

SOME ASPECTS OF HUNGARIAN ECONOMY IN THE OECD CONTEXT MULTIVARIATE STATISTICAL COMPARISON

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Received: Apr. 14, 1998

Abstract

This paper¹ deals with the Hungarian economy on the basis of selected characteristic features connected to the EU accession conditions. In most cases there are no exact criteria which have to be fulfilled. Therefore the difference between the real performance and the expected level cannot be measured. The statistical analysis can concentrate on similarity of EU (and OECD) members and new applicants. The structural similarity, the closeness in statistical sense can prove the economic success or failure.

Keywords: transition, development level, EU accession conditionality, multivariate statistical analysis, international comparison.

In the Copenhagen declaration of June 1993 the European Union offered membership of the Union to those former communist European countries that wished to join and that fulfilled certain political and economic criteria. This enlargement is the biggest challenge facing both the European Union and countries of Central and Eastern Europe. The goal of integrating the associated countries is widely shared, the question is when and how.

The accession conditions should ensure that the candidates share the same objectives as the EU members, that they have similar democratic and market-oriented institutions, they converge to Western European income level. The conditionality can introduce some competition between candidates on how to satisfy best the conditions. These conditions can be divided into four types: institutional or legal conditions, macroeconomic and microeconomic management conditions, and performance conditions.

¹This is an extended version of our paper presented at the 45th International Atlantic Economic Conference in Rome. The participation of Erzsébet Kovács was supported by the Soros Foundation.

The EU will review the fulfilment of the criteria before the accession of a first group of countries. It seems to be vitally important for countries in transition to measure their performance, to compare themselves to the EU members and to other candidates.

Hungary intends to join to the European Union. This decision underlines comparison with well-developed European countries. At the same time the Hungarian GNP per capita income level fits to the upper-middle-income group. This group contains several countries from Latin-America (e.g. Mexico), and Korea (Republic) is at the same income level. Hungary became member of the OECD in 1995 and intends to catch up the developed Western countries.

The process of transition means development in certain aspects. There are positive results in stabilising the economy, in significant reduction of the government deficit, etc.

On the other hand, there is a widely used cliché in Hungary: Our country faces the danger of 'latinamericanization', which means coexistence of dual economy and wide black economy, deep social deviancy, and corruption, extreme differences in income, briefly the possibility of peripherization is mentioned this way. The possibility and the intensity of these twofold tendencies are under investigation.

Hungary ended the 1980s with a stagnant economy. The stabilisation and transformation process started in 1989 and the first democratic elections were held in the next year. The change in the political regime allowed to change the economic philosophy. The transition process is combined with the clear vision of a developed market economy integrated into Western Europe. Hungarian politicians and economic experts contrast transition with the Latin-American way of development as a bad tendency for the future.

Is there any model for countries in transition to feel secure from difficulties? Are they similar to each other or do they have their unique characteristics? Do or can we fulfil accession conditions?

- Institutional or legal conditions are clearly relevant for integration and are within the control of applicant countries. Newly established laws and guidelines in the fields of taxation and social security are good examples in case of Hungary.
- Macroeconomic management conditions are within the control of national authorities. The changing role of the Hungarian government, reduction of the budget deficit and inflation rate are clear evidences on the progress of economic reforms.
- Microeconomic management conditions (increasing share of private sector, subsidy level close to the EU average, effective competition, etc.) play necessary but not sufficient role in integration.
- Measurable performance conditions, like per capita GDP, export growth and employment rate, etc. could play a useful role in judging applicant countries taking into account the ability to sustain economic growth.

There are numerous aspects of analysing the Hungarian transition process. Instead of comparing the situation with the previous one, comparison of figures to the results of the EU members is preferred. Our previous research² focused on taxation and government expenditure structure. This paper deals with other selected characteristic features connected to the accession conditions. In most cases there are no exact criteria which have to be fulfilled. Therefore the difference between the real performance and the expected level cannot be measured. The statistical analysis can concentrate on similarity of EU members and new applicants. The structural similarity, the closeness in statistical sense can prove the economic success or failure.

To meet the overall reliability, consistency and comparability of data OECD Observer, UN figures and World Development Report are used for multivariate statistical comparison.

International comparison is frequently conducted on the basis of general economic indicators, among them the GDP per capita. In addition to explicitly measurable per capita GDP the purchasing power of GDP and changes in consumer prices are taken into account. The labour market is characterised using the unemployment rate together with self-employment and female participation rate. Health expenditure, in-patient care day, life expectations of men and women are taken into account to describe those differences which are influenced not only by economic indicators.

Our data base contains limited amount of data of other transition countries. Comparison of transition countries would be interesting but data from the years of transition are extremely variable and in some cases missing. The speed of transition and the pattern followed by the Central-European economies are not the same. Changes are introduced in different years, the result would be influenced by the time period, not only by the measures. There are no clear-cut solutions to many of the data-problems so we do not use time series data for comparison. Data not merely subject to statistical manipulations are used to classify 9 countries from Central-Eastern Europe. The working hours necessary to buy the basket of goods and services³ are analysed and compared to the geographically close EU member state, Austria.

Our earlier international comparison⁴ indicates that Hungarian economy is similar to Latin American countries and several EU countries (the 'less-developed' economies). The question is: what is the tendency of the Hungarian economy towards European integration. Hungarian economy faces a dilemma: 'westernization' or 'latinamericanization'. The Hungarian economic policy has special functions at this stage of economic and political transition:

²Erzsébet Kovács - Zoltán Kollár (1997a)

³Source of data: *Heti Világgazdaság* (1998): p. 24. Prices and wages are from December 1997.

⁴Erzsébet Kovács - Zoltán Kollár (1997b)

- The new economic system has to support the economic stabilisation and growth.
- It must comply with the requirements of the Maastricht treaty. It has to adapt Europe's impulses to form and orient the Hungarian modernisation and reintegration into European 'society'.
- It must lighten the contradictions of Hungarian transition or liquidate the occasional tendencies of 'latinamericanization'.

1. (A) Stabilisation and Growth – Measurable Performance Indicators

The accession conditions include explicitly measurable performance conditions like per capita GDP. Three countries in transition, Czech Republic, Hungary and Poland are members of the OECD, so their figures can be easily compared to the other 25 member states' data.

According to the GDP per capita at current exchange rate in 1995 Turkey had the lowest level of income (\$2747) within the OECD members. Mexico was the next one with \$2946, and transition countries followed them. After these 5 countries a big income gap is noticed, Portugal and Greece had higher than 10000 dollar per capita GDP (\$10060 and \$10936). The average GDP per capita level for the 28 members was \$21314. The range is wide enough (\$40486). Poland with \$3057 reached 14% of the average, Hungary had \$4273 (20%) and Czech Republic presented \$4420 (21%)⁵. One widely cited accession condition is that living standards among newcomers should be equal at least 75 per cent of the EU average which is higher than the OECD level. Eligibility for structural funds is based on per capita income below 75% of the EU average. On this basis all the new Central European members would be eligible.

The tendency towards convergence in living standard can be completed with structural convergence in other aspects of economy and society. Consumption is determined not only by the income level, but by the purchasing power parities and changes in consumer prices. The average of the per capita GDP using current PPP⁶ is only \$18893, the average difference is \$4508. 16 countries have higher per capita GDP using current exchange rate, and people from 8 countries are in better financial position on the basis of PPPs. Four of them (Greece, Mexico, Portugal and Turkey) could increase significantly their relative position. The difference between the maximum and the minimum is \$25612, only 63% of the range at exchange rate.

According to our previous results concerning taxation and government expenditures Portugal is very similar to Hungary in structural sense. Portugal entered the EC in 1986 with a GDP per capita equal to 32% of the

⁵See Annex 1

⁶Purchasing power parities were not published for new OECD members in 1995.

EU average. Portugal reached 47% of the OECD average in 1995, and 66% according to the GDP using PPP. The membership in the EU underpins very rapid economic growth as it is experienced in Portugal. The expected membership could give strong impetus to Hungarian economic stabilisation and growth.

Comparison of OECD countries according to changes in consumer prices (Dec. 1996/Dec. 1995) combined with the unemployment rate gives two-dimensional classification of members concerning the stability of their economy. These two indicators are not linearly correlated. There is no typical combination with high rate on one side and lower rate on the other side. Some countries with stable economy could preserve low unemployment rate with limited changes in consumer prices. 23 countries had less than 5% increase in consumer prices, but their unemployment rate varied between 2 and 24%. Six countries with smaller unemployment rate (3–13%) presented higher increase in prices. The average of the consumer price index was 7.5% with a high standard deviation (15.7) because of Turkey's extreme value (79.8). The average of the unemployment rate was 8.5% (std. 4.9), the maximum was reached by Spain (23.8%), followed by Finland and Ireland in the same cluster. Czech Republic, Hungary and Poland are not similar in this context.

Table 1. Consumer prices and unemployment in the OECD

		Consumer prices change Dec. 1996/Dec. 1995 (%)				
Unemp- loyment rate(%)	-0.4 – 2	2.1 – 5.0	5.1 – 9.9	10 – 20	20 – 30	70–
2–5	Japan Switzerl. Luxemb.	Korea Austria	Czech		Mexico	
5.1–7.5	Norway	Iceland USA Netherl. Portugal				
7.6–9.9	Australia Germany Sweden	New Zeal. Denmark UK	Greece			Turkey
10–15	France Ireland	Canada Belgium Italy		Hungary	Poland	
15–20	Finland					
20–25		Spain				

Further analysis of this classification seems to be necessary to identify those economic efforts which could improve position of Hungary in reducing unemployment rate and/or changes of consumer prices.

As it was expected significant differences can be noticed between Hungary and other OECD members. Because of the outlier position of Turkey and Mexico. Hungary and Poland seem to be similar from the output of cluster analysis and Czech Republic has unique position. It is worth to verify this similarity classifying 9 countries from Central-Eastern Europe on the basis of differences in working hours necessary to buy basket of goods and services. Transition countries are compared to geographically close EU member state. Austria.

Working time for 14 selected items were compared and total working hours for basket of goods and services was estimated by multiple regression.

The total working hours are in significant positive linear relationship with minutes for 7 goods and services (bread, potato, bus, restaurant, beer, milk and Marlboro can be mentioned according to decreasing correlation). Because of strong multicollinearity Stepwise Regression⁷ involves only one variable into the regression model. The total working time for basket of goods and services (y) can be estimated as linear function of minutes for bread (x):

$$y = 3.918x + 79.5 .$$

Student t -values are 5.443 and 4.266, correlation is 0.887, and Durbin-Watson test=1.88.

Table 8 shows the average working time for 14 goods or services. Ten minimum times were reached by Austria, and 5 countries in transition have very similar minimum times in certain cases. Slovakia is the only country not mentioned in this table (no minimum, no maximum).

The Dendrogram gained by Average Linkage (Between Groups) Method⁸ separates these 9 countries in transition into 2 extremely different groups. The first group contains Czech Republic, Croatia, Hungary and Poland combining Slovakia and Austria with greater distances. The second group involves Bulgaria, Romania, Russia and Ukraine. The highest dissimilarity¹⁰ (91713) is measured between Austria and Bulgaria, the lowest dissimilarities were calculated for the following pairs of countries:

Czech Republic and Hungary (155),

Croatia and Poland (201),

Hungary and Poland (464),

Croatia and Hungary (579).

⁷See Annex 2

⁸Calculated on the base of the data of *Heti Világgazdaság* (1998): p. 24

⁹See Annex 3

¹⁰Squared Euclidean Distance was calculated.

Table 2. Working time for basket of goods and services

Name and unit	Average minute	Minimum*	Maximum
Bread, 1 kg	21.9	Austria, Poland	Russia
Potato, 1 kg	11.7	Austria, Poland	Russia, Ukraine
Beef, 1 kg	175	Austria, Croatia	Bulgaria
Milk, 1 l	21.6	Austria, Croatia	Ukraine
Marlboro	50.6	Austria, Poland	Russia
Railway 100 km	73	Rumania, Austria	Ukraine
Local Bus	9.7	Austria, Rumania	Russia
Petrol 1 l	20.3	Austria	Bulgaria
Phone 3 min.	3.3	Ukraine (no fee)	Bulgaria
Electricity 1 kwh	2.2	Austria	Poland
Gas 1 m ³	3.7	Russia	Bulgaria
Repairer 1 hour	250	Russia	Ukraine
Restaurant	505	Austria, Hungary	Russia
Beer (local)	17.9	Austria, Czech	Ukraine

*Second country is mentioned if the values are very close to each other.

Croatia is the closest one to Austria in this comparison followed by Poland, Hungary and Czech Republic.

The two groups separated by cluster analysis underpin our conclusion. Dissimilarities measured in working time are in accordance with those differences measured in the first part of the analysis. The geographical closeness does not mean structural similarity. There are basic differences in prices which indicate differences in consumption and in living standard of countries in transition. This kind of inhomogeneity seems to be consequence of different social and economic development.

2. (B) Reintegration or Peripherization? Dilemmas of Hungarian Transition

There are several direct and indirect indicators of economic and social development to complete information gained from the basic performance measures. In this part of the analysis we would like to compare Hungary to the other OECD members on the basis of so called 'social' characteristics. 12 indicators were selected from the OECD in Figures (1997 Edition) covering demography, employment, health and education. Cluster analysis formed 2 big groups with 10-11 members, and other 2-3-3 countries were separated from each other. Hungary, Czech Republic, Poland were members of the first group together with 8 countries: Austria, Belgium, France, Ger-

many, Korea, Luxembourg, Portugal and Switzerland. Which variables are responsible for this classification? Mainly female participation rate and in-patient care days cause significant differences among clusters. These two variables are in linear correlation with the others. To avoid interactions smaller groups of variables were selected.

The unemployment rate is analysed together with the self-employment (% of total employment) and the female participation rate¹¹.

The total fertility rate, health expenditure (as % of GDP), in-patient care day, man and woman life expectancy at birth are used for classifying countries.

2.1. Employment

From the employment characteristics 5 clusters can be identified using Complete Linkage Clustering.

- Greece, Mexico and Turkey have traditionally low rate of female employment rate (40%) with very high self-employment proportion (30%). Because of these two results their unemployment rate is close to the OECD average.
- Spain, Italy, and Ireland have higher unemployment rate with higher female participation rate and lower self-employment.
- Korea, New Zealand, Poland and Portugal are similar to each other with relatively high self-employment (24%) and female participation (60%), which helps to reach lower unemployment rate.
- Similar female participation and unemployment rates are associated with low self-employment in the biggest group which contains Hungary and Czech Republic, Australia, Austria, Belgium, France, Germany, Japan, Luxembourg and the Netherlands.
- 9 countries from Northern part of Europe and USA are in the fifth group with the highest female participation rate (71%) and the lowest self-employment rate (11%).

Each group contains countries from the EU. Their social development is determined by their tradition, urbanisation and agricultural structure. Nor the high rate of female participation, nor the low rate of self-employment can be mentioned as source of development.

Hungary faces the problem of high unemployment rate. The process of privatisation was quick and effective. More than 70 per cent of the GDP was produced by the private sector in 1997. The number of small businesses has increased during the privatisation, but many small firms were founded to avoid unemployment, they can be mentioned as self-employment. The

¹¹See Annex 4

changing structure of business sector and the decreasing involvement of the state in the Hungarian economy are impressive results of transition period. The position of Hungary has to be preserved by reducing the unemployment rate and not necessarily increasing the self-employment proportion.

2.2. Demography and Health

The total fertility rate does not cause significant differences among OECD countries. Differences can be noticed mainly in life expectancy and in-patient care day. The variable 'In-patient care day' has an extremely high value for Japan (45) which is associated with relatively high life expectancy for both men and women. The Netherlands is the only European country with similar results, but the health expenditure is higher than in Japan or in the EU.

The other 27 countries are classified into 3 groups¹²

- Countries with low number of in-patient care day (9 days) are those where the self-employment and the unemployment rates are higher.
- Other 10 countries with higher health expenditure and higher in-patient care day (14 days) form one cluster.
- Lower health expenditure, lower life expectancy, relatively low in-patient care day and somewhat higher fertility rate are describing cluster of Czech Republic, Hungary, Korea, Mexico, Poland and Turkey.

Taking into account this kind of demographic and health characteristics, the European periphery seems to be realistic from the data of 1995.

The processes in Hungarian economy of the last two years indicate positive changes: perceptible economic growth, stabilisation of market economy, moderating inflation, etc. Supposing continuation of these processes international position of Hungary can become more stable with less contradiction in (developed) Europe.

¹²See Annex 5

Annex 1

GDP PER CAPITA OF THE OECD COUNTRIES

Country	GDP per capita at current exchange rate 1995	GDP per capita using current PPP
Australia	19314.00	19354.00
Austria	28997.00	20772.00
Belgium	26556.00	20792.00
Canada	18915.00	21031.00
Denmark	33144.00	21529.00
Finland	24468.00	17788.00
France	26445.00	19939.00
Germany	29542.00	29497.00
Greece	10936.00	12174.00
Iceland	26366.00	21938.00
Ireland	17964.00	17228.00
Italy	18983.00	19464.00
Japan	40726.00	21795.00
Luxembourg	42298.00	31303.00
Mexico	2946.00	7383.00
Netherlands	25597.00	19782.00
New Zealand	16689.00	16851.00
Norway	33535.00	22672.00
Portugal	10060.00	12457.00
Spain	14272.00	14226.00
Sweden	26096.00	18673.00
Switzerland	43233.00	24809.00
Turkey	2747.00	5691.00
UK	18777.00	17756.00
US	26438.00	26438.00
Mean:	23401.76	18893.68
N:	25	25
Std. Deviation:	10765.88	5500.70

Annex 2

Beer Bread Bus Electric Gas Marlboro Milk
 Petrol Phone Potato Railway Repairer Restaur

Variable(s) Entered on Step Number

1. BREAD bread. 1 kg
 Multiple R 0.88735
 R Square 0.78738
 Adjusted R Square 0.76081
 Standard Error 31.49472

Analysis of variance

	DF	Sum of Squares	Mean Square
Regression	1	29386.76193	29386.76193
Residual	8	7935.33807	991.91726

$F = 29.62622$ Signif $F = 0.0006$

Variables in the Equation

Variable	B	SE B	95% Confidnce	Intrvl B	Beta
Bread	3.917879	0.719802	2.258015	5.577743	0.887346
(Constant)	79.525871	18.642044	36.537284	122.514458	

Variable	in	T	SIG T
Bread		5.443	0.0006
(constant)		4.266	0.0027

Multiple Regression

Equation 1 Number 1	Dependent Variable	TOTAL	total working hours - consum
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Variables not in the Equation					
Variable	Beta In	Partial	Min Toler	T	Sig F
Beer	-0.369026	-0.395840	0.244639	-1.140	0.2916
Bus	0.217069	0.327380	0.483626	0.917	0.3898
Electric	0.019489	0.041558	0.966747	0.110	0.9155
Gas	-0.022253	-0.047947	0.987062	-0.127	0.9025
Marlboro	0.142659	0.241498	0.609291	0.658	0.5313
Milk	-0.183658	-0.231829	0.338779	-0.631	0.5484
Petrol	0.124496	0.227868	0.712283	0.619	0.5554
Phone	-0.048864	-0.077900	0.527974	-0.204	0.8439
Potato	-0.306250	-0.246552	0.131179	-0.656	0.5330
Railway	-0.105247	-0.172045	0.568153	-0.462	0.6580
Repairer	-0.034944	-0.073565	0.942307	-0.195	0.8508
Restaur	-0.773865	-0.660039	0.154671	-2.325	0.0530

End Block Number 1 PIN = 0.050 Limits reached

Multiple Regression

Equation Number 1	Dependent Variable	TOTAL	total working hours - consum
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Residual Statistics					
	Min	Max	Mean	Std Dev	N
*PRED	91.7105	285.9981	165.3000	57.1419	10
*RESID	-50.7105	46.6127	0.0000	29.6935	10
*ZPRED	-1.2878	2.1123	0.0000	1.0000	10
*ZRESID	-1.6101	1.4800	0.0000	0.9428	10

Total Cases = 10
Durbin-Watson Test = 1.87946

Annex 3

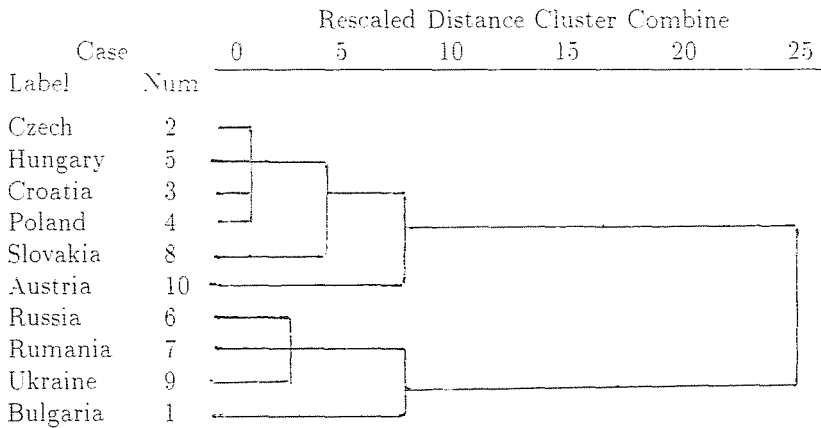
Squared Euclidean Dissimilarity Coefficient Matrix
 (Beef, beer, bread, bus, electricity, gas, milk, potato)

Case	Bulgaria	Czech	Croatia	Poland	Hungary
Czech	40469.2773				
Croatia	55622.5664	1253.1489			
Poland	53850.5586	1097.5441	201.6718		
Hungary	45329.7266	155.1560	579.8037	464.4843	
Russia	9723.3154	13944.7832	22603.7441	22018.7266	16689.4277
Rumania	5761.1235	15842.2969	25851.8828	24680.7734	18970.4375
Slovakia	23789.4785	2250.0457	6744.5430	6240.5396	3487.9407
Ukraine	4178.8262	24969.6816	36390.0664	35078.3750	28524.4570
Austria	91713.7656	10443.3340	4685.9424	5144.1875	8161.9917

Case	Russia	Rumania	Slovakia	Ukraine
Russia				
Rumania	1990.1403			
Slovakia	5400.0693	6273.9111		
Ukraine	2378.0583	2916.2859	12521.5654	
Austria	47588.6406	51781.0195	22268.7949	66550.7891

Hierarchical Cluster Analysis

Dendrogram using Average Linkage (Between Groups)



Annex 4

Female participation rate, self-employment and unemployment in the OECD

Country	Cluster	Distance
Australia	4	5.547
Canada	5	4.088
Czech	4	6.735
Hungary	4	7.866
Iceland	5	10.684
Japan	4	4.816
Korea	1	10.231
Mexico	3	3.642
New Zealand	1	6.247
Norway	5	3.903
Poland	1	5.952
Switzerland	5	6.092
Turkey	3	5.895
USA	5	3.562
Austria	4	4.422
Belgium	4	7.280
Denmark	5	3.833
Finland	5	10.571
France	4	4.584
Germany	4	3.625
Greece	3	6.078
Ireland	2	3.503
Italy	2	5.522
Luxembourg	4	7.112
Netherlands	4	2.401
Portugal	1	2.221
Spain	2	7.042
Sweeden	5	3.253
UK	5	5.645

Quick Cluster

Final Cluster Centers

Cluster	Femlabor	Selfemp	Unemploy
1	60.4750	24.2750	7.5750
2	44.7333	22.3333	16.8000
3	39.4333	32.5333	7.0000
4	59.6600	11.7800	7.0200
5	71.2444	11.3444	8.2667
F:	41.5000	55.5000	3.3000
Prob.:	0.0000	0.0000	0.0260

Distances between Final Cluster Centers

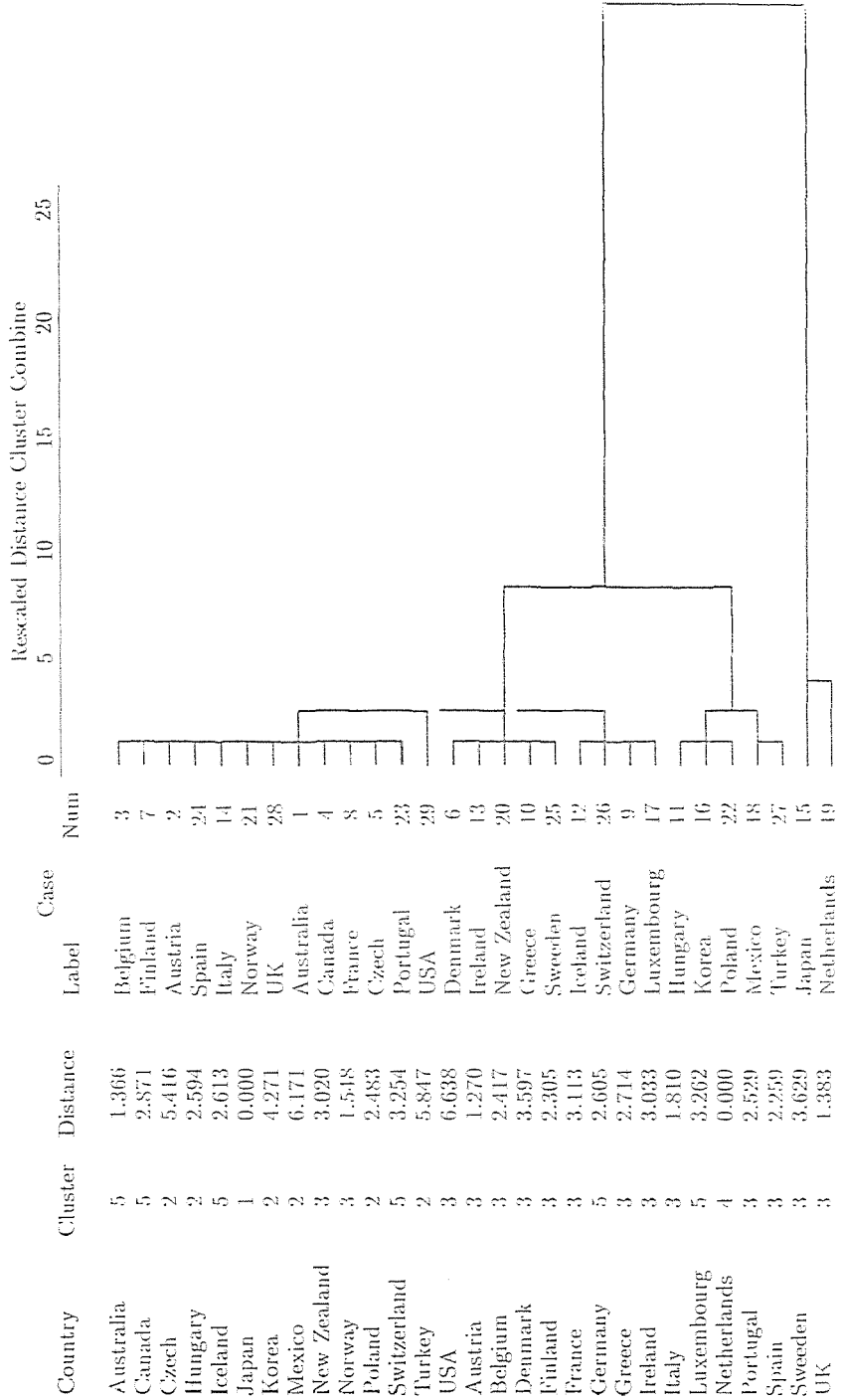
Cluster	1	2	3	4
1	0.0000			
2	18.3486	0.0000		
3	22.6116	15.1053	0.0000	
4	12.5338	20.7323	28.9796	0.0000
5	16.8422	29.9401	38.2429	11.6595

Number of Cases in each Cluster

Cluster	Unweighted cases	Weighted cases
1	4.0	4.0
2	3.0	3.0
3	3.0	3.0
4	10.0	10.0
5	9.0	9.0

Annex 5

Fertility, Health Expenditure, In-Patient Care Day, Man and Woman Life Expectancy at Birth in the OECD



Quick Cluster

Final Cluster Centers

Cases	Cluster	Fertil	Healthex	Manlife	Illday	Womlife
1.0	1	1.4200	7.2000	76.4000	45.5000	82.8000
6.0	2	1.9817	5.8000	67.1333	9.5500	74.5167
15.0	3	1.6420	7.9267	73.5933	9.6667	79.9667
1.0	4	1.5300	8.8000	74.6000	32.8000	80.4000
6.0	5	1.6633	8.9333	74.5333	15.1833	80.5667
F:		1.0500	2.7500	24.2800	76.1700	17.4900
Prob.:		0.4000	0.0500	0.0000	0.0000	0.0000

Distances between Final Cluster Centers

Cluster	1	2	3	4
1	0.0000			
2	38.0679	0.0000		
3	36.0626	8.7227	0.0000	
4	13.1477	25.3008	23.1760	0.0000
5	30.5063	11.5333	5.7176	17.6186

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