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REGIONAL GROWTH AND REGIONAL IMBALANCES: SPAIN AND U.S.A.

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Angel Alañón Pardo; ecap1y0@sis.ucm.es

Juan Bueno Lastra; ecap101@sis.ucm.es

Departamento de Economía Aplicada I

Facultad de C.C. Económicas

Universidad Complutense de Madrid

E-28223 Madrid

Fax 34-1-3942499

ABSTRACT

Regional and national incomes are determined by spatial and non spatial phenomena. Relative elasticities in Spain and U.S.A. for income explanatory variables, which were derivated from space models estimates, are 35 y 65%, respectively. External spatial economies, locational inertia of investment and urban expenditure multiplier -all of them typical spatial variables- are all concepts explaining the way space cooperates to income generation. Non spatial economic analysis therefore does not pay attention to phenomena which explain about a third of the produced national wealth.

Regional income imbalances have not disappeared after decades or even centuries of economic development. Although they have indeed decreased dramatically, this reduction stopped around 1960 in the U.S.A. and 1980 in Spain. Since then regional per capita income imbalances have remained almost constant, ranging from 60 to 75 % between poor and rich regions. Interregional technological transfers, internal economies of scale, the urban expenditure multiplier, and decreasing external spatial economies explain the interregional "catching-up". External spatial economies, locational inertia of investment and the end of regional labour migration are the reasons explaining the present steadiness in spatial imbalances.

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1. INTRODUCTION

Economic growth is affected by the way economic activity is performed in the space. A high percentage of per capita income (PCI), whether regional or national, is determined by spatial variables (SV); i.e., variables which take into account the spatial distribution of economic resources. Economic activity –regardless claims by micro and macroeconomists- does not develop on an imaginary point in space; it rather takes place unevenly in such a space. An uneven spatial distribution of resources causes differences -precisely spatially originated- in income generation. The higher the resources concentration and the better the intra and interregional links are, the higher income will be. Summing up : the higher the urbanization degree is, the higher income will be.

On the other hand, we know regional income differences have not disappeared after decades or even centuries of economic development. Furthermore, those differences, estimated around 60-75%, have stabilized.

In this paper we present firstly the determinants for PCI, with special attention to spatial factors, and we estimate very simple models -for several years and for Spain and U.S.A. regions. Secondly, we develop an explanation pointing to reasons underlying the discovered steadiness in PCI differentials in Spain from 1981 onwards.

We have found through spatial models estimates that company mean size (CMS) and urban agglomeration (UA) explain roughly around 64 and 35% out of PCI, and that spatial dependence explains the rest. Thus SV, to which micro and macroeconomics do not pay almost any attention, explain around a third of PCI . Interestingly enough, CMS and UA elasticities are very similar for Spain and the U.S.A.

We analyse the decreasing and then steadiness in PCI differentials in two stages: "getting closer" and steadiness. First stage is determined by regional technological transfers and by decreasing internal economies of scale (IES) reapening, all of which has led to : a) an equalization in elasticites for CMS among rich and poor regions –in Spain between 1981 y 1991, and in USA before 1985; and to b) an equalization in elasticities for UA in such regional groups due to a growing decrease in spatial external economies (SEE)- which took place firstly in rich regions- and to the influence imposed by the urban expenditure multiplier (UEM) in poor regions.

On the other hand, the steadiness in PCI differentials in force in Spain since 1980 and in USA since 1960, may be better understood if we consider the observed steadiness in absolute differences in CMS and UA between poor and rich regions. These differences occurr due to non explosive cumulative causation caused by SEE, locational inertia of investment (LII), and to the end of regional migration of labour force.

2. REGIONAL GROWTH DETERMINANTS

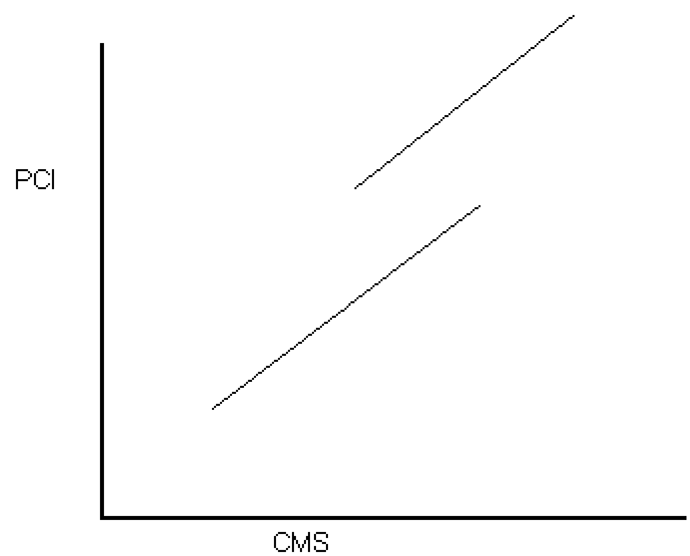
Here we develop a theory of regional economic growth –in fact a PCI theory- and we present estimates from a spatial model for Spain and the U.S.A. for several years.

2.1 PCI determinants

It is convenient to separate variables explaining PCI in two groups: spatial variables (SV) and non spatial variables (NSV). We will just try to develop some basic ideas.

a) NSV : CMS, where dPCI/dCMS > 0. We postulate further that the function linking PCI and CMS has "jumps" or leaps as a result of main macrotechnological developments – figure 1.

Figure 1 PCI and CMS



CMS is an indicator for underlying and very complex phenomena affecting mean labour productivity : technological innovation and development (ID) and IES. The higher the values for this variables , the higher will be labour productivity and therefore the higher will be PCI. A high growth in ID gives way to production and selling of products and services with a high added value- and thus with a stronger productivity. IES, on the other hand, also cause higher labour productivity.

Now, the point is that higher values for ID and IEE –leading to higher productivity and thus to higher PCI- may be reaped the better , the higher CMS is. So the higher CMS is, the higher will be PCI because the higher will be the productivity coming out from higher ID and IEE.

b) NSV : UA, where dPCI/dUA >0. We postulate that function linking PCI and UA is like the one shown in figure 2.

Figure 2 PCI and UA

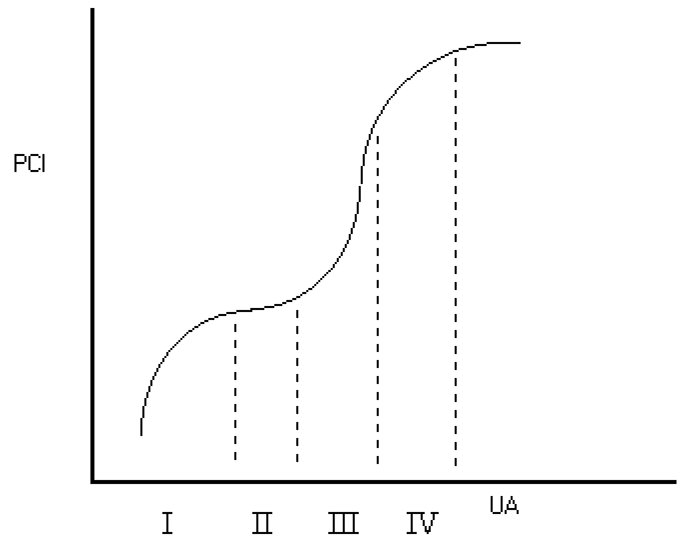


Figure 2 reflects the way UA affects PCI through two channels, SEE and UEM, and four stages which will be explained in 3.2b. SEE act on the supply side whereas UEM affects PCI by the demand side.

SEE are well known –so we will not insist on them. We consider decreasing SEE as UA grows and also that there might be spatial external diseconomies. Therefore , taking both possibilities into account, we may draw a curve with two ends (a) and (b), (figure 3).

UEM is a second channel for UA affecting PCI; where regional expenditure (RE) grows as long as UA does, dRE/dUA > 0. The higher the spatial concentration of resources, the higher will be RE –consumption and investment (both private and public). We postulate that the functional form is as shown in figure 4.

Figure 3 Spatial external economies and diseconomies

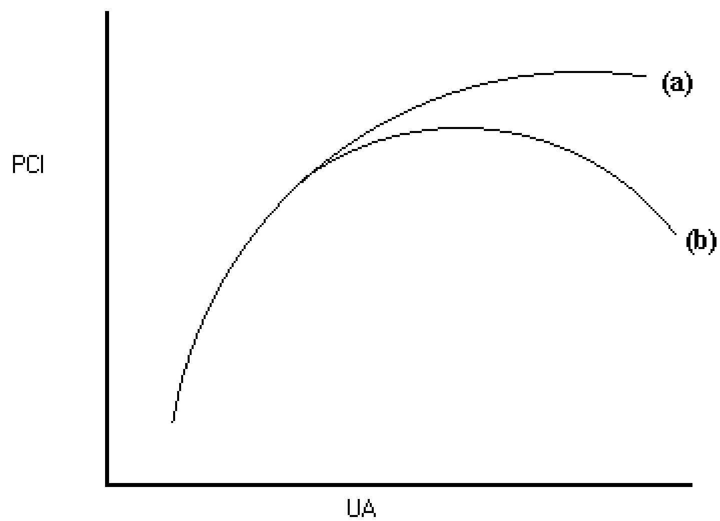
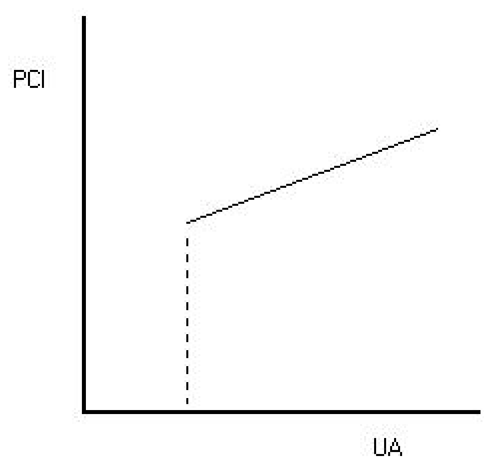


Figure 4 PCI and UEM



UEM operates only from a certain UA threshold onwards, and shows a positive steady slope from then.

UEM is due to two factors closely related which are typical in big urban agglomerations: a higher propensity to spend; and locational goods and services.

On one hand we have found that big spatial agglomeration of resources –measured both in absolute term and in density (area) terms- give way to a higher expenditure in goods and services. This propensity is further increased the higher the quality of resources is –labour and capital- and it does act through prices and quantities. Thus, for instance, a higher petrol consumption in cities, a higher squared meter price for housing buildings or parking tickets are some cases showing a higher propensity to spend.

Now this higher propensity to spend can only be understood if we consider the so called locational goods and services, meaning by those which are only produced and demanded in certain towns -like an underground train service –or those which are produced and demanded more intensively in certain cities or towns. An opera theatre, a "chic" boutique, etc. are examples of such an specific type of expenditure.

Note that a higher regional expenditure due to UEM will only generate a higher PCI as long as this expenditure is on goods and services which are produced within the region. But this does occur when local producers are more competitive –in price and in quality- than their competitors from other regions, and if there are locational goods and services. This way cities show a higher propensity to spend than small towns .

2.2 Evidence from Spain and the U.S.A.

2.2.1 The quantitative approach

In order to contrast our PCI theory, according to which PCI depends on CMS and UA, we have chosen the following observations, regression analysis estimation techniques and functional forms.

Spanish data cover years 1971, 1981 and 1991, for 50 provinces. PCI is gross added value at factor costs (GAV) divided by total population (P), [PCI=GAV/P]. We dispose of U.S.A. data for 1985, 1986, 1990, 1991 and 1996, for 47 continental states (excluding Wyoming). PCI is gross state product (GSP) divided by total population, [PCI=GSP/P].

CMS is in Spain GAV divided by the number of productive establishments, (E), [GAV/E], whereas in USA is [GSP/E]. UA is demographic density in both countries.

To estimate the model we have applied spatial regression techniques with maximum likelihood procedures. Considering the existence of spatial autocorrelation and structural spatial instability that is the better approach (Anselin, 1988). Spacestat v.190 (Anselin, 1992) is the software we have used to perform calculations.

Functional form is the so called spatial error model:

Equation 1 : $y = X\beta + \varepsilon; \quad \varepsilon = \lambda W \varepsilon + \xi$

Where W is the well known spatial interregional matrix –contiguity and distances-; ε follows a spatial autoregressive process; and ξ is an error term with zero mean and constant variance randomly distributed.

Therefore :

Equation 2 : $PCI = \beta_1 CMS + \beta_2 UA + \lambda W \varepsilon + \xi$

Where dPCI/dCSM >0; dPCI/dUA >0; dPCI/dWε >0 and W is a contiguity matrix for Spain and an inverse distance matrix for the U.S.A.

The indicator for variable UA has been transformed to its reciprocal: 1/UA. This curve shows a decreasing path according to the postulates we made about SEE, which are reflected in figure 3. We have applied the Freeman-Tukey transformation to all observations, with population as the base, in order to cope with heteroskedasticity and non normality (Cressie and Chan, 1989).

2.2.2 Spain: 1971,1981 and 1991

Table 1 shows an important outcome for Spain. We have regionalized Spanish provinces into two groups: rich and poor regions –according to a technique developed in Bueno (2000). Once we applied a spatial structural instability Chow test (Anselin, 1988), we have found that we must accept the existence of clearly defined spatial regimes for those groups for 1971 and 1981. So, although rich and poor regions PCI are explained by the same variables, the difference between coefficients in the two regimes is statistically significant. For 1991, however the same test leaded us to accept just one model for both regions.

Thus, accepted estimates show us clearly the following points:

a) In 1971 and 1981 CMS accounts for 60% in poor regions, and 40 and 50% in rich regions. UA elasticity for poor regions is always 40%, whereas for rich regions such percentage decreases from 59 to 48%, approaching this way to the one of poor regions. Spatial dependence is roughly steady, and explains around 2% of PCI.

b) In 1991, once every variable elasticity equals other´s region, CMS accounts for 64%, whereas UA explains around 36%. Note the key change occurred from 1971 and 1981 to 1991, which will be analyzed in 3.

2.2.3 U.S.A.: 1985, 1986, 1990, 1991 and 1996

The estimates for the 47 continental states (table 2), which are very similar to the Spanish ones for 1991 (table 1), show high stability of coefficients and elasticities. CMS and UA explain around 66% and 33 %, respectively, of PCI every year. $W\varepsilon$ accounts for only 0,5 % of PCI, a half than in Spain, but it also shows a decreasing path. In that period (1985-1996) there was not any significant evidence of spatial heterogeneity, because the U.S.A. states have reached stability of coefficients long time ago, so we did not need to impose spatial regimes in the regression analysis.

3. THE STEADINESS IN REGIONAL IMBALANCES

It has been argued by many analysts, both theoretically and empirically, that regional imbalances would be reduced and eventually would disappear due to market forces and/or public intervention. However, we argue that though there has been a significant reduction of regional imbalances – measured by PCI -, these imbalances have not disappeared yet, and, what it is more striking, they have remained steady for decades. Here we show evidence and try to explain the reasons for this fact.

Table 1. Estimates for PCI for the Spanish provinces: 1971, 1981 y 1991

Spatial Error Model, Maximun Likelihood Estimation.
Dependant Variable: PCI; Spatial Matrix: Contig. OBS 50
VARS 4 DF 46; CMS_0, UA_0: Poor Regs.; CMS_1, UA_1: Rich Regs.

1971

R2	0.9674	**Sq. Corr.**	0.9940	**R2(Buse)**	0.9952
LIK	402.964	**AIC**	-797.928	**SC**	-790.280
SIG-SQ	5.70517e-09	(7.55326e-05)			

Variable	Coeff.	S.D.	z-value	Prob.	Elasti.
CMS_0	0.166911	0.0115054	14.507165	0.000000	58 %
UA_0	0.655423	0.0613362	10.685740	0.000000	40 %
CMS_1	0.111633	0.0156438	7.135941	0.000000	39 %
UA_1	1.14839	0.107264	10.706265	0.000000	59 %
λ	0.324642	0.175032	1.854757	0.063631	2 %

Test on Structural Instability for 2 regimes defined by Reg

Test	DF	Value	Prob
Chow - Wald	2	43.551744	0.000000

Stability of Individual Coefficients

Test.	DF	Value	Prob
CMS_0	1	8.102739	0.004420
UA_0	1	15.917396	0.000066

1981

R2	0.9482	**Sq. Corr.**	0.9909	**R2(Buse)**	0.9930
LIK	390.354	**AIC**	-772.709	**SC**	-765.060
SIG-SQ	9.30219e-09	(9.64479e-05)			

Variable	Coeff.	S.D.	z-value	Prob.	Elasti.
CMS_0	0.165747	0.0107829	15.371301	0.000000	59 %
UA_0	0.669348	0.0635572	10.531424	0.000000	38 %
CMS_1	0.137148	0.0144389	9.498481	0.000000	49 %
UA_1	1.06002	0.11898	8.909192	0.000000	48 %
λ	0.405075	0.163754	2.473672	0.013373	3 %

Test on Structural Instability for 2 regimes defined by Reg

Test	DF	Value	Prob.
Chow - Wald	2	29.577294	0.000000

Stability of Individual Coefficients

Test	DF	Value	Prob.
CMS_0	1	2.518705	0.112503
UA_0	1	8.387789	0.003778

1991

R2	0.9789	**Sq. Corr.**	0.9907	**R2(Buse)**	0.9942
LIK	385.124	**AIC**	-766.248	**SC**	-762.424
SIG-SQ	1.02057e-08	(0.000101023)			

Variable	Coeff.	S.D.	z-value	Prob.	Elasti.
CMS	0.173467	0.00768501	22.572080	0.000000	64 %
UA	0.713485	0.0495236	14.406972	0.000000	35 %
λ	0.719149	0.103027	6.980191	0.000000	1 %

Table 2. PCI Estimates for the States of the U.S.A: 1985, 1986, 1990, 1991 y 1996

Spatial Error Model, Maximun Likelihood Estimation. Dependant Variable: PCI; Spatial Matrix: Distan. OBS 47 VARS 2 DF 45

1985

R2	0.9910	**Sq. Corr.**	0.9924	**R2(Buse)**	0.9931
LIK	262.661	**AIC**	-521.322	**SC**	-517.621
SIG-SQ	7.91204e-07	(0.000889497)			
Variable	**Coeff.**	**S.D.**	**z-value**	**Prob.**	**Elasti.**
CMS	0.34439	0.0215715	15.965095	0.000000	67,1 %
UA	0.312971	0.0359114	8.715087	0.000000	32,2 %
λ	0.724531	0.184622	3.924401	0.000087	0,6 %

1986

R2	0.9953	**Sq. Corr.**	0.9928	**R2(Buse)**	0.9932
LIK	263.504	**AIC**	-523.009	**SC**	-519.309
SIG-SQ	7.69018e-07	(0.000876937)			
Variable	**Coeff.**	**S.D.**	**z-value**	**Prob.**	**Elasti.**
CMS	0.334259	0.0198542	16.835674	0.000000	65,6 %
UA	0.327688	0.0335151	9.777299	0.000000	33,8 %
λ	0.666252	0.219824	3.030839	0.002439	0,6 %

1990

R2	0.9893	Sq. Corr.	0.9931	R2(Buse)	0.9937
LIK	265.494	AIC	-526.989	SC	-523.289
SIG-SQ	7.02797e-07	(0.000838330)			
Variable	**Coeff.**	**S.D.**	**z-value**	**Prob.**	**Elasti.**
CMS	0.345377	0.0194858	17.724512	0.000000	67,9 %
UA	0.314952	0.0325848	9.665634	0.000000	32 %
λ	0.709552	0.193825	3.660782	0.000251	0,1 %

1991

R2	0.9900	**Sq. Corr.**	0.9929	**R2(Buse)**	0.9935
LIK	265.112	**AIC**	-526.224	**SC**	-522.524
SIG-SQ	7.15953e-07	(0.000846140)			
Variable	**Coeff.**	**S.D.**	**z-value**	**Prob.**	**Elasti.**
CMS	0.341164	0.0197126	17.306890	0.000000	67,9 %
UA	0.321976	0.0331408	9.715376	0.000000	32 %
λ	0.692121	0.204401	3.386100	0.000709	0,2 %

1996

R2	0.9866	**Sq. Corr.**	0.9934	**R2(Buse)**	0.9940
LIK	267.626	**AIC**	-531.251	**SC**	-527.551
SIG-SQ	6.41736e-07	(0.000801085)			
Variable	**Coeff.**	**S.D.**	**z-value**	**Prob.**	**Elasti.**
CMS	0.332805	0.0192168	17.318451	0.000000	66 %
UA	0.337376	0.0331124	10.188788	0.000000	34 %
λ	0.711036	0.192918	3.685682	0.000228	0,0 %

3.1 Evidence from Spain and the U.S.A.

The conclusions are clear and very similar for both countries. In the U.S.A. case, there has been a significant reduction of regional imbalances, measured both as product or income, from 1929 to the end of the fifties, almost without anyinterruption. However, these imbalances have remained stable since 1960 (figure 5.a). Income imbalances are smaller than product ones showing that public transfers may reduce the imbalances but they can not make them disappear. We have to note that the stability of imbalances had been reached before 1985, the first year of our estimates. Because of lack of data we could not make estimations for the fifties, the sixties or the seventies.

Figure 5.a. Theil Index for U.S.A. states: Gross State Product and Personal Income

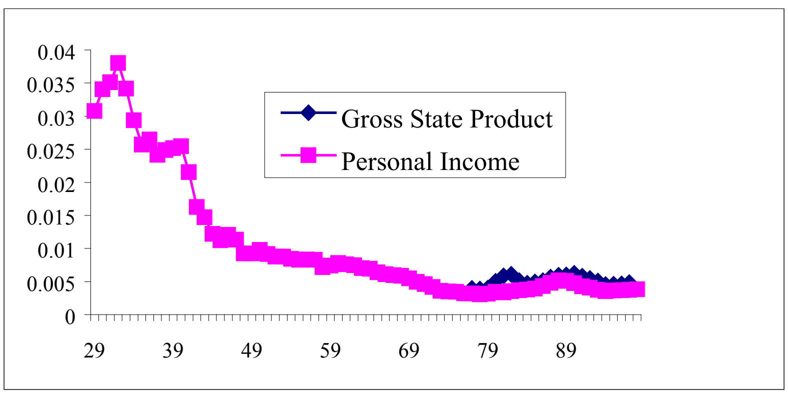
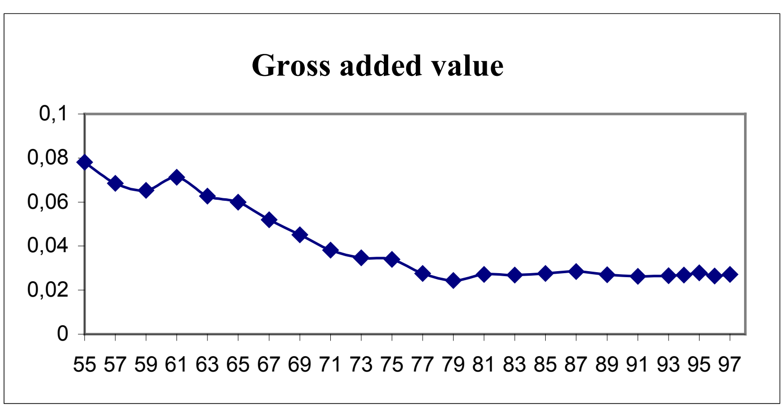


Figure 5.b. Theil Index for Spanish provinces: Gross Added Value



In Spain the strong reduction of PCI took place later than in the U.S.A., from 1955 to 1980, when the regional PCI imbalances stabilized.

The evidence for these countries seems conclusive: there are two different stages. The first stage is characterized by a strong reduction of regional imbalances and a variable duration, at least 30 years for the U.S.A. and 25 for Spain. At the second stage, regional imbalances become steady around 60-75 % between the poor regions and the rich ones.

3.2. Determinants of steadiness in regional imbalances: Spain

3.2a) Two stages: "getting closer" and steadiness in regional differences

In order to set out the mechanisms that explain these two stages it is convenient to go back to equation (2):

Equation (2) $PCI = \beta_1 CMS + \beta_2 UA + \lambda W \varepsilon + \xi$

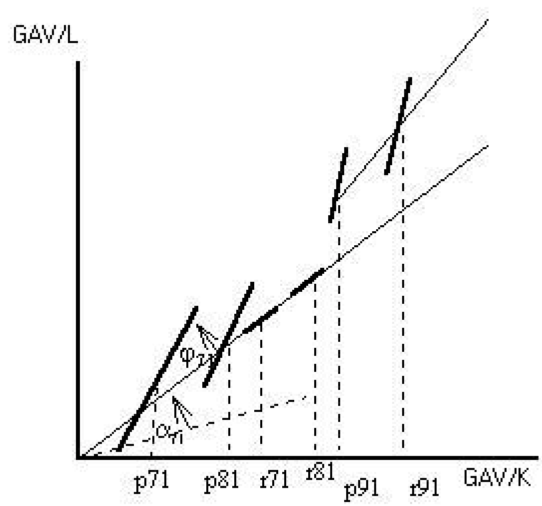
Here we can verify that PCI is affected both by the regression coefficients of each variable and their values. Then, the reduction of regional imbalances, the first stage, can be seen as one of matching the regression coefficients -or the elasticities- of each variable and each regional group - poor and rich regions. And the second stage, the stabilization of regional imbalances, may be explained by the absolute differences of CMS and UA between poor and rich regions.

3.2b) "Getting closer"

We must return to the ideas outlined in figures 1 and 2, which showed the relationship between PCI and CMS and UA respectively, to understand the dynamics of this stage. Figures 6 and 7 show the slopes of CMS and UA estimated in table 1 for Spain. Poor regions coefficients for CMS are higher than the ones in rich regions, whereas poor regions coefficients for UA are smaller, all for 1971 and 1981. However, neither CMS nor AU coefficients show statistical differences between rich and poor regions in 1991.

To explain this stage lets CMS be defined as GAV divided by the number of productive establishments, (E), CMS = GAV/E. If we multiply both parts of the ratio by the stock of capital, (K), we can break it down into a triple product: GAV/K, K and the inverse of E [CMS = (GAV/K)*K*(1/E)]. And PCI can be seen as the product of mean labour productivity, (GAV/L), where L means employment, and employment / total population relationship, (L/P), [PCI = (GAV/L)*(L/P)]. If we assume 1/E and L/P to be constant we can divide the CMS and PCI relationship into two different effects, both with a direct economic meaning: GAV/L = $\beta^a{}_1$ * GAV/K, (figure 6.a), and GAV/L = $\beta^b{}_1$ * K, (figure 6.b). The poor regions have a sharper slope that of the rich ones in 1971 and 1981 as far as GAV/L and GAV/K relationship, ($\beta^a{}_1$) concerns (figure 6.a.). On the one hand the poor regions are benefited by technological transfer, both of products and processes - through patents, multiregional firms, etc. - from the rich regions, which let the poor regions slope become closer to the rich regions one. -an increase of angle α_{71}. However, since the poor regions have a bigger K/L ratio, better know how, and better capital human than the one rich regions had when their GAV/K ratio was similar to the one of the poor regions in the 1971-81 period- maybe 15 or 20 years before-, the poor regions slope overcome the rich regions one -an increase of angle φ_{71}. This approaching process, evidenced by higher slopes of $\beta^a{}_1$ for the poor region in 1971 and 1981, comes to the end, at least, in 1991, when both slopes are the same. The transfer of product and process innovations, etc., which have benefited poor regions so much, are nowadays faster than they were before 1991. In fact, it seems as if it happened with no time lags.

Figure 6.a Technological change effects



On the other hand, the convergence process between the slopes β^a_1 of poor and rich regions can also be explained by the raise of the slope of the rich regions between 1981 and 1991. It seems reasonable claiming that this increase is due to a general technological breakthrough or "jump"- electronics, biotechnology, etc. - which has created a new link between GAV/K and GVA/L, that is reflected in a β^a_1 higher in 1991 than in previous periods. The straight line situated in the right side of figure 6.a, with equal slopes β^a_1 for the poor and the rich regions represents this technological breakthrough.

IES are represented in figure 6.b, which shows the link between K and GAV/L. These economies help τhe slope of the poor regions, to overcome the one of the rich regions both in 1971 and in 1981. So these economies reinforece the slope increases between CMS and GAV/L, and, therefore between CMS and PCI. Figure 6.b. shows clearly that when CMS, measured by K, is bellow certain threshold the slope of poor regions is bigger than the one of the rich regions since the size of the first is smaller all the way before K_0. However, when it reaches K_0, all the initial advantages, which benefited poor region firms, disappear. It happens so because at that moment the firms achieve smaller IES, so the slope of the poor regions, β^b_1, equals practically the one of the rich regions.

Figure 6.b Internal economies of scale

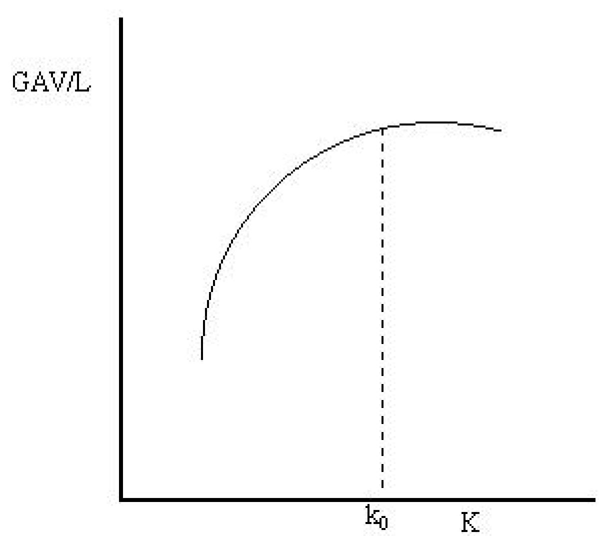
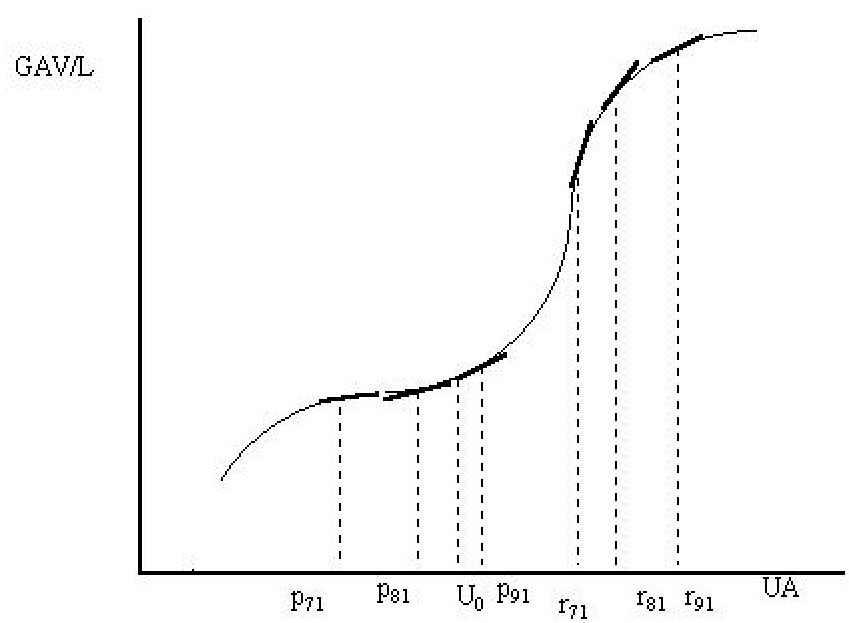


Figure 7 shows a curve that links PCI and UA. Its characteristic profile is generated by two pehonomena: SEE and UEM. Lets us remember that SEE are diminishing and can even be negative (spatial external diseconomies). If we further postulate that UEM is only significant from certain a threshold of UA onwards (figure 4), then we can define a curve of such a type. Lets us suppose this threshold is reached in u_0. When the poor regions are in point p_{71} of the UA axis, they show a smaller slope than the one of the rich regions in r_{71}. Whereas the poor regions only take advantage of the SEE (stage II in figure 3), the rich regions also harvest the fruits of the UEM, which is already active in $r_{71,}$ (stage IV in figure 2). However, once the poor regions have overcome UA threshold u_0 both poor and rich regions achieve the same slope in 1991 (stages III and IV in figure 2). The regional imbalance reduction works through this first channel - the slopes of the explanatory variables – in the UA case, due, therefore to the fact that the poor regions ended up surpassing that threshold, taking advantage from that moment of the expenditure-rent effect generated by the UEM in the 70s. Moreover, the above mentioned reduction is also caused by the existence of diminishing SEE - the reason which explains why we have substituted the observations of UA by their reciprocal in order to carry on the regression analysis.

Figure 7 Mean Labour Productivity and Urban Agglomeration



3.2c) Steadiness

The constant proportions of CMS (CMS rich / CMS poor) and UA (UA rich / UA poor), which amount to around 1.35 and 3.9 respectively between 1981 and 1991, guarantee the stability of relative PCI differences in time due to three factors: SEE, locational inertia of investment, (LII), and to the end of interregional labour migration. All of them affect directly or indirectly both to CMS and UA. They also produce a cumulative causation effect, but not of an explosive nature. The SEE produce both an attraction and a reutilization of resources in a certain place where there are already located that kind of resources. However we must remember that the effect of the SEE decreases as long as UA rises. That is, diminishing SEE reduce positive effect of bigger absolute values of CMS on PCI in the rich regions.

The LII also fuels UA and CMS proportions, since it causes resource reutilization- both of investment and labour force – at the same town or even productive establishment. Therefore, LII can be defined as the tendency to invest resources at the same establishment than in the past in order to maximize the returns of capital. Indeed, since almost any establishment does not hardly ever register full use of all the components of its facilities, even when the industrial plant is, as a whole, working at full capacity, there is room to use more intensively some components eliminating the bottlenecks of capital to achieve bigger profitability of capital. It can be done through new net investments in the same establishment, that is, reinvesting in the same region. So, there is such a strong inertia to reinvest economic resources – and to demand labour force – in the same geographical point than in the past. Since the capital stock of the rich regions is bigger than the one of the poor regions, then the new investments will also be bigger. This process could be explosive, so that CMS and UA proportions would increase and so on the regional imbalances. However, it does not follow that such path because of the compensating effects of multiregional firms, which transfer part of the resources of the firm to the poor regions through the establishment of subsidiaries.

Finally, the end of interregional migration also contributes to the stability in UA and CMS proportions. The movements of labour force from the poor regions to the rich ones in search of higher wages, better working conditions and a better way of life practically disappeared between 1971 and 1981, as the reduction of regional PCI imbalances disabled the basic engine of those geographical movements: differences in regional wages. There were still regional wage differences in 1981, but there were not high enough. This way, interregional labour migration stopped fueling directly UA proportion, and indirectly CMS proportion - since the new labour force from the poor regions contributed to the growth of employment in the rich regions through bigger firms, both in labour and in capital terms.

4. CONCLUSIONS

1 PCI is certainly determined by non spatial phenomena, but also by spatial ones. The non spatial and the spatial phenomena account for 2/3 and 1/3, respectively, of regional PCI.

2 CMS and demographic density, as indicators of these two types of phenomena, have an impact on PCI through technological innovation and development and the IES, on the one hand, and through the SEE, the LII and the UEM, on the other. The higher firm size and spatial agglomeration, the higher regional PCI.

3 From a certain threshold of CMS and spatial agglomeration the elasticity of both variables is almost constant.

4 Regional PCI differences have been reduced dramatically – both in terms of product and of income – until they reached the 65 or 70 % level. From that moment the imbalance became fixed and seems to be everlasting. The U.S.A. and Spain reached that point around 1960 and 1980, respectively. This process consists of two different stages composed by a descendant curve and an horizontal line which prevent us from regressing a straight line for the whole period.

5 The first stage is characterized by the approaching of the regional PCI through technological transfers – both in product and in process – and by the human capital improvement of poor regions, and the progressive decay of IES as CMS grows, as far as it is concerned to the non spatial variables. The spatial variables contribute through the outbreak of the UEM in the poor regions and the diminishing SEE in the rich agglomerations.

6 The second stage, which is the current one, is characterized by the stability of regional PCI differentials, and it is caused by the SEE, LII and the end of interregional migration of labour force. All these phenomena cause the stability of the relative proportions of CMS and UA between regions and, thus, produce the stability of regional PCI differences.

7 Interregional migration, therefore has not helped to reduce regional income differences. On the contrary, since it had increased regional differences of spatial density of resources it has favoured the growth of regional imbalances before the first stage, delayed their reduction at first stage, and fosters its stability onwards.

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