FORTY YEARS OF EMPLOYMENT BY SECTOR AND ECONOMIC DEVELOPMENT IN 17 SPANISH REGIONS, 1976-2016 GUISAN, Maria-Carmen

Abstract

Economic Policies of Spain, for the period 1976-2016, have allowed a great increase of employment in many regions but little advance on convergence of real wages with more advanced countries. Although Spain has experienced the highest increase in employment among the 5 major European countries, both in absolute values and in percentage, with an in increase of 40% in Spain, 11% in Germany, 23% in France, 18% in Italy and 20% in the United Kingdom, this has not been accompanied by other measures addressed to reach the desired increase of production per head and real wage, due to the lack of enough industrial real income. The analysis of production by sector is important in this regard. We analyze both the evolution of employment in Agriculture, Industry, Building and Services in 17 Spanish Regions and the evolution of real income produced by sector. While employment in Agriculture diminished during that period of forty years, there were important increases of non-agrarian employment in all the regions, with the highest increases in Madrid, Andalucia and Cataluña (with an increase higher than one million in each of these three regions) and Comunitat Valenciana (with an increase of more than 800 thousand employed people). Industrial employment diminished in several regions and there was little increase in industrial production per head. The lack of enough industrial development led to increase the foreign trade deficit per capita and made unsustainable the development of services after the crisis of year 2008. We present the estimation of employment equations for each sector, with a pool of 17 Spanish regions for the period 1987-2013, and the relationship between real income of Services and real income produced in other sectors. The main conclusion points to the convenience of increase real income per head in industry, in the majority of the regions, in order to favor sustainable development of Spanish regions.

Keywords: Forty years of Employment, Spain, Regional Development, 1976-2016 JEL Codes: J2, J21, O18, O52, R1, R11, R15

1. Introduction

During the period 1976-2016 the increase of total employment has been very high in many Spanish regions. Although there were diminutions for the period 2006-2016, the net increase of the period 1976-2016 has been important in the majority of the Spanish regions. Non agrarian employment (Industry, Building and Services) has increased in Spain in more than 7 million workers.

Section 2 presents international comparisons of employment by sector in Spain and for the period 1972-2012, and a summary of interregional econometric models of European regions. The comparison of Spain with the 4 major European Union (EU) countries and with the USA shows that Spain got the highest increase of employment for the period 1972-2012 among the 5 EU countries of the comparison, but the lowest increase of Production per head. The main cause of the low increase of production per head in Spain has been the lack of enough industrial development For that reason it is important to analyze the evolution of production by sector. The summary of

interregional econometric models, shows that industry, and other factors, are of great importance to get sustainable increase both of production per head and employment.

Section 3 analyses the evolution of employment by sector in 17 Spanish regions (CCAA=*Comunidades Autonomas*) for the period 1976-2016. The most important increases of non-agrarian employment, in thousand personas, have happened in Madrid (1346) Andalucia (1248) and Cataluña (1182). This group of three regions amounts for an increase of 3776 thousand employments (49% of the increase of non-agrarian employment in 17 Spanish regions). Increases between 300 thousand and 900 have happened in Comunitat Valenciana (827), Canarias (491), Castilla-La Mancha (352), Baleares (342), Galicia (330) and Castilla y Leon (327). This group of 6 Spanish regions amounts for the increase of 2669 thousand employments (35% of the increase of non-agrarian employment in 17 Spanish regions). The other 8 regions amount for an increase of 1202 thousand (16% of the increase of non-agrarian employment in 17 Spanish regions).

Section 4 presents the estimation of employment equations by sector, with a pool of 17 Spanish regions, as well as equations that show the positive impact of industry on regional development. Finally section 5 summarizes the conclusions. In the Annex we include supplementary data and a summary of the evolution of each region.

2. International comparisons and econometric models of employment by sector

International Comparisons of Spain with 5 OECD countries, 1972-2012

Spain has experienced an important increase of total employment for the period 1972-2012, but little advance in real convergence of wages and real income per capita, in comparison with 4 major EU countries

Table 1 shows the percentages of increase of employment and real Gross Domestic Product (GDP) per capita in Spain, Germany, France, Italy, the United Kingdom and the United States of America, for the period 1972-2012. The rates of sectoral employment per one thousand people in years 2007 and 2012 are shown in table 2.

	Spain	Germany	France	Italy	UK	USA
Employment in year 1972	12306	36042	21143	19417	24510	83966
Employment in year 2012	17272	39878	25990	22898	29420	142500
Δ in thousand workers	4966	3836	4847	3481	4910	58534
% Increase of Employment	40.34	10.64	22.92	17.93	20.03	69.71
Real GDP p.c. in year 1972	7.582	13.283	12.897	10.013	13.721	21.579
Real GDP p.c. in year 2012	14.837	25.739	24.113	18.471	27.020	38.736
Δ in real GDP pc. (th USD2000)	7.255	12.456	11.216	8.458	13.299	17157
% Increase of real GDP p.c.	95.70	93.80	87.00	84.50	96.90	79.50

Table 1. Forty years of increase of Employment and real GDP per capita in 6 countries, 1972-2012

Source. Elaborated by the authors from OECD statistics.

As seen in table 1, for the period 1972-2012 Spain experienced an important percentage of increase in Employment (40.34), higher than Germany (10.6), France (22.9), Italy (17.9) and the United Kingdom (20.0%). The United States experience a higher percentage of increase (79.50) in comparison with the 5 European Union countries of table 1. In absolute value of the increase of employement, Spain reached, in that period, the top position, among 5 major EU countries, with an increase of 4.966

million, higher than Germany (3.836), France (4.847), Italy (3.481) and the United Kingdom(4.910).

	LHA	LHA	LHI	LHI	LHB	LHB	LHS	LHS
	2007	2012	2007	2012	2007	2012	2007	2012
Spain	19	16	67	51	59	24	302	274
Germany	10	8	95	98	28	33	334	341
France	12	10	56	48	28	29	320	322
Italy	17	16	88	72	32	29	293	259
UK	6	5	54	46	37	30	417	386
USA	7	7	63	55	39	29	381	363

Table 2. Rates of employment by sector, per one thousand people: years 2007 and 2012

Note: LH is the rate of employment per thousand people. The rates of Agriculture, Industry, Building and Services are indicated by A, I, B, S. Source: Author's elaboration from OECD statistics.

Table 2 shows that the rates of employment of Agriculture in year 2012 varied between 5 in the United Kingdom and 16 in Spain and Italy. In industry the rates varied between 46 in the United Kingdom and 98 in Germany. The Building sector showed in year 2012 rates of employment between 24 in Spain and 33 in Germany.

The highest rates of employment in services correspond to the United States, the United Kingdom and Germany. In the case of Germany and the USA the main explanation is a high degree of industrial production, with its positive effect on other sectors (particularly in services). In the case of UK a high rate of employment in services is also favored by a high degree of development of several social services. Italy and Spain show the lowest values of LHS in year 2012, mainly due to two causes (the lack of enough industrial production and the lack of enough support to employment in social services).

We may notice that the very high rate of LHB of year 2007 in Spain, with a value of 59 was unsustainable, given the lack of enough industrial development. For the same reason the rate of employment in Services experienced an important decrease in Spain for the period 2007-2012.

Table A1 in the annex shows the evolution of employment by sector in Spain in the period 1976-2016. Although there was an important increase during the period, we may notice a diminution in total employment, due to the economic crisis, for the period 2007-2013 and some degree of recovery for 2013-2016.

Graphs 1 and 2 shows the evolution of the rates of employment by sector in Spain for the period 1965-2012 in comparison with Germany: Graph 1 includes the rates of employment in Agriculture and Building and Graph 2 the the rates of employment in Industry and Services. In spite of a lower level of industrial development Spain tried to sustain a high building activity but it was unsustainable and the bubble diminished. We may notice that the lack of enough industrial activity of Spain limits its capacity for development in Services and other non-agrarian sectors.

Graph 3 presents a comparison, between Spain and Germany, of real income per capita produced in industry (RHI) with the general level of real consumption expenditure per capita (ZH=CH+GH, private and public). We may notice that Spain should increase the value of RHI in order to get higher levels of ZH.



Graph 1. Rates of employment: Agriculture and Building Graph 2. Rates of employment: Industry and Services

Note: Rates of employment (number of employed people per one thousand inhabitants) in Spain (Es) and Germany (De), 1974-2013. Source: Elaboration by Guisan(2016) from OECD Labour Force Statistics



Graph 3. Real Income in industry per capita and real Consumption per capital. Spain and Germany

Note: ZH=CH+GH is the sum of real private and public consumption per inhabitant, in thousand Euros at 2000 prices. RHI is the real income produced in industry. Source: Elaborated by Guisan(2016) from OECD statistics.

In the next sections we will analyze the evolution of real income produced in industry per capita in Spanish regions and recommend regional development policies addressed to a higher degree of convergence in consumption per head with most advanced regions. Although other variables, like tourism, have also impact on real family income and consumption, the question is that the majority of the regions also need some degree of industrial development.

Interregional econometric models of development in Europe

The use of cross-section and pool sample, of several countries or regions, is usually very useful to test the impact of different factors on economic development and employment. The methodology to test homogeneity of parameters among the different geographical units is of great help in order to get a right specification of the model.

We may find some interesting books on regional development in Europe. Here we cite a few. In the book by Guisan, Cancelo, Aguayo and Diaz-Vazquez (2001) we present selected literature and empirical evidence for the important relationship between industry and services in the European regions for the period 1985-1995. Our models have into account both demand and supply approaches.

Selected literature includes the pioneering works by American and European economistas, like Klein(1969), Klein and Glickman(1977), Funck and Rembold(1975), Courbis(1975), Perryman and Schmidt(1986) and other ones.

The book by Korres(2005) is of great interest regarding the importance of human capital and other factors of development.

The book by Dissart, Dehez and Marsat, (2016) is focused on the impact of tourism and recreational activities on regional development.

In the references we include some interesting regional studies related with the positive impact of industry on wages and employment in the European regions, as the article by Guisan and Vazquez (2013), the study by Guisan and Aguayo (2013) on employment by sector and gender in the European and Spanish Regions, and the study by Guisan, Aguayo, and Carballas, D.(2004) on the effects of human capital, industry and tourism on Economic Development of EU25 Regions", as well some studies related with intersectoral relationshipps in Spain, like Guisan and Exposito(2003), Europe, America and other areas like in the study by Guisan(2008), or the effects of industrial stagnation on economic development of European countries in Guisan(2011a).

We also include analysis of regional or sectoral studies in other areas of the World like in the study of Guisan and Aguayo(2006b) including Mexico, Canada and the United States, or Guisan (2008) on intersectoral relationships on Europe, America, Africa and Asia-Pacific.

Although industry does not create many direct jobs in the sector it makes possible the expansion of activity and employment in Services and other sectors. An interesting study in this regard concerns the important positive effects of industrial development on the employment of private and public services, as see in Guisan(2010).

The empirical evidence from quantitative studies of regional development in Europe shows that industry, research, education, transport, tourism and other activities are of uppermost importance for the development of services and other activities. It is important to have into account those findings in order to avoid economic crises that hit strongly the quality of life and sustainable development.

The international financial crisis since year 2008 has had strong impacts in Spain, due to the negative consequences of cuts in international credit in a country with a high degree of international debt per head accumulated for the period 2000-2007. For the period 1997-2007 there was a strong *building bubble*, without enough development of industry to lead to sustainable development. We may notice lack of enough domestic support to industry for that period and that the European Union policies for the period 2000-2016 usually did not contribute to increase the support to industry led, in Spain, and in other countries, to increase foreign trade disequilibria and international debt.

A quick growth of building and services, without enough industry, led to increase the deficit of foreign trade of goods and to a high degree of international debt per head, what has had important consequences on the economic crisis since year 2008.

The main forces addressed to increasing employment in Spain, during the *building bubble period*, seem have been led by public forces interested in fostering immigration of workers, and the increase of the number of contributors to the social security funds, under the thinking that this increase would help to pay the pensions incomes. We may also find private and public forces interested in increasing profits from the development of building and services, without being aware of the limits of that development without enough support to industry.

3. Employment by sector in the 17 Spanish regions and real income 1986-2013.

The order of the regions in the tables is: Andalucia (An), Aragon (Ar), Asturias (As), Baleares (Bl), Canarias (Cn), Cantabria (Cb), Castilla y Leon (Cl), Castilla-La Mancha (Cm), Cataluña (Ct), Comunitat Valenciana (Cv), Extremadura (Ex), Galicia (Ga), Madrid (Ma), Murcia (Mu), Navarra (Na), Pais Vasco (Pv) and Rioja (Ri).

Table 3 shows the values of employment by sector in year 2016, the percentage of increase of total employment for the period 1976-2016 at regional level in Spain, and the increase, in thousand employed people, of non agrarian sectors for that period.

			,			(-		1 7	,	
Re	LA	LI	LB	LS	LNA	LA	LNA	Incr.	Incr.	Incr
gion	2016	2016	2016	2016	2016	1976	1976	LA	LNA	LT
								1976-	1976-	1976-
								2016	2016	2016
1. An	246	251	161	2175	2587	465	1339	-219	1248	1029
2. Ar	36	105	33	380	518	111	319	-75	199	124
3. As	14	57	20	295	373	130	294	-116	79	-37
4. Bl	4	35	50	441	526	42	184	-38	342	304
5. Cn	20	40	40	713	794	82	303	-62	491	429
6. Cb	7	37	16	174	228	48	129	-41	99	58
7. Cl	70	164	63	668	895	347	568	-277	327	50
8. Cm	51	120	57	523	701	182	349	-131	352	221
9. Ct	51	584	184	2365	3133	164	1951	-113	1182	1069
10. Cv	54	319	116	1443	1878	205	1011	-151	867	716
11. Ex	36	38	28	262	327	164	183	-128	144	16
12. Ga	71	162	72	736	969	565	639	-494	330	-164
13. Ma	7	234	138	2457	2828	22	1482	-15	1346	1331
14. Mu	77	73	27	386	486	78	216	-1	270	269
15. Na	10	67	12	178	258	32	143	-22	115	93
16. Pv	13	201	49	639	889	61	689	-48	200	153
17. Ri	8	33	6	86	125	25	69	-17	56	16
Spain	775	2522	1074	13971	17567	2658	9755	-1883	7812	5929

Table 3. Employment by sector at regional level in year 2016, values of LA and LNA in 1976 and increases of LA, LNA and LT for 1976-2016 (thousand employments)

Note: Labour (employment) by sector: Agriculture (LA), Industry (LI), Building (B), Services (S), LNA (Non-agrarian Employment= LI+LB+LS), LT=LA+LNA. The last row, Spain, includes 17 regions and 2 Autonomous cities (Ceuta and Melilla). Source: elaborated from INE (Active Population statistics). See the Annex, on statistical updates and comparisons.

The highest increases in Non-Agrarian Employment (LNA) for the period 1976-2016 happened in Madrid (1346 thousand of new employments), Andalucia (1248 thousands), Cataluña (1182 thousand employments) and Comunitat Valenciana (867 thousand employments). A second group of regions experienced increases between 250 and 500 thousand employments in non-agrarian activities: Baleares (342), Canarias (491), Castilla and Leon (327), Castilla-La Mancha (352), Galicia (330) and Murcia (270). A third group of regions experienced increases between 50 and 250 thousand employments in LNA: Aragon (199), Asturias (79), Cantabria (99), Extremadura (144), Navarra (115), Pais Vasco (200) and Rioja (56). We may notice that there was a strong reconversion of Agriculture from labour intensive to capital intensive, with a great diminution of Agriculture employment, in order to increase productivity by worker. Although all the regions have experienced an important increase of LNA, the increase in LT has diminished or stagnated in some regions due to the diminution of LA.

Table A2, in the Annex, presents de evolution of Total Employment and Population, by region for the period 1976-2016 and the rate of total employments per one thousand people. In the Annex we also include table A3, which shows the evolution of non agrarian employment of the 17 regions in the years 1976, 1986, 1996, 2006 and 2016, as well as tables A4.1 to A4.17 showing the evolution of employment by sector at each region in the years 1976, 1986, 1996, 2006 and 2016, and the increase for the period 1976-2016.

Table 4 shows the evolution of total Real income per heat (RHT) for a period of 25 years: 1986-2013, as well as the ranking position of each region in RHT and in the increase of RHT (Δ RHT).

1 4010	Table 4. Real medine per head in years 1966, 2015 and fanking positions					
obs	Rht	Rht	∆RHT :Increase	Ranking	Ranking	Ranking
	1986	2013	of Rht, 86-13	Rht	Rht	ΔRHT
				1986	2013	1986-2013
AN	7242	10474	3232	16	16	10
AR	10543	15307	4764	7	6	6
AS	9374	12819	3446	10	10	9
BL	12273	14986	2713	3	7	13
CN	9463	12159	2696	9	13	14
CB	9191	13375	4184	12	9	8
CL	8922	13567	4645	13	8	7
CM	7845	10950	3106	14	15	12
CT	11204	16295	5090	6	4	5
CV	9783	12167	2384	8	12	15
EX	6172	9380	3208	17	17	11
GA	7607	12758	5151	15	11	4
MA	11668	18038	6370	4	2	1
MU	9324	11442	2118	11	14	17
NA	11483	17414	5931	5	3	3
PV	12304	18311	6007	2	1	2
RI	13263	15413	2150	1	5	16
ES	9585	13875	4290	-	-	-

Table 4. Real Income per head in years 1986, 2013 and ranking positions

Source: elaborated by Guisan(2016) from INE (Regional Accounts, and other Statistics).

The highest 5 top positions of RHT in 2013 correspond Pais Vasco, Madrid, Navarra, Cataluña and La Rioja, and the lowest 5 positions, in decreasing order, to Canarias, Murcia, Castilla-La Mancha, Andalucia and Extremadura. There are 7 regions with intermediate positions which, in decreasing order, are: Aragon, Baleares, Castilla y Leon, Cantabria, Asturias, Galicia and Comunitat Valenciana. The top 5 increases in real income per capita for the period 1986-2013 corresponded to Madrid, Pais Vasco, Navarra, Galicia and Cataluña.

Tables 5 to 9 present a comparison of real income per head produced by sector in the 17 regions for the years 1986, 1995, 2004, 2007 and 2013. Real Income per head produced by sector is Value-Added per head at current prices deflated by Consumption Prices, as explained in the Annex. The source of data for these tables is the same that figures at the footnote of table 4.

In Guisan and Exposito(2013) we analyze the evolution of real Value-Added by sector in Spain by comparing the *production and the income approaches*. The diminution in real income produced by sector may be due to a fall in real production and/or a fall in relative prices.

The most outstanding features of these tables are the stagnation of real income of Industry per head in a long period 1986-2007 and the diminution for 2007-2013. The building bubble for the period 1995-2007 and the high increase of Services without enough industrial development, led to an increasing trade deficit, because the demand of industrial products by building and services increased imports as consequence of not enough availability in of domestic industrial production. Those policies addressed to increase building and services, without enough development of industry, make development unsustainable, particularly during the international crisis of the period 2007-2013.

Regions	1986	1995	2004	2007	2013
AN	754	735	739	622	520
AR	787	843	964	878	653
AS	364	312	355	333	230
BL	329	277	254	218	127
CN	448	347	221	199	136
CB	484	581	590	539	266
CL	820	1089	1223	1178	870
СМ	1039	1249	1438	1247	812
CT	240	265	331	297	210
CV	513	402	397	335	244
EX	810	435	1165	1062	556
GA	896	800	749	725	564
MA	30	39	45	39	20
MU	874	593	931	770	616
NA	767	466	685	647	470
PV	297	218	300	268	130
RI	1291	893	1514	1281	807
Spain	535	540	562	493	358

Table 5. Real Income per head produced in Spanish regions(€at 2000 prices): Agriculture (RHA00)

Source: See Annex.

Table 0. Real IIK	come per neua pre	Jaacea III Spainsi	riegions(eut 200	o prices). madsu	y (IM1001)
Regions	1986	1995	2004	2007	2013
AN	1634	1269	1492	1540	1336
AR	3354	3273	4115	4356	3389
AS	3461	2915	3017	3539	2618
BL	1422	1469	1267	1304	1253
CN	1235	1084	971	995	1052
CB	2784	2641	3146	3573	2926
CL	2615	2581	3034	3178	2856
СМ	2259	1942	2391	2409	2516
CT	4122	4294	4438	4419	3418
CV	3048	2775	2882	2796	2301
EX	1181	1302	1084	1211	1276
GA	2094	2067	2484	2762	2689
MA	2591	2821	2804	2947	1928
MU	2332	2576	2300	2351	1946
NA	4252	5098	5708	6156	5453
PV	5478	5745	5763	6555	4951
RI	5881	6698	4492	4631	4494
Spain	2780	2626	2873	2968	2423

Table 6. Real Income per head produced in Spanish regions(€at 2000 prices): Industry (RH00I)

Source: See Annex.

Table 7. Real Income per head produced in Spanish regions (€at 2000 prices): Building (RHB00)

	A A		U	▲ <i>′</i>	0
Regions	1986	1995	2004	2007	2013
AN	555	751	1547	1921	889
AR	603	885	1705	2230	1364
AS	667	889	1712	2232	1184
BL	907	958	1785	1997	1224
CN	787	837	1597	1792	860
CB	464	790	1881	2293	1221
CL	665	887	1567	2007	1132
СМ	628	935	1554	1956	1094
CT	657	966	1689	2090	1082
CV	533	823	1600	1946	1071
EX	681	1030	1489	1917	1040
GA	532	837	1498	1939	1206
MA	741	1132	1922	2317	1187
MU	653	928	1436	1777	945
NA	588	1123	1929	2468	1234
PV	476	991	1743	2236	1411
RI	629	880	1729	2146	1188
Spain	620	898	1653	2032	1088

Source: See Annex

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Regions	1986	1995	2004	2007	2013
AN	4298	6097	8214	9254	7729
AR	5799	7983	10062	11342	9901
AS	4882	6369	8300	9822	8788
BL	9615	11766	14256	15163	12382
CN	6993	9101	11450	12207	10111
CB	5459	7150	9479	10896	8963
CL	4822	6919	8780	10338	8709
СМ	3918	5675	6845	7847	6529
СТ	6185	9083	12076	13418	11584
CV	5690	7201	9507	10537	8551
EX	3500	5376	6625	7760	6507
GA	4084	5973	7716	9149	8299
MA	8306	11778	15694	17127	14903
MU	5466	6772	8408	9409	7936
NA	5877	8017	11154	12430	10257
PV	6053	8030	11672	13422	11820
RI	5464	7889	9191	10388	8924
Spain	5649	7927	10454	11640	10005

Table 8.Real Income per head produced in Spanish regions (€at 2000 prices): Services (RHS00)

Source: See Annex.

Table 9 shows the diminution of total real income produced per head for the period 2007-2013 in all the Spanish regions. The ratio between the maximum and the minimum of RHT in year 1982 was 2.15 and evolved to 1.88 in 2007 and 1.95 in 2013.

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Regions	1986	1995	2004	2007	2013
AN	7242	8851	11992	13337	10474
AR	10543	12984	16846	18806	15307
AS	9374	10485	13384	15925	12819
BL	12273	14471	17562	18682	14986
CN	9463	11369	14239	15193	12159
CB	9191	11163	15097	17302	13375
CL	8922	11476	14604	16702	13567
СМ	7845	9800	12228	13459	10950
СТ	11204	14608	18535	20225	16295
CV	9783	11201	14386	15614	12167
EX	6172	8143	10363	11950	9380
GA	7607	9677	12447	14576	12758
MA	11668	15771	20465	22430	18038
MU	9324	10869	13075	14307	11442
NA	11483	14703	19477	21701	17414
PV	12304	14984	19478	22481	18311
RI	13263	16360	16926	18446	15413
Spain	9585	11991	15543	17133	13875

Table 9. Real Income per head produced in Spanish regions(€at 2000 prices):: Total (RHT00)

Source: See Annex.

The situation in year 2013 and the evolution of Real Income produced per head and by sector, for the period 1986-2013) were as follows:

Agriculture: The top values in year 2013 correspond to 8 regions with more than 500 Euros per capita: (An, Ar, Cl, Cm, Ex, Ga, Mu, Ri). Regarding the evolution for 1986-2013, in 16 regions (all but Castilla y Leon), the value of RHA00 diminished. In spite of the diminution, the values of many regions are higher than those of many advanced European regions. This was mainly due to the diminution of relative prices of the sector.

Industry: The top values in year 2013 correspond to 5 regions with more than 3000 Euros per capita (Ar, Ct, Na, Pv, Ri). In the period 1986,2013, there were 10 regions with diminution (An, As, Bl, Cn, Ct, Cv, Ma, Mu, Pv, Ri) and 7 regions with increases (Ar, Cb, Cl, Cm, Ex, Ga, Na). Only a few Spanish regions had real income per capita produced in industry so high as the usual values of advanced European regions.

Building: There was an important increase of real income produced per capita in the period 1986-2013. Within this period there was a strong building bubble, with high increases for the period 1995-2007 and a strong decay for the period 2007-2013. In year 2007 there were 9 regions with a real income produced per capita higher than 2000 Euros (Ar, As, Cb, Cl, Ct, Ma, Na, Pv, Ri) and 8 between 1700 and 2000. In year 2013 the 17 Spanish regions produced in this sector below 1500 Euros per capita.

Services: The top values in year 2013 correspond to 6 regions with more than 10000 Euros per capita (Bl, Cn, Ct, Ma, Na, Pv), In some cases the most important factor was tourism (Bl, Cn), in other cases industry (Na, Pv), a mix of tourism and industry (Ct), or both factors and the capital effect (Ma). There was an important increase for 1986-2007 and a hard decrease for 2007-2013, when the increase was unsustainable due to the lack of enough industrial development.

The economic policies of the period 2008-2016 were only partially effective in order to get a sound recovery of the development of real income per head and employment. European and Spanish policies should be more effective in this regard. In spite of these shortcomings there was a partial recovery of employment of Services in all the 17 regions, as it is shown in Graph 4.



Graph 4. Partial recovery of employment in Services in 17 Spanish regions 2012-2016 (increase in employed people of Services sector, thousands)

Note: The order of the regions is the same than in the tables of section 3 (1.An, 2.Ar, 3.As, 4.Bl, 5.Cn, 6.Cb, 7.Cl, 8.Cm, 9.Ct, 10.Cv, 11.Ex, 12.Ga, 13.Ma, 14.Mu, 15.Na, 16.Pv, 17.Ri. Source: Elaborated by Guisan(2016) from Active Population Statistics of INE.

4. Econometric models of employment and real income by sector

Equation 1. Relationship between Employment Real Income in Spanish regions: Agriculture

Dependent Variable:	LA?					
Method: Pooled Leas	t Squares, San	ple (adjusted): 1987 2012			
Included observations	s: 26 after adju	stments. Cros	s-sections ind	cluded: 17		
Total pool (balanced)	observations:	442				
White cross-section s	tandard errors	& covariance	(d.f. correcte	ed)		
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
LA?(-1)	0.958552	0.009044	105.9932	0.0000		
D(RA00?/1000)	7.788376	4.210132	1.849912	0.0650		
R-squared	0.987232	Mean dep	endent var	61.92814		
Adjusted R-squared	0.987203	S.D. depe	endent var	68.53730		
S.E. of regression	7.753061	Akaike in	fo criterion	6.938567		
Sum squared resid	26448.38	3.38 Schwarz criterion 6.957080				
Log likelihood	-1531.423 Hannan-Quinn criter. 6.945869					
Durbin-Watson stat	1.812707					

Equation 2. Relationship between Employment Real Income in Spanish regions: Industry

Dependent Variable:	LI?					
Method: Pooled Least	t Squares, San	ple (adjusted): 1987 2012			
Included observations	s: 26 after adju	stments. Cros	s-sections in	cluded: 17		
Total pool (balanced)	observations:	442				
White cross-section s	tandard errors	& covariance	(d.f. correcte	ed)		
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
LI?(-1)	0.993365	0.006636	149.6911	0.0000		
D(RI00?/1000)	16.37046	4.874710	3.358243	0.0009		
R-squared	0.995370	Mean dep	oendent var	166.5063		
Adjusted R-squared	0.995359	S.D. depe	endent var	167.6800		
S.E. of regression	11.42276	Akaike in	fo criterion	7.713608		
Sum squared resid	57410.98	Schwarz criterion 7.732121				
Log likelihood	-1702.707	1702.707 Hannan-Quinn criter. 7.720910				
Durbin-Watson stat	2.047139					

Equation 3. Relationship between Employment Real Income in Spanish regions: Building

Dependent Variable:	LB?					
Method: Pooled Leas	t Squares, Sam	ple (adjusted): 1987 2012			
Included observations	s: 26 after adju	stments. Cros	s-sections ind	cluded: 17		
Total pool (balanced)	observations:	442				
White cross-section s	tandard errors	& covariance	(d.f. correcte	ed)		
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
LB?(-1)	0.974127	0.016332	59.64593	0.0000		
D(RB00?/1000)	29.45246	4.139724	7.114593	0.0000		
R-squared	0.985702	Mean dep	endent var	95.34530		
Adjusted R-squared	0.985669	S.D. depe	endent var	88.96924		
S.E. of regression	10.65068	Akaike in	fo criterion	7.573638		
Sum squared resid	49912.24	Schwarz criterion 7.592151				
Log likelihood	Log likelihood -1671.774 Hannan-Quinn criter. 7.580940					
Durbin-Watson stat	2.034792					

Dependent Variable:	LS?		-						
Method: Pooled Least Squares, Sample (adjusted): 1987 2012									
Included observations: 26 after adjustments. Cross-sections included: 17									
Total pool (balanced) observations: 442									
White cross-section standard errors & covariance (d.f. corrected)									
Variable	Coefficient	Std. Error	t-Statistic	Prob.					
LS?(-1)	1.013008	0.007347	137.8753	0.0000					
D(RS00?/1000)	12.88146	3.586113	3.592041	0.0004					
R-squared	0.996572	Mean dep	endent var	581.4404					
Adjusted R-squared	0.996564	S.D. depe	endent var	575.2736					
S.E. of regression	33.72132	Akaike in	fo criterion	9.878652					
Sum squared resid	500336.2	Schwarz criterion 9.8971							
Log likelihood	-2181.182	Hannan-Quinn criter. 9.885954							
Durbin-Watson stat	2.477788								

Equation 4. Relationship between Employment Real Income in Spanish regions: Services

The Services sector depends, at a great extent on the increase of real income produced in the other sectors as it is shown in equation 5.

Equation 5 relates RS (real income produced in Services) with real income produced in Agriculture, Industry and Building, and Equation 6 estimates a similar relationship in per capita terms.

Equation 5. Real Income produced in Services related with other sectors: 17 Spanish regions

Dependent Variable: RS00?										
Method: Pooled Least Squa	res									
Sample (adjusted): 1987 2013										
Included observations: 27 after adjustments										
Cross-sections included: 17										
Total pool (balanced) observations: 459										
White cross-section standard errors & covariance (d.f. corrected)										
Variable	Coefficient	Std. Error	t-Statistic	Prob.						
RS00?(-1)	1.021224	0.006648	153.6083	0.0000						
D(RA00?+RI00?+RB00?)	1.100985	0.324485	3.393023	0.0008						
R-squared	0.998177	Mean dep	endent var	22809.57						
Adjusted R-squared	0.998173	S.D. depe	endent var	23953.64						
S.E. of regression	1023.859	Akaike in	fo criterion	16.70489						
Sum squared resid	4.79E+08	Schwarz	criterion	16.72288						
Log likelihood	-3831.773	Hannan-O	16.71198							
Durbin-Watson stat	1.370234									

Note: Some degree of autocorrelation may be due to the effect of missing variables: other factors that have impact on Services, like the increase of active population, tourism or other ones.

Dependent Variable: RHS00?								
Method: Pooled Least Squares								
Sample (adjusted): 1987 2013								
Included observations: 27 after adjustments								
Cross-sections included: 17								
Total pool (balanced) observations: 459								
White cross-section standard errors & covariance (d.f. corrected)								
Variable	Coefficient	Std. Error	t-Statistic	Prob.				
RHS00?(-1)	1.013565	0.006629	152.8896	0.0000				
D(RHA00?+RHI00?+RHB00?)	0.600753	0.168691	3.561263	0.0004				
R-squared	0.984872	Mean dep	endent var	8860.765				
Adjusted R-squared	0.984839	S.D. depe	endent var	2651.179				
S.E. of regression	326.4450	Akaike info criterion		14.41875				
Sum squared resid	48700802	Schwarz	14.43674					
Log likelihood	-3307.103	Hannan-C	14.42583					
Durbin-Watson stat	1.262457							

Equation 6. Real Income produced per capita in 17 Spanish regions, 1987-2013

Note: Some degree of autocorrelation may be due to the effect of missing variables: other factors that have impact on Services, like the increase of active population, tourism or other ones.

The increase of real income produced by sectors A, I, B, depends on the evolution of quantity produced and the relative prices.

In the case of Agriculture usually it is difficult to get high increases of real income.

In the case of Industry, the econometric studies show that several variables have an important and positive impact: human capital (both through the Education and the expenditure in Research and Development (RD), social capital (quality of government and friendly rules for innovation and production) as well as investment and trade policies.

The Building sector depends on the availability of credit and on the demand of construction (both from domestic population, institutions and firms as from foreign tourism). In order to get sustained growth of this sector it is necessary to keep enough equilibrium between supply and demand.

Having into account that real income produced per capita in Agriculture is difficult to increase (RHA), and that RHB has also important limits to expand without an equilibrated relationship with family income, industry, services and the capacity of the economy to sustain increases of activity in building, we may notice that increases in industrial real income per head (RHI) are very important in order to increase real income per capita of Services (RHS) and to favor sustainable development without increase of foreign trade deficit, because industrial development usually may contribute to important increases of Exports of goods and to diminish, or to moderate, the increase of Imports of goods.

5. Conclusions

One of the most outstanding conclusions of this study is the stagnation, or even diminution. of real income per capita in Spain, and in many of the Spanish regions, for the period 1986-2013. Real value-added per capita from *income approach* decreased, as explained in the Annex, in spite of the increase of Real value-added per capita from production approach. This was due to the diminution of relative prices of industry and it means that we produce more but our real income did not increase.

Only three Spanish regions (Navarra, Pais Vasco and Rioja) reached in year 2013 a real income per head in industry over 4000 Euros, close to advanced regions of Europe. Given the important positive effect of industry to make the development of Services sustainable, policies for regional development should foster industry in many regions.

Regarding the ranking position evolution of the regions, in RHT (Real Total income produced per head) and the increase of this variable, at 2000 prices, for the period 1986-2013, we summary here the data included in the Annex:

Andalusia remains in the 16th place of real Real Income per capita (RTH) and experienced an increase of 3232 Euros.

Aragon went from 7th place to 6th place in the ranking of the real income per capita. with an increase of 4764 Euros.

Asturias remains in the 10th place of real income per capita with an increase of RTH of 3446 Euros.

Baleares moved from the 3rd place to the 7th place in real income per capita with an increase of RTH of 2713.

Canarias moved from 9th place to 13th place in real income per capita and experienced an increase of RTH of 2696.

Cantabria went from 12th place to 9th place in real income per capita, with an increase in RTH of of 4184.

Castilla and Leon went from 13th to 8th in real per capita income with an increase of RTH of 4645.

Castilla-La Mancha went from 14th to 15th ranking position in real RT per capita, with an increase of RTH of 3106.

Cataluña moved from position 6th to position 4th of real income per capita with an increase of RTH of 5090.

Comunitat Valenciana moved from 8th place to 12th place of real income per capita, with an increase of RTH of 2384.

Extremadura remains in the 17th place of real income per capita and experienced an increase in RTH of 3208.

Galicia has moved from 15th place to 11th place in real income per capita, with an increase of the RTH of 5151.

Madrid has moved from position 4th to position 2nd in real income per capita and experienced an increase of RTH of 6370.

Murcia has moved from 11th to 14th in real income per capita with an increase of RTH of 2118.

Navarra has moved from the 5th to the 3rd position in real income per capita, with an increase of RTH of 5931.

Pais Vasco has moved from the 2nd place to the 1st place in real income per capita, with an increase of RTH of 6007.

Rioja has moved from the 1st place to the 5th place in real income per capita with an increase of RTH of 2150.

The highest increases in real income per inhabitant (RTH) for the period 1986-2013, correspond to: Madrid, Pais Vasco, Navarra, Galicia and Cataluña.

The econometric models show the great importance that Industry usually has on the sustainability of Services and the important impact of Services real income on employment of this sector. As seen in Graph 3, there it is important to increase RHI in Spain, particularly in the regions with low levels of income per head, in order to get a real convergence with the levels of development of the most advanced regions of Europe.

We suggest a change in Spanish regional development policies in order to guarantee sustainable development, with increase of industrial development in many regions, in order to increase employment rates, real wage and real income per head.

On the other hand we may find that the excessive austerity measures imposed to Spain by European economic policies, during the period 2008-2013, with strong diminution both of bank credit and real family income, have had negative impact on industry, and thus they have not been positive for recovery. For the period 2013 to 2016 we may notice slight recovery in real income per head of several Spanish regions

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Annex.

Sources of data and updates: The general sources for regional data used in this study are the statistics of the National Statistical Institute of Spain (INE), related with Employment, Regional Accounts, Population and National Accounts.

	LAE	LIE	LBE	LSE	LNAE	LTE	UE
1976	2658	3389	1206	5160	9755	12413	749
1977	2585	3375	1207	5155	9737	12322	681
1978	2498	3310	1168	5121	9599	12097	913
1979	2370	3232	1109	5195	9536	11906	1130
1980	2219	3115	1038	5391	9544	11763	1275
1981	2099	2981	967	5403	9351	11450	1625
1982	2051	2819	957	5513	9288	11339	1880
1983	2058	2754	937	5555	9246	11303	2086
1984	1981	2686	818	5524	9029	11009	2473
1985	1943	2593	776	5577	8946	10889	3004
1986	1750	2636	831	5870	9338	11088	2975
1987	1710	2747	926	6257	9930	11640	2976
1988	1678	2804	1020	6433	10257	11936	2906
1989	1582	2898	1134	6790	10822	12403	2631
1990	1472	2978	1220	7038	11237	12709	2509
1991	1333	2890	1273	7293	11457	12790	2545
1992	1240	2804	1196	7312	11313	12553	2883
1993	1198	2532	1088	7214	10834	12032	3597
1994	1151	2474	1059	7329	10861	12012	3879
1995	1107	2485	1135	7586	11206	12313	3714
1996	1074	2500	1175	7884	11560	12634	3656
1997	1070	2580	1243	8144	11966	13036	3270
1998	1074	2705	1307	8444	12456	13530	3177
1999	1040	2782	1464	8948	13194	14234	2722
2000	951	3035	1749	9487	14271	15222	2484
2001	943	3077	1914	9818	14809	15752	1867
2002	952	3064	2006	10138	15208	16160	2155
2003	951	3037	2113	10556	15706	16657	2242
2004	932	3017	2233	11299	16549	17481	2214
2005	916	3029	2357	12096	17482	18398	1912
2006	870	3050	2516	12722	18288	19158	1837
2007	855	3044	2697	13771	19512	20367	1834
2008	836	3025	2404	13786	19215	20051	2591
2009	786	2775	1888	13439	18102	18888	4149
2010	835	2610	1651	13402	17663	18498	4632
2011	760	2555	1393	13396	17344	18104	4999
2012	743	2431	1148	12950	16529	17272	4087
2013	745	2293	1016	12696	16005	16750	5704
2014	736	2380	994	13235	16609	17345	5610
2015	717	2441	1061	13236	16738	17455	5056
2016	775	2552	1074	13971	17567	18342	4481

Table A1. Employment by sector and Unemployment in Spain, 1976-2016

	(unousand employed persons)										
	1976	1986	1996	2006	2016	Increase					
						1976-2016					
1. An	1339	1307	1736	2739	2587	1248					
2. Ar	319	305	388	573	518	199					
3. As	294	264	299	378	373	79					
4. Bl	184	194	290	443	526	342					
5. Cn	303	326	486	743	794	491					
6. CB	129	121	148	222	228	99					
7. Cl	568	560	715	902	895	327					
8. Cm	349	348	466	661	701	352					
9. Ct	1951	1694	2255	3230	3133	1182					
10. Cv	1011	941	1278	1871	1878	867					
11. Ex	183	179	253	319	327	144					
12. Ga	639	580	753	933	969	330					
13. Ma	1482	1398.	1777	2978	2828	1346					
14. Mu	216	219	306	471	486	270					
15. Na	143	139	189	289	258	115					
16. Pv	689	603	719	982	889	200					
17. Ri	69	64	83	126	125	56					
Sum 17	9868	9242	12141	17861	17515	7647					

Table A2. Non agrarian employment in Spanish regions, 1976-2016 (thousand employed persons)

Table A3. Total Employment, Population and Increase of Employment (thousand people). Rate of Employment (% of Population), 1976-2016

Re	Total	Total:	Incr.	%Incr.	Pop	Pop	Incr.	% Incr.	Rate	Rate
gion	LT	LT	LT	LT	1976	2016	Рор	Pop	of LT	of LT
	1976	2016					(th)		1976	2016
1. An	1804	2833	1029	43.4	6149	8388	2239	36	293	338
2. Ar	430	554	124	28.8	1175	1309	134	11	366	423
3. As	424	386	-38	-8.9	1100	1043	-57	-5	385	370
4. Bl	226	531	304	134.8	601	1107	506	84	377	479
5. Cn	385	813	428	111.3	1295	2102	807	62	297	387
6. Cb	177	235	58	32.7	492	582	90	18	360	404
7. Cl	915	965	50	5.4	2552	2448	-104	-4	358	394
8. Cm	531	752	221	41.6	1645	2042	397	24	323	368
9. Ct	2115	3184	1069	50.5	5699	7523	1824	32	371	423
10. Cv	1216	1932	716	58.9	3420	4960	1540	45	356	389
11. Ex	347	363	16	4.7	1072	1088	16	1	324	334
12. Ga	1204	1041	-164	-13.6	2700	2719	19	1	446	383
13. Ma	1504	2835	1331	88.5	4399	6467	2068	47	342	438
14. Mu	294	562	269	91.2	891	1465	574	64	329	384
15. Na	175	267	93	52.8	486	641	155	32	359	418
16. Pv	750	902	153	20.2	2068	2190	122	6	362	412
17. Ri	94	133	16	41.1	242	316	74	30	482	420
Spain	12591	18342	5929	47.76	35937	46557	10620	30	345	394

Note: LT= total employment, Pop=population. LT and Pop in thousand people. Rate of LT, employed people per one thousand inhabitants. Source: Elaborated by Guisan(2016) from statistics of INE.

	1976	1986	1996	2006	2016	Increase			
LAAN	465.000	297.000	207.246	226.601	246.025	-218.975			
LIAN	310.000	234.000	238.811	299.593	250.625	-59.375			
LBAN	168.000	126.000	185.577	410.769	161.400	-6.6			
LSAN	861.155	947.384	1312.038	2028.290	2175.325	1314.170			
LNAAN	1339.155	1307.384	1736.426	2738.652	2587.350	1248.195			
LTAN	1804.155	1604.384	1943.672	2965.253	2833.375	1029.220			

Table A4.1. Employment by sector and increase 1976-2016 (thousands): Andalucía (AN)

Notes and Source for tables A4-1 to A4-1: Employment in thousand persons. The point indicates decimal position. The last column presents the increase for the period 1976-2016. Source: Elaborated by Guisan(2016) from INE statistics.

Table A4-2. Employment by sector and increase 1976-2016 (thousands): Aragon (AR)

	1976	1986	1996	2006	2016	Increase
LAAR	111	67.000	37.405	39.712	35.850	-75.150
LIAR	119.000	100.000	103.364	112.718	105.200	-13.800
LBAR	36.000	27.000	32.386	76.503	32.525	-3.475
LSAR	164.000	178.000	252.621	354.246	380.375	216.375
LNAAR	319.000	305.000	388.263	573.478	518.100	199.100
LTAR	430.000	372.000	425.669	613.190	553.950	123.950

Table A4-3. Employment by sector and increase for 1976-2016 (thousands): Asturias (AS)

	1976	1986	1996	2006	2016	Increase
LAAS	130.000	73.000	34.919	15.512	13.500	-116.500
LIAS	121.000	93.000	70.269	70.517	57.425	-63.575
LBAS	30.000	25.000	29.464	58.457	20.075	-9.925
LSAS	143.000	146.000	198.174	242.325	295.050	152.050
LNAAS	294.000	264.000	299.324	377.519	372.550	78.550
LTAS	424.000	337.000	334.243	393.032	386.050	-37.950

Table A4-4. Employment by sector and increase 1976-2016: Baleares (BL)

	1 0					· /
	1976	1986	1996	2006	2016	Increase
LABL	42.000	15.000	6.379	8.536	4.450	-37.550
LIBL	42.000	43.000	41.259	36.522	35.400	-6.600
LBBL	25.000	26.000	28.782	74.173	50.050	25.050
LSBL	117.000	125.000	217.382	340.568	440.700	323.700
LNABL	184.000	194.000	289.708	443.388	526.150	342.150
LTBL	226.000	209.000	296.087	451.924	530.600	304.600

Table A4-5. Employment by sector and increase 1976-2016 (thousands): Canarias (CN)

	1976	1986	1996	2006	2016	Increase
LACN	82.000	53.000	36.867	16.430	19.800	-62.200
LICN	44.000	38.000	46.991	42.646	40.450	-3.550
LBCN	40.000	41.000	50.357	113.925	40.200	0.200
LSCN	219.000	247.000	388.324	541.489	712.925	493.925
LNACN	303.000	326.000	485.539	743.091	793.575	490.575
LTCN	385.000	379.000	522.405	759.522	813.375	428.375

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	1976	1986	1996	2006	2016	Increase		
LACB	48.000	33.000	15.783	14.211	7.325	-40.675		
LICB	53.000	40.000	33.832	37.196	37.075	-15.925		
LBCB	14.000	10.000	16.997	42.197	16.125	2.125		
LSCB	62.000	71.000	96.475	148.603	174.400	112.400		
LNACB	129.000	121.000	147.567	222.252	227.600	98.600		
LTCB	177.000	154.000	163.350	236.462	234.925	57.925		

Table A4-6. Employment by sector and increase 1976-2016 (thousands): Cantabria (CB)

Table A4-7. Employment by sector and increase 1976-2016 (thousands): Castilla y León (CL)

	1976	1986	1996	2006	2016	Increase
LACL	347.000	199.000	101.124	107.511	70.225	-276.775
LICL	174.000	152.000	150.812	169.820	163.725	-10.275
LBCL	75.000	62.000	81.111	148.063	62.700	-12.300
LSCL	319.000	346.000	483.511	586.433	668.150	349.150
LNACL	568.000	560.000	715.290	902.236	894.575	326.575
LTCL	915.000	759.000	816.414	1009.747	964.800	49.800

Table A4-8. Employment by sector and increase 1976-2016 (thousands): Castilla-La Mancha (CM)

	1976	1986	1996	2006	2016	Increase
LACM	182.000	127.000	62.194	70.057	50.825	-131.175
LICM	110.000	98.000	94.433	150.457	120.475	10.475
LBCM	64.000	51.000	77.215	94.439	57.475	-6.525
LSCM	175.000	199.000	293.654	376.402	523.175	348.175
LNACM	349.000	348.000	465.728	661.404	701.125	352.125
LTCM	531.000	475.000	527.922	731.461	751.950	220.950

Table A4-9. Employment by sector and increase 1976-2016 (thousands): Cataluña (CT)

	1976	1986	1996	2006	2016	Increase
LACT	164.000	107.000	69.650	69.782	50.800	-113.200
LICT	860.000	662.000	641.117	730.698	583.550	-276.450
LBCT	231.000	119.000	186.350	419.203	184.250	-46.750
LSCT	860.000	913.000	1410.957	1933.587	2365.225	1505.225
LNACT	1951.000	1694.000	2255.479	3229.521	3133.025	1182.025
LTCT	2115.000	1801.000	2325.129	3299.304	3183.825	1068.825

Table A4-10. Employment by sector and increase 1976-2016 (thousands): C. Valenciana (CV)

	1976	1986	1996	2006	2016	Increase
LACV	205.000	140.000	82.807	59.842	53.900	-151.100
LICV	424.000	317.000	343.201	429.591	319.475	-104.525
LBCV	114.000	76.000	122.846	295.816	115.600	1.600
LSCV	473.000	548.000	805.122	1161.242	1442.850	969.850
LNACV	1011.000	941.000	1278.107	1871.357	1877.925	866.925
LTCV	1216.000	1081.000	1360.913	1931.200	1931.825	715.825

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	1976	1986	1996	2006	2016	Increase
LAEX	164.000	77.000	44.207	50.673	36.250	-127.750
LIEX	35.000	27.000	31.943	32.492	37.500	2.500
LBEX	28.000	26.000	35.625	51.600	27.725	-0.275
LSEX	120.000	126.000	187.308	209.621	261.925	141.925
LNAEX	183.000	179.000	253.137	319.481	327.150	144.150
LTEX	347.000	256.000	297.344	370.154	363.400	16.400

Table A4-11. Employment by sector and increase 1976-2016 (thousands): Extremadura (EX)

Table A4-12. Employment by sector and increase 1976-2016 (thousands): Galicia (GA)

	1976	1986	1996	2006	2016	Increase
LAGA	565.000	431.000	215.266	79.408	71.400	-493.600
LIGA	205.000	153.000	149.701	186.455	161.900	-43.100
LBGA	94.000	66.000	97.232	129.650	71.850	-22.150
LSGA	340.000	361.000	490.590	617.288	735.550	395.550
LNAGA	639.000	580.000	753.129	933.392	969.300	330.300
LTGA	1204.000	1011.000	968.396	1012.800	1040.700	-163.300

Table A4-13. Employment by sector and increase 1976-2016 (thousands): Madrid (MA)

	1976	1986	1996	2006	2016	Increase
LAMA	22.000	15.000	17.894	14.260	7.475	-14.525
LIMA	393.000	313.000	315.023	313.950	233.850	-159.150
LBMA	169.000	100.000	143.424	366.652	137.550	-31.450
LSMA	920.000	985.000	1341.379	2324.463	2456.525	1536.525
LNAMA	1482.000	1398.000	1776.848	2977.536	2827.925	1345.925
LTMA	1504.000	1413.000	1794.742	2991.795	2835.400	1331.400

Table A4-14. Employment by sector and increase 1976-2016 (thousands): Murcia (MU)

	1976	1986	1996	2006	2016	Increase
LAMU	78.000	49.000	32.481	45.239	76.600	-1.400
LIMU	74.000	61.000	60.194	87.931	73.050	-0.950
LBMU	26.000	22.000	31.047	81.805	27.025	1.025
LSMU	116.000	136.000	215.402	298.254	385.575	269.575
LNAMU	216.000	219.000	305.560	470.760	485.650	269.650
LTMU	294.000	268.000	338.041	515.999	562.250	268.250

Table A4-15. Employment by sector and increase 1976-2016 (thousands): Navarra (NA)

	1976	1986	1996	2006	2016	Increase
LANA	32.000	20.000	15.595	16.429	9.575	-22.425
LINA	64.000	55.000	59.053	73.426	67.175	3.175
LBNA	16.000	10.000	16.753	46.927	12.275	-3.725
LSNA	63.000	74.000	112.799	177.398	178.450	115.450
LNANA	143.000	139.000	189.426	289.471	257.900	114.900
LTNA	175.000	159.000	205.021	305.900	267.475	92.475

	1976	1986	1996	2006	2016	Increase
LAPV	61.000	28.000	17.354	23.067	12.550	-48.450
LIPV	336.000	233.000	203.109	237.044	201.050	-134.950
LBPV	70.000	40.000	52.451	86.813	49.250	-20.750
LSPV	283.000	330.000	467.542	655.762	638.950	355.950
LNAPV	689.000	603.000	719.002	981.943	889.250	200.250
LTPV	750.000	631.000	736.357	1005.010	901.800	151.800

Table A4-16. Employment by sector and increase 1976-2016 (thousands): País Vasco (PV)

Table A4-17. Employment by sector and increase 1976-2016 (thousands): Rioja (RI)

	1976	1986	1996	2006	2016	Increase
LARI	25.000	14.000	10.318	12.263	8.000	-17.000
LIRI	34.000	23.000	30.424	37.245	32.900	-1.100
LBRI	7.000	6.000	6.380	17.247	5.800	-1.200
LSRI	28.000	35.000	45.353	75.094	85.950	57.950
LNARI	69.000	64.000	83.314	125.629	124.650	55.650
LTRI	94.000	78.000	93.632	137.892	132.650	38.650

Table A4-18. Employment by sector and increase 1976-2016 (thousands): Spain (Es)

	1976	1986	1996	2006	2016	Increase
LAES	2723.000	1745.000	1007.489	869.533	774.525	-1948.475
LIES	3398.000	2642.000	2613.536	3048.299	2522.225	-875.775
LBES	1207.000	833.000	1193.995	2514.239	1073.850	-133.150
LSES	5263.155	5767.384	8318.631	12071.066	13970.950	8707.795
LNAES	9868.155	9242.384	12141.847	17888.532	17567.025	7698.870
LTES	12591.155	10987.384	13149.336	18758.065	18341.550	5750.395

In the period 1976-2016, total employment in Spain increased by 5750 thousand employed persons, in spite of the diminution of employment in Agriculture with a loss of 1948 thousand employments in that sector. There was a great increase of employment in Services, with 8707 thousand new employed people, and it is very important to increase this variable through a new economic policy of sustainable development.

Graphs 5.1 to 5.18 shows that in majority of Spanish regions there was a positive relationship between real income per capita of Services and real income per capita produced in other sectors. Two exceptions to this general rule where Canarias and Rioja. In the case of Canarias we may notice that the value of RHS is higher than expected, accordingly to the sum of RHA+RHI+RHB, due to the high intensity of tourism. In the case of Rioja, we may notice that the value of RHS is lower than expected, accordingly to the sum of real income of the other sectors indicating possible investments or expenditures of the income produced in non Services in Services, or other sectors, at other regions. This may happen, at some degree, also in other regions.



Graphs 5.1 to 5.18: Relationship between real Income per capita in Services and Other Sectors, 1986-2013







Graph 5.9 Cataluña



Graph 5.10.Com.Valenciana

Graph 5.11. Extremadura

Graph 5.12. Galicia





In the Analysis of region al development it is usually very important to analyze the evolution of real Value-Added from the income approach, which has more influence on regional development than production approach.

In tables 5 to 9, of the main text, we have presented the values of real income per capita produced by sector in the Spanish regions. They represent the purchasing capacity of the income produced in each sector and are calculated from Value-Added data accordingly to the "income approach" (dividing by the consumption price), while the "production approach" (dividing by the deflactor of the sector) represents the capacity of production. One sector may increase its real value accordingly to the production approach (producing more goods and services) but decrease in real value accordingly to the income approach if the relative price of the sector (deflator of the sector divided by the consumption price) decrease.

Table A5 shows the evolution of real value added by sector in Spain accordingly to both approaches, presented in Guisan and Exposito(2013).

(initi. e 2000). production and meonie approaches								
Año	VA	VI	VB	VS	RA	RI	RB	RS
	00es	00es	00es	00es	00es	00es	00e	00e
1965	13460	30789	17801	108208	38259	51730	10164	76221
1970	14867	46686	24997	145083	40809	72668	18713	104780
1975	18146	65848	29155	186949	43109	98311	27116	124158
1980	20116	73169	24699	212116	37783	100158	25773	163642
1985	21334	74622	24306	231724	31440	98993	19568	182636
1990	21509	91385	38436	287266	31213	116812	32791	229400
1995	17667	96159	38230	319204	22917	110434	33612	274652
2000	24984	119217	47584	378775	24974	116255	42793	361289
2005	22410	126575	63933	449561	24089	123138	70845	448010
2010	22109	110535	59541	496395	19897	116082	79422	538977

Tabla A5. Real Value-Added by sector in Spain, 1965-2010 (mill.€2000): production and income approaches

Nota: Vj00ES = Producción real, o VAB real según enfoque producción. Millones de \in del 2000. Rj00ES= Es el VAB real según enfoque renta. Mide el poder adquisitivo del VAB sectorial. Source: Elaborated by Guisan and Exposito(2013) from statistics of INE.

In Agriculture we may notice an important increase of production, from 13460 million in year 1965 to 22109 millon, at constant prices, but a clear diminution of real income (from 38259 million in year 1965 to only 19897 in year 2010). This has been due to a strong diminution of relative prices of this sector.

In Industry production almost multiplied by a factor of three (from 30789 in year 1965 to 110535 in year 2010) but income only multiplied for a factor slight higher than two (from 51730 to 116082), due to a diminution of relative prices of this sector.

In Building production multiplied by a factor higher than three and real income by a factor higher than seven, due to a high increase in relative prices of this sector. In Services production was multiplied for a factor higher than four and income by a factor close to seven, indicating an increase in the relative prices of this sector.

A Summary by region (English): Evolution of real Value-Added per capita, income approach.

Andalucia remains in the 16th place of real Real Income per capita. It occupies the 6th position in the % of increase of RT, the 9th position in the % of population increase and the 10th position in the RTH increment, with an increase of 3232 Euros at 2000 prices.

Aragon went from 7th place to 6th place in the ranking of the real per capita. It occupies the post 10 in the % rt increment, the 11th position in the % of population increase, and the 6th position in the increase of RTH with an increase of 4764 Euros.

Asturias remains in the 10th place of real RT per capita. It occupies the 17th position in the % increase of real RT and the 17th position in the% increase of population, occupies the 9th place in the increase of rh with an increase of 3446.

Baleares moved from the 3rd place to the 7th place in real per capita. It occupies the position 2 in the increase of RT and the position 1 in the increase of population. It occupies the position 13 in the increase of RTH with an increase of 2713.

Canarias moved from 9th place to 13th place in real RT per capita. It occupies the position 4 in% of increase of RT and the position 3 in% of increase of population. It occupies the position 14 in increase of rh with an increase of 2696.

Cantabria went from 12th place to 9th place in real RT per capita. It ranks 11th in% of rt increase and 12th in% of population increase. It occupies the 8 position in increase of rh with an increase of 4184.

Castilla y Leon went from 13th to 8th in real per capita RT. It ranks 11th in% of rt increase and 15th in% of population variation. It occupies the position 7 in increase of rh with 4645.

Castilla-La Mancha went from 14 to 15 in real RT per capita. It occupies the 8th position in% increase of the real RT and the 7th position in% of increase of population. It ranks 12th in rh increase with 3106.

Cataluña moved from position 6 to position 4 of real RT per capita. It occupies the 5 th position in the% rt increase and the 6 th position in% of the population increase. Rank 5 in increase of real RT per capita with 5090.

Comunitat Valenciana moved from 8th place to 12th place of real RT per capita. It occupies the 9th position in% increase of rt and the 4th position in% of increase of population. It occupies the position 15 in increase of real RT per capita with 2384.

Extremadura remains in the 17th place of real RT per capita. It occupies the 13 th position in the% rt increase and the 14th position in% of the population increase. It occupies the 11th place in increase of the real RT per capita with 3208.

Galicia has moved from 15th place to 11th place in real per capita RT. It occupies the 12th place in% of rt increase and the 16th place in% of population variation. Rank 4 in increase of the real RT per capita with 5151.

Madrid has moved from position 4 to position 2 in real RT per capita. It occupies the 1 st position in% rt increase and the 5th position in% of population increase. Rank 1 in increase of real RT per capita with 6370.

Murcia has moved from 11th to 14th in real per capita RT. It occupies the 7th position in% increase of rt and the 5th position in% of increase of population. It occupies the 17th place in increase of the real RT per inhabitant with 2118.

Navarra has moved from the 5th to the 3rd position in real RT per capita. It occupies the position 3 in% of increase of rt and the position 8 in% of increase of population. It occupies the position 3 in increase of the real GAV per capita with 5931.

Pais Vasco has moved from the 2nd place to the 1st place in real RT per capita. It ranks 14th in% of rt increase and 12th in% of population increase. It occupies the position 2 in increase of the real GAV per capita with 6007.

Rioja has moved from the 1st place to the 5th place in real BWP per capita. It occupies the position 16 in% of increase of rt and the position 10 in% of increase of population. It occupies the 16 position in increase of the real GAV per capita with 2150.

The highest increases in real RT per inhabitant corresponded, in the period 1986-2013, to: Madrid, Basque Country, Navarre, Galicia and Catalonia.

They are located in an intermediate position: Aragon, Castile and Leon, Cantabria, Asturias, Andalusia, Extremadura, and Castilla-La Mancha,

The smallest increases corresponded, in that period, to: Baleares, Canarias, C. Valenciana, Rioja and Murcia.

A Summary by region (Spanish): VAB real per capital, enfoque renta.

Andalucía se mantiene en el puesto 16 de VAB real per cápita. Ocupa el puesto 6 en el % de incremento de RT, el puesto 9 en el % de incremento de población y el puesto 10 en el incremento de RTH, con un incremento de 3232 Euros del 2000.

Aragón pasó del puesto 7 al puesto 6 en el ranking del VAB real per cápita. Ocupa el puesto el puesto 10 en el % de incremento de RT, el puesto 11 en el % de incremento de población, y el puesto 6 en el incremento de rh con un incremento de 4764 Euros.

Asturias se mantiene en el puesto 10 de VAB real per cápita. Ocupa el puesto 17 en el % de incremento de RT y el puesto 17 en el % de incremento de población, Ocupa el puesto 9 en el incremento de RTH con un incremento de 3446.

Baleares pasó del puesto 3 al puesto 7 en VAB real per cápita. Ocupa el puesto 2 en el incremento de RT y el puesto 1 en el incremento de población. Ocupa el puesto 13 en el incremento de RTH con un incremento de 2713.

Canarias pasó del puesto 9 al puesto 13 en VAB real per cápita. Ocupa el puesto 4 en % de incremento de RT y el puesto 3 en % de incremento de población. Ocupa el puesto 14 en incremento de RTH con un incremento de 2696.

Cantabria pasó del puesto 12 al puesto 9 en VAB real per cápita. Ocupa el puesto 11 en % de incremento de RT y el puesto 12 en % de incremento de población. Ocupa el puesto 8 en incremento de RTH con un incremento de 4184.

Castilla y León pasó del puesto 13 al puesto 8 en VAB real per cápita. Ocupa el puesto 11 en % de incremento de RT y el puesto 15 en % de variación de la población. Ocupa el puesto 7 en incremento de RTH con 4645.

Castilla-La Mancha pasó del puesto 14 al 15 en VAB real per cápita. Ocupa el puesto 8 en % de incremento de RT y el puesto 7 en % de incremento de población. Ocupa el puesto 12 en incremento de RTH con 3106.

Cataluña pasó del puesto 6 al puesto 4 de VAB real per cápita. Ocupa el puesto 5 en el % de incremento de RT y el puesto 6 en % de incremento de población. Ocupa el puesto 5 en incremento de RTH con 5090.

C. Valenciana pasó del puesto 8 al puesto 12 de VAB real per cápita. Ocupa el puesto 9 en % de incremento de RT y el puesto 4 en % de incremento de población. Ocupa el puesto 15 en incremento de RTH con 2384.

Extremadura se mantiene en el puesto 17 de VAB real per cápita. Ocupa el puesto 13 en incremento del % de RT y el puesto 14 en % de incremento de población. Ocupa el puesto 11 en incremento de RTH con 3208.

Galicia ha pasado del puesto 15 al puesto 11 en VAB real per cápita. Ocupa el puesto 12 en % de incremento de RT y el puesto 16 en % de variación de población. Ocupa el puesto 4 en incremento de RTH con 5151.

Madrid ha pasado del puesto 4 al puesto 2 en VAB real per cápita. Ocupa el puesto 1 en % de incremento de RT y el puesto 5 en % de incremento de población. Ocupa el puesto 1 en incremento de RTH con 6370.

Murcia ha pasado del puesto 11 al puesto 14 en VAB real per cápita. Ocupa el puesto 7 en % de incremento de RT y el puesto 5 en % de incremento de población. Ocupa el puesto 17 en incremento de RTH con 2118.

Navarra ha pasado del puesto 5 al puesto 3 en VAB real per cápita. Ocupa el puesto 3 en % de incremento de RT y el puesto 8 en % de incremento de población. Ocupa el puesto 3 en incremento de RTH con 5931.

País Vasco ha pasado del puesto 2 al puesto 1 en VAB real per cápita. Ocupa el puesto 14 en % de incremento de RT y el puesto 12 en % de incremento de población. Ocupa el puesto 2 en incremento del VAB real per cápita con 6007.

Rioja ha pasado del puesto 1 al puesto 5 en VAB real per cápita. Ocupa el puesto 16 en % de incremento de RT y el puesto 10 en % de incremento de población. Ocupa el puesto 16 en incremento del VAB real per cápita con 2150.

Los mayores incrementos de VAB real por habitante, corresponden, en el período 1986-2013, a: Madrid, País Vasco, Navarra, Galicia y Cataluña.

Se sitúan en una posición intermedia: Aragón, Castilla y León, Cantabria, Asturias, Andalucía, Extremadura, y Castilla-La Mancha,

Los menores incrementos correspondieron, en dicho período, a: Baleares, Canarias, C. Valenciana, Rioja y Murcia.

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