Regional Science Inquiry

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Editorial RS Inquiry

On the Crisis and the new ground offered for scientific inquiries

Economies all around the world are in crisis. People have been losing their jobs and income, irrespective of their skills, education and their positions in production. Entrepreneurs are facing the walls of bankruptcy and their legal consequences, for their actions or inaction and negligence. The stock-markets -until very recently recognised as symbols of national economic freedom and power- and the national financial sectors are sending the combined signals of unprecedented national economic malaise, all out of the blue. And they are receiving, to an unprecedented extent in history, scepticism and anger for their inability to perform, not only their economic, but also their social role. A larger than ever segment of the population is emerging in western societies, which until very recently was considered well off. It is falling beneath the poverty level and is continuously experiencing the consequences of the crisis, the job-cuts and disinvestment and a generally observed retreat of national power to the benefit of globalised capital. This capital today enjoys a rare historical privilege of mobility all around the world, due to technological advancements and the increased global integration of economies and finance, and seeks, in most of the cases, the best prospects to expand, at the expense of and, often, in clear contradiction with the localised labour markets, the national populations and its footprints, left on the societies where it was created, sustained and form which it had significantly benefited. Irrespective of the nation or society where it was based until recently, it now seeks conditions that will allow a minimum of taxes, reduced labour and other costs and is seriously considering the move to another, "easier" production location. It therefore neglects its valuable historical role and contribution in creating the financial capacity of nations, which helped to build and sustain social security and protection, for the older generation, the handicapped, the less privileged and the people in need.

Though economics as a discipline has made significant progress in the last century, it remains difficult to understand and fully present what characterises the present crisis, what are the causes of national decline and how growth of economies can be achieved. Surprisingly, these are theoretical questions discussed extensively in economics and related disciplines, for example in regional economics and economic geography. Never in the past have economists seemed so incapable in the eyes of the public, of understanding the conditions creating or sustaining the stability or instability of economies and of proposing solutions. Isn't the cause as simple as the well-known economic truth that an economy needs to produce more than it consumes, to increase its exports and income, by increasing its productivity? Isn't this crisis, as every other crisis in the past, synonymous to that fact we had produced less than could be consumed inside the western nations or abroad?

What does geography and the study of regional economies have to say about this? Which questions need to be asked, referring to the past and the present? Clearly questions need to be answered. Inquiries are raised among those who united their efforts to provide through this journal a new, fertile, academic ground for their expression and their answer. Or other questions, shared so far among many scientists in economics, regional economics and geography wishing to improve the understanding of economies, their function and the processes under operation. And especially those that could help to assemble past and present knowledge and carefully to accumulate it, in order to

understand economic, geographical and other phenomena and improve theoretical knowledge, policy and practice.

Finally, given that this effort comes mainly from European scientists and members of the European Regional Science Association, why not talk about Europe as a whole? Why not face an unprecedented historical evolution, the unification of Europe, and use national evidence as a research condition to extract common European conclusions and policies? Viewing Europe as a whole could be a perspective useful to transfer to other regional areas of this world as well as to other academic work on Europe.

In the present volume

The first volume of this new journal contains five articles that reveal all together the wealth of regional economics and geography. The first contribution poses the question of spatial mismatches in employment in the city of Santa Cruz, on the island of Tenerife. Does answering such a question in a peripheral European environment confirm theoretical past explanations or, on the contrary, does distance from central Europe and/or the environment of an island offer the conditions to provide a new theoretical answer? The authors use an interesting methodology from a very large sample of residents to provide a well-argued, concise and clear answer to this question.

The next work by two Greek authors, which is based on research conducted in the newly created department of Geography at the University of the Aegean, in Greece, develops the concepts of economic growth, productivity and technological change by referring to OECD and European data. This paper discusses growth, by exploring its association to technological change and productivity. It follows the current trend in growth studies that explores and investigates the significance of endogenous growth factors and the "new growth" evidence. The authors' emphasis on the necessity of introducing or improving technology for growth is certainly spurred by the need for technological change in Greece. But how can growth, productivity and technological change take place without altering the national and regional environmental and the physical wealth of nations, such as that of the Aegean Sea? Does this relate to questions in coastal management, conservation and environmental studies? Are there answers to these inquiries that could lead relevant research towards new directions?

The third paper is a substantial effort made by two Portuguese researchers to provide quite concise answers on how income is distributed and stabilised, by transferring this central economic question, of critical importance for the understanding of the contemporary crisis, to the spatial level. They use an interesting methodology, based on the decomposition of variance and focus on the spatial level of the Portuguese regions (European level of NUTS III regions), finally achieve a fine description and provide a careful analysis of these two distinct processes.

The fourth contribution in this volume is a very good example of an analysis of a geographical theme at the international level that attempts to bring the discussion of micro-states into a common framework. The paper inquires as to what is a micro-state, by referring to small islands across the world which are commonly used as tax-havens. This is a comprehensive analysis on the concept of micro-states, whose study is important for a number of economic reasons, such as those relating to taxes and

financial mobility in the period of globalisation, as well as the need to explore the potential paths of sustainable growth that will not further damage the Earth.

The last article provides a more focused analysis on the effects of the global capital shift. It focuses on a case-study from a company, a paper mill in the Mexican town of Atenquique which had historically played a valuable role in the local society, before its restructuring and change in management and ownership structure. These last two articles are interesting for their overall descriptive geographical value and strength, which uses a wealth of geographical information (from physical, social, economic, business and other information on the human activities) as a background to understanding the economic inquiries under study.

I truly hope that the present inquiries will create the ground for interesting discussions and provide answers and solutions to problems.

On behalf of the editorial team,

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Articles

Dr. Flora Mª Diaz-Pèrez, Dr Victoria Jimènez-González, Regional Science Inquiry Journal, I, 1(2009) pp.11-19

SPATIAL DISTRIBUTION OF EMPLOYMENT OPPORTUNITIES IN THE CITY OF SANTA CRUZ DE TENERIFE

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Abstract:
The analysis of spatial mismatches in access to employment remains a very important area of labour market literature. A particular case is that of the mismatches in urban labour markets, which can result in substantial differences in the employment opportunities available in city centres and suburbs. This study examines the spatial mismatches presented in the labour market of Santa Cruz de Tenerife. To that end, the results of a survey taken in 2003-2004 of a sample of 2000 city residents were reviewed. Results confirm the importance of transport policy for city residents; they suggest that public transport linking the different districts to the city centre should be reviewed.

Key Words: spatial mismatches hypothesis, urban labour market, employment opportunities

1. Introduction:

The analysis of spatial mismatches in access to employment remains a very important area of labour market literature. A particular case is that of the mismatches in urban labour markets, which can result in substantial differences in the employment opportunities available in city centres and suburbs. Similarly, neighbourhood behaviour patterns and differences in education levels compound the already poor employment conditions of least-favoured sectors, who live in very specific locations in most cities.

This study examines the spatial mismatches presented in the labour market of Santa Cruz de Tenerife. To that end, the results of a survey taken in 2003-2004 of a sample of 2000 city residents were reviewed. The survey, funded by Santa Cruz de Tenerife City Council, was used to obtain a sub-sample of 727 residents of the city meeting the characteristics required for the present work.

2. Background

Two approaches can be identified in terms of explaining the effect of place of residence on how individuals live within a given city: the spatial mismatch hypothesis and 'neighbourhood effect' literature. The first of the two theoretical approaches (spatial mismatch hypothesis) centres on the relationship between urban location and employment opportunities. The hypothesis emerged some people forty years ago thanks to the work by Kain (1968). Other leading authors include Gorden, Kumar and Richardson (1989), Jencks and Mayer (1990), Blackely (1990), Holzer (1991), Holzer and Vroman (1992) and Ihlanfeldt (1994).

Kain's theories gave rise to the emergence of a current of later studies, including the works by Wilson (1987), Kasarda (1989), Peterson and Vroman (1992), and Packer and Writ (1992). For this group of authors, interest should focus not so much on the spatial mismatch but on differences in education. The empirical studies they present show that, while employment has grown in areas inhabited by the least-favoured and less-educated sectors of the labour market, the focus has been on jobs in the upper segment of the market and the more disadvantaged levels have therefore been unable to access the new vacancies. This circumstance led the above-mentioned second generation of authors to suggest that, if the aim is to equate the

living conditions of persons who reside in areas offering different employment opportunities, the education mismatch needs to be addressed before the spatial one.

It is possible that this approach, which essentially views education mismatches as the fundamental cause, has disregarded the second of the two theories - neighbourhood effect -, the hypothesis representing the other major thrust of research in the study of the consequences of residential location. Under this latter approach, the characteristics of the neighbourhood are linked to individual behaviour and to access to employment opportunities. One therefore needs to examine the cultural models generated by different neighbourhoods and their effects on attitudes and behaviours concerning the labour market. Researchers have tended to focus primarily on the neighbourhood effects on children and teenagers. Studies conducted include those by Hogan and Kitagana (1985), Crane (1991), Coulton and Pandley (1992) and Coulton et al (1995).

Studies of labour market spatial mismatches are particularly important in the case of cities. The metropolitan labour market is spatially segmented due to the 'travel to work' structure, which penalises the most disadvantaged groups, and due also to housing market segregation, information flow asymmetry, and discrimination by employers too (Zhang and Bingham, 2000, p.392).

In the present work we focus on the spatial mismatch hypothesis mentioned above. The approach taken is in line with the work by Zhang (1998), MacDonald (1999) and Blumenberg (2004), among others, who pay particular attention to commuting by workers from home to work. According to Zhang (1998), transport costs - which cover both indirect costs (fuel and car depreciation) and fares paid by commuters - play a fundamental role in the segmentation of the local labour market, particularly for low-earners, for whom commuting represents a considerable portion of their wages. MacDonald (1999), for example, studied the link between journeys made by women and their participation in the labour market, and found that shorter journeys are explained in terms of low salaries.

The new aspect introduced in this study is the way in which travel to work is measured. In our case, this is done by taking the average travel time needed to reach the areas where jobs are concentrated. In addition, we consider as study variables age, level of education, gender, and others such as home ownership, the number of cars owned by the family unit and the length of time lived in the city.

In line with the approach followed here, Blumenberg (2004) recommends economic policy measures to better connect residents' wellbeing to job opportunities. Kraus (2004, p. 49), referring to the importance of economic policy decisions in the concentration of poverty in the United States, states that 'on several political decisions concerning housing, redevelopment and education, local governments have frequently assumed the desire of the majority, often that of the white majority which has supported policies that have segregated and on occasions isolated the Afro-American community'.

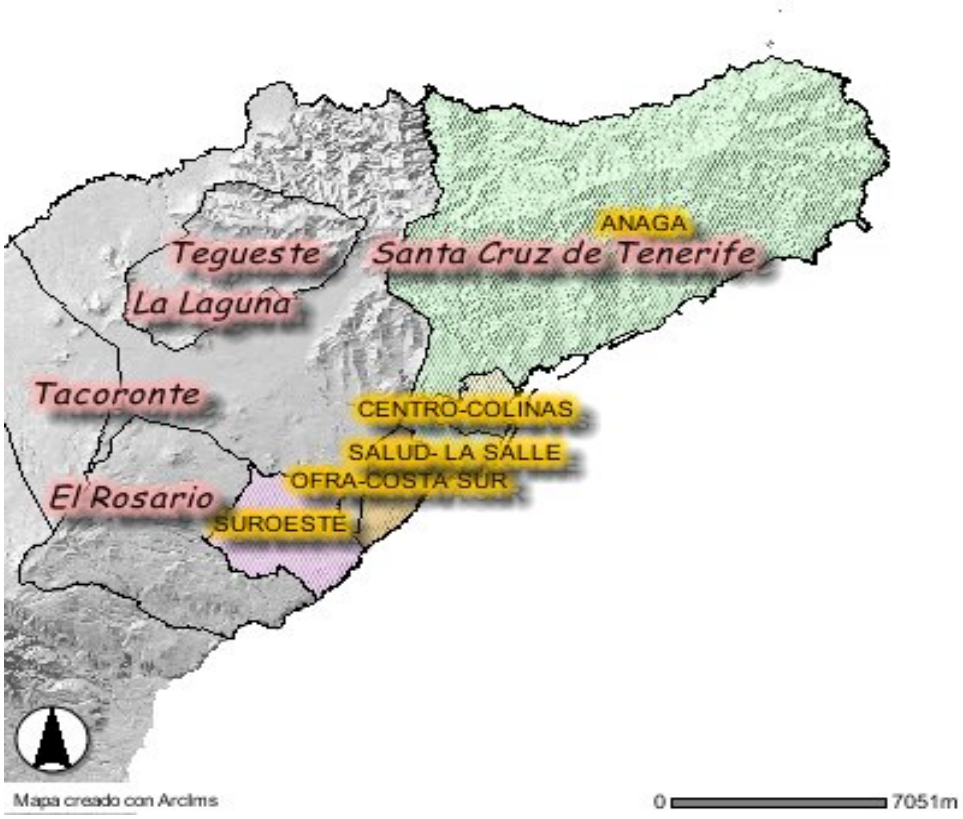
Our aim in this work is to offer some suggestions to guide the action of the competent authorities when seeking to address spatial mismatches in the labour market.

3. Empirical Analysis

3.1. *Introduction*

Santa Cruz de Tenerife, the capital city of the island of Tenerife (Canary Islands), has a population of 223,347 (2005) and covers an area of approximately 150 km^2, with a population density of 1483 inhabitants per km^2. The city is divided administratively into five districts, as shown in the map below.

Map of Santa Cruz de Tenerife



The characteristics of the five districts are in Table 3.1

Table 3.1

ZONE	Name	Km^2	Population
A	Anaga	119.32	14,056
B	Centro-Colinas	4.41	53,304
C	Salud-La Salle	4.14	67,821
D	Ofra-Costa Sur	7.53	49,122
E	Suroeste	14.58	39,044

Each district is very different to the others and major differences also exist between the centre and the suburbs in terms of the labour market structure.

Most of the studies on spatial mismatch in labour markets cited in the preceding section on theoretical considerations are based on the hypothesis that the least-favoured segments of the labour market reside in city centres, whereas those who benefit from the best conditions live in the suburbs.

In the case of Santa Cruz de Tenerife, however, as a rule it is the city-centre residents who enjoy better employment access conditions. A similar situation is reported in other studies, such as that by Immergluck (1998), which confirms that in areas populated mainly by coloured people the suburbs offer less access to employment and receive less investment.

However, it is worth clarifying that Immergluck's works seek to reinforce the hypothesis of education mismatches, as mentioned above in the section on background, ahead of spatial mismatches. In the particular case of Santa Cruz de Tenerife, other circumstances are present which account for the existing situation.

In Santa Cruz de Tenerife the reasons are more to do with the city's specialist production niche: basic service activities (social, administrative, trade, financial and consultancy), i.e. firms specialising in consumer-oriented activities, as opposed to production-oriented, and which thus tend to be located close to their clients and users, given that their market area tends to be highly localised.

3.2 Data

The data used correspond to the five districts of the city of Santa Cruz de Tenerife and cover the following variables:

Employment status (unemployed - employed)
Gender (male - female)
Age (under 24 - 24 and above
Education (primary or below - secondary or above)
Years resident in the city (less than 5 years - 5 years and above)
Home (not owned - owned)
Number of cars /members in family unit
Average journey time to city centre

All are dichotomous variables, except for the last two, which are numerical.

The explanatory variables considered initially in the model are gender, age, the number of years resident in the city, education, home ownership, number of cars/members of the family unit, and average journey time to the city centre.

The reasons for the choice of these explanatory variables can be summarised as follows.

1) Age, gender and education are decisive variables for studying the labour market and are generally taken into consideration when testing the spatial mismatch hypothesis.

2) Journey time from home to the city centre, where the bulk of jobs tend to be located, and the number of cars owned by the family unit also merit special attention. Other studies that set out to test the spatial mismatch hypothesis in cities use the number of kilometres travelled as a variable. The distance is usually measured in terms of the train journey from the different districts to the areas where the majority of jobs are concentrated. Given the geographical characteristics of the city studied here, we have opted to use travel-time as opposed to distance as the variable. Santa Cruz de Tenerife has a number of mountainous districts (Anaga, highest point 750m) which are connected to the city centre by mountain roads. However, it also has low-lying districts which are linked to the centre by motorway. Consequently, the same distance can take much longer in the case of the former.

3) By taking into account the number of years a person has lived in the city we hope to indirectly gauge the influence, which immigrant status may have, on whether the person is employed or unemployed. Similarly, we assume that the unemployed are less likely to be home-owners.

3.3. Methodology

Our aim is to study the possible relationship between the employment status of residents of Santa Cruz de Tenerife and the other variables considered. For this purpose we used a sample of

727 individuals, which was obtained from the study carried out by Díaz, F., Bethencourt M. and others (2004).

The two possible techniques that could be used are

✓ A logit model, in which employment status would be the dependent variable and the others would be factors, except for the last two, which would be co-variables given their numerical nature.

✓ A discriminant analysis, in which employment status is the classifying variable and the remaining variables are the independent variables of the model, depending on their classification.

We have opted for a Discriminant Analysis given that:

❖ It analyses the sample of individuals one by one and decides if, according to the independent variables, they have the characteristics of an unemployed or employed person.

❖ It provides a model which can be used to decide in which group an individual with given characteristics is more likely to be found.

❖ It indicates which variables best discriminate between the two groups considered.

3.4. Results Analysis

The main results obtained from the discriminant analysis using the SPSS package are given below. When tests of the equality of the group means are performed for the unemployed and employed groups, significant differences are found at significance levels below 2% for the following variables:

Journey time to city centre	Gender
Age	No. of cars/members of the family unit

Table 3.2 sets out the results of the tests. The last column indicates the area of probability to the right of the critical test point for each variable. Bold print denotes cases where the hypothesis of equality between the two groups (unemployed and employed) should be rejected.

Table 3.2

Variables	Tests of equality of group means				
	Wilks Lambda	F	df1	df2	Sig.
Journey time to city centre	0.991	6.379	1	725	0.012
Gender	0.986	10.348	1	725	0.001
Age	0.943	44.122	1	725	0.000
Education	0.996	2.989	1	725	0.084
No. cars /members of family unit	0.976	18.114	1	725	0.000
Years resident	0.999	1.056	1	725	0.304
Own home	0.999	0.997	1	725	0.318

Logically, these are the variables that best discriminate between the two groups considered, as shown in table 3.3:

Table 3.3

Variables in the analysis	Tolerance	F to remove	Min. D squared	Between groups
Age	0.986	42.669	0.252	Unemployed and

				employed
Gender	0.976	14.648	0.466	Unemployed and employed
No. of cars /no. in family	0.986	11.122	0.494	Unemployed and employed
Journey time to city centre	0.977	5.103	0.543	Unemployed and employed

The above table indicates the variables that maximise the Mahalanobis distance between the closest groups, provided they meet the following restrictions:

The minimum partial F to enter is 3.84	The maximum partial F to remove is 2.71

The other variables do not sufficiently discriminate between the unemployed and employed groups and they are therefore excluded from the analysis:

Education	Years of residence	Own home

We can conclude that, using the variables included in the analysis (see Table 3.3), there are significant differences between the unemployed and employed groups. This is confirmed by Table 3.4, which gives the results of an ANOVA comparing the equality of means for the two groups.

Table 3.4

Comparisons of groups by pairs (*)			
Employment status		Unemployed	Employed
Unemployed	F		19.631
	Sig.		0.000
Employed	F	19.631	
	Sig.	0.000	

(*) 4.722 degrees of freedom

The model obtained using the Discriminant Analysis is the discriminatory canonical function:

$$ES = -2{,}029 - 0{,}033T - 0{,}92G + 1{,}95A + 1{,}018C \quad \text{(equation 3.1)}$$

where each of the parameters corresponds to the variables included in the analysis, given that they are the ones that best discriminate between the unemployed and employed groups.

Parameters	Variable
ES	Employment status
T	Journey time to city centre
G	Gender
A	Age
C	No. cars /members of family unit

If the values of this variable are replaced in the case of a specific individual, the result is likely to be lower if the person is unemployed given that the centroid for the unemployed lies on the negative side, whereas the centroid for the employed is positive (Table 3.5).

Table 3.5

Group centroid functions	
Status: unemployed or employed	Function 1
Unemployed	-0.576
Employed	0.188

Note that the T (journey time to city centre) and G (gender) variables have negative coefficients and hence when the values for the variables of a specific individual are substituted in equation 2.1., the higher these are, the lower the value of the dependent variable will be. In other words, if the journey time to the city centre is longer and the individual is female (G=2), the likelihood that the individual is unemployed is greater.

The classification can also be performed using Fisher linear discriminant functions, which are as follows in our case:

$$\begin{aligned} ESU &= -17{,}9133 - 0{,}0338T - 6{,}279G + 10{,}108A + 2{,}274C \\ ESE &= -18{,}197 - 0{,}313T - 5{,}575G + 11{,}598A + 3{,}052C \end{aligned} \quad \text{(equation 3.2)}$$

If the values of the independent variables included in the model are substituted for a specific individual, these two equations will enable us to ascertain whether the person is more likely to belong to the unemployed group or to the employed group. The individual will be included in the group for which the equation result is higher.

Table 3.6

Result of the classification (*)	Status	Predicted group membership		Total
		Unemployed	Employed	
Count	Unemployed	38	141	179
	Employed	26	522	548
%	Unemployed	21.23	78.77	100
	Employed	4.74	95.26	100

(*) 77.0% of the original grouped cases classified correctly.

Using the model obtained, the results of the classification of the individuals included in the analysis show that 77% are correctly classified in their respective groups (unemployed and employed) (Table 3.6). In other words, their characteristics in terms of the best discriminating variables match their employment status.

4. Conclusions

Our study's results allow us to draw the following conclusions with regard to the validity of the spatial mismatch hypothesis in the case of Santa Cruz de Tenerife.

1) The possibility of being unemployed increases with longer journey times from home to the city centre, where the bulk of jobs are usually found. It also increases where the family unit has fewer cars.

2) Adscriptive characteristics, particularly age and gender, are also determinant depending on the model. The likelihood of being unemployed is higher in the case of females and individuals aged under 24. These results are in line with the majority of studies that test the spatial mismatch hypothesis, as described above in the background section.
3) Education did not prove significant, although the statistics indicate it was very close to significance level.
4) Home ownership and the number of years of residence in the city did not prove significant in the analysis. Consequently, the results obtained mean that, for this particular case study, we cannot consider the potential relationship which might exist between these variables and labour market status.

By way of summary, we can conclude that, in the particular case of Santa Cruz de Tenerife, rather than focus on education policies to improve the situation of the unemployed, the emphasis should be placed on transport policy for city residents. Public transport linking the different districts to the city centre should be reviewed, specifically timetables, frequencies and direct costs, which should be adapted to the requirements of the labour market. These results contradict to some extent the approach followed within the spatial mismatch hypothesis (Wilson, 1987; Kasarda, 1989; Peterson and Vroman, 1992 and Packer and Writ, 1992), which attributes greater importance to education policy than spatial policy as a means of addressing poorer living conditions in the most disadvantaged areas of cities.

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LESSONS AND EVIDENCE FROM PRODUCTIVITY AND REGIONAL GROWTH IN EUROPE

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Abstract:
This paper investigates the relationship between productivity and technological change. The question that we shall address in this paper, is whether the recent slow down in productivity can be explained by the slow-down of innovation activities. This paper measures the effects from productivity and technical change in regional growth for European member states. The paper concludes by summarizing some of the major findings of the discussion and pointing to some directions for future research activities.

Keywords: Innovation, technical change, productivity, economic growth.

1. Introduction

Since the observed serious declines in the rates of growth in productivity that occurred around 1973 in most OECD countries, an expansive research effort has sprung up to explain both these declines and the previous high productivity growth rates. Overviews of much of this work are provided by Maddison (1987), and Jorgenson (1987, 1988).

Many studies have suggested that there is a close correlation between technological development and productivity (see for example Abramovitz, 1986; Fagerberg, 1987, 1988, 1994), and economists have analysed different possible views of why productivity growth has declined. These alternative explanations can be grouped into the following categories:

- the capital factor, for instance investment may have been insufficient to sustain the level of productivity growth;
- the technology factor, for instance a decline in innovation might have affected productivity growth;
- the increased price of raw materials and energy;
- government regulations and demand policies that affect the productivity level;
- the skills and experience of the labour force may have deteriorated or workers may not work as hard as they used to;
- the products and services produced by the economy have become more diverse; and
- productivity levels differ greatly across industries.

The various factors which might influence the incidence of innovation and productivity are the following:

- the *technical applicability*;
- *profitability*;
- *finance*, (lack of financial resources might delay the diffusion of new processes);
- *size, structure and organisation*, (large companies may for a number of economic and technological reasons which behave differently from the SMEs;

- *management attitudes*, (which is the most difficult to assess or to quantify, but nevertheless they may be as important as economic factors in influencing the rate of adoption of new methods);
- *other factors*, such as research and development activities, access to information, the labour market availability of certain skills, licensing policy, the market situation and more precisely the growth of demand for the product as well as the competitive position with special regard to the import competition. All these illustrate the wide range of factors which could contribute to explain the differences in the speed of diffusion.

This paper attempts to measure the relationship between technology and productivity, or more precisely, to investigate the correlation between technological development and the decline in productivity growth. We shall empirically test the technological and catching-up models using data for the EU member states.

2. Technical Change, Productivity and Growth: Theory and Model Specification

Productivity growth is the basis of efficient economic growth. Economic growth has been defined as the process of a sustained increase in the production of goods and services with the aim of making available a progressively diversified basket of consumption goods to population Scarcity of resources, which includes physical, financial and human resources, has been recognised as a limiting factor on the process of economic growth. While output expansion based on increased use of resources is feasible, it is not sustainable.

Role of productivity growth in the process of economic growth became clear when in the 1950's it was found that accumulation of productive factors (capital and labour) could explain only a fraction of actual expansion of output. Empirical work on the American economy by Tinbergen (1942), Schmookler (1952), Fabricant (1954), Abramovitz (1956), Kendrick (1957), Solow (1957) and Denison (1962) showed that between 80 to 90 percent of observed increase in output per head could not be explained by increase in capital per head and was attributed to productivity growth. Further, Terleckyi (1974), Scherer (1982, 1987) and Griliches (1984) showed that technological advancement was a major source of productivity improvement for the American industry.

Productivity is a relationship between production and the means of production. Or, more formally a relation of proportionality between the output of a good or service and inputs which are used to generate that output. This relationship is articulated through the given technology of production.

Productivity growth is crucially affected by technological change. Their relationship is so close that the two terms are often used interchangeably. Productivity is a wider concept. Even though a crucial one, technological change is only one of the many factors which affect productivity growth. Other being social, cultural, educational, organisational and managerial factors. Better management of workers and machines and appropriate incentive structures can increase production and/or reduce costs. But these are different from technological change.

It is not easy or straightforward to disentangle the effects of technological change from social and cultural factors. One simple way to conceptualise the differences is in the following way suggested by Spence (1984). If changes concern primarily people then they may reasonably be considered as being *social* in nature. On the other hand, if they appear to be fundamentally about material products and related processes then they can be more easily viewed as *technological*.

Given input prices, one can view technological improvement as a downward shift of the cost function. Technology has two aspects, 'embodied' or 'disembodied'. The former is identified with 'hardware' and consists of tools, machinery, equipment and vehicles, which together make up the category of capital goods. Disembodied technology is identified with 'software' and encompasses the knowledge and skills required for the use, maintenance, repairs, production, adaptation and innovation of capital goods. These are often called the 'know-how and the know-why of processes and products'.

Technological change does not affect all factors equally. When it does, it is considered neutral technical change. Otherwise, it may have a specific factor using or factor saving bias. The terms technological change and technical change are used interchangeably in the literature

under review, both being indicators of a shift in the production function. It would have been useful to reserve the latter term for indicating change in techniques or processes. The terms technological progress and technical progress are synonymous with technological change and technical change respectively, all change being considered as being for the better.
The aim of this section is to examine the nature of technological progress and productivity using the *translog production function.*

In particular, this section presents a theoretical background of technical progress and of the contributions of each of the sources of growth (namely: capital, labour and technical progress). One of the problems in estimating the rate of technical change and the elasticity of substitution is that of accurately specifying the production function as well as the type of technical progress. There is a big difference though, between the models adopted here and models of *induced* technical change. The sectoral cost functions have to be homogeneous of degree one, monotonic or non-decreasing and concave in input prices. This model contributes substantially and upgrade the methodologies adopted therein. It is possible to distinguish several different aspects of this procedure, for instance:

- The model was first proposed by Jorgenson D.W. and Fraumeni B.M. (1983). Their main innovation was that they estimated the rate of technical change along with income share equations as functions of relative input prices. The shares and the rate of technical change are derived from a translog production function.
- The procedure permits the decomposition into the estimated technical change of three components: *pure technology*, which is only the time element times a coefficient; *non-neutral*, shows how the time trend influences the usage of inputs; *scale augmenting* component, which suggests how time affects the economies of scale. The sum of those three give the growth of *multifactor productivity*.
- It relaxes the assumption of constant returns to scale by estimating the initial cost function along with factor shares and the rate of technological change, and so provides the evidence for the existence of *scale economies*.

The methodology is based on a two input (capital and labour) case dual translog cost function (Christensen, Jorgenson and Lau 1971, 1973), on the derived factor shares and on the rate of technical change for all twenty industrial sectors. All these variables are functions of relative prices and time. Implicitly, it is assumed that total cost and the input shares are translog functions of their corresponding prices and time. Technology is in fact endogenous in our sectoral models and is parametrically rather than residually estimated. Applying Jorgenson and Fraumeni's methodology we fitted the models so that they embrace all of these theoretical requirements. Since perfect competition is assumed, the input prices are exogenously determined. The translog cost function can be written

$$lnc^{v}(w_K, w_L, Y, T) = \alpha_0^{v} + \alpha_y^{v} lny^{v} + \frac{1}{2}\alpha_{yy}^{v}(lny^{v})^2 + \sum_{i=1}^{n}\alpha_i^{v} lnw_i^{v} + \frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n}\gamma_{ij}^{v} lnw_i^{v} lnw_j^{v} + \sum_{i=1}^{n}\gamma_{iy}^{v} lnw_i^{v} lny$$
$$\gamma_T^{v} T + \frac{1}{2}\gamma_{TT}^{v} T^2 + \sum_{i=1}^{n}\gamma_{iT}^{v} lnw_i^{v} T + \gamma_{yT}^{v} \ln y^{v} T \qquad \textbf{(1)}$$

where C= total cost, W_i (i= K,L)=input prices (price of capital and labour), Y= value-added, and T= technical change index.

Since we are using the averages we have to transform the cost function, the share equations and the rate of technical change as, (for simplicity we can drop the superlative index which declares the number of sectors):

$$\overline{lnc}^{v}(\overline{w}_K,\overline{w}_L,\overline{Y},T) = \alpha_0^{v}+\alpha_y^{v}\ \overline{lny}^{v}+\frac{1}{2}\alpha_{yy}^{v}\ (\overline{lny}^{v})^2+\sum_{i=1}^{n}\alpha_i^{v}\ \overline{lnw_i}^{v}+\frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n}\gamma_{ij}^{v}\ \overline{lnw_i}^{v}\ \overline{lnw_j}^{v}$$

$$+\sum_{i=1}^{n}\gamma_{iy}^{v}\ \overline{lnw_i}^{v}\ \overline{lny}^{v}+\gamma_T^{v}T+\frac{1}{2}\gamma_{TT}^{v}T^2+\sum_{i=1}^{n}\gamma_{iT}^{v}\ \overline{lnw_i}^{v}\ T+\gamma_{yT}^{v}\ \overline{\ln y}^{v}T+\overline{e}_c^{v} \quad \textbf{(2)}$$

where the share equation and the rate of technical change take the form:

$$\overline{S}_i^{v}(w_K,w_L,Y,T) = \alpha_i^{v}+\sum_{i=1}^{n}\gamma_{ij}^{v}\ \overline{lnw_j}^{v}+\gamma_{iy}^{v}\ \overline{lnY}^{v}+\gamma_{iT}^{v}\ T+\overline{e}_i^{v} \quad \textbf{(3)}$$

$$-\overline{S}_T^{v}(w_k,w_L,Y,T) = \gamma_T^{v}+\gamma_{TT}^{v}\ T+\sum_{i=1}^{n}\gamma_{iT}^{v}\ \overline{lnw_i}^{v}+\gamma_{yT}^{v}\ \overline{lnY}+\overline{e}_T^{v} \quad \textbf{(4)}$$

(where: v = 1,...,20 and i = K, L), are the average error terms. The share equations have the following form: S_K (share of capital)=$(P_K*Q_K)/TC$ and S_L (share of labour)=$(P_L*Q_L)/TC$, where $P_{K,L}$L is the price of capital and the price of labour, $Q_{K,L}$ is the capital and labour and TC is the total cost.

The Allen-Uzava partial elasticities of substitution, σ_{ij}, and price elasticities of input demands, P_{ij}, are given by following equations.

$$\sigma_{ij} = (\gamma_{ii}+ S_i^2- S_i)/(S_i^2), \quad i = K, L\ i = j \quad \textbf{(5)}$$

and

$$\sigma_{ij} = (\gamma_{ij} + S_iS_J)/(S_iS_j), \quad i,j = K, L\ i \neq j$$

Where the own-partial elasticities of substitution, σ_{ii}, are expected to be negative. On the other hand, the cross-partial elasticities of substitution can be either positive, suggesting substitutability between inputs, or negative, suggesting input complementarity.

$$P_{ij}= \sigma_{ij}S_j, \ i = K, L\ i \neq j \quad \textbf{(6)}$$

and

$$P_{ii}= \sigma_{ii}S_i, \ i = K, L\ i = j$$

Several comments should be made concerning these substitution elasticity estimates. First, parameter estimates and fitted shares should replace the γ's and S's when computing estimates of the σ_{ij} and P_{ij}. This implies that in general the estimated elasticities will vary across observations. Second, since the parameter estimates and fitted shares have variances and covariances, the estimated substitution elasticities also have stochastic distributions. Third, the estimated translog cost function should be checked to ensure that it is monotonically increasing and strictly quasi-concave in input prices, as is required by theory. For monotonicity it is required that the fitted shares all be positive, and for strict quasi-concavity the (n x n) matrix of substitution elasticities must be negative semidefinite at each observation. Moreover, we may calculate the scale elasticities, (which is the percentages change of the total cost after the change one percentage in the output). As has been shown by Giora Hanoch (1975) there are computed as the inverse of costs with respect to output. More specifically, ***scale***=$1/e_{cy}$ where $e_{cy}= \partial \ln c/\partial \ln y$ and where for the translog function.

$$\overline{e}_{cy}^{v} = a_y + a_{yy}\ \overline{lnY}^{v}+\Sigma_i^{n}\gamma_{ij}\ \overline{lnP_i}^{v}+\gamma_{YT}\ \overline{T} \quad \textbf{(7)}$$

A number of additional parameter restrictions can be imposed on the translog cost function, corresponding to further restrictions on the underlying technology model. For the translog cost function to be homothetic it is necessary and sufficient that $\gamma_{iy}=0 \ \forall \ i= 1,...,n$. Homogeneity of a constant degree in output occurs if, besides these homotheticity restrictions, we have $\gamma_{yy}= 0$. In this case the degree of homogeneity equals $1/\alpha_y$. Constant returns to scale of the dual production function occurs when, in addition to the above homotheticity and homogeneity restrictions, $\alpha_y=1$.

One potential problem with estimation of scale economies, however, is that the α_y and γ_{YY} parameters do not appear in the share equations, and so these parameters cannot be estimated by using only the share equation system. To estimate the above model of the average cost functions along with the share of one input and the rate of technical change, we adopted the three stage least squares --with endogenous lag variables-- (i.e. lag shares, lag prices of capital, labour and output). This method requires the usage of instrumental variables. We picked up the lagged variables of capital stock, price of capital, value added, price of output, number of employees and the price of labour. To interpret the estimates of these parameters it is useful to recall that if the production function is increasing in capital and labour inputs then the average value shares are non negative.

3. Recent trends & evidence of innovation activities & productivity puzzle

Schmookler (1966), Kendrick (1991), and Abramovitz (1986) have studied the interaction between technological change and productivity. In these studies, factor prices were used to weight the various inputs in order to obtain a measure of total input growth.

Table 1: Recent trends in productivity growth, 1980-99

	Trend growth in GDP per hour worked				Trend growth in multi-factor productivity			
	Total economy, percentage change at annual rate				Business sector, percentage change at annual rate			
	1980-90	1990-99	1990-95	1995-99	1980-90	1990-99	1990-95	1995-99
Canada	1.1	1.3	1.3	1.4	0.5	1.2	1.1	1.3
Mexico	..	-0.6	-1.0	-0.1	..	..	..	..
United States	1.3	1.6	1.3	2.0	0.9	1.1	1.0	1.2
Australia	1.2	2.0	1.8	2.2	0.5	1.4	1.4	1.5
Japan	3.2	2.5	2.6	2.2	2.1	1.2	1.3	0.9
Korea	6.3	5.1	5.3	4.7	..	..	..	..
New Zealand	..	0.7	0.5	0.9	0.7	0.9	1.0	0.7
Austria	..	..	..	2.9	..	..	..	..
Belgium	2.4	2.3	2.3	2.4	1.7	1.4	1.3	1.6
Czech	..	..	..	1.7	..	..	..	..
Denmark	1.7	1.8	1.9	1.6	0.9	1.5	1.5	1.5
Finland	2.8	2.9	3.0	2.8	2.3	3.3	3.0	3.6
France	2.7	1.8	1.8	1.6	1.8	1.0	0.9	1.1
Germany	2.3	2.0	2.2	1.8	1.5	1.1	1.1	1.1
Greece	1.3	1.4	0.9	2.0	..	..	..	..

Hungary	..	2.7	2.7	2.7	..	..	..	..
Iceland	..	1.5	1.3	1.6	..	1.3	1.2	1.4
Ireland	3.6	4.3	4.0	4.6	3.6	4.5	4.4	4.6
Italy	2.6	2.0	2.3	1.6	1.5	1.1	1.2	0.8
Luxembourg	..	5.1	5.5	4.6	..	..	..	..
Netherlands	2.9	1.8	1.9	1.7	2.3	1.7	1.9	1.5
Norway	2.6	2.6	3.1	2.0	1.2	1.7	2.1	1.2
Portugal	..	2.3	2.4	2.2	..	..	..	..
Spain	3.2	1.4	2.0	0.7	2.3	0.7	0.9	0.5
Sweden	1.2	1.7	1.8	1.6	0.7	1.3	1.3	1.3
Switzerland	..	0.8	0.6	1.2	..	..	..	..
United Kingdom	2.3	1.9	1.9	1.9	2.2	0.9	0.8	1.0

Source: OECD calculations, based on data from the *OECD Economic Outlook No. 68*. See Economics Department Working Paper No. 248.

The approach developed by Abramovitz (1986), Solow (1957) and Denison (1962) involves the decomposition of output growth into its various sources, which can be defined as the growth accounting and residual method. Growth accounting tries to explain changes in real product and total factor productivity based mainly on a comparison between the growth of inputs (capital and labour) and the growth of output. One part of actual growth cannot be explained and has been classified as 'unexplained total factor productivity growth' (or the so called residual).

In particular, following the decomposition analysis by Solow (1957), many alternative factors can explain the path of economic growth. According to Solow's findings, technology has been responsible for 90 per cent of the increase in labour productivity in the United States in the twentieth century.

Furthermore, technological gap theories (Abramovitz, 1986; Fagerberg, 1987, 1988, 1994) relate the technological level and innovation activities to the level of economic growth. According to these theories, countries where more innovation activities take place tend to have a higher level of value added per worker (or a higher per capita GDP).

Following the technological-gap argument, it would be expected that the more technologically advanced countries would also be the most economically advanced (in terms of innovation activities and per capita GDP). Technology-intensive industries play an increasingly important role in the international manufacturing trade of OECD countries. In the 1990s, OECD exports of high- and medium-high-technology industries grew at an annual rate of around 7%, and their shares in manufacturing exports reached 25% and 40%, respectively, in 1999.

Substantial differences in the shares of high- and medium-high-technology industries in manufacturing exports are found across the OECD area, ranging from over 75% in Japan, Ireland, and the United States to less than 20% in Greece, New Zealand and Iceland.

Catching-up theory (Abramovitz, 1986; Fagerberg, 1987) starts with the investigation of growth performance. The main idea is that large differences in productivity among countries tend to be due to unexpected events (for instance wars).

According to these studies, the only possible way for technologically weak countries to converge or catch up with the advanced countries is to copy their more productive technologies.

The outcome of the international innovation and diffusion process is uncertain; the process may generate a pattern where some countries follow diverging trends or one where countries converge towards a common trend. In this literature, economic development is analysed as a disequilibrium process characterised by two conflicting forces:

▪ innovation, which tends to increase economic and technological differences between countries, and
▪ diffusion (or imitation), which tends to reduce them. Technological gap theories are an application of Schumpeter' s dynamic theory.

Table 2 presents the annual average growth rate for the labor productivity growth by industry, for the period 1995-1998.

Table 2: Labor productivity growth by industry, 1995-98 annual average growth rate.

		United States			**Japan**			**European Union**		
	ISIC Rev. 3	Employment	Real value added	Labour productivity	Employment	Real value added	Labour productivity	Employment	Real value added	Labour productivity
All industries	01-95	2.1	4.6	2.4	0.3	1.5	1.2	1.0	2.4	1.4
Total non-agriculture business sector	10-67,71-74	2.5	5.9	3.3	-0.3	1.4	1.7	1.2	2.6	1.4
Mining and quarrying	10-14	0.7	3.7	3.1	-3.9	-0.9	3.1	-3.5	-1.5	2.1
Food, drink, tobacco	15-16	0.2	-5.4	-5.6	-1.3	-2.1	-0.8	0.3	0.0	-0.4
Textiles, clothing	17-19	-5.3	-3.9	1.6	-4.8	-3.8	1.0	-1.7	-1.4	0.4
Paper, printing	21-22	0.0	-0.4	-0.4	-1.7	-2.1	-0.4	0.1	1.5	1.3
Petroleum refining	23	-1.4	-0.4	1.1	-0.7	3.9	4.6	-1.9	0.9	2.8
Chemicals	24	0.1	2.6	2.5	-0.5	0.7	1.1	-0.9	1.3	2.3
Rubber, plastics	25	1.3	4.6	3.2	-2.1	-3.4	-1.4[3]	1.6	3.3	1.7
Non-metallic minerals	26	1.1	3.1	1.9	-1.9	-2.1	-0.2	-0.5	-0.1	0.4
Basic metals and metal products	27-28	1.2	2.5	1.4	-1.6	-2.7	-1.1	0.4	1.0	0.6
Machinery and equipment	29-33	1.8	14.5	12.4	-0.7	4.7	5.5	0.1	3.0	2.9
Transport equipment	34-35	2.2	2.5	0.4	-0.4	-1.9	-1.5	2.0	4.3	2.3

Wood and other manufacturing	20,36-37	1.3	0.5	-0.8	-2.1	0.1	2.2	-0.1	1.0	1.1
Electricity, gas and water supply	40-41	-2.0	-1.6	0.4	0.8	4.3	3.5	-2.6	2.1	4.8
Construction	45	4.5	4.9	0.4	-0.1	-2.0	-1.9	-0.6	-0.4	0.3
Services: Wholesale and retail trade, hotels, restaurants	50-55	1.6	8.5	6.8	0.3	1.1	0.8	1.4	2.4	1.0
Transport and storage	60-63	3.2	4.5	1.3	0.4	-3.4	-3.8	0.8	3.0	2.2
Post and telecommunications	64	2.4	4.5	2.1	0.4	17.7	17.3	-1.1	7.6	8.7
Finance and Insurance	65-67	2.6	7.5	4.8	-1.4	0.6	2.0	0.5	3.1	2.6
Business services	71-74	6.3	7.0	0.6	2.2	6.4	4.1	5.8	5.6	-0.2

Source: OECD, STAN and National Accounts databases.

Labour productivity levels relative to the total non-agriculture business sector, 1998, European Union. The ratio of value added to employment provides an indication of which industries yield relatively high value added per unit of labour input. Although total employment is not the best measure of labour input for this purpose (see box), a reasonably clear pattern emerges.

Labour productivity by industry can be measured in several ways. For the measurement of output, total production or value added are the typical yardsticks. If production (gross output) is used, productivity measures need to cover a combination of inputs, including intermediate inputs (such as materials and energy), labour and capital. If value added is used as the output measure, labour and capital suffice as indicators of factor inputs. The indicators shown here are determined by data availability and simply measure value added per person employed. Further adjustments to labour input, including adjustment for part-time work and hours worked per worker, can be made for certain OECD countries but international comparisons are not yet feasible.

For the labour productivity levels, 1998 value added at current prices was used. For the European Union, member countries' value added data were aggregated after applying 1998 US dollar GDP PPPs – industry-specific PPPs are preferable, but are not available for all sectors and countries.

For value-added volumes (used to estimate labour productivity growth), the European Union series were derived by aggregating member countries' value-added volumes after applying 1995 US dollar GDP PPPs, the reference year for the volume series being 1995. This is not an ideal practice since some countries, such as France and Sweden, now use annually reweighted chained (rather than fixed-weight) Laspeyres aggregation methods to derive their

value-added volumes by industry. Volumes calculated in this manner are generally non-additive.

Table 3: Income and productivity levels, 1999. Percentage point differences in PPP-based GDP per capita with respect to the United States

	Gap	Productivity	Labour use (1)
Switzerland	-15	-9	-6
Norway	-17	8	-25
Canada	-21	-14	-6
Denmark	-21	-7	-14
Iceland	-22	-28	6
Netherlands	-22	9	-32
Australia	-24	-16	-8
Japan	-25	-26	1
Ireland	-25	-4	-21
Belgium	-27	10	-36
Austria	-27	-5	-22
Germany	-30	-6	-23
Italy	-32	6	-38
Sweden	-32	-16	-15
United Kingdom	-32	-13	-19
Finland	-33	-18	-15
France	-35	-3	-32
New Zealand	-45	-38	-7
Spain	-46	-24	-23
Portugal	-51	-47	-5
Korea	-53	-60	7
Greece	-55	-44	-12
Czech Republic	-60	-61	1
Hungary	-67	-55	-12
Mexico	-75	-69	-6

1.This reflects the joint effect of differences in the demographic structure of countries (the ratio of the working-age population to the total population), in employment rates and in average hours worked per person
Source: OECD, GDP and population from National Accounts database; working-age population, labor force and employment from Labor Force database; hours worked from OECD calculations, see S. Scarpetta, et al., Economics Department Working Paper No. 248, 2000

The labour productivity levels by industry are relative to the total non-agriculture business sector. This consists of all industries except agriculture, hunting, forestry and fishing (ISIC 01-05), real estate activities (ISIC 70) and community, social and personal services (ISIC 75-99; includes mainly non-market activities such as public administration, education and health).

Productivity growth in some services sectors may be low because estimates of real output are based on input measures (such as employment). Much effort is currently being undertaken in Member countries to improve the measurement of real output in the services

sectors. Sectors that are considered technology- and/or knowledge-intensive are highlighted in the graphs.

Table 3 illustrates the income and the productivity levels for the period of 1999. The percentage point of differences for PPP, (Purchase Power Parity) is based on Gross Domestic Product per capita respecting the United States.

Table 4: Estimates of Multi-factor Productivity (MFP) growth rates, 1980-1998: average annual growth rates (based on trend series time-varying factor shares)

Countries	MFP growth rate without control for composition/quality changes in labour and capital		MFP growth rate with control for composition / quality changes in labour and capital	
	1980-1990	1990-1998	1980-1990	1990-1998
Australia	0.9	0.9	2.1	2.0
Belgium	1.4	-----	1.0	-----
Denmark	1.0	0.9	1.8	1.9
Finland	2.4	2.2	3.2	2.8
Greece	0.6	-----	0.3	-----
Ireland	3.9	3.8	3.9	3.6
Netherlands	2.2	2.2	1.7	1.7
New Zealand	0.7	0.6	1.1	1.2
Norway	1.1	0.9	2.1	1.9
Portugal	1.9	1.9	2.2	-----
Spain	2.2	-----	0.6	-----
Sweden	0.8	0.6	1.3	1.0
Switzerland	-----	-----	0.2	0.2

Source: O. E. C. D, Economic Outlook, 2000, Paris.

Productivity ratios relate a measure of output to one or several inputs to production. The most common productivity measure is labour productivity, which links output to labour input. It is a key economic indicator as it is closely associated with standards of living. Ideally, estimates of labour productivity growth should incorporate changes in hours worked.

Estimates of the increase in GDP per hour worked for OECD countries–adjusted for the business cycle – show that Korea, Ireland and Luxembourg had the highest rates of productivity growth in the 1990s. Switzerland, New Zealand, Spain and Mexico had the lowest. In countries such as Ireland, Australia, the United States, Greece and Germany, labour productivity growth in the second half of the 1990s was substantially higher than in the first half.

Labour productivity is a partial measure of productivity; it relates output to only one input in the production process, albeit an important one. More complete measures of productivity at the economy-wide level relate output growth to the combined use of labour and capital inputs. This measure is called multi-factor productivity (MFP). Growth in MFP is key to long-term economic growth, as it indicates rising efficiency in the use of all available resources. It is also a better reflection of technological progress than the increase in labour productivity, since the latter can also be achieved through greater use of capital in the production process and the dismissal of low-productivity workers.

Estimates of MFP growth are available for fewer countries than estimates of labour productivity growth, primarily because of the limited availability of data on capital stock. The estimates show that Ireland and Finland experienced the most rapid MFP growth over the 1990s. In countries such as Ireland, Finland, Belgium, Australia, Canada, the United States, France and the United Kingdom, MFP growth accelerated during the 1990s. In other countries, such as the Netherlands, Norway, Spain and Japan, MFP growth declined.

4. Conclusions

Technological progress has become virtually synonymous with long-term economic growth. This raises a basic question about the capacity of both industrial and newly industrialised countries to translate their seemingly greater technological capacity into productivity and economic growth. Usually, there are difficulties in estimating the relation between technology change and productivity. Technological change may have accelerated, but in some cases there is a failure to capture the effects of recent technological advances in productivity growth or a failure to account for quality changes in previously introduced technologies.

The countries of Europe have a long cultural and scientific tradition and the major scientific discoveries and developments in technology are products of European civilisation. There is a close relationship between innovation and productivity levels. However there are large technological disparities between the member states, which affects productivity performance, increases economic disparities and hinders economic integration.

There are various explanations in the literature for the slow-down in productivity growth in the OECD countries. One source of the slow-down may be substantial changes in the industrial composition of output, employment, capital accumulation and resource utilisation. Another may be that technological opportunities have declined; or else new technologies have been developed but their application to production has been less successful. Technological factors act in a long-term way and should not be expected to explain medium-term variations in the growth of GDP and productivity.

The technological gap models represent two conflicting forces: innovation, which tends to increase productivity differences between countries; and diffusion, which tends to reduce them. In Schumpeterian theory, growth differences are seen as the combined result of these forces. We have applied an economic growth model based on Schumpeterian logic. This technological gap model provides a good explanation of the differences among various countries. The empirical estimates suggest that the convergence hypothesis applies for industrialised countries. Research on why growth rates differ has a long history that goes well beyond growth accounting exercises. The idea that poorer countries eventually catch up with richer ones was advanced as early as in the nineteenth century, to explain continental Europe's convergence with Britain. In the 1960s one of the most basic model was the Marx~Lewis model of abundant labour supplies, which explained the divergent growth experience of the Western European countries.

To achieve safe results it is necessary to conduct a cross-country, multi sectoral analysis of how technological activities affect the different sectors. According to our estimates there is a relationship between the level of economic growth and the growth of technological activities. Technological activities (best measured by patents) appear to contribute considerably to economic growth, unless this is a negative demand effect. Specifically, our results confirm that there is a close relationship between the level of economic growth (as measured by per capita GDP) and the level of technological development (as measured by the number of external patents). Our results indicate that both imitation and innovation activities have a significant effect on the growth of GDP and productivity. Countries that are technologically backward might be able to generate more rapid growth than even the advanced countries if they were given the opportunity to exploit the new technologies employed by the technological leaders.

The pace of the catching up depends on the diffusion of knowledge, the rate of structural change, the accumulation of capital and the expansion of demand. Those member states whose growth rates are lagging behind could catch up if they reduced the technological gap. An important aspect of this is that they should not rely only on technology imports and investment, but should also increase their innovation activities and improve their locally produced technologies (as happened in Korea and Singapore).

The catching-up hypothesis is related to economic and technological relations among countries. There are different opportunities for countries to pursue a development strategy that depends on resource and scale factors. In summary, we can say that the introduction of new technologies has influenced industrialisation and economic growth. Of course, for countries with poor technological apparatus the impact of new technologies is much smaller. Finally, it seems that the technological gap between the less and more advanced countries is still widening.

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THE INCOME INTER-REGIONAL REDISTRIBUTION AND THE INCOME SPATIAL STABILIZATION EFFECTS: AN APPLICATION TO PORTUGAL

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Abstract:
The main idea of this paper is that although the per capita regional GDP is a good indicator of regional income according to its place of generation, it cannot take into account the redistribution process that comes after production, and that may be very significant at the regional level. The paper focuses then on the transformation of the regional product on the adjusted disposable income of the households, and on the different redistributive flows that proceed with that transformation. It has two distinct parts. Firstly we adopted a synchronic analysis where we deal with the so-called income inter-regional redistribution process. In this part we wonder how the regional income inequalities, that are the outcome of the different locations of production, are smoothed when the income falls into the hands of the households (or if the contrary happens, how they are amplified). The identification and the estimation of the weights of the different channels through which that lessening (or amplifying) process acts is an essential part of the work. In a second part ahead we turn to a dynamic approach where we focus on the spatial stabilization of the income effect. At this point our purpose is rather to look at the shocks on the regional product, and to discuss how they can be absorbed (or not) when the production income is transmuted into the regional adjusted disposable income of the households. The degree and the channels of risk sharing (as this absorption process is named too) are also estimated.

Key Words: Inter-regional redistribution; spatial stabilization; risk sharing; cross-sectional variance

1. Introduction

The Gross Domestic Product per capita (GDPpc) is the most common indicator of economic welfare, both at the countries and at the regional level. However, the GDP is the source of all the income produced all over the economy, comprising the yields of all its institutional sectors: households of course, but also societies, general government units, and so on. Indeed, in our view, what really matter at the economies is people – that means households. As a consequence, in the analysis of income distribution we are going to proceed to, our approach will favor the households' income alone, or the personal income as we call it as well, excluding the other kind of institutions (that furthermore, as a rule, do not account significantly as income recipients at last resort).

On the other hand, even when we already look at personal income what is really important for the households welfare is not the so-called Primary Income (the one that is received by virtue of their direct participation in the production process), but the income that actually households benefit. In fact, beyond the compensations by the use of their production factors, households engage as well in a secondary redistribution process of the income, paying taxes, profiting from social benefits, receiving and paying a miscellaneous of other transfers from/to the other institutional sectors of the economy. It is through this secondary redistribution process that the Primary Income is then converted into the Disposable Income of the Households.

Besides, households' economic welfare does not depend exclusively on monetary income, as the one essentially gauged by their Disposable Income. In several countries, governments (and non-profit institutions) provide a multitude of goods and mainly services in kind that households access free of charge or at a trifling price. In other countries, however, people must pay by almost everything they consume. Of course, this makes a difference. This is the reason why the distribution of income in kind, as this one, must be taken into account in view of the households' welfare. When these social transfers in kind are added up the Disposable Income transforms into the Adjusted Disposable Income of the Households.

The main idea of this paper is then that it may exist, remarkably at the regional level, a considerable mismatch between the GDPpc and the income that households actually benefit. The Adjusted Disposable Income of the Households Gross per capita (AGDIHpc)[1] is the measure of income in which we focus our attention on. Ramos (1996) gave two main reasons why regional per capita income measures may be so distinct from GDPpc: one is that commuters, that may reach a huge number among regions, bring their income home, which they generated elsewhere, in other regions. The other is that multiregional or multinational firms operating inside one region, may amount to a significant share of its GDP, but distribute the correspondent incomes – dividends, interests and so on – to those residing outside the region or even abroad. Of course, both of these arguments may apply to countries analyses as well, but it is plain that they are of great consequence mainly for regions. Behrens (2003) in a statistical note published by the Eurostat made the same point, concluding that GDPpc in an inappropriate measure of regional economic welfare.

As a matter of fact, this paper looks at the regional mismatch between the GDPpc and our income variable, the AGDIH, adopting two different perspectives. In a first step, we deal with the issue of the extent to which observed regional GDPpc disparities are reproduced (or not) at the AGDIH level, on a synchronic basis. We are also seeking at once which channels smooth those GDP disparities – if this is the case – when that product is distributed to the households, or on the opposite – if that happens – how those disparities can be amplified. We are dealing in this stage with what we called the "inter-regional distribution of income".

In a second part of this paper, we adopted instead a dynamic approach, checking how the households succeed in stabilizing their Adjusted Disposable Income, after their region has been hit by a GDP shock. This means that we are then focusing on the growth rates instead of the levels of the aggregates. We called this analysis of "spatial stabilization of income". This effect is also named risk sharing, as the original shocks at production level spread into other regions while product is transformed into income. We are interested, of course, as well, in the risk sharing channels that are the mechanisms that allow that automatic stabilization over space of the adjusted disposable income.

The purpose of this article is to explore these ideas, applying them to the Portuguese NUTS III regions, on the years of 2002 and 2003. Our analysis is mainly founded in the pioneering works of Asdrubali *et al.* (1996) and Sørensen and Yosha (1998), although these authors mostly focused on the inter-regional risk sharing, or as we call it as well on the income spatial stabilization effect. The dichotomy between inter-regional income distribution and spatial stabilization of income, that we have adopted, was proposed by Mélitz and Zumer (1998) and Decressin (1999). After their early works, Asbrubali, Sørensen and Yosha went on searching the same topic (Asdrubali and Kim, 2004; Sørensen *et al*., 2004; Sørensen *et al.*, 2005). Other relevant contributions may be seen as well in von Hagen and Happ (2001), Kim *et al*. (2003), Jüβen (2006) and Andersson (2008)[2].

[1] Primary Income, Secondary Distribution, Disposable Income and Adjusted Disposable Income are all National Accounts standard concepts. The official definitions of these aggregates applying to Portugal are provided by the European System of Accounts (Eurostat, 1996a).

[2] The majority of these articles do not remain in their analyses at the households' income level, but they step down into the per capita consumption expenditure. In fact, we might argue that the consumption is the very last purpose of everybody, so it should be our focus. However, in Portugal neither do we have that information, nor it can be estimated in our opinion in a reliable way. On the other hand, even if we had so it would be debatable anyway that we should go so far. Although the consumption is really the

Figure 1 ahead summarizes our reasoning scheme (based on the sequences of accounts of official National Accounts systems) that beginning with production, that at last resort generates all the income, goes through the income distribution process until reach the AGDIH. This scheme applies both to the "inter-regional distribution of income" and to the "spatial stabilization of income" effects.

Figure 1
From Gross Domestic Product until the Adjusted Gross Disposable Income of Households

GROSS DOMESTIC PRODUCT (GDP)
↓
PRIMARY INCOME OF HOUSEHOLDS (PIH)
↓
GROSS DISPOSABLE INCOME OF HOUSEHOLDS (GDIH)
↓
ADJUSTED GROSS DISPOSABLE INCOME OF HOUSEHOLDS (AGDIH)

It is important to remark that although all the aggregates of Figure 1 are National Accounts concepts, they are not available at NUTS III regional level (except GDP) in the official Portuguese statistics. Portuguese (and as a rule European) Regional Accounts only reach NUTS II for the majority of these indicators. The data by NUTS III that we deal with in this paper were then built by us, taking advantage of our past or present experience as statisticians in that area. The starting point on these estimates were the Portuguese NUTS II Regional Accounts, having then we followed, for stepping down to the NUTS III level, as close as possible, the same rules and proxies used in the official production of the NUTS II statistics[3]. This is the reason why this paper confines to only two years: 2002 and 2003.
The following two sections of this paper deal with each one of our two types of effects we considered above: section 2 with the "inter-regional distribution of income" and section 3 with the "spatial stabilization of income" effect. Throughout these sections we describe our empirical approach that consists in decomposing the cross-sectional variances of the level of GDPpc (of its log) and of the GDPpc growth rate. This methodology allowed an identification of the channels through which our two effects act, beyond measuring the actual strength of both. Section 4 summarizes our main conclusions.

2. The inter-regional distribution of income

This section tracks down a double purpose. On the one hand, we wonder if the regional GDP disparities, at NUTS III level in Portugal, are really lessened when the income fall into the hands of the households, forming their Adjusted Disposable Income. On the other, we aim to gauge the weights of the different channels that may produce that smoothing process (if it happens).

Our methodological approach – inspired in the pioneering works of Asbrubali *et al*. (1996) and Sørensen and Yosha (1998) and in the ensuing literature – is based on a cross-sectional variance analysis.

Our starting point is the identity (1) below, that follows the logical scheme of Figure 1:

$$(1) \quad \frac{GDP_i}{Pop_i} = \frac{GDP_i}{PIH_i} \cdot \frac{PIH_i}{GDIH_i} \cdot \frac{GDIH_i}{AGDIH_i} \cdot \frac{AGDIH_i}{Pop_i}$$

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final aim of the households, that does not mean it is their purpose at every moment. Future consumption grants welfare as well, when households look over their entire life cycle. As savings is the tool for ensuring that future consumption, then it comes that in a given moment saving itself generates welfare. As a result we may choose to look at AGDIHpc – as we are going to do in fact in this paper – even beside the practical point of the non-existence of proper data for dealing with consumption.

[3] These rules are the scope of several methodological documents: Eurostat (1996b, 1996c and 1999)

where i refers to the NUTS III region and Pop means the regional population.

Taking logs in equation (1), we can then reckon the cross sectional variance of GDPpc by:

$$(2)\quad \mathrm{var}(\log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}) = \mathrm{cov}\{\log\frac{\mathrm{GDP_i}}{\mathrm{PIH_i}}, \log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}\} + \\ + \mathrm{cov}\{\log\frac{\mathrm{PIH_i}}{\mathrm{GDIH_i}}, \log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}\} + \mathrm{cov}\{\log\frac{\mathrm{GDIH_i}}{\mathrm{AGDIH_i}}, \log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}\} + \\ + \mathrm{cov}\{\log\frac{\mathrm{AGDIH_i}}{\mathrm{Pop_i}}, \log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}\}$$

Dividing both sides of the equality (2) by the total variance of GDPpc, we get:

$$(3)\quad 1 = \beta_1 + \beta_2 + \beta_3 + \beta_4$$

where:

$$\beta_1 = \frac{\mathrm{cov}\{\log(\frac{\mathrm{GDP_i}}{\mathrm{PIH_i}}), \log(\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}})\}}{\mathrm{var}(\log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}})}$$

and the other βs are the equivalent ratios for the other covariances. Please note that by definition the βs are as well the slopes of the OLS regressions of the logs of the parts in (1) on the log of GDPpc.

Clearly if AGDIHpc disparities among regions are fully independent of GDPpc asymmetries, then $\mathrm{cov}\{\log\frac{\mathrm{AGDIH_i}}{\mathrm{Pop_i}}, \log\frac{\mathrm{GDP_i}}{\mathrm{Pop_i}}\} = 0$ and $\beta_4 = 0$ as well. That would mean that the redistribution income process to households lavishly spread over space, insofar that the locals of generation of the income loose any influence on regional AGDIHpc. When, on the contrary $\beta_4 = 1$, regional GDPpc disparities are fully mirrored on AGDIHpc, and any smoothing process among regions did occur. If in the intermediate case we have $0 < \beta_4 < 1$, the regional distribution of the AGDIH is not fully exempted from the influence of the location of the production process, so the inter-regional redistribution process operates partially only. Thus, $1-\beta_4$ is to be regarded as a measure of the degree at which inter-regional distribution of income actually worked. β_1, β_2 and β_3 (that by (3) equal $1-\beta_4$) are of course the different channels of that inter-regional distribution process.

When β_1 is positive and significantly different from zero, we may conclude that the reduction of disparities among NUTS III, felt at the AGDIH level, has been reached at least in part at the expense of the primary distribution of income. The inequalities in regional GDPpc were absorbed by the variability of the income of the other institutional sectors not distributed to the households, and/or are mixed up among the regions by the cross-participations of the residents in ones regions in other regions' production processes.

When we have (instead or additionally) β_2 positive we may then assert that it was secondary redistribution of income that played that role of reducing disparities. That effect was performed by the taxes and social benefits (and other kind of transfers) system. On its turn, if $\beta_3 > 0$, that means that were the social transfers in kind that softened the original income asymmetries. Table 1 depicts our estimations of these βs.

Table 1: Decomposition of the cross-sectional variance of log GDPpc, 2002 and 2003, Portuguese NUTS III

Anos	β_1	β_2	β_3	β_4
2002	0,349	0,181	- 0,041	0,511
	(4,563)	(4,160)	(-0,762)	(8,077)
2003	0,391	0,161	- 0,024	0,472
	(4,981)	(3,399)	(-0,513)	(7,483)

In this table, as in the others ahead, t-ratios are given in parentheses. As we expected, by (3), the βs exactly added up 1 in each year (although we did not introduce any a priori constraint). The results are rather similar for both years.

The main conclusion is that it does exist an inter-regional redistribution process of income among Portuguese NUTS III regions. As far as β_4 is at the same time significantly different from 0 and 1, we can then say that the regional GDPpc disparities have an influence, but they are largely reduced, when after that distribution process the income take the form of AGDIH. Asymmetries may even have been reduced, at least in 2003, by more than 50%.

As for the shares of the different channels on that inter-regional redistribution process we settled that both the primary distribution and the secondary redistribution of income play a relevant role. The channel of the primary distribution seems to be the more robust one, as β_1 clearly exceeds β_2. That primary distribution of income effect (β_1) happens among institutional sectors (the other sectors variance protecting households) and/or among regions. This process is seemingly more important at the spatial level than the smoothing effect of the taxes/transfers system, given by β_2. On the other hand, it looks as though the social transfers in kind have any contribution to the minimization process of regional income disparities, as β_3 took the wrong signal although non-significantly[4].

As the primary distribution and the secondary redistribution of income (caught by β_1 and β_2) are the main routes that bear the inter-regional benign redistribution of income we confirmed to exist in Portugal, we decided to go further and decompose these effects in finest and more disaggregated channels, that were able to explain this process. We began by the primary distribution of income that led us from the regional GDP to the PIH. The idea was that the primary distribution consists of:

- subtracting the gross operating surpluses (GOS) generated by the production held by the other institutional units (societies, etc.) that is not distributed in that period to the households
- adding up the property incomes (PI) received, less paid, by the households from the rest of the world, comprising in that concept the other regions of the country and the foreigner countries
- adding up the compensation of employees (CE) received, less paid, from the rest of the world
- subtracting the taxes on production and imports, less subsidies (TPLS), that are incorporated in regional GDPs, evaluated at purchasers prices, but are excluded of course from households' incomes.

Having then in mind that:

$$(4) \qquad PIH_i = GDP_i - GOS_i + PI_i + CE_i - TPLS_i$$

It comes that (1) may be transformed into:

$$(5) \qquad \frac{GDP_i}{Pop_i} = \frac{GDP_i}{GDP_i - GOS_i} \cdot \frac{GDP_i - GOS_i}{GDP_i - GOS_i + PI_i} \cdot \frac{GDP_i - GOS_i + PI_i}{GDP_i - GOS_i + PI_i + CE_i} \cdot \frac{PIB_i - GOS_i + PI_i + CE_i}{PIB_i - GOS_i + PI_i + CE_i - TPLS_i} \cdot \frac{PIH_i}{GDIH_i} \cdot \frac{GDIH_i}{AGDIH_i} \cdot \frac{AGDIH_i}{Pop_i}$$

Taking logs and reckoning the cross-sectional variance of GDPpc in the same way than in (2), we then reach:

[4] One reason why social transfers in kind seem not to contribute to the reduction process of disparities may be that in regionalizing that flow we considered the place where the services are rendered and not the actual place of residence of the beneficiaries. In many cases, education or health services, or other transferred in kind to the households, concentrate in some regions – sometimes the urban richest ones – but their benefits surpass the borders of these regions reaching the peripheral poorer other ones.

$$(6) \quad 1 = \beta_{11} + \beta_{12} + \beta_{13} + \beta_{14} + \beta_2 + \beta_3 + \beta_4$$

where β_{11} until β_{14} are calculated in the same way than in (3), with the covariances of the logs of the parts in (5) with the log of the GDPpc. Note that $\beta_1 = \beta_{11} + \beta_{12} + \beta_{13} + \beta_{14}$, and the remaining βs shall keep the same values than in our previous estimations reported in Table 1.

Table 2 shows then the decomposition of the cross-sectional variance of the GDPpc, extending further the identification of the channels of the inter-regional redistribution of income, taking into account the different types of flows that lead from GDP to PIH. The β_1 channel splits then in β_{11}, β_{12}, β_{13}, and β_{14}.

Table 2: Decomposition of the cross-sectional variance of log GDPpc, with β_1 split, 2002 and 2003, Portuguese NUTS III

Anos	β_{11}	β_{12}	β_{13}	β_{14}	β_2	β_3	β_4
2002	0.194	0.019	0.071	0.065	0.181	- 0.041	0.511
	(4.000)	(1.590)	(2.343)	(4.498)	(4.160)	(-0.762)	(8.077)
2003	0.209	0.034	0.074	0.074	0.161	- 0.024	0.472
	(4.027)	(2.098)	(2.470)	(4.889)	(3.399)	(-0.513)	(7.483)

The conclusion is that all the process of primary distribution of income has an impact on the inter-regional redistribution of income, except perhaps the property income received (less paid) from the rest of the world (β_{12}), mainly in 2002. The most impressive effect is the retained income by the other kind of institutions but households (β_{11}). That non-distributed income seems to mimic the GDP asymmetries, absorbing them before the income fall into the hands of the households. However, both the taxes on production less subsidies (β_{14}), and the net compensations received from the rest of the world (β_{13}), play a significant role as well in the smoothing of the income inequalities among the households residing in different regions.

On the other hand, in a second stage we decided to decompose as well the smoothing impact of the secondary redistribution of income that transforms the PIH into the GDIH (β_2). These calculations were performed as follows:

$$(7) \quad GDIH_i = PIH_i + SB_i - SC_i - TIWH_i$$

where SB are the "Social benefits other than social transfers in kind received by households", SC the "Social contributions paid by (or on behalf of) households", and TIWH are the "Current taxes on income and wealth due by the households"[5].

Adopting a similar procedure to the one that led to decomposition of β_1 in (6) we then get:

$$(8) \quad 1 = \beta_1 + \beta_{21} + \beta_{22} + \beta_{23} + \beta_3 + \beta_4$$

As in the case of the primary income we must have $\beta_2 = \beta_{21} + \beta_{22} + \beta_{23}$, and the remaining βs shall keep the same values reported in Table 1.

Table 3 gives then our results of the decomposition of the cross-sectional variance of the GDPpc, splitting β_2 into β_{21}, β_{22} and β_{23}.

Table 3: Decomposition of the cross-sectional variance of log GDPpc, with β_2 split, 2002 and 2003, Portuguese NUTS III

Anos	β_1	β_{21}	β_{22}	β_{23}	β_3	β_4
2002	0.349	0.104	0.005	0.072	- 0.041	0.511
	(4.563)	(3.439)	(0.363)	(4.731)	(-0.762)	(8.077)
2003	0.391	0.088	0.003	0.070	- 0.024	0.472
	(4.981)	(2.826)	(0.175)	(4.460)	(-0.513)	(7.483)

[5] As a matter of fact we did not take here into account the Other Current Transfers, received less paid, by the households, that amount to a very small value, because we did not find a proper proxy for regionalizing them at NUTS III level.

The outcome of this new decomposition of the cross-sectional variance of the GDPpc (of its log) is that social benefits – represented by β_{21} – and the taxes on income and wealth – β_{23} – actually account for inter-regional income redistribution process. The poorest regions benefit from this process because very likely poorer people – that reside there in a relevant percentage – receive more social benefits and pay fewer taxes. On the opposite, the richest regions are losers in that redistribution process, as they benefit less from social transfers and they have a higher tax burden. On the contrary, the social contributions due, by the households, (β_{22}) to the social security systems do not seem to play a similar spatial distributive role.

3. The spatial stabilization of income analysis

The spatial stabilization of income analysis is different from the inter-regional redistribution effect, that we dealt with in the precedent section, because the focus now is on the growth – instead of the levels – of the regional incomes. When in our previous analysis the issue was how the richest (poorest) regions become less rich (poor), when we proceeded from the product (that is also the generation of income) to the income that households actually dispose, our point now is how the positive or negative shocks that hit the product are absorbed by the transformation process of that product in income. Note that through this transformation a shock in one region product spreads into the income of other regions too, that being the reason why this phenomenon is known as well by the "risk sharing" analysis.

In this second part of our paper, the starting point is again the same identity (1) of the previous section that emanates from the Figure 1's scheme. The difference now is that we transform each ratio taking the first differences of the logs (which is the same of their growth rates), leading to the following decomposition of the variance:

$$(9)\quad \operatorname{var}\left(\Delta \log \frac{GDP_i}{Pop_i}\right) = \operatorname{cov}\left\{\Delta \log \frac{GDP_i}{PIH_i}, \Delta \log \frac{GDP_i}{Pop_i}\right\} +$$
$$+ \operatorname{cov}\left\{\Delta \log \frac{PIH_i}{GDIH_i}, \Delta \log \frac{GDP_i}{Pop_i}\right\} + \operatorname{cov}\left\{\Delta \log \frac{GDIH_i}{AGDIH_i}, \Delta \log \frac{GDP_i}{Pop_i}\right\} +$$
$$+ \operatorname{cov}\left\{\Delta \log \frac{AGDIH_i}{Pop_i}, \Delta \log \frac{GDP_i}{Pop_i}\right\}$$

Dividing again both sides of the equality (9) by the total variance of the growth rate of the GDPpc, adopting a similar procedure to what we made in (2), we get:

$$(10)\qquad 1 = \gamma_1 + \gamma_2 + \gamma_3 + \gamma_4$$

where the γs (likewise the βs) are the ratios of each covariance in (9) by the variance in the left side. When γ_4 is less than 1, revealing a small correlation between the growth rates of the AGDIHpc and of the GDPpc, that means that the shocks on regional GDP are partially absorbed, having only a reduced effect on the AGDIHpc of the regions. It exists therefore risk sharing. 1- γ_4 is to be regarded precisely as the risk sharing degree among the regions of the country. Thus we have, as a consequence of this spatial stabilization of income process, by (10), that γ_1, γ_2 or γ_3 or all together must be positive. These γs are the channels where the spatial stabilization occurs through. When γ_1 is positive we conclude that the risk sharing happened at the expense of the primary income distribution to the households. When it is γ_2 that is positive – also or instead – it is the secondary redistribution of income (the taxes/transfers system) that plays that role of stabilizing the income over space. In the case of γ_3 the spatial stabilization process is performed through the social transfers in kind that transforms the GDIH into AGDIH.

Table 4 depicts the results we obtained for our γs.

Table 4: Decomposition of the cross-sectional variance of Δlog GDPpc, 2002 – 2003, Portuguese NUTS III

Anos	γ_1	γ_2	γ_3	γ_4
2002-2003	0.530	0.023	0.031	0.415
	(5.398)	(0.525)	(0.380)	(3.932)

These results confirmed that as we expected the shocks on regional product are softened by a spatial stabilization of income process, as γ_4 is significantly different from 1 (and from 0 as well, granting that anyway GDP matters to some extent for explaining the variability of the AGDIH). The risk sharing degree exceeds even 58%, that meaning that less of 42% of a GDPpc shock in one particular region is kept inside that very region. However, very interestingly, it becomes patent that it is the primary distribution of income (γ_1) alone that grasps that process of income stabilizing over regions. As for γ_2 and γ_3, they assume a very low value non-significantly different from zero, preventing the secondary and the in kind distribution from playing this stabilizing role.

As we concluded that it is the primary distribution of income that hold the full charge for the risk sharing process among regions, we decided to focus on that effect splitting it in the same mode adopted in section 2. γ_1 is then substituted by the sum $\gamma_{11} + \gamma_{12} + \gamma_{13} + \gamma_{14}$.

The γ_{11} accounts to the stabilizing effect of variations of non-distributed gross operating surpluses, protecting the households income, while γ_{12} refers to the impact of the fluctuations of the property income received/paid from the rest of the world (including other regions and other countries), and γ_{13} measures the equivalent effect of the compensation of the employees also received/paid from the rest of the world. γ_{14} finally is the part of the primary income effect concerning the fluctuations of the taxes on production less subsidies, that are excluded when we come up to look at the income of the households instead of GDP. The meaning (and the value) of the other γs is of course the same than in (10).

Table 5 ahead comprises then the decomposition of the cross-sectional variance of the variation of log GDPpc, among the Portuguese NUTS III regions, with the splitting of the primary income effect into its constituent parts.

Table 5: Decomposition of the cross-sectional variance of Δlog GDPpc, with γ_1 split, 2002 - 2003, Portuguese NUTS III

Anos	γ_{11}	γ_{12}	γ_{13}	γ_{14}	γ_2	γ_3	γ_4
2002-2003	0.435	- 0.010	- 0.004	0.109	0.023	0.031	0.415
	(7.819)	(- 0.158)	(- 0.786)	(5.464)	(0.525)	(0.380)	(3.932)

Our conclusion is then that the main channel of the households income stabilizing effect among regions is the non-distribution to the households of part of the gross operating surpluses (γ_{11}). Following a sharp variation, positive or negative, in a regional GDPpc the major impact is felt at the other sectors (societies, government) incomes, that do not propel these shocks (at least in the short run) to the households sector[6]. The fluctuation of taxes on production, less subsidies (γ_{14}), that resembles the GDPpc variations, is also a relevant mechanism – although a weaker one given its lower value – on that process of spatial stabilization of income. On the contrary, the distributions of property income and labor compensations from/to the rest of the word (γ_{12} and γ_{13}) do not seem to have a significant impact on the GDP shocks absorption.

4. Main conclusions

The purpose of this paper was to look at the regional effects of the income distribution process that come after the product generation. In fact, the trivial analyses usually based on the regional GDP concept only account for the generation of the income, neglecting its distribution. On the contrary our focus was on the distribution of income ensuing generation, and on its impact at the regional level. We proceeded to our analysis in two steps: the first approach was a synchronic one and consists in wondering if product asymmetries among regions, in a given year (we looked at 2002 and 2003), that arise when it is generated, still remain when income is distributed to the households. The ultimate households' income concept that we adopted in this study, after the entire distribution process was over, was the Adjusted Gross Disposable Income of the Households, defined in the frame of the official National Accounts systems. We refer to this first approach as the "inter-

[6] This result that the non-distribution of incomes to the households has an outstanding effect on stabilizing their income along GDP shocks is recurrent all over the relevant literature, including the original classic papers of Asdrubali *et al*. (1996) and Sørensen and Yosha (1998)

regional distribution of income". In our second stage we rather adopted a dynamic approach, raising the issue of how the product variations, or shocks, lead to identical income variations at the AGDIH level, if those shocks are buffered by income distribution, or if on the contrary they may be amplified. We looked in this phase at the 2002-2003 growth rates. This latter approach was named of the "spatial stabilization of income" analysis.

Our main conclusions, referring to the Portuguese NUTS III regions, were based on a methodology of decomposing cross sectional variances, adopted from the relevant literature. We then asserted that:

- The regional asymmetries, in Portugal, are much more lessened as a result of the inter-regional distribution of income, at the AGDIHpc level, than they were before when we looked at the GDPpc of the Portuguese regions.
- These minor asymmetries result both from a benign distribution of primary income and from a fairer secondary redistribution of income too. The former effect may have been produced by several sub-channels: the income retention by other institutions (societies, government units and so on), the compensation of employees received, less paid, from other regions and countries, and the burden of the taxes on production less subsidies all seem to have played a significant role on the income distribution over space. There is, however, less evidence that the property incomes received, less paid, from the rest of the world, played an equivalent role in equalizing the regional incomes. As for the secondary distribution of income, its benign effect on regional income was the result of the taxes on income and wealth and of the social benefits received by households, but the social contributions avoided this flattener role. We did not find evidence as well that the social transfers in kind contributed to an equitable income distribution of income over regions.
- Just as regional asymmetries, product shocks are also absorbed when our focus proceed from the product generation, felt at the GDP level, to the income of the households, gauged by the AGDIH. In other words, distribution of income to the households works as a spatial stabilizer in regard to the disturbances that may hit product.
- This spatial stabilizer effect on households' regional income was performed, however, by the primary income distribution alone, the secondary distribution and the distribution in kind having been pulled out from this process. In the scope of that primary income effect, the effective channels were the compression of the non-distributed income to the households when negative shocks happened, and in a small scale the decrease of the taxes bearing on the production and imports, net of subsidies.

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GEOGRAPHY OF MICRO-STATES: MAIN ARISING ISSUES

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Abstract:
News is often interspersed with reports from small islands. Reference is often made to them due to their small size, or due to their administrative autonomy or financial regime; usually attracting the common interest. Actually, what are the so-called microstates, virtual lands, unrecognized state entities, or ephemeral states?

Their de facto distance from the centers of socio-economic developments contributes to the conservation of both their traditional social web and their natural environment, but at the same time, it deprives them the opportunities to keep in pace with the modern developments and renders them under the status of isolation.

On the one hand, the barrier resulting from natural obstacles acts like a filter that bars the introduction of opportunistic innovations, and on the other hand geographical proximity would make contact with progress feasible. In other words, situation acts as an immune system which secures the better health of microstates.

Keywords: Microstate, micronation, small economies, insular space, quasi-state, sovereignty, development.

1. Introduction

News is quite often interspersed with reports from small islands in the middle of the ocean. Reference is often made to them due to their small size, or due to their administrative autonomy or financial regime; usually attracting the common interest.
Actually, what are the so-called microstates, virtual lands, unrecognized state entities, or ephemeral states?

2. How small is Micro?

The basic step in the study of microstates is to define the concept of size. The Forbidden City in Peking, well-organized university campuses, large recreation complexes, even great multinational enterprises or huge cruise ships may as well be regarded small organized societies.

Is Sealand[7] off the coast of England a microstate?

The basic difference between microstates and the examples mentioned above is that their social structure has not been built on the basis of features like employment, social structure, or any other form of social or economic activity. Microstates are integrated social systems even though their surface area is limited. Definitions related either to qualitative or quantitative features are more widely used in available literature.

Several factors are required to define a state as a microstate. Microstates, mostly the insular ones, are identified upon the basis of physical and geographical features, serving as a definition frame (Pic. 1). The degree of geographical isolation can be one such feature: limited resources, limited land, limited ecosystem sensitivity, which can result in any form of developmental activity having a negative impact on the environment on the short term. Another

[7] Principality of Sealand, a micro-nation offering offshore services off the coast of Suffolk, Great Britain.

such feature may be proneness to natural disasters: a tropical storm may affect the whole area, since ecosystems in microstates have a limited tolerance margin[8].

Picture 1

Beyond the above qualitative features, there are also quantitative features related to geographical area, population size and economic indices. The size of financial activity is often used in order to define a microstate: if a state entity fails to influence markets on its own it is called a microstate. Micro-economies amount to microstates. Another set of defining features is focused on factors related to both an upper population limit and territorial area. In all such cases, population is unbreakably tied with the country's size[9].

This study adopts geographical area as the dominant feature of defining microstates. The limit of an area of 1,000 km^2 has been set following qualitative and quantitative comparisons and the study has been based on microstates having an area smaller than this upper limit[10].

In several cases, these entities can be marginally designated as states because they have a very small population, basic economic activity and primary social structures.

In other cases, even though the national sovereignty area (i.e. in island complexes) is extremely large (reaching up to 1,000,000 km^2), the inhabited area may not even reach 300 km^2.

Microstates and self-governing territories studied here total seventy-two (72) entities, while their number rises steadily.

3. Methodological Issues

A fundamental point of difficulty in collecting both cartographic and thematic information is the fact that these microstates mainly represent a single socio-politic, or economic -and less- geographical space.

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[8] Singh N., Environmental Problems & Opportunities in Small Open Economies, paper presented at the Eastern Caribbean Central Bank & Commonwealth Secretariat on small states, Problems & Opportunities in a World of Rapid Change, St Kitts, 25-27 March, 1991.

[9] Kuznets, Simon, Economic Growth of Small Nations, in E.A.G. Robinson ed., The economic consequences of the Size of Nations: Proceedings of a Conference Held by the International Economic Association. London: Macmillan, 1960.

[10] In certain instances (e.g. Hong Kong with 1,045 km^2) the study has overstepped this rule, because socioeconomic and political conditions in those microstates showed great similarities that made it more logical for them to be included in the current field of study.

The major problem proved to be the need to use very large scales. It is a need that emerges from the mandates of the information dissemination means. Atlases play the leading role in this particular case. The space given to uninhabited island complexes is minimal and the scale is proportional to the microstate's area, so cartographical information is scarcely provided. In any case, it is not the same as for 'large states'. Among the first steps of the study was to transfer the maps to the same scale for size comparability.

Digital Atlases will probably resolve this problem in the future, as soon as technology offers enough volume, power and speed to build a worldwide cartographic base with a uniform grid or grids (as it is the case in the services provided by national states).

Unlike cartographic information, thematic data –better managed by current technology- has raised the issue of organizing the abundance of available information. A point must be made here about the fact that information -although abundant- is far from limitless and naturally follows the development of information technology. This means that limited instances of digital entries were found relating to decades prior to 1980 and therefore these had to be supplemented through manual research.

4. Microstates by Numbers

The late emergence of these state entities in the historical foreground makes studying their **government status** particularly interesting.

Two broad categories become evident. On the one hand, there are those constitutionally **independent** microstates, totaling 24 entities, and on the other hand, those microstates which are subject to some form of independence or dependence, a total of 48 entities, which are here, called **semi-independent** microstates (Fig. 1).

Talking about economies there are a total of 130 economies measuring 1,500,000 people: this equals in size a big city. Most microstates were established between 1975 and 1986. Contrary to their size, their control area is especially large. Kiribati stretches over 280 ml^2, while its control area extends to 1,370,300 ml^2. Their characteristics are similar to those of a region:

- limited natural reserves
- small populations
- small enterprises
- little 'local' potential
- insufficient local demand
- susceptibility / vulnerability
- inadequate official infrastructure

The status of the semi-independent microstates appears in various forms. Fourteen such status forms have been enumerated noting different stages of constitutional development. Depending on the degree of development, the varying stages ranged from the stage of gradual independence to the stage of integration into a powerful regime:

> **Dependencies, Enclaves, Autonomous parts, Outermost regions, Self-governing territories, Free association territories, Self-governing regions, Overseas territories, Colonies, Overseas departments, Exclaves, Special territories, Disputed territories**.

The presence of the **human element** in absolute magnitudes is small, in proportion to the small area of these microstates; however, population is generally increasing. In the subgroup of independent microstates, for example, the mean increase in the population between 1950 and 1990 has been at the order of 85%[11].

[11] United Nations Statistics Division - Demographic and Social Statistics United nations Statistical yearbooks – UNESCO, 2005

The average population per microstate is 54,019 individuals, with Hong Kong ranking at the top of the list with 5,838,000 people, followed by Singapore with 2,821,000. A considerable proportion of these microstates, up to 14%, show zero indices.

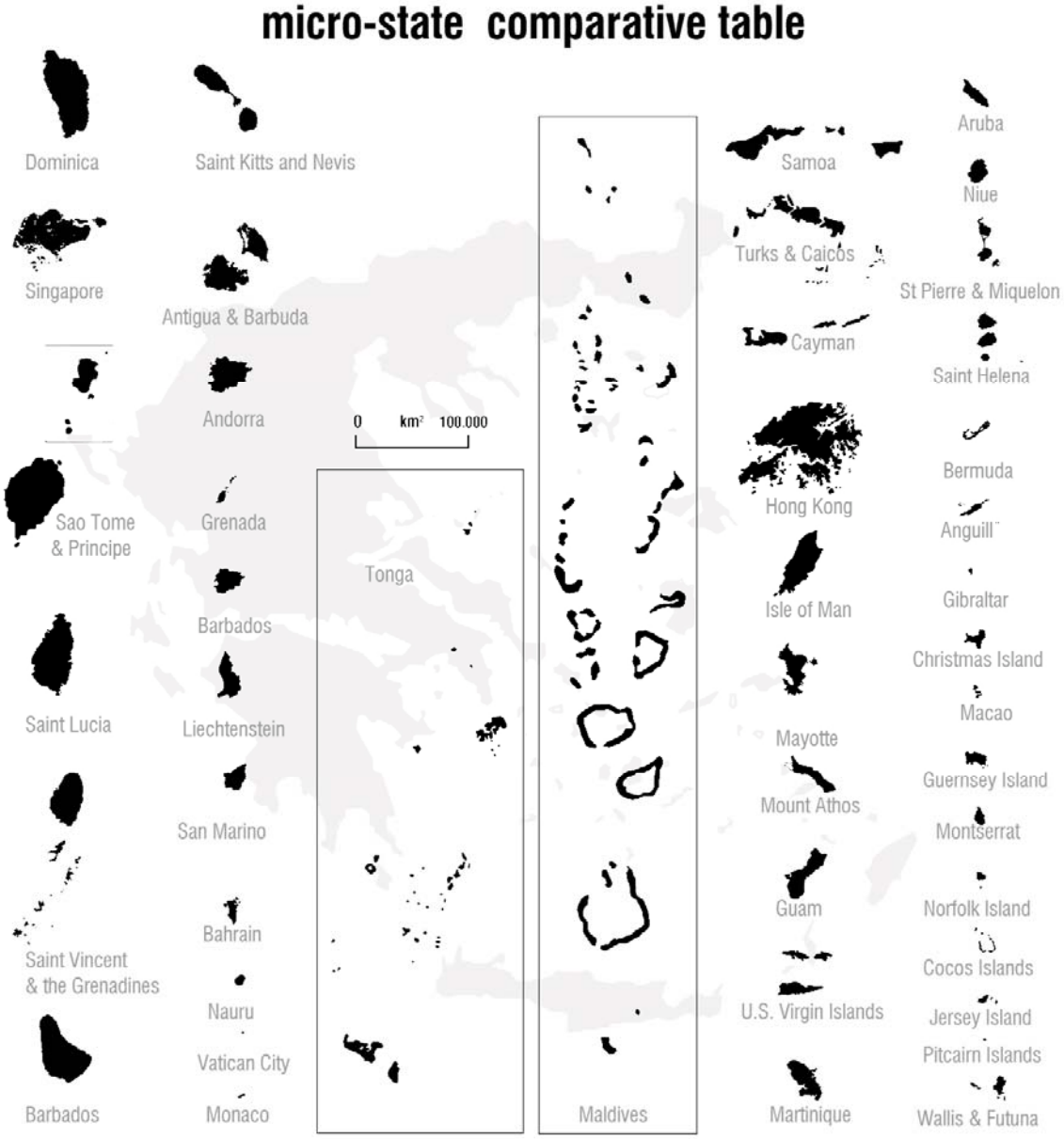

Figure 1

What can more accurately specify the population profile of our subjects is their population density, which appears in extremely high values. The average is 1,206 individuals per km^2, while 60% of microstates show a population density above 100 individuals per km^2. Note here that an average industrial country[12] has a population density varying around 100 individuals/ km^2.

A series of microstates have values well above the average: Bermuda (1,103), Vatican (2,273), Singapore (4,295), Gibraltar (4,319), Hong Kong (5,914), Monaco (15,321), while Macau has the highest value with a density of 19,761 inhabitants/km^2!

Also note here that variation of density values is also high (standard deviation = 2.895), which clearly demonstrates the population density unevenness across microstates.

[12] France: 104, Greece: 78, Zaire: 17 individuals per km (The Dorling Kindersley Atlas, 1995).

According to data provided by the United Nations for the year 1993, when measured by HDI (Human Development Index)[13] independent microstates classify above an agricultural country[14] (65/100), although semi-independent territories score definitely lower indexes. This is partly explained by the **economic regime** of these entities**.**

Monocultures are typical of the economic activity in microstates, which of course are quite vulnerable to the world market system. For Mauritius, it is sugar, for Gambia groundnuts; for Tonga it is copra, for Trinidad & Tobago mineral oil; for Guyana it is the bauxite industry and for Seychelles it is tourism, the same for Barbados. A series of specific developmental activities are also met in microstates: foreign investments on clothing and handcrafting as well as offshore enterprises. As regards the independent microstates, these developmental activities are classified into: Military bases (8)[15], tax havens (5), banking activities (5), scientific bases (3), animal reserves - parks (2), trade centers (1) and refineries (1).

Average GNP for independent microstates is $ 6.505 and depicts countries that are developing. However, the vast majority of them demonstrate low GNP and the high average GNP is actually attributed to the inclusion of certain microstates like Andorra ($ 15,430), Singapore ($ 12,310), Monaco ($ 11,000), Hong Kong ($ 10,320), Nauru ($ 10,000), which score rather high GNP levels; quite a few microstates have a remarkably high GNP, like Liechtenstein ($ 31,000). This peak pattern would be even more manifest if one had the opportunity to register[16] the GNP values of some semi-independent microstates like the Guernsey and Jersey islands, Gibraltar, the Isle of Man, the British Virgin Islands, Bermuda, Cayman Islands, and Cook Islands, which all have very high GNP levels.

This group of microstates with a high GNP is widely known under the name of 'tax havens'. Indeed banking is one of the mostly met and most successful activities in microstates. In a total of 60 states around the world, 13 microstates are included in the dominant centers through which half of the global financial transactions are circulating[17].

5. Geographical Space through Time

The determinant factor in order to interpret the evolution of microstates is to delineate and identify the systems which organize their vital geographical space. Two parameters come into discussion for such an analysis: site[18] and situation[19].

The first impression is that the large number of microstates in this field of study are located in the Pacific Ocean, with a second major group of them in the Atlantic Ocean 'basin', and a third one in Asia (Fig2).

Actually, the geographical nature of microstates can provide groups with common features under the wider framework of their emergence in the historical foreground as organized societies.

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[13] HDI (Human Development Index) is derived from four other indexes relating to: a) National Income, b) Life Expectancy, c) Schooling and d) Literacy (CNN NEWSROOM Global View, 1994).

[14] Typical value for an agricultural country, Zaire = 26, 2/100; for an industrial country, France = 96, 9/100; Greece is at 90, 1/100.

[15] The term 'Military base' often conceals the use of the area as a nuclear test field or chemical waste disposal area –this is the case of the Marshall Islands in the Pacific.

[16] Information mining is impractical for semi-independent microstates because their presence in international organizations is only possible through the general statistics of the countries they depend on, even if in most cases they enjoy a certain autonomy status.

[17] Tripidakis G., Kathimerini neswspaper, «Ta thelgitra ton forologikon paradison» (in Greek) ["The attractions of tax havens"], 12/12/93

[18] Site: The way in which a geographical subject "is registered in space" (Dolfus, 1971,p. 15).

[19] Situation: The way in which a geographical subject "is registered in the spatial continuum", i.e. the total of the circumstances in which it is found. (Dolfus, 1971,p. 15)

	Africa	Asia	Atlantic Ocean	Pacific Ocean	Europe	Indian Ocean	Caribbean	Middle East
Semi-Independent	0	4.5	20	40	9	9	15.5	0
Independent	4	8	0	19	27	8	27	4
Total	4	12.5	20	59	36	17	42.5	4

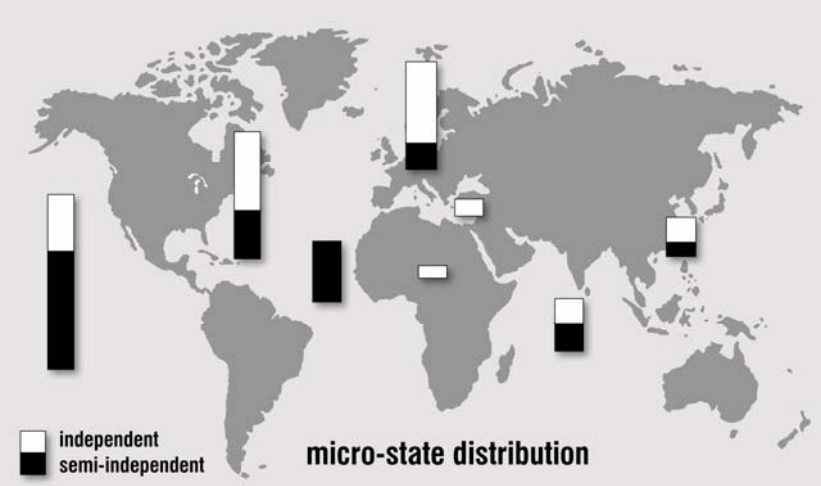

Figure 2

The phenomenon of microstates is largely located in overseas dependencies (i.e. islands –since only 11 microstates are actually located in continental ground) and is the outcome of seafaring explorations by the major marine powers from the Middle Ages up to the last century. Therefore, one notices that the possessors and creators of these microstates belong to the class of the powerful international actors in each historical period.

It is only natural that control areas have not remained the same but they were occasionally modified through the centuries, either due to the dynamic position of a powerful state or because of the changing technical capacities of navigation, as well as the course of political transactions among the powerful countries.

The English, the Dutch and the French were among the first as early as in the 11th century. After the colonists of Australia, New Zealand and the USA strengthened their position as well, organized states took under their control smaller states that were situated inside their radius of influence in the seas.

The USA today ranks as second biggest ‘owner' of such territories (12), mostly located in the Caribbean and the Pacific Ocean. Great Britain is the longest-living and greatest owner (17 territories), which is explained by the most powerful political position held by the British Empire as well as by the potential provided by the fact that the British were among the first dominant sea actors. As a result of these, British dependencies are scattered all around the globe, while those of the USA are gathered in its wider radius of influence[20].

But even though in general terms the phenomenon of the appearance and establishment of microstates is the effect of the great explorations, the political genealogy of some of them dates back much earlier than the Middle Ages.

Historical sources refer to San Marino in 4th, the Isle of Man in 9th, Guernsey and Jersey islands in 11th, Andorra in 13th century. This historical continuity has played an important role in the formation of a special cultural identity of these states.

[20] The delineation of our field of study prohibits the opportunity to discuss the phenomenon of overseas dominions in all of its extent. France –although a major, sea power in the past, – simply appears to have no possession of such dominions, which is false only because its dependencies are far greater than the limits set for the microstates of this study (Guadeloupe etc).

Mount Athos certainly classifies as a unique case, since its special independence status was determined as long ago as 883, during the Byzantine Empire times. What distinguishes it from other entities however is the fact that Mount Athos possesses all of its legislative proofs from 883 to present time, confirming an unprecedented legal continuity; add to this the fact that its administrative borders were never disrupted, so this makes Mount Athos an entity that has been functioning uninterrupted as an organized social formation.

Long historical continuity through the centuries is not the only contributing factor in the shaping of conditions for further development of a special cultural identity. Much later microstates and for completely different reasons, such as the Vatican City (independent from 1929) or Monaco (its 1st Constitution was written in 1911), are characterized by their exclusive cultural activity.

6.Site

Site is the actual topographical frame in which an area is registered. In the opinion of some scholars site is an issue of a minor scale compared to situation. In our specific case however, the small size of microstates fails to differentiate these two concepts or even renders them identical.

In most of the areas studied here, the original site selection was directed by demands for safety and security (defense, food supply, control over passages or straits etc). In the course of their evolution however, original sites were changed in an organized and purposeful scheme to accommodate new needs or new functions assigned by central political planning. Gibraltar, Monaco, Macao etc. are examples of intervention in site (Fig 3).

The chief families of area types are: **territories with no exit to the sea** (Andorra), **territories with exit to the sea** (Monaco), **peninsular territories** (Mount Athos), **islands** (Malta), and **island complexes** (Seychelles). Using this classification the vast majority of microstates (59 out of 72) fall into islands (29) and island complexes (30).

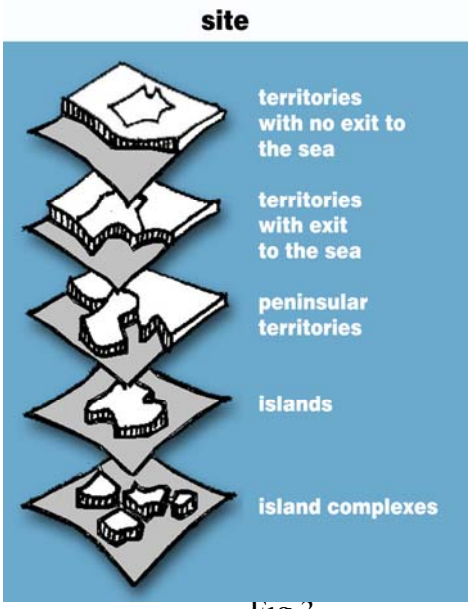

Fig 3

Still using the above families and specifying whether microstates are located on continental or overseas locations, half of them appear as overseas.

Administrative independence as well as economic well-being coincides to a great extent with continental microstates.

Either the site of about 3/4 of independent microstates is in the form of an island closes to continental areas or it is itself a continental state (Malta, Liechtenstein etc.).

Some 1/4 of them are overseas territories: it is the case of island complexes which show a remarkable feature in that they occupy huge sea areas despite the fact that their total area is less than 1,000 km^2.

In the class of semi-independent microstates, which are old dominions with no major geopolitical role any more, some 3/4 of them are island complexes and the majority of them are overseas islands (91%).

7. Situation

Situation of a spatial unit is the outcome of its internal system of operation in relation to its interconnection system with the external world, in other words the way in which the geographical subject ‘is registered’ in the spatial continuum.

A microstate's situation is of key importance. Microstates are nodal points which have served and continue to serve military needs, refueling demands and have been strategic points for trade or even serve as environmental bases. The information technology revolution has given them the chance to evolve into nodal banking establishments and developments in the new marine law are expected to turn them into key geopolitical actors again (option to extend territorial waters to 200 miles).

Based on situation the chief families are: **cities** (Vatican City), **urban agglomeration** (Gibraltar) and **regions** (Hong Kong) (Fig 4).

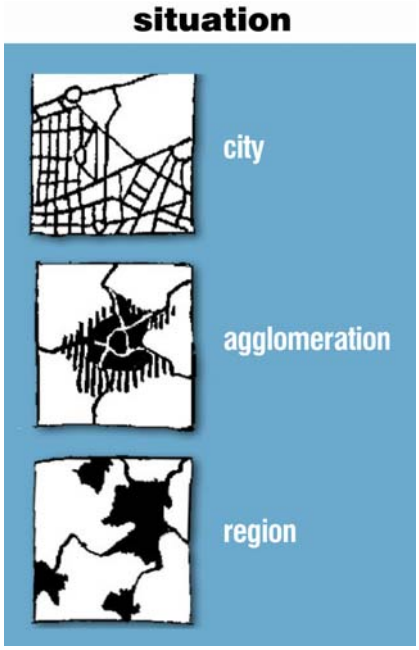

Fig 4

The average profile of microstates in relation to situation is that of a 'region' (61 instances). There are also two cities (Vatican, Monaco) and only one urban department, Gibraltar.

As for independent microstates, the main feature of their situation is their free exit and accessibility to the sea (Fig5).

For those rare cases of microstates, whose situation fails to provide access to the sea it is worth noting the following typical instances: the case of microstates which border more than one country (Liechtenstein, Andorra) and the case of microstates which are enclaves within other countries (San Marino, Vatican City).

Semi-independent microstates are mainly islands. Some 50% of them are island complexes and 3 cases are peninsulas (Mount Athos, Gibraltar and Monaco). Some 3/4 of this group is situated in overseas locations.

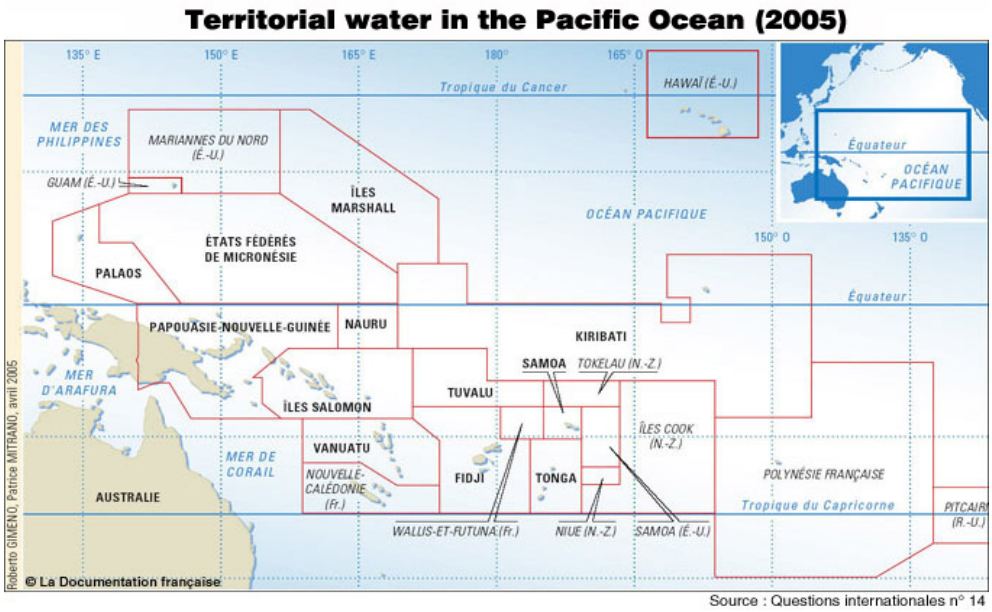

Figure 5

8. On the Label of 'Outlandish Tax Havens'

As already mentioned above, microstates are almost always mentioned as '**outlandish tax havens**'. Let it be made clear right from the beginning that this label of a tax haven is not a synonym for social prosperity, and careful observation will definitely revert this view.

Two categories of such microstates are met: on the one hand, there are microstates where the financial regime is a profitable activity and on the other hand, microstates where the financial regime is just their goal. The first category includes the most successful cases, which are also geographically close to traditional cultural centers. Take the cases of the Isle of Man in Europe (between England and North Ireland) and Hong Kong in South China (just 3 km far from continental China) etc.

The main question however is whether activities of this kind are advantageous in general. The answer is no. Quite often, although banking activities are profitable the balance of payments is negative and GNP is well low. The Cayman Islands are a typical example, being one of the major offshore financial centers of the world and nevertheless relying on tourism for 70% of their GNP.

Driven by the stereotype of ' tax haven' model in other countries, several microstates focuses in the establishment of similar activities. In the good case, what they achieved is to make financial activities part of their other activities, with no particular success, while there was also the bad case of failure in their attempt to achieve this goal. The case of the British Virgin Islands is applicable here, where economic abuse led to a legislative arrangement in 1990 which brought shrinking of the sector.

Cases are also reported in which wealth came from exploitation of natural resources. However, inconsiderate use of resources caused gradual reduction of the national resources. Nauru, where phosphate deposits have declined heavily, and Bahrain, where oil resources have depleted, are two good examples here.

The 'tax haven' model works but only in those cases where it 'has been effective'. In their majority microstates are no tax havens but small poor states which look forward to the 'coming' economic flourishing. In some of them banking is simply one of their activities as mentioned before. Production of agricultural goods (sugar, bananas, nutmeg, coconuts, cocoa etc), profits from the intermediate refuel stops (of sea lines and air lines), traditional fishing and recently tourism form the standard economic framework (Fig 6).

Figure 6

Even political **independence** is not given and often it is not even an aim at all. The claim for independence has not demonstrated for sure that independence has a positive impact on the socio-economic well-being of microstates. The people of many microstates are not even indigenous -they were transferred there as slaves or workforce for the colonial forces. (In Sao Tomé & Príncipe it was the Portuguese who first arrived there in 1470 carrying with them African slaves. By 19th century, at the time of the microstate's independence, some 10% of the population was Portuguese and Creoles while 90% of its people were Black Africans).

Their international representation is elementary. After World War II only Luxemburg has become a member of the United Nations, while Andorra, Liechtenstein, Monaco, Mauritius only participate in the margin of UN assemblies. Between 1946 and 1960 only Iceland and Luxemburg participated in an international system as equivalent states.

Microstates neither participate in international bodies nor do they plan to participate –they do not even have the capacity for representation. This fact of course raised questions as to their independence. Britain has suggested their 'pragmatic' independence by merging with other microstates.

The background of co-operations, alliances and coalitions to date includes the following types:

1. Independence.
2. Alliance with former colonialists (former metropolises act as a central state in the first years after independence providing subsidies, services, know-how etc.)
3. Alliance among microstates (at this point 26 regional and intergovernmental coalitions are been listed).
4. International alliance (United Nations acts as 'entrance' into the world community).

Often the claim for breaking away from a sovereign country causes huge economic and social problems. In many cases, even at the time of declaring independence, re-attachment was sought with the 'former' metropolitan country in the form of interstate union or participation in wider local or international organizations. It is generally ascertained however that microstates "... seek to be accommodated in larger organized associations ..." which "... will be able to safeguard to them the advantages of scale and collective security and at the same time guarantee the preservation of their particular characteristics..."[21].

On the other hand, many of these microstates have lost the advantages they used to offer, so sovereign states seek to release themselves from the immense economic expenditure spend on assistance to them.

[21] Dimitrakos D., «Ta megala pleonektimata ton mikron xoron» (in Greek) ["The great advantages of small countries"], TO VIMA newspaper, 1-2-98

Prosperity also seems to be irrelevant to the nationality of the sovereign state and this is only logical if one takes into account the fact that as soon as many of these dependencies actually appeared not only did they change 'owners' but have also been the object of transactions among the various powerful world actors and this has had no particular effect on them –for example Antigua has been in turn a Spanish, French and British colony, while the USA had already built a military base there in 1941, before it was even declared independent from Britain.

9. Development Planning Efforts

Regarding most microstates, there have been a series of ambitious development plans. One of the main aims has been the development of financial organizations. In other cases, where natural resources have been exploited, misuse has been common. Tourist service activities have not flourished either, at least to the degree they had been expected to succeed. Facts usually show small range activities, which are extremely fragile and vulnerable.

The main problem was identified to be around the fact that the size of microstates is that of a region and also microstates lack the function of a central state which could take action to balance the system of economic activities. This fact demonstrated the need to seek coalitions for planning and finally the United Nations has been shown to be the central partner. In 1994 the first principles of a planning framework were laid out in Barbados islands for island microstates and 2005 a second plan was launched in Mauritius.

The reality of developmental planning is based on principles that appear to be unable to flourish as they had originally been conceived. Studies have shown (Commonwealth Secretariat/World Bank, 2000) that a success framework has to aim at the following characteristics which define the development challenges faced by many microstates:

- Remoteness and isolation.
- High degree of exposition to large markets.
- Natural disasters and environmental changes.
- Limited range of activities.
- Poverty.
- Limited opportunities.

The combination of all the above features affects microstates regarding their income instability and access to external capital.

10. Addendum

The majority of microstates and self-governing territories show the average features of an overseas insular administrative region. Site is not the key element and often it is purposefully modified when deemed inadequate.

Their de facto distance from the centers of socio-economic developments contributes to the conservation of both their traditional social web and their natural environment, but at the same time, deprives them the opportunities to keep in pace with the modern developments and renders them under the status of isolation.

These general findings also include some exceptions: microstates that have had a successful course of development, constant presence and a distinguishable social and cultural identity. These are exactly those thriving microstates that attract attention and act as successful socio-economic models. A significant portion of their profile is attributed to their form, as microstates in the form of urban departments or cities, located close to continental territories which play an important role in international socio-economic developments.

On the one hand, the barrier resulting from natural obstacles acts like a filter that bars the introduction of opportunistic innovations, and on the other hand geographical proximity would make contact with progress feasible. In other words situation acts as an immune system which secures the better health of microstates.

Under the general notion that microstates are big enough to give solutions to individual problems but too small to influence larger countries, their size tones with the general tendency

of establishing small integrated administrative units, while their situation acts as a safety distance for the creation of model 'social parks'.

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ENVIRONMENTAL AND ECONOMIC DEVELOPMENT SHRINKAGE OF ATENQUIQUE DECLINACIÒN DEL DESARROLLO AMBIENTAL Y ECONÓMICO DE ATENQUIQUE

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Abstract:
This paper focuses on the environmental and economic shrinkage impact it has had the transfer of ownership from state owned Paper Mill Company to a corporate private ownership as an effect of the ongoing economic process of globalization, after the industrial boom of the paper mill during the second half of the last Century. The paper also focuses on how the employees of this Paper Mill Company live and how they have been affected by globalization and how they feel about their paper mill's new corporate owners. The methodology used was descriptive and exploratory. A sample of ten workers at the Company who lived in Atequique was chosen for an interview. The town of Atentique was settled and grew up in terms of population, social and economic development in the same way that the Industrial Company of Atenquique did during the period when the company was property of by the Mexican State. After the Company has been privatized, the town started declining and shrinking in these three variables. The impact on the environmental and economic development has initiated the shrinking and declining of Atenquique but also of the surrounding cities and towns.

Key words: Atenquique, environmental development, economic development. Shrinkage, neoliberal model, globalization.

Resumen
Este trabajo se enfoca en el impacto de la declinación económica y ambiental que ha tenido la transferencia de la propiedad de una compañía papelera propiedad del Estado a una propiedad privada corporativa como un efecto de los procesos económicos de globalización, después de la bonanza industrial de la fábrica de papel durante la segunda mitad del último Siglo. El trabajo también se enfoca en cómo los empleados de esta compañía papelera que viven en un pequeño poblado han sido afectados por la globalización y cómo se sienten acerca de los nuevos dueños corporativos de la compañía papelera. La metodología usada fue descriptiva y exploratoria. Una muestra de diez empleados de la compañía que vivieron en Atenquique fueron seleccionados para una entrevista. El pueblo de Atenquique fue fundado y creció en términos de población, desarrollo económico y social en la misma proporción que lo hizo la Compañía Industrial de Atenquique durante el período que la Compañía fue propiedad del Estado Mexicano. Después de que la Compañía fue privatizada, el pueblo empezó a declinar en población, desarrollo económico y social y lo más desastroso, es el peligro ambiental. El impacto en el desarrollo ambiental y económico ha iniciado la declinación de Atenquique pero también de de las ciudades y pueblos que lo rodean.
Palabras clave: Atenquique, desarrollo ambiental, desarrollo económico, declinación, modelo neoliberal, globalización.

1. Introduction

During the 1990s a period of restructuring in the paper mill companies started in Mexico, a process that has been characterized by large corporate owned companies consolidating to become larger, more vertically integrated, transnational, less diversified, and leaner. These changes and developments were caused because of the long term trends toward economic process of globalization. As the economic processes of globalization continue, its effects on local

communities are uncertain to their residents' perceptions (Brady and Wallace 2000:91). Global competition and capital mobility have changed the incentive of new corporate owners for community concerns (Miller, 2006).

A Mexican-based forest products private company recently purchased the paper mill in a paper mill town, Atenquique, a small community in the Southern region in the State of Jalisco. When the paper mill company was founded it was state owned and had financially supported housing, schools and other community activities for his employees and workers. However the state owned company was sold to a private corporation and after the transfer of ownership, employees had distrust and fear on the new corporate owners. In a similar way, it has been reported already by most of the literature about the effects of globalization focusing on how owned corporations are perceived as they take off state owned companies.

It has been said that in Atenquique the inhabitants used to live like a great family. Family meetings were characterized by the warm environment of friendship, the spirit of solidarity at work and the affinity of aspirations. This unification and fraternity of Atenquique was the contribution and worrying of the Companfa Industrial de Atenquique, a paper mill factory, to provide the township with adequate infrastructure, buildings and installations to promote the living together among the workers and their families. For this reason the Company had restaurants, Movies Theater, casinos and reading rooms. The Company also offered swimming pools, playgrounds for foot ball, basket ball, gym, etc., to foster sports among the population living in Atenquique (Medina Enriquez, 1988).

To develop social relationships among the population the Company supported the formation of clubs with the memberships of workers, employees and their families to participate in contests of speech, poetry, conferences and theater performances. Famous writers, poets and intellectuals attended as well as the performance of music concerts. Employees and workers formed the Mariachi Atenquique who used to perform every Sunday evening in downtown. Dancing schools received support. In sum, Atenquique was conducive to an intense social and cultural life as part of better life quality. It was the time when the economic and environmental development of Atenquique was at the rise.

Compania Industrial de Atenquique was one of the showcases where the emergence of economic institutions structured under the dominant ideological paradigm of the Mexican revolutionary State was concerned for the welfare of employees, workers and all the stakeholders. In fact, the Company was publicly and State owned enterprise, and it was concerned for creating sources of employment and welfare for the post-revolutionary generations of Mexicans living in the Southern region in the State of Jalisco. However, this situation doesn't exist anymore. The economic and environmental development of Atenquique and the surrounding Region of Southern Jalisco is shrinking and the main turning point was the privatization of the Compania Industrial de Atenquique as the result of the undergoing processes of economic globalization.

2. Materials and Methods

The methodology used was descriptive and exploratory. A sample of ten workers at the Company who lived in Atequique was chosen for an interview. The sketch of the interview had five questions:

- (1). since when do you live in Atenquique?
- (2). since when do you work in Atenquique?
- (3). what are the most important changes that you have lived in Atenquique?
- (4). what are the most important labor changes that you have had in your work?
- (5). How these labor changes have positive or negative affected you?

All the chosen people to be interviewed had provided valuable information.

3. Localization of the Village of Atenquique

The village of Atenquique (19°32'N 103°30'W), is located in the South in the State of Jalisco, at the East foot of the Colima peaks, over the middle of the ravine of a precipice at 1030 meters above the sea level. The precipice of Atenquique is 24 kilometers large located in the East bank of the Volcano Nevado of Colima and together with the other precipices The Platanos and Arroyo

Seco, form the Atenquique Basin. The Atenquique basin has a form of long funnel West-East oriented joining the Tuxpan River Atenquique is located 7 mi/11.3 km W of Tuxpan, on Mexico Highway; 54.

The Volcan Colima is a decadent volcano and the most active in Mexico. Currently it is approaching its climactic phase and a major eruption could occur in the next decade. Volcanic debris flows are likely to occur in the two major drainages to the east and west of the volcano, Rio Tuxpan and Rio Armeria respectively. Unfortunately, as a large lumber-producing town, Atenquique is a high risk for moderate to large lahars because it is near the volcano and at the bottom of a deep canyon. At this location the hydraulic radius of the largest model lahars (10^8 m^3) would be about 75 m and that of the intermediate flows (10^7 m^3) would be about 40 m. Atenquique would be inundated and devastated by such mudflows (Sheridan, Michael f., Hubbard, Bernard, and Hooper, Donald, no dated) The largest lahars (10^8 m^3) would have a peak depth of about 60 m and a run out of about 120 m, reaching the sea. The smallest lahars examined (10^5 m^3) would have a peak height of about 7 m and would only reach about 15 km distance. These models should be helpful for a risk planning at Volcan Colima (Paul and Sheridan, no dated.) Atenquique is a lumbering center; soda, wood-pulp mills.

4. Brief history of the town

Atenquique was the site of battle of Atenquique in 1858. Before the construction of the paper company in Atenquique, this village only had 50 inhabitants. The village was created in 1946 as the consequence of installation of a paper mill named Compama Industrial de Atenquique, S.A. (CIDASA) as a strategic point to capture the water the two rivers: Atenquique and Tuxpan, vital for the industry. The Compania Industrial de Atenquique was inaugurated in October, 1946 and became the largest in the Southern Region of Jalisco. Immediately after the establishment of the Company, Atenquique had more than 4, 000. Since then, the labor force comes from the neighboring cities and towns had survived thanks to this employer.

The 16th of October, 1955, an intense storm of 140 mm that lasted 3 days, originated in a sudden manner a series of fluxes of rubble and debris devastated almost the whole Village of Atenquique. On the 16th of October, 1955, a strong current and flooding from the Atenquique Creek caused the death of tens of persons and destroyed the church, a school, business and shops buildings and around 20 homes. The issue was that a slope of high inclination collapsed near the village which was enough to cover some meters the church that today only shows the highest part from the central garden. It also affected the industrial plant and killing 23 persons and some people saved their lives in the campanile of the church. The flooding left desolation and affected the operations of the paper company for 2 Months, railroad and other roads were truncated and the material damages were estimated in 10 thousand million pesos at that time. This catastrophic event obliged to make new plans for Atenquique (Redaction Del Sur, 2005). The inhabitants helped to repair the damages of the Company.

After installation of the paper Company in the locality of Atenquique, which was only a camping spot, the population had duplicated in only 20 years from 1950 to 1970, consolidating itself as a pole of regional attraction. Atenquique grew up until it reached a peak of 291 households with a population of 1,645 in 1990 as it is shown in table 1 that takes account of the larger localities out of 82 in the municipality of Tuxpan.

Table 1. Population for the years 1990 and 1995 in the main localities of the Municipality of Túxpan

Name of localities	Population (Year/inhabi	
	1990	1995
Cabecera Municipal	25,895	26,219
Atenquique	1,645	1,237
La Higuera	1,479	1,410

San Juan Espanatica (El Pueblito)	908	792
Pozo Santo	868	
Platanar		582

Source: INEGI (200O).

For the case of Atenquique, it can be determined that there were 1,645 inhabitants in 1990 while there were only 1,237 in 1995, marking a trend towards a shrinking population. Comparing the population that had Atenquique in 1988 and the Population Atenquique has in 2007, the results are:

Table 2. Population of Atenquique

Year	Population attending	Total population
1988	750	3700
2007	139	310
	-611	-3390

Source: Own estimations after counting and taking a census.

5. The History of the Company

Although the area of the Nevado de Colima was declared "protected zone" in 1934 and considered national park in the times of President Lazaro Cardenas, the decree was modified two years later in 1936 to give opportunity to the company in Atenquique to exploit the forest. The 3rd of August of 1936, by decree was created the National Park El Nevado after the visibility of strong interests for the forestry wealth existing in the area.

The lad reform implemented in Mexico during the 30s and 40s gave shares of communal land (Ejido) to poor peasants (ejidatarios) of expropriated land from large states' private owners, generally called haciendas. In order to exploit their land, the ejidatarios cleared the forest and leveled the ground through irrational felling of large forest surfaces.

The large owners of property organize in the enterprise Union Forestal de Jalisco y Colima in 1940 to maintain control of forest resources and protect from possible risks. Union Forestal de Jalisco y Colima was formed the 14 of September, 1940 with the association of the larger landowners of the Southern Jalisco which controlled the forests not only of the Volcanoes of Colima but also the Mountains of Sierra del Tigre, El Halo y la Leona.

The 26 of November 1940 the decree was modified again and on the 7 of September of 1941, the Compania Industrial de Atenquique, S.A. (CIDASA) was founded to take advantage of forest resources in the Southern Jalisco. The decree established the concession for forest exploitation in the Southern Jalisco for 50 years in favor of CIDASA for the elaboration of chemical celluloses, mechanical past, paper, synthetic fibers and diverse plastic materials.

The paper company in Atenquique was created by local investors and promoted by a German military. The Mexican federal government granted one million eighty thousand hectares in a free concession for a free exploitation during 50 years. This extension represents 1.7 of the forests in all the Mexican territory.

The Industrial Company of Atenquique, was a state owned paper mill enterprise. Since the beginning, the Company had been befitted by fiscal incentives. The Company diversified its productive activities in a conglomerate integrated by the lumber exploitation cellulose extraction, and packing manufacturing.

The 22nd of March, 1945, an industrial forest exploitation unit was created in favor of CIDASA with a concession for exploitation of timber on a surface of 225,000 acres. This area was distributed in 17 municipalities in the Southern region of Jalisco, with an annual production

varying between 60 and 70 percent of the global production of the State. The 27 of March, in 1945 the Industrial Unit of Forest Exploitation (Unidad Industrial de Explotacion Forestal or UIEF) was created by decree to consolidate control of forests adopting a legal regime. In 1945 it is created the Direccion Tecnica Forestal (Technical Forestry Direction) with employers paid by CIDASA, thus, as the organization in charge of technical surveillance of exploitation is on the payroll of whom take advantage of the forests. Between 1946 and 1948, the first forest inventory named General Project of Ordination was carried out.

Figure 1. Partial view of Atenquique

Source: Jose Vargas

There was a world crisis of paper in 1954 that benefited the expansion of CIDASA. Because of that the forest exploitation was consolidated as the main economic activity given the potential and magnitude. In 1963 and 64 the CIDASA plant was modernized and amplified. Between 1964 and 1968 took place the second forestry inventory. As an immediately consequence if these agreements, the exploitation of the forest resources was accelerated. By 1969 the modernization of the plant was already consolidated incorporating new techniques and processes.

On 1971, CIDASA became a parastatal enterprise due to financial problems. In 1972, another decree widen the uses of the exploited lumber by the UIEFA (Unidad Industrial de Explotacion Forestal de Atequinque). At the beginning, it was allowed the use for the elaboration of cellulose, cardboard and paper. Later, it would be used for wood, triplay and other products. Later, a manufacturing plant of triplay was installed although the oyameles were scarce after a fierce exploitation.

Relationships between inhabitants of neighboring municipalities, more specifically between the cities of Tuxpan and Cd. Guzman were considered familiar communion because the company was "the heritage of our fathers". General wages were at the rank between 150 and 160 pesos (15-16 US Dollars) per day, although some workers earned more than 300 pesos (30 US Dollars) justified by the high productivity and personal qualifications.

GIDUSA was founded in 1980 and has been the only one producer that integrates vertically the whole productive process of cardboard and packing from the lumber exploitation, cellulose, manufactured paper and products. After the Mexican economic and financial crisis of 1982, the economic policy addressed the problem gradually dismantling the State, selling and privatizing public enterprises, merging, transferring, canceling and settling down major companies and taking out from the parastatal sector minor companies. After the end of the exclusive concession to Atenquique in 1990, the Company was sold to the Durango Group.

Under the ongoing structural reforms and privatization programs, the Industrial Company of Atenquique, a conglomerate producing paper most important of Latin America, was sold to the is the Grupo Industrial Durango. The firm provided 65 percent of packing of cardboard utilized by the Mexican export sector, 80 percent of Mexican packing utilized by the maquila (in bound industry) sector and 40 per cent of the packing consumed in the country. In 1987, the

government sold the conglomerate to the Grupo Industrial Durango, S.A. de C.V. (GIDUSA) that belongs to the family Rincon Arredondo.

The company was an economic empire in the Southern Region of Jalisco because it used resources conceded by decree that belonged to ejidatarios (Holders of one right to exploit a plot of land) and small property owners. GIDUSA is the major lumber Company and the major manufacturing of brown papers and packing of cardboard in Latin America. It also owns 26 manufacturing plants in Mexico and 5 more in United States. Nowadays, the Industrial Company of Atenquique is one of the subsidiaries of Grupo Industrial Durango.

Also, Grupo Durango owns Productora e Importadora de Papel (PIPSA), that controls 90 percent of the newspaper paper in the national market. In 1998, Bancomext gave 80 million US Dollars to GIDUSA in order to pay its debts to the banks after shopping PIPSA. The federal government remitted their debts for the acquisition of PIPSA, although it was sold off at half its value (Proceso, 1999).

The problem initiated the third week of April, when 97 workers out of 650 were fired because their contract was rescinded without any reason and later another 30 workers more. The 21st of April, after the Company stopped production due to maintenance, it declared that it was not competitive. Since that moment, the workers strike outside the facilities of the Company waiting a solution for the conflict.

The firm shut down operations the 26 of April, 2001 firing employees and workers. The company of paper Kraft closed due to the increase of production costs, and more specifically the labor costs. After half a Century of operating, the Industrial Company of Atenquique closed the doors. It transcended that the Company had taken out equipment of the plant, which in turn had motivated protests of employees.

Under the argument that the Company was operating with high costs, the plan was shut down and 900 employees were fired. It was quite difficult to think that an Industrial Group like this had economic difficulties. Actually, the main reason to close Atenquique was its high cost of manpower (Milenio, 2001).

There were two different versions of the company closing: The workers were striking that the ambition of shareholders and managers from the Grupo Durango was the main cause. The Union strategy was to avoid the definitive closing down of the plant.

The second version argues that a weakness was the traditional collective contract of labor signed 55 years ago with an addendum of benevolent clauses that benefited the employees and workers as the result of negotiations between the labor union in one side and in the other, the representatives of the State and the Company. However, it was argued that higher labor costs were the result of the lack of flexibility to change culture labor. The owners argued that in Atenquique exists the oldest and less competitive labor contract in the national paper mill industry. The firm declared that the collective labor contract includes clauses, terms and benefits difficult to understand (Milenio, 200l) in an economy of high competitiveness and open borders to imports, argued.

The company argued was the lack of profitability due to higher labor costs. Therefore the origin of the conflict was to eliminate the collective contract and to hire personnel under a new scheme of labor conditions designed to lower the labor costs. However, the Company accepted that the main problem was the age of workers, who were older than 35 years old. The threat was to locate the plant to a place where the Company could achieve higher profitability. The message was clear: to suspend the labor contracts that threatened the principles of productive efficiency. The closing of Atenquique meant that labor rights achieved in half a Century can be nullified by management and fired 650 union workers, 120 employees of trust and 130 eventual workers.

The collective contract set a daily production limit of 240 tons of paper while at the moment before of the strike the production was more of 350 tons.

During the visit of the Governor of the State of Jalisco to Tamazula de Gordiano, a neighboring city to Atenquique, Guillermo Legarret Gonzalez, and General Secretary of the National Union of Paper industries exposed this situation of the workers at GIDUSA. The Governor dialogued with the workers of the firm and offered support to solve the conflict

(Comunicacion Social (2001). During the labor conflict, the Municipal President of Tuxpan, Tranqilino Rua Laureano, affirmed that the workers had his moral support to find out the way out of the conflict.

On May 16, 2001, The State Congressman Ramon Leon Morales submitted an agreement point to the Permanent Commission of the Congress which was turned to the Social Welfare and Labor Commission. The mandate of this point of agreement was to find a solution to maintain the source of labor and respect the labor and contractual rights of employees and workers.

However, after several meetings between the managers and the employers to settle down the amount to be paid to fired workers as liquidation, they did not reach any agreement After the paper plant closed and fired all the workers and employers, it was announced that the Economic Promotion Secretary of the Jalisco State Government would sustain the economic reactivation programs to create employment in the Southern Jalisco after the closing of the GIDUSA plant.

In meetings between the Secretary of Labor, leaders of the Union, and representatives of the Village of Atenquique, the Company accepted to pay maintenance of primary services that enjoyed the population and were given by the Company. They also agreed to review the collective labor contract to settle benefits to workers in order reduce the costs of paper production. Also, the Company agreed to sign a new contract hiring all the employees. The Company and workers accepted the commitment, although the Company decided not to accept it. The Secretary of Labor had to intervene to reach the agreement after the workers had to agree on receiving only part of the benefits as part of the deal to settle the labor collective contract.

The labor conflict in the paper plant GIDUSA was part of the strategy of the Company to overcome the labor collective contract to reduce labor costs. All the workers and employers were fired ending the labor collective contract that had been enforced for 55 years, with an estimated cost of 160 million pesos. Once settled this collective labor relation, Atenquique could open the plant without the heavy burden of the payment of labor benefits.

On the 3rd of September, 2001, GIDUSA declared it was ready to open again (El Financiero, 2001) investing 50 millions of dollars (Rodriguez, 2001). The Company was named Compama Papelera de Atenquique S.A. de C.V. The new company began operations in September 2001 with around 50 percent of the labor force. Since then the management of the firm has been requesting new attitudes toward the multifunctional job assignments, supported by programs of training and productivity. Overall, salaries are lower than before. Starting on February 2007, the firm changes again its name to ATENSA, S.A. de C.V., Empaques de Carton Titan, S.A. de C.V.

6. Results and discussion

Data from the individuals that live in Atenquique and work at the Company, 90% began living and working before the crisis. Regarding the question what are the most important changes? The interviewed who had lived in Atenquique, it is quite interesting to find that 100 percent reported that these changes are related to facts of the Company's cycle life, such as change of ownership in 1987 when it was privatized and sold to the Grupo Durango. The oldest interviewed commented that they started working in the Company or in other companies clustered such as Unión Forestal de Jalisco y Colima, Aserraderos Tècnicos, etc.

Another important change commented was the closure of the Section XI of the Union Workers in the year 2001, when most of the workers were fired. In order to cancel the workers Union, the Company closed operations and declared bankruptcy. Only part of the union workers were hired under contract, just to find that after the end of this contract were transferred to other clustered company with the same terms and conditions of a new contract.

Answers to question 4: What are the most important changes that have had in their work? Implied explicitly the time when the interviewed began to work for the Company and the required competencies to for a good performance and higher productivity at work. Other answers reported as the most important changes from the employees and workers who lived in

Atenquique were the adjustment and adaptation to the work, job promotions in the company, changes in the information and data systems, personnel reduction and new hires.

It is interesting to find that all the interviewed agreed that the turning point was marked on September 2001 when after the crisis, the Union was eliminated and the new named company began operations again hiring workers without experience and without fringe benefits and job requirements. The pressures were higher on efficiency, productivity, with less resources and new challenges. The employers kept the same wages while the workers have lower salaries and fewer fringe benefits than when the company was owned by the Mexican State.

They also agreed that there's been more pressure and the labor environment and labor climate are tenser and stressful in contrast to the times when the company was owned by the Mexican State. Employees and workers had a more relaxed environment, less pressure on assignments and more personnel assigned to perform the same duties. Now under the new management the stress increases when the employees and workers are required to take care of resources and some fringe benefits such as tires for cars, gas bonuses, profit sharing, etc., have disappeared.

One of the interviewed captures the situation stating that during that time supervision was difficult because the operative personnel with Union membership were lazy, negligent When the new Company started in September 2001, after the declared bankruptcy and crisis of the former Company, all the personnel with union membership were fired, some of them were hired but most of the personnel were new hires.

The responses to the last question. How the labor changes have positive or negative affected? Answers can be also analyzed in terms of their personal job experiences at the company, more participation of workers, earning more money, more labor options, learning more, and the opportunity to have a job. Most of them declared that the labor changes at the company have favored them because they have received more training. One of the respondents concluded that he has been more motivated by all the events caused by the globalization changes, commercial treaties, and unemployment have caused that people value more the sources of jobs and the struggles for the company to survive in the Southern Region of Jalisco.

Other interviewed reported that labor changes have benefited him because he has achieved promotions in rank and salaries. Furthermore, other interviewed declared that although the labor changes are more stressful and with more pressure, he perceived that the changes have been positive. He also argued that because of the devaluation of the acquisitive power of wages, he needs to achieve the goals to keep the job. In general terms the employed people at the Company perceived that since they started to work and until now, they have improved, attitude and productivity of personnel is positive. Personnel have squired more abilities and became multifunctional: a mechanic now knows welding, painting, etc. Before, he worked always with a partner, and now he works by himself.

Among the negative impacts of the labor changes at the company reported by all the interviewed persons, are that they work under more pressure, more time than the ordinary labor day of eight hours, without receiving overtime payment or negotiation of worked hours in exchange of more flexible time when required for personal problems such as health attention, etc. Other effects are the lower salaries and less employees and workers. An interviewed declared as the negative effect the job pressure and stress when achieving productivity goals, better results with less costs.

Another negative aspect reported by an interviewed was that labor environment is heavy and stressful. The managers of the company are obliged to have profits alongside pressing and obliging personnel to get better performance. He states that "it has been managed psychologically to make us believe that we are the owners of progress and we are responsible of good results". It is a scaling upwards objective, always improving productivity.

A. Economic impact

The once considered the "economic motor of Southern Jalisco for more than 55 years, closed the doors. The labor conflict was a social and economic conflict not only in the region of South of Jalisco, but also at the level of the State of Jalisco. Not only had the labor conflict an economic impact, but also it had an affective implication. 95% of the workers of the Company

in Atenquique were from Túxpan, a municipality that had 33 thousand inhabitants. The main economic activity of Tùxpan is the agriculture of sugar cane and vegetables.

From March 1995 to December 2000, investments in the Southern region of Jalisco added 55 millions of US Dollars, which represents .98 per cent of the total in the State of Jalisco (Secretaría de Promoción Económica del Gobierno del Estado de Jalisco, 1995-2001).

The company provided more than 1,000 direct employments and more than 4, 000 indirect employments which had an economic impact not only in Atenquique but the neighboring cities of Túxpan and Cd. Guzmàn and the towns of Zapotiltic and Tecalitlàn. It was calculated that the economic spill over was around 150 pesos daily per employee as an average which amounts to a total of 750 thousand pesos per day or 22'800,000 per month. 650 workers plus 300 employees were affected by not earning its salaries with an impact on the living standards of 4, 750 inhabitants. It was estimated that 4 out of 10 families of the municipality of Túxpan depend on the Atenquique worker's income. More than 600 families were directly damaged in their income. The immediate impact on local economy of Túxpan was the falling down 60% of sales and consequently less than this percentage, although it was not estimated, on the falling down of sales in the regional market of Cd. Guzman.

A study of the State Legislatura concluded that in the multiplication effects of the salaries spill over were estimated around 800,000 pesos per month only in the municipality of Túxpan, but they should be considered as an impact on Mazamitla, Tecalitlán, Tamazula de Gordiano, Tolimán, Zapotiltic, Zapotlàn el Grande and other locations in the State of Colima, limiting consumption and eroding the living conditions.

The economic effects of the labor conflict were visible at the Tianguis (the street market) on Sunday, where fewer customers than before had gone to buy. The earned wages as the direct economic sustainability of families and also indirectly were dependent of the labor conflict. For example, as a consequence of the labor conflict, it was estimated a reduction of around 40 percent in income of restaurants.

Seniority average of workers and employers was around 20 years of service who had a legitimate aspiration to achieve pension. Most of these workers had not any other opportunity to be employed or to start their own business because of the backward economic development of the region. For this condition the region has been fiscal favored.

The social impact in the analysis of the State Legislature implied that the closing of the Company could origin familiar disintegration, health, nutrition, education, migration and criminal problems. The Economic Promotion Secretary announced that they have a diagnostic to find solutions and economic alternatives to the problems derived of firing the workers.

The municipal President of Túxpan suggested that some corrective measures were taken in order to attract more investments to the municipality just to avoid being highly dependent on one Company. Korean entrepreneurs involved in the metal mechanics industry pretended to establish a plant in the municipality of Túxpan. It was viewed as an alternative to create employment, but unfortunately, the negotiations were wrong. In Fact, the municipal President Rúa Laureano had bet to the Korean investment which should have generated 3,000 employments in the short term and 10,000 in the long term, although women were the employed. This plant could interrupt the trend toward migration of young generation that leaves behind towns without young men.

B. Environmental impact

Starting the second half of the past Century, the environmental degradation on the area has been significant and reached alarming dimensions when it surpassed the natural capacity of natural regeneration of forest communities. The most serious problem of the Southern Region of Jalisco has been the irrational deforestation which started since the beginning of the CIDASA today GIDUSA. The Federal Government also modified the limits to shrinking the protected area, from 2,300 meters above the sea level to 3,000. Besides the limits never were well defined which always had confused.

Thus, the Company took advantage of the National Park and ruined brutally the forest resources of the Nevado of Colima`s area. When the Company started to exploit the forest, it

had the capacity to transform around 200 thousand cubic meters of lumber per year, which represented an enormous quantity of felling trees.

The abundant ecological resource supply without almost any restrictions motivated that the Company over exploited annually more than 230 thousand cubic meters of lumber, above the sustainable capacity of regeneration of forests. In this way, Atenquique raised its production to more than one million of cubic meters of lumber, more than five times the capacity of regeneration of the forest. This caused an ecological debacle of the forest.

The results after 50 years of forest exploitation are the secondary vegetation and deforested areas utilized for agriculture and cattle, infrastructure and commercial exploitation. The company sub utilized the forest resources not having any planning of byproducts derived from lumber. The Company exploited the pine for manufacturing paper and the holm oak for the furniture industry, but never exploited hundred of tons of shaving that were spoiled. Besides, the interests have been of others to the local communities from have taken advantage. There is not other form of getting away that to maintain a client relationship with the lumber industry that manages the forest.

Many owners of forest decided to exploit on their own the resources springing up and proliferating sawmills around Cd. Guzman, where more than 25 are operating and exploiting with no reason the forests, argues García de Alba, (2004). This irrational exploitation of forests is the cause that hills collide originating in a sudden manner the fluxes of rubble and debris. After the natural forest disappears, the roots of the trees can not retain and compact the ground. Because the high slope of the hills, the water erodes the ground and cause the removing of materials.

Several systems of forest management had been implemented according to the needs, such as the Mexican Method of organizing irregular forests (Método Mexicano de Ordenación de Bosques Irregulares or MMOBI), Forestry Development Method (Método de Desarrollo Silvícola or MDS), Jalisco Coastal Plan (Plan Costa de Jalisco), Integral Management Plan for the Region of Atenquique (Plan de Manejo Integral para la Región de Atenquique or PMIFRA), Forestry Conservation and Development (Sistema de Conservación y de Desarrollo Silvícola, or SICODESI), Integral Management System (Sistema de Manejo Integral or SIMANIN).

However, the results of implementing these plans are not positive.

After the earthquake of Armería in 21 January 2003; the geomorphology dynamics of the Atenquique basin has been accelerated. This dynamics can generate flows of detritus in the short term as it had occurred in October 1995 that had destroyed a great part of Atenquique. It is necessary to incorporate in the urban development plans the risks by flows of detritus in the locality of Atenquique. Natural phenomena, such as the crawling of hills and solifuction when de materials suddenly and fast split apart as flood, cause these natural disasters.

The other area of high landslide concentration was along a 6-km stretch of the Barranca de Atenquique, a deep, steep-sided canyon cut into the eastern flank of Nevado de Colima. On the south flank of Volcàn de Fuego and along several smaller canyons south of the Barranca de Atenquique, moderate landslide concentrations evidently involved similar materials to those along the Barranca de Atenquique.

GIDUSA spill over the sewage on the river Túxpan polluting the running waters pitting at risk any forms of living.

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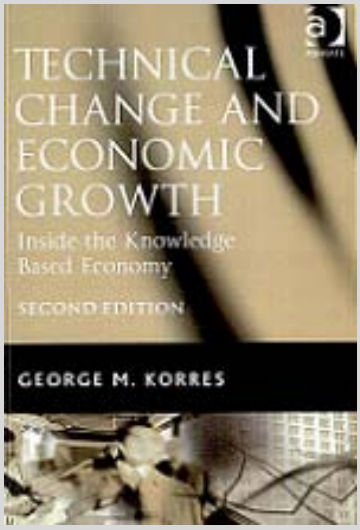
Book Review Essay



Technical Change and Economic Growth: Inside to the Knowledge Based Economy

George M. Korres, **University of the Aegean, Greece, and University of Leeds, UK.**
Avebury-Ashgate publishing, London, 12/2008, pages 392, Hardback, ISBN-13: 978-1-84014-992-0.

The growing importance of technological change in world production and employment is one of the characteristics of the last four decades. This book performs such an empirical analysis. It uses the unique example of the E.U. to analyze whether convergence or divergence occurred within the E.U. The book argues that regional economic development ultimately depends on technical change, social and human capital and civic entrepreneurship, among others. If so, technology, in all its facets, will be the crucial ingredient in regional improvement, in contrast with the usual regional pleas for better infrastructure, health care and banking facilities.

The book is intended to provide a basic understanding of the current issues and the problems of knowledge economy, technical change, innovation activities; it will also examine many aspects and consequences of regional integration that are obscure or yet to be explored. The book consists of five main chapters. Chapter I is devoted to definitions and measurement of innovation activities and knowledge economy. Chapter II investigates the neoclassical growth theory and models of innovation activities and the knowledge based economy. This Chapter attempts to analyse and model the new economy, within the framework of knowledge and innovation activities; It also attempts to estimate socio-economic effects of technical change, using both a theoretical and an empirical approach. Chapter III deals with the main issues of technical change, knowledge economy and productivity growth. This Chapter attempts to identify the R&D activities and also to investigate the estimation-methods, the techniques of scientific and technological activities and the measurement problems for productivity growth. Chapter IV investigates the role of FDIs (Foreign Direct Investments) in the context of national systems of innovation. Finally, Chapter V deals with the challenges and the institutional matters for the European policy-makers encounter and the effects on regional growth and economic integration, including technology policy, other related policies, the distribution of E.U. funds, regional development and productivity issues.

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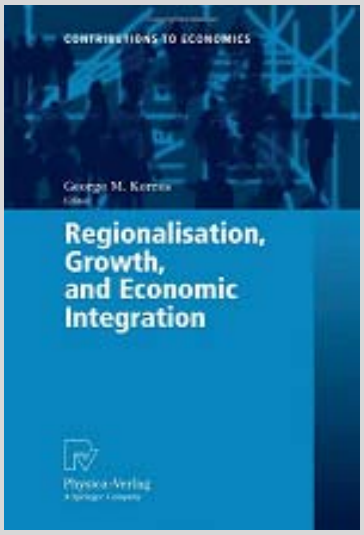

Regionalization, Growth and Economic Integration, Contribution to Economics

George M. Korres, **University of the Aegean, Greece, and University of Leeds, UK.**
Springer Press, Germany, 2007, XX, pages 308, 40 illus., Softcover, ISBN: 978-3-7908-1924-3.

The book is intended to provide a basic understanding of the current issues and the problems of economic integration and it examines many aspects and consequences of this integration that are obscure or as yet unexplored. After addressing general issues in the field of economic integration, the discussion turns to empirical and theoretical aspects of monetary union, social policy reform and social union, public finance and technology policy. In particular, with its wide range of topics, methodologies and perspectives, the book offers stimulating and wide-ranging analyses that will be of interest to students, economic theorists, empirical social scientists, policy makers and the informed general reader. The volume comprises four parts. Part I is devoted to macroeconomic issues and the problems of economic integration. The chapters in this part contain theoretical and empirical analyses of economic integration, the European Union and the monetary system. Part II investigates the microeconomic implications of economic integration with regard to manufacturing, foreign direct investment, unemployment and growth. Part III deals with institutional matters and the policies of integration, including technology policy, the distribution of E.U. funds, regional development and productivity issues. Finally, Part IV discusses the challenges for an integrated Europe, with emphasis on social policy, the welfare state, political reforms and privatisation.

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