

**EMPLOYMENT, POPULATION AND REGIONAL
DEVELOPMENT IN WESTERN AND CENTRAL EUROPE.
ECONOMETRIC MODELS AND CHALLENGES OF EU
ENLARGEMENT**

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Abstract:

We analyse the relationships between employment, population and regional development in Europe with a cross section sample, for year 2000, of 151 regions belonging to the 25 countries of EU after Enlargement of year 2004. Regional disparities in EU are higher than in the US, while the rate of employment, wages and income per inhabitant are lower in Europe. We analyse the main factors which explain those differences and estimate an econometric model for Western and Central European regions which shows the positive effect of real value added on employment and population. Finally we suggest to foster economic policies focused to increase the rates of employment and income per inhabitant in EU countries and regions.

JEL Classification: C5, E24, J2, O18, O52, R23

Key words: Employment, Population, European Economics, Western Europe, Central Europe, Regional Development

1.- Introduction

The European Enlargement of year 2004, and the future Enlargements and/or Cooperation agreements of European Union with East-Europe, Eurasia and Mediterranean countries, present important challenges for European policies regarding employment, regional development and international cooperation, and immigration policies. The first concerns in this regard should be in our view to

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foster inside cooperation for regional development in EU regions and outside cooperation for economic development in neighbouring countries, in order to diminish emigration pressures on European regional labour markets beyond their capability. In section 2 we show some differences between Western and Central Europe at country level, and in section 3 at regional level. In section 4 we present the estimation of cross-section models for population and employment at regional level and in section 5 we present the main conclusions.

2.- Comparison of Western and Central Europe, 1950-2002.

Table 1 presents the evolution of real Gross Domestic Product per inhabitant in Central Europe in comparison with some countries of Western Europe and the USA, elaborated from the estimations by Maddison(2001) and (2004), OECD Statistics and our provisional estimations for Czech Republic, Slovakia and Slovenia for years with unavailable data in those sources. Data are expressed in dollars of year 2000 at Purchasing Power Parities, PPPs.

Table 1. Real GDP per inhabitant in Central Europe, Western Europe and the USA (thousands of dollars at 1990 prices and PPPs)

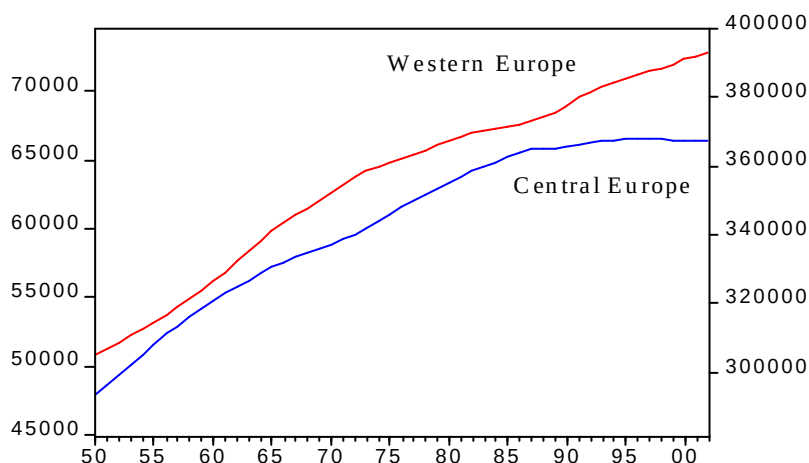
Country	1950	1960	1970	1980	1990	2000
Czech R.	3.561	5.199	6.585	8.137	8.689	8.837
Hungary	2.480	3.649	5.028	6.307	6.471	7.131
Poland	2.447	3.218	4.428	5.740	5.115	7.228
Slovakia	3.347	4.887	6.190	7.649	8.168	8.736
Slovenia	2.410	3.742	5.700	9.158	8.848	10.456
<i>Central Europe</i>	2.723	3.781	5.064	6.476	6.226	7.679
Spain	2.397	3.437	7.291	9.524	12.210	15.367
Austria	3.706	6.864	10.246	13.746	17.459	21.030
Ireland	3.446	4.279	6.200	8.541	11.825	21.981
<i>Western Europe</i>	4.594	6.930	10.297	13.226	15.988	18.910
USA	9.597	11.328	15.030	18.575	23.221	29.403

Source: Maddison(2001) and (2004), OECD and provisional estimations for some unavailable data of Central Europe.

We can notice than some Western European countries such as Austria, Ireland and Spain, with levels of development very alike to Central Europe in 1950, have experienced higher degree of development during the period 1950-90 mainly due to market and foreign trade freedom and other incentives to foster industrial production, as it has been analysed in Guisan, Aguayo and Carballas(2004) and other studies.

Central European countries have reached high educational level of population and moderate fertility rates and thus they are prepared to experience an important increase in investment and production per inhabitant in a market system. In spite of some problems to promote industrial investment and market freedom, some of those countries, as Poland and Slovenia, have experienced important increases of real Gdp per inhabitant during the decade 1990-2000, but their values are still very low in comparison with Western Europe. Those disparities imply Westwards emigration from many Central regions, what implies increase of population in West EU and diminution or stagnation in Central EU, as it is shown in graph 1.

Graph 1. Population of Central and Western Europe, 1950-2002
(thousand inhabitants)



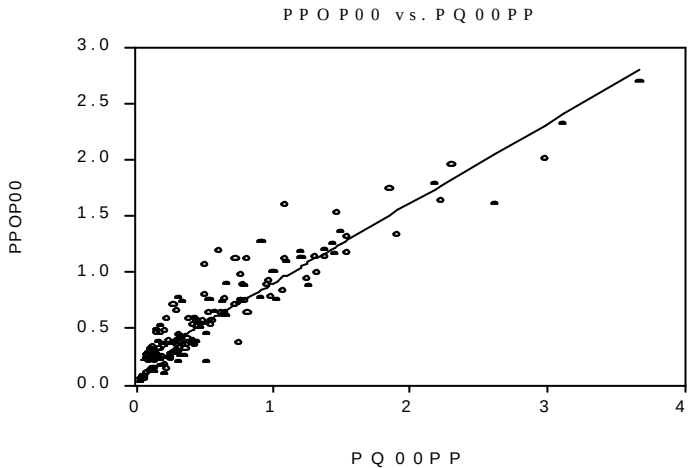
Source: Guisan and Cancelo(2004) from international statistics.

Some interesting studies about the causes of mobility in EU are those of Fertig and Schmidt (2000) and (2002), Firdrmuc(2002), and Zaiceva(2003). On the other hand, Leon-Ledesma and Piracha(2001) and other authors analyse the interesting role of international migration and remittances in Eastern Europe. In this regard the past experiences of Spain, Portugal and Greece are interesting because their economic development has been highly supported from emigrants remittances from other EU countries, particularly during the period 1960-75.

3.- Regional Development in 151 regions of EU25, 1995-2000

Graphs 2 and 3 show the high positive correlation for the year 2000 between the percentages of population, PPop00, and employment, PLt00, with that of Value-added in purchasing power parities, PQ00pp, for each European region on EU total of each variable. Data for regions with more than 4% of EU Value-Added are not included in the graphs, in order to show a better representation for smaller regions. Those major regions, with more than 4%, show also a positive correlation between the variables.

Graph2. Percentages of Population and Value-Added in EU regions



Graph 3. Regional Percentages of Employment and Value-Added

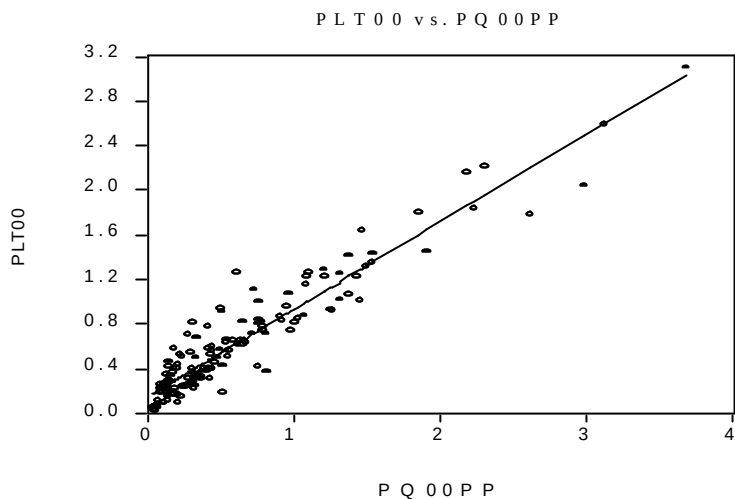


Table 2 shows data at regional level in years 1995 and 2000. Data are percentages and have being elaborated from Eurostat Regional Statistics, Polish Statistics, OECD Labour Force Statistics and World Bank. In some cases with unavailability of data, particularly for Central European regions in the year 1995, data are only provisional estimations. Countries are indicated in *italic* below their regions.

Table 2. % of Population, Value-Added and Labour,1995-2000

obs	Región	%Population		%Value-Added		%Labour	
		1995	2000	1995	2000	1995	2000
1	Bruxelles	0.21	0.21	0.54	0.51	0.18	0.18
2	Vlaams	1.31	1.32	1.61	1.53	1.31	1.35
3	Wallone	0.74	0.74	0.68	0.64	0.63	0.66
	<i>Belgium</i>	2.27	2.27	2.83	2.68	2.11	2.19
4	<i>Denmark</i>	1.17	1.18	1.53	1.54	1.45	1.44
5	Baden-Württemberg	2.30	2.32	3.13	3.12	2.64	2.59
6	Bayern	2.67	2.70	3.67	3.68	3.19	3.10
7	Berlin	0.78	0.75	0.96	0.79	0.89	0.78
8	Brandenburg	0.57	0.58	0.45	0.44	0.61	0.60

9	Bremen	0.15	0.15	0.24	0.23	0.16	0.15
10	Hamburg	0.38	0.38	0.78	0.76	0.44	0.42
11	Hessen	1.34	1.34	1.98	1.91	1.48	1.45
12	Mecklenburg-Vorpommern	0.41	0.39	0.32	0.30	0.45	0.41
13	N.Sachen	1.73	1.75	1.94	1.85	1.83	1.81
14	Nordrhein-Westfalia	3.98	3.98	5.04	4.76	4.07	4.02
15	Rheinland-Pfalz	0.88	0.89	1.00	0.95	0.94	0.96
16	Saarland	0.24	0.24	0.28	0.25	0.23	0.24
17	Sachsen	1.03	0.98	0.83	0.76	1.08	1.00
18	Sachsen Anhalt	0.62	0.58	0.46	0.44	0.65	0.56
19	Schleswig-Holstein	0.61	0.62	0.71	0.65	0.68	0.65
20	Thüringen	0.56	0.54	0.42	0.41	0.61	0.58
	<i>Germany</i>	18.24	18.19	22.21	21.29	19.95	19.31
21	Voreia	0.75	0.76	0.51	0.53	0.71	0.66
22	Kentriki	0.58	0.59	0.38	0.38	0.44	0.41
23	Attiki	0.78	0.76	0.65	0.65	0.78	0.83
24	Nisia A.-Kriti	0.22	0.23	0.16	0.17	0.20	0.20
	<i>Greece</i>	2.34	2.34	1.71	1.74	2.13	2.10
25	Galicia	0.61	0.60	0.43	0.43	0.51	0.53
26	Asturias	0.24	0.23	0.18	0.18	0.17	0.18
27	Cantabria	0.12	0.12	0.10	0.10	0.09	0.09
28	Pais Vasco	0.47	0.46	0.48	0.51	0.38	0.43
29	Navarra	0.12	0.12	0.13	0.14	0.10	0.11
30	Rioja	0.06	0.06	0.06	0.06	0.05	0.05
31	Aragon	0.26	0.26	0.25	0.25	0.22	0.24
32	Madrid	1.12	1.14	1.28	1.38	0.89	1.06
33	Castilla y León	0.56	0.55	0.46	0.46	0.42	0.46
34	Castilla-La Mancha	0.38	0.38	0.27	0.28	0.26	0.31
35	Extremadura	0.24	0.24	0.13	0.14	0.15	0.18
36	Cataluña	1.36	1.37	1.44	1.49	1.18	1.31
37	C.Valenciana	0.87	0.89	0.72	0.78	0.70	0.82
38	Baleares	0.16	0.17	0.17	0.19	0.15	0.17
39	Andalucía	1.59	1.60	1.02	1.08	0.98	1.16
40	Murcia	0.24	0.25	0.17	0.19	0.18	0.22
41	Canarias	0.35	0.37	0.29	0.32	0.27	0.32

	<i>Spain</i>	8.74	8.80	7.57	7.97	6.69	7.66
42	Ille de France	2.46	2.43	4.36	4.24	2.63	2.67
43	Champagne	0.30	0.30	0.32	0.31	0.27	0.25
44	Picardie	0.42	0.41	0.40	0.37	0.36	0.37
45	Haute Normandie	0.40	0.40	0.43	0.41	0.39	0.40
46	Centre	0.54	0.54	0.58	0.54	0.53	0.52
47	Basse Normandie	0.32	0.32	0.31	0.30	0.26	0.26
48	Bourgogne	0.36	0.36	0.38	0.36	0.34	0.33
49	Nord-Pas-de-Calais	0.89	0.89	0.82	0.79	0.69	0.75
50	Lorrain	0.52	0.51	0.51	0.47	0.47	0.50
51	Alsace	0.38	0.39	0.46	0.44	0.38	0.41
52	Franche-Comté	0.25	0.25	0.25	0.24	0.23	0.24
53	Pays de Loire	0.70	0.72	0.71	0.71	0.70	0.72
54	Bretagne	0.64	0.65	0.61	0.61	0.62	0.62
55	Poitou	0.36	0.37	0.35	0.33	0.35	0.33
56	Aquitaine	0.64	0.65	0.66	0.65	0.62	0.62
57	Midi-Pyrennees	0.56	0.57	0.57	0.55	0.51	0.56
58	Limousin	0.16	0.16	0.15	0.14	0.14	0.15
59	Rhône-Alps	1.25	1.26	1.45	1.43	1.26	1.23
60	Auvergne	0.29	0.29	0.28	0.28	0.27	0.26
61	Languedoc-Rousillon	0.50	0.51	0.44	0.44	0.43	0.40
62	Provence-Alps-C. Azur	0.99	1.01	1.05	1.01	0.82	0.82
63	Corse	0.06	0.06	0.05	0.05	0.03	0.03
	<i>France</i>	12.98	1303	15.12	14.68	12.30	12.43
64	Ireland	0.80	0.84	0.83	1.07	0.70	0.88
65	Piemonte	0.96	0.95	1.30	1.25	0.94	0.94
66	Valle d'Aosta	0.03	0.03	0.04	0.04	0.03	0.03
67	Liguria	0.37	0.36	0.44	0.43	0.33	0.31
68	Lombardia	1.99	2.02	3.04	2.98	2.03	2.05
69	Trentino-Alt Adige	0.20	0.21	0.31	0.31	0.21	0.22
70	Veneto	0.99	1.00	1.34	1.31	0.99	1.02
71	Friuli-Venezia Giulia	0.27	0.26	0.35	0.33	0.25	0.25
72	Emilia-Romagna	0.88	0.89	1.29	1.26	0.92	0.92
73	Toscana	0.79	0.78	0.98	0.98	0.76	0.75
74	Umbria	0.18	0.19	0.21	0.21	0.17	0.17

75	Marche	0.32	0.32	0.37	0.36	0.31	0.31
76	Lazio	1.16	1.17	1.51	1.46	1.00	1.01
77	Abruzzo	0.28	0.28	0.28	0.26	0.25	0.24
78	Molise	0.07	0.07	0.06	0.06	0.06	0.06
79	Campania	1.29	1.28	0.93	0.92	0.82	0.83
80	Puglia	0.91	0.90	0.67	0.67	0.64	0.64
81	Basilicata	0.14	0.13	0.11	0.11	0.10	0.10
82	Calabria	0.46	0.45	0.31	0.31	0.31	0.28
83	Sicilia	1.14	1.12	0.83	0.81	0.72	0.72
84	Sardegna	0.37	0.36	0.31	0.30	0.27	0.27
	<i>Italy</i>	12.81	12.78	14.68	14.34	11.12	11.13
85	<i>Luxembourg</i>	0.09	0.10	0.17	0.21	0.09	0.10
86	Noord Nederland	0.36	0.37	0.42	0.41	0.37	0.39
87	Oost Nederland	0.71	0.74	0.74	0.76	0.78	0.81
88	West Nederland	1.62	1.64	2.14	2.23	1.79	1.84
89	Zuid Nederland	0.76	0.78	0.87	0.90	0.84	0.87
	<i>Netherlands</i>	3.45	3.52	4.17	4.31	3.78	3.90
90	Ost Osterreich	0.76	0.76	1.00	1.03	0.89	0.86
91	Sud Osterreich	0.39	0.39	0.41	0.41	0.81	0.78
92	West Osterreich	0.65	0.65	0.79	0.82	0.39	0.38
	<i>Austria</i>	1.80	1.79	2.20	2.26	2.10	2.01
93	Norte	0.79	0.80	0.52	0.50	0.89	0.94
94	Centro	0.39	0.39	0.25	0.23	0.46	0.51
95	Lisboa e Val Tejo	0.75	0.76	0.76	0.76	0.82	0.84
96	Alentejo	0.12	0.12	0.08	0.07	0.12	0.12
97	Algarve	0.08	0.08	0.06	0.06	0.08	0.09
98	Açores	0.05	0.05	0.03	0.03	0.05	0.05
99	Madeira	0.06	0.05	0.04	0.04	0.06	0.06
	<i>Portugal</i>	2.24	2.26	1.73	1.69	2.46	2.60
100	<i>Finland</i>	1.14	1.15	1.22	1.31	1.19	1.25
101	<i>Sweden</i>	1.97	1.96	2.32	2.30	2.22	2.21
102	North East	0.58	0.57	0.52	0.49	0.59	0.57
103	North West	1.54	1.53	1.48	1.47	1.63	1.65
104	Yorkshire+Humberside	1.12	1.12	1.06	1.09	1.24	1.23
105	East Midlands	0.92	0.93	0.92	0.96	1.06	1.07

106	West Midlands	1.19	1.19	1.18	1.20	1.31	1.29
107	Eastern	1.17	1.20	1.26	1.38	1.40	1.42
108	London	1.57	1.62	2.40	2.61	1.71	1.79
109	South East	1.75	1.80	1.95	2.18	2.09	2.17
110	South West	1.08	1.10	1.07	1.10	1.22	1.26
111	Wales	0.65	0.65	0.58	0.58	0.66	0.66
112	Scotland	1.15	1.13	1.25	1.21	1.27	1.23
113	Northern Ireland	0.37	0.38	0.32	0.32	0.35	0.36
	<i>United Kingdom</i>	13.10	13.22	13.99	14.60	14.53	14.69
114	<i>Cyprus</i>	0.16	0.15	0.15	0.13	0.19	0.19
115	Praha	0.27	0.26	0.34	0.35	0.35	0.32
116	Stredni Cechy	0.25	0.25	0.13	0.13	0.31	0.28
117	Jihozapad	0.26	0.26	0.17	0.15	0.33	0.30
118	Severozapad	0.25	0.25	0.16	0.13	0.30	0.27
119	Severovychod	0.33	0.33	0.20	0.17	0.41	0.37
120	Jihovychod	0.37	0.37	0.23	0.20	0.44	0.40
121	Stredni Morava	0.28	0.27	0.16	0.14	0.32	0.29
122	Moravskoslezsko	0.29	0.28	0.19	0.15	0.31	0.28
	<i>Czech Republic</i>	2.31	2.27	1.59	1.41	2.77	2.52
123	Estonia	0.32	0.30	0.12	0.13	0.39	0.35
124	Kozep-Magyarország	0.65	0.64	0.47	0.53	0.63	0.63
125	Kozep-Dunantul	0.25	0.25	0.11	0.14	0.25	0.25
126	Nyugat-Dunantul	0.22	0.22	0.12	0.14	0.23	0.23
127	Del-Dunantul	0.22	0.22	0.09	0.09	0.19	0.19
128	Eszak- Magyarország	0.29	0.29	0.11	0.10	0.22	0.22
129	Eszak-Alfold	0.35	0.34	0.12	0.12	0.27	0.27
130	Del-Alfold	0.31	0.30	0.13	0.12	0.27	0.27
	<i>Hungary</i>	2.29	2.26	1.16	1.23	2.05	2.05
131	<i>Lithuania</i>	0.83	0.78	0.29	0.30	0.86	0.82
132	<i>Latvia</i>	0.57	0.53	0.15	0.18	0.62	0.59
133	<i>Malta</i>	0.08	0.09	0.05	0.05	0.08	0.07
134	Dolnoslaskie	0.67	0.66	0.26	0.29	0.55	0.55
135	Kujawsko-Pomorskie	0.47	0.46	0.18	0.18	0.42	0.41
136	Lubelskie	0.50	0.49	0.15	0.14	0.53	0.47
137	Lubuskie	0.23	0.23	0.08	0.09	0.19	0.19

138	Lodzkie	0.60	0.59	0.21	0.22	0.59	0.53
139	Malopolskie	0.71	0.71	0.24	0.27	0.73	0.71
140	Mazowieckie	1.13	1.12	0.54	0.73	1.26	1.11
141	Opolskie	0.24	0.24	0.09	0.09	0.21	0.22
142	Podkarpackie	0.47	0.47	0.14	0.14	0.51	0.43
143	Podlaskie	0.27	0.27	0.08	0.09	0.27	0.26
144	Promorskie	0.48	0.49	0.18	0.21	0.41	0.44
145	Slaskie	1.10	1.07	0.51	0.51	1.00	0.91
146	Swietokrzyskie	0.30	0.29	0.09	0.10	0.33	0.24
147	Warminsko-Mazurskie	0.32	0.32	0.10	0.10	0.27	0.27
148	Wielkopolskie	0.75	0.74	0.28	0.34	0.72	0.68
149	Zachodniopomorskie	0.39	0.38	0.15	0.16	0.33	0.34
	<i>Poland</i>	8.64	8.55	3.28	3.66	8.32	7.76
150	<i>Slovenia</i>	0.45	0.44	0.31	0.33	0.52	0.50
151	<i>Slovakia</i>	1.20	1.20	0.61	0.60	1.37	1.27
	Total EU	100	100	100	100	100	100

Source: Own elaboration from Eurostat Statistics and other sources.

In the next section we present as a novelty an interregional econometric model with this sample of 151 Western and Central regions, to explain the positive impact of real Value-Added on the percentages of population and employment.

4.- Econometric models of regional Population and Employment.

Model 1 present an interdependent system, with contemporaneous bilateral relation between Population and Employment. Equations 1 and 2 show the Two Stages LS estimation for the equations of this model, and Model 2 presents a recursive model with causality but not interdependence, estimated by Least Squares.

D(Z) represents the increase of a variable Z during the period 1995-2000: $D(Z)=Z_{00}-Z_{95}$. The names of the variables are as follows:

PPOP = Percentage of Regional Population on EU total.

PVA = Percentage of Regional Value-Added on EU total.

PL = Percentage of Labour on EU Total.

Model 1: Interdependent system

Equation 1. TSLS estimation: Population equation in Model 1

Dependent Variable: PPOP00.

Method: Two-Stage Least Squares. Sample: 1 151

Instrument list: RPOB95 RLT95 RQ95PP (RQ00PP-RQ95PP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PPOP95	1.000464	0.001103	906.9730	0.0000
PVA95-PPOP95	0.020699	0.003421	6.049774	0.0000
D(PVA)	0.129130	0.021179	6.097041	0.0000
D(PL)	0.035174	0.034995	1.005104	0.3165
R-squared	0.999638	Mean dependent var		0.662252
Adjusted R-squared	0.999631	S.D. dependent var		0.574038
S.E. of regression	0.011026	Sum squared resid		0.017870
Durbin-Watson stat	1.719143			

Equation 2. TSLS estimation: Employment equation in Model 1

Dependent Variable: PLT00

Method: Two-Stage Least Squares. Sample: 1 151

Instrument list: RPOB95 RLT95 RQ95PP (RQ00PP-RQ95PP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PLT95	0.991374	0.004224	234.6901	0.0000
D(PVA)	0.029791	0.088973	0.334838	0.7382
D(PPOP)	2.475906	0.555907	4.453813	0.0000
R-squared	0.995329	Mean dependent var		0.662252
Adjusted R-squared	0.995265	S.D. dependent var		0.618050
S.E. of regression	0.042527	Sum squared resid		0.267666
Durbin-Watson stat	1.316860			

The TSLS estimation of Model 1 shows that Population follows Production and Income, and that Labour follows Population directly, and Production indirectly. Interdependence can exist at some small degree but the coefficient of Employment in the TSLS equation of Population is not significant.

Model 2: Recursive system

Equation 3. LS estimation: Population Equation in Model 2

Dependent Variable: PPOP00

Method: Least Squares. Sample: 1 151

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PPOP95	1.000392	0.001134	882.4691	0.0000
PVA95-PPOP95	0.021999	0.003262	6.744104	0.0000
D(PVA)	0.141840	0.017497	8.106765	0.0000
R-squared	0.999614	Mean dependent var		0.662252
Adjusted R-squared	0.999609	S.D. dependent var		0.574038
S.E. of regression	0.011355	Akaike info criterion		-6.098662
Sum squared resid	0.019082	Schwarz criterion		-6.038716
Log likelihood	463.4490	Durbin-Watson stat		1.730549

Equation 4. LS estimation: Employment equation in Model 2

Dependent Variable: PLT00

Method: Least Squares. Sample 1-151

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PLT95	0.995046	0.003681	270.3331	0.0000
D(PVA)	0.158964	0.065848	2.414097	0.0170
D(PPOP)	1.325356	0.253123	5.236017	0.0000
R-squared	0.995901	Mean dependent var		0.662252
Adjusted R-squared	0.995845	S.D. dependent var		0.618050
S.E. of regression	0.039837	Akaike info criterion		-3.588360
Sum squared resid	0.234877	Schwarz criterion		-3.528414
Log likelihood	273.9212	Durbin-Watson stat		1.281764

Population emigrate to seek income and thus the increases in the percentage of Value-Added have important positive influence to maintain domestic population and to increase it attracting population from outside the region. Employment is favoured both by the increases in Value-Added (demand of employees) and by the Population growth, which increases in the supply of workers not only as employees but also as self-employed. A more detailed analysis of causality is presented in Aguayo and Guisan(2004).

5. Conclusions

After EU Enlargement, there is a higher need for a really efficient economic policy of regional development in EU. These policies would be accompanied of policies aimed to converge with the USA and other countries which have reached higher levels of employment and income per inhabitant than EU average. After the pioneering study of Klein(1969) in regional models the USA have promote more than Europe the study and implementation of regional development policies. We agree with Fertig and Schmidt(2002) when they claim that regional development research in EU *“has to be conducted from a pronounced European perspective... Such an ambitions task can hardly be performed by a handful of researchers alone. Instead, it is necessary to co-ordinate there endeavours on an European basis. In the light of the overwhelming relevance of these topics, it is hoped that representatives and institutions of the European Union will spend more effort in supporting the development of more and better knowledge on issues decisive to the future development of European societies”*.

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