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REGIONAL ANALYSIS OF STANDARDS OF LIVING AND INEQUALITIES IN GREECE AND THE ALLOCATION OF EU FUNDING

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Abstract

Regional indices get special attention because of their all inclusive nature which focuses on variables that are able to describe a region and indicate the level of its development. An analysis of consumer's decision making indicates that the weights used for the regional variables considered and included in the index should not vary across regions. Given this, a regional index is computed for the 10 major regions of Greece assuming that all variables incorporated in it are equally weighted. The values of all variables considered are scaled from 0 - 100, so that the index is independent of units of measurement. According to the adapted regional index, the Athens Region is on the top of the ranking followed by Crete, Macedonia, Thessalia, Aegean Islands, Thrace, Peloponnisos, Sterea Ellada and Evia, Ionian Islands, and Epirus. A comparison of the regional indices with the per capita European Union funding indicates that the allocation of funds supports the integration process within Greece. Finally, an analysis of the actual versus the planned spending of the European Union funding indicates the low project management capabilities of the local (regional) administration in all cases.

Keywords: standards of living, inequalities, European Union funding

JEL Classification: R50

Introduction

Regional indices of almost any sort attract attention. The contention is that the well being of economic agents (in terms of either utility or profit) depends on various factors of our external environment such as infrastructure, transportation systems, climate, environmental quality, crime, public services, as well as more traditional pecuniary factors such as the prices of inputs and outputs, the cost of living, the technology that is available and its cost, the conditions of the business environment etc. These are all important location factors.

One consequence of the information technology revolution is the rapid increase in the volume and availability of data on the social, economic, and physical environments. Economic agents must attempt to make sense of these data to make the best possible decisions. Unfortunately, the rate at which usable information is produced from these data is increasing slowly. There is a lot of data but not enough information. A common way of avoiding being swamped by data is by using indicators as a tool to produce information. Ott (1978) describes indicators in the following way:

«Ideally, an index or an indicator is a mean devised to reduce a large quantity of data down to its simplest form, retaining essential meaning for the questions that are being asked of the data. In short, an index is designed to simplify. In the process of simplification, of course, some information is lost. Hopefully, if the index is designed properly, the lost information will not seriously destort the answer to the question».

Certainly, no indicator is perfect and the price to pay for extracting information from the available data is a probable distortion of that data. In order indices to be a useful tool, they must be designed with care so that they minimise information distortion and are best able to answer the questions that the economic agents and the researchers seek to answer.

Our societies express today in various ways their need to improve their knowledge and information about all aspects of our natural and non-natural environments, that eventually determine the possibilities for a healthy development as well as the across region inequalities. Therefore, it is important to bring reports and statistics to life. Towards this end, the development of regional indices can be extremely useful just as indices of prices and output are widely and successfully used to summarise various aspects of our economies. Justifications for developing an index to represent aspects of a region's environment can be found in Hope and Parker (1990), and Hope et al (1991; 1992).

The locational decisions of economic agents depend on various aspects of their external environment. Within our framework composite indices are assumed to provide the necessary information to economic agents.

A common characteristic of all indices is that they are having the form of a weighted average of a set of variables, see for example, Blomquist et al (1985) and (1988), Giannias (1996). Although the selection of regional indicators is best achieved by scientific and expert consensus, public opinion should be used in setting the weights for such indices, Hope et al (1991). Experts do not necessarily have superior knowledge at the aggregate level, and the major priorities and interests should be socially determined, Gould et al (1988).

The objective of this paper is 1) to develop a composite index which is offered for a comparative evaluation of all (ten) regions of Greece, and 2) to use it to obtain rankings that are offered for a comparison of the regions under consideration. Investigating the meaning of the composite index in terms of microeconomics and analysing the decision making process of consumers indicate that we should use the same set of weights for each region unlike Hope et al (1995); this is shown in the Appendix. Our regional index may be interpreted as a standards of living index or as an index of the relative development of a region since it takes into consideration variables that all together as a set can approximate the overall condition of the external environment of a region (infrastructure, the availability of public services, including health and education, etc).

The aim of integration is attained in real terms if main characteristics of life and development across regions converge. In this paper we want not only to introduce a methodology and specify a way that let us compare life in Greece but also to investigate whether the European Union (EU) funding is directed to the regions of the country that need it more so that the objective of integration is achieved in the longrun.

Computation of regional indices and the allocation EU funding

The regional index specified in the Appendix can be computed to compare the 10 major regions of Greece, namely, the Athens Region, Sterea Ellada and Evia, Peloponnisos, Ionian Island, Epirus, Thessalia, Macedonia, Thrace, Aegean Islands, and Crete. To compute such indices we usually consider a variety of variables. The variables that were available for all regions for 1995 (Source: Epilogi, Annual 1996 issue) and that were eventually considered are the following.

1. Births per capita
2. Cropland per capita
3. Marriages per capita
4. Unemployment
5. GNP per capita
6. Electricity consumption per capita
7. Passenger cars per capita
8. Telephones per capita
9. Number of students in elementary and high school per capita
10. Number of doctors per capita.

All the above variables were scaled from 0-100 and taken into account for computing our regional index for each one of the above specified regions of Greece assuming that all of them are equally weighted. The scaling is such that the value 100 is reserved for the region with the «best» value (the highest or the lower depending on the variable considered) and the 0 for the «worse», while all the other values are lying in the between.

All variables considered give some indication about some aspect(s) of the external environment of a region and as result of it some indication about the standards of living that someone could have in it as well as some indication about the development of the region relevant to that of others. The contention is that, if the value of the index is relatively high, then the condition of the external environment of the region is relatively high, life in it is relatively better, and its development is relatively higher.

The results and a ranking which is based on regional index, RI, values is given in Table 1. To compute the RI value for each region all 10 variables have been accounted for.

TABLE 1

REGION	RI	RI BASED RANKING
Athens Region	74,67	1
Sterea Ellada & Evia	32,11	8
Peloponnisos	33,4	7
Ionian Islands	27,71	9
Epirus	24,1	10
Thessalia	43,05	4
Macedonia	45,67	3
Thrace	34,16	6
Aegean Islands	34,57	5
Crete	52,21	2

SOURCE: EPILOGI 1996

RI: it is the regional index

The RI values of Table 1 also provide a measure of the inequalities across regions. The Athens Region is having an RI value close to 75, while the second (Crete) is having a value that is equal to 52. Four regions (Sterea Ellada and Evia, Peloponnisos, Thrace, and Aegean Islands) are having a value between 30 and 35, two (Ionian Islands and Epirus) between 24 and 28, and two (Thessalia and Macedonia) between 43 and 46.

So, according to the variables considered and our index, we can see that the Athens Region and Crete are quite different than (unequal to) all others, while the rest can be classified in three groups of homogeneous regions. These are the following.

GROUP A: Sterea Ellada and Evia, Peloponnisos, Thrace, and Aegean Islands

GROUP B: Ionian Islands and Epirus

GROUP C: Thessalia and Macedonia.

To investigate further the structure of the inequalities across regions, we compute the coefficient of variation, CV, for each one of the above ten variables we have included in our analysis, where:

$$CV(X_i) = 100\ \{[X_i - m(X_i)]^2/m(X_i)]\}^{1/2}$$

and i = 1, 2, 3, ..., 10. The values of the coefficients obtained are: $CV(X_1) = 85$, $CV(X_2) = 58$, $CV(X_3) = 42$, $CV(X_4) = 60$, $CV(X_5) = 45$, $CV(X_6) = 77$, $CV(X_7) = 99$, $CV(X_8) = 63$, $CV(X_9) = 79$, $CV(X_{10}) = 95$. According to these values, the variables can be grouped in the following way:

1. Passenger cars per capita and Number of doctors per capita with a coefficient of variation value between 95 and 100.
2. Births per capita, Electricity consumption per capita, and Number of students in elementary and high school per capita with a coefficient of variation value between 75 and 85.
3. Cropland per capita, Unemployment, and Telephones per capita with a coefficient of variation value between 55 and 65.
4. Marriages per capita and GNP per capita with a coefficient of variation value between 40 and 45.

The values of the variables that belong to groups 1 and 2 above are rather big while those that belong to groups 3 and 4 are rather moderate. The regional index RI let us conclude about what is «on average» the inegualities across the ten regions of Greece.

The EU funding

The per capita European Union funds that will be allocated to the 10 regions of Greece for the 1994-1999 period from the Community Structural Funds (ΚΠΣ) are given in Table 2.

TABLE 2

REGION	EUF	EUF BASED RANKING	SUM OF RI AND EUF BASED RANKINGS
Athens Region	91,49	10	11
Sterea Ellada & Evia	146,75	8	16
Peloponnisos	120,39	9	16
Ionian Islands	188,05	6	15
Epirus	303,31	3	13
Thessalia	226,70	5	9
Macedonia	147,55	7	10
Thrace	597,71	1	7
Aegean Islands	460,25	2	7
Crete	239,33	4	6

SOURCE: EPILOGI 1996

RI: it is the regional index
EUF: is the European Union per capita funding (ECU per person)

Given that integration is the main concern of the European Union nowadays, we would like to know whether the criterion «the available funding is directed to the regions that need it more» is satisfied. This criterion is justified by reasons of efficiency and possibly fairness. Integration within Greece will be supported if more funding is directed to the regions that need it more and vice-versa.

Table 2 gives a ranking based on the per capita EU funding that each of the Greek regions receives. The above criterion will be met if the sum of the regional index and the per capita based rankings equals N+1 for each region, where N is the number of regions. However, this condition is satisfied only for the Athens Region. If the sum of the two rankings is less than N+1 for a region, this region is receiving relatively more than it deserves. These regions are: Thrace, Peloponnisos, Sterea Ellada and Evia, Ionian Island, Epirus.

On the other hand, if the sum of the two ranking is greater than N+1, this region receives relatively less than it deserves. These regions are: Crete, Macedonia, Thessalia, and Ionian Islands.

The above is a first test which indicates that the allocation of EU funds may not support an integration process in Greece, since some regions seem to receive more funding than what they deserve and some less. To conclude what is the situation overall, we proceeded further in the following way.

Overall, if the available funding and its allocation support the integration process, the regional index (RI) and the European Union per capita funding (EUF) values of each region should be negatively correlated. This correlation has been computed and found to be equal to - 0.3658.

Conclusions

The paper analyses the decision making process of a consumer (see Appendix) and concludes that a regional index should be weighted by a set of weights that is hold constant across regions unlike in Hope et al (1995). This result of our theoretical analysis is subsequently used for a comparison of «life in Greece» and an identification of the existing inequalities so that we are able to see what are the most developed and what are the lagging behind regions of the country. For this comparison, all variables, that were available in the Annual issue of Epilogi (1996), that could be a measure of the inequalities across regions if considered all together, and that were providing information about some aspect of life in the 10 regions of Greece, were used. Of course other variables should be included to incorporate additional information in our analysis but a broader set of data was not available. This and the fact that all variables were equally weighted make us view our results as indicative and preliminary. Although the variables included in our index can give a sufficient description of important characteristics of each region considered, more information is needed before global regional indices are estimated. An extension of this work should focus on assigning proper weights to all variables considered.

The analysis indicates that according to the adapted regional index the Athens Region is on the top of the ranking followed by Crete, Macedonia, Thessalia, Aegean Islands, Thrace, Peloponnisos, Sterea Ellada and Evia, Ionian Islands, and Epirus.

In addition to the above, a comparison of the regional index values with the per capita EU funding indicates that the allocation of funds supports the integration process. Finally, the figures of Table 3 show that the actual versus the planned spending of the EU funding is relatively low in all cases for the 1994-1995 period, which indicates the low project management capabilities of the local (regional) administrations that handle these funds.

The correlation between the actual -planned spending ratio for the 1994-1995 period and the regional index is low and positive (+0.008) indicating that the relatively more developed regions are able to follow better the planned time-schedule of project implementation. At the same conclusion we may arrive by looking at the correlation between the actual - planned spending ratio for the 1994-1995 period and the EU funding per capita, which is slightly negative (-0.0139) indicating that the relative less developed regions (that receive relative more EU funding per capita) should devote more of the available funding to improve the efficiency of their project management. The latter is an implication of the fact that the relatively less developed regions are having to administer larger budgets and are not (possibly) having yet the administration and control mechanisms needed for this purpose.

TABLE 3

REGION	ACTUAL/PLANNED SPENDING 1994-95
Athens Region	0,65
Sterea Ellada & Evia	0,46
Peloponnisos	0,31
Ionian Islands	1
Epirus	0,72
Thessalia	0,65
Macedonia	0,625
Thrace	0,58
Aegean Islands	0,52
Crete	0,72

APPENDIX

A theoretical framework for index development and interpretation

In the following, we present a framework for an analysis of consumer behaviour concerning their locational and other choices which introduces explicitly a regional index in the analysis. Our framework assumes that consumers within well defined homogeneous regions have identical tastes and skills, are completely mobile within their region, and have chosen locations such that they could not be made better off by relocating. Across regions mobility is not possible either because of high moving costs or institutional and legal barriers.

In our analysis, sites or regions are fully described by a bundle of variables: a_{1i}, a_{2i}, ..., a_{Ni}, where, a_{ki} is the kth variable of the site or region i, k = 1, 2, ..., N, and N is the number of variables. A consumer sees and perceives in his own way the variables of a region or site. These specify the regional index value that he assigns to them, RI, which includes all aspects of natural and non-natural external environment of a region. Consumers do not assign the same regional index value to identical bundles of site specific variables. To be more specific, the regional index, RI, is assumed to be a scalar, and the regional index, RI_{ji}, that consumer j assigns to a bundle of attributes a_{1i}, a_{2i}, ..., a_{Ni} is:

$$RI_{ji} = f_j(a_{1i}, a_{2i}, ..., a_{Ni})$$

The infrastructure of a region, the availability of public services, etc are assumed to be approximated and be described by the Regional Index (RI) and affect consumer preferences which are assumed to be described by a utility function.

The consumers of a region are assumed to have identical tastes. Let the utility function of a consumer of region j be: $U_j(.)$. Individuals are assumed to consume the numeraire good, X, which is a composite good with a price that is equal to one. A consumer supplies one unit of labour and receives his income, I, in return. His income is assumed to be a function of the regional index of the region, for example, for a consumer of region j: $I_j = I_j(RI_{jj})$, and is spent on housing and the numeraire good. The rental price of a house in region j is a function of the vector of housing characteristics, h, and the regional index, that is, the rental price of a house is specified by a function of the following form: $P_j = P_j(h,RI_{jj})$. It is assumed that $P_j(h,RI_{jj}) = R_j(RI_{jj})\,h'$, where h' is the transpose of h, and $R_j(.)$ is the vector of implicit prices for each housing characteristic in region j. An equilibrium must be characterised by equal utility for identical consumers within a region.

The consumer's income, $I_j(RI_{jj})$, may depend in equilibrium on the regional index value that the consumer places on the bundle of regional variables that he faces because a high RI value indicates a «better» external environment which has a positive effect on its productivity and, as a result of it, on the income he earns/paid. Moreover, rents, $P_j(h,RI_{jj})$, may depend in equilibrium on characteristics of the region and the value of its regional index. The latter formulation is equivalent to assuming that there may exist price differentiation in the rental housing market since different consumers may assign a different regional index to a region, which implies (or better assumes) that the use a consumer gets from a house depends on how he perceives and appreciates the overall conditions of the external environment of the region he considers (which it has been assumed in our formulation that it is given by «his» regional index value). The above specified relationship among consumer income, rents and regional characteristics is empirically verified in Bellante (1979), Johnson (1983), Eberts and Stone (1986), Blomquist et al (1985) and (1988).

A utility maximising consumer of a region j solves the following optimisation problem:

$$\max U_j(h,X,RI_{jj})$$
$$\text{with respect to } h,X,RI_{jj}$$
$$\text{subject to } I_j(RI_{jj}) = R_j(RI_{jj})\, h' + X$$

where $I_j(.)$ and $P_j(.)$ are the equilibrium income and rental hedonic equations, respectively.

Let RI_{jj}^*, h^*, and X^* be the solutions to the above utility maximisation problem specifying, respectively, the site within the region the consumer will be located, RI_{jj}^*, the kind of house he will live in, h^*, and how much of the numeraire good he will be able to consume, X^*. As a result of it, we have that the income of the consumer will be: $I_j^* = I_j(RI_{jj}^*)$, and that the rent he will pay for his house is: $P_j^* = P_j(h^*,RI_{jj}^*) = R_j^*\, h^{*\prime}$, where $R_j^* = R_j(RI_{jj}^*)$. Equivalently, the problem can be stated in terms of an indirect utility function $V_j(.)$ where,

$$V_j(RI_{jj}^*) = \max U_j(h,X,RI_{jj}^*)$$
$$\text{with respect to } h,X$$
$$\text{subject to } I_j(RI_{jj}^*) = R_j(RI_{jj}^*)\, h' + X$$

Equilibrium for a consumer of a region j requires that his utility is the same at all sites within region j, that is, $V_j(RI_{jj}^*) = v_{jj}$ for all j, where v_{jj} is a constant for all sites in region j. This equilibrium condition implies that individuals in sites with a better regional index pay for it through reductions in real income in the form of higher rent and lower wage income.

The model described above is illustrated in Figure 1. The upward sloping curve in Figure 1, labelled $V_j(RI)$, shows combinations of regional index values and the maximum utility that an individual of region j would enjoy by facing different vectors of variables (a_{1i}, a_{2i}, ..., a_{Ni}). For example, if our representative consumer were in region 1, where its characteristics are (a_{11}, a_{21}, ..., a_{N1}), he would face the regional index value RI_{j1} and utility v_{j1}, if he or she were located in region 2, where its characteristics are (a_{12}, a_{22}, ..., a_{N2}), he would the regional index value RI_{j2} and utility v_{j2}, where v_{ji} is the maximum utility that a consumer of region j can enjoy in all locations of region i in equilibrium, for all j and i, that is, $V_j(RI_{ji}) = v_{ji}$. Figure 2 gives the quality of life - indirect utility curves of three different consumers, that is, for j = 1, 2, 3.

To compare life across regions, we must compare the maximum utility that a consumer can enjoy in the regions under consideration. This can be done by looking at either the v_{jj} values for all j or the v_{ji} values for all regions i and a given j, where $v_{jj} = V_j(RI_{jj})$ and $v_{ji} = V_j(RI_{ji})$. The problem, however, is that the v_{jj} and v_{ji} values are not readily available or easily obtained. Moreover, the series of the v_{jj} values shows the maximum utility that a consumer enjoys in his region (e.g., the Athenian in Athens,, the Cretan in Crete, etc.) and should not be used for comparing life in different regions because the utilities of different consumers cannot be compared. Therefore, only a v_{ji} based ranking is conceptually correct[1].

If for our comparison the v_{ji} values are used for all i and a given j, we compare the maximum utility that the consumer we have chosen, the consumer of a region j, would enjoy in case he were located in region i, for all regions i we want to compare (e.g., if j = Athens, then we compare the maximum utility of an Athenian consumer in Athens, Crete, Peloponnisos, etc.)

It can be seen from Figure 1 that there is a monotonic relationship between v_{ji} and RI_{ji}. This implies that a v_{ji} based ranking and one based on RI_{ji} will be identical, that is, both $RI_{j2} > RI_{j1}$ and $v_{j2} < v_{j1}$ imply that region 2 is preferred to 1, that is, $R(2) < R(1)$, where R(i) is the ranking of region i, i = 1, 2, R(2) = 1, R(1) =2; given that 1) the greater the maximum utility, the higher the position of a region on the relevant ranking (the lower the R(i) value), and 2) the higher the RI value, the higher the position of a region on the relevant ranking (the lower the R(i) value). Therefore, we can obtain a ranking of regions i based on the v_{ji} utility levels and the preferences of a consumer of region j by looking at his regional indices across regions since the two rankings will be identical.

The above implies that we are able to obtain a ranking of regions i based on the v_{ji} utility levels and the utility structure of a consumer of region j if we are able to compute the RI_{ji} values.

To apply the above theory the quality of life can be defined as follows:

$$RI_{ji} = \Sigma_{k=1}^{N} (w_{kj}\, a_{ki})/\Sigma_{k=1}^{N} (w_{kj}) \qquad \text{for } i = 1, 2, 3, ..., m$$

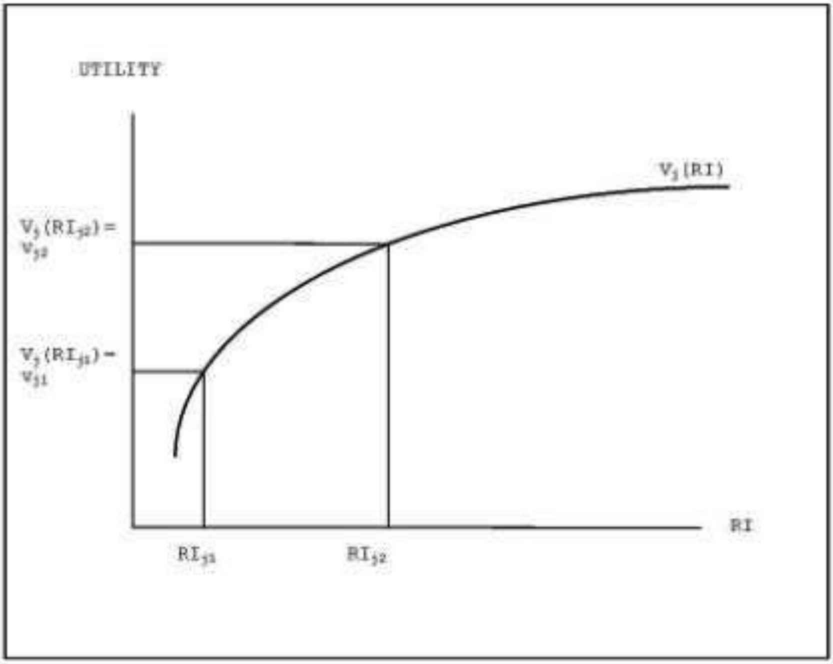
where a_{ki} is the kth variable of region i, w_{kj} is the weight for the variable k of individual j, N is the number of variables considered, and m is the number of regions being examined. The weights w_{kj} are not necessarily the same across regions since individuals may put a different value and perceive in a different way the various regional variables. That is, the regional index of a region i will depends on whose weights are used to compute it; for example, in the above formula the weights of a consumer of region j are used, which implies that RI_{ji} is the regional index value that a consumer of region j would assign to region i in case he moved to it. In general, the weights can take any value. For example, they can be all equal to 1/N or be assigned atheoretically using principal component or survey results.

The above analysis indicates that in order to obtain a ranking of regions based on the maximum utility they are able to offer to their residents, we must look at the regional index values across regions of a particular consumer and take a ranking based on these regional indices since the two rankings will be identical. This requires that for each region we substitute in the above formula the a_{ki} values of the region and compute the regional index value using the same weights w_{kj} of a consumer of region j.

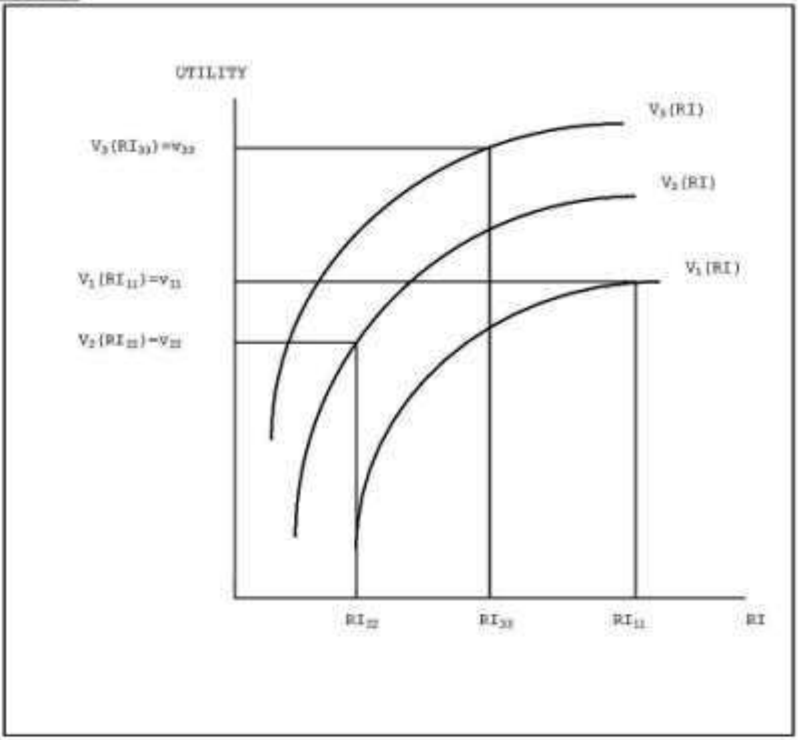
ENDNOTES

1. A ranking based on the v_{jj} values could be obtained if consumer preferences are identical in all regions and if we knew the positions of the V(RI) curves. Suppose now that consumer preferences are identical and that the V(RI) curves are the ones given in Figure 2; note that the curves are not the same because the price of the good X may vary across regions. For example, if the information of Figure 2 were available, we could conclude that region 3 is preferred to 1 and that region 1 is preferred to 2, that is, $R(3) < R(1) < R(2)$ since $v_{33} > v_{11} > v_{22}$, where R(i) is the ranking of region i, i = 1, 2, 3, R(3) = 1, R(1) = 2, R(2) = 3. However, as it can be seen from the example, there is not a monotonic relationship between RI_{jj} and v_{jj}. This implies that a ranking based on RI_{ji}, which is observable, will not necessarily be identical to one based on v_{ji} , which is unobservable, since $RI_{11} > RI_{33} > RI_{22}$ which implies that according to the RI criterion the ranking should be $R(1) < R(3) < R(2)$, where R(1) = 1, R(3) = 2, R(2) = 3.

FIGURE 1



<u>**FIGURE 2**</u>


UTILITY
V3(RI)
V3(RI33)=v33
V2(RI)
V1(RI)
V1(RI11)=v11
V2(RI22)=v22
RI22
RI33
RI11
RI

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