees, inhabitants will start to save and they will buy lower quality food, so the agriculture can start to have problem with excessive production and next year they will decrease production also due to this situation.
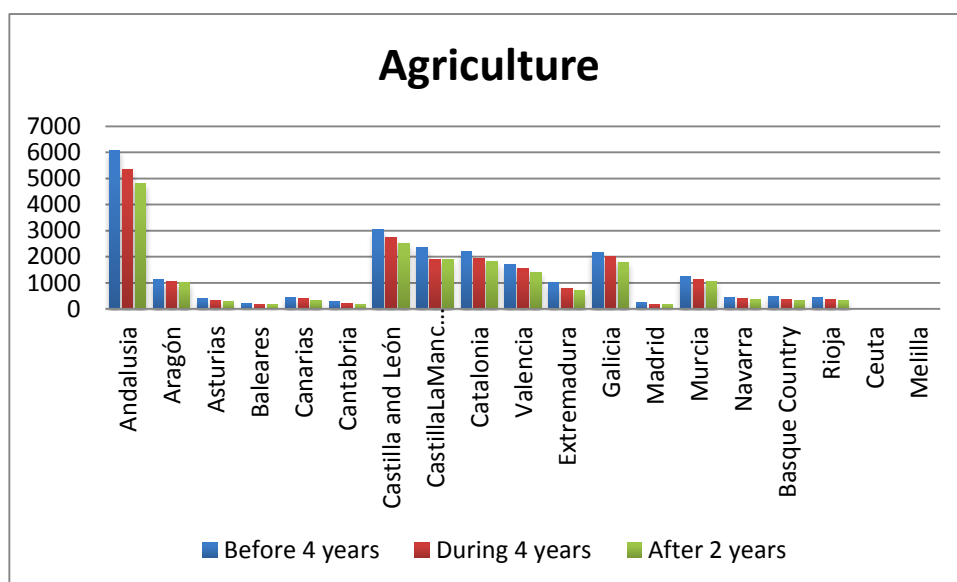
Figure 21: GDP of agriculture sector among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Extractive industry**

Catalonia is the most important in this industry over all ten years which is evident in figure 22. Madrid, Andalusia, Valencia and Basque country belong among other important regions in extractive industry. Catalonia amounted for 23 % of this industry before the crisis started in Spain. The crisis period decreased the contribution into this industry in almost all Spanish regions except Canarias, Rioja and Castilla La Mancha. However, all these regions represent a small portion of this industry in Spain. It can be supposed that crisis arrived with some delay into these regions or they are not dependent or interconnected to regions or countries in EU which were immediately hit by the crisis. In the first crisis period, the most significant region, Catalonia, declined its production in extractive industry by 3 %. In total during the first contact with crisis, extractive industry declined its production by 5 % with regard to previous period. During last period, all regions recorded a decline with respect to pre-crisis period. Some of them such as Galicia remained on almost the same level as at the beginning of the period. However, Catalonia declined its production from 23 % to 20 %. In total, extractive industry declined by 9 % with respect to initial period.
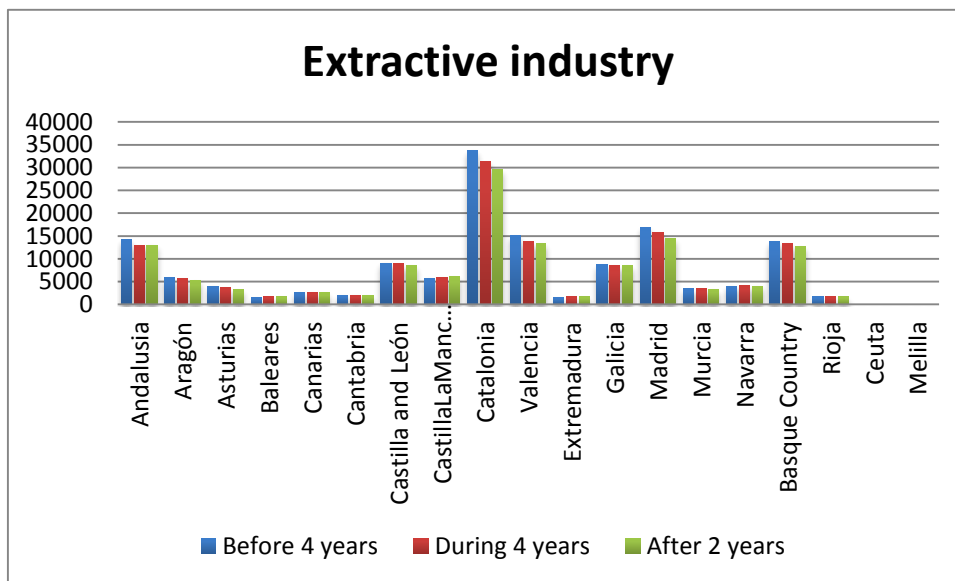
Figure 22: GDP of extractive industry among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Manufacturing industry**

Industrial region Catalonia is the most important region also in manufacturing industry during last ten years. Andalusia, Valencia, Madrid and Basque Country belong among other regions in extractive industry. It is known that when country is hit by crisis industry is sensitive to the crisis from the very beginning. Nevertheless, it has to be said that also location and interconnection with rest of the world are important factors which influence velocity and extent of crisis on economy. From figure 23, it is evident that manufacturing industry in Catalonia

lost significant portion of this industry. Catalonia declined its manufacturing production during the first crisis period by 3 %. In total, manufacturing industry decreased its production by 10 % in first crisis period and the loss increased up to 17 % with respect to the initial pre-crisis period. Regions with smaller contribution into this industry were oscillating around same level or they slightly decreased their production by 1 %. Important region Catalonia decreased its production in this industry by 4 % with respect to the initial period, followed by other important region such as Madrid and Andalusia which decreased their production in manufacturing industry by 3 % and 2 %.
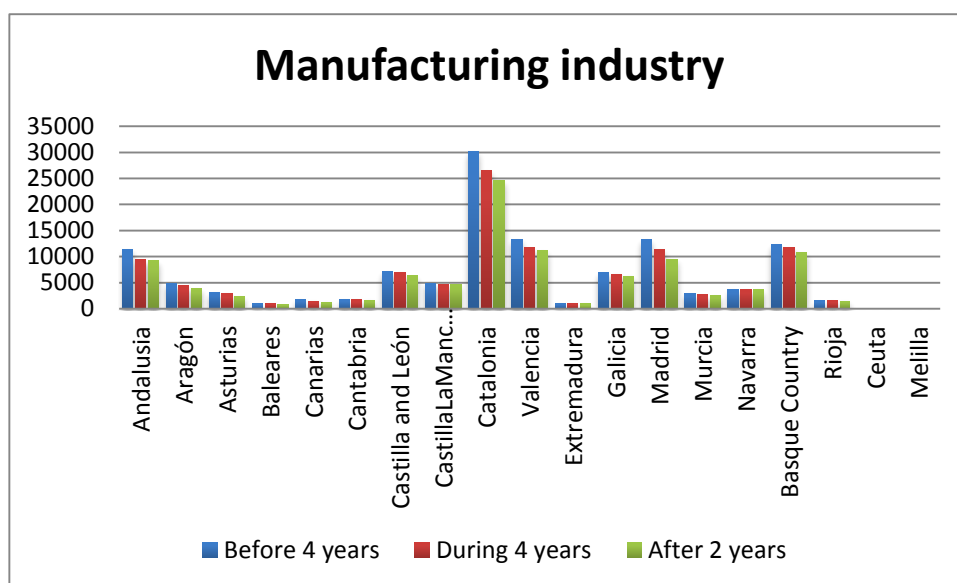
Figure 23: GDP of manufacturing industry among Spanish regions in million €,4-4-2 years model
Source: Own elaboration, INE

- **Construction**

   As it was mentioned in previous model, construction is very good crisis indicator. Construction contributed by 11 % into total Spanish GDP in initial pre-crisis period. During the crisis (initial crisis year was considered year 2009) construction declined its contribution into Spanish GDP down to 6 %. This situation is clearly seen in figure 24. Catalonia, Andalusia and Madrid are without any doubts the most important regions in this sector. Valencia belongs to other significant regions in this sector At this point, it is useful to mention that all above mentioned regions are highly productive in manufacturing and extractive industry so there could be a link between these three sectors and their crisis behavior. In first period, Catalonia kept 16 % followed by Madrid and Andalusia with 15 % in this sector. All these three most significant regions declined its contribution into GDP by 2 % during the first crisis period. Nevertheless, decreasing trend hit all Spanish regions at first years of crisis. In total, Spanish economy recorded a decline in construction by 11 % with respect to the pre-crisis period. However, construction industry kept losing its portion and during years 2012 and 2013 recorded huge

decline in this sector. For example the most important regions in this industry, Catalonia, Madrid and Andalusia, lost around 7 % each with regard to the initial period. Decline was as huge that during this two years all regions lost incredible 43 % with respect to the pre-crisis time. It brings evidence about difficult times in Spain which let to decline in industry and construction sector.
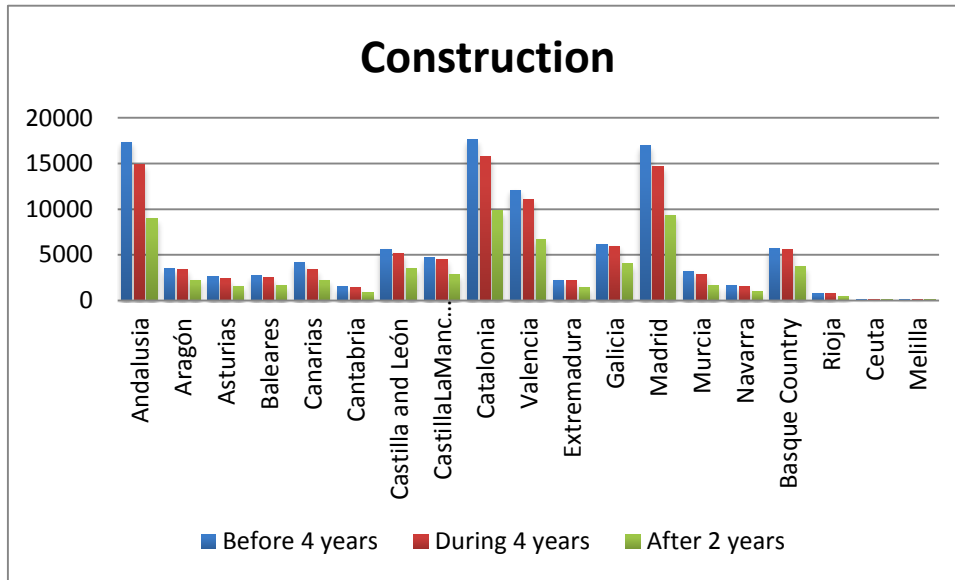
Figure 24: GDP of construction sector among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Retail**

Figure 25 includes retail which contains also services. The most important region in retail is Madrid followed by Catalonia and then Andalusia and Valencia. Baleares, Canarias, Galicia and Basque Country belong among other regions with significantly lower contribution to GDP. This sector kept slightly growing also during first period of crisis in all regions except highly touristic regions Baleares and Canarias. As it was mentioned in previous model, it can be given by the decrease of tourists due to crisis situation and decrease of incomes etc. In total, retail grew by 5 % with respect to the pre-crisis period. However, during following second two years also retail felt some impact of crisis and growing trend decreased. But the level did not declined under the pre-crisis level.
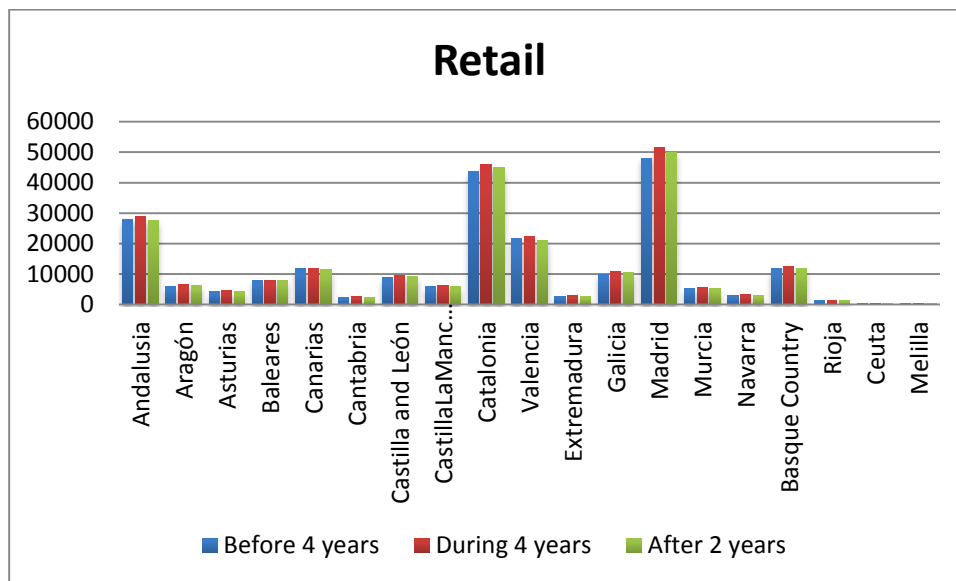
Figure 25: GDP of retail among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Finance and insurance**

In figure 26, the most financial region in Spain can be observed, namely Madrid, followed by Catalonia and Andalusia. Valencia together with Basque Country belong to other important financial region. The first three mentioned regions contribute with more than 50 % into Spanish gross domestic product in this sector. From the figure 26, it is clear that during the first four years in crisis, finance kept slightly growing in all regions with smaller contribution. However, Madrid grew by 3 %, Catalonia and Andalusia by 2%, which can be given by huge decline in industries and construction and for this reason finance could optically grow due to decline in remaining sectors. However, second part of the crisis stopped growing trend and all regions experienced decline in finance. It is important to say that this decline did not go under the pre-crisis level and with respect to the initial period it still grew by 3 %.
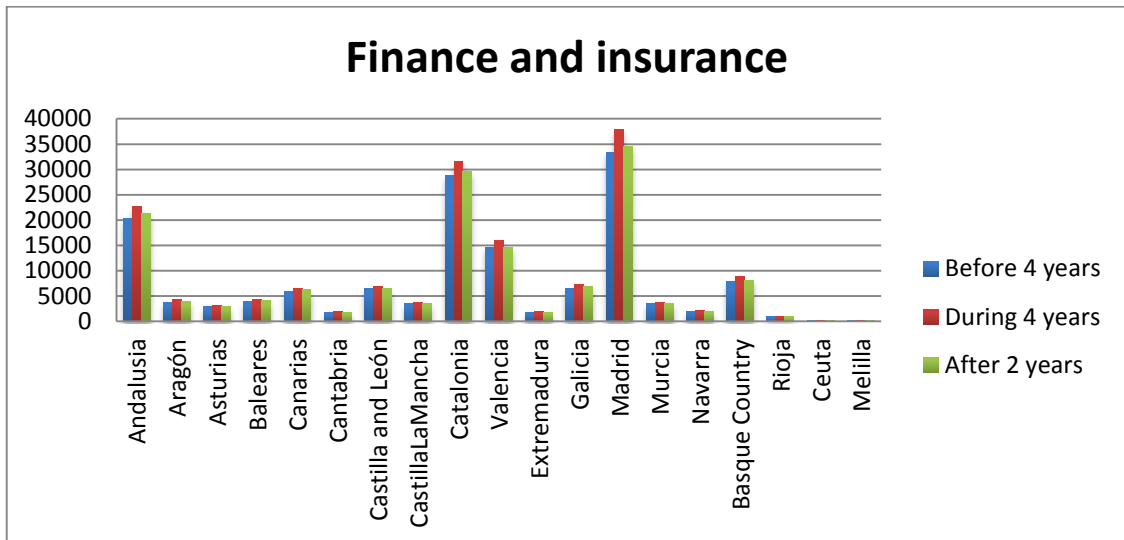
Figure 26: GDP of finance and insurance sector among Spanish regions in million €, 4-4-2 year model
Source: Own elaboration, INE

- **Public administration**

In figure 27, development of public administration contribution into GDP in Spain can be seen. Regions can be divided into three groups. First group contains regions with biggest contribution, namely Madrid, Andalusia, and Catalonia. Second group is created by regions Valencia, Castilla and Leon, Galicia, and Basque Country. The third group contains remaining regions with small contribution less than 5 %. Public administration covers also heath care and education which can explain why this sector kept growing also during first period when crisis entered into Spain. All regions with big contribution increased around 2 % during the crisis period. The rest of the Spain kept the moderate growing trend. Nevertheless, last two years slowed down the growing trend and percentage kept by all regions decreased with respect to the initial crisis period but did not go under the level of pre-crisis situation.
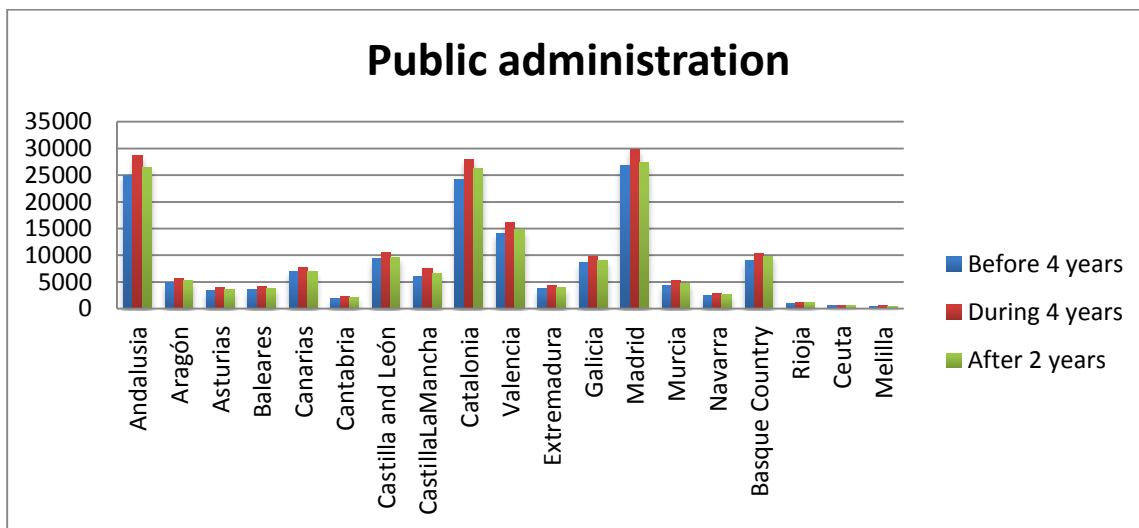
Figure 27: GDP of public administration among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Tax on product**

According to the figure 28, it can be said that this model provides nice over-view of the influence of the crisis in ten-year period. The region which collects the high amount of tax on product is Catalonia followed by Madrid and Andalusia. Valencia, Basque Country, Galicia and Castilla and Leon belong among other re-gions with higher collection of this tax as it was in previous model. It can be seen that first four years of crisis collection of this tax decreased a lot. Following two years decreased the previous level just slightly so it can be said the last two crisis years evidenced more moderate situation.
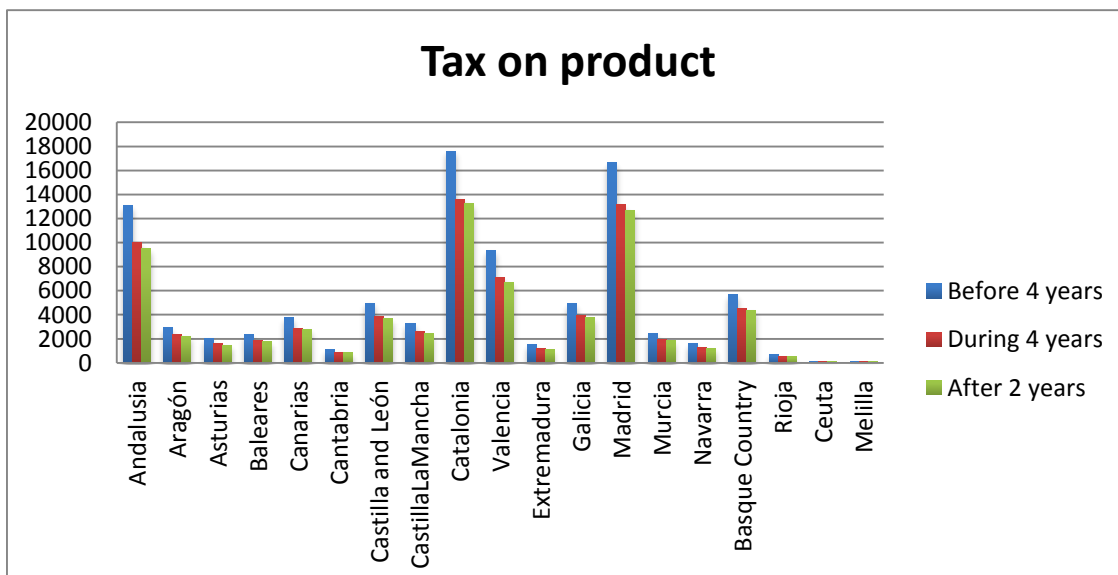
Figure 28: GDP of tax on product among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

- **Gross value added**

According model distribution 4-4-2 year, it is clear to see in figure 29 that all Spanish regions experienced slow increasing trend during the first crisis period. Catalonia and Madrid belong to the regions with highest gross value added in Spain. These two regions are followed by Andalusia and Valencia with significantly lower contribution. Gross value added measures value added to products and services in the economy. During the first touch with crisis, the added value of goods and services produced during this period grew a little bit. In total gross value added grew by 3 % with respect to the previous pre-crisis period. In regions which produced lower amount of added value grew just in decimals of percentage. Nevertheless, following two crisis years revealed the true and gross value added decreased in all Spanish regions. In regions such as Madrid, Catalonia and Andalusia, it decreased by 2 %. In total, gross value added declined to 93 % with respect to the initial period.
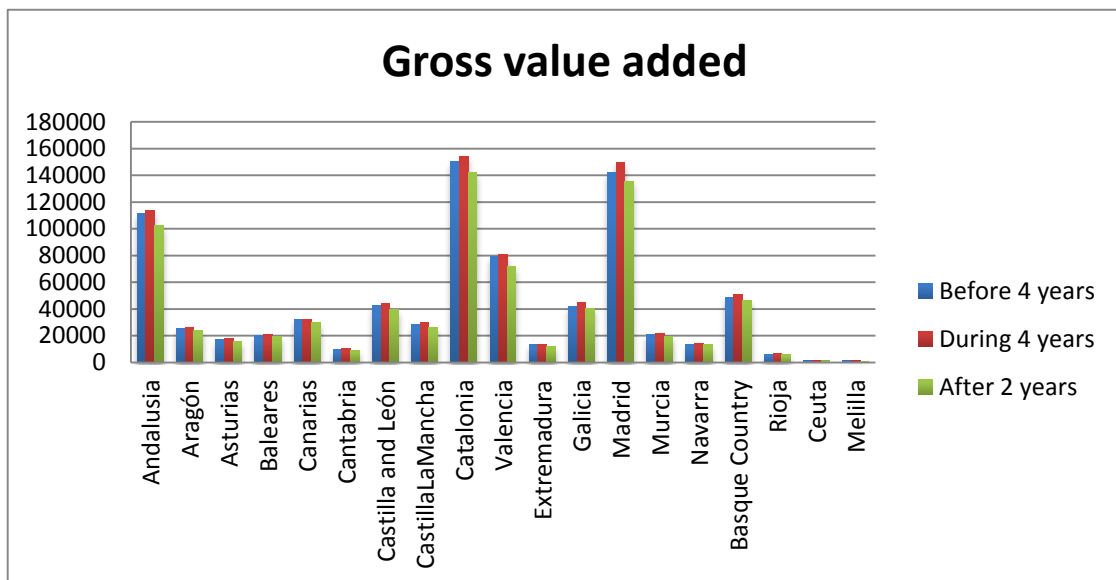
Figure 29: GDP of gross value added among Spanish regions in million €, 4-4-2 years model
Source: Own elaboration, INE

According previous figures, it can be summarized that model 4-4-2 years was able to explain the impact of crisis on different sectors of Spanish economy better and it was easier to determine during which period crisis hit Spanish regions. The five-year model provided good results also, however it has to be considered that year 2008 affected results of pre-crisis period, as it did in macroeconomic analysis. Nevertheless, following can be concluded from figures above. Agriculture in dominant region Andalusia decreased during first years of crisis by 13 % and in following period decreased by another 11 %. During the first crisis period, all Spanish regions experienced a decrease in agriculture. The biggest decline of 66.64% was in Melilla. However, this region is really small and produces smallest part of agriculture in Spain. But still this decline in agriculture could be devastating in

this region. During second period, again all regions except Castilla La Mancha experienced decrease in agriculture with respect to the first crisis period. Extractive industry raised little bit in a few region for example in Baleares and Canarias during first crisis period. However, these regions contribute to this industry by a really small part. Regions with big contributions such as Catalonia, Andalusia, Madrid, Valencia and Basque Country experienced decrease immediately during the first period. Second crisis period was more moderate for Andalusia which increased contribution to extractive industry by 1 % with respect to the previous crisis period. Remaining regions declined their contribution in extractive industry by another 6 %. Manufacturing industry experienced tough years during the crisis period and this can be nicely seen in manufacturing figure. All regions with big contribution in this industry recorded big declines. For example Catalonia decreased by 17 %, Andalusia by 12 % and Madrid by 15%. However that decline did not stop in the following period. Catalonia decreased by another 8 % and Madrid by another 16 %. But majority of Spanish regions experienced decrease around 6 % with respect to the first crisis period. As it was mentioned in previous model, construction was the most affected sector in Spain. 4-4-2 year model nicely revealed which years were crucial for this important sector. During first four crisis years construction was hit in all Spanish regions. Andalusia lost 15 %, Catalonia 11 % and Madrid 14 %. Remaining regions decreased their contribution into this sector by 10 %. However, real tough years for construction were coming. The whole Spain experienced a huge decrease. Andalusia lost 40 % in this sector, Catalonia lost 38 % and Madrid lost 37 % with respect to previous crisis period. Nevertheless, the situation was not better for rest of the Spain where they lost around 30-40 % in contribution in this sector. Retail during first years of crisis increased by 3-9 % in all Spanish regions except Baleares and Canarias. But during second period, also this sector evidenced losses with respect to the previous four years. It should be underlined here that five-year model revealed that retail was increasing during crisis period which is not true in this model. Sector of finance experienced during first crisis period increase around 5-14 % in all Spanish regions. But the same situation did not happen in following period. All regions lost around 10 %. Same scenario as in finance happened also in public administration. During first crisis period all regions except Ceuta and Melilla were increasing their contribution by 10-15 % then in second crisis period they lost around 7-10 %. Contribution of gross value add was slightly increasing during first crisis time, however second crisis period had decreasing trend of 10- 12 % for all regions. The biggest loss during first crisis period experienced collection of taxes on products, which decreased by 20-30 % in all Spanish regions. Second period had also decreasing trend but just around 5 %.

5.2   Cluster analysis

This part of the thesis is dedicated to the cluster analysis. The procedure of cluster analysis used in this thesis is in detail described in the methodology part. Cluster analysis is divided into two models. The first one is five-year model and divides

ten-year period into two equally long time periods 2004-2008 as pre-crisis period and 2009- 2013 as crisis period. The second model is named 4-4-2 year model and divides ten-year period into three sections. First section was determined as pre-crisis period of 2004-2007, second section was indicated as crisis period and includes years 2008-2011 and last part contains only last two years of crisis, namely 2012 and 2013. In following subchapters all results of two models will be evaluated. In appendix 5 there can be found figures of PCA analysis used in this section.

5.2.1   Five-years model

As it was mentioned before, this model divides the ten-year period into two sections. First section uses data since year 2004 until year 2008 and it is considered as pre-crisis period. It is supposed that data set is not influenced by the impact of the crisis. Second section works with data from the period of 2009-2013. This period is considered as crisis period when Spanish economy was strongly hit by the crisis. Five-year model is divided into two sections. Each section provides proper figure with clusters of Spanish regions and PCA analysis.

According to the figure 30, it can be said that before the crisis entered into Spain, regions were divided into three different clusters in accordance of their similarity. First cluster, which is also the most distant from other two clusters, includes regions Madrid, Catalonia, and Andalusia. It was confirmed in macroeconomic section that Catalonia and Madrid are the most similar regions and are followed by region Andalusia. These three regions proved in macroeconomic section that they are really close in respect of level GDP and GDP growth. However Andalusia differed in remaining two indicators, namely in level of unemployment and GDP per capita. Andalusia experienced significantly higher level of unemployment than Madrid and Catalonia during the pre-crisis period and level of GDP per capita was also significantly lower than in these two regions. In order to explain this, Catalonia and Madrid are close in one sub-cluster and Andalusia created other different sub-cluster. Now, it would be useful to explain cluster in the middle of the figure 30. This cluster is created by other three sub-clusters, which included twelve Spanish regions out of nineteen. First sub-cluster included regions Galicia, Murcia and Castilla La Mancha. These regions experienced similar problems with respect to unemployment where Galicia struggled the least from them. However, they are really similar according to macroeconomic indicators. In sector division, Galicia proved better results in industry and constructions than other two regions were losing to Galicia. Second sub-cluster contains the most similar regions to the strongest three regions, namely Madrid, Catalonia, and Andalusia. Thus, this sub-cluster includes regions Valencia, Basque Country and Castilla Leon. At this point, it would be nice to say that it had been expected Galicia would be included in this cluster. Valencia is the most similar to the strongest three regions. And Basque country is trying to catch up with Valencia. Last sub-cluster of this cluster contains remaining six regions. Regions Rioja, Baleares and Cantabria are close to region Asturias and all these regions are getting

close to region Aragon and then all these are close to region Navarra. This is the evidence of strong divergence among these regions so they have to catch up the nearest region to get close to the more distant region Navarra. Last cluster contains other two sub-clusters. Regions Extramadura and Canarias are really similar in level of unemployment which was around 13 % before crisis. At this time the average unemployment rate was oscillating around 9 %. The worst situation according unemployment rate in Spain occurred only in Melilla and Ceuta. These regions that are closing the all cluster are the most distant to the strongest three regions. However, it should be underlined that these two regions are autonomous cities and they occupy really small part of Spanish territory and for this reason they can struggle with respect to rest of the Spain. For that, it would be better to say that the real most distant regions are regions Extramadura and Canarias.
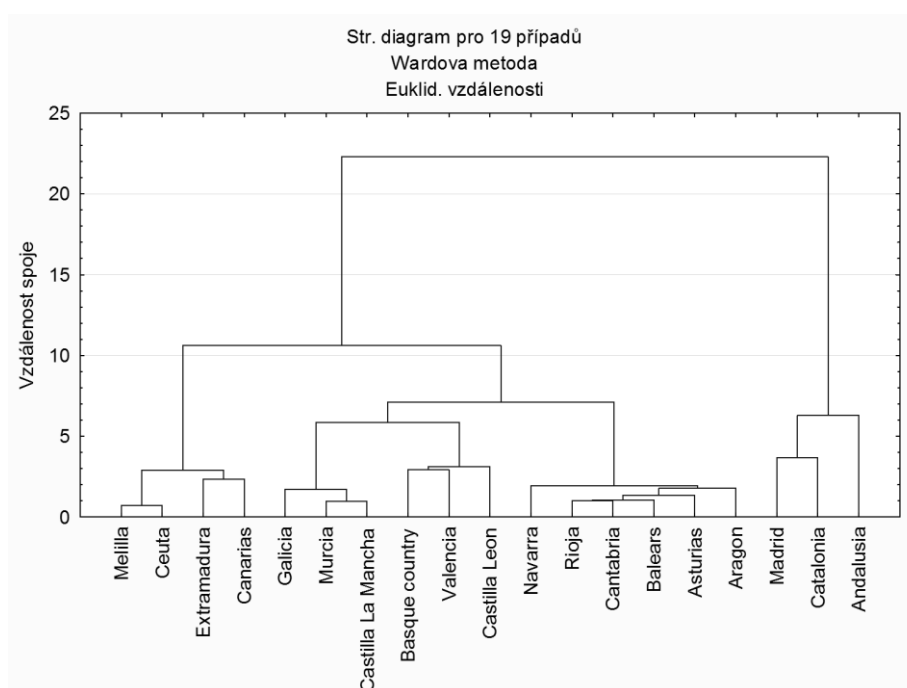
Figure 30: Cluster analysis before crisis-five-year model
Source: Own elaboration, INE

PCA analysis included in figures 39, 40, 41 and 42 provides useful information about variables used in analysis. According to the figure 39factor 1 explains 66.61 % of variables. The most important variables according this analysis are all variables which are close to zero, namely components of Spanish GDP. These variables are highly correlated among themselves and for this reason they are close to each other. As it was explained in methodology, high correlation is not a problem in this case because all variables are components in Spanish gross domestic product and it is logical that they are dependent on each other. However, from statistical point of view this correlation is not a problem and it will not influence analysis results. Remaining other four variables are not so important for factor 1 and they are significantly more important in factor 2 where they explain 15.65 %. By

explaining these two factors, 82 % of this model will be clarified which is enough for this purpose. According the PCA analysis, all sectors except agriculture are highly correlated, in other words important for explanation of factor 1. It implies that regions which are close to 0 in factor one are not so dependent on these sectors. Nevertheless regions which are distant to 0 they are highly dependent on situation of these sectors. For factor two explains 15.65 % of the model contain important three factors GDP per capita, unemployment and agriculture. According above explained, Catalonia is the most dependent on industry, construction, retail, finance and other variables. Bad development of these sectors will have significant impact on Catalonia. And this is valid also for region Madrid. The most of the regions are situated close to 0 of both factors. It provides evidence about similarity among these regions because they are in similar way independent on both two factors. However, the independence on these factors decreases with increasing distance from 0.

A result of cluster analysis during the crisis observed in figure 31 brings a new distribution of region in clusters. Three main clusters remained, however the most significant cluster now contains one region more, namely Valencia. At this point, it would is important to say that according expectation, this scenario would be expected in pre-crisis period when Valencia had and increasing trend and was more close to these three regions. Second cluster contains other two important sub-clusters. Sub-cluster with Basque Country, Galicia and Castilla Leon changed completely. In the pre-crisis period, Basque Country was close to Valencia and Castilla Leon and Galicia was situated in a different cluster with regions which are now close to 0. However, Basque Country is the most dominant in this cluster. Regions Galicia and Castilla Leon are far from the Basque Country. Galicia catches up these regions probably due to decline in convergence with other regions such as Madrid and Catalonia. Second group of this cluster also changed significantly with respect to the pre-crisis figure. Now, regions are more close to together. Rioja and Cantabria remained as the closed region from the less good doing regions. These two regions remained close to the region Aragon for which crisis time was really hard. All these three regions are also close to region Asturias. Region Navarra remained in same position as it was in pre-crisis period but Baleares got closer to this region. At this point it would be good to remind that Baleares were doing worse than such regions as Asturias and Aragon. It implies that these regions which were doing better in pre-crisis period were hit more strongly by impact of crisis and decreased their growing trend significantly. So it can be considered that these regions such as Baleares converged to these stronger regions and experienced bigger impact of crisis. Nevertheless, the worst situation is in regions Murcia, Extramadura and Castilla La Mancha. According figure 32, it can be supposed that crisis decreased growing trend of highly industrial and developed regions which leads to convergence among regions with similar economic importance and dependent on industry and other sectors. And so, it can be supposed that Spanish regions during crisis region did not converge but they increased their divergence and they created new convergence groups.
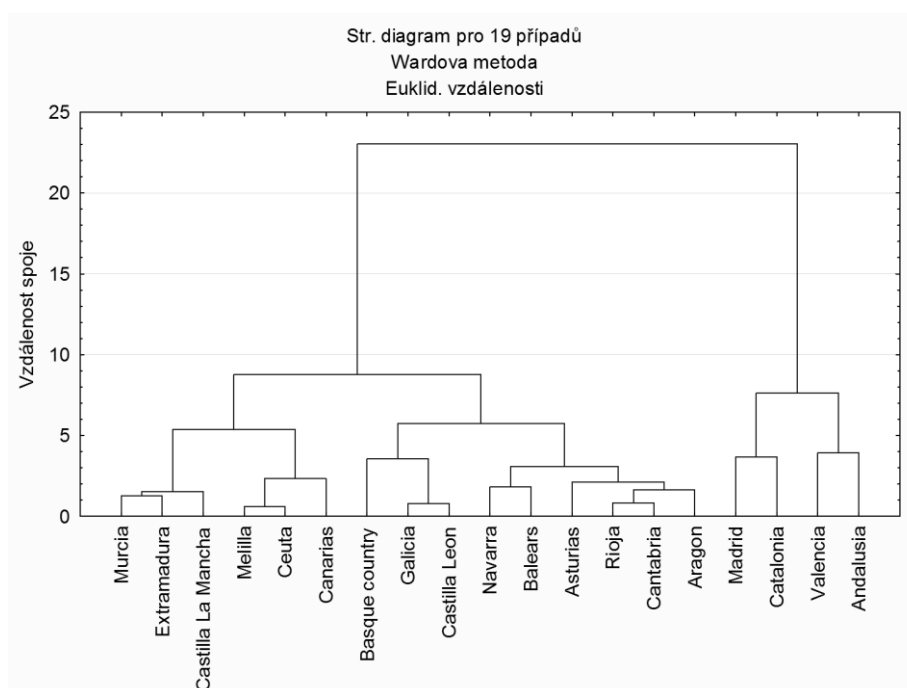
Figure 31: Cluster analysis during crisis-five-year model
Source: Own elaboration, INE

PCA analysis did not change dramatically over the observed period can be observed in figures 43, 44, 45 and 46 which are included in appendix 2. The only thing which changed little bit is that factor one now explains 65.73 % and factor two explains 18.58 %. It implies that now factor two increased its importance with respect to the previous period by 3 %. Nevertheless, the distribution of region remained unchanged and explains variables as well. For this reason, it is valid also for these two figures the previous explanation of pre-crisis period.

Comparing cluster analysis results of both periods it can be concluded that during last ten-years, Spanish regions moved across different clusters. Comparing these two figures, it can be seen how these regions were situated in pre-crisis period and where they finished at the end of the observed period. According to figure, 30 and 31 t is clear that are strongest regions which are close to each other are Catalonia and Madrid followed by Andalusia in pre-crisis period. However, the crisis revealed that these three regions were caught up by Valencia which is now situated in a cluster with Andalusia. According to the data set, it was expected that Valencia would be close these three regions in pre-crisis years when the GDP per capita and GDP growth was higher than in Andalusia. Valencia is likely more industrial region then Andalusia. It was obvious from data that Valencia was really struggling in crisis times and also Andalusia lost substantial portion in almost all sectors. Thus, it can be concluded that these two regions converged to each other and they diverged from the most powerful regions Catalonia and Madrid. Second big cluster remained also in sequential period, however changed a lot. Cluster in the middle of the figure 32 underwent the biggest change and it can be observed that more industrial regions tend to converge to the less

industrial among one cluster. Precisely, region Rioja and Cantabria remained closed together and closer to region Aragon and Asturias got better than all of them. Region Navarra which in pre-crisis period was alone in one cluster connected to all these regions and now it is in cluster with Baleares. It implies that some regions remained unchanged or slightly converged to each other. They created to convergence groups which diverged respect to other regions. Second branch of middle cluster now contains only one cluster because the other group converged to the last cluster. In pre-crisis period, Castilla Leon was close to Basque Country, however during the crisis they diverged from each other. Also last cluster reveals same scenario. Small regions Ceuta, Melilla and Canarias converged to each other and got closer to the rest of the Spain. On the other hand, Extramadura converged to Murcia and remained in worse position together with Castilla La Mancha. It can be concluded that crisis had surely an impact on Spanish regions and that it led to the different scenario than it was expected according to the pre-crisis cluster figure. It led to the convergence between apparently similar region such as Rioja and Cantabria and also to convergence among regions which were more distant in pre-crisis scenario. It can be also said that there is huge difference between strong regions such as Catalonia, Madrid, Andalusia, and also Valencia with rest of the Spain and crisis did not lead to the convergence with rest of the Spain. These regions decreased their growing trend, however the difference is such big that it would last decades to rest of the Spain catch them up. Basque Country is getting close to Valencia, however the gap is still big and it will last some substantial time to equalize this gap. It can be also concluded that the crisis led to apparently to the convergence among small regions and the bigger once stopped growing. Therefore it can be said that in long term, it can turns out as divergence because according science articles in literature review part it can be said that during short period it can be observed apparently convergence, however it leads to divergence to other countries.

5.2.2 The 4-4-2 years model

This part is divided into three cluster analysis results. Each one will be separately explained and in the end of this sub-chapter the summarization of all periods will be written. This model is divided into 2 four year period and one two year period. First period is considered as pre-crisis period and includes years 2004-2007. Second period is considered as period when crisis hit Spain and includes also four years since 2008-2011. Last period presents last two years of crisis, namely 2012 and 2013. This model was included into thesis because it reveals the course of the crisis impact on Spanish regions better. First figure explains pre-crisis period with lower amount of year with respect to the previous five-year model.

In figure 32, result of cluster analysis of Spanish regions during four pre-crisis years can be observed. It is clear from the figure that Spanish regions are divided into two sub-clusters. The right side cluster includes all Spanish regions which generate significant part of Spanish GDP. It can be nicely seen that regions

with biggest amount of GDP, Madrid and Catalonia, created one cluster. The second branch includes also another sub-cluster. Andalusia for sure is the close and more similar region to these two most powerful regions. Valencia is trying to catch up with Andalusia and the most similar regions to Valencia are Basque Country and Castilla Leon. However, it can be though that second branch is close to Madrid and Catalonia but opposite is true. They are relatively close that is true, however regions such as Basque Country and Castilla Leon they generated more than 50 % of GDP less than Madrid. Nevertheless, it can be said that distribution of this cluster reveals the true in the best way. But it has to be underlined that difference between these clusters is really big and that other regions in second cluster are closer to each other than regions in the first one. Second cluster redistributes remaining thirteen regions. These regions are more similar to each other and therefore they are situated close to themselves. At first, it would be good to explain right side branch of the cluster which includes majority of Spanish regions. This branch includes another cluster with regions similar in a different way. The group of regions in the middle of the figure contains five Spanish regions. Murcia and Castilla La Mancha are again in the one cluster together with Galicia which can be verified in figure 30 in previous model distribution. This cluster is close to regions Asturias and Aragon which are again situated in similar way together as in the previous model. On the other side of sub-cluster, other four Spanish regions are distributed. Notable is that again Rioja is in small cluster with Cantabria which are connected to Baleares and this cluster is concluded by Navarra alone. This situation is really similar to the previous model, however the powerful regions as Basque Country, Valencia and Castilla Leon are situated in first cluster. It can be supposed that this model reveals better the real situation because data are not influenced by impact of crisis when crisis entered in Spain immediately in year 2008. Left side branch of second big cluster remained in similar way as in five-year model where Melilla and Ceuta are the closest regions to zero. It can be concluded that this pre-crisis period reveals in better way true between Spanish regions where there are two big groups. First groups generated significantly more than the second group. The gap between these two big groups was really huge during the pre-crisis.
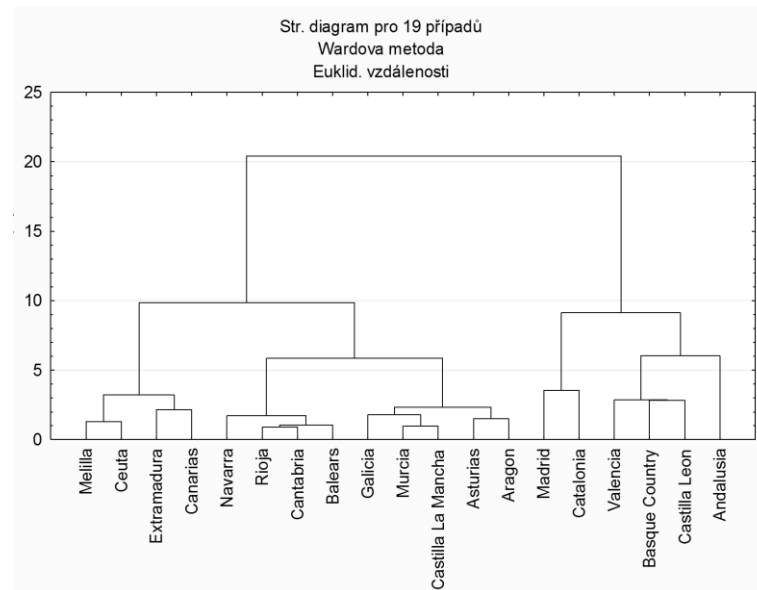
Figure 32: Cluster analysis before the crisis- 4-4-2-years model
Source: Own elaboration, INE

According to the figures of PCA analysis 47, 48, 49 and 50, factor 1 explains 66.73 % of model, meanwhile factor 2 provides information about 14.48 % of the model and factor 3 informs about 11.30%. Due to this finding, the figure with first two factors can be commentated. As it was mentioned also in previous model, also now all sectors of Spanish economy except agriculture, are relevant when explaining factor 1. Prevailing majority of Spanish regions are situated on positive side and close to zero which implies that these sectors are not as much important for these regions. But when there is a change in these sectors it should have positive effect on them. Nevertheless, the most industrial regions and strongest regions are situated on the negative side of factor 1. Regions such as Basque Country, Valencia, Castilla Leon and Galicia which were positioned in cluster with Catalonia and Madrid are on negative side of factor 1 and on close to zero. This implies that if something happened in these sectors, it would have a negative impact on development of these regions. The most distant region meting the most dependent on these sectors is Catalonia reaching almost -7. Factor 2 indicates also as in previous model as explaining variables GDP per capita, unemployment rate and agriculture. According to this factor Spain remains almost equally distributed. First half is situated on the positive side and Catalonia together with Murcia and Asturias are close to zero. Factor two has positive effect on region Navarra, Basque Country, Rioja and Madrid. On the other hand, second half of regions are situated on negative side when most of them are close to zero. The worst situation can happen for Andalusia which produces 25 % of Spanish agriculture. Negative development in agriculture has for sure huge impact on others sectors in these regions which consequently have an impact also on unemployment rate. Factor 3, which can be observed in PCA analysis figures, explains remaining 11.30 % of model and therefore GDP growth and its impact on regions. Eleven of Spanish

regions are positioned on the positive side of the figure. As the most distant regions for factor 3 regions Ceuta, Melilla and Canarias can be identified. For these regions, development of GDP growth then GDP per capita is the most important.

Initial contact with crisis reveals different regions distribution across Spain in figure 33. Division of Spanish region into two big clusters remained, however the position between them changed. The most important regions remained Madrid and Catalonia together with Valencia and Andalusia. Basque Country and Castilla Leon got more distant from these four most powerful regions and now they are situated in the second cluster. It is evidence about the impact of crisis on divergence among Spanish regions. Regions which had pace and catch up trend left that strong group. So the first cluster experienced divergence of two regions and is now composed by two different groups. However Valencia is still close these three strong regions. Second cluster also experienced huge change during the crisis period. Right branch of the second cluster not includes more diverged regions. In the middle of the figure 34, it cluster created by other small sub-clusters can be seen. It implies that these regions converged towards each other. Some of them left cluster such as Rioja, Cantabria and Baleares were closer to Navarra, which is now closest to the Basque Country. This new redistribution of Spanish regions also implies that these regions in new clusters react on the crisis conditions in similar way. Also, it has to be considered that is also possible that some of them were hit by crisis in different way and some regions just remained in same position and others which were more hit diverged from their closest cluster. It should be also underlined here that majority of regions reacted in same way on crisis impact. This was proved in macroeconomic part where smaller economies decreased, however this decrease was big with respect of their pre-crisis amount of GDP for example. Left branch of the second big cluster now includes six Spanish regions so two new regions joined this group. Castilla La Mancha and Murcia created new sub-cluster between Extramadura and Canarias. Regions Ceuta and Melilla remained as the most distant regions to the strongest group. From the figure 33 it can be easily observed how the initial crisis contact changed position of regions and how smaller economies converged towards each other meanwhile they diverged to toward other regions. It can be also said that the crisis deepened distance between individual clusters.
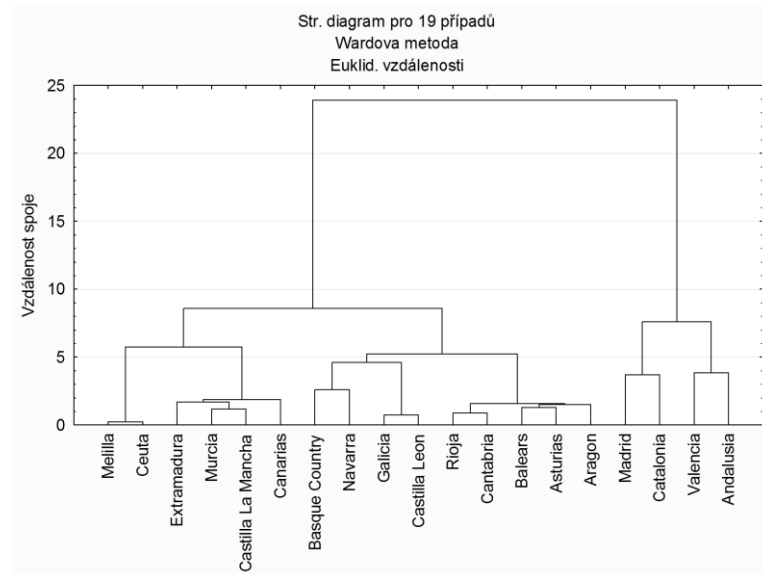
Figure 33: Cluster analysis during the crisis- 4-4-2-years model
Source: Own elaboration, INE

In figures 51, 52, 53 and 54 almost same redistribution as in the pre-crisis period can be observed. However, there are some changes which would be good to notice. Factor 1 explains 66.47 % of the model, factor 2 increased its importance and explains almost 20 %. During the crisis, factor 3 decreased its importance in explaining to 5.89 %. Regions situated on right side upper quadrant got closer to the zero. However, Navarra got more distant from zero with respect to the previous pre-crisis period. Ceuta and Melilla moved close to zero in right side down quadrant and other regions moved to the point around -1,5. Andalusia moved little bit down on axis Y. However Catalonia become more sensitive on factor two with respect to the previous period. Explanatory variables for factor 1 are as in previous case all sectors except the agriculture. Second factor is explained by remaining four variables by GDP per capita, GDP growth, unemployment rate and by agriculture. Factor one is not as much important because most of them are close to zero, however during the crisis they changed the position little bit and now they are around point 2 on a positive side. It is valid for regions such as Ceuta, Melilla, Rioja, Cantabria and Extramadura. Other regions remained importance on these sectors such as Catalonia, Madrid, Andalusia and Valencia. Catalonia reveals bigger importance on factor 2 when the crisis entered into Spain. According to the figure, factor 3 explains only insignificant part of the model. So it explanation is not relevant for purpose of this thesis when 86 % of model are already explain. Nevertheless, distribution of Spanish regions according to factor 3.

Cluster analysis of last two crisis years which can be seen in figure 34 reveals again different situation across Spain. As it was seen also in previous results, Spain is divided into two parts, in other words two clusters which are distant from each other. The first cluster includes the most important economies in Spain, namely Madrid, Catalonia and Andalusia. It is important to say that these two

regions remained close together during the whole ten-years. Also, Andalusia stayed close to these two main regions, however Andalusia diverged from Valencia which left this group during this period. In the other cluster, Valencia joined cluster together with Basque Country, Galicia, Castilla and Leon. This group except from Galicia was in the pre-crisis period catching up with the three strongest regions Madrid, Catalonia and Andalusia. It implies a different reaction on the initial contact of crisis. Basque Country and Castilla Leon reacted in more sensitive way to the crisis and left the first cluster during the first four crisis years. It can be given by fact that these regions generated a smaller part of Spanish GDP and the decline during the crisis sent them back to the second and more distant-divergent group. Right side branch of the second cluster now contains twelve Spain regions. Just this fact speaks about convergence among these regions. However, this branch provides a new redistribution of Spain regions and different sub-groups. On the left side, Ceuta and Melilla can be found. These regions were during all ten years together and in same cluster and are still more similar to the region Extramadura. All together, they are connected to the cluster created by region Murcia and Castilla La Mancha. Also these two regions were together during observed ten-year period. It is good to notice that newly created group is composed by highly touristic regions, namely Canarias and Baleares. It implies that the crisis converged and joined regions with similar structure of economy. These two are well known for tourism which could be affected by crisis in way that tourist shortened its vacations or they selected different and cheaper destination. Remaining Spanish regions compose last cluster which is situated in the middle of figure. All these regions were together in one sub-cluster also in previous periods, however they changed their position and closest region. Navarra in previous period converged to Basque Country and now is close to the Aragon. It implies that Navarra diverged from Basque Country and converged to Aragon. Crucial period was second observed period, which revealed impact of crisis and changed pace of individual regions. Last two crisis years converged regions with similar behavior under crisis situation.
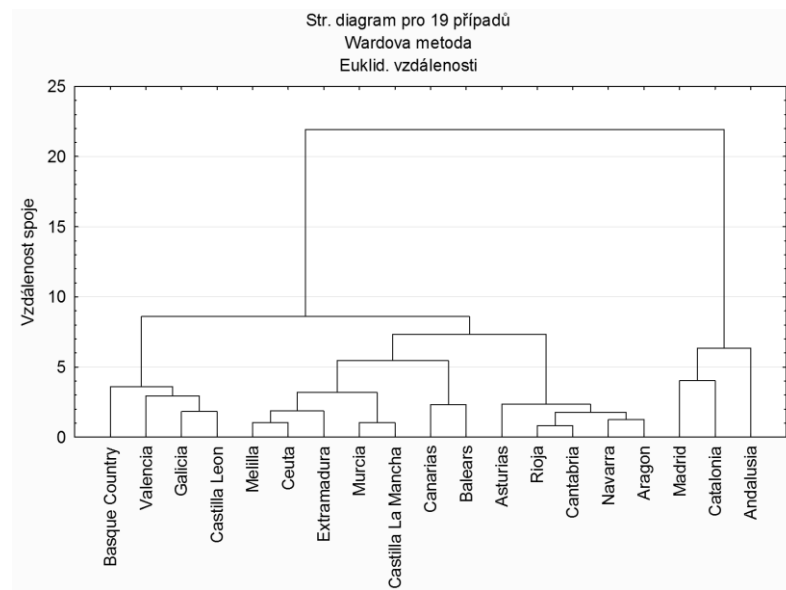
Figure 34: Cluster analysis last two years of the crisis- 4-4-2-years model
Source: Own elaboration, INE

As well as in previous cases, also here are factors 1 and 2 the most important for explaining the model. These factors can be observed in figure 55, 56, 57 and 58. Factor 1 represents 66.84 % of the model, factor 2 explains almost 17 %. According to the factor 3 holds just around 8 %. Factor 1 also in this case explains all sectors, except agriculture. Factor 2 two now explains just three factors, namely GDP per capita, unemployment rate and agriculture. Factor 3 then explains GDP growth. During last two observed years, some changes with respect to the previous period happened. It can be seen that regions situated in positive side of factor 1 got more distant from 0. For example, Ceuta and Melilla are in the middle of point 2. This group which is situated in right side down quadrant moved from zero of factor 2 and now is situated around point -1 and -2. This implies that these regions became more positively influenced by Spanish economy sector and they became more sensitive on GDP per capita, unemployment rate and agriculture. However, these regions, which belong to the second cluster indicated in cluster analysis are more likely to be close to 0. The strongest regions Catalonia, Madrid and Andalusia are more sensitive to variables of factor 1 and Andalusia is more sensitive to factor 2 due to agriculture. In PCA analysis regional dependence on factor 3 which represents GDP growth can be seen. Majority of regions is oscillating around the zero. However during this period, factor 3 increased its importance for Baleares and Canarias. As it was mentioned before, it can be given by similar structure of economy.

Comparing all three periods of time, following results can be concluded. The first period, namely the pre-crisis period nicely showed real redistribution of Spanish regions. It was easy to see how deep the gap between Spanish regions in first cluster and second cluster is. First cluster included also regions which contributed with lower share to GDP than Catalonia or Madrid. Nevertheless, they

contributed more than remaining Spanish regions. Pre-crisis period revealed divergence between Spanish regions which were positioned in different clusters and sub-clusters. The first four crisis years changed the previous scenario. The strongest Spanish regions decreased its number in the first cluster. Basque Country and Castilla Leon diverged from these regions and created another sub-cluster in second cluster. Last two observed years during the crisis revealed again new distribution in Spain. Valencia left the group with strongest regions which implies that it diverged from them. It can be nicely seen that crisis deepened the gap between these two groups. However, it has to be said that crisis led to converge between regions with smaller contribution share into GDP. Some of these regions diverged so it seems that these regions converged but the opposite is true. Regions with higher share in GDP they declined its share more than remaining regions and so these regions were able to catch up them.

5.3   β-Convergence analysis

Regional evolution is according European Commission measured by using β-convergence. The aim is to reveal whether poorer regions are growing faster that richer ones and therefore if there is catching up process between them. This approach is directly connected to the Neo-classical growth theory of Solow which assumes that production is one of the important factors. Therefore in the long run, growth process should push regions to long run steady state with increasing growth rate which is related and depends on factors-technological progress and labor force progress. It implies that richer regions should have higher level of GDP per capita and poorer regions should be in catching up process and should have higher growth rate. The β-convergence analysis was calculated by formula $\frac{1}{T} log \left(\frac{GDP_{i,T}}{GDP_{i,0}} \right) = \alpha + \beta log \left(GDP_{i,0} \right) + \varepsilon_i$. Calculations were done for three periods, one before the crisis, during the crisis and difference during whole ten-year period. All calculations are available on CD attached on cover of this thesis. The estimation of the model can be observed in figure 59 in appendix 6. According to the estimation of the model α=6.72062 and β=0.0000262. Since all variables were significant according to the p-value and the R-squared was 0.95 %, the model could be claimed as significant and explains 95 %.

According to the thesis hypothesis whether the convergence or divergence happened in Spain, it was necessary to see the regional evolution during the pre-crisis period. For this purpose the β-convergence analysis was done for the years 2004 until year 2007 to see how Spanish regions were doing without any crisis situation. According to the literature, the positive values showed that Spanish regions tend to convergence during pre-crisis period. It can be nicely seen in the Figure 35 that during the pre-crisis period Spanish regions tend to converge. Regions have created a few groups according to the level of GDP per capita and GDP growth. The first group consists of Madrid, Navarra, Basque Country and Catalonia. It implies that these regions tend to have similar rate of growth and similar

level of GDP per capita during the observed period. Regions Baleares, Rioja and Andalusia are slightly under this level and conclude the first group. From the figure below, it is clear that Andalusia was the region with highest catching up process because is the most distant region from 0 of this group. Second groups consists remaining Spanish regions except region Extramadura which is situated alone in the Figure 35. It is good to notice that Valencia was close to Castilla and Leon which were close to each other also in Cluster analysis. However, Castilla and Leon together with Cantabria are leaders in catching up process towards the first group. Asturias recorded the biggest convergence trend toward to leading group with value almost 0,016. β-convergence values of Melilla and Canarias were with respect to the rest of the Spain significantly lower but still they are in better situation than Extramadura. This region is situated alone with worse initial position than the rest of Spain but with average pace of β-convergence. It implies that even if this region is poorer than rest of the Spain, it was able to reach average rate of growth around 4.5% during the pre-crisis period which confirms catching up process towards the rest of the Spain. It is clear that this period of time was positive for all Spanish regions and they evinced the convergence trend between 0.08-0.018. They created groups according similar levels of GDP per capita and GDP growth. It can be said that during this period region Catalonia was more distant to region Madrid which according to the Cluster analysis were situated in same cluster. Region Andalusia is at the bottom of the first group and was most distant region to Madrid.

Figure 35: β-convergence among Spanish regions during years 2004-2007
Source: Own calculation, INE

In Figure 36, different situation can be observed. It depicts an evolution among Spanish regions during last eight years which includes four years of crisis. Now Spanish regions are divided into two groups. Group on the positive side of the axis x still evinced positive values of β-convergence results which implies that they still were converging. These regions consist of Basque Country, Castilla Leon, Asturias, Galicia and Extramadura. The region with the highest value of β-convergence was Galicia with value 0,003 and Castilla and Leon was the region with the lowest value of convergence which just slightly overcame the level of 0. Divergence among Spanish regions is clear at the first sight. Spanish regions moved from each other and they deepened gaps among them. The only region which neither converged nor diverged was Aragon which recorded result of zero β-convergence. Values of divergence among Spanish regions varied from -0.0009 to -0.008. Regions with the lowest value of divergence during the crisis period were Navarra, Cantabria and Rioja. Madrid, Catalonia, Murcia, Ceuta, Castilla La Mancha, and Andalusia experienced divergence around -0.002 during the crisis period. Remaining four regions experienced the biggest divergence in Spain reachin -0.004 to -0.008. It can be said that all Spanish regions which experienced negative evolution of convergence during last eight years were marked by financial and economic crisis and crisis in Eurozone area. The convergence decreased significantly and in majority of the cases was replaced by divergence. It

can be said that Spanish regions started to diverge and create new groups of regions with similar level of GDP per capita and growth rate. The crisis situation left a mark on all Spain regions. It divided Spanish regions into two groups. First one consisting regions with moderate convergence and second one including regions with moderate and higher divergence. It is obvious that some regions were more resistant to the crisis and still evinced convergence because the impact of the crisis did not have to be spread immediately and it depends on the interconnection of economy with other regions and countries.
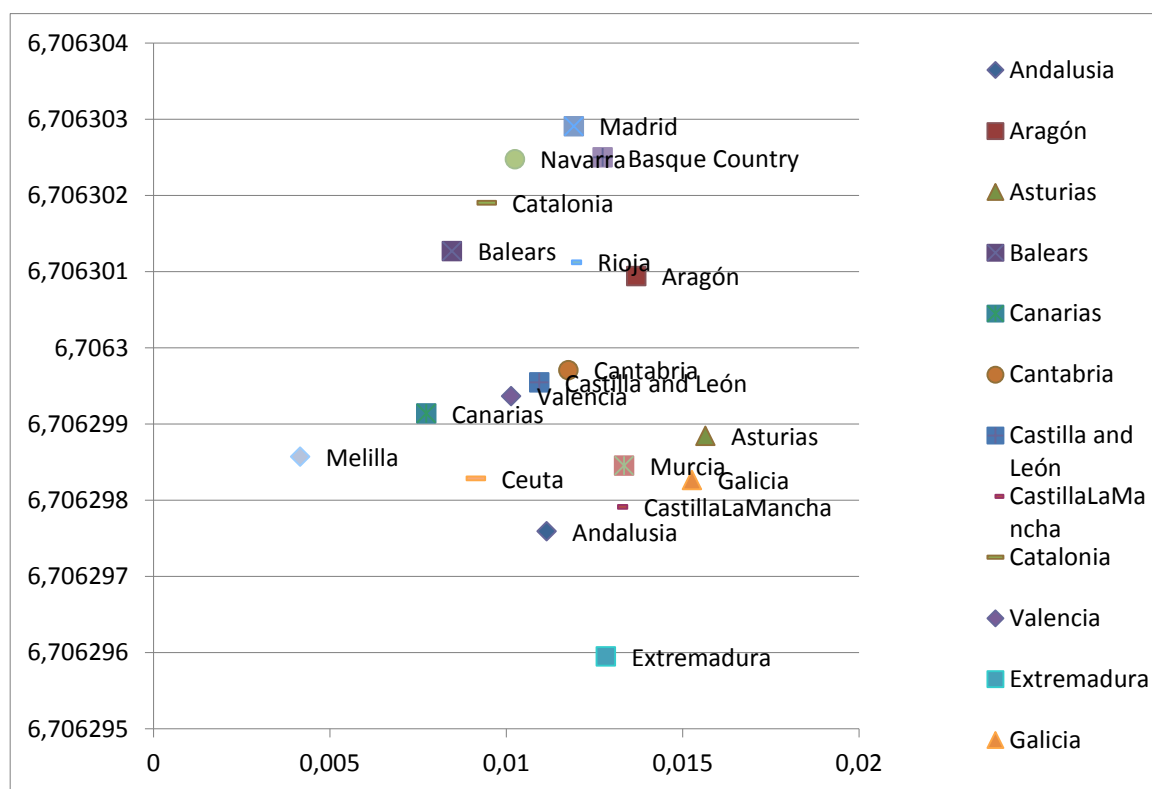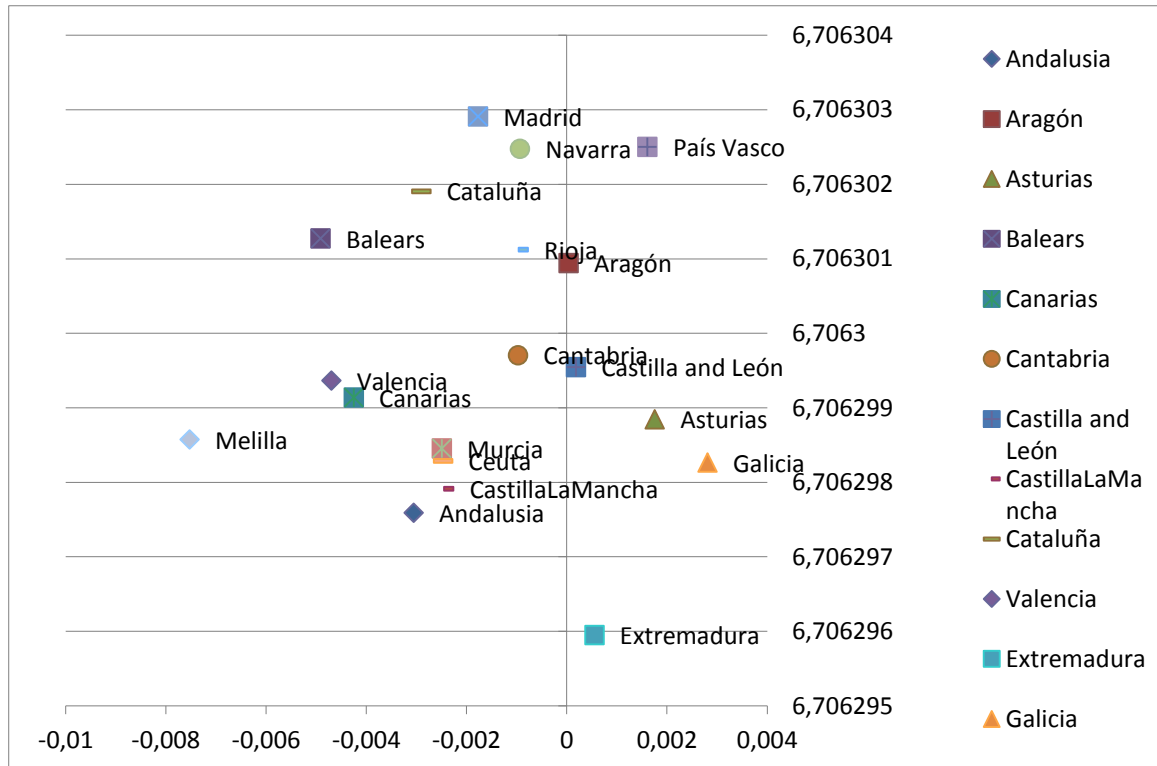

Figure 36: β-convergence among Spanish regions during years 2004-2011
Source: Own calculation, INE

Moreover, different situation can be observed in Figure 37 which represents results of β-convergence for whole period, namely for ten-years and includes also impact of financial and economic crisis in Spain. The figure has different format than the others because of large scale of axis x. It is given by fact that majority of Spain regions are oscillating around 0 to -0.015 and two regions Cantabria and Baleares experienced significantly higher divergence than rest of the Spain. The second axis y represents change of scale which is valid from that point to the left side of the figure. This little change of scale facilitated observation of real redistribution of Spanish regions. From the figure below, it can be observed how crisis changed approach of all Spanish regions. All Spanish regions changed their pace and catching up process. All regions except Galicia experienced negative convergence. So it can be said they converged during the last ten years which were

marked by crisis. Groups which were obvious in first pre-crisis figure remained in almost same logic, however gap between these groups increased significantly with divergence trend. During the whole period, Basque Country is now the region with lowest divergence tightly followed by Asturias (which is distant from Basque Country). Major part of Spanish regions experienced divergence around -0.005. For example, region Castilla and Leon experienced slight convergence during the previous period and now is diverging and getting close to the group of regions Valencia and Canarias. The region Melilla experienced bigger divergence from the main group. Nevertheless, regions Cantabria and Baleares evinced significantly stronger divergence then rest of the Spain which implies they were significantly harder influenced by crisis in Spain. Baleares experienced negative β-convergence result (thus divergence) of value -1.05 and Cantabria -1.035 and majority of the Spain recorded divergence of value around -0.005 which is significantly lower with respect of these two regions. It implies that GDP per capita and growth rate significantly declined for these two regions during the observed period. It can be rationalized by following. Balearic Islands employ around 70 % of their inhabitants in the service sector which includes tourism. During the crisis period, uncertainty of future incomes, high unemployment and other significant variables influenced decrease of consumption and money spent on vacations. Crisis decreased number of arriving tourist which made their vacations shorter. This behavior influenced earnings of people engaged in tourism sector which is related to many other sectors. Region Cantabria employs 35 % of its inhabitants in primary and secondary sector which was strongly hit by crisis. Remaining inhabitants are working in third sector which had increasing trend in Spain, however in Cantabria decreased slightly. So these two regions were hit by crisis in their important sectors.
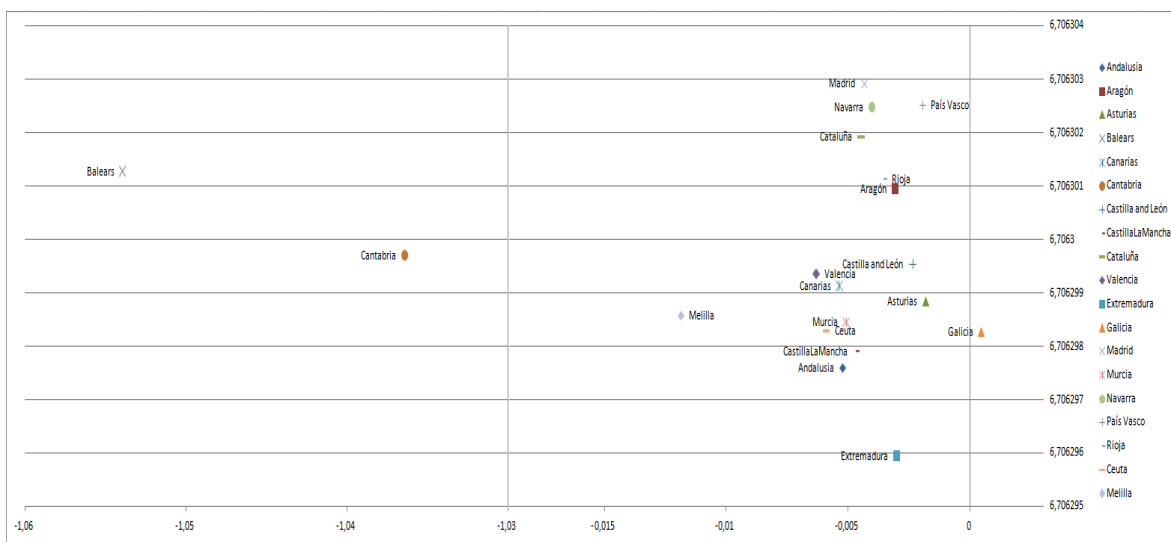

Figure 37: β-convergence among Spanish regions during years 2004-2013
Source: Own calculation, INE

Comparing all figures above, it can be concluded that crisis significantly influenced evolution of Spanish regions and it changed their catching up-converging trend to the opposite direction and they started to divergence. Spanish regions were converging during the pre-crisis period. They created three groups according their similarity. Madrid, Basque Country, Navarra and Catalonia were indicated as the richest regions in Spain and other regions were catching them up. It also has to be mentioned that even in this group, regions were catching up Madrid which is situated above them. However, the second group of regions which is situated below first group was characterized by higher converging trend than the first group. Majority of these regions recorded higher convergence values than Madrid. However, region Extramadura was indicated as the poorest region which was positioned close to the axis x but during the pre-crisis period experienced average Spanish convergence value slightly higher than Madrid. The crisis period changed this situation when regions were doing steps to get closer to each other. Crisis period revealed how the crisis influenced the evolution among Spanish region. Convergence was changed for divergence in majority of cases. Just five of Spanish regions did not experienced divergence. The initial four years of the crisis divided Spanish regions significantly. Most of the regions were hit by crisis immediately more exactly their crucial sectors were strongly hit and influenced by crisis. Catalonia experienced stronger impact which brought biggest divergence value of the first group. It should be notice that average divergence of Spanish regions was around -0.002, meanwhile four regions Baleares, Canarias, Valencia and Melilla experienced significantly bigger divergence with respect to the rest of the Spain. However, the most important clarification was brought by the figure representing evolution of the ten-year period. Comparing figure before the crisis with ten-year evolution, it can be concluded that crisis changed significantly direction to which Spanish regions were approaching. The crisis influenced significantly all Spanish regions and as only Galicia maintained positive convergence value. Remaining Spanish regions changed their approach towards divergence. Change of catching up process can be seen comparing first and third figures of convergence where Valencia, Cantabria and Castilla and Leon were close to each other. Valencia was approaching towards Castilla and Leon and they together were approaching towards Cantabria. This was changed by the crisis. Valencia enlarged its gap with Castilla and Leon which means divergence. Cantabria left this group completely and significantly diverged not only from Valencia and Castilla and Leon, but also from rest of the Spain. But did how the crisis influence the richest group of regions consisting of Madrid, Basque Country, Navarra and Catalonia? In pre-crisis period, Madrid was the wealthiest region followed by Basque Country with higher convergence value. Catalonia was following regions from this group and with lowest convergence value. The crisis period changed little bit their position. Madrid, Navarra and Catalonia now have almost identical divergence and they are closer to each other. On the other hand, Basque Country is getting more distant from this groups due to lower divergence value. It can be said that Madrid, Navarra and Catalonia converged and at the same time they diverged from Basque Country. Similar scenario happened also in case of region Aragon

and Rioja. Aragon was catching up with Rioja having higher convergence value. The crisis situation caused that these two regions are now closer to each other having almost identical negative value of convergence. Then it should be noticed the evolution of regions Asturias, Galicia, Murcia and Castilla La Mancha. In pre-crisis period they were positioned really close together. In first crisis figure, divergence among them started and gap between them was enlarged significantly. Region Asturias and Galicia were still having positive values of convergence while the rest of the group diverged significantly. Comparing first and third figure of convergence, it can be said that these regions diverged significantly from each other during last ten-years of crisis in Eurozone. Nevertheless, the most significant divergence during last ten-years was experienced by Baleares and Cantabria. In pre-crisis period Baleares where close to the Catalonia and Rioja. That implies they were doing quite well. Balearic Islands felt impact of crisis immediately because they reacted to this situation by almost highest divergence value. They changed completely pace and approach. The same situation happened in case of Cantabria. As it was mentioned above, this strong divergence can be given by fact that these regions are highly dependent on one sector which was strongly hit by crisis. For example, Baleares are dependent on third sector: tourism. The crisis brought fear of losing jobs, decrease of consumption, and decrease of savings and therefore tourists might have decided to postpone their vacations to next year. They could decrease vacation length or they could chose cheaper option. It is clear that crisis changes behavior of consumers and regions, which are dependent on such sector which can be devastating. It should be also said that crisis certainly influenced Canarias and as well Italy experienced decrease of arriving tourists who decreases time of their vacations. According β-convergence results, it can be said that crisis strongly hit Spanish regions and changed completely their approach. They lost positive values of β-convergence and they gradually went into a divergence trend. Crisis influenced also gaps among regions and their catching up process. Some regions apparently converged and now they are close such as Catalonia and Madrid. But it can be claimed as incorrect convergence because the wealthier region Madrid decreased GDP so it would be more correct to say that Madrid declined to them. Some of the regions were more hit by crisis than others but in Spain divergence trend with enlarged gaps between regions prevailed.

6 Discussion and results

Comparing all results provided in this thesis, following can be concluded. Analysis of the most important macroeconomic indicators available on regional level revealed that Spanish economy was hit by crisis already in year 2008. According to the macroeconomic analysis which assumed as the pre-crisis period 2004 - 2008 and crisis period since 2009 until year 2013, it was evident that all selected indicators were already affected by the crisis in year 2008. GDP, GDP per capita, GDP growth and unemployment rate were selected as crucial macroeconomic indicators. It was proved that majority of Spanish regions started to decline their GDP already in 2008. Regions with highest GDP contribution, namely Madrid, Catalonia, and Andalusia, started to decline their GDP immediately in year 2008. Increasing trend of GDP continued in year 2008 only in regions with significantly lower contribution to Spanish GDP, such as Rioja. According to the subsequent findings, it can be said that decline in GDP was given by higher interconnection of their economies with rest of the world because large companies and majority of Spanish industry are situated in these three regions: Madrid, Catalonia and Andalusia (followed by region Valencia and Basque Country). Interesting fact was discovered analyzing GDP per capita results. In pre-crisis period, Madrid was region with highest GDP per capita followed by Basque Country and by Catalonia. However the crisis period changed the leading and Basque Country is now the region with highest GDP per capita in Spain followed by Madrid and by Catalonia. It should be underlined once again that all Spanish regions declined significantly their level of GDP per capita during the crisis. Moreover, Andalusia which belongs to the three regions with highest contribution of GDP in Spain decreased its level of GDP per capita also significantly, and so, by 22 % and now its level is close to level of region Castilla La Mancha. Another interesting thing was discovered analyzing ten-year development of unemployment rate. Recently mentioned region Andalusia was keeping its unemployment rate in pre-crisis period close to the 10 %. The crucial year turned to be year 2008 during which the unemployment rate reached to 17 %, but still it was just beginning and at the end of the observed period region Andalusia reached incredibly high value of 36 %. According to the general data about Spanish economy, it was proven that private consumption decreased significantly since the crisis entered in Spain. It is known that labor costs in south countries are rigid and high with respect to the other European countries (it was proven in chapter about Spain economy). All these important macroeconomic indicators indicated that companies endangered by crisis and lower consumption lowered their level of employment. Decrease of company's revenues can be seen among all sectors in Spain. Moreover it should be underlined here once again that macroeconomic analysis revealed important thing that Spanish regions can be segmented into three groups according to the results of indicators during last ten-years. First group contains three regions contributing the most to the Spanish GDP, namely Madrid, Catalonia, and Andalusia. Second group is cre-

ated by region Valencia, Basque Country, Castilla and Leon and Galicia. Remaining twelve Spanish regions creates third group. Macroeconomic analysis provided first crucial evidence of the crisis for this thesis. This analysis was crucial due to evidence that the crisis hit Spanish regions already in year 2008 which helped to improve following analysis to determine best results about the convergence and divergence during the pre-crisis and crisis period. The macroeconomic analysis also proved that Spanish regions can be grouped according economic performance similarities, which are important for convergence of regions. Moreover, macroeconomic analysis proved important background for Cluster and β-convergence analysis about the development of the regions during ten years marked by crisis.

The thesis implied the question whether the Spanish regions converged or diverged during the crisis period. For this purpose the Cluster analysis was used and because this analysis worked with regional sector data it nicely revealed how the crisis hit important sectors of Spanish regions and what impact it had on regions. This analysis grouped regions into several clusters according their sector and macroeconomic similarity. As the macroeconomic analysis revealed, already year 2008 was affected by crisis. Due to this reason, it was suggested to run Cluster analysis in two models, namely five-year model and the 4-4-2 year model, which provided a better view on development of regional convergence. Comparing Cluster analysis results of both models and sector analysis, following can be concluded. Both models redistributed Spanish regions into two big clusters which are different in terms of economic performance. The five-year model provided two different clusters capturing the pre-crisis and crisis situation. The same result provided also the 4-4-2 year model which revealed ten-year evolution of Spanish regions in three clusters. First group in both models represents the most powerful regions, namely Catalonia, Madrid and Andalusia. However the 4-4-2 year model included also other three regions into first group, namely Valencia, Basque Country and Castilla and Leon.

According to the Cluster analysis, these regions were close each other during the pre-crisis period. This was confirmed by sector analysis, which revealed that regions Catalonia, Madrid, Valencia, Basque Country and Andalusia (in manufacture industry) are really significant for Spanish industry: construction, retail and other. Importance in every sector vary for each regions, however it should to be underlined that region Catalonia and Madrid belong to the most important regions in all sectors in Spain. It can be assumed that five-year model did not include the other three above-mentioned regions because values are affected by the crisis year 2008. For this reason, it can be outlined that model 4-4-2 revealed the situation among Spanish regions in better way. Cluster analysis results of crisis period provided excellent proof about the divergence in Spain. The figure 30 representing five-year model during the crisis revealed that Valencia converged to first group. Figure 31 of the 4-4-2 year model presents gradual change among Spanish regions. During the first crisis period, Basque Country and Castilla and Leon left the first group and diverged from them. Last two years of crisis period revealed another abandon of the group when also Valencia converged to

the second group. In reality it means that Valencia diverged and increased its disparities with respect to the first group. It can be confirmed that according to the all variables, the model 4-4-2 revealed the reality better and provided nice overview about gradual divergence these regions and captured gradual abandon of regional groups. Nevertheless, it should be mentioned that Valencia, Basque Country and Castilla Leon proofed that their values are lower with respect to the Madrid, Catalonia and Andalusia (it can be seen in macroeconomic analysis section). But they were the closest regions to this group.

According to the Cluster analysis, second cluster contains remaining Spanish regions. Second cluster is divided into two sub-clusters. The bigger one included the majority of Spanish regions and the smaller one included regions which were the most distant to the first group. The bigger cluster is divided into other smaller clusters according to the similarity of regions. The five-year model identified that regions Rioja, Cantabria, Baleares, Asturias, Aragon and Navarra were close to each other but the crisis period increased the distance between them and some of regions diverged to the other cluster which is situated close to zero. During the crisis, Basque Country and Castilla Leon remained together meanwhile group was extended by Galicia which shifted to the worst positioned cluster in pre-crisis group. This cluster which was situated close to zero was enlarged by two other regions: Castilla La Mancha and Murcia which converged to this group from region Galicia. It can be said that this model nicely captured the position of regions which were doing worst that rest of the Spain.

The 4-4-2 model revealed movements among more precisely regions. In figures 32, 33, 34 the rotation of regions during observed ten-year period can be nicely observed. According to results of this model, it can be said that during the crisis period which was divided into two parts regions converged to regions which were at lower level in pre-crisis situation. So this supposed "convergence" can be understood as divergence from the pre-crisis trend where these regions were approaching before the crisis hit Spain. This is nicely seen in case of Valencia, Basque Country and Castilla and Leon which were in pace to catch up the three most powerful regions. The crisis changed the supposed evolution and hit regions in their important sectors which are necessary for their growing trend. The crisis created new groups of regions in Spain which are now very similar regarding to the economic situation. These converged groups were created according to the sector similarities which were hit in similar way. For example, regions Canarias and Baleares are now situated in one cluster. Both regions are highly tourism-oriented regions. These regions felt a lot an impact of the crisis because construction sector stopped built new hotels in Canarias and both regions recorded decrease in retail sector which includes services and hotel industry. This decline was given likely due to decline in tourist and shortening their vacations. Other example can be taken from Madrid, Catalonia and Andalusia. These regions were followed by other regions, however the crisis revealed that catching up regions could not be kept up any more. These three regions are very similar in terms that they are positioned in almost all sectors in first three places. Region Andalusia is the most important region in agriculture. Madrid and Catalonia are important for

Spain in all industries, construction, financial sector, and so on. All regions which created new converged groups were close and similar in their important sectors. It is also given by fact that their significant regions were in similar way hit by crisis. It can be summarized that crisis had a huge impact on Spanish economy. Spanish regions were strongly hit by crisis which turned out in divergence from the most powerful regions. Now, Spanish regions are divided into two groups. First group consists of Madrid, Catalonia and Andalusia which are really distant form rest of the Spain. Second group is divided into other smaller groups of regions which used to be together and close to each other but during the crisis period they diverged from each other and they converged to new groups.

Additionally, the β-convergence was done. This analysis is used by European Union to find out whether European regions are converging. The β-convergence analysis provided different view on this topic using just two variables, namely GDP per capita and GDP growth. The β-convergence analysis was done for three periods which were selected according to the Cluster analysis results. It was done according to the 4-4-2 year model which contained the best results revealing gradual moving of regions. The β-convergence results of pre-crisis period revealed that distribution of Spanish regions and their converging trend. The best performing regions in Spain include Madrid, Basque Country, Navarra and Catalonia. All these regions had positive β-convergence value and it can be said that they were oscillating around average Spanish β-convergence value. Other group contained almost all Spanish regions which were positioned close to each other. However, Asturias which was positioned in the middle among Spanish regions recorded the highest β-convergence value which implies about its high catching up process. On the other hand, Melilla had the lowest β-convergence value in Spain during the pre-crisis period. In terms of this analysis Extramadura was indicated as the poorest region in Spain which is far from rest of Spain. However it had an average β-convergence value. The big change in redistribution of Spanish regions happened during the first four crisis years. The majority of Spanish regions were hit strongly by crisis and they started to have negative β-convergence value, which provides an evidence of divergence among Spanish regions. Only six regions out of nineteen maintained their positive values of β-convergence. These regions were: Basque Country, Aragon, Castilla Leon, Asturias, Galicia and Extramadura. Nevertheless, β-convergence value decreased significantly. Rest of the Spain was hit more by crisis and started to diverge. It can be noticed that Spanish regions started to open up gap among them and they stopped converging to each other. It implies that catching up process had been stopped due to crisis. Baleares belongs to regions which recorded highest divergence during first four crisis years. The figure 36 revealed this change among regions during six years of crisis. Comparing pre-crisis and crisis situation, it can be concluded that crisis significantly affected evolution of Spanish regions. Six years of crisis revealed that all regions except Galicia recorded divergence with compare to the pre-crisis period. The average divergence in Spain was around -0.005. It should be underlined that regions situated in first the wealthiest group started converging to each

other. It implies that the wealthiest regions Madrid decreased its wealth and started to diverge to regions which were doing worse than Madrid. It can be also concluded that regions created new groups because some regions significantly diverged such as Cantabria. The crisis caused opening up the gap among Spanish regions which can have really bad impact on the current situation in Spain. As soon as the regions start to diverge from each other, it will certainly affect also growing trend of Spanish economy, once the common budget have solve regional differences and provide transfers to regions which are in economic troubles. However, it should be underlined that asymmetric shocks between regions can be solved by automatic transfers, but permanent shock should not been solved by these transfers but by deep changes in economy, infrastructure and other. Permanent transfers can endanger country once the inhabitant of such a country did not feel to be part of this nation. And this is Spanish case. Inhabitants of Catalonia feel to be paying to other regions which are struggling in Spain. This thesis provided evidence that financial and economic crisis certainly strongly hit all Spanish regions and caused that these regions started to diverge from each other. It has an impact on catching up process which stopped. However, the analysis of the regional transfers among regions should be done to complete the view on this topic. This work provided economic and statistical evidence about divergence among Spanish regions based on macroeconomic and sector data during the ten-years affected by crisis.

This thesis used the β-convergence analysis, which is used by European Union. Due to this, this work can be compared with other works in this field. It should be underlined that current works focus mainly on the β-convergence of countries in EU, however the convergence among national regions is not as much observed. Nevertheless, this topic should be involved in the national and European observation. It was proved that crisis significantly influenced the evolution of convergence among Spanish regions that are now diverging from each other. This can endanger the whole country and lead to the increase of separatist attempts. The majority of works focus only on convergence among the countries. However, it should be mentioned that if the country is not unified it will be more difficult, more costly and take longer time to converge with other countries in monetary union. The crisis impact on regional development should be more observed and it should be put more weight on it because once the country will not be unified and more separatist attempts will affect development of convergence and situation in European Union. This thesis confirmed hypothesis that crisis significantly influenced the evolution of convergence among Spanish regions. This work should be enriched by analysis of transfers among Spanish regions that would identify which regions are net contributors and net gainers. This would complete the analysis done within this thesis.

To deal with current difficult situation, it could be suggested that Spanish government should increase its importance in these newly created groups of regions, which were created according to the crisis impact on their important sec-

tors. As first important step to be done is to increase motivation for firms to employ young people to decease high rate of young unemployment. Together with this, the Spanish government should decrease barriers to enter in market which would encourage young people to start to run their business. Then the wage in Spain should decrease so that Spain cold increase its competitiveness. Spanish government should encourage and support industry in all Spanish regions which would regain their power. Once the industry start to recover, it will help to remaining sectors among Spanish regions. Spanish government should be aware of bad situation in highly touristic regions Canarias and Baleares which diverged significantly from rest of Spain. Predominantly, European Union should not underestimate this situation, although it might appear as non-significant feature. However once the regions start to diverge it will slow down country. Disunited country will have to solve regional problems or separatist attempts which will not endangered only country situation but also situation in whole Eurozone (in case of Spain) and European Union. Once the country is disunited it will struggle to converged to remaining member-states and initial idea of United States of Europe will be destroyed because if countries will not converge to each other, the political union could not be done, and fragility of incomplete monetary union never disappear.

7 Conclusion

This thesis provides an evidence of the impact of financial and economic crisis on Spanish regions. These pieces evidence were derived thanks to using three different types of analyses. Firstly, the macroeconomic analysis of most important macroeconomic indicators for all nineteen Spanish regions during the pre-crisis and crisis period was elaborated. This analysis provided a proof that Spanish economy and thus its regions was strongly affected by crisis immediately in year 2008. Due to this finding, the two models were suggested for the second analysis- Cluster analysis. The macroeconomic analysis brought other two importance evidences. The Spanish regions could be divided into three groups according their economic performance. First group contains regions Madrid, Catalonia and Andalusia that contributed by more than 50 % to Spanish GDP. Second group was created by regions, who's GDP was significantly higher than among rest of the Spanish regions. Into this group belong region Valencia, Basque Country, Castilla and Leon and region Galicia. Remaining twelve Spanish regions created third group. All these groups were responding to the crisis in the similar way. This analysis provided important evidence about tough situation among Spanish regions. Their economic level declined below the level in year 2004.

Additionally, the Cluster analysis was done. It was based on most important macroeconomic and sector data for all Spanish regions. The analysis was run in two different time models. First model divided ten-year period into two sections. Five years before the crisis and five years during the crisis. Second model was created in three time sections. First section included four years before the crisis, without year 2008. Second section included another four years of crisis. And last section included only last two year of crisis, and thus year 2012 and 2013. The cluster analysis grouped Spanish regions into two different clusters. First cluster includes regions which were doing significantly better than the rest of the Spanish regions, and so, the region Madrid, Catalonia and Andalusia. These regions were grouped into one cluster according economic similarities proved already in macroeconomic analysis. Second cluster contained remaining Spanish regions. According to the Cluster analysis results it was proved that Spanish regions were strongly hit by crisis and started to diverge from each other. Model 4-4-2 year appeared to be the best model for revealing current situation and provided information on gradual moving of regions during ten-year period. This model provided a nice view into divergence changes during the crisis. It could be though that Spanish regions converged to each other however the opposite is true. Regions which were catching up with the better performing regions such as Catalonia and Madrid abandoned them and they diverged to another group. The model 4-4-2 years nicely captured the moving among sub-clusters. Basque Country together with Castilla and Leon and Valencia moved from the first cluster and converged to the second group during the crisis period. Additionally, it can be said that these new groups of newly similar regions in Spain was based on divergence of regions which were worse in the better group.

Lastly, the β-convergence analysis was done. The β-convergence analysis is used by European Union to find out, whether the convergence among countries is happening. This analysis provided a different view on regional situation in Spain. However, the previous evidence was confirmed once again. The β-convergence analysis proved that crisis changed positive β-convergence value which turned in to divergence of all Spanish regions except Galicia which kept slight convergence trend. In pre-crisis period all Spanish regions were experiencing convergence. The first four crisis years already influence the positive evolution of previous period. Nevertheless, the difference between the pre-crisis period and last years revealed that Spanish regions changed the convergence pace for the divergence. Region Baleares was significantly strongly hit by crisis than rest of the Spain and recorded the highest divergence.

According to the results from all three analyses it can be concluded that hypothesis whether the crisis strongly hit all Spanish regions. Moreover, the Cluster analysis and β-convergence proved that crisis affected development of Spanish regions and they changed their pre-crisis pace. The crisis changed groups of similar regions. The crisis changed the convergence for the divergence. Crisis left Spanish regions with extremely high unemployment rate that national average is above 26 %. Increase of disparities among Spanish regions can endanger Spain and also European Union. Increase of regional disparities tends to the separatist attempts. Moreover non-unified countries will more costly try to converge with other countries in European Union and without similar countries the complete monetary union will be difficult to achieve in the future.

Thus it can be concluded that financial and economic crisis had a strong impact on all Spanish regions. It caused that Spanish regions stopped their convergence and catching up process and their started to diverge from each other. This situation can certainly have a negative effect on country development and convergence process with rest of the Eurozone and European Union. It would be recommended that European Union and countries should start to observe whether the crisis influenced the evolution of regions and whether the country is starting to diverge among its regions. Fast increase of regional disparities can be dangerous for economic performance of the country, its convergence process among countries in European Union. Spanish government should decrease barriers to enter to market and help to young people to start their business. Additionally Spain should provide help to industries that were strongly affected by crisis, especially to construction, manufacturing industry and extractive industry. Spanish government should be aware about difficult situation in highly touristic regions that diverge significantly from rest of the Spain. This thesis reveals that there is divergence among Spanish regions. In order to complete the overall analysis of development of Spanish regions it would be useful to analyze financial transfers among individual regions. After that net contributors and net gainers would be identified and this information would provide complementary view on the whole situation on Spain and concrete polices could be suggested. However, such analysis was out of the scope of this thesis.

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9 Appendices

9.1 Appendix 1

Figure 38: Regions in Spain
Source: Ministry of Social Affairs of Spain, (30)

9.2 Appendix 2 :Impacts and effects of financial and economic crisis on economy

Once the economy is hit by crisis, at first it starts to affect macroeconomic indicators. Immediately, when crisis erupted all regions experienced a decline in GDP. Three years before the crisis they started to recognize slower increasing trend of their GDPs. Notable is the fact that European emerging economies were growing two or three times faster than advanced economies in US and Western Europe. This was caused by large capital inflows which permitted them to maintain investment on high level. But this big dependence on external financing turned as big disadvantage when the crisis emerged. Then double digits in unemployment rate in all regions followed the decrease of GDP. Approximately half of unemployed in US were men working in construction and manufactures sectors.

In Europe, the unemployment rate between genders was almost balanced. European regions had to face to possibility of increasing inflation pressures. As the crisis had its origin in real-estate sector so it influenced especially construction and manufacture industries. So all regions were hit by a decline in investment spending in real estate and construction sector which led to a decrease in other sectors that collaborate with above mentioned. Industrial production declined in all European regions. The mostly hit country was Estonia (-32.2 %), followed by Spain (-22.0 %). The biggest decrease in manufacturing sector hit regions with advanced economies. Then, automobile sector was one of the most severely hit. It is given by the fact that cars have long time usage and their purchase can be postponed. Then they are purchased with credit so in a financial crisis it became more difficult to buy one. During the crisis period it is expected that financial sector will shrink and due to this fact the manufacture industry could increase again its importance. Manufacture industry is more likely to be wide spread in country but financial centers tend to be concentrated in major cities. More over manufacture industry offers job opportunities to the low-educated workers who can obtain higher salaries. It is known that when crisis hit, the commodity prices tend to decline. So exporters of these commodities also suffer by large loss. Current crisis also affected trade of all regions which was caused by a decline in national income and lower consumption. The crisis significantly affected also conditions in financial sectors. Regions with advanced financial sector lost one half of their value, meanwhile emerging regions lost three-quarters of their value. (31)

Additionally, when crisis erupted, companies started to behave in different way. Corporate policy responded to the geographical area in which headquarter of companies was situated. The major cut American and European companies made in spending for technologies reached 10 %. Moreover, European firms were expecting to reduce the amount of cash they hold. The cuts and change of firms' behavior had certainly a huge impact on European regions where the industry and large international companies are situated. Spending cuts forced these companies to decrease development of new technologies and also production which had an impact on unemployment rate in these regions. Main difference during the crisis was that small companies implemented larger capital spending cuts while large companies implemented cuts in technological expenditures. So it can be summarized that crisis had an impact on companies' policy leading to changes in technology, capital and marketing expenditures, reduced number of employees, and dividend payout. It implies that regions where smaller companies are predominantly situated could suffer more than regions with small number of large companies. It should be underlined at this point that Madrid and Catalonia are regions, where big international regions are situated in Spain. However as it was mentioned above, large companies reduced technological expenditures and they decreased number of employees as well as smaller companies did. Regions where smaller companies are situated could suffer more than regions with large companies, because crisis could destroy them. (32)

Then it is known that rapid private indebtedness precedes banking crisis which raise the direct probability of sovereign default and in indirect way public

debt. So when a negative shock hit economy it leads to capital crunch, which turns into disruption of credit supply. Several options how to reduce impact of capital crunch in and economy can be identified. The first and most direct option is to use capital injections from state to companies. Otherwise there are other ways how to alleviate impact of capital crunch such as support of liquidity, asset purchases and others. According empirical finding, the bank recapitalization is considered as most direct target to reduce solvency problems and so it has significant effect on bank credit supply. Moreover discretionary governed fiscal policy tends to give a greater boost to growth of firms that are more dependent on external finance. Impact on expected losses of banks, due to banking and economic crisis, can be reduced by improving firm profitability, which decreases expected loss in banks, which will encouraged to lend. It is well known that southern countries such as Italy and Spain they have lot of regional banks. Once the crisis hit country in asymmetric way, government should start focusing on encouraging small and medium companies in all regions across the country to lend, and create job opportunities which would lead to boom economy instead of banking crisis and recession. Nevertheless, credit demand can drive observed effect of fiscal policy. It can be given by the fact, weather financial condition of firms is correlated with external finance dependence at level of industry. Empirical finding of impacts of last economic crisis says that monetary policy and other bank interventions became insignificant when effects of fiscal policy and bank recapitalizations are controlled. (33), (34)

Additionally, recent crisis had the major impact on government finances. Governments provided support packages reaching unprecedented levels. For example, 74 % of UK GDP, 73 % of US GDP and 18 % of GDP in EU. This led to an increase in debt ratios in many countries around the world. Before the crisis erupted, the Euro area debt was 66.2 % of GDP in 2007 and it was expected that the euro area debt would rise up to 102.4 % of GDP in 2012. Once the country debt increases, it is logical that also regions turns into negative values especially regions where hit industries are situated. (20)

Moreover regions which are fighting against bad economic conditions and high unemployment also during "good days" are thrown into even worse economic situation and they will issue higher debt than before. Regional policy during the crisis period is really important because good strategy at regional level can significantly improve country situation. Once government fights with high debts, its interventions can be seen in increase in stock flow or in debt-deficit adjustments or in higher deficits. It can be also called as fiscal costs and this cost can be recovered after certain period of time. According to the data of EU Commission, as result of crisis stock flow adjustment was around 0.3 % in euro area, during that time the stock flow increased 3.2% of GDP in 2008 and returned to 0.6 % of GDP in 2009. It is important to identify relationships among intervention policies and economic fiscal costs of crisis. The output of loss measures relative trend during the crisis. Empirical finding brings evidence that policies which support the banking system do not seem to decrease output cost of banking. It has been

proved that recent financial crisis had homogeneous effect among all OECD countries. But it has to be outlined that real life results vary according countries and regional characteristics. It was claimed that when credit to private sector exceeds 110 % of GDP it has negative effect on growth of economy. Then output volatility starts to increase when credit to private sector reaches 100 % of GDP. The size of impact of economic crisis on the debt ratio depends on size of financial sector. More precisely, regions with large financial sectors experienced impact effect of recent crisis on debt ratio about 4.2 % - 4.4 % of GDP, meanwhile regions with smaller financial sector evidenced impact on debt ratio about 1.4 % of GDP. However, the size of financial sector affects size of fiscal intervention. And so, regions with large financial sector cyclically adjusted primary balance to GDP ratio makes easier by 2.5 % to 2.7 % of GDP, meanwhile smaller financial sector simplified by 0.8 % of GDP. So the bigger financial sector, the bigger size of fiscal intervention has to be made. Additionally, in some cases the fiscal policy keeps to be expansionary during next year of financial crisis, which leads to deficit bias and creates fiscal imbalances in economy. Regions with bigger fiscal sector should promote fiscal intervention during period of crisis. Regions with smaller size of fiscal sector should run in times of crisis cyclically adjusted primary balance as per cent of potential GDP. It implies fact that primary balance decreases even during crisis time, represents that some part of the increase in adjusted debt ratio is because of stock flow adjustment, which has connection with fiscal operations to support financial and banking system. (35), (36), (37)

9.3   Appendix 3: Detailed description of macroeconomic analysis

9.3.1   GDP in Spanish regions before crisis

As I have mentioned above, GDP is a key indicator in evaluating economic performance of the country and the same is valid in case of regions. In table 1, you can see evolution of GDP of all Spanish regions before crisis. Spain is made up of 17 regions and 2 autonomous cities. Andalusia, Catalonia and Madrid can be determined to be the most significant Spanish regions. These three regions represent around 50.2 % of Spanish GDP. It means Spanish economy is dependent on their economic performance. Valencia follows these keys regions and during observed period got near to the limit of 100 billion €. Then they are just three regions that oscillate during observed ten year period around the limit of 50 billion €, namely Castilla and León, Galicia and Basque country. And so, the pre-crisis period can be characterized by following three groups.

First group includes regions that created the biggest part of GDP that actually overcame 100 billion €. As I have mentioned earlier, this group consists of Andalusia, Catalonia, and Madrid. These regions have a common feature that during the observed period GDP, they experienced an increasing trend until year 2007, the year after all this regions decreased some part of GDP. Madrid increased its GDP every year until 2007 by 4-5 %, however during year 2008 fell by

0.5 % with respect to previous. Catalonia and Andalusia they increased their GDP in similar way, and so, by 4 and 5 %. However in year 2008 they declined their GDP by 2 % with respect to the previous year.

Second group includes regions that were oscillating around the limit of 50 billion € except Valencia, which is considered apart, namely Castilla and León, Galicia and Basque country. These regions showed similar trend during the observed period. Regions have increasing trend of GDP and during year 2008, Basque country and Galicia they recorded just slight increase of GDP, meantime Castilla and Leon showed loss of GDP. However in general, the increase is not as high as increase of three most powerful regions. The Basque country recorded the biggest increased between years 2004-2007, every year increased was around 4 % of their GDP. During the year 2008, Basque Country stopped increasing trend and they remained with same GDP as in previous year.

Third group consists of rest of the thirteen regions meaning the regions with GDP lower than 50 billion €. During observed period GDP was increasing, but just slightly respect to other two groups. These regions did not lose as much portion of GDP as did previous groups during year 2008. Just regions as Asturias and Canarias Islands recorded significant loss around 2 % in year 2008. It should be caused by decrease in traditional mountain agricultural in Asturias and decrease of tourism in Canarias. Other regions were not as much hit and also recorded slight increase in year 2008 Murcia increased its GDP by 18.13 % of its total GDP, which is really huge amount. Castilla La Mancha increased its GDP by 17.77 % and Aragon by 15.98 %. It is clear that such a big increase of regional GDP is significant for these regions, however for Spain in total is not such a significant increase. Total GDP of Spain evinced growth trend until 2007, however Spain increased its GDP by 12.79 %.

9.3.2   GDP in Spain during the crisis

When the crisis hit the Europe, every country recorded some decrease and loss of GDP and the same is valid also for Spain and its regions and it can be seen in table 2. Also for this period, we can divide Spanish regions into three groups just as for previous period. First group experienced tough period that was marked by permanent decline of GDP. Madrid experienced every year decline around 3-4 % of its GDP. Catalonia together with Andalusia recorded decline around 2-4 % of its GDP. Andalusia lost 5 % of its GDP, Catalonia lost 3 % and Madrid 2 % of their GDP with respect to year 2004.Second group showed decreasing level of GDP but the decreasing amount of GDP was smaller. Nevertheless, Basque Country declined its GDP by 5 % and in total with respect to the initial year 2004 declined its GDP by 2 %.Third group can be characterized in the same way. When the level of GDP is compared in 2008 with 2013, it can be found out that Madrid and Catalonia recorded biggest loss of GDP followed by Andalusia and Valencia. However, in total the percentage of GDP these regions did not lost as much as other Spanish regions. All regions recorded loss of GDP between 11-17 % of their GDP. The region Asturias lost around 17.04 % of GDP, followed by Murcia, Valencia

and Extremadura. Regions, which generate biggest part of GDP lost between 12-14.9 % of GDP and it has without any doubt big impact on Spanish economy. Region Valencia, which also generate big portion of GDP, lost almost 17 %. During the studied period, thus in year 2013 Spanish government registered loss of GDP of 13.79 % of total GDP with respect to the year 2008.

9.3.3   GDP per capita before the crisis

All monetary values in this paragraph represent GDP per capita. The richest region at the beginning of the observed period in 2004 was Madrid with 24 935 € per inhabitant, which got over the level of EU28, Euro Area and Italy. On the other hand, the poorest region in 2004 was Extremadura with 12 575 € per inhabitant. However, entire period of 2004 -2008 is characterized by increasing trend with a slight decrease in 2008. This is valid for all seventeen regions and two autonomous cities. At the end of the period, Madrid with 26 882 € per inhabitant was straight followed by Basque country, which level raised up to 26 762 € per inhabitant. These regions were followed by Navarra with 25 667 € and Catalonia with 23 787 €. It can be underlined that these regions significantly overcame level of Spain which was 20 558 € in 2008 per inhabitant. Nonetheless, the level of wellbeing raised the most in region Galicia where the level increased by 14.72 %. This region was followed by other regions such as Asturias, Basque country, Extremadura, Aragon and Murcia. They increased their level of GDP per capita by 10-14 %. The most important regions such as Catalonia, Madrid and Andalusia, they increased their level of GDP per capita just around 5-7.81 %. The lowest increased can be seen in touristic regions as Baleares, Canarias and Melilla. Spain increased its level from 19 073 € to 20 558 € per inhabitant, which represents also increase of 7 %.

9.3.4   GDP per capita during the crisis

Nevertheless, the breaking point of increasing level of GDP per capita for all regions came to Spain with crisis (Table 4). Time of period during the crises was and still is very difficult for all regions. In that period all regions recorded negative growth rate and loss of GDP per capita. The year 2009 was difficult for all regions, however as the most struggling region to outline was Baleares with loss of 15 % of GDP per capita, followed by Catalonia with decline of GDP per capita by 14. 3 %. Next two years were more moderate, however the negative trend continued. The biggest decrease of GDP per capita appeared in the year 2012. Although for the whole observed period is typical descending trend, in 2013 decrease was lower with respect to previous years. The worst situation experienced region Melilla which level of GDP per capita decreased by immense 22.69 %. Regions as Ceuta, Murcia, Extremadura, Valencia and Cantabria lost around 11.33-17.51 % of GDP per capita. From the big regions, the lowest loss was recorded by Catalonia with -9.7 % and Madrid lost 13.29 % of GDP per capita. Spain lost 11.33 % of GDP per capita and at the end of the observed period, the GDP per capita was only 17 358 € which was slightly higher than in Slovenia.

9.3.5 GDP growth rate before the crisis

And thus, this economical indicated for used also for all nineteen Spanish regions and their GDP data (adjusted from inflation). In table 5, growth rate for all Spanish regions in pre-crisis period can be seen. From the table it is evident that until year 2007 Spanish regions recorded a growth, even though the growth rate was slowing down. In year 2005, the growth rate was oscillating around 3-6 % per year and Murcia recorded the greatest growth rate in Spain. However in following two years, the growth rate was slowing down. In year 2006, ten regions from seventeen still recorded an economic growth respect to the previous year. Among these regions belong big economies as Catalonia, Madrid and Valencia. In year 2007, positive growth rate recorded "just" five regions, which most of them had lower growth rate in previous year. Last year of observed period, the GDP declined in ten regions, meanwhile the rest held positive growth rate closely above zero.

9.3.6 GDP growth rate during the crisis

The period during the crisis can be seen in table 6. In 2008, ten regions recorded a negative growth rate for the first time during given period. Following year, when the erupted, all the residents of nineteen regions experienced touch of crisis which was represented by negative growth rate. Big economies such as Andalusia, Catalonia and Valencia recorded negative growth rate of GDP from -3.6 % to -5.57 %. Madrid which belongs to this group recorded a better negative growth rate than the rest, namely -1.41 %. Rest of Spanish regions was struggling with negative growth rate between -2 % and -5.4 %. The biggest decline in GDP was recorded smallest regions Ceuta and Melilla, namely -0.53 % and -0.11 %. The crisis period, turned out to be difficult time for the whole Spain. First group, which represents 50.2 % of Spanish economy, was deepening the negative growth rate until 2012 when Andalusia and Madrid recorded negative growth rate around -4 %, and Catalonia just -3.2 %. A year after, the negative growth of these three regions decreased to -1.5 % for Catalonia and -2.51 % for Madrid. It is clear that Catalonian's economy was recovering faster than Madrid. Nevertheless, the same scenario is valid also for rest of the Spain. In the following years, the negative growth was increasing and in year 2013 Spain started to recuperate and negative growth became smaller. Also the Spanish negative growth rate became smallest in 2013 for the whole observed period.

9.3.7 Unemployment rate before the crisis

The unemployment rate for all Spanish regions in pre-crisis period can be seen in table 7. Spanish statistical office did not contain data for year preceding to the year 2006. For this reason, pre-crisis period contains just data for years 2006, 2007, and 2008. In year 2006, the unemployment rate in Spain was at level of

8.45 % which is quite high, however for some states it can be considered as natural unemployment rate. Six regions exceeded this averaged unemployment rate. Andalusia belongs among them. In 2006 Andalusia unemployment rate of 12.62 % was recorded. However, the biggest rate was held by region Ceuta with enormous 21.49 %. On the other hand, region with the smallest unemployment was Navarra with 5.32 %. Big economic centers such as Madrid and Catalonia kept the level around 6 %. Entire observed period is characterized by an increasing unemployment rate except three regions, namely Asturias, Basque country, and Ceuta. These regions decreased level of unemployment rate during the pre-crisis period, even though two of them raised little bit in 2008. Rest of Spain experienced an increase in unemployment and in some regions it raised very much. Rate of unemployment got above 10 % in nine of seventeen regions and five of them dealt with unemployment higher than 15 %. Madrid and Catalonia remained around the same level and increased the level of unemployment up to 8.89 %. However, Andalusia started to struggle and its rate raised up to enormous 17.73 %. The worst situation at the end of this period was in Melilla where the rate almost reached a level of 20 %. The unemployment rate increased by more than 50 % in two regions, namely in Baleares and Murcia. In nine regions is increased by over 30 %.

9.3.8   Unemployment rate during the crisis

Data for the period during the crisis can be found in table 8 which contains unemployment rate for seventeen Spanish regions in five-year period. It is immediately clear that crisis started influencing the Spanish economy and during observed period, it showed its power. In 2009 which was the first year of crisis the whole Spain recorded huge increase in unemployment. The Spanish average unemployment rate increased from 11.25 % to 17.86 %. Ten regions increased its unemployment rate by more than 5 % with respect to the previous year. In 2009, six regions overcame level of 20 % unemployment rate and only one region, namely Navarra, had unemployment rate around 10 %. The highest unemployment rate was recorded in Andalusia reaching to 25.24 %, followed by Melilla with 23.49 %. Spain has been struggling with high unemployment for many years but the crisis showed its power during following years. During the observed period, the unemployment rate increased in all regions and reached very dangerous level because some regions increased unemployment up to incredible 36 % (Andalusia) and the Spanish average was 26 %. It has to be underlined that presented data includes just people that are actively searching for a job. For that reason, the actual unemployment rate can be even higher. In 2013 the unemployment rate in sixteen regions increased by more than 100 % and in two of them almost by 200 % respect to the level in year 2008. Six regions are above or very close to the level of 30 % unemployment. For example, the unemployment rate of 33.73 % was recorded in 2013 in Canarias that is known for tourism. For this island, it can be devastating and it can lead to movement of residents to other regions where there is a higher possibility of getting a job. The lowest unemployment rate is in Basque

country 16.58 %, followed by Navarra with 17.93 %. It should be underlined that very small regions such as Ceuta and Melilla are struggling with unemployment rate above 30 % and it can be destructive for these regions. However, impact on Spanish economy is insignificant. On the other hand, regions which generate 50 % of Spanish GDP are experiencing with unemployment of 19.76 % in Madrid, 23.12 % in Catalonia and 36.22 % in Andalusia. At the first place, Andalusia is fighting with extreme level of unemployment rate and it has impact on amount of GDP which is lower than in year 2004.

9.4   Appendix 4: Spanish constitutional system

Constitutional system in Spanish kingdom is very specific, based on historical and national background, which plays crucial role for understanding of distinctive needs of Spanish economy and for this reason is relevant to give an idea about organization and relation between regions in Spain. This sub-chapter will introduce basis of Spanish constitutional system and reason of creation. Afterwards, the redistribution of competences among Spanish regions will be revealed together with income distribution and regional funding. Sub-chapter about Spanish constitutional system will be concluded by short introduction about transfers between Spanish regions.

At the beginning of establishment of democratic-parliamentary monarchy, creators of Constitutional system had to deal with difficult and controversial issues as transformation from dictation that was for long decades on Spanish peninsula to the democracy. Among that, they had to deal with sensitive question about regional autonomy. Since Spain is huge and extent country they had to overcome regional, ethical and nation differences between all Spanish regions. Society in Spain consists of three main ethical groups the Basques, Catalans and Galician. All these ethical groups distinguish from other Spaniards linguistically and culturally, that turns as big issue since establishment of constitutional system until now. However, back to the creation of the constitutional system in 1978, after dictation of Franco, when solid centralism had been established for a long time, new constitutional system brought more decentralized structure. As it is written in article 2 of Spanish Constitution, every region has the right for recognition of autonomy. Territorial organization of Spain is based on three levels system: central or state organization, regions and local entities. In other words, Madrid from which every this is governed accomplishes the role of central organization, other regions have their own right for govern their region and consist local entities. The result is that Spanish territory is organized since 1983, when the process was accomplished, into seventeen regions and since 1995 consists also two autonomous cities Ceuta and Melilla when they declared the statue of autonomy. (38)

9.4.1   Redistribution of competencies

Legislation recognizes four types of the perform competencies among the state. First type is that competence belongs exclusively to the state. Second is that State creates legislations and Communities implement it. Third, is based on that state must approved the basic legislation and Communities can develop it. And the last one, are exclusives competencies in hands of Regions. (38), (39)

We can characterize competencies that are administered by State as services that have benefits for entire territory of the country including National Defense, International Representation, Justice, National Police, Economic planning and regulation, Redistribution of income and wealth, Basic social security and national infrastructure. A regional government is engaged with fundamental management of education at all levels [primary, secondary and universities] and health [Since year 2002 regions took completely responsibility], mainly because only 1.67 % of local governments are over 50,000 inhabitants. And this makes the administrative capacity of most local governments is too small to handle these duties, in addition to these two competencies of regional governments have responsibilities in agriculture, industry, energy and mining, environment, tourism, domestic trade, social services, protection of artistic and historical heritage, protection of regional language, land management and housing, and regional infrastructure [roads, railways, etc. .]. Local governments are in first step in political structure in Spain that means that they have direct contact with their citizens, they dispose by responsibilities to manage area of jurisdiction as garbage collection, water cleaning, street lighting, social protection and so. (38)

9.4.2   Income distribution

Since the constitution of 1978, Spain has experienced rapid decentralization, enjoying high rates of economic growth and prosperity, accompanied in the beginning of high unemployment rates, explained due to the rigidity of the labor market, we can see that in 1980 the GDP [PPP] per capita was $ 9,414 international and in 2006 GDP [PPP] per capita was $ 26,320 international. And during this period Spain made a substantial increase in tax effort, in 1975 total tax revenue as a percentage of GDP was less than 20 %, the OECD countries on average had a 31 %, and for 2002 Spain had converged with other OECD countries, tax revenues being GDP ratio above 35 %, this increase shows a significant presence of public services in the economy, meaning a jump in the provision of public services at all levels of government. (38)

In table 9 we can observe evolution of gross domestic product per capita in US dollars over almost twenty-five years. Table shows that Spanish economy was growing rapidly since 1990 to years before economic crisis, and so to the 2008 when GDP has increased by almost 150 %. However the GDP is a great evidence of entrance of the economic crises to Spain. Since 2009, the gross domestic prod-

uct has been struggling and did not overcome amount earned in 2008. Tax revenue[5] recorded decreasing during years of crises, however decreasing tax revenues characterize past twelve years.

Table 9: Overview of Gross domestic product and tax revenue in Spain

	GDP per capita in $	Tax Revenue [% of GDP]
1990	13,2	*
2000	21,26	16,3
2005	26,85	12,9
2008	31,99	10,4
2009	31,35	8,6
2010	29,732	11,4
2011	31,118	9,6
2012	28,282	7,3
2013	29,118	*
2014	*	*

Source: own table, data world bank, *no data available (40), (41)

However the Spanish constitution established inside obligation of the central government to allocate income to the regional governments for purpose to finance regional government on basis of two systems basic and different that means special statutory regime applicable for regions Navarra and Basque Country. Common rules are applied to order other regions.

9.4.3 Funding for Regional Plan

Common system
Revenue allocation under common system is regulated by the "Law on Financing of the Regions", commonly known as LOFCA, this law establishes basic principles of the system, however the special implementation is covered by Council for Financial and Fiscal Policy that intergovernmental body has been who has evaluated evolution of equal body formed by authorization of Public Finance in National government and Regional government responsibilities. Initially, the funding system to regions was based on system of general transfers and these transfers were calculated by method of Net Cash Cost. The calculation is based on principle that you need to calculate spending that central government destined to competencies of decentralized powers, in way that transferred powers and equivalent

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[5] Tax revenue is an income that the goverement had generated throught taxation of its inhabitants, it comprises tax on production and import, wealth tax, tax on income, capital gains tax and social contributions (44)

costs of resources needed to execute competencies, thus is not able to reduce differences between regions, compared when provision of goods realized Central Government, also equality in provision of public goods is not guaranteed, dependence of regions on transfers, as opposite to the system of own property taxes, made that Regional Governments practically had no autonomous incomes in a way that benefits associated with principle of fiscal decentralization was not reached, that principle of financial autonomy [which states that each regional government should be able to decide the level and composition of their income and expenditure and therefore has have the ability to earn income directly from its citizens], the principle of accountability or efficiency [which requires that the cost of providing them is borne by the individuals that benefit from its provision] have not be executed at this early stage. (39)

In 1986, they swapped the system of Net Cash Cost and they started to calculate expenditures needs. This concept, in general, is based on calculation of cost that will occur to the regional government, so it can provide same level of public goods and services as another regional government at same stage of fiscal effort. To quantify that, the following criteria in table 10 had been established.

Table 10: Criteria for qualification of expenditure needs of Communities with Common system in Spain

Criteria	Weighting	
	2005	2014
Population	94 %	30 %
Area	4,2 %	1,8 %
Dispersion	1,2 %	0,6 %
Insularity	0,6 %	0,6 %
Protected population	75 %	38 %
Population > 65	24,5 %	8,5 %
Population 0-16	*	20,5 %

Source: *data no available, Lopez 2005, Ministry of finance, (39), (38)]

In addition to finance these expenditure needs, was abandoned the financing based on solely on funding transfers and replaced for a scheme of two incomes: ceded tax and participation on state incomes. Against assigned taxes were established and regulated by central level and ceded the regional level of tax revenue and its governance [this system is known as tax-sharing]. Since 1997 also begin to give regulatory powers in some taxes, and thus begins to characterize some taxes themselves to regional governments.

Actually ceded taxes6 can be seen in table below. Central level maintains all competencies of taxation on companies, tax on insurance, tax on non-residents, import charges and contribution to social security.

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6 In Spanish "impuesto cedido" represets traditional taxes, which were in 1997 transforem into shared taxes. (43)

However, once calculated the revenue that a regional government may perceive by common fiscal effort by all others regions is marked as TC total assigned taxes, estimated expenditures needs NG than is calculated amount of and direction of transfers, TR total revenue, in way if the expenditures need exceeds potential needs collection, leveling transfer is guaranteed. In table 11 Ceded taxes to Regions under common system can be observed

Tr = TC - NG; if Tr> 0 => Surplus at Central Level

Tr = TC - NG; if Tr <0 => Surplus at Regional Level

Table 11: Ceded taxes to Regions under common system

Tax liability	Revenue of managing	Regulation	Type
Income tax of individuals with partial character with the maximum limit of 50 %.	33 % NO	Tariffs and deduction	Own tax revenue[7]
Property tax	100 % Yes	Minimum exempt, tariffs, deductions, concessions	Own tax revenue
Tax of property transfers demanding and Juridical Acts Documented	100 % YES	Type of commitment, deduction, concessions [no tax on social acts, commercial documents or adminis.] proceeding and liquidation	Own tax revenue
Inheritance and gift tax.	100 % YES	Reduction, tariffs, amount and coefficient of preexisting property, deduction and concessions	Own tax revenue
Value added tax, with partial character with the maximum limit of 50 %.	35 % NO	NO	Participation
Special taxes on production, except tax on electricity, with partial character with the maximum limit of 58 % of each.	40 % NO	NO	Own tax revenue
The tax on electricity	100 % NO	NO	Own tax revenue
Special tax on means of transport	100 % YES	Type of commitment, models of declaration	Own tax revenue
Taxes on game	100 % YES	Exemption, taxable base, type of commitment, fixed quotas, concession..	Own tax revenue
The tax on retail sales of certain hydrocarbons	100 % YES	Type of commitment, inspection	Own tax revenue

Source: (38)

If we observe Regions, they are only one responsible for financing their own expenditures demanded by their citizens above the common level of provision by establishing New Taxes, increased taxation of assigned taxes or with loan operations. In addition regional governments receive some conditional transfers through funds of Compensation inter territorial and funds of European Union. In Table 12 can be seen the composition of revenues of the regions and regions will have significant autonomy in managing their income is and have legislative competence in 34 % of its revenue and 79 % of its revenues are unconditioned. (38)

Table 12: Structure of no financial incomes to the Regions under common system, budget for years 2004, 2008 and 2012

	2004	2008*	2012*
OWN TAX REVENUES	34,01 %	35 %	33,98%
Own tax revenue, fine, taxes and other incomes	5,25 %	5,32 %	5,24%
Income tax of individuals	14,18 %	14,60 %	14,17
Property tax	1,08 %	1,11 %	1,07
Inheritance and gift tax.	1,62 %	1,71 %	1,59
Tax of property transfers demanding and Juridical Acts	9,58 %	9,75 %	9,57
Tax on game	0,14 %	0,2 %	0,18
Tax of property transfers demanding and Juridical Acts	1,24 %	1,28 %	1,24
The tax on retail sales of certain hydrocarbons	0,92 %	0,99 %	0,92
TAX SHARING	20,88 %	19 %	18%
Value added tax	13,85 %	13,5 %	12,5 %
Special incomes	7,03 %	5,5 %	5,5 %
TRANSFERS	45,11 %	46 %	52%
Funds of sufficiency- unconditional	24,07 %	24,37 %	27%
Funds of inter territorial compensation- conditional	0,94 %	0,96 %	1 %
Other transfers of state conditional	12,10 %	12 %	15 %
Transfers of EU conditional	8 %	8 %	9 %

Source: (38), 2008* and 2009* professional estimation

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7 In Spanish "Tributo propio" has two different aspects, the charge is part of own tax system or a tax which takes effect establishing the entity to which the property is attributed, (42)

9.4.4   Charted system

This regime is applied in regions in Navarra and Basque country, also called as "System agreement" for Navarra and "Convention system" for Basque. Fundamental characteristic of the charted system is that provides wide fiscal autonomy to those two regions, that these communities establish, maintain and regulate their own tax system, in respect to the principle of solidarity and freedom of movement and establishment of persons and the free movement of goods, services and capital. So communities under this system are exclusively financed by tax revenue in the case of Navarra and the Basque Country concluded the only taxes that are outside the regime Agreement or Convention are import charges and contributions Social Security, then when these communities have raised their taxes, [unlike the standard system] they are doing a transfer to the central level [called the Basque and Navarra contribution quota] to help finance the cost of goods and national public services that provincial regimes assume this value is calculated as follows:

Navarra contribution = 1.6 % * [[TNC + Dc] - Gc]

Basque Quota = 6.24 % * [[TNC + Dc] - Gc]

As you can observe above the charging rate for Navarra is 1,6 % and for Basque country is 6,24 % agreed by law. TNC income received by central level in respect of taxes not convention or transferred including income tax No [Dc] is the budget deficit and [Gc] expenses that regions have not assumed. (38)

9.4.5   Financing charted system

Municipal governments have their own resources separately from regional governments; this is set in the "Law Regulating Local Tax" and can be seen by analyzing the structure of income [Table 13] how much autonomy they have been given to these governments.

Table 13: Composition of incomes of municipals in year 2004, 2008, 2012

	2004	2008*	2012*
OWN TAX REVENUES	60,42 %	58 %	55%
Honorarium, public prices and others	28,50 %	28,5 %	27,8 %
Property tax	16,06 %	15,91 %	15,5 %
Commercial tax	3,04 %	2,89 %	2,79 %
Tax on vehicles	4,93 %	4,75 %	4 %
Tax on valuation	2,92 %	2,80 %	2,5%
Constructions tax	4,95 %	2,91 %	2,39 %
Others	0,02 %	0,04 %	0,02 %
TAX SHARING	1,82 %	1,78 %	1,5%
Income tax of individuals	0,98 %	0,94 %	0,8 %
Value tax added	0,60 %	0,58 %	0,5 %
Exemption of taxes	0,24 %	0,26 %	0,2 %
TRANSFERS	37,76 %	40,7 %	43,5%
From central government	20,63 %	22 %	23 %
From regions	9,31 %	10 %	11%
Foreign countries	0,67 %	0,7 %	1 %
Others	7,15 %	8 %	8,5 %

Source: (38) 2008* and 2012* professional estimation

Municipalities in Spain have the regulatory management of 60 % of their income, and this allows to these communities considerable autonomy, and assumes big responsibilities to its citizens, so the most important field to examine is tax burden that is based on principle of profit, who benefits from the services provided is the one who pays. Finally we both transfers, such as participation in income is unconditional, which allows each local government to establish what amount and which are the goods and services you provide in your jurisdiction (38).

9.4.6 Transfers from local governments

Local governments receive unconditional transfers from central government; distribution funds depend on different formulas depending on the large, medium and small cities. For large cities (> 75,000 inhabitants) the amount of the transfer is composed of two parts, first a stake in state revenues (Tax Sharing), these are: the income tax of the people's 1.6875 % in the 1.7897 % VAT and the Consumption Tax 2.0454 % and the other side is called the "Supplementary Fund" which is nothing more than what it received in initially these municipalities as transfers and calculating the share of taxes delivered, the contribution of this Supplementary Fund to municipalities is updated to the same extent that grow tax revenues of the central government. In the case of medium and small municipalities, the amount of transfers is assigned by constructing an index composed of three vari-

ables weighted as follows: 75 % of the population, the inverse of 12.5 % fiscal capacity and tax effort 12.5 %, that contribution is updated each year to the growth rate of tax revenue of the central government. (38)

Fiscal Federalism in Spain brings important characteristics that the literature on these topics are called as necessary, to achieve the benefits obtained by decentralization, so as we can see that in addition to give regional and local governments the powers of their jurisdictions [administrative decentralization] also has delivered them the resources and the regulatory management of their main income so that they can take on new responsibilities. We can observe that regional and local governments have a financing system that allows one hand to get a basic level of basic services to the minimum level of tax obligations and moreover have a wide scope for action [although this could be further more] to determine the composition of the basket of goods and services offered to its citizens, and if it is your desire to deliver a benefit above the guaranteed basic, this will have a matched increase in the tax burden on its territory. Thus, until recent years central government continued regulating and collecting most of taxes and so more than half of regional government resources came from transfers of central level, in addition capacity of regions to regulate these tax figures that revenue corresponded, was subject to severe limitations, which made its autonomy margin was even lower. This situation had very negative consequences for unnecessarily restricted freedom of action of regional administrations, so it was placed in a dangerous situation of fiscal irresponsibility. Since the political benefits of spending that managed regional administrations reversed on them, while the electoral cost of taxes that financed fell on the central administration, the temptation to push always higher demanding and higher transfers to finance better services was hardly resistible. While currently this has substantially improved within the principles of equality and autonomy, the system lacks strengthen fiscal responsibility, which requires that, to the extent on maximum, each level of government is seen as responsible to their citizens not only their spending decisions, but also the tax burdens they entail, otherwise perverse incentives for some levels of government that lead to conflict between government and excessive pressure to increase regional spending are generated. While the empirical literature has not found a completely clear relationship between fiscal decentralization and economic growth, if found between public investment in infrastructure or public equity and productivity, and there is a clear relationship between productivity and economic growth, so if we are using a model of fiscal decentralization country achieved an increase in Public Infrastructure Stocks, you get an increase in productivity, which in time will be reflected in economic growth. Based on the above, we may infer that the policy of the Spanish State to try to reduce internal disparities of income by improving the productive capacity of the less developed regions, and an ambitious program of public investment, financed mostly by aid European structural, preferably focusing on improving the provision of productive infrastructure, training human resources and grants to attract private investment and promote job creation, is in all probability one of the keys to development both domestically and regionally. While there are authors who criticize these policies

of public expenditure, based on the principle of equity [when the resources are used to search for regional convergence by reducing the gap between these, but doing that GDP grows at a slower rate], sacrificing the principle of efficiency [when resources are allocated to the regions that contribute more to aggregate growth of the country, so that the GDP will grow at a faster rate]. Finally it is important to note that the European fund of regional development, which is used to help regions with less than 75 % of real income per capita in the country for periods of five years, is an indispensable tool has consider in setting a strategy Interregional Transfers as this criterion serves to help the relatively poorer regions, and now the Spanish model has not established within its system of decentralization, and these transfers are primarily used to finance productive investment by regional governments may continue to be an engine of growth and development in Spain, once the European Union allocate these resources to the new countries that have joined the community. (38)

9.5   Appendix 5: Cluster analysis
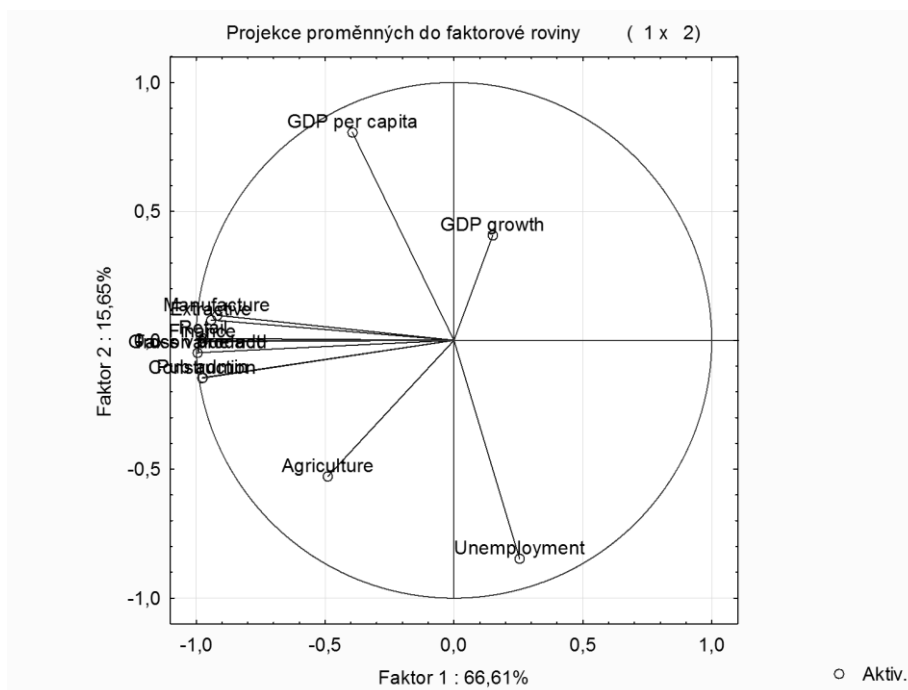
Figure 39: Projection of variables to factor plane for factor 1,2 before crisis-five-year model
Source: Own elaboration, INE
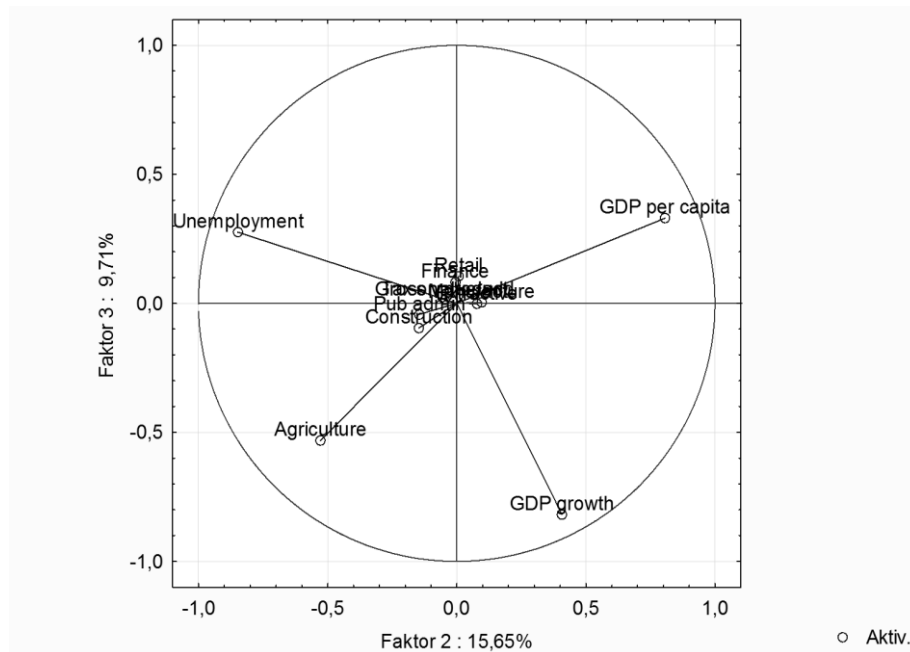
Figure 40: Projection of variables to factor plane for factor 2, 3 before crisis-five-year model
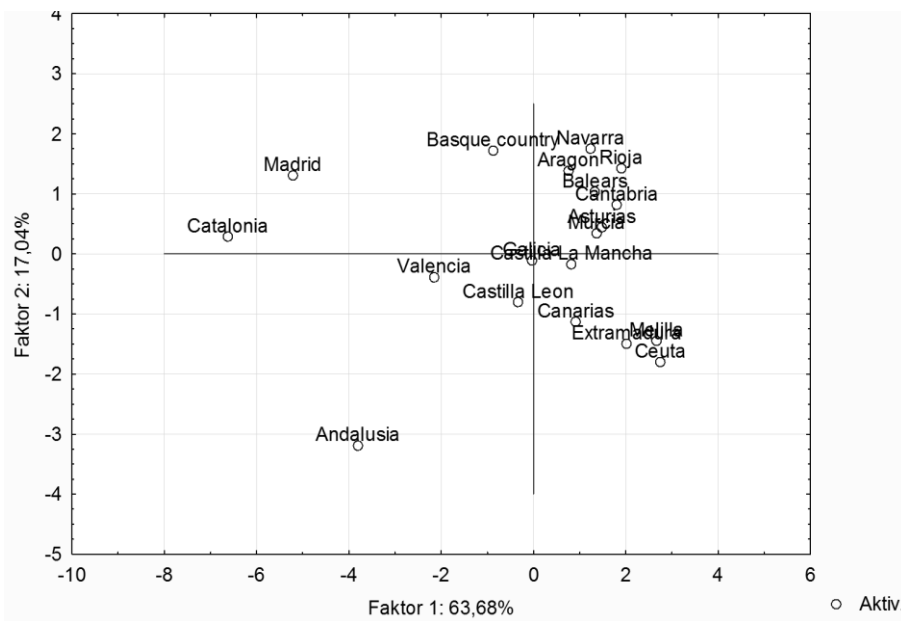**Source: Own elaboration, INE**
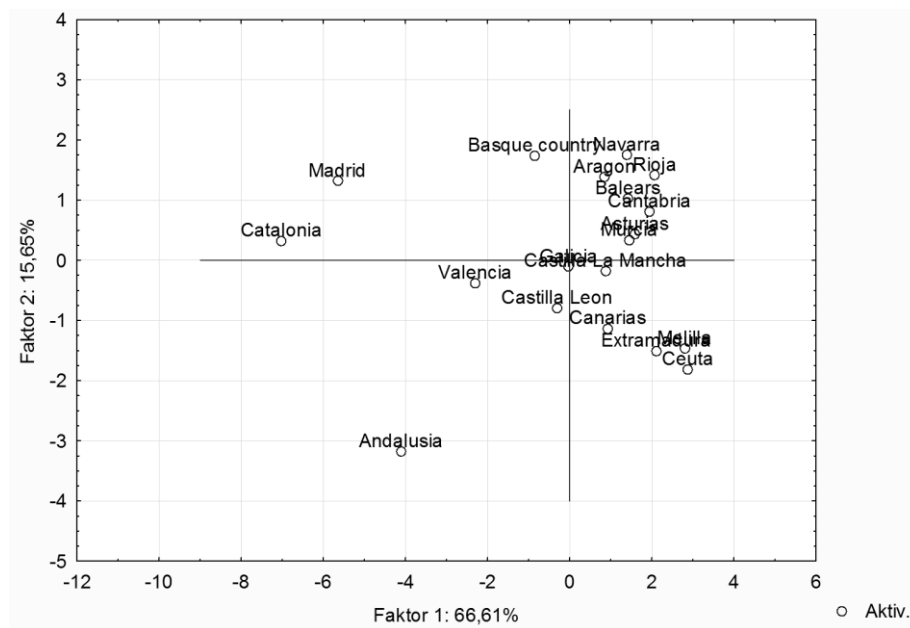
Figure 41: Projection of cases to factor plane for factor 1,2 before crisis-five-year model
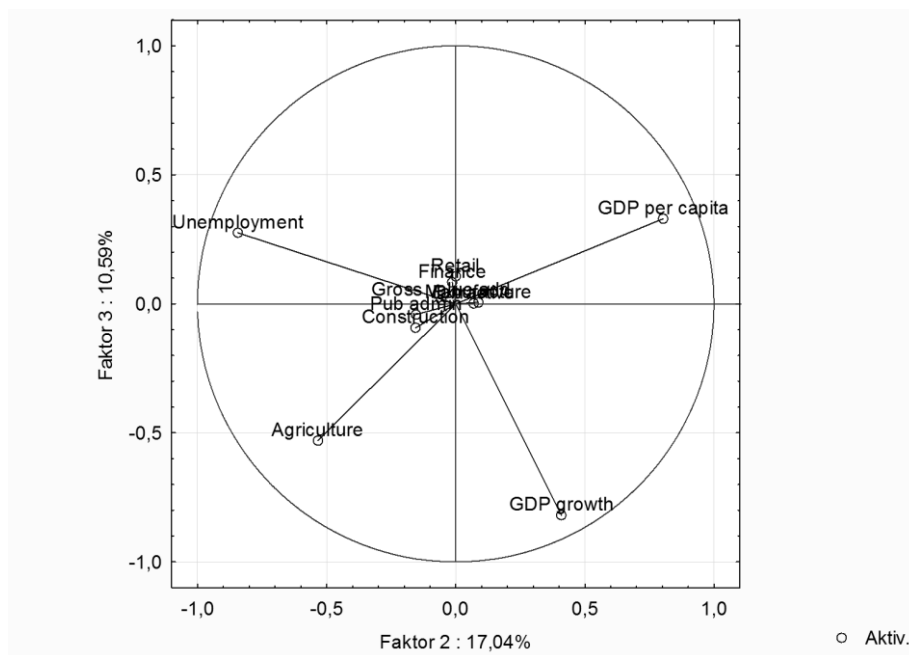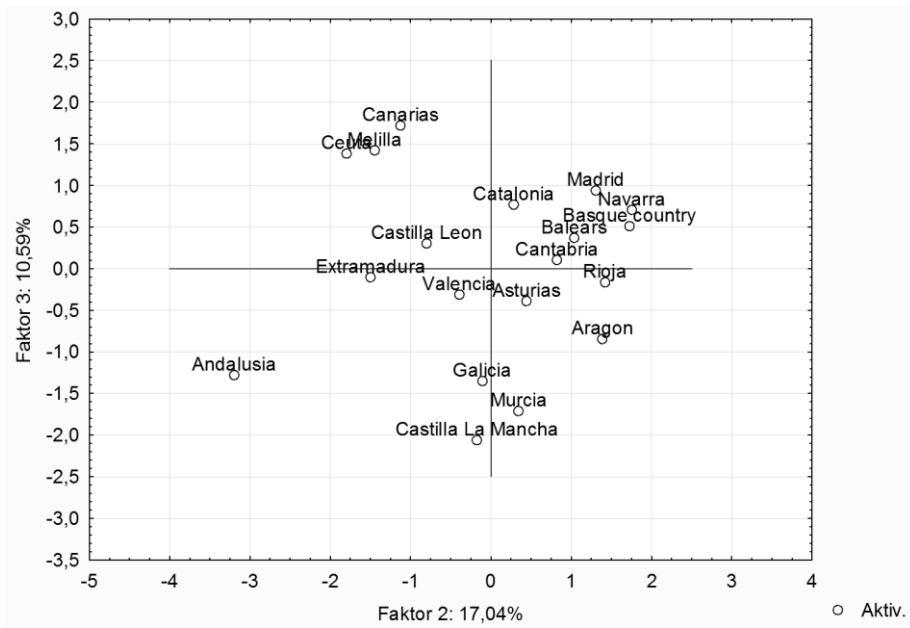**Source: Own elaboration, INE**
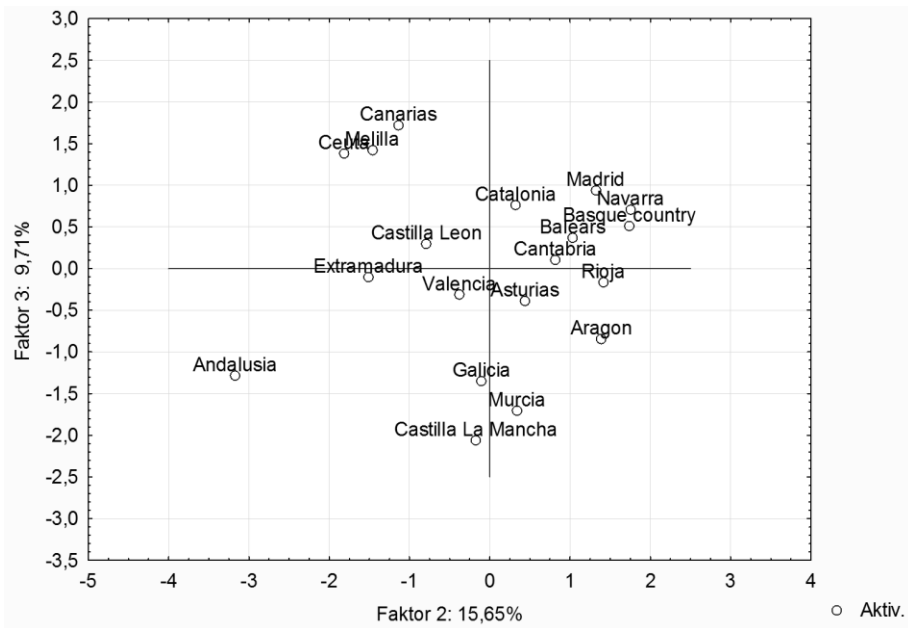
Figure 42: Projection of cases to factor plane for factor 2,3 before crisis-five-year model
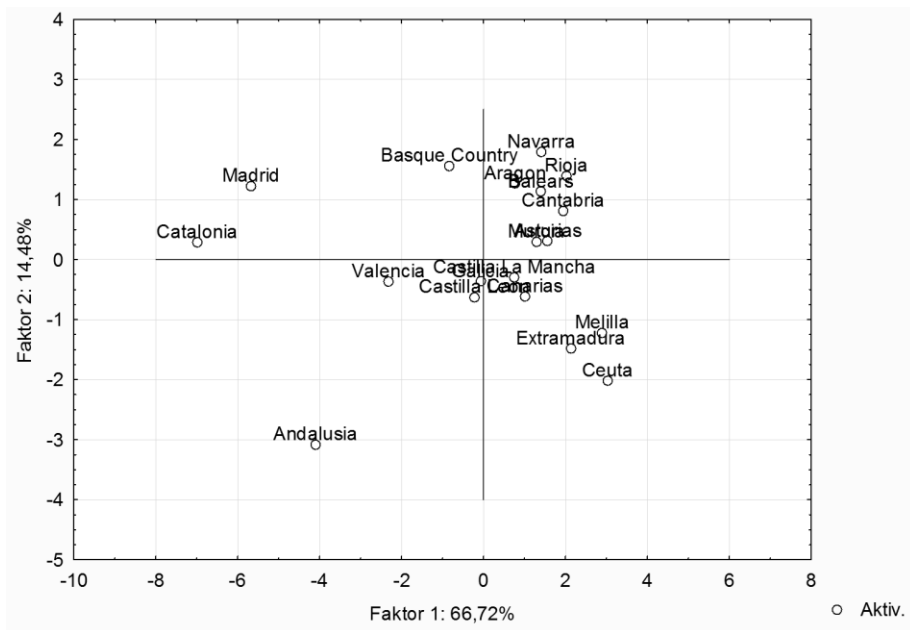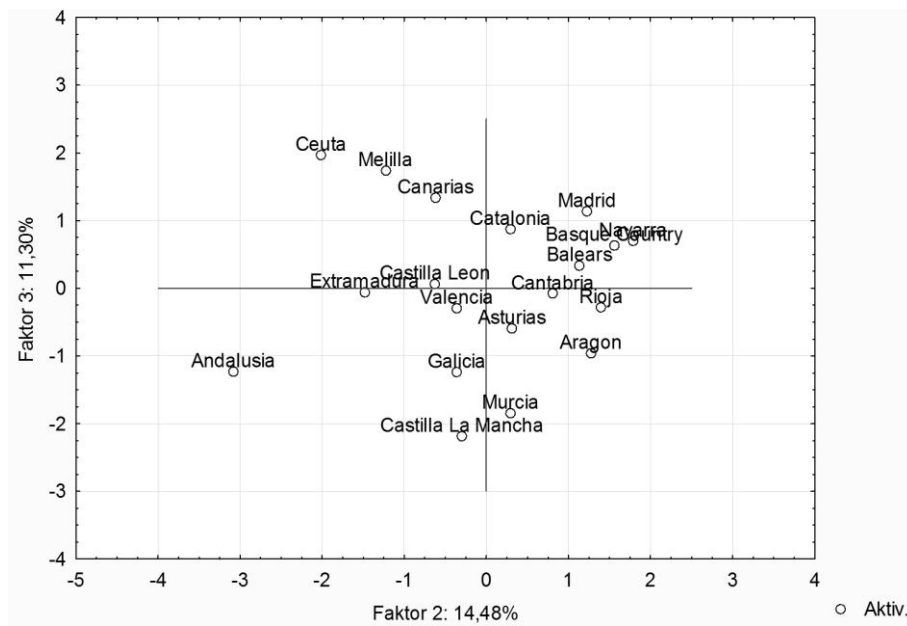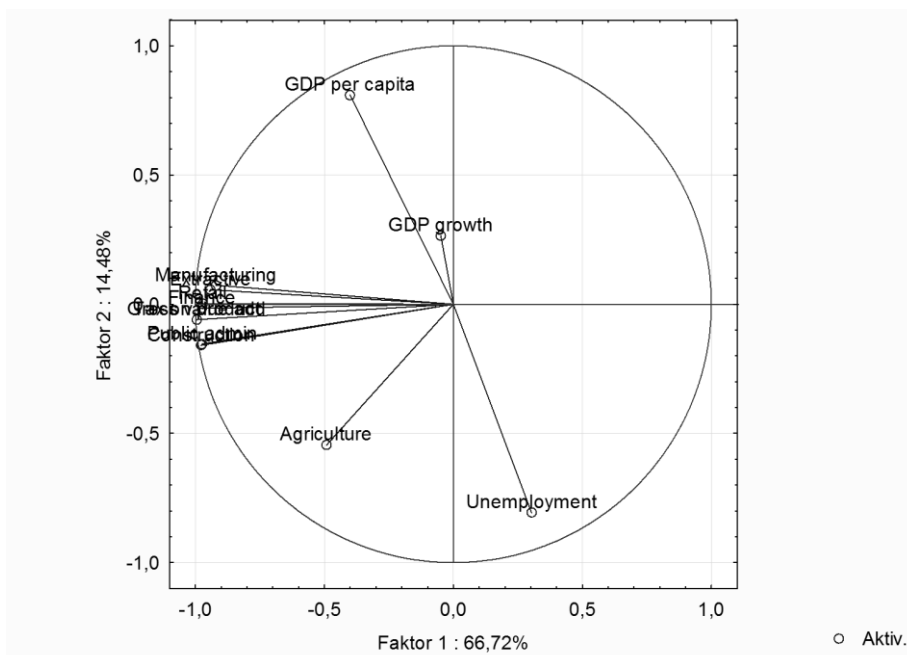**Source: Own elaboration, INE**
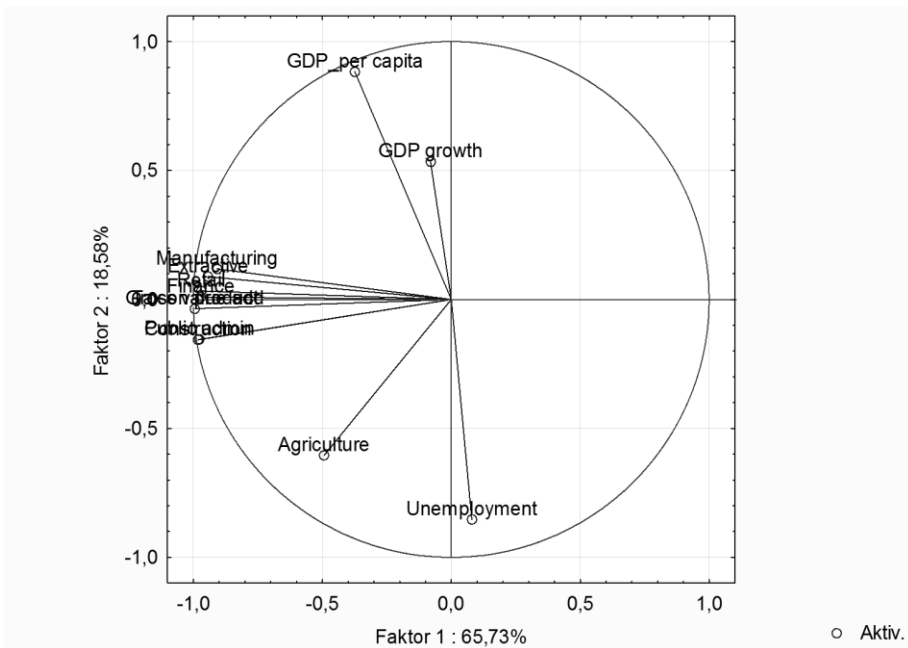
Figure 43: Projection of variables to factor plane for factor 1, 2 during crisis-five-year model
Source: Own elaboration, INE

Figure 44: Projection of cases to factor plane for factor 1,2 during crisis-five-year model
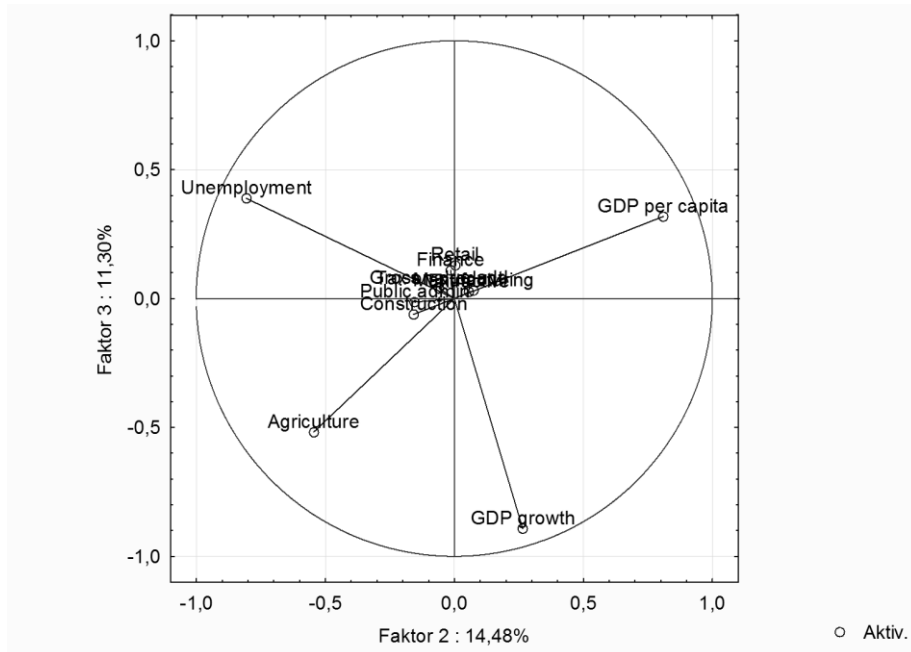**Source: Own elaboration, INE**

Figure 45: Projection of variables to factor plane for factor 2,3 during crisis-five-year model
Source: Own elaboration, INE

Figure 46: Projection of cases to factor plane for factor 2,3 during crisis-five-year model
Source: Own elaboration, INE

Figure 47: Projection of cases to factor plane for factor 1,2 before the crisis-4-4-2-years model
Source: Own elaboration, INE

Figure 48: Projection of cases to factor plane for factor 2,3 before the crisis-4-4-2-years model
Source: Own elaboration, INE

Figure 49: Projection of variables to factor plane for factor 1,2 before crisis-4-4-2-years model
Source: Own elaboration, INE

Figure 50: Projection of variables to factor plane for factor 2,3 before crisis-4-4-2-years model
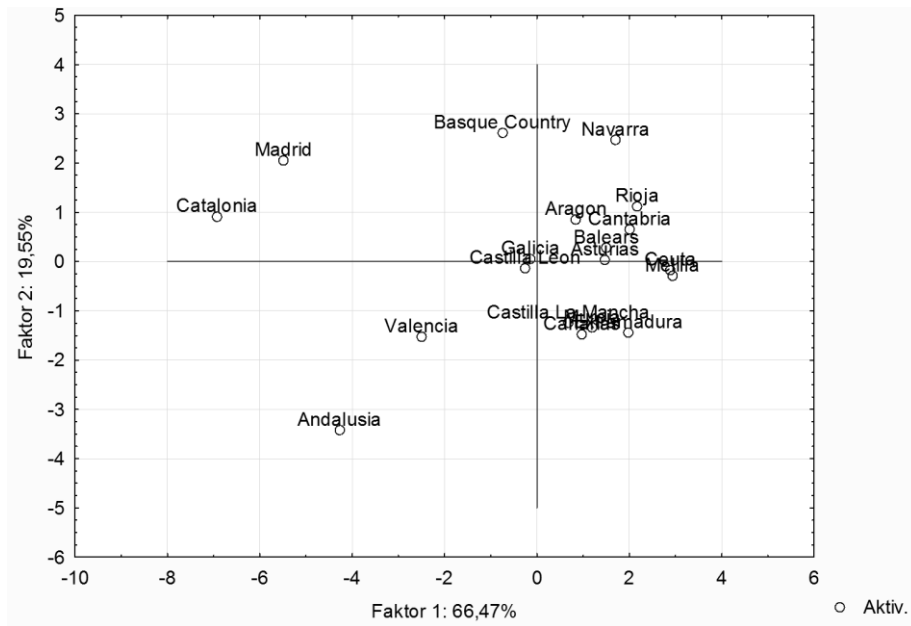**Source: Own elaboration, INE**

Figure 51: Projection of cases to factor plane for factor 1,2 during the crisis-4-4-2-years model
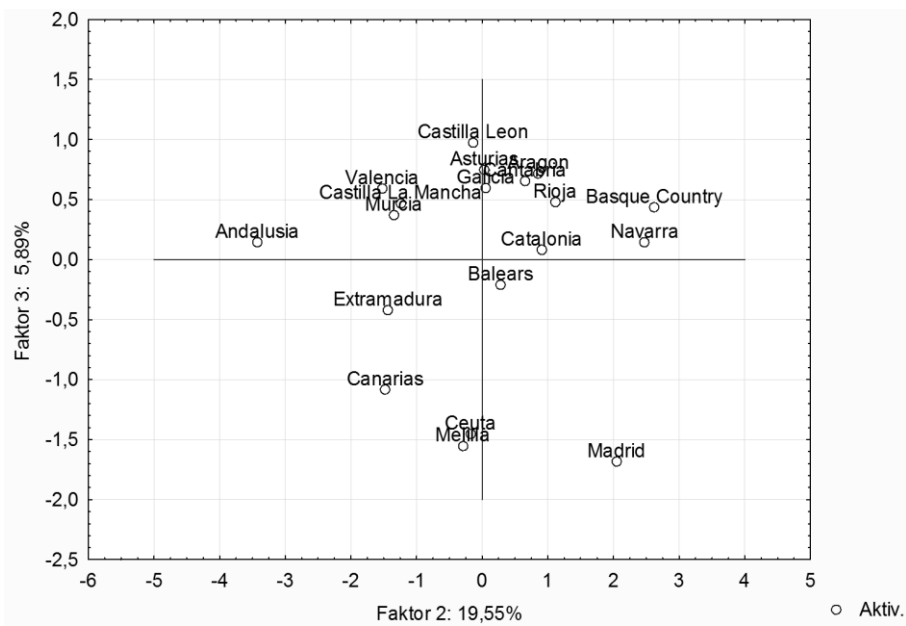**Source: Own elaboration, INE**

Figure 52: Projection of cases to factor plane for factor 2,3 during the crisis-4-4-2-years model
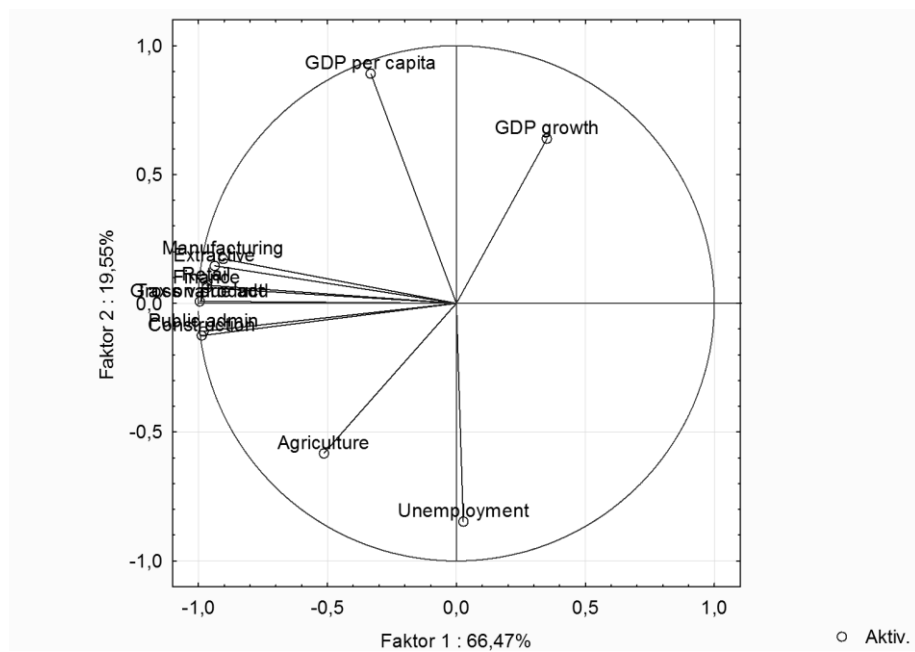**Source: Own elaboration, INE**

Figure 53: Projection of variables to factor plane for factor 1,2 during crisis-4-4-2-years model
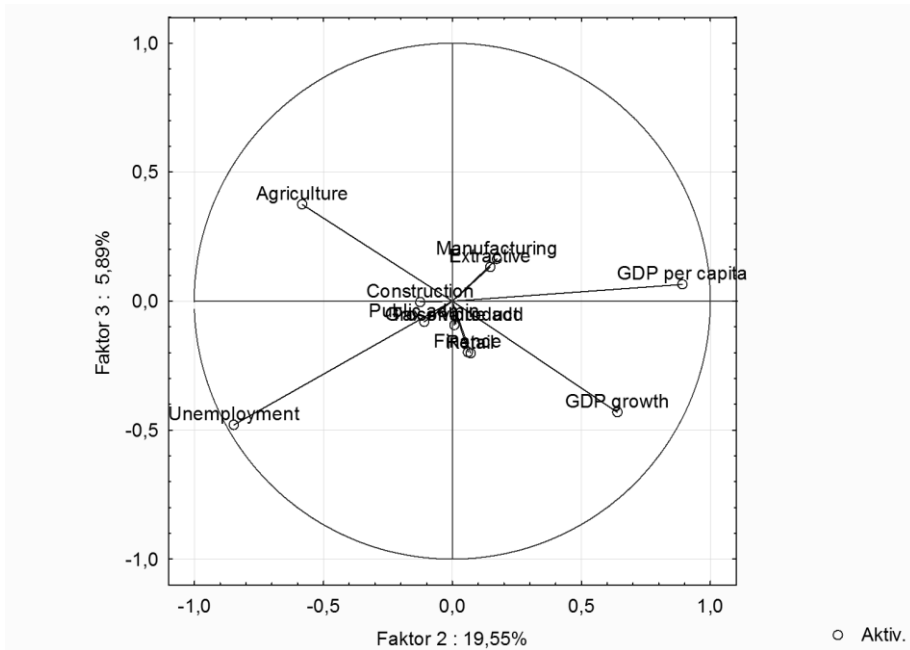**Source: Own elaboration, INE**

Figure 54: Projection of variables to factor plane for factor 2,3 during crisis-4-4-2-years model
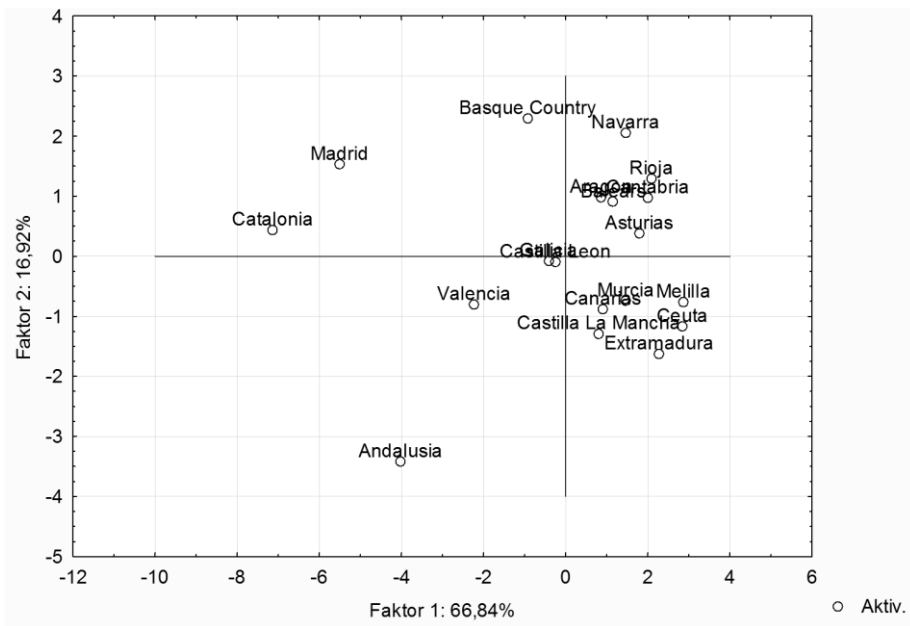**Source: Own elaboration, INE**

Figure 55: Projection of cases to factor plane for factor 1,2 last two years of the crisis-4-4-2-years model
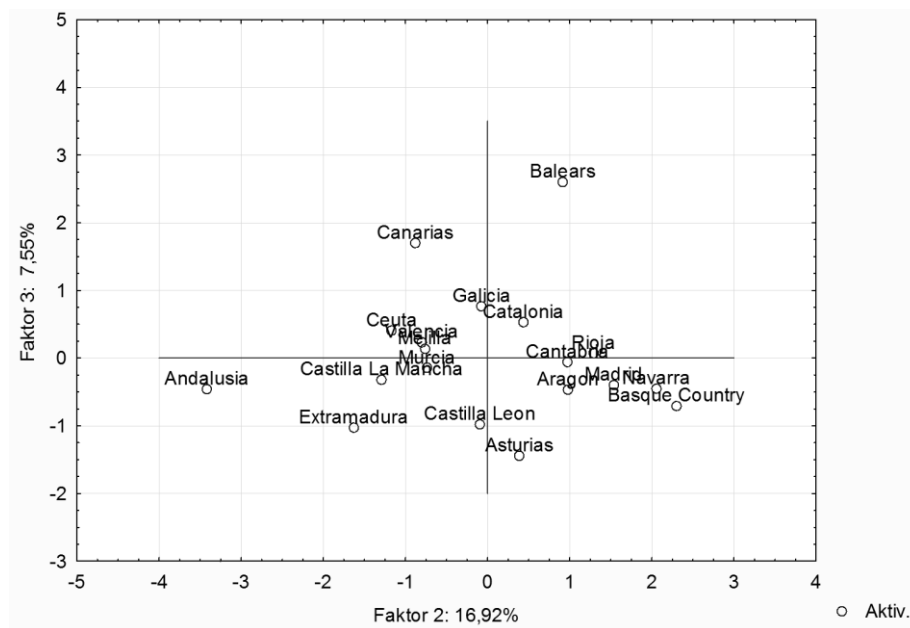**Source: Own elaboration, INE**

Figure 56: Projection of cases to factor plane for factor 2,3 last two years of the crisis-4-4-2-years model
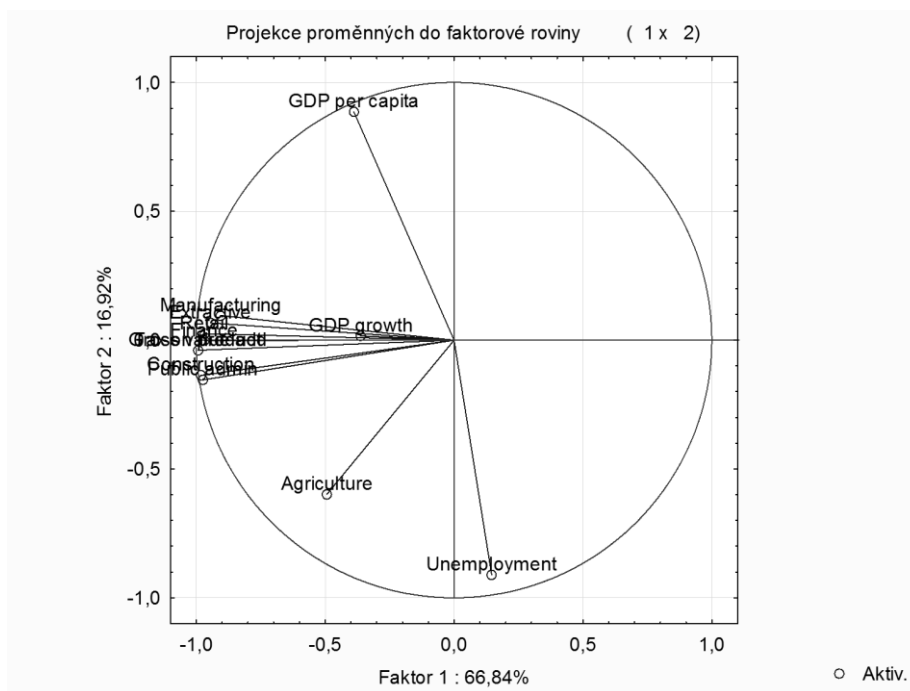**Source: Own elaboration, INE**

Figure 57: Projection of variables to factor plane for factor 1,2 last two years of crisis-4-4-2-years model
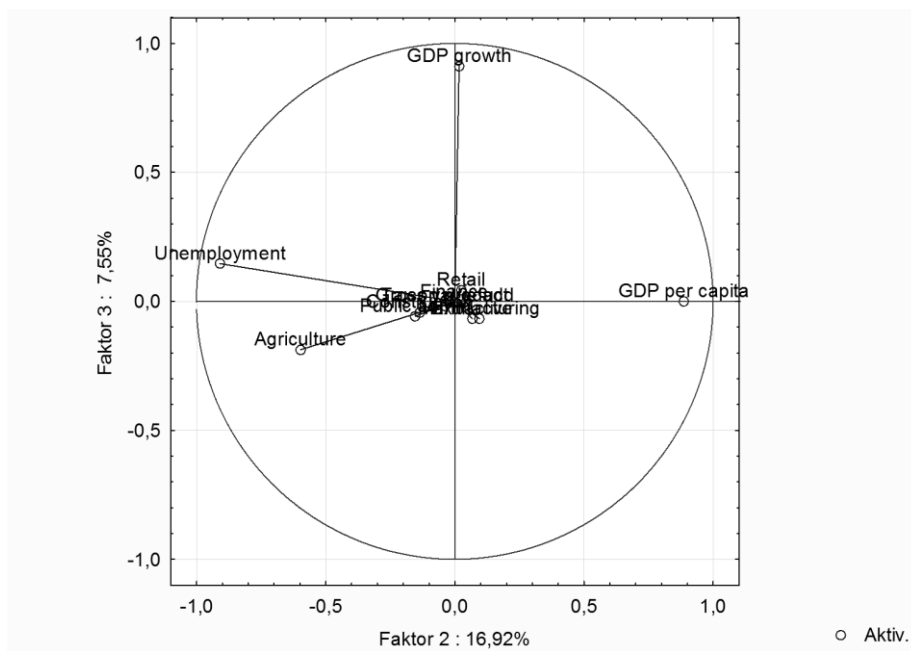**Source: Own elaboration, INE**

Figure 58: Projection of variables to factor plane for factor 2,3 during crisis-4-4-2-years model
Source: Own elaboration, INE

9.6 Appendix 6: β-convergence analysis

```
Model 6: Pooled OLS, using 190 observations
Included 19 cross-sectional units
Time-series length = 10
Dependent variable: GDP_growth
Robust (HAC) standard errors
```

	coefficient	std. error	t-ratio	p-value	
const	6.72062	0.252802	26.58	4.67e-64	***
GDP_per_capita_i~	2.34052e-05	8.47724e-06	2.761	0.0064	***
dt_2	-2.61552	0.150655	-17.36	3.17e-40	***
dt_3	-2.74129	0.154167	-17.78	2.09e-41	***
dt_4	-3.13609	0.194474	-16.13	1.03e-36	***
dt_5	-7.56970	0.215511	-35.12	3.19e-82	***
dt_6	-10.6430	0.385351	-27.62	1.91e-66	***
dt_7	-8.89882	0.268377	-33.16	2.45e-78	***
dt_8	-10.2633	0.265536	-38.65	8.48e-89	***
dt_9	-11.3457	0.191985	-59.10	2.31e-119	***
dt_10	-9.29897	0.205952	-45.15	9.25e-100	***

```
Mean dependent var   0.510226   S.D. dependent var    4.015360
Sum squared resid    133.7226   S.E. of regression    0.864323
R-squared            0.956117   Adjusted R-squared    0.953666
F(10, 179)           390.0049   P-value(F)            7.6e-116
Log-likelihood      -236.2289   Akaike criterion      494.4579
Schwarz criterion    530.1752   Hannan-Quinn          508.9264
rho                  0.263009   Durbin-Watson         1.391417
```

Figure 59: Estimation of panel data set for β-convergence purpose
Source: own calculation