A Correspondence Analysis of Labour Market Institutions

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Abstract

The aim of the paper is to combine the systemic approach to labour market institutions with the analysis of the role played by the organisational forms of the bargaining partners, which favour coordination both inter partes and intra partes, in order to characterise the 19 countries considered. The methodology adopted is based on Multiple Correspondence Analysis and on the use of a device called doubling. The results show a clear-cut distinction between two groups of countries: the former is characterised by the absence of institutional mechanisms of coordination whereas the latter by the presence of the organisational forms. In details, the countries with regulated labour market functioning but without any control of wages at macroeconomic level have the worst long term unemployment performance. The inter partes coordination role of the government entails the choice of a specific trade-off between direct intervention in the bargaining process and fiscal policy. This trade off performs well when it is supported by intra partes coordination devices. The evidence confirms the existence of the institutional equivalence, leading to the conclusion that better unemployment performances go along with specific institutional set-ups.

1. Introduction

The debate on labour market institutions has undergone a significant change since the mid-nineties. In the literature has grown the need for a systemic approach to the role played by institutions and organisations in labour market functioning as only a comprehensive analysis of the complementarities between these factors allows defining labour market institutional systems and an in-depth understanding of their impact on macroeconomic performance. In this respect, Nickell (1997) though investigating the causal links between single institutions and macroeconomic performance, has underlined the complementarity between couples of institutions. Starting from the complexity of exchange relations on this market, it has been possible to overcome the well-known distinction between decentralised and regulated/corporatist markets. The evolution of some corporatist economies has shown the importance of combining the need for guarantees in order to stabilise social consensus, with forms of organisational flexibility, fostering competitiveness in a context of increasing globalisation and market integration. Theoretical models of competitive corporatism (Hartog e Teulings, 1998) or regulated co-operation (Regini, 1997) have been developed. They are based on the principle of interest mediation, achieved through the delegation of policy functions and the participation of all the agents involved in the bargaining process rather than through pure exchange mechanism and the 'pie sharing'. A broad view of these aspects has led to the approach of 'institutional equivalence' (Schmid, 1995), which goes beyond the

stitutional equivalence' (Schmid, 1995), which goes beyond the mere evaluation of the wage bargaining process characterising the traditional distinction between centralisation and decentralisation. It has stressed the importance of policy objectives, collective preferences for the 'pie sharing' and consensual support to institutional decisions.

Interestingly, the role played by intra partes co-ordination - within unions and firm organisations - in the decision making process of wage bargaining has drawn some attention (Soskice, 1990; Hartog e Teulings, 1998; Nickell, 1997). As Flanagan (1999) has noticed, it has been emphasised the link between institutional aspects of the bargaining structure and economic performance, partly neglecting the mediation role of government. As to this aspect, often the objectives of unions and firms can be in contrast with the macroeconomic goals of governments, and the achievement of a socially desirable solution in terms of trade-off between unemployment and inflation can be enhanced by the inter partes co-ordinating role of the government. Such mediation role of the government may be crucial for the compatibility of firms' and unions' choices with macroeconomic goals and collective welfare.

In this framework, the analysis taking into account the complementarity between the systemic approach to labour market institutions and organisation and the one considering the mechanisms of interaction between the agents involved in the bargaining process, discloses the possibility of an in-depth understanding of market functioning and macroeconomic performances.

The interaction between the bargaining agents, in turn, cannot leave out of consideration inter partes and intra partes co-ordination forms with the government playing a mediation role. Thus, the objective of this paper is to verify the possibility of characterising the labour markets of some countries by using the integration of the two approaches described above and by singling out the complementarities both among institutional features of the bargaining systems and between the latter and intra partes/inter partes co-ordination forms. In this respect the data set used concerns the period 1989-1994, which precedes the more recent evolution of some countries like the Dutch Employment Miracle and the diffusion of 'social pacts' in several European countries. This choice has been driven by the need for a theoretical reference

concerning this period, supported by a consolidated debate in literature.

The methodology adopted is the multiple correspondence analysis with the doubling technique (Greenacre, 1993), which has been only recently used in this type of investigation. The paper is articulated as follows: in §2 the data set will be described; §3 contains some methodological issues whereas §4 the analysis of the results; in §5 there are some comments on the results and in §6 final conclusions are drawn.

2. The data set

The data set concerns the period 1989-1994 (**Tab. 1**) and mainly consists of the indicators of labour market rigidities in terms of *labour protection* in the countries considered. They are the following:

1) *Employment protection index,* based on the rigidity of hiring and firing rules. Country classification follows a rank from 1 to 20. The latter represents the case of the most rigid procedure.
2) *Labor Standard index*, representing the rules and norms governing labour conditions (working time, labour protection, the presence of fixed term contracts, minimum wages, employees representation rights). The ranking goes from 0 (absence of legislation or weak regulation) to 10 (strict legislation).

The indicators regarding unemployed protection are:

1) *Benefits replacement rate*: the ratio of unemployment subsidies to income.
2) *Benefits duration*: the duration of unemployment benefits.

Moreover there are the indices corresponding to the degree of co-ordination among unions, on the one hand, and firm organisations on the other:

1) *Union Co-ordination*: co-ordination among unions during wage bargaining. The index ranges from 1 to 3, and increases with the degree of co-ordination.
2) *Employer Co-ordination*: co-ordination among firm organisa-

tions during wage bargaining. The index ranges from 1 to 3, and increases with the degree of co-ordination.

Finally, the indices corresponding to the bargaining structure and the role of the government are:

1) *Centralisation*: the index is ranked from 1 to 3 and rises with the level of centralisation.
2) *Government*: degree of government involvement in the bargaining process.
3) *Union Density*: the ratio of union members to the total of all wage and salary earners.
4) *Bargaining Coverage*: percentage of workers covered by union bargaining.
5) *Active Labour Market Policies*: expenditures aimed at helping unemployed back into work. It is given by the ratio of expenditure per unemployed to GDP per member of the labour force. It includes public spending for training, assistance during job search and for assisting disabled.
6) *Payroll Tax Rate*: is an indicator though unstable, of the incidence of the tax burden on wages. It is given by the ratio of labour costs to wage earned. The greater the index, the greater the gap between labour cost and wage earned depending on the tax burden.
7) *Total Tax Rate*: it includes not average payroll tax rate but also the income and consumption tax rates.

Almost all the indicators are commonly used in the analyses of the role of labour market institutions (Nickell, 1997), whereas the indicator of government involvement in the bargaining process (Golden, Lange e Wallerstein, 1997) has been used by Flanagan (1999).

TAB. 1 – DATA SET 1989 - 1994

	Employed protection		Unemployed protection		Co-ordination		Bargaining Structure			Government Role			
COUNTRIES	**Employment Protection**	**Labour Standards**	**Benefit Replacement rate (%)**	**Benefit Duration (years)**	**Union**	**Employer**	**Centralization**	**Union Density**	**Bargaining Coverage**	**Payroll Tax Rate (%)**	**Total Tax rate (%)**	**Government**	**Active Labour Market Policies**
AuStria	16	6	50	2	3	3	3	46,2	98	22,6	53,7	6	8,3
BElgium	17	5	60	4	2	2	3	51,2	90	21,5	49,8	4	14,6
DEnmark	5	3	90	2,5	3	3	2	71,4	69	0,6	46,3	5	10,3
FInland	10	6	63	2	2	3	3	72	95	25,5	65,9	8	16,4
FRance	14	7	57	3	2	2	2	9,8	93,5	38,8	63,8	3	8,8
GErmany	15	7	63	4	2	3	2	32,9	91	23	53	3	25,7
ITaly	20	8	20	0,5	2	2	2	38,8	82,5	40,2	62,9	3,7	10,3
The **N**etherlands	9	6	70	2	2	2	1	25,5	76	27,5	56,5	6	6,9
NOrway	11	6	65	1,5	3	3	3	56	74,5	17,5	48,6	5	14,7
POrtugal	18	5	65	0,8	2	2	2	31,8	75	14,5	67,6	0	18,8
SPain	19	8	70	3,5	2	1	2	11	77	33,2	54,2	0	4,7
SWeden	13	8	80	1,2	3	3	2	82,5	87,5	37,8	70,7	8	59,3
Swit**Z**erland	6	4	70	1	1	3	2	26,6	51,5	14,5	38,6	3	8,2
UK	7	1	38	4	1	1	2	39,1	47	13,8	40,8	2	6,4
CAnada	3	3	59	1	1	1	1	35,8	37	13	42,7	2	5,9
US	1	1	50	0,5	1	1	1	15,6	18	20,9	43,8	2	3
JApan	8	2	60	0,5	2	2	1	25,4	22	16,5	36,3	4	4,3
AUstralia	4	4	36	4	2	1	3	40,4	80	2,5	28,7	10	3,2
New **Z**ealand	2	4	30	4	1	1	1	44,8	49	0	34,8	10	6,8

Source: OECD, *Job Study* (1994), Part II, Table 6.7, column 5; OECD *Employment Outlook* (1994), Table 4.8, column 6; Nickell (1997); U.S. Department of Health and *Social Service, Social Security Programmes Throughout the World* (1993); OECD, *Employment Outlook*, (1995), Table T. OECD, *Employment Outlook*, (1997), *Golden, Lange e Wallerstein*, (1997).

3. Methodology

The aim of this analysis is to identify a lower - dimensional subspace which explains the latent relations among the variables and to plot the countries (observational units of our analysis) on this subspace. A useful method for this study is the Correspondence Analysis (CA). In fact, the Correspondence Analysis is a multidimensional graphical technique for categorical data, and it has many similarities with the Principal Component Analysis (PCA), which was a reason for the French to label correspondence analysis as *analyse factorielle des correspondences.* The basic idea of these two methods is that the set of variables can be described as a different linear combination of a smaller number of common factors. The aim is to find these latent factors and to reduce the original dimensionality of the set of variables, with the minimum loss of information, and to have an easier global picture of the association or "interaction" among the qualitative variables.

The "leading case" of a data matrix suitable for the correspondence analysis is a two way contingency table which expresses the observed association between two qualitative variables (the rows and the columns of the data matrix). This is the Simply Correspondence Analysis, but the CA could be extended to a more general indicator matrix, where more than two discrete variables have been observed on each observational units (individuals, cases or subjects). The correspondence Analysis of this matrix is called Multiple Correspondence Analysis (MCA).

In this study we have n = 19 observational units, countries, and m = 13 categories or variables indicating different institutional aspects. Besides our original data are reported in the form of rating from 0 (the lowest presence of the variables) to 4 (the highest presence of the variables). In this particular case it is usually justifiable the introduction of the data transformation using the technique known as *doubling* (Greenacre, 1993, Greenacre, 1984)

The idea behind doubling is to allocate two complementary sets of data to each rating scale, one labelled as the "positive" pole of the scale and the other the "negative" pole. In this way we obtain a bipolar or doubled data matrix comprising both the original and the reflected (complementary) forms of the data[i].

In order to introduce correspondence analysis of bipolar data we must firstly say that we can analyse the table of ratings in its original form. One method is to transform the ratings in a dummy 1/0 for each score of the scale. The latter should be considered as a single variable, but by this token we loose the ordinal relation with the other scores of the scale.

Alternatively, we can consider the rating as a nominal variable and apply the traditional MCA to this data matrix. In this case the inherent ordering of the categories is ignored. For example in a 1 - 5 scale if an observational unit (individuals, cases or subjects) scores 1 for all the *m* variables, and another scores 5 for all the *m* variables, the two subjects have the same profiles [1/(*m*×1) ed 5/(*m*×5)] and thus have identical positions in a correspondence map. The average rating of the subjects should only be taken in account in the mass[ii], not in the subject's position and then the subject who has the highest rating should have a higher weight in the total inertia (chi - squared distance or dispersion measure of the variables) computation. For example, Australia and Austria respectively have an original rating of 0 and 3 on the scale of the variable "v1" (**Tab. 2**). In this case the traditional Correspondence Analysis would give a higher weight to Austria than to Australia. This procedure would be right if 3 were a frequency or in other words if the variable "v1" counted 3 times in Austria and 0 times in Australia. But in our matrix we have ratings and we must taking into account the absolute nature of the ratings and it has no sense to attribute a higher weight to Austria than to Australia. Applying the traditional MCA to a data matrix of rating scale, the notions of profile, mass and total inertia have no meaning because we do not have any table of frequencies.

Secondly, much of the success of the analysis is due to the fact that the subjects (countries) represent a fairly complete spectrum of ratings, because the traditional correspondence analysis displays the positions of the individual group relative to the spectrum of groups included in the analysis.

Finally, the analysis should not be invariant to the direction of the rating scale. In fact if each rating is represented by subtracting it from the upper bound (4 in our case) so that 0 corresponds to the highest presence of the variables and 4 to the lowest one, then the traditional MCA completely changes character.

The solution to these problems is to transform the original data, which result in the doubling of the size of the original data matrix. With this transformation, the geometric concepts of profile, mass and total inertia are more justifiable. In fact, in a doubled matrix for each country we have the original rating and its complement, calculated with respect to the highest value of the scale, by this token, each subject (country) and each variable have the same weight. In particular the row sums of this matrix are equal to a constant for any individual group and the column sums of the pair columns of each variable are equal to a constant too[iii].

- The row sum is equal to 52, which is the upper bound (4) multiplied by the number of variables (m = 13), consequently the average column profile or row masses are equal to 5,3% (1/19). The row masses are the weights of the row profiles in the calculation of the Chi - squared distance or inertia of the table[iv] and then the countries have an equal weight in this calculation.
- For the columns one has to consider the pair of columns (positive pole and negative pole) of each variable or category. The sum of the column pairs is equal to 76, that is the upper bound (4) multiplied by the number of countries (n = 19) and the average row profile or column masses are equal to 7,7% (1/13). Thus, each variable receives equal weight in the calculation of inertia and the (origin) centroids of each pair of column points $p+$ (positive pole) $p-$ (negative pole) are all at the origin in the correspondence display[v].

Besides the doubling establishes symmetry between the two poles of the bipolar variables and the correspondence analysis is invariant with respects to the choice of the scale direction. In order to understand this fact, one has to say that the fractional rating P_{iq} (the rating divided by its upper bound) is analogous to the probability of the subject i to be at the positive pole $p+$, and $1-P_{iq}$ is the probability of being at the negative pole $p-$. For example, in the case of Austria the fractional ratings for the variable v1 and its complement W1 respectively are 3/4 e 1/4, then for Austria the probability of being at the positive pole is 75% and 25% at the negative pole of the variable v1. The sum of these probabilities weighted by the relative length of the scale (upper bound of the rating divided by the sum of the upper value of all the variables -

4/52) gives the row average profile or column masses 7,7% (**Tab. 4**) constant for any variable. Then each subject's "response" is treated as a positive mass divided between the two poles, analogous to a pair of probabilities assigned to each pole.

In a doubled matrix, other than the general concept of the traditional MCA, it is necessary to add the concepts of polarisation of the observations and of their average on each variable. We can distinguish two types of polarisations: *individual polarisation* which summarises how near the poles of individual observations lie, for each variable; the *polarisation of the average (or polarity)* which indicates how near the average of each variables lie to the poles. The ratio of the polarisation of the average to individual polarisation is called *relative polarisation.*

The inertia (and then the dispersion) of a specific variable *q* is related to the *relative polarisation,* and the variables contribute with their inertia to explain the total inertia which is a measure of the variability of the data:

1. for a fixed polarisation of the average, the inertia increases when the individual ratings are more polarized. In fact, considering two variables, if the average ratings are equally distant from the poles, the higher contribution to the chi - squared distance derives from the variable with the higher individual polarisation, that is the variable with the individual rating closer to one of the two poles;
2. for a fixed polarisation of individual ratings, the inertia of a variable actually decreases when the average is more polarised. In fact, if individual observations of two variables have the same distance from the poles, the higher contribution to the chi - squared distance derives from the variable with the lower polarisation of the average, that is an average more centred.

Graphically, the positive poles of the variables are depicted with small letters whereas the negative poles with capital letters. These endpoints could be joined by a straight line which passes through the centre (centroid). It is important to consider not only the total length between the opposite poles but also the length both of the positive segment and of the negative one. The ratio of the two segments indicate the polarisation of the average, instead the total length of the segment depends on the variability and the

polarisation of the data average. The total length is proportional to the standard deviation of the fractional ratings (i.e. the ratings divided by their respective upper bound) and the polarisation of the average.

For example, considering two variables, we can have three cases:

a) the ratio of the negative and positive segments of each variables are the same but the total lengths are different; this means that the variables have the same polarisation of the average but the standard deviation is higher for the variables presenting a longer total length;
b) the segment total length of each variables is the same, but the origin divides the length into different length segments, then the relation between standard deviation and polarisation is such that the least polarised set of responses must have the highest standard deviation;
c) if both total lengths and ratios of the subdivisions are different, as is often the case, then there is an interaction between standard deviation and polarisation of the average, giving the total length, which increases both due to increasing standard deviation and to increasing polarisation.

It is important to add that the greater the variance the higher the contribution of the variable to explain the total inertia of the data. Consequently, with the same total length of the segments a greater contribution to the inertia derives from the variables with a lower polarisation of the average (Case b). With the same polarisation of the average a greater contribution to the inertia derives from the variables with a higher total length (case a).

4. Description of the results

In the *"doubled"* matrix (**Tab. 2**) for any of the 19 countries considered each variable (transformed in a scale indicator[vi]) has two values: the former, in small letters, represents the variable on the positive scale (positive pole)whereas the latter in capital letters

is the complement with the former on the negative scale (negative pole).

As one can notice, the row totals of the matrix are equal to a constant (44) obtained by summing up the maximum score of each variable and the mass is given by (1/19)x100 = 5.3%, where 19 is the number of individuals (**Tab. 4**). The sum of the column pairs is equal to 76, that is the upper bound (4) multiplied by the number of countries (n = 19). Thus, the average row profile or column mass is equal to 7,7% (1/13)x100, where 13 is the number of variables (**Tab. 3**).

TAB. 2 – DOUBLED MATRIX

	v1	**W1**	**v2**	**W2**	**v3**	**W3**	**v4**	**W4**	**v5**	**W5**	**v6**	**W6**	**v7**	**W7**	**v8**	**W8**	**v9**	**W9**	**t1**	**T1**	**t2**	**T2**	**t3**	**T3**	**t4**	**T4**	**Total**
AUstralia	0	4	2	2	0	4	4	0	0	4	2	2	3	1	4	0	2	2	0	4	0	4	0	4	4	0	52
Au**S**tria	3	1	3	1	1	3	2	2	1	3	2	2	4	0	4	0	4	0	4	0	3	1	3	1	2	2	52
BElgium	3	1	2	2	2	2	4	0	3	1	3	1	4	0	4	0	2	2	2	2	3	1	1	3	2	2	52
Canada	0	4	1	3	1	3	1	3	0	4	1	3	0	4	0	4	0	4	0	4	1	3	1	3	0	4	52
DEnmark	1	3	1	3	4	0	2	2	1	3	4	0	2	2	2	2	4	0	4	0	0	4	1	3	2	2	52
Finland	2	2	3	1	2	2	2	2	3	1	4	0	4	0	4	0	2	2	4	0	3	1	4	0	4	0	52
France	3	1	3	1	1	3	3	1	1	3	0	4	4	0	2	2	2	2	2	2	4	0	4	0	0	4	52
GErmany	3	1	3	1	2	2	4	0	4	0	1	3	4	0	2	2	2	2	4	0	3	1	3	1	0	4	52
Italy	4	0	4	0	0	4	0	4	1	3	1	3	3	1	2	2	2	2	2	2	4	0	4	0	2	2	52
Japan	1	3	1	3	2	2	0	4	0	4	0	4	0	4	0	4	2	2	2	2	1	3	0	4	2	2	52
NOrway	2	2	3	1	2	2	1	3	3	1	3	1	2	2	4	0	4	0	4	0	1	3	1	3	2	2	52
NZealand	0	4	2	2	0	4	4	0	0	4	2	2	1	3	0	4	0	4	0	4	1	3	0	4	4	0	52
Netherlands	2	2	3	1	3	1	2	2	0	4	0	4	2	2	0	4	2	2	2	2	3	1	3	1	2	2	52
POrtugal	4	0	2	2	2	2	0	4	3	1	1	3	2	2	2	2	2	2	2	2	1	3	4	0	2	2	52
Spain	4	0	4	0	3	1	3	1	0	4	0	4	2	2	2	2	2	2	0	4	4	0	3	1	2	2	52
SWeden	2	2	4	0	4	0	1	3	4	0	4	0	3	1	2	2	4	0	4	0	4	0	4	0	4	0	52
Swit**Z**erland	1	3	2	2	3	1	1	3	1	3	0	4	1	3	2	2	0	4	4	0	1	3	0	4	0	4	52
UK	1	3	0	4	0	4	4	0	0	4	1	3	1	3	2	2	0	4	0	4	1	3	1	3	0	4	52
Usa	0	4	0	4	1	3	0	4	0	4	0	4	0	4	0	4	0	4	0	4	3	1	1	3	0	4	52
Total	36	40	43	33	33	43	38	38	25	51	29	47	42	34	38	38	36	40	40	36	41	35	39	37	34	42	988
		76		76		76		76		76		76		76		76		76		76		76		76		76	

TAB. 3 – ROW PROFILES

	v1	W1	v2	W2	v3	W3	v4	W4	v5	W5	v6	W6	v7	W7	v8	W8	v9	W9	t1	T1	t2	T2	t3	T3	t4	T4	total
AUstralia	0,0%	7,7%	3,3%	4,4%	0,0%	7,7%	7,7%	0,0%	0,0%	7,7%	3,8%	3,8%	5,8%	1,9%	7,7%	0,0%	3,8%	3,8%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	7,7%	0,0%	100%
Au**S**tria	5,8%	1,9%	5,5%	2,2%	1,9%	5,8%	3,8%	3,8%	2,6%	5,1%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	5,1%	2,6%	5,1%	2,6%	3,8%	3,8%	100%
BElgium	5,8%	1,9%	4,4%	3,3%	3,8%	3,8%	7,7%	0,0%	5,1%	2,6%	5,8%	1,9%	7,7%	0,0%	7,7%	0,0%	3,8%	3,8%	3,8%	3,8%	5,1%	2,6%	2,6%	5,1%	3,8%	3,8%	100%
Canada	0,0%	7,7%	2,2%	5,5%	1,9%	5,8%	1,9%	5,8%	0,0%	7,7%	1,9%	5,8%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	2,6%	5,1%	2,6%	5,1%	0,0%	7,7%	100%
DEnmark	1,9%	5,8%	2,2%	5,5%	7,7%	0,0%	3,8%	3,8%	2,6%	5,1%	7,7%	0,0%	3,8%	3,8%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	0,0%	7,7%	2,6%	5,1%	3,8%	3,8%	100%
Finland	3,8%	3,8%	5,5%	2,2%	3,8%	3,8%	3,8%	3,8%	5,1%	2,6%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	3,8%	3,8%	7,7%	0,0%	5,1%	2,6%	7,7%	0,0%	7,7%	0,0%	100%
France	5,8%	1,9%	6,6%	1,1%	1,9%	5,8%	5,8%	1,9%	2,6%	5,1%	0,0%	7,7%	7,7%	0,0%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	0,0%	7,7%	100%
GErmany	5,8%	1,9%	6,6%	1,1%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	1,9%	5,8%	7,7%	0,0%	3,8%	3,8%	3,8%	3,8%	7,7%	0,0%	5,1%	2,6%	5,1%	2,6%	0,0%	7,7%	100%
Italy	7,7%	0,0%	7,7%	0,0%	0,0%	7,7%	0,0%	7,7%	2,6%	5,1%	1,9%	5,8%	5,8%	1,9%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	3,8%	3,8%	100%
Japan	1,9%	5,8%	1,1%	6,6%	3,8%	3,8%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	3,8%	3,8%	3,8%	3,8%	2,6%	5,1%	0,0%	7,7%	3,8%	3,8%	100%
NOrway	3,8%	3,8%	5,5%	2,2%	3,8%	3,8%	1,9%	5,8%	5,1%	2,6%	5,8%	1,9%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	2,6%	5,1%	2,6%	5,1%	3,8%	3,8%	100%
NZealand	0,0%	7,7%	3,3%	4,4%	0,0%	7,7%	7,7%	0,0%	0,0%	7,7%	3,8%	3,8%	1,9%	5,8%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	2,6%	5,1%	0,0%	7,7%	7,7%	0,0%	100%
Netherlands	3,8%	3,8%	5,5%	2,2%	5,8%	1,9%	3,8%	3,8%	0,0%	7,7%	0,0%	7,7%	3,8%	3,8%	0,0%	7,7%	3,8%	3,8%	3,8%	3,8%	5,1%	2,6%	5,1%	2,6%	3,8%	3,8%	100%
POrtugal	7,7%	0,0%	4,4%	3,3%	3,8%	3,8%	0,0%	7,7%	5,1%	2,6%	1,9%	5,8%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	2,6%	5,1%	7,7%	0,0%	3,8%	3,8%	100%
Spain	7,7%	0,0%	7,7%	0,0%	5,8%	1,9%	5,8%	1,9%	0,0%	7,7%	0,0%	7,7%	3,8%	3,8%	3,8%	3,8%	3,8%	3,8%	0,0%	7,7%	7,7%	0,0%	5,1%	2,6%	3,8%	3,8%	100%
SWeden	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	1,9%	5,8%	7,7%	0,0%	7,7%	0,0%	5,8%	1,9%	3,8%	3,8%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	100%
Swit**Z**erland	1,9%	5,8%	3,3%	4,4%	5,8%	1,9%	1,9%	5,8%	2,6%	5,1%	0,0%	7,7%	1,9%	5,8%	3,8%	3,8%	0,0%	7,7%	7,7%	0,0%	2,6%	5,1%	0,0%	7,7%	0,0%	7,7%	100%
UK	1,9%	5,8%	0,0%	7,7%	0,0%	7,7%	7,7%	0,0%	0,0%	7,7%	1,9%	5,8%	1,9%	5,8%	3,8%	3,8%	0,0%	7,7%	0,0%	7,7%	2,6%	5,1%	2,6%	5,1%	0,0%	7,7%	100%
Usa	0,0%	7,7%	0,0%	7,7%	1,9%	5,8%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	0,0%	7,7%	5,1%	2,6%	2,6%	5,1%	0,0%	7,7%	100%
Total	3,6%	4,0%	4,3%	3,4%	3,3%	4,4%	3,8%	3,8%	2,6%	5,1%	2,9%	4,8%	4,3%	3,4%	3,8%	3,8%	3,6%	4,0%	4,0%	3,6%	4,2%	3,5%	3,9%	3,8%	3,4%	4,3%	100%
		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%		7,7%	

TAB. 4 – COLUMN PROFILES

	v1	W1	v2	W2	v3	W3	v4	W4	v5	W5	v6	W6	v7	W7	v8	W8	v9	W9	t1	T1	t2	T2	t3	T3	t4	T4	total
AUstralia	0,0%	10,0%	4,0%	6,9%	0,0%	9,3%	10,5%	0,0%	0,0%	7,9%	6,9%	4,3%	7,1%	2,9%	10,5%	0,0%	5,6%	5,0%	0,0%	11,1%	0,0%	11,5%	0,0%	10,7%	11,8%	0,0%	5,3%
AuStria	8,3%	2,5%	6,7%	3,4%	3,0%	7,0%	5,3%	5,3%	5,3%	5,3%	6,9%	4,3%	9,5%	0,0%	10,5%	0,0%	11,1%	0,0%	10,0%	0,0%	6,5%	3,8%	6,9%	3,6%	5,9%	4,8%	5,3%
BElgium	8,3%	2,5%	5,3%	5,2%	6,1%	4,7%	10,5%	0,0%	10,5%	2,6%	10,3%	2,1%	9,5%	0,0%	10,5%	0,0%	5,6%	5,0%	5,0%	5,6%	6,5%	3,8%	3,4%	7,1%	5,9%	4,8%	5,3%
Canada	0,0%	10,0%	2,7%	8,6%	3,0%	7,0%	2,6%	7,9%	0,0%	7,9%	3,4%	6,4%	0,0%	11,8%	0,0%	10,5%	0,0%	10,0%	0,0%	11,1%	3,2%	7,7%	3,4%	7,1%	0,0%	9,5%	5,3%
DEnmark	2,8%	7,5%	2,7%	8,6%	12,1%	0,0%	5,3%	5,3%	5,3%	5,3%	13,8%	0,0%	4,8%	5,9%	5,3%	5,3%	11,1%	0,0%	10,0%	0,0%	0,0%	11,5%	3,4%	7,1%	5,9%	4,8%	5,3%
Finland	5,6%	5,0%	6,7%	3,4%	6,1%	4,7%	5,3%	5,3%	10,5%	2,6%	13,8%	0,0%	9,5%	0,0%	10,5%	0,0%	5,6%	5,0%	10,0%	0,0%	6,5%	3,8%	10,3%	0,0%	11,8%	0,0%	5,3%
France	8,3%	2,5%	8,0%	1,7%	3,0%	7,0%	7,9%	2,6%	5,3%	5,3%	0,0%	8,5%	9,5%	0,0%	5,3%	5,3%	5,6%	5,0%	5,0%	5,6%	9,7%	0,0%	10,3%	0,0%	0,0%	9,5%	5,3%
GErmany	8,3%	2,5%	8,0%	1,7%	6,1%	4,7%	10,5%	0,0%	15,8%	0,0%	3,4%	6,4%	9,5%	0,0%	5,3%	5,3%	5,6%	5,0%	10,0%	0,0%	6,5%	3,8%	6,9%	3,6%	0,0%	9,5%	5,3%
Italy	11,1%	0,0%	9,3%	0,0%	0,0%	9,3%	0,0%	10,5%	5,3%	5,3%	3,4%	6,4%	7,1%	2,9%	5,3%	5,3%	5,6%	5,0%	5,0%	5,6%	9,7%	0,0%	10,3%	0,0%	5,9%	4,8%	5,3%
Japan	2,8%	7,5%	1,3%	10,3%	6,1%	4,7%	0,0%	10,5%	0,0%	7,9%	0,0%	8,5%	0,0%	11,8%	0,0%	10,5%	5,6%	5,0%	5,0%	5,6%	3,2%	7,7%	0,0%	10,7%	5,9%	4,8%	5,3%
NOrway	5,6%	5,0%	6,7%	3,4%	6,1%	4,7%	2,6%	7,9%	10,5%	2,6%	10,3%	2,1%	4,8%	5,9%	10,5%	0,0%	11,1%	0,0%	10,0%	0,0%	3,2%	7,7%	3,4%	7,1%	5,9%	4,8%	5,3%
NZealand	0,0%	10,0%	4,0%	6,9%	0,0%	9,3%	10,5%	0,0%	0,0%	7,9%	6,9%	4,3%	2,4%	8,8%	0,0%	10,5%	0,0%	10,0%	0,0%	11,1%	3,2%	7,7%	0,0%	10,7%	11,8%	0,0%	5,3%
Netherlands	5,6%	5,0%	6,7%	3,4%	9,1%	2,3%	5,3%	5,3%	0,0%	7,9%	0,0%	8,5%	4,8%	5,9%	0,0%	10,5%	5,6%	5,0%	5,0%	5,6%	6,5%	3,8%	6,9%	3,6%	5,9%	4,8%	5,3%
POrtugal	11,1%	0,0%	5,3%	5,2%	6,1%	4,7%	0,0%	10,5%	10,5%	2,6%	3,4%	6,4%	4,8%	5,9%	5,3%	5,3%	5,6%	5,0%	5,0%	5,6%	3,2%	7,7%	10,3%	0,0%	5,9%	4,8%	5,3%
Spain	11,1%	0,0%	9,3%	0,0%	9,1%	2,3%	7,9%	2,6%	0,0%	7,9%	0,0%	8,5%	4,8%	5,9%	5,3%	5,3%	5,6%	5,0%	0,0%	11,1%	9,7%	0,0%	6,9%	3,6%	5,9%	4,8%	5,3%
SWeden	5,6%	5,0%	9,3%	0,0%	12,1%	0,0%	2,6%	7,9%	15,8%	0,0%	13,8%	0,0%	7,1%	2,9%	5,3%	5,3%	11,1%	0,0%	10,0%	0,0%	9,7%	0,0%	10,3%	0,0%	11,8%	0,0%	5,3%
Swit**Z**erland	2,8%	7,5%	4,0%	6,9%	9,1%	2,3%	2,6%	7,9%	5,3%	5,3%	0,0%	8,5%	2,4%	8,8%	5,3%	5,3%	0,0%	10,0%	10,0%	0,0%	3,2%	7,7%	0,0%	10,7%	0,0%	9,5%	5,3%
UK	2,8%	7,5%	0,0%	12,1%	0,0%	9,3%	10,5%	0,0%	0,0%	7,9%	3,4%	6,4%	2,4%	8,8%	5,3%	5,3%	0,0%	10,0%	0,0%	11,1%	3,2%	7,7%	3,4%	7,1%	0,0%	9,5%	5,3%
Usa	0,0%	10,0%	0,0%	12,1%	3,0%	7,0%	0,0%	10,5%	0,0%	7,9%	0,0%	8,5%	0,0%	11,8%	0,0%	10,5%	0,0%	10,0%	0,0%	11,1%	6,5%	3,8%	3,4%	7,1%	0,0%	9,5%	5,3%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The description of the variables is in the following table:

TAB. 5 – SCALE VARIABLES

Variables	Positive	Negative
EMPLPROT	v1	W1
LSTANDARS	v2	W2
REPLACRATIO	v3	W3
BENDUR	v4	W4
ACTIVELABO	v5	W5
UNIONDENSITY	v6	W6
BARGAINCOVERA	v7	W7
DEGCENTR	v8	W8
DEGCOORD1 (Union)	v9	W9
DEGCOORD2 (Employer)	t1	T1
PAYTAX	t2	T2
TOTTAX	t3	T3
GOVERNANCE	t4	T4
TOTUNEMP	u1	U1
SHORTUNEMP	u2	U2
LONGUNEMP	u3	U3

The last variables (short term, long term and total unemployment) are taken as supplementary variables.

The results are reported in tab. **6a**, **6b**, **6c** e **6d**. The first shows the decomposition of inertia with respect to the principal axes and contains the eigenvalues of the matrix of the inertia (or chi - squared) contribution of the variables. Each axis accounts for a part of the inertia, and this is expressed as a percentage as well as is graphically displayed in the form of a histogram. The first dimension explains 42.13% of total inertia or the correlation between rows and columns. The second one accounts for 17,57% whereas the third dimension for 13,84% (**Tab. 6a**). The threshold value adopted in order to choose the significant dimensions is the ratio 1/Q, where Q is the number of the variables, which is 13 as the other 13 variables are linearly dependent on their complements. The threshold value is 1/13 = 0.076 and following it we consider only the first three dimensions as the fourth one is below this value.

TAB 6a – PRINCIPAL INERTAS AND IERTIA PERCENTAGES

1	0,210721	42,13%	**********
2	0,087892	17,57%	**********
3	0,069227	13,84%	**********
4	0,040432	8,08%	*******
5	0,025002	5,00%	******
6	0,020913	4,18%	****
7	0,012048	2,41%	***
11	0,010388	2,08%	**
13	0,00831	1,66%	**
12	0,006501	1,30%	*
10	0,00383	0,77%	*
9	0,003395	0,68%	*
8	0,001514	0,30%	
14	0	0,00%	
15	0	0,00%	
16	0	0,00%	
17	0	0,00%	
18	0	0,00%	
19	0	0,00%	
20	0	0,00%	
21	0	0,00%	
22	0	0,00%	
23	0	0,00%	
24	0	0,00%	
25	0	0,00%	
	0,500173 = X^2/N	494,1713/988	

Chi-square statistic = 494,1713 (d.f. = 450 = 18×25).

In the following tables the results regarding the 19 countries (**Tab. 6b**), the active variables (**Tab. 6c**), and the supplementary variables (**Tab. 6d**) are reported. Each table contains the information on:

QLT: a quality measure (*communalities* in the Analysis of Principal Components) indicating in what percentage the chosen dimensions explain the inertia of the variables or individuals. For instance, in **Tab. 6b** the contribution to the inertia of the first country is contained in the first three dimensions by 89%.

MASS: row masses (average column profile) in **Tab. 6b** and column masses (average row profile) in **Tab. 6c**.

INR: the contribution of each variable or individual to total inertia. For instance, in **Tab. 6b** the first country contributes to total inertia by 7,3%.

COORD: co-ordinates of the variables or individuals with respect to the dimensions.
CORR: the percentage of the contributions to the variables or individuals inertia, explained by each dimension. For instance, in **Tab. 6b** the first dimension accounts for the contribution to the first country inertia (7,3% of total inertia) by 9,5%, whereas the second dimension by 49,6% and the third one by 29,6%.
CTR: indicating to what extent each variable or individual contributes to the inertia explained by each dimension. In **Tab. 6a**, the first dimension explains 42% of total inertia, of which 1.7% is explained by the first country (**Tab. 6b**). Geometrically, CTR shows to what extent the axis orientation is determined by a single variable.

TAB. 6b – ROW CONTRIBUTION

				First dimension			Second dimension			Third dimension		
NAME	QLT	MAS	INR	COORD	COR	CTR	COORD	COR	CTR	COORD	COR	CTR
AU	0,887	0,053	0,073	0,257	0,095	0,017	***0,587***	***0,496***	***0,206***	***0,453***	***0,296***	***0,156***
AS	0,672	0,053	0,037	**-0,477**	**0,646**	**0,057**	0,045	0,006	0,001	0,086	0,021	0,006
BE	0,728	0,053	0,036	-0,336	0,333	0,028	0,204	0,123	0,025	***0,304***	***0,272***	***0,070***
CA	0,901	0,053	0,061	***0,706***	***0,861***	***0,125***	-0,083	0,012	0,004	-0,128	0,028	0,012
DA	0,807	0,053	0,055	-0,171	0,056	0,007	***0,492***	***0,463***	***0,145***	**-0,387**	**0,287**	**0,114**
FI	0,777	0,053	0,058	**-0,614**	**0,680**	**0,094**	0,226	0,092	0,031	0,055	0,005	0,002
FR	0,848	0,053	0,041	-0,193	0,096	0,009	**-0,461**	**0,543**	**0,127**	***0,287***	***0,210***	***0,062***
GE	0,432	0,053	0,052	-0,416	0,350	0,043	-0,172	0,060	0,018	0,105	0,022	0,008
IT	0,660	0,053	0,046	-0,260	0,154	0,017	**-0,461**	**0,485**	**0,127**	0,096	0,021	0,007
JA	0,851	0,053	0,053	***0,521***	***0,542***	***0,068***	0,020	0,001	0,000	**-0,393**	**0,308**	**0,118**
NO	0,767	0,053	0,039	-0,381	0,396	0,036	***0,285***	***0,222***	***0,049***	**-0,234**	**0,149**	**0,042**
NZ	0,750	0,053	0,074	***0,581***	***0,480***	***0,084***	0,327	0,152	0,064	0,288	0,118	0,063
OL	0,395	0,053	0,023	0,120	0,067	0,004	**-0,254**	**0,299**	**0,039**	-0,080	0,030	0,005
PO	0,435	0,053	0,031	-0,195	0,128	0,010	**-0,247**	**0,205**	**0,037**	-0,175	0,102	0,023
SP	0,520	0,053	0,046	-0,015	0,001	0,000	**-0,393**	**0,350**	**0,093**	***0,273***	***0,170***	***0,057***
SV	0,778	0,053	0,090	**-0,766**	**0,684**	**0,147**	0,053	0,003	0,002	-0,279	0,091	0,059
SZ	0,466	0,053	0,046	0,277	0,174	0,019	-0,008	0,000	0,000	**-0,359**	**0,292**	**0,098**
UK	0,802	0,053	0,059	***0,601***	***0,641***	***0,090***	0,067	0,008	0,003	***0,294***	***0,153***	***0,066***
US	0,904	0,053	0,078	***0,762***	***0,779***	***0,145***	-0,226	0,069	0,031	-0,204	0,056	0,032

As to the choice of the variables to take into consideration, in conventional analysis some criteria are based on the evaluation of the following bits of information:

– CORR, in each dimension one considers those variables with a CORR higher than the percentage of total inertia explained by each dimension;

- -CTR, in each dimension one considers those variables with a

TAB. 6c – COLUMN CONTRIBUTION

				First dimension			Second dimension			Third dimension		
NAME	**QLT**	**MAS**	**INR**	**COORD**	**COR**	**CTR**	**COORD**	**COR**	**CTR**	**COORD**	**COR**	**CTR**
v1	0,819	0,036	0,038	**-0,497**	**0,470**	**0,043**	**-0,409**	**0,319**	**0,069**	0,126	0,030	0,008
W1	0,819	0,040	0,034	0,447	0,470	0,038	0,368	0,319	0,062	-0,114	0,030	0,008
v2	0,790	0,043	0,027	**-0,433**	**0,610**	**0,039**	-0,203	0,134	0,020	0,119	0,046	0,009
W2	0,790	0,034	0,034	0,560	0,610	0,050	0,262	0,134	0,026	-0,154	0,046	0,011
v3	0,552	0,033	0,035	-0,307	0,182	0,015	0,012	0,000	0,000	**-0,438**	**0,370**	**0,092**
W3	0,552	0,044	0,027	0,235	0,182	0,011	-0,009	0,000	0,000	0,336	0,370	0,071
v4	0,718	0,038	0,042	-0,019	0,001	0,000	0,244	0,108	0,026	***0,580***	***0,609***	***0,187***
W4	0,718	0,038	0,042	0,019	0,001	0,000	-0,244	0,108	0,026	-0,580	0,609	0,187
v5	0,721	0,026	0,054	**-0,851**	**0,689**	**0,088**	0,033	0,001	0,000	-0,181	0,031	0,012
W5	0,721	0,051	0,027	0,426	0,689	0,044	-0,016	0,001	0,000	0,090	0,031	0,006
v6	0,817	0,029	0,051	-0,541	0,334	0,041	***0,648***	***0,480***	***0,140***	-0,052	0,003	0,001
W6	0,817	0,048	0,032	0,334	0,334	0,025	-0,400	0,480	0,087	0,032	0,003	0,001
v7	0,916	0,043	0,034	**-0,533**	**0,711**	**0,057**	0,005	0,000	0,000	***0,287***	***0,205***	***0,050***
W7	0,916	0,034	0,042	0,659	0,711	0,071	-0,006	0,000	0,000	-0,354	0,205	0,062
v8	0,702	0,038	0,040	**-0,486**	**0,449**	**0,043**	0,278	0,147	0,034	0,236	0,106	0,031
W8	0,702	0,038	0,040	0,486	0,449	0,043	-0,278	0,147	0,034	-0,236	0,106	0,031
v9	0,708	0,036	0,038	**-0,572**	**0,623**	**0,057**	0,150	0,043	0,009	-0,149	0,042	0,012
W9	0,708	0,040	0,034	0,515	0,623	0,051	-0,135	0,043	0,008	0,134	0,042	0,011
t1	0,823	0,040	0,050	**-0,593**	**0,571**	**0,067**	0,108	0,019	0,005	**-0,378**	**0,233**	**0,084**
T1	0,823	0,036	0,055	0,659	0,571	0,075	-0,120	0,019	0,006	0,420	0,233	0,093
t2	0,751	0,042	0,027	-0,247	0,188	0,012	**-0,411**	**0,521**	**0,081**	0,117	0,042	0,008
T2	0,751	0,035	0,032	0,295	0,188	0,014	0,490	0,521	0,096	-0,139	0,042	0,010
t3	0,785	0,039	0,040	**-0,487**	**0,462**	**0,044**	**-0,405**	**0,319**	**0,073**	0,047	0,004	0,001
T3	0,785	0,038	0,042	0,504	0,462	0,046	0,419	0,319	0,076	-0,049	0,004	0,001
t4	0,417	0,034	0,044	-0,292	0,132	0,014	***0,412***	***0,264***	***0,066***	0,117	0,021	0,007
T4	0,417	0,043	0,036	0,236	0,132	0,011	-0,333	0,264	0,054	-0,094	0,021	0,005

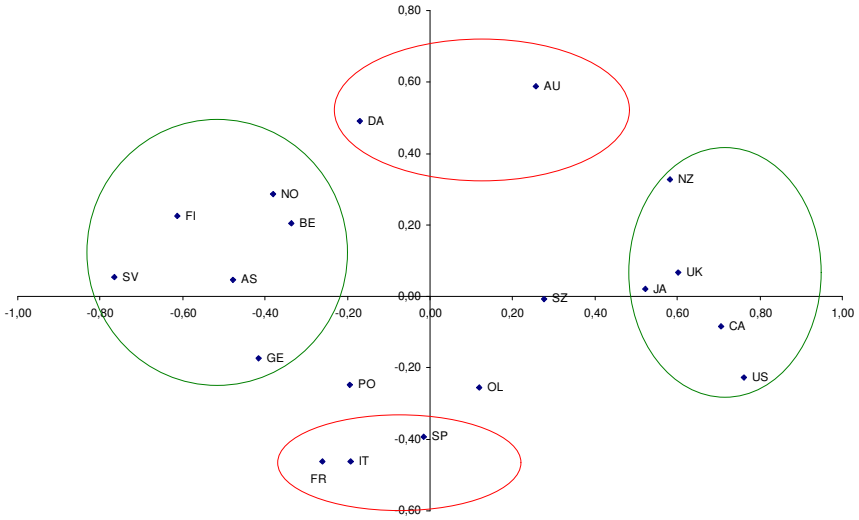
CTR higher than i 1/13 = 0.076.

As we used the doubling technique, graphical analysis is more helpful as allows visualising how the variables are positioned with respect to dimensions. In any case, the position and the significance of the variables and countries positively depend on the respective values of CORR and CTR. In this respect the variables considered as relevant in the determination of the first dimension have the value of CORR greater than 42.13%, greater than 17.57% for the second one and than 13.84 for the last dimension.

TAB. 6d – CONTRIBUTION OF SUPPLEMENTARY VARIABLE

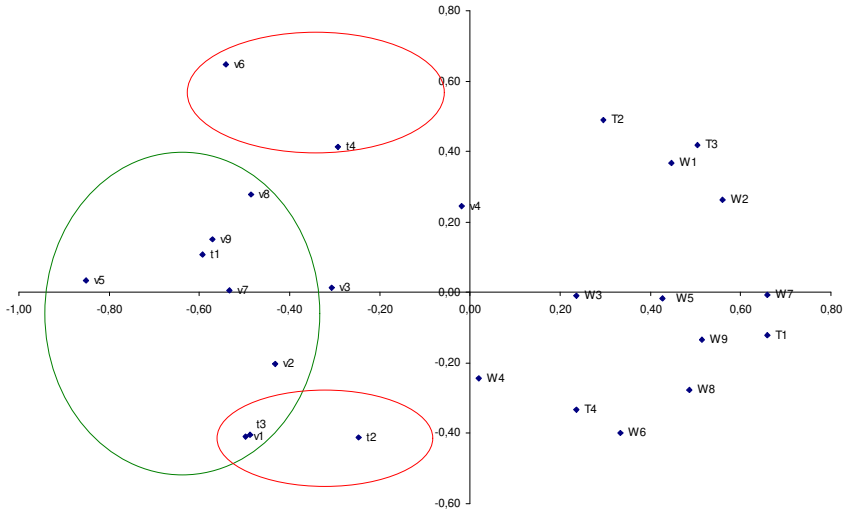
				First dimension			Second dimension			Third dimension		
NAME	**QLT**	**MAS**	**INR**	**COORD**	**COR**	**CTR**	**COORD**	**COR**	**CTR**	**COORD**	**COR**	**CTR**
u1	0,233	0,036	0,045	0,011	0	0	0,021	0,001	0	0,362	0,217	0,066
U1	0,233	0,055	0,029	-0,007	0	0	-0,014	0,001	0	-0,236	0,217	0,043
u2	0,154	0,032	0,039	0,140	0,033	0,003	0,169	0,049	0,011	0,172	0,050	0,013
U2	0,154	0,036	0,035	-0,126	0,033	0,003	-0,152	0,049	0,010	-0,154	0,050	0,012
u3	0,417	0,028	0,055	-0,239	0,059	0,007	-0,286	0,084	0,026	0,514	0,271	0,102
U3	0,417	0,063	0,024	0,104	0,059	0,003	0,124	0,084	0,011	-0,223	0,271	0,044

GRAPH. 1 – FIRST AND SECOND DIMENSION, PRINCIPAL CO-ORDINATES, ROW VARIABLES



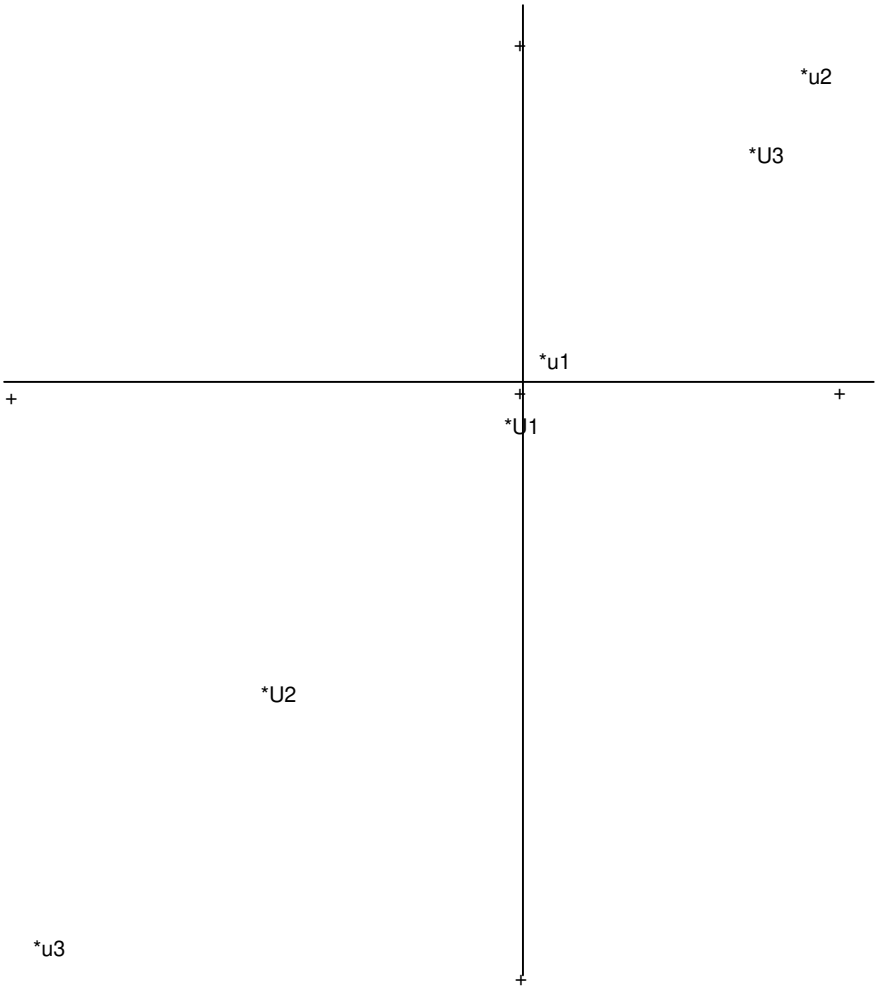
Horizontal axis is dimension 1 with inertia = 0.2107 (42.13%)
Vertical axis is dimension 2 with inertia = 0.08789 (17.6%)
59.7% of total inertia is represented in the above map

GRAPH. 2 – FIRST AND SECOND DIMENSION, PRINCIPAL CO-ORDINATES, COLUMN VARIABLES



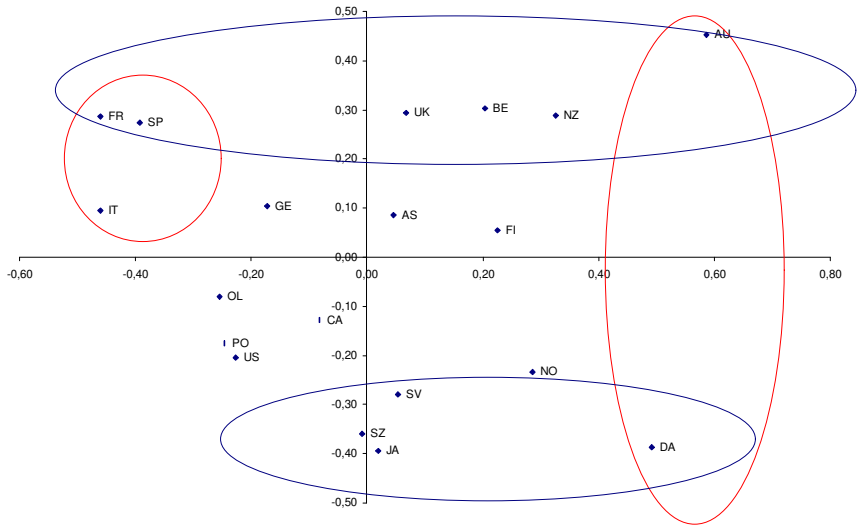
Horizontal axis is dimension 1 with inertia = 0.2107 (42.13%)
Vertical axis is dimension 2 with inertia = 0.08789 (17.6%)
59.7% of total inertia is represented in the above map

GRAPH. 3 – FIRST AND SECOND DIMENSION, PRINCIPAL CO-ORDINATES, SUPPLEMENTARY VARIABLES



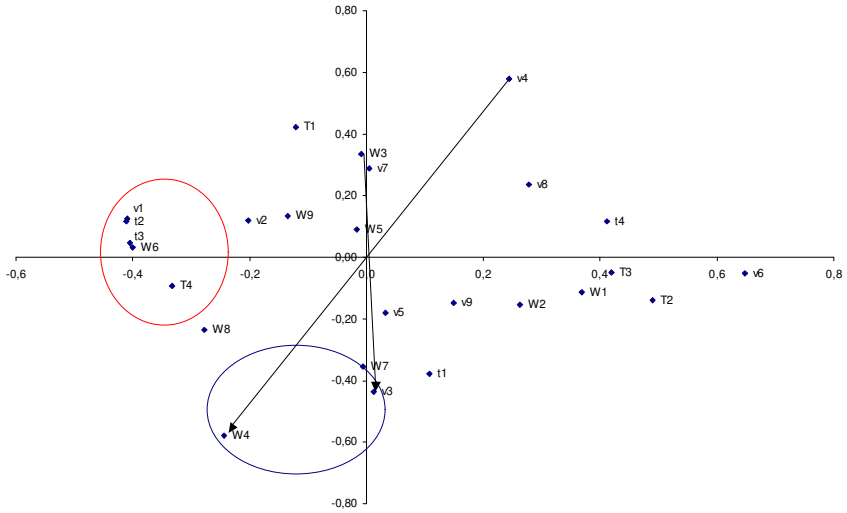
Horizontal axis is dimension 1 with inertia = 0.2107 (42.13%)
Vertical axis is dimension 2 with inertia = 0.08789 (17.6%)
59.7% of total inertia is represented in the above map

GRAPH. 4 – SECOND AND THIRD DIMENSION, PRINCIPAL CO-ORDINATES, ROW VARIABLES



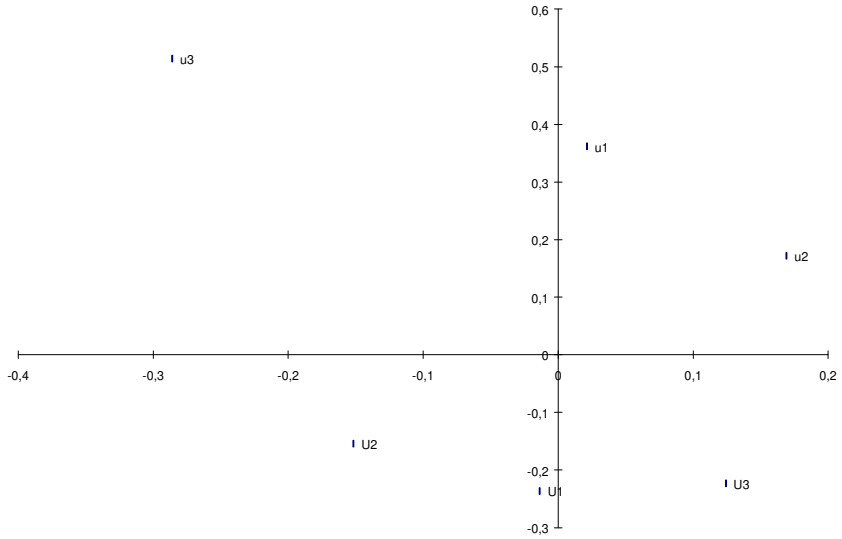
Horizontal axis is dimension 2 with inertia = 0.0878 (17.6%)
Vertical axis is dimension 2 with inertia = 0.0692 (13.8%)
31.4% of total inertia is represented in the above map

GRAPH. 5 – SECOND AND THIRD DIMENSION, PRINCIPAL CO-ORDINATES, COLUMN VARIABLES



Horizontal axis is dimension 2 with inertia = 0.0878 (17.6%)
Vertical axis is dimension 2 with inertia = 0.0692 (13.8%)
31.4% of total inertia is represented in the above map

GRAPH. 6 – SECOND AND THIRD DIMENSION, PRINCIPAL CO-ORDINATES, SUPPLEMENTARY VARIABLES



Horizontal axis is dimension 2 with inertia = 0.0878 (17.6%)
Vertical axis is dimension 2 with inertia = 0.0692 (13.8%)
31.4% of total inertia is represented in the above map

5. Dimensions analysis

First dimension

Looking at the map describing the first and the second dimension, we can easily see two different groups of countries. In each one we find the countries with the same institutional setting, as already stated in the literature. Therefore, following the standard distinction between regulated and non-regulated countries, we can easily interpret the first two dimensions. Moreover, knowing each dimension components (variables which contribute more to each dimension), we can add some specific marks to the institutional setting. **Table 7** lists the variables contributing more to each dimension, with the corresponding correlation sign.

TAB. 7 – VARIABLES CARACHTERISING THE FIRST THREE DIMENSIONS

First dimension		Second dimension		Third dimension	
COORD1	(-)	UNIONDEN	(+)	BENDUR	(+)
COORD2	(-)	GOVERN	(+)	REPLRATIO	(-)
ACTIVELAB	(-)	TTAX	(-)		
EMPLPROT	(-)	PTAX	(-)		
BARGCOV	(-)				
CENTR	(-)				
LSTAND	(-)				

We identify in the first dimension four subgroups of variables. The first one includes all the variables concerning co-ordination within organizations: unions and employers coordination. It simply represents *bargaining co-ordination*.

Centralisation and bargaining coverage are indicators describing the main features of bargaining structure. They form the second subgroup defined as *bargaining structure.* Taking together the first and the second subgroup we get an indicator of *bargaining structure and coordination.*

In the third subgroup we lists indicators of work legislation: ri-

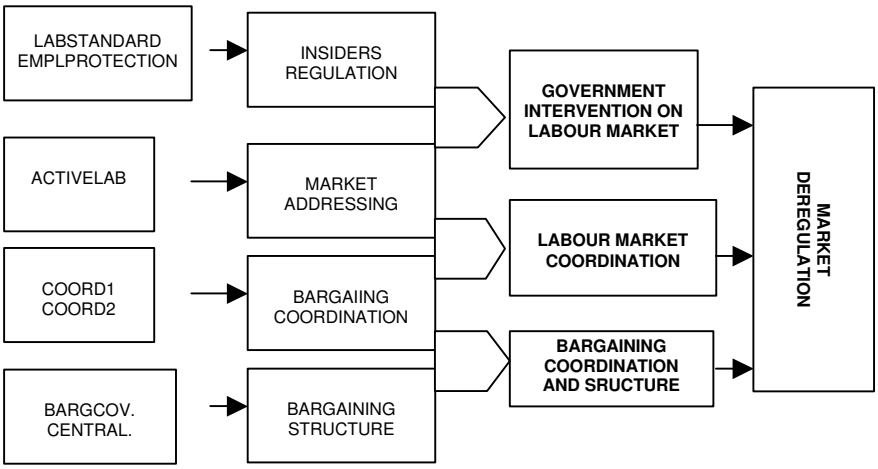
gidity of rules concerning hiring and firing (*employment protection)* and working conditions (*labour standards)*. They summarise the extent of employed protection, here labelled as *insiders regulation.* Expenditures in active labour market policies represent a single group, showing the extent of government intervention in labour market. Basically, the third and the fourth subgroups describe a particular type of government intervention on labour market about specific issues and targets.

A more in-depth analysis of the variable subgroups highlights that active labour market policy plays an indirect addressing role, guiding toward preferred performance results, chosen by the government. From this perspective, active policy associated with within-organisation-co-ordination is an indicator of overall market *co-ordination.* What we want to emphasise is the combination of government intervention with *intra partes* co-ordination, the latter concerning mainly (non-government) labour market agents/organisations, nominally unions and employer confederations. According to the theoretical framework underpinning our analysis, this variable set summarises *co-ordination* on labour market, implemented both by the government and the bargaining sides. Union and employer confederations co-ordinate the market when harmonising their actions. Government co-ordinate market functioning guiding it towards specific targets with labour active policy implementation: workers training programmes, for example, have to meet the needs of new types of labour demand. Our basic hypothesis is that organisational forms embodying *intra partes* co-ordination help the diffusion of and the access to. This enables each unit to overcome transaction costs in gathering information about incentives and chances on the market. This opportunity has a stronger prominence when price signalling cannot co-ordinate agents' actions by its own. If the availability of broader information sets to agents enhances market functioning, one way to build up this set and to spread information is to combine organisations co-ordination and active labour market policies.

Centralisation and bargaining coverage may be interpreted as an enforcement device of bargaining co-ordination. These factors involve the members of each social partner in wage determination rules resulting from *intra partes* co-ordination.

Figure 1 shows the structure of the interpretation of the first dimension.

FIG. 1 – FIRST DIMENSION



Following the aggregation criterion displayed in figure 1, the first dimension represents ***market deregulation***. In graphic 2, all positive poles lie on the left side, while the negative ones are on the right side. This means that the first dimension is a "size dimension" following the doubling technique: some countries have higher ratings than others. In this analysis deregulated countries (Canada, US, Japan, UK) have lower ratings for all the variables. This strong feature of the countries enables us to shift to the second and third dimension plane.

Graphic 1 shows each country position with respect to the first dimension. It is easy to see a broad distinction between two groups of countries. On the one hand we find all the countries where labour market has a non-regulated structure (US, UK, Canada, New Zealand and Japan[vii]). Other countries plotted in association with positive values of the first dimension are closer to the

first dimension: they are not strongly characterised by variables contributing to the zero of the first dimension. On the other hand, among the countries associated to the negative values of the first dimension, Finland Austria and Sweden contribute more to the first dimension.

Second dimension

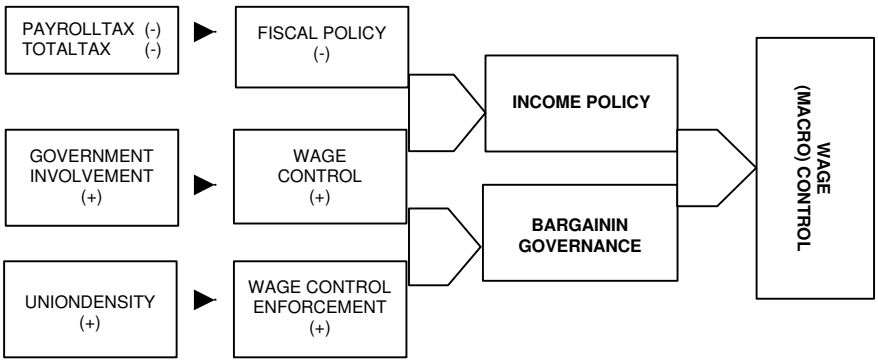
Variable contributing to the second factor correspond to another type of government intervention. The first variable contributing to the second dimension is *government involvement,* describing how government intervenes in wage bargaining and encompassing the provision of economic forecasts to bargaining partners, minimum wage guidelines or norms, or signing formal tripartite agreements on national wage schedule with or without sanctions (Flanagan, 1999). The government can also impose wage freeze and prohibit local wage bargaining. With a higher government involvement, government plays a major role in imposing and enforcing wage policies.

Another variable contributing to the second dimension is *union density,* which, in this framework, may be interpreted as a factor supporting the co-ordinating role of the government in wage bargaining. G*overnment involvement* along with *union density* may indicate to what extent the decisions concerning wage setting are binding for the whole economy. This combination has been defined as "*bargaining governance",* meant as the set of rules and organisational forms governing the bargaining process. This subgroup, therefore, includes some *coordination enforcement devices* of the bargaining results, deriving from *intra partes* coordination and government involvement. They are enforcement devices because they help to impose wage rules on all the social partners members. Following the well-known Calmfors and Driffill (1988) model, which Soskice (1990) extended by considering the *intra partes* co-ordination aspects, this set of variables emphasises the *inter partes* co-ordination role of the government aimed at making labour market policies targets binding all over the economy. *Payrolltax* and *totaltax* are variables representing fiscal policy tools, which can be used to influence labour market performance.

These two variables are closely linked to government involvement and are negatively correlated to the second dimension. They can be used in association with the government involvement in order to implement income policies as an alternative to mere fiscal policy.

Income policies and bargaining governance suggests the existence of a *macro control of wages,* which specifies a type of government intervention complementary with the one described in the first dimension, concerning more specific targets and policy measures. Figure 2 shows how the variables have been aggregated in order to define second dimension.

FIG. 2 – SECOND DIMENSION



The countries that contribute more to the second dimension, are all plotted very close to zero of the first dimension as they do not contribute to it at all. This characteristic implies that, where labour market is fundamentally uncoordinated, macro wage control has no role to play. It becomes more important for the countries plotted on right part of the diagram, which have a more coordinated labour market with some differences among countries (it is worth to remember that only Sweden, Austria and Finland are significant for the first dimension). The countries on the right part are broadly differentiated by the macro wage control: South

Europe countries and The Netherlands are plotted near to zero of the second dimension; Central Europe and Northern countries are characterised by the intermediate ratings for the second dimension, while Denmark alone has a higher position in the graphic[viii]. Among the countries on the left part, Australia contributes more to the second dimension.

Third dimension

The indicators based on passive labour market policies (*replacement ratio, benefit duration)* contribute to the third dimension. The groups of countries, homogeneous with respect to the first and second dimension, show some differences when considering the third dimension. In particular, higher values of benefit duration and lower values of replacement ratio contribute to the third dimension positive axis. This is compatible with the evidence that more generous unemployment benefits have a shorter duration.

With respect to the third dimension the country groups previously defined show internal differences. In more details, Portugal does not have the same position as the other South Europe countries any more, because it is closer to the non-regulated countries group (Canada, USA, Switzerland and Japan). Norway, Sweden, Finland and Austria show the same aggregation as before, with minor differences in passive policies. Australia and New Zealand are still in a *spurious* group, where Belgium and UK enter too.

Unemployment and dimensions

In this paper we use long run, short run and total unemployment as control variables. Long run unemployment is negatively associated with the first and the second dimension, while short run unemployment has a positive association with both. Institutional settings based on labour market deregulation are associated with higher short run unemployment, while co-ordinated countries without any wage control are associated with higher long run unemployment. Moreover, long run unemployment is positively associated with the third dimension too.

Countries' ranking is summarised in Table 8 in further details. Each box lists the countries with approximately the same level of market deregulation and wage control. Within each box, countries with higher unemployed protection are in the bottom line. The shadowed box represents the dimension combination associated with long run unemployment. Countries in bold characters have the highest values for long run unemployment.

TABLE 8 – COUNTRIES RANKING BASED ON LONG RUN UNEMPLOYMENT

		MARKET REGULATION	
		LOW	HIGH
WAGE CONTROL	LOW	JA SZ USA CA NZ ***UK***	PO ***IT NE*** ***SPA FR***
	HIGH	DE AU	SW NO GE FI AS ***BE***

It is now possible to draw some broad remarks. First, the market regulation and low wage control combination is associated with higher long run unemployment. We cannot claim the opposite relation because countries with lower long run unemployment (Japan, Sweden and Switzerland) are spread all over the diagram. Referring to the third dimension, the relation with long run unemployment is positive: countries with higher long run unemployment al-

ways are in the bottom line of each box. The latter relation mainly holds for the countries in the shadowed box. In this context we cannot state the direction of the causality relation: it may be that unemployment benefits have a longer duration (and a lower replacement ratio) where the institutional setting causes long run unemployment to a greater extent and vice versa.

In the following table (**Tab. 9**) we find a similar ranking according to which countries in bold characters present a higher short run unemployment. This control variable exhibits a positive correlation with all the three dimensions. Nevertheless, her ranking does not explain much more as to the difference of performances among countries.

TABLE 9 – COUNTRIES RANKING BASED ON SHORT RUN UNEMPLOYMENT

		MARKET REGULATION	
		LOW	HIGH
WAGE CONTROL	LOW	JA SZ USA ***CA*** ***NZ*** UK ↓	PO IT NE ***SPA*** ***FR*** ↓
	HIGH	**DE** ↓ AU	SW NO GE ***FI*** AS ↓ *BE*

The ranking of the countries on total unemployment yields a more interesting table (table 10): total unemployment shows a

clear-cut correlation with countries associated with high values of the third dimension (passive policies), market deregulation ad wage control.

TAB. 10 – COUNTRIES RANKING BASED ON TOTAL UNEMPLOYMENT

		MARKET REGULATION	
		LOW	HIGH
WAGE CONTROL	LOW	JA SZ USA CA ***NZ UK*** ↓	PO IT NE ***SPA*** FR ↓
	HIGH	***DE*** ***AU*** ↓	SW NO GE ***FI*** AS *BE* ↓

6. Some concluding remarks

Two groups of countries emerge from the above analysis. The former does not have any institutional co-ordination devices beyond the market itself. The latter has a common ground of organisational forms furthering informational flows. These organisational forms smooth labour market functioning fostering the achievement of consensual targets. But the co-ordinated institutional model shows the worst long-run performances in some regulated countries. This is particularly true in countries where there is not any

wage control supporting market regulation. As our dimensions show, among all the possible institutional combinations there are only few that perform well in terms of unemployment performance. This evidence supports the need for relations taking into account the complementarity among complex institutional forms. The equivalence of different institutional combinations depends on the targets that have been specified (long run instead of short run unemployment, unemployment versus equity).

From the analysis emerges a correlation between passive policies and unemployment (total and long run), stronger where specific institutional combinations arise. In more details, regulated markets without any strong wage control show the highest values for long run unemployment. Deregulated markets, with some wage control, have the worst total unemployment performance. It seems that government intervention is important both for wage control and unemployment rate. Government plays its market role using fiscal policy and/or directly intervening in the bargaining process, which helps to mediate among conflicting partners' objective functions and to make individual interests compatible with macroeconomic targets. The government's role of inter partes co-ordination is based on the choice of a combination of specific policy tools: strong bargaining intervention and lighter market intervention with traditional fiscal policy measures. This combination needs the direct support of market regulation, inter partes co-ordination being an important factor.

Mixed models (low/high high/low) have the worst performances, and in this case passive policies show a relation with unemployment of ambiguous direction. Broadly speaking, active labour market policies, by helping unemployed back into labour market, may reduce perverse effects of too generous subsidies. But policies perform well if unemployment benefits have a shorter duration (Nickell, 1997; OECD, 1993). Higher benefits combined with low pressure on unemployed to search a job, or worker (re-) training programs, give up to rigidities that “create unemployment or make it persistent” (Nickell, 1997). Other studies show positive effects of unemployment subsidies both with high and with low shares of active spending programs (Elmeshov, Martin, Scarpetta, 1998).

The unclear relation between passive policies and unemploy-

ment suggests better specifying the current analysis. Further developments may improve it with more control variables in order to encompass all the possible government targets: the correlation with variables regarding labour market equity must be tested. On the other hand, it could be of some interest to take the regulated countries alone to separately analyse the latent factor.

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[i] The "reflected" of the original ratings is obtained by subtracting it from the highest value of the scale.

[ii] The most basic concept in correspondence analysis is that of profile. The profile of a set of frequencies is simply the frequencies divided by their total. There are row profiles and column profiles, the former are obtained dividing each row frequencies by their row sum, the latter are obtained dividing each column frequencies by their column sum. Then we have the average column profile, which is the profile of the last column and the average row profile which is the profile of the last row. Finally, the average column profile is also the row masses and the average row profile is also the column masses. The word 'mass' is a term preferred in correspondence analysis although it is entirely equivalent to the term 'weight'.

[iii] In order to have equal weights, it is necessary to have the same scale for each variable: in our case we have a rating scale ranging from 0 to 4.

[iv] The inertia or total inertia is the weighted average of the squared χ^2 distances between the row profiles and their average profile and indicates the dispersion of row profiles. When the inertia is low, the row profiles are not dispersed very much, and lie close to their average profile. They do not extend out to the column vertex point and lower is the association, or correlation, between rows and columns (the same holds for the column profiles and their average).

[v] The centroid (or centre of gravity or mean vector) is the average row profile (columns masses) in the row space and the average column profile (row masses) in the column space.

[vi] As one can see from Tab 1, some variables have been originally provided as scale indices by OCSE, others, on the contrary, are continuous variables. For the sake of homogeneity, the latter have been transformed in ratings as well. The method used for the transformation is based on the division of continuous values in classes and the attribution of an increasing scale index to the classes with rising values. The division has led to a maximum of 5 classes by grouping the values representing 20, 40, 60, 80 and 100% of cumulate intensities. Equal intensities and class coherence have been taken into account through a cautious analysis of the data.

[vii] For Japan it would be useful a more in-depth analysis as this country is characterised by a high degree of bargaining coordination.

[viii] Countries contributing more to the second dimension are Italy, France and Spain, with negative correlation, and Denmark and Australia with positive correlation.

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