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Benchmarking national labour market performance: A radar chart approach

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Benchmarking National Labour Market Performance: A Radar Chart Approach

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Abstract

The radar chart approach is one of a number of special analytical tools that have been developed in connection with benchmarking in the private and public sectors. Although well established as a management tool, the radar chart approach has to our knowledge never been applied to benchmarking labour market performance. This paper assesses the usefulness of the radar chart approach in this policy area.

The radar chart approach makes two important contributions: First, it provides a simplified presentation of multiple performance indicators, which is highly intuitive even to non-experts. Second, the surface area, formed by the four (or more) axes, can also be used as a composite performance indicator.

Among EU Member States, the best overall performers on the employment and unemployment indicators examined were Denmark, Sweden, the United Kingdom, and Austria in that order. Japan and the USA attained the highest overall performance scores. By contrast three countries (Spain, Italy and Greece) were clearly worst performers.

This benchmarking exercise demonstrates the utility of the radar chart approach in assessing comparative labour market performance. It has, however, also identified a number of theoretical and practical problems that should be taken into consideration in future work:

1) The sensitivity of national benchmarking rankings to the choice of performance dimensions and the definition of indicators;
2) The desirability of including additional dimensions of the European employment strategy such as "adaptability" and of giving greater consideration to qualitative dimensions of labour market performance;
3) The methodological problems of the construction of a quantitative indicator of over-all labour market performance based on radar charts, including standardization, weighting, and correlation among indicators;
4) The need to distinguish the impact of short-term (e.g. cyclical) and structural components of labour market performance in benchmarking.

Zusammenfassung

Der Radar-Chart-Ansatz ist einer von mehreren Analyse-Instrumenten, die speziell für das Benchmarking im privaten und öffentlichen Sektor entwickelt worden sind. Als Management-Instrument sehr gebräuchlich, wurde die Radar-Chart-Methode nach unserer Kenntnis bisher nicht für das Benchmarking der Leistungsfähigkeit von Arbeitsmärkten verwendet. In diesem Beitrag wird die Nützlichkeit der Radar-Chart-Methode für dieses Politikfeld untersucht.

Zwei Vorteile des Radar-Chart-Ansatzes stechen ins Auge:
Erstens bietet es in einfacher und überschaubarer Form die Möglichkeit, mehrere Leistungsindikatoren gleichzeitig darzustellen, die auch für Nicht-Experten schnell erfaßbar sind. Zweitens kann die aus mehreren Teilflächen bestehende Gesamtfläche als Gesamtleistungs-Indikator interpretiert werden.

Unter den EU-Mitgliedsstaaten erbrachten Dänemark, Schweden, Großbritannien und Österreich, bezogen auf die Indikatoren "Beschäftigung" und "Arbeitslosigkeit", die beste Gesamtperformanz. Japan und die USA erreichten die insgesamt besten Werte, Spanien, Italien und Griechenland hatten die eindeutig schlechtesten Performanz-Werte.

Der Versuch der beschriebenen spezifischen Anwendung des Benchmarking zeigt die Praktikabilität der Radar-Chart-Methode, um vergleichend Arbeitsmarktperformanzen einschätzen zu können.

Es wurden aber auch einige theoretische und praktische Schwierigkeiten deutlich, die bei zukünftigen Anwendungen beachtet werden sollten:

1) Die Sensitivität national vergleichenden Benchmarkings je nach gewählten Leistungsindikatoren und ihrer Definition.
2) Es ist anzustreben, zusätzliche Indikatoren wie beispielsweise "Anpassungsfähigkeit" einzubeziehen, um die europäische Beschäftigungsstrategie erfassen zu können; außerdem sollten qualitative Dimensionen der Arbeitsmarkt-Performanz stärker berücksichtigt werden.
3) Die methodologischen Probleme der Konstruktion eines quantitativen Gesamt-Indikators für die Arbeitsmarkt-Performanz auf Basis des Radar-Chart-Ansatzes; dies betrifft auch Probleme der Standardisierung, der Gewichtung und der Korrelation zwischen den Indikatoren.
4) Die Notwendigkeit, zwischen den Auswirkungen kurzfristiger, etwa zyklischer und struktureller Komponenten auf die Arbeitsmarkt-Performanz in Benchmarking-Vergleichen zu unterscheiden.

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1 Introduction: The Radar Chart Approach as a Benchmarking Tool

The radar chart approach is one of a number of special analytical tools that have been developed in connection with benchmarking in the private and public sectors. Benchmarking and ”radar charts” are usually employed as a management tool at the micro-level for the assessment of organizational performance (e.g. outputs, profitability, productivity, accident rates, error rates). Although well established as a management tool (Albach and Moerke 1995, Bogan and English 1994, Domptin 1997), the radar chart approach has to our knowledge never been applied to benchmarking labour market performance and policies. Building on recent work by Schütz, Speckesser, Schmid, (1998), this paper aims to assess the usefulness of the radar chart approach in this policy area by applying it to the benchmarking of the labour market performance of EU Member States. The institutional context for this exercise in benchmarking is the new annual process of formulation of employment policy guidelines, monitoring and reporting on Member States' labour market performance, which has been institutionalized at the European level by Art. 4 (Employment Title) of the Treaty of Amsterdam.

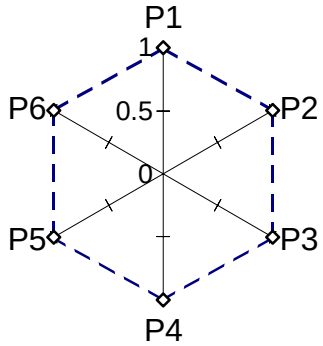
1.1 What are Radar Charts?

At first sight, generic radar charts are merely another mode of presentation of data found in many standard statistical and graphics software programs such as MS Excel, the program used to produce the radar charts in this report. Radar charts have four (or more) axes integrated into a single radial figure on which data for one or more countries (cases) can be presented simultaneously. Radar charts are useful in particular for comparing performance on multiple dimensions simultaneously or for comparing cases with multiple performance dimensions. The name "radar" chart comes from their resemblance to a radar screen, although other names are also sometimes used (measures matrix, net chart, etc.). In a conventional radar chart such as the six-sided figure displayed in the illustration below, the lines joining the data points represent graphically levels of performance of a country (or other unit of analysis) on the 6 axes or performance dimensions.[1] By adding additional data series to the chart it is

[1] It is also possible to transform the display into one in which the axes represent countries and the lines performance indicators. The later is for obvious reasons frequently called "spider web" chart and is more suitable for graphic display of the variation in performance among a larger number of cases.

also possible to compare changes in performance over time or the performance of several countries on the same chart.

Radar chart with six dimensions and theoretical maximum performance



1.2 Benchmarking Applications of Radar Charts

In benchmarking applications, each of the four or more axes of the radar chart represent organizational goals in the designated key performance dimensions to be measured. On the basis of agreed performance indicators, the radial axes of the radar chart quantify performance in terms of the degree of attainment of the declared benchmarking goals. There is no theoretical limit to the number of axes used in radar charts, i.e. the number of benchmarks represented, but experience suggests that radar charts with more than six to eight benchmarking dimensions become difficult to understand and interpret. The most important consideration is the number of relatively independent performance benchmarks that are the focus of the analysis. There is thus no apriori reason for the use of radar charts with four dimensions, i.e. ”diamond charts,” in this report; this choice is merely a reflection of the decision to analyze employment and unemployment benchmarks separately.

In order to present several indicators of various dimensions of labour market performance in the same radar chart, the original data are standardized to a common interval scale with values between 0 and 1. On the basis of a mathematical formula a value of "1" is assigned to the best performer benchmark and a value of "0" to worst performer. Other countries are assigned values between 0 and 1 according to their relative performance on each indicator, i.e. a value of 0.5 indicates performance at the middle point of the scale half way between the lowest and the highest case. In the radar charts on labour market performance presented below, higher values represent better performance. This is, however, an arbitrary decision from a methodological point of view; it is equally possible to define good performance as values

approaching zero. The only constraint is that all performance dimensions must be depicted on the same scale.[2] Technical details of the transformation of the data are described in Appendix B.

The radar chart approach makes two important contributions to benchmarking:

- The first and most obvious is that it provides a simplified presentation of multiple performance indicators, which is highly intuitive even to non-experts and thus suitable for widespread use in organizations. It should be noted in this respect that benchmarking is not merely an analytical exercise but, perhaps most importantly, a management tool for motivating staff and steering performance; the visual representation of complex quantitative indicators provided by radar charts is an important reason for their popularity as a management tool.
- Second, the figure formed by the four (or more) axes of the radar chart provides not only a visual representation of performance, but its surface area can be used as a composite indicator of the level of overall achievement of goals that may be measured in different dimensions, instead of separate indicators for each goal.

Since organizations typically have multiple rather than single goals, for example, the labour market policies of countries, regions, or PES offices, this management tool can be very useful for comparative analysis. It also has the advantage of being a relatively simple approach in comparison, for example, with the frontier production function approach. The latter is a powerful tool for analyzing organizational efficiency in relating inputs to outputs but has demanding data needs and requires sophisticated programming techniques that are not available in standard software.

This "surface measure of overall performance" or "SMOP" (Schütz, Speckesser, Schmid 1998; Albach and Moerke 1996), which is calculated simply on the basis of the mathematical formula for the area of the polygon, yields an interval index measure of overall performance that can be used, for example, to rank performance of countries or to measure changes in performance over time. The maximum value of the SMOP indicator depends on the number of sides, assuming that the maximum benchmark value of "1" (or 100%) is achieved on all four performance dimensions. Thus a radar chart with four axes has a maximum SMOP of 2 and an eight-sided figure a maximum SMOP of 2.83. The calculation of the SMOP is explained in technical Appendix B.

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2 Although it is possible to use different scales within a generic radar chart, for benchmarking purposes the chart loses much of its attractiveness because the different performance dimensions can no longer be compared directly and the SMOP surface measure of overall performance can no longer be calculated (Schütz, Speckesser, Schmid 1998).

The surface measure of overall performance (SMOP) is subject to all the limitations and potential problems that beset any index measure:

- The first problem for SMOP indices - like for the radar charts -- is the selection of the performance goals in terms of which labour market performance is to be benchmarked. This represents in essence a political or managerial decision, which is a prerequisite of the benchmarking process in a given political or organizational context.
- Second, appropriate indicators for these performance dimensions must be selected and quantitative benchmarks defined. The results of radar charts and corresponding SMOP rankings may be highly sensitive to changes in the indicators used or in the definition of the benchmarks (see Schütz, Speckesser, Schmid 1998 for illustrations of these problems).
- Third, the results of the benchmarking exercise are sensitive to the weighting of performance indicators in calculating the SMOP index. In the analysis presented below all indicators for performance benchmarks are weighted equally. This approach may be criticized for its implicit assumption that low values in one dimension can be compensated by high values in another. On the other hand, in the absence of a clear political mandate at the European level, there is no apriori reason for giving greater weight to particular performance goals.

2 Benchmarking National Performance in Monitoring European Employment Policy

This section develops a framework for a benchmarking labour market performance in the EU using the radar chart and surface measure of overall performance approach. It discusses in particular the choice of performance dimensions, indicators and appropriate benchmarks for assessing the labour market performance of EU Member States within the framework of European employment policy. It is based insofar as possible on the Essen employment strategy as developed by subsequent Councils and the European Commission, in particular the "1998 Employment Guidelines" adopted by the extraordinary Council meeting on Employment of 20 and 21 November 1997 and Commission communication "Proposal for Guidelines for Member States' Employment Policies 1998" of 1 October 1997. Finally, we draw on extensive work on benchmarking carried out by DG V on benchmarking, especially the development of a proposal for basic labour market performance indicators.[3]

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3 See European Commission (DG V), "Monitoring the Employment Guidelines: Basic Performance Indicators. Report by the ELC expert group on employment indicators [Final Proposal] V/A/GDM D(98), July 1998.

2.1 Selection of Performance Dimensions and Indicators

The first problem in benchmarking European employment policy, which may well be typical for political organizations, is the sheer number and complexity of the goals enunciated. Thus, for example, the 1998 Employment Guidelines identify four major policy dimensions (the "four pillars": Employability, Entrepreneurship, Adaptability, Equal opportunities) and 19 specific guidelines for assessment of national action plans on employment policies. Earlier Council declarations and Commission communications since the Essen Council have articulated the same or similar goals, although sometimes with important differences in emphasis.

We have confined our analysis to benchmarking labour market performance and, therefore, do not consider numerous recommendations for changes in labour market policies (e.g. activation of labour market policies), regulation (of business start-ups and small business), and even tax systems (e.g. employment friendly changes in VAT and social security contributions), which are beyond the scope of this report. We have rather attempted to distil two sets of performance goals for separate presentation and analysis in four dimensional radar charts. For "Employment" we have selected employment growth, employment level, equal opportunity, and integration of older workers and for "Unemployment" combating unemployment, equal opportunity, integration of youth and of the long-term unemployed) with in each case corresponding indicators (see Table 1). It should be noted that this selection of performance goals for inclusion in the analysis was heavily guided by the existence of basic performance indicators that have been agreed for monitoring the employment policy guidelines.[4]

These performance dimensions are operationalized in this benchmarking exercise on the basis of the following indicators: (see also Table 1):[5]

- <u>Employment growth and the unemployment rates:</u> Both were included as standard general measures of labour market performance. Moreover, indicators for both are available and have been included in the agreed list of indicators for monitoring labour market performance (Eurostat's harmonized unemployment rates and the employment benchmark series). The indicator for employment growth used in the radar charts and indices is percentage change in employment over the previous 5 years (1992-1997 or 1987-92).[6]

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4 See footnote 4 above.

5 For a more detailed discussion of selection of performance dimensions and indicators for benchmarking with radar charts see Schütz, Speckesser, Schmid 1998.

6 It should be noted that employment growth is more difficult to deal with in a radar chart presentation and in calculation of the SMOP measure because it includes negative values for some countries. Although negative values can be represented in a radar chart, they may detract from the presentation. Moreover, the use of negative values complicates the

- Employment rate: The importance of a high employment level, i.e. employed persons as a percentage of the population of working age had been stressed in a number of Council and Commission documents, although it has not been explicitly included in the 1998 guidelines. A level of 70%, which corresponds approximately to the level of the main trading partners, was recently proposed by the Commission.[7]
- Employment rate older workers: The exclusion of older workers (50-64) from the labour market has been a long-standing concern of European employment policy. Low employment rates for older workers are a principal reason for national differences in employment rates, along with gender differences. Moreover, older workers are disproportionately represented among the long-term unemployed and people with disabilities, two specific target groups of European employment policy.
- Gender gaps in employment and unemployment rates: Equal opportunity for women is one of the "pillars" of the employment guidelines and at least three related recommendations are included (reducing the gender gap in unemployment and in the sectoral distribution of employment, measures to reconcile work and family life, special attention to the problems of persons re-entering the labour market). Although the 1998 Employment Guidelines refer explicitly only to reducing the gap between male and female unemployment rates, closing the gender gap in employment rates appears to be a clear implication of both the goal of increasing overall employment rates and of equal opportunity policies. The employment and unemployment gender gaps are measured in terms of the ratio of female to male employment and male to female unemployment rates respectively. It should be noted that in some countries (e.g. the UK) the male employment rate is higher than that for women. Although other definitions are possible, the formula for the index used here returns a lower score for any deviation from equality in the incidence of unemployment.[8]
- Youth unemployment: At least three recommendations in the 1998 Guidelines address issues of youth unemployment (offer of an active measure or a job before reaching six months of unemployment, easing transition from school to work, providing young people with relevant skills). Youth integration has been operationalized here using the ratio of unemployed youth to the population 15-24 years of age rather than the unemployment rate. This is the indicator agreed for comparability among

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calculation of the SMOP (Albach and Moerke 1996:10). See the discussion of the transformation of the data below in Appendix B.

7 COM(97) 497 final, Brussels, 1.10.1997, "Proposal for Guidelines for Member States Employment Policies 1998."

8 Gender gap in unemployment index is defined as follows: = 1- |(1- (M / F))|, where M is the male and F the female unemployment rate. The simple difference between male and female employment rates is not suitable for international comparison because it is too strongly affected by cross national differences in the level of employment/unemployment.

member states with diverse education and training systems for youth and different ages of entry into the labour force.

- Long-term unemployment: Long-term unemployment is a special focus of European employment policy. It is the subject of a strong recommendation for active policy intervention before 12 months of unemployment is reached and it is also implicit in the guidelines on integration of people with disabilities in working life and the above mentioned provision on youth unemployment. This performance goal is operationalized here as the share of long-term unemployed (>12 months) among all unemployed persons. Long-term unemployment like other performance indicators can be measured in other ways as well (e.g. long-term unemployment rate) and can be defined differently (e.g. 6 months or 2 years), which might lead to different results. We have preferred to measure long-term unemployment as a share of all unemployment rather than as the long-term unemployment rate. The principal reason for this choice is that it is a standard definition that provides a more independent measure of the structure of unemployment than does the long-term unemployment rate, which is strongly affected by the level of unemployment.

While the choice of these performance dimensions and indicators is strongly based on EU policy declarations, it represents merely one possible interpretation for this heuristic benchmarking analysis: Other combinations of indicators or definitions of their measurement may be equally legitimate. Moreover, other goals not included here may be deemed equally or more important (e.g. integration of the disabled or ethnic minorities). Finally, as noted above, although national employment policies may give more weight to some goals rather than others, this analysis abstains from any attempt at weighting and gives all goals the same weight.

2.2 Performance Benchmarks

Last but not least, benchmarking of national labour market performance requires the choice of appropriate goals or targets in terms of which performance is to be assessed. There are in principal three types of benchmarks:

1. **Theoretical benchmarks**: Purely theoretical or academic criteria posited by a researcher on the basis of the relevant literature (e.g. zero long-term unemployment);
2. **Best performance benchmarks**: A benchmark might also be based on "best performance" in the specific policy dimension, either within the EU or internationally (e.g. part-time unemployment in the Netherlands);
3. **Institutional benchmarks**: Finally, specific targets or benchmarks for assessing performance may be set by the leadership or management of an

organization engaged in benchmarking, for example, a target employment rate of around 70% has been proposed at the European level.[9]

In this benchmarking exercise we have defined performance standards in terms of ”best performance” in 1997, i.e. the country with the best score on the chosen indicator among EU Member States, the USA and Japan in 1997. This procedure yields the following best performance benchmarks on the basis of the indicators reported in Table 1:

- employment growth: Ireland;
- employment rate: Denmark;
- employment gender gap: Sweden;
- employment 50-64: Sweden;
- unemployment rate: Luxembourg;
- youth unemployment: Luxembourg;
- unemployment gender gap: Japan;
- long-term unemployment: USA.

Institutional benchmarking was deemed inappropriate for this benchmarking exercise after a survey of EU employment policy statements showed that most labour market performance goals have thus far been formulated only in general terms and not as quantitative targets necessary for institutional benchmarking. The important quantitative targets that have been set are in every instance performance goals for labour market policies. For example, the 1998 guidelines mandate intervention of active labour market measures in youth unemployment spells after six months and in adult spells after 12 months at the latest.

The third possibility, specifying theoretical benchmarks,[10] was rejected for two reasons: First, while it is possible to specify theoretical benchmarks for some performance dimensions (e.g. long-term unemployment = 0; gender gap in unemployment = 0), for others (e.g. employment growth, employment level, part-time employment, or unemployment) the theoretical goal is unclear or ambiguous. There is, for example, no agreement even on the optimal level of unemployment since there is a trade-off between unemployment and inflation. Second, although benchmarking exercises can be based on purely theoretical performance targets, these are inevitably somewhat arbitrary and externally imposed by the analyst. It was felt that a benchmarking exercise in the context of European employment policy should be based on endogenous criteria, i.e.

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9 See footnote 8.

10 See Schütz, Speckesser, Schmid 1998 for an example of this approach.

either "best performance " or institutional benchmarks. In the absence of the latter we have relied on "best performance."

In summary: The policy dimensions examined are based on those central to European employment policy but are inevitably selective. Although a great deal of useful work has been done at the European level on the development of appropriate indicators, different definitions of indicators affect the results, sometimes markedly. The quantitative benchmarks in this analysis are based simply on best performance in the reference year.

In order to compare labour market performance at two points in time, 1997 and 1992 data on labour market performance are pooled and standardized in terms of the same benchmark values in this analysis. While best performance is defined exclusively in terms of performance in 1997, worst performance at the negative end of the relative benchmarking scale is defined as the lowest value on the indicators examined either in 1997 or 1992. This scoring convention allows values greater than ”1” where performance in 1992 exceeded the 1997 benchmark value but rules out negative values for technical reasons (see Table 3).

Table 1: EU Labour Market Performance: Goals, Indicators, and Benchmarks

Performance dimension	Performance goal	Performance Indicators		Source
Employment		**Indicator**	**Definition**	
Employment Growth	High Employment Growth	Employment Growth 1997-93	Average Annual Growth in Occupied Population, Previous 5 years; %	Eurostat, Employment Benchmark Series
Employment Level	High Employment Level	Total Employment Rate	Employed Population (15-64 years) as Proportion of Total in the Same Age Bracket; %	Eurostat, Employment Benchmark Series & LFS; USA & JP, and Austria, Finland Sweden for 1992 national LFS
Equal Opportunity	Gender Equality in Employment	Female/Male Employment Ratio	Ratio of Female to Male Employment Rate	Eurostat, LFS; USA & JP, and Austria, Finland Sweden for 1992 National LFS
Integration of Older Workers	High Emloyment Level, Equity	Employment Rate 50-64	Employed Persons 50-64 as Proportion of Total in the Same Age Bracket; %	Eurostat, LFS; USA & JP, and Austria, Finland Sweden for 1992 National LFS
Unemployment				
Combating Unemployment	Reducing Unemployment	Total Unemployment Rate	Unemployed as Proportion of Total Active Population; %	Eurostat, Harmonized Unemployment Rates
Equal Opportunity	Gender Equality in Labour Market	Male/female Unemployment Ratio	Ratio of Male to Female Unemployment Rate	Eurostat, LFS; USA & JP OECD
Integration of Youth into Labour Market	Reducing Youth Unemployment	Youth Unemployment Ratio	Unemployed youth (15-24 years) as proportion of total in same age bracket; %	Eurostat, LFS; USA & JP OECD
Integration of problem groups	Reducing Long-term Unemployment	Long-Term Unemployment Share	Long-term Unemployed (>12m) as Proportion of Total Unemployment; %	Eurostat, LFS; USA & JP OECD

3 Empirical Application: Benchmarking Labour Market Performance in the EU, 1997 and 1992

Table 2 reports the original data series, sources, and definitions for the employment and unemployment indicators used and Table 3 summarizes the transformed data used in the radar charts. The original data were transformed in order to make the data suitable for use in radar charts whose axes depict performance in relationship to benchmarks and whose surface area can be used as a composite indicator of overall performance. In each case the underlying labour market indicators for the years 1997 and 1992 are transformed into index values with a common scale in which the benchmark (best performance) value in 1997 is always equal to "1" and the lowest value (worst performance) in 1997 or 1992 is equal to "0." The benchmark performance values for the other countries reflect their relative position in the field between best and worst performance. Thus in the following presentations a higher score is always indicative of better performance. A maximum score of "1" or above on an indicator represents performance at or exceeding the benchmark value achieved by the benchmark country (best case), worst performance receives a score of "0". Thus a score of "0.5" indicates performance at the midpoint of the range defined by best and worst performance, i.e. if the lowest unemployment rate is 5% and the highest 15%, then a country with an unemployment rate of 10% is scored as "0.5" on the benchmarking scale for this indicator.

It should be emphasized that best performer benchmarks, in contrast to theoretical benchmarks, are always relative to the performance of the other countries included in the comparison (here 15 EU Member States, the USA, and Japan). Thus each of the benchmark performance measures compares the performance of an individual country with the performance of the universe of all other countries included in the benchmarking exercise during the same period. In this report we have pooled data for the years 1997 and 1992 for the purpose of identifying best and worst performance in order to make possible a direct comparison between performance at two points in time,

3.1 Cross National Comparisons

The results of our benchmarking exercise on the basis of a composite indicator or surface measure of overall performance (SMOP) for 1997 are reported in Figure 1 and Table 4 for all eight indicators and for the employment and unemployment indicators separately. Among EU Member States the best performers were Denmark, Sweden, the United Kingdom, and Austria in that order, all of which received total SMOP benchmarking scores of 1.5 or greater

in 1997 out of a theoretical maximum of 4.[11] Japan and the USA attained the highest overall performance scores. By contrast three countries (Spain, Italy, and Greece) were clearly worst performers with total SMOP benchmarking scores of less than 0.5. The remaining EU Member States (Portugal, Ireland, the Netherlands, Germany, Luxembourg, Finland, France, and Belgium) constitute a distinct group of intermediate level countries with mixed performance profiles.

Analysis of change in overall labour market performance between 1997 and 1992 shows a very mixed pattern in the EU. Whereas 8 Member States show a decline in performance on the indicators observed, 6 show improvement, which in the case of Ireland exceed 100% (see Figure 2). Greece showed virtually no change over the 1992-1997 period on the composite indicator. This mixed pattern is primarily a result of the fact that many labour market performance indicators are highly sensitive to changes in the business cycle (e.g. employment growth, unemployment rate, youth unemployment ratio). For the EU this mixed pattern in the individual Member States resulted in an overall negative trend. Analysis of individual indicators shows that this decline was primarily due to the decline in employment growth and increase in unemployment in the EU in comparison with the previous period (Table 4 and Figure 3).

The overall performance ranking remained relatively stable between 1992 and 1997, but there were a number of shifts: Two countries with high performance scores in 1997 (Austria and the United Kingdom), had only intermediate scores in 1992, whereas two other countries with only intermediate scores in 1997 (Luxembourg and Portugal) belonged to the group of top performers in 1992, and the German SMOP index value was only slightly below the 1.5 level (see Figure 1 and Table 4). Both the USA and Japan maintained a very high level of performance over the entire period despite cyclical fluctuations as did Denmark and Sweden, the two top ranking EU Member States. In most cases these shifts appear to be strongly affected by changes in the economic environment that impact on the labour market through declines in employment growth (see Tables 2 & 3). Although the results thus appear to be relatively robust in the median term, in future benchmarking exercises it may be preferable to distinguish more carefully between structural features of labour market performance and indicators that are sensitive to or highly correlated with economic growth rates.

A limitation of the radar chart approach - like any benchmarking indicator - is that, while it provides tools for measuring and ranking labour market performance on multiple dimensions, it does not of itself provide any

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11 The maximum possible score for a country with a score of "1" (best practice) on all eight indicators. The total SMOP is a simple sum of the separate employment and unemployment SMOPS reported below, each of which has a maximum value of 2

explanation for the observed differences in performance, which have to be explained by resort to other tools of analysis.

It is, however, possible to decompose the analysis and identify the strong or weak points in the national performance profiles that explain the overall performance scores achieved. Table 4 also reports the component employment and unemployment indicators separately. While Spain, Italy, and Greece form a distinct group of worst performers (<0.25) on both sets of performance indicators in 1997, only Sweden and Denmark among the group of four best EU-performers are among the top performers in both categories in 1997, together with the USA and Japan (see Figure 1 & Table 4). The radar charts for the individual Member States reported below show eight different dimensions of national labour market performance (see Appendix A).

Table 2: Original Data Series: Employment and Unemployment Performance Indicators, 1997 and 1992

	employment rate		employm. ratio (50-64) (1)		gender gap		employment growth (3)	
	1997	1992	1997	1992	1997	1992	1997	1992 (4)
B	57,3	56,8	35,3	32,7	0,7	0,7	0,4	1,7
DK	77,5	75,8	64,0	62,3	0,8	0,9	0,7	-0,7
D	61,8	65,9	46,3	50,3	0,8	0,7	-1,1	1,2
GR	56,7	55,4	47,1	45,6	0,5	0,5	0,9	0,5
E	48,6	48,4	41,3	40,6	0,5	0,5	0,6	1,8
F	60,1	61,4	45,6	43,2	0,8	0,7	0,0	0,5
IRL	57,8	52,4	46,5	43,5	0,6	0,6	3,6	1,2
I	51,3	53,7	36,5	39,6	0,6	0,5	-1,4	0,3
L	60,6	62,0	33,8	36,9	0,6	0,6	1,9	3,7
NL	66,7	63,5	44,7	39,9	0,7	0,7	1,5	2,3
A	69,9	70,7	43,9	48,1	0,7	0,7	1,0	1,5
P	67,5	68,7	55,1	54,3	0,8	0,7	0,0	1,5
FIN	63,9	66,2	51,0	50,4	0,9	1,0	0,1	-2,1
S	69,5	77,2	71,3	74,9	1,0	1,0	-1,4	-0,5
UK	70,8	69,4	58,7	56,9	0,8	0,8	0,7	0,8
EU	60,5	61,8	46,8	47,2	0,7	0,7	-0,2	0,7
JP	74,6	74,2	63,6	64,5	0,7	0,7	0,4	1,8
USA	74,0	70,9	65,7	61,1	0,8	0,8	1,9	1,1
min	48,6	48,4	33,8	32,7	0,5	0,5	-1,4	-2,1
max	77,5	77,2	71,3	74,9	1,0	1,0	3,6	3,7
Average	63,8	64,1	49,8	49,6	0,7	0,7	0,5	1,0
	unemployment rate		**youth ratio**		**gender gap**		**long-term unemployed**	
	1997	1992 (1)	1997	1992	1997	1992(1)	1997	1992 (2)
B	9,2	7,3	6,8	4,8	0,6	0,5	58,7	54,8
DK	5,5	9,2	6,0	8,9	0,7	0,8	27,3	26,1
D	10,0	6,6	5,3	3,5	0,9	0,6	49,0	31,8
GR	9,6	7,9	11,0	9,5	0,4	0,4	55,2	49,4
E	20,8	18,5	15,9	14,7	0,6	0,6	51,9	42,2
F	12,4	10,4	9,9	8,6	0,7	0,6	40,3	33,7
IRL	10,1	15,4	7,2	10,5	1,0	0,9	56,4	56,5
I	12,1	10,0	12,8	11,8	0,6	0,5	66,9	59,0
L	2,6	2,1	2,7	1,9	0,5	0,6	34,6	19,0
NL	5,2	5,6	6,1	5,0	0,6	0,5	48,1	42,9
A	4,4	3,6	4,4	12,4	0,7	0,6	34,1	16,1
P	6,8	4,2	6,2	4,9	0,8	0,7	51,5	28,6
FIN	13,1	12,3	17,2	14,7	0,9	0,6	33,6	30,6
S	9,9	5,6	9,0	9,6	0,9	0,5	35,4	8,3
UK	7,0	10,1	8,7	10,6	0,7	0,5	38,6	34,7
EU	10,7	9,2	9,8	9,0	0,8	0,7	48,6	41,3
JP	3,5	2,2	6,6	2,4	1,0	1,0	21,8	25,3
USA	4,9	7,4	11,3	8,8	1,0	0,6	8,7	11,2
min	2,6	2,1	2,7	1,9	0,4	0,4	8,7	8,3
max	20,8	18,5	17,2	14,7	1,0	1,0	66,9	59,0
Average	8,8	8,2	8,7	8,4	0,7	0,6	42,3	34,0

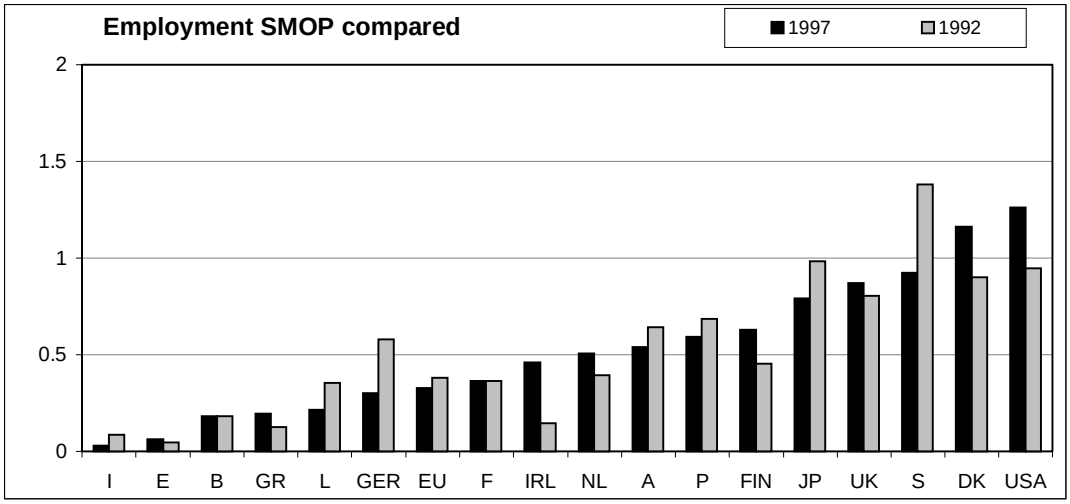
Sources: In general data are from Eurostat except for USA and Japan and 1992 data for Austria, Finland, and Sweden, which are drawn from OECD or national sources. The Eurostat data used are identical with the data in the 1998 Joint Employment Report. See Table 1 for sources and definitions of indicators.

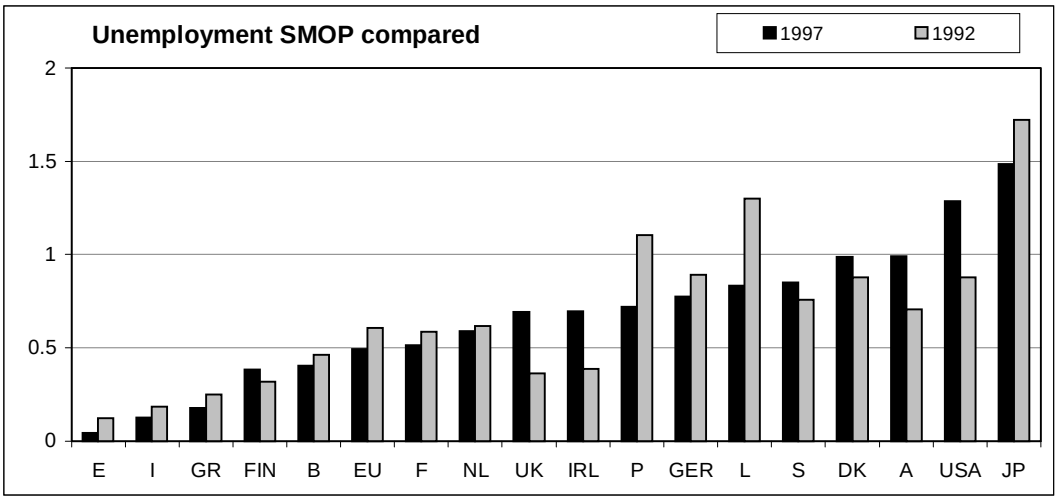
Table 3: Standardized Data Series: Employment and Unemployment Performance Indicators, 1997 and 1992

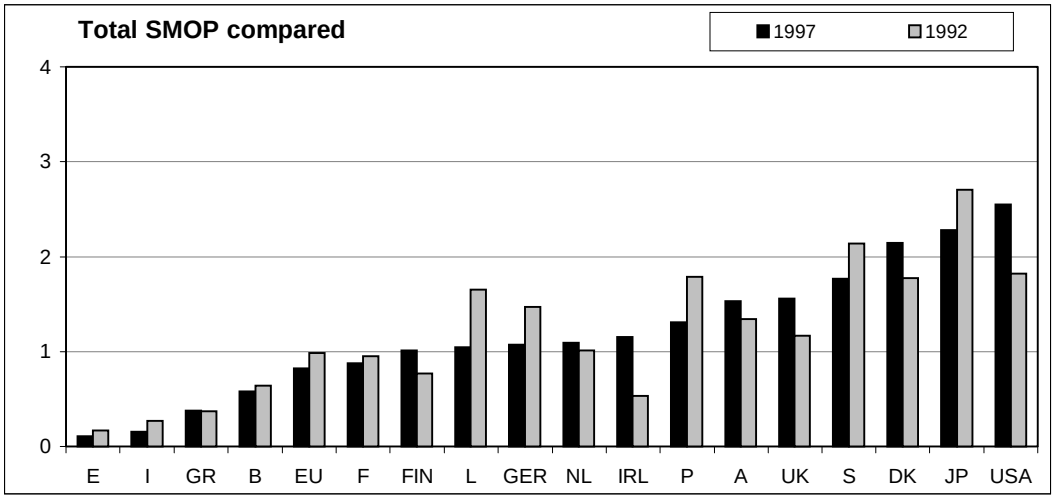
	employment rate		employment 50-64		employment gender gap		employment growth	
	1997	1992	1997	1992	1997	1992	1997	1992
A	0,7	0,8	0,3	0,4	0,5	0,5	0,5	0,6
B	0,3	0,3	0,1	0,0	0,5	0,4	0,4	0,7
DK	**1,0**	0,9	0,8	0,8	0,8	0,8	0,5	0,2
E	0,0	0,0	0,2	0,2	0,1	0,0	0,5	0,7
EU	0,4	0,5	0,4	0,4	0,5	0,4	0,3	0,5
F	0,4	0,4	0,3	0,3	0,6	0,5	0,4	0,5
FIN	0,5	0,6	0,5	0,5	0,9	1,0	0,4	0,0
GER	0,5	0,6	0,4	0,5	0,6	0,5	0,2	0,6
GR	0,3	0,2	0,4	0,3	0,1	0,0	0,5	0,4
I	0,1	0,2	0,1	0,2	0,2	0,1	0,1	0,4
IRL	0,3	0,1	0,4	0,3	0,3	0,2	**1,0**	0,6
JP	0,9	0,9	0,8	0,8	0,4	0,4	0,4	0,7
L	0,4	0,5	0,0	0,1	0,3	0,3	0,7	**1,0**
NL	0,6	0,5	0,3	0,2	0,5	0,4	0,6	0,8
P	0,7	0,7	0,6	0,6	0,6	0,5	0,4	0,6
S	0,7	**1,0**	**1,0**	**1,1**	**1,0**	**1,0**	0,1	0,3
UK	0,8	0,7	0,7	0,6	0,7	0,7	0,5	0,5
USA	0,9	0,8	0,9	0,7	0,8	0,7	0,7	0,6
Standard-abweichung	0,3	0,3	0,3	0,3	0,3	0,3	0,2	0,2
Varianz	0,1	0,1	0,1	0,1	0,1	0,1	0,0	0,0
Median	0,5	0,6	0,4	0,4	0,5	0,5	0,5	0,6
	unemployment rate		**youth ratio**		**gender gap**		**long-term unemployed**	
	1997	1992	1997	1992	1997	1992	1997	1992
A	0,9	0,9	0,9	0,3	0,5	0,3	0,6	0,9
B	0,6	0,7	0,7	0,9	0,4	0,2	0,1	0,2
DK	0,8	0,6	0,8	0,6	0,5	0,7	0,7	0,7
E	0,0	0,1	0,1	0,2	0,3	0,3	0,3	0,4
EU	0,6	0,6	0,5	0,6	0,6	0,6	0,3	0,4
F	0,5	0,6	0,5	0,6	0,6	0,4	0,5	0,6
FIN	0,4	0,5	0,0	0,2	0,9	0,4	0,6	0,6
GER	0,6	0,8	0,8	0,9	0,8	0,4	0,3	0,6
GR	0,6	0,7	0,4	0,5	0,1	0,0	0,2	0,3
I	0,5	0,6	0,3	0,4	0,3	0,2	0,0	0,1
IRL	0,6	0,3	0,7	0,5	**1,0**	1,0	0,2	0,2
JP	1,0	1,0	0,7	1,0	**1,0**	**1,0**	0,8	0,7
L	**1,0**	**1,0**	**1,0**	**1,1**	0,2	0,4	0,6	0,8
NL	0,9	0,8	0,8	0,8	0,3	0,2	0,3	0,4
P	0,8	0,9	0,8	0,8	0,7	0,6	0,3	0,7
S	0,6	0,8	0,6	0,5	0,9	0,2	0,5	**1,0**
UK	0,8	0,6	0,6	0,5	0,5	0,2	0,5	0,6
USA	0,9	0,7	0,4	0,6	1,0	0,4	**1,0**	1,0
Standard-abweichung	0,2	0,2	0,3	0,3	0,3	0,3	0,2	0,3
Varianz	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Median	0,6	0,7	0,6	0,6	0,6	0,4	0,4	0,6

Source: Original data series from Table 2 standardized according to procedure described in Appendix B. Benchmark (1.00) = top performing country on indicator in year 1997; lowest performer in 1992 or 1997 = "0". No minimum value.

Figure 1: Composite Indicators of Performance (SMOP): Total, Employment, and Unemployment, 1997 & 1992

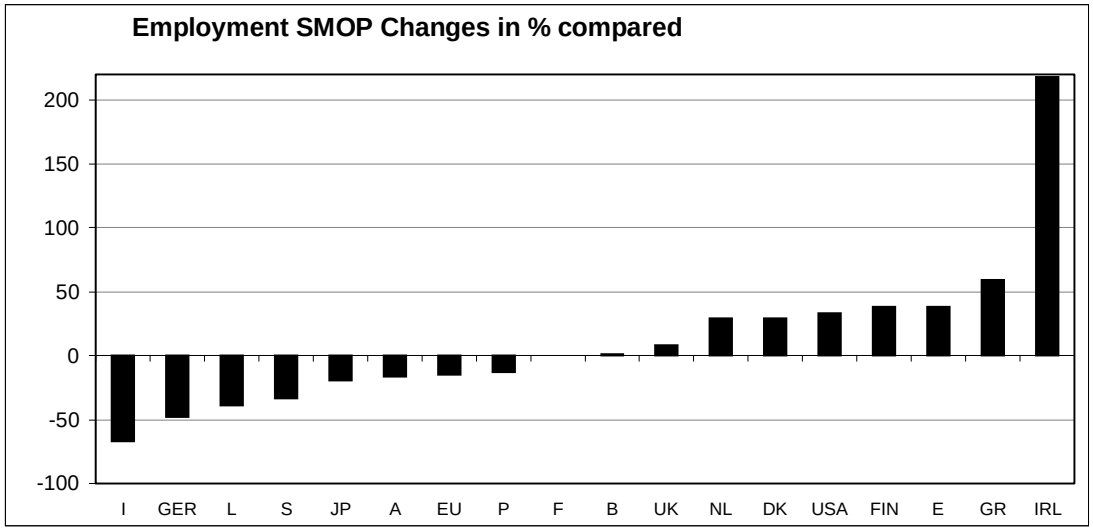


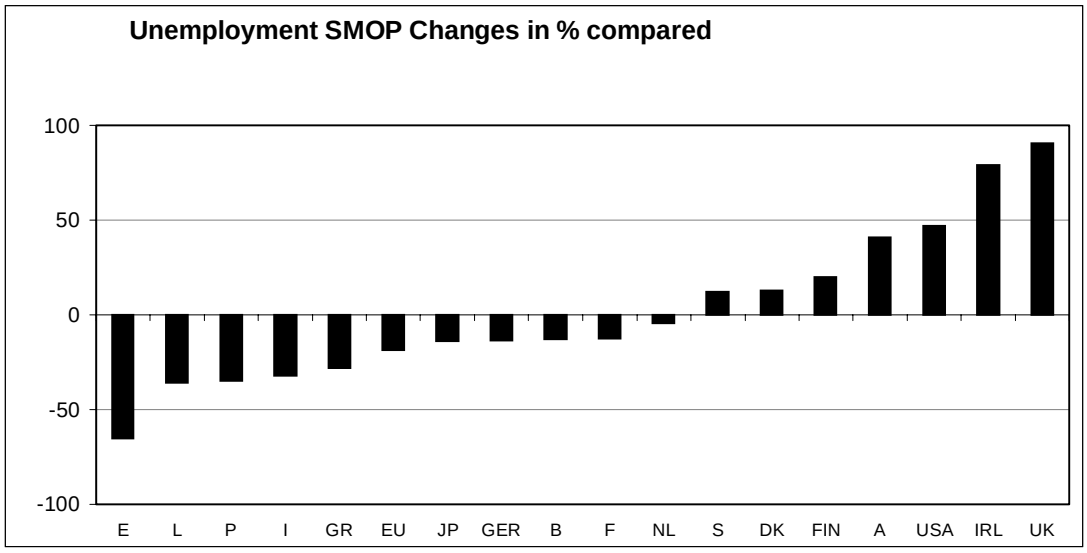


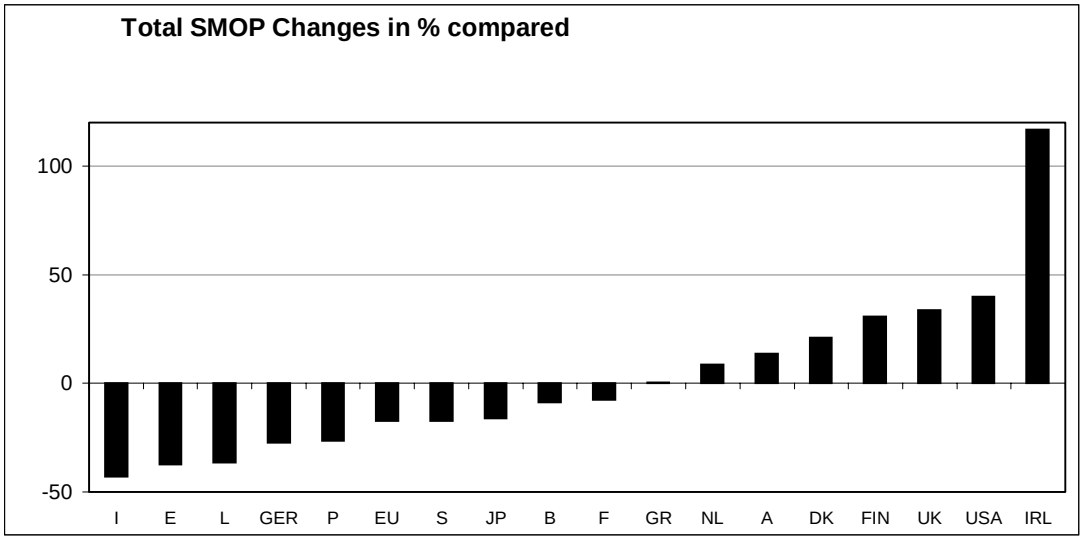


Source: See Table 4

Figure 2: SMOP CHANGES in % (1992-97)







Source: See Table 4

Table 4: Composite Indicators of Performance (SMOP), Total, Employment, and Unemployment, 1997 & 1992

	EMPLOYMENT		UNEMPLOYMENT		TOTAL	
	1997	1992	1997	1992	1997	1992
B	0,18	0,18	0,40	0,46	0,58	0,64
DK	1,16	0,90	0,99	0,88	2,15	1,78
D	0,30	0,58	0,77	0,89	1,07	1,47
GR	0,20	0,12	0,18	0,25	0,38	0,37
E	0,06	0,05	0,04	0,12	0,11	0,17
F	0,36	0,36	0,51	0,58	0,88	0,95
IRL	0,46	0,14	0,69	0,39	1,15	0,53
I	0,03	0,08	0,13	0,18	0,15	0,27
L	0,22	0,35	0,83	1,30	1,05	1,65
NL	0,51	0,39	0,59	0,62	1,10	1,01
A	0,54	0,64	0,99	0,70	1,53	1,35
P	0,59	0,68	0,72	1,11	1,31	1,79
FIN	0,63	0,45	0,38	0,32	1,01	0,77
S	0,92	1,38	0,85	0,76	1,77	2,14
UK	0,87	0,80	0,69	0,36	1,56	1,17
EU	0,32	0,38	0,49	0,62	0,82	1,00
JP	0,79	0,98	1,49	1,72	2,28	2,71
USA	1,26	0,95	1,29	0,88	2,55	1,82

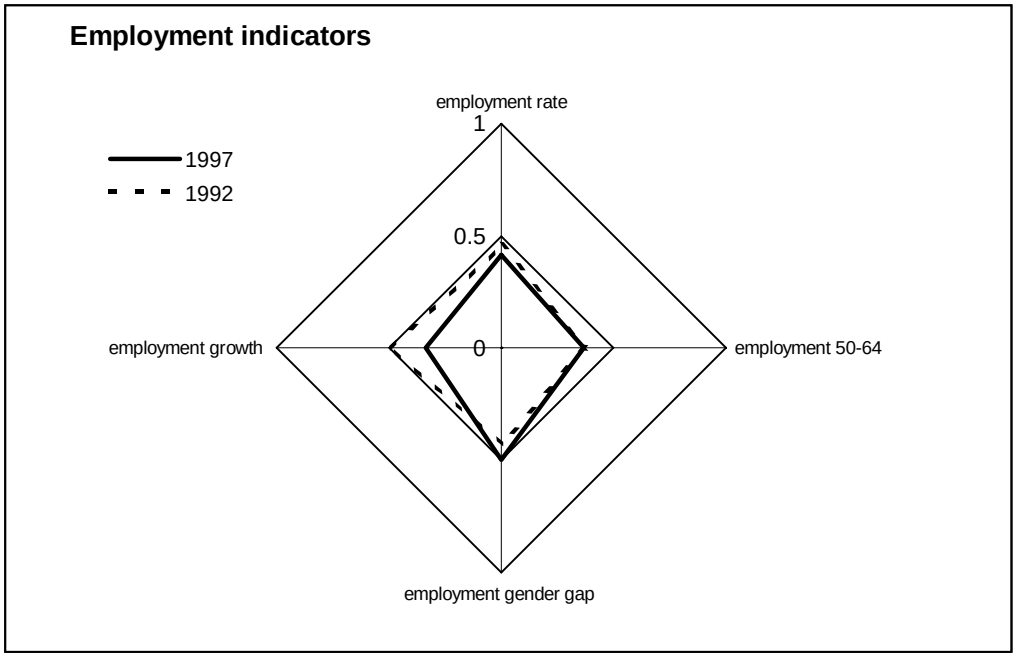
Source: Employment and unemployment composite indicators (SMOPs) based on area of polygon formed by data points of radar charts (averaging). See Appendix B for an explanation of calculation of SMOP on basis of radar chart values.

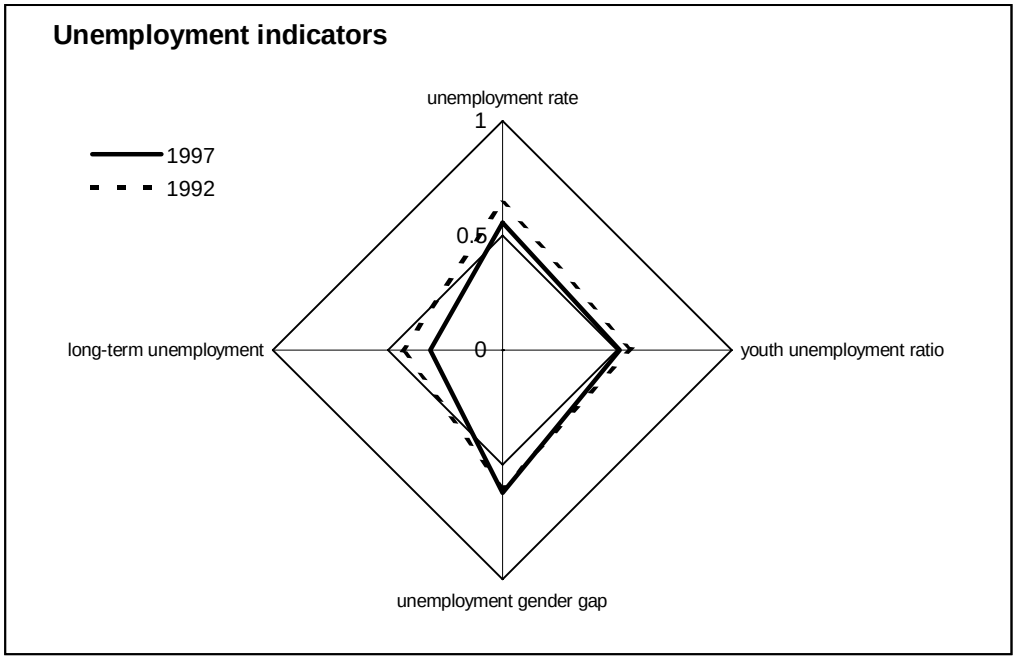
The EU, USA and Japan

Although individual European countries score better than the USA and Japan on most dimensions, comparison of the composite results for the European Union, the USA, and Japan for the year 1997 show that the latter two countries achieve markedly higher overall performance ratings on the total composite indicator and on the employment and unemployment indicators separately (see Figure 1 and Table 4). The comparative radar charts for the EU and the USA and Japan illustrate the individual dimensions of this performance gap between these three large labour markets (Figure 4). For the four unemployment indicators examined, the performance of the EU surpasses that of the United States only in youth unemployment and that of Japan in no case. In the other dimensions of unemployment examined (unemployment rate, long-term unemployment, unemployment gender gap) there is a wide performance gap between the EU and both the USA and Japan on the indicators examined. For the 1997 employment indicators the comparison is more favourable for the EU. Although there is a large gap in the employment rates, the performance of the EU surpasses that of Japan on the gender gap in employment and shows only slightly lower rates of employment growth during the past 5 years. By contrast

there is a marked gap between the EU and the USA on all dimensions of relative performance.

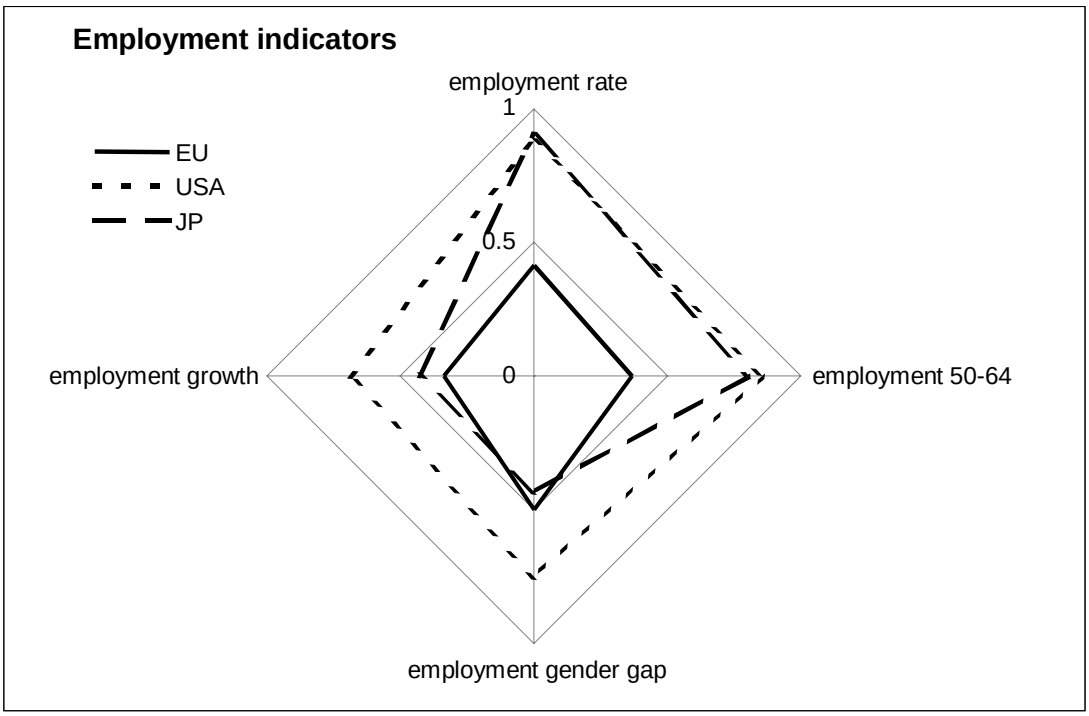
Figure 3: EU Labour Market Performance, 1997 and 1992

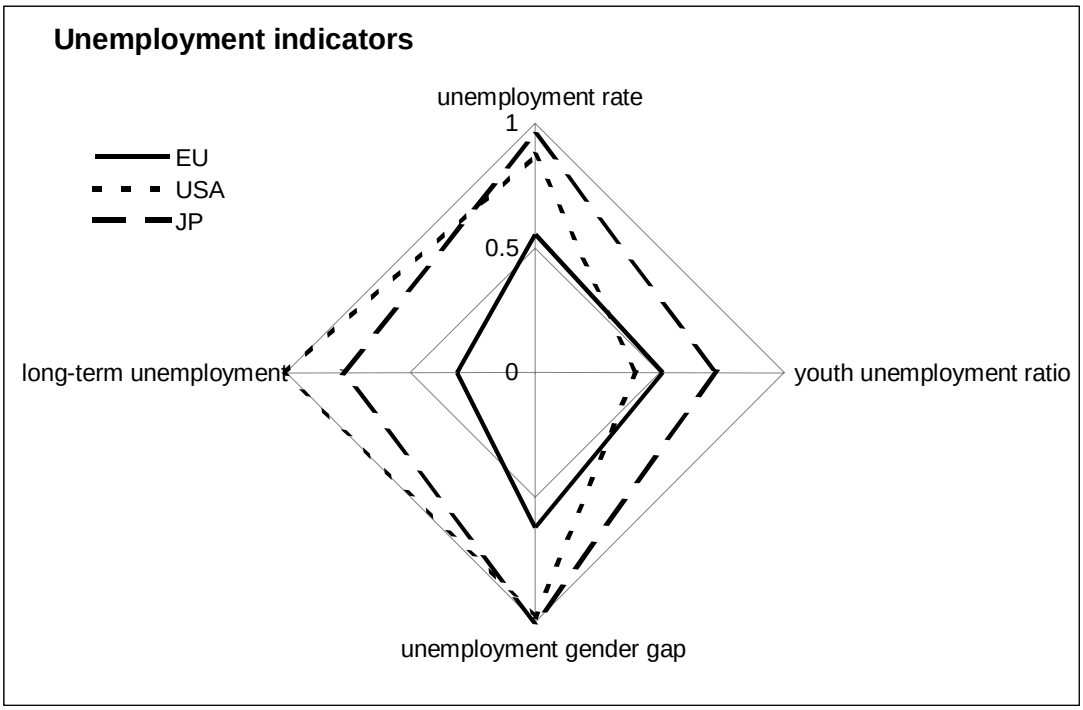




Source: See Table 3

Figure 4: Labour Market Performance in the European Union, USA, and Japan, 1997





Source: See Table 3

4 Conclusions

This benchmarking exercise illustrates the usefulness of the radar chart approach for comparing national labour market performance: 1) The radar charts provide a highly intuitive synoptic overview of national performance on multiple performance measures and changes over time and can also be used, for example, to compare the performance profiles of several countries; 2) The surface measure of overall performance (SMOP), the area of the polygon formed by connecting the data points of the radar chart, provides a useful composite indicator of multi-dimensional labour market performance, which can be used to rank national performance and to monitor change over time. There are, however, a number of theoretical and practical issues in applying a benchmarking approach that should be taken into consideration both in interpreting these findings and in future benchmarking work in the context of the European employment strategy.

An initial problem is the need to select a limited number of performance dimensions for analysis from the large number of potential candidates mentioned in the employment guidelines. The substitution of other indicators that are equally plausible in terms of the European employment strategy (e.g. promotion of self-employment or integration of handicapped persons) might lead to somewhat different comparative results. Moreover, the quantitative indicators actually used are inevitably only approximations because of the institutional and cultural diversity in the employment systems compared, and the qualitative dimensions of indicators (e.g. of employment) are neglected due to the lack of agreed measures. Finally, benchmarking requires the specification of quantitative goals. Since this is seldom the case in the EU's employment guidelines, it has been necessary to define benchmarks pragmatically in terms of "best performance."

The construction of a composite indicator for over-all performance (SMOP) based on the surface area of the polygon depicted in the radar charts was found to entail methodological problems that had not been adequately resolved by previous research (see the methodological appendix below): (1) standardization of the data; (2) the influence of the sequence of the axes in the radar chart on surface area of the polygon (SMOP); (3) correlation between indicators.

Standardization of the underlying performance indicators is necessary because the use of values with different scales to compute the surface area of polygon (SMOP) may result in an unequal weighting of the performance dimensions. The procedure adopted in our analysis addresses this problem by standardizing all indicators between "0" and "1" based on their distance to the benchmark values for the given indicator. The relative nature of the benchmarking standardization procedure on each indicator may, however, still result in higher or lower average scores if the values are affected by outliers.

On the other hand, further standaridization of the radar chart data would detract from the transparency of the results.

The surface area of the polygon is not unambiguously defined by the radial values in the radar chart but is also affected by their sequence. Sensitivity tests show, however, that in practice the observed differences are marginal. Nevertheless, in order to rule out any element of arbitrariness, the following revised methodology was adopted: The reported SMOP indicators for the employment and unemployment 4-indicator radar charts are based on the average result of the three theoretically possible combinations of the axes in computing the surface area of the polygon. Since the number of theoretical possibilities is too large to apply the same procedure to the total (8 indicator) SMOP, the latter is calculated as the simple sum of the employment and unemployment SMOPs computed on the averaging basis described above.

Finally, there is a problem of interdependence, i.e. a relatively high degree of correlation, among the available basic performance, which has to be taken into consideration in selecting and defining performance indicators. For example, employment growth and the unemployment rate or the employment rate and the female employment rate are highly correlated. Insofar as the performance indicators are not independent, countries that score low (or high) on one indicator perform similarly on all the correlated indicators. Although this problem is in part a result of the limited number of basic performance indicators available, it can be minimized by careful construction of indicators (see indicators of long-term unemployment and gender gaps above) and by careful grouping of indicators.

A principal shortcoming of this and other benchmarking approaches is that it is primarily an instrument for identification and measurement of good (and bad) labour market performance, which is essentially descriptive rather than explanatory. The lack of an explanatory framework is particularly a problem in benchmarking labour market performance since good and bad performance are strongly influenced by the impact of economic fluctuations . This is particularly true for all indicators based on levels of unemployment or employment growth. If such indicators are used, they probably need to be adjusted to reflect different macro-economic conditions. Future analyses need to distinguish more carefully between short-term performance indicators and structural indicators of relatively stable characteristics of the employment system (e.g. employment rates, segmentation patterns with regard to women, youth, minorities etc.).

Based on this benchmarking exercise, we recommend that further methodological work on benchmarking labour market performance in the context of the European employment strategy address several outstanding issues: 1) The sensitivity of national benchmarking rankings to the choice of performance dimensions and the definition of indicators; 2) The inclusion of complex and thus far neglected performance dimensions such as ”adaptability”

and greater consideration to the qualitative dimension of labour market performance, 3) The methodological problems of the construction of composite indicators of labour market performance based on radar charts (e.g. standardization, weighting, correlation among indicators) and consideration of alternative types of indicators; 4) Distinguishing the impact of short-term (e.g. cyclical) and structural components of labour market performance in benchmarking.

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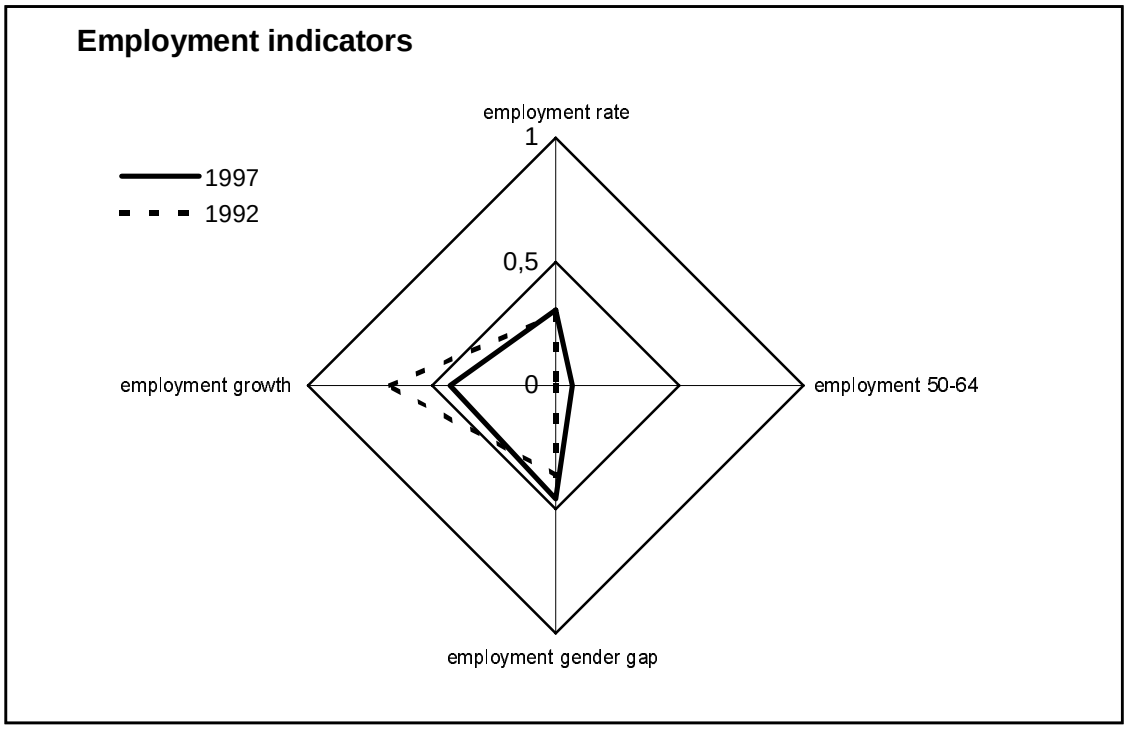
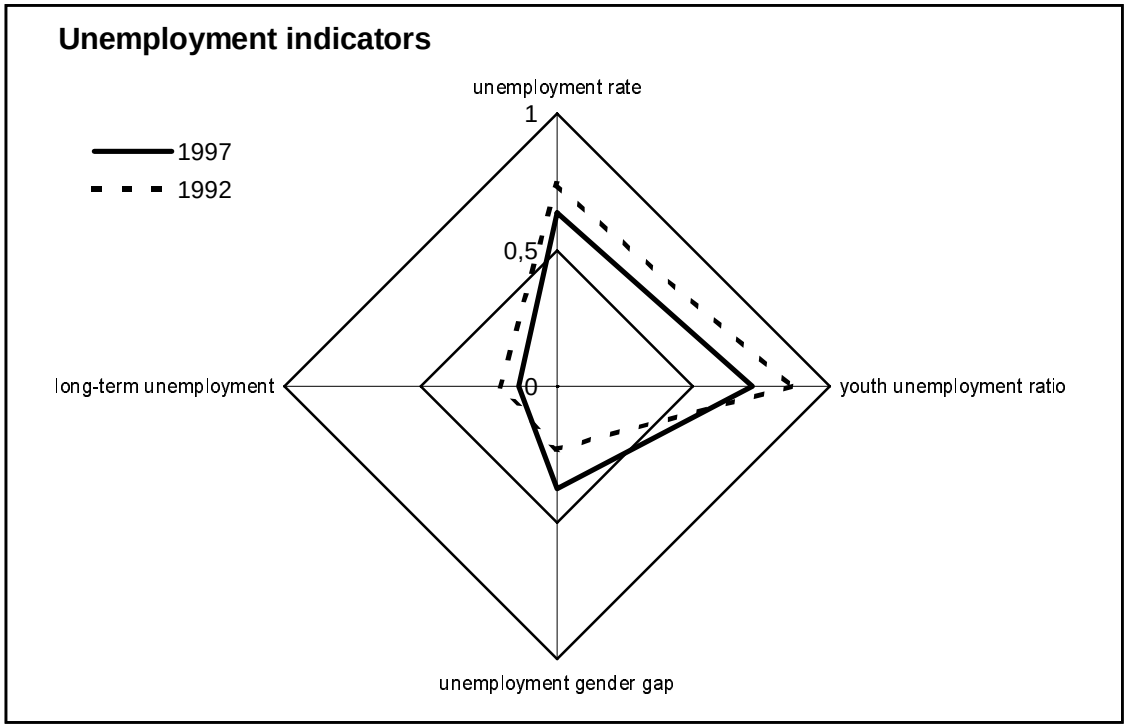
6 Appendix A: Radar Charts of National Labour Market Performance, 15 EU Countries, EU, Japan, USA, 1997 and 1992

Note: The following radar charts depict labour market performance in 15 EU Member States, the EU, USA, and Japan in 1997 and 1992. Performance on the selected employment and unemployment indicators is measured relative to that of all countries included in the comparison: A score of "1" on an indicator represents performance at the 1997 benchmark value (best performer), worst performance receives a score of "0". The benchmark performance values for the other countries reflect their relative position in the field between best and worst performance. Thus a score of "0.5" indicates performance at the midpoint of the range defined by best and worst performance, i.e. if the lowest unemployment rate is 5% and the highest 15%, then a country with an unemployment rate of 10% is scored as "0.5" on the benchmarking scale for this indicator. Since benchmark values are defined in terms of best performance in 1997, reported performance scores for 1992 may in some cases exceed ”1.” The actual values for the underlying performance indicators are reported in Table 2, and the standardized scores on which all the radar charts are based are reported in Table 3. The methodology is explained in Appendix B.

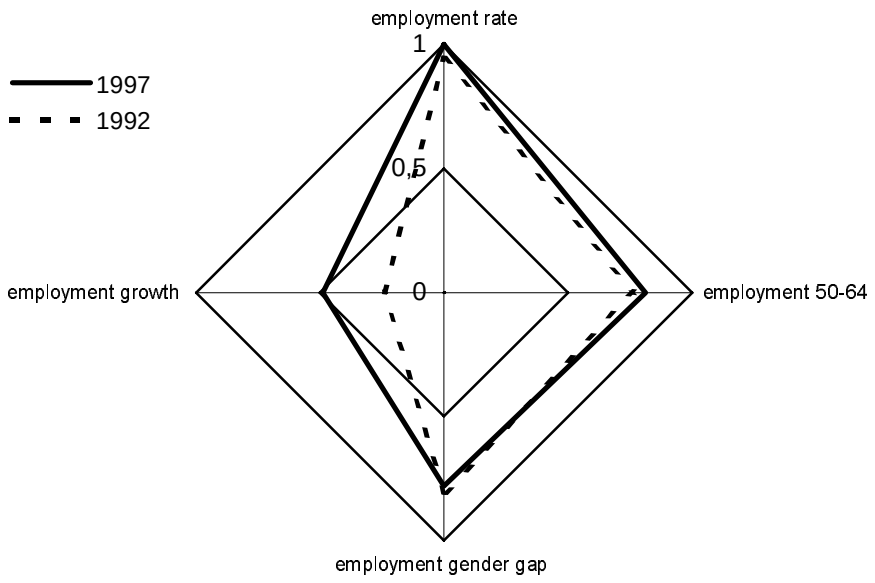
BELGIUM


Employment indicators
1997
1992
employment rate
1
0,5
0
employment growth
employment 50-64
employment gender gap

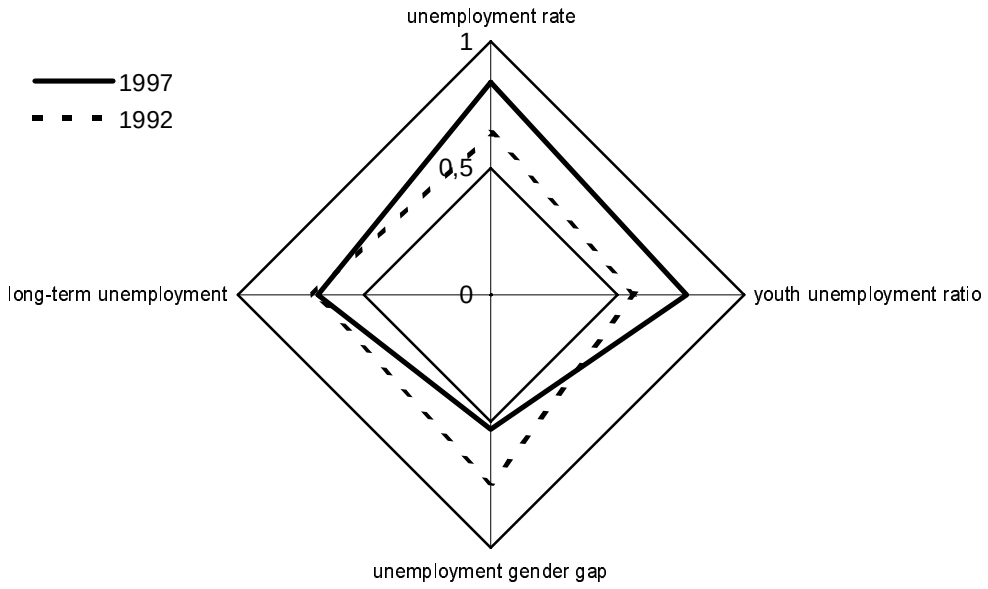

Unemployment indicators
1997
1992
unemployment rate
1
0,5
0
long-term unemployment
youth unemployment ratio
unemployment gender gap

DENMARK

Employment indicators

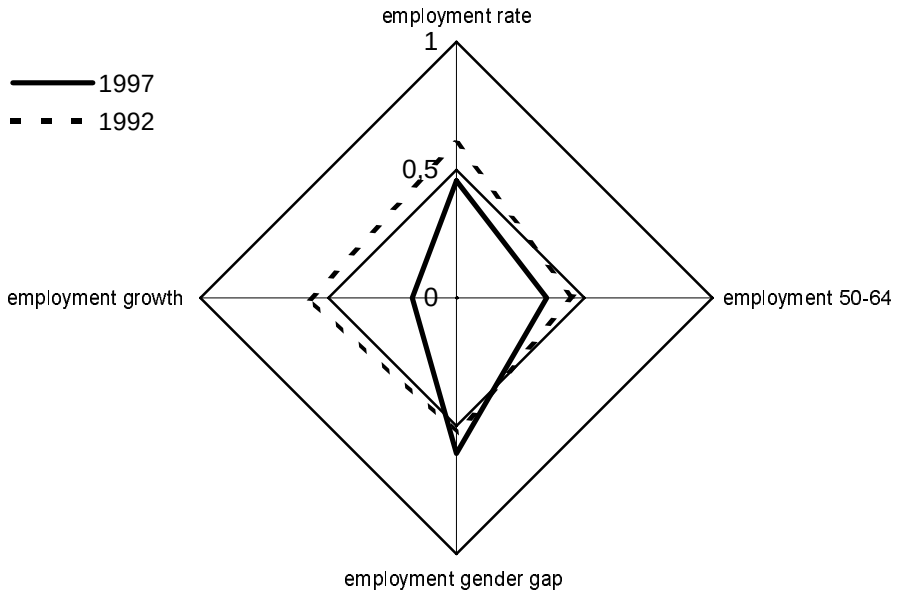


Unemployment indicators



GERMANY

Employment indicators



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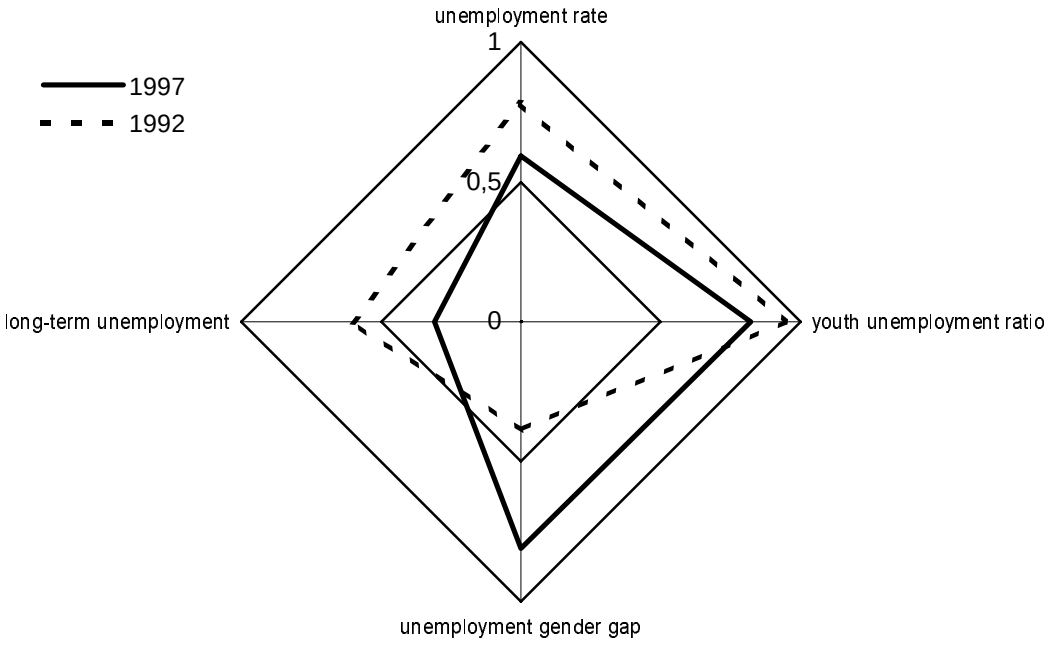
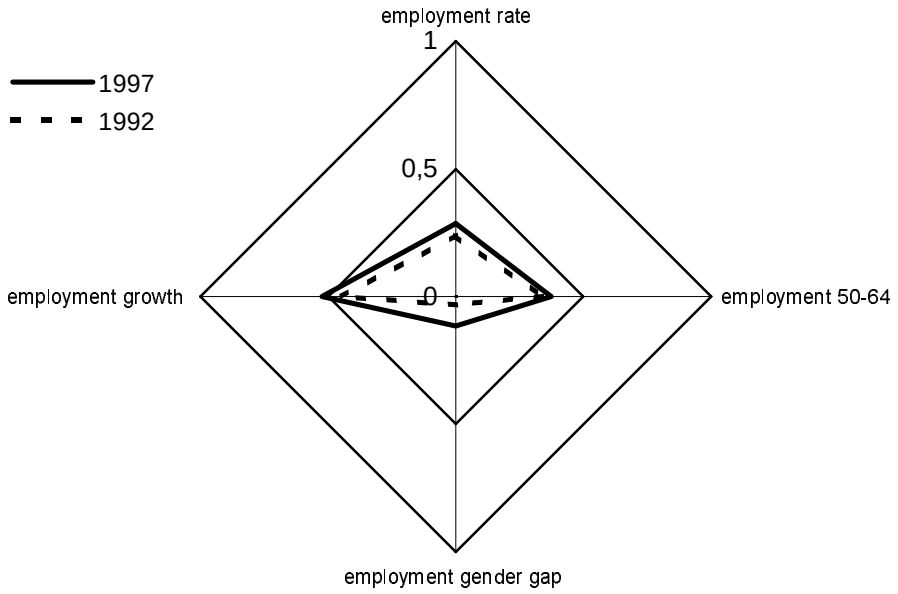


GREECE

Employment indicators



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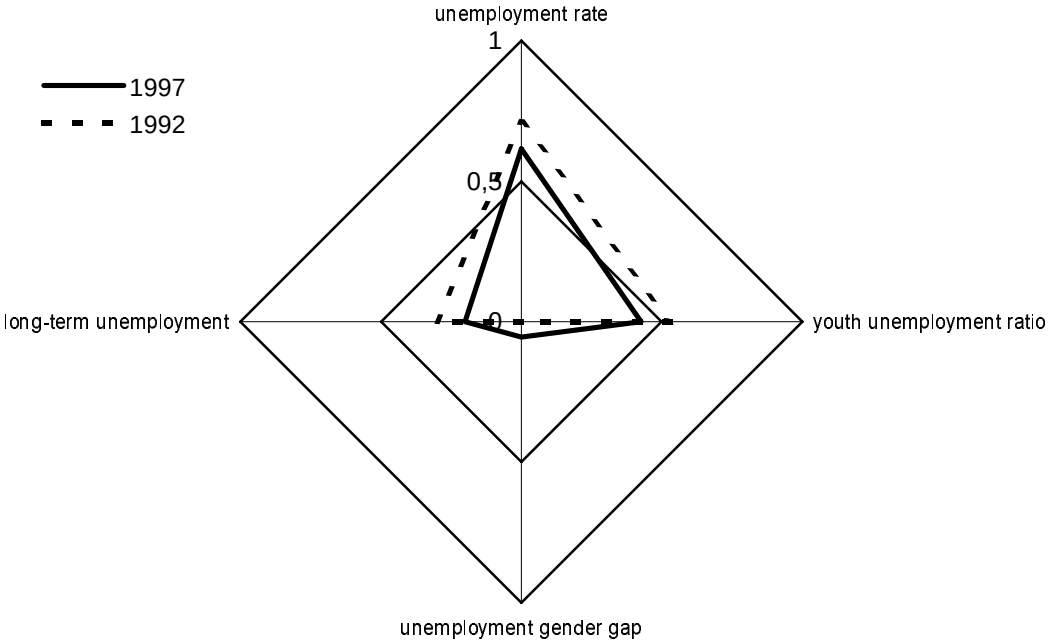
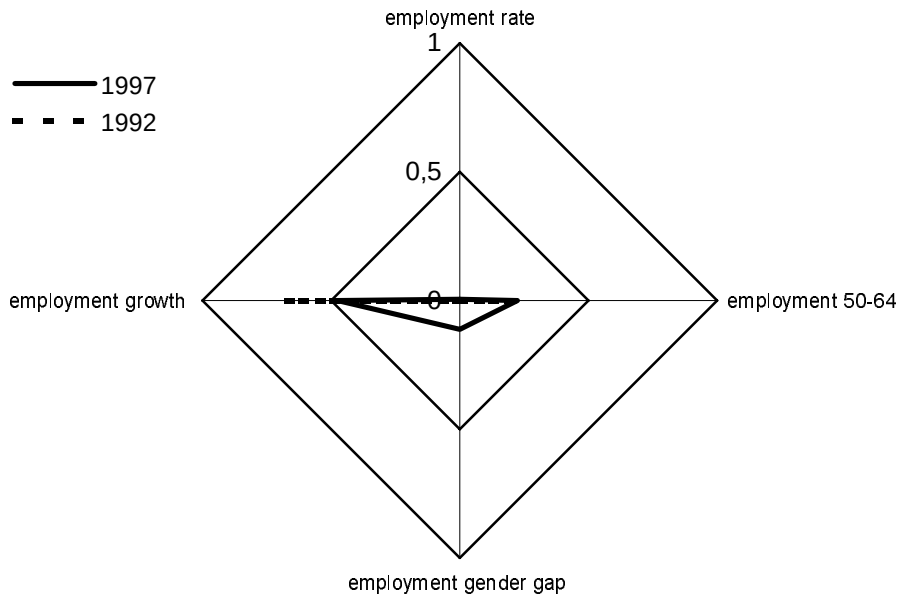


SPAIN

Employment indicators



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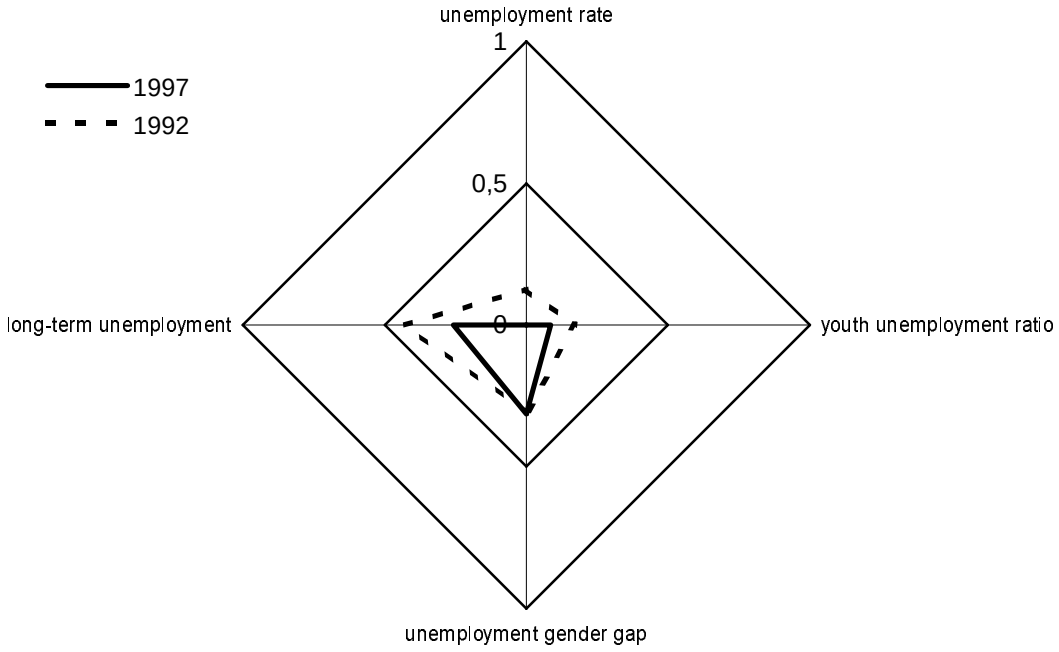

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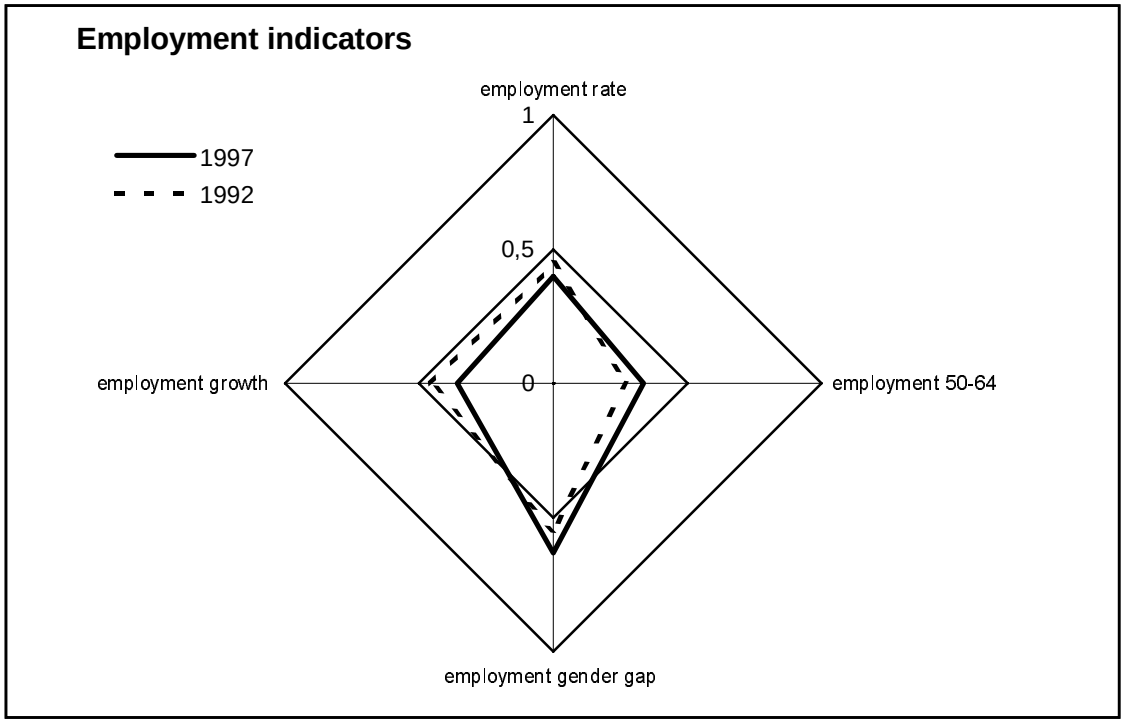
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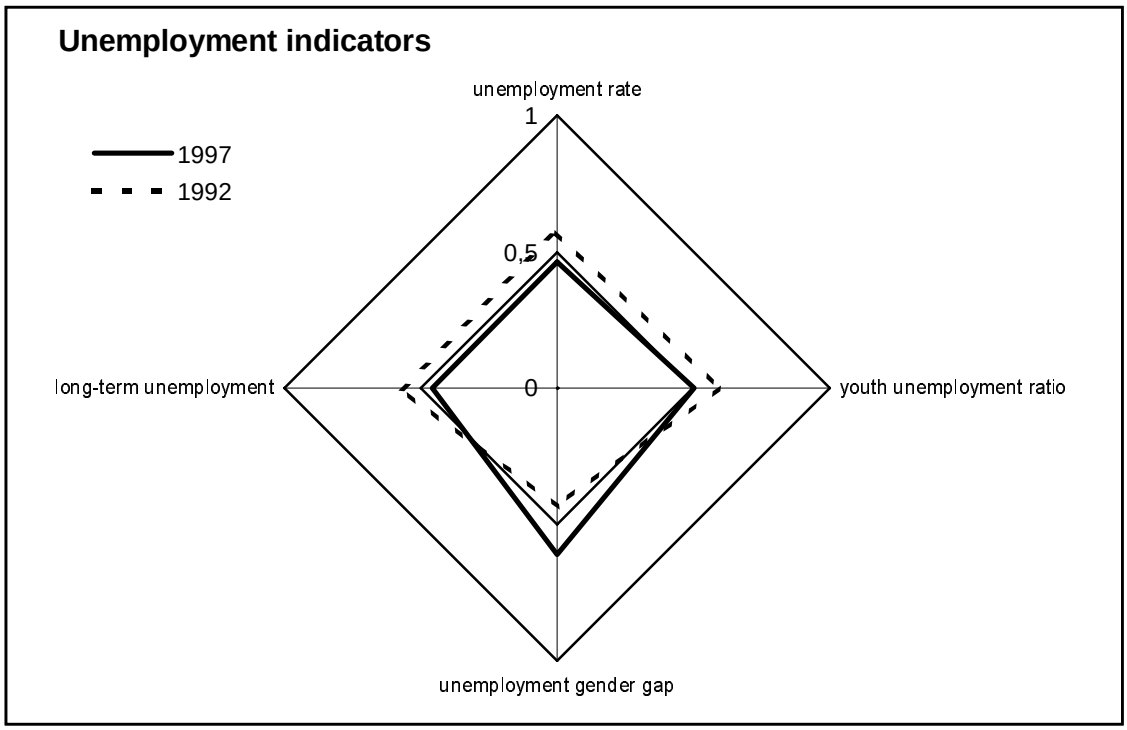
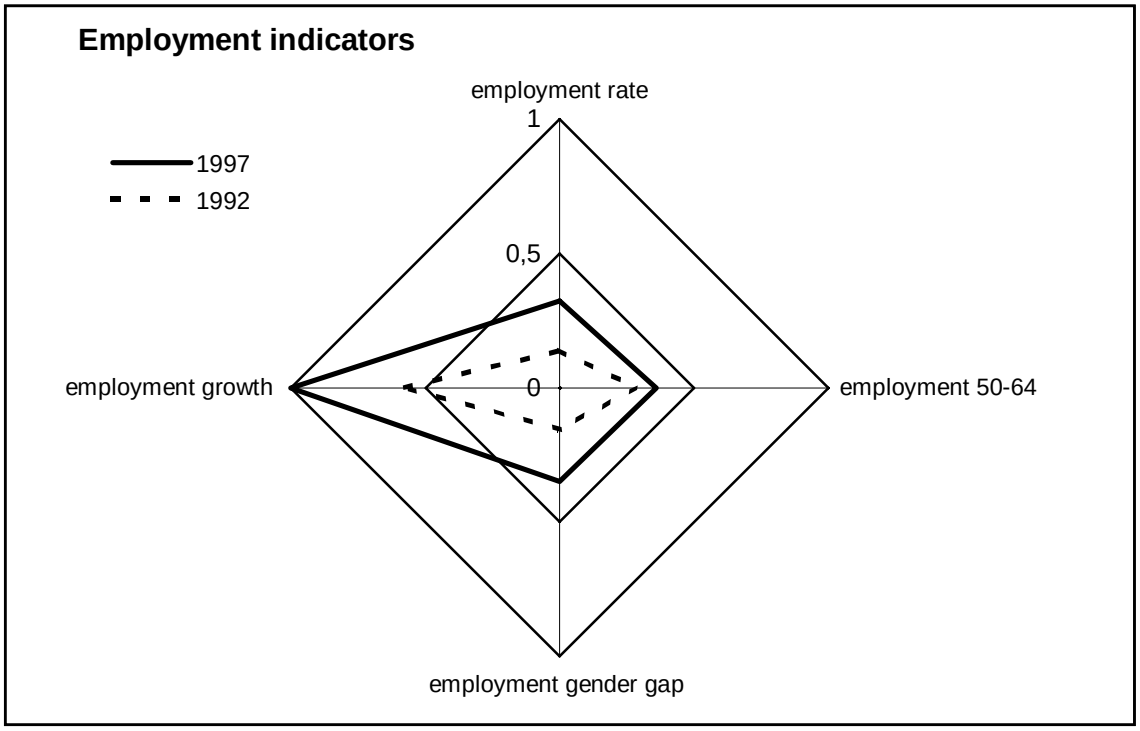
1992
employment rate
1
0,5
0
employment growth
employment 50-64
employment gender gap


Unemployment indicators
1997
1992
unemployment rate
1
0,5
0
long-term unemployment
youth unemployment ratio
unemployment gender gap

IRELAND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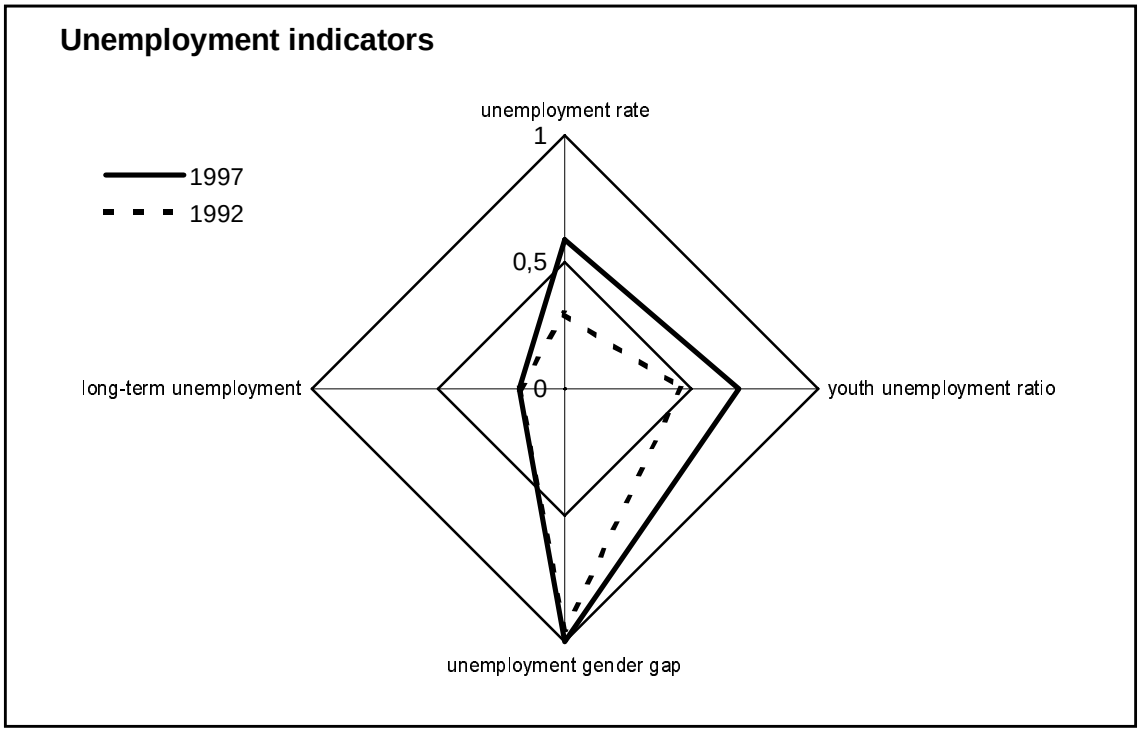
0,5
0
1997
1992
employment growth
employment 50-64
employment gender gap


Unemployment indicators
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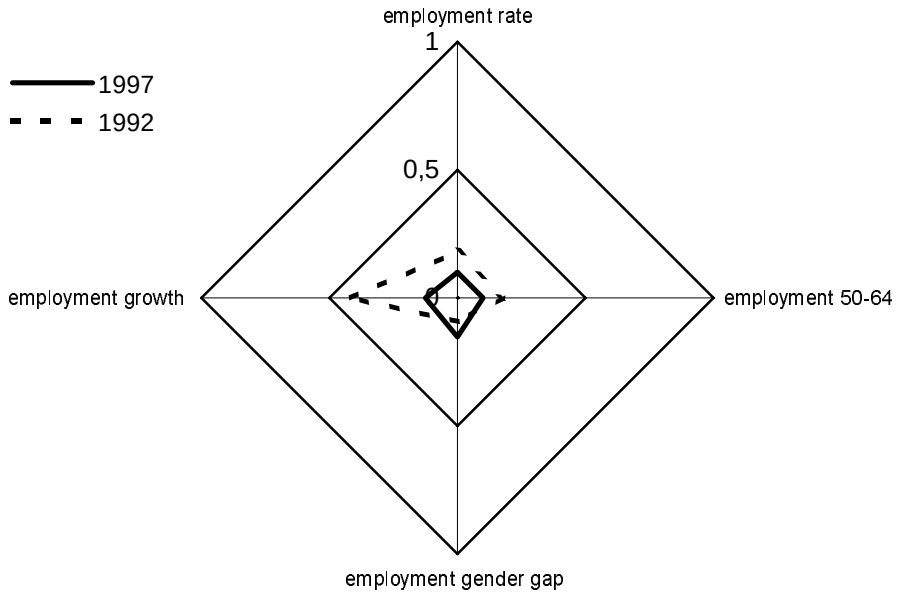
1
0,5
0
1997
1992
long-term unemployment
youth unemployment ratio
unemployment gender gap

ITALY

Employment indicators



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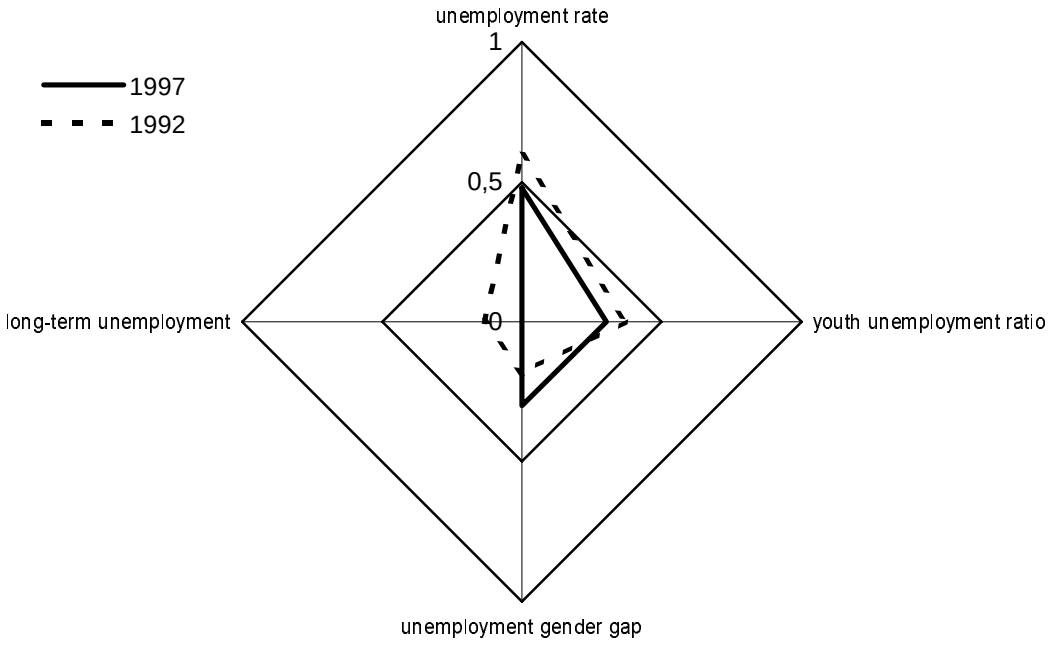
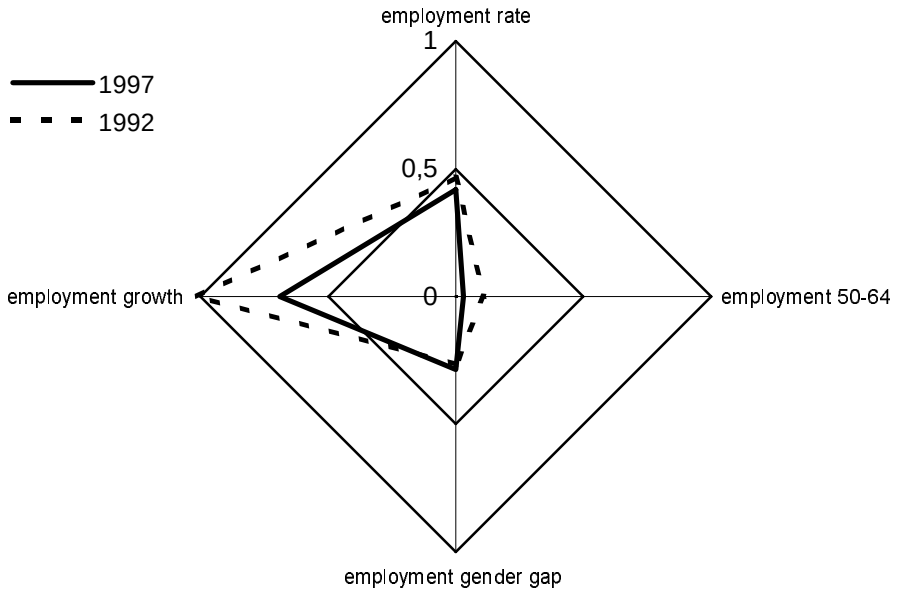


LUXEMBOURG

Employment indicators



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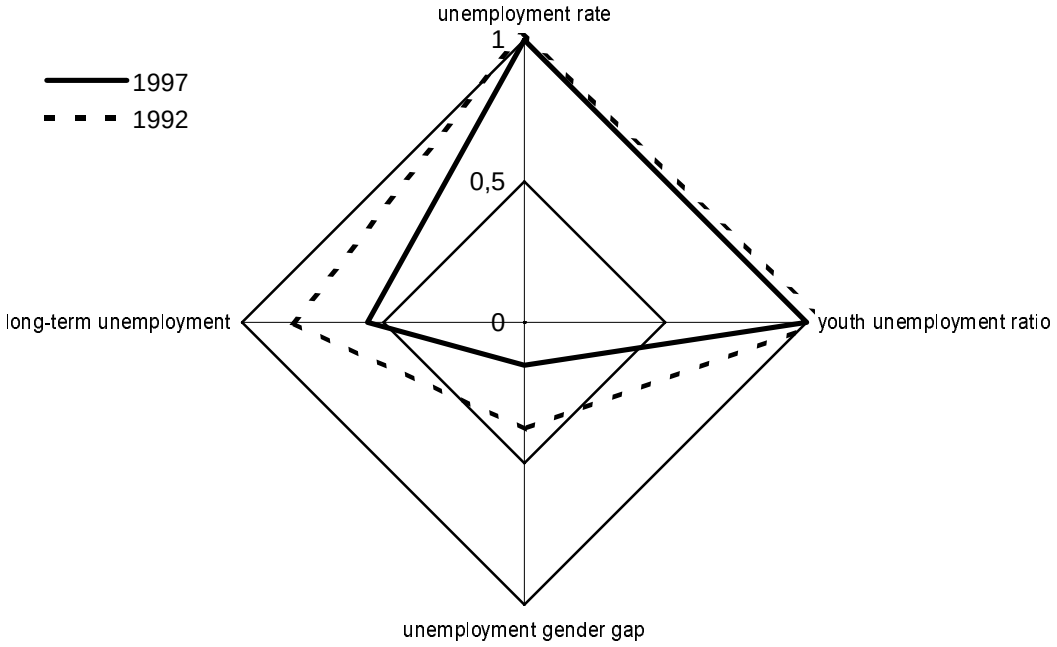
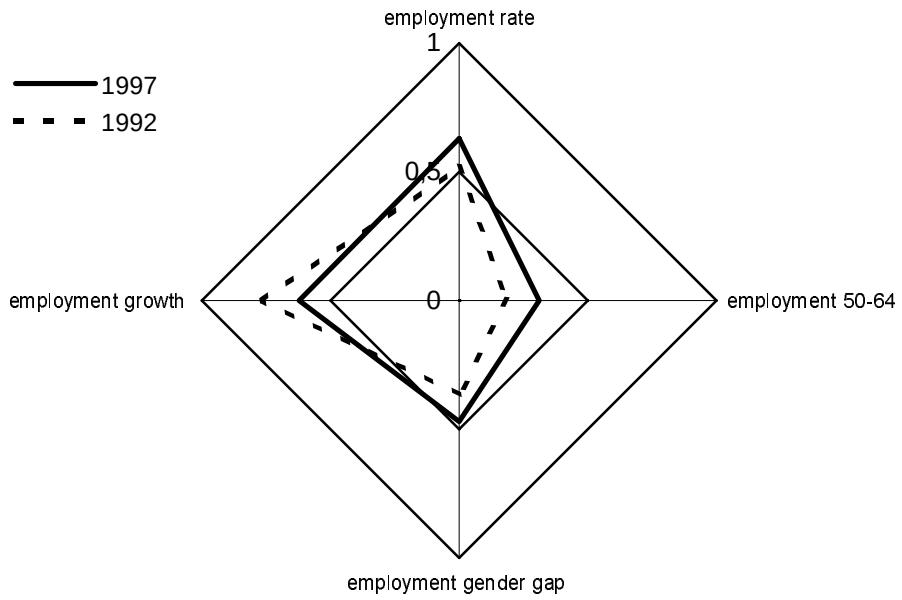


NETHERLANDS

Employment indicators



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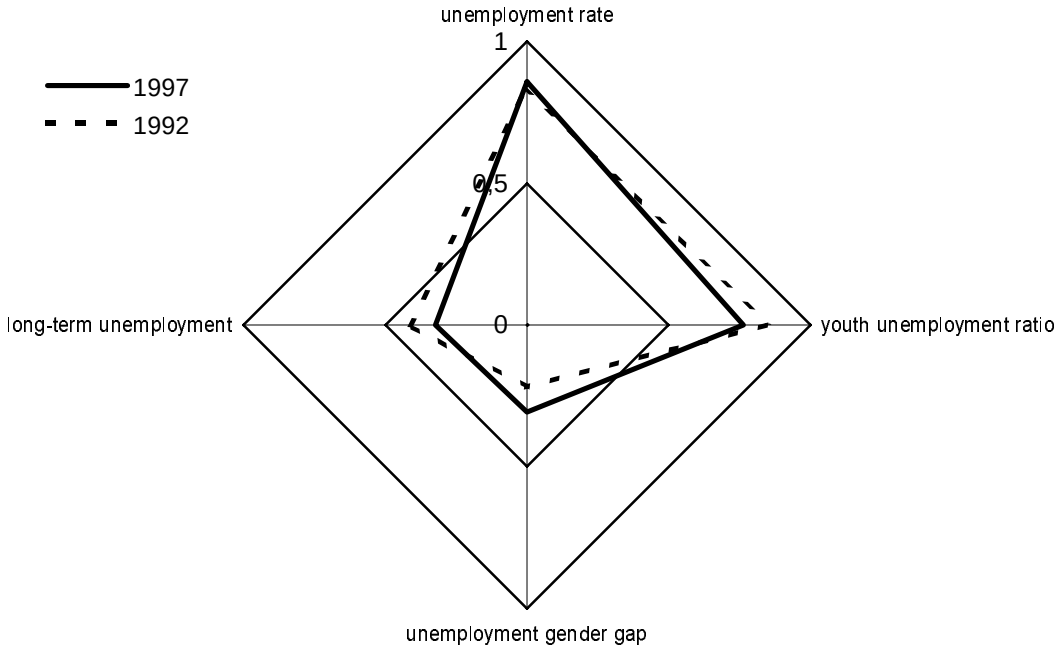

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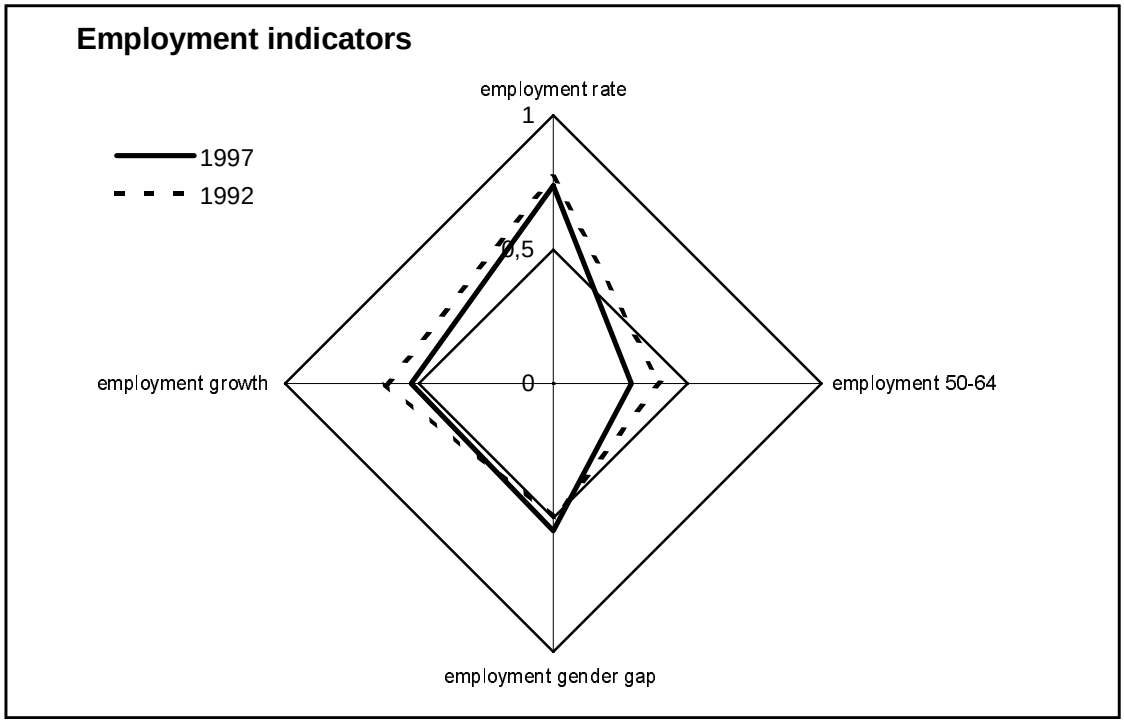
Employment indicators
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1
1997
1992
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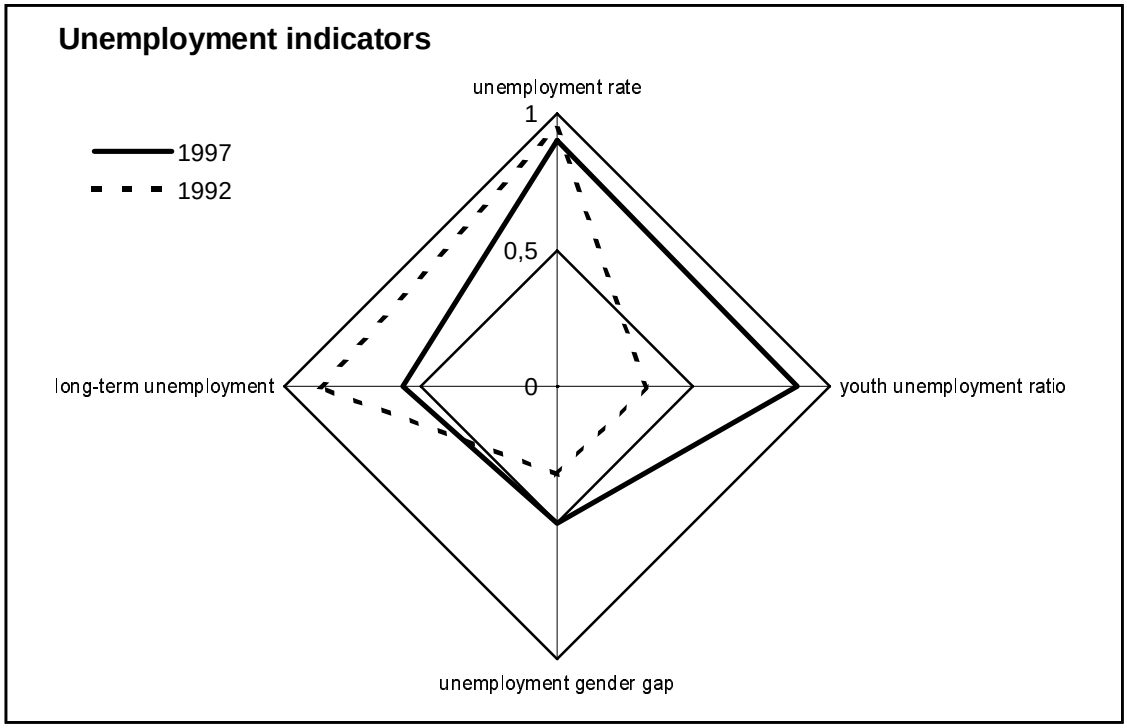
employment growth
0
employment 50-64
employment gender gap


Unemployment indicators
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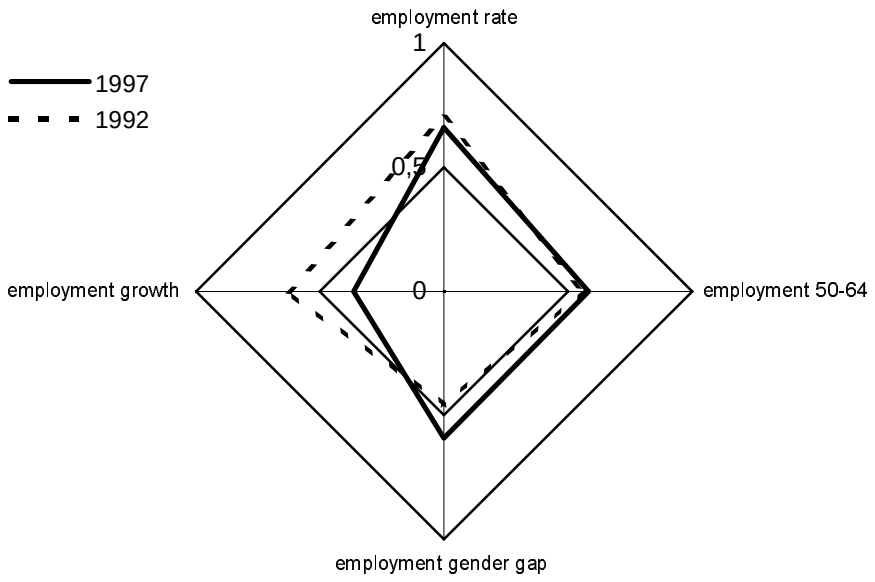
1
1997
1992
0,5
long-term unemployment
0
youth unemployment ratio
unemployment gender gap

PORTUGAL

Employment indicators



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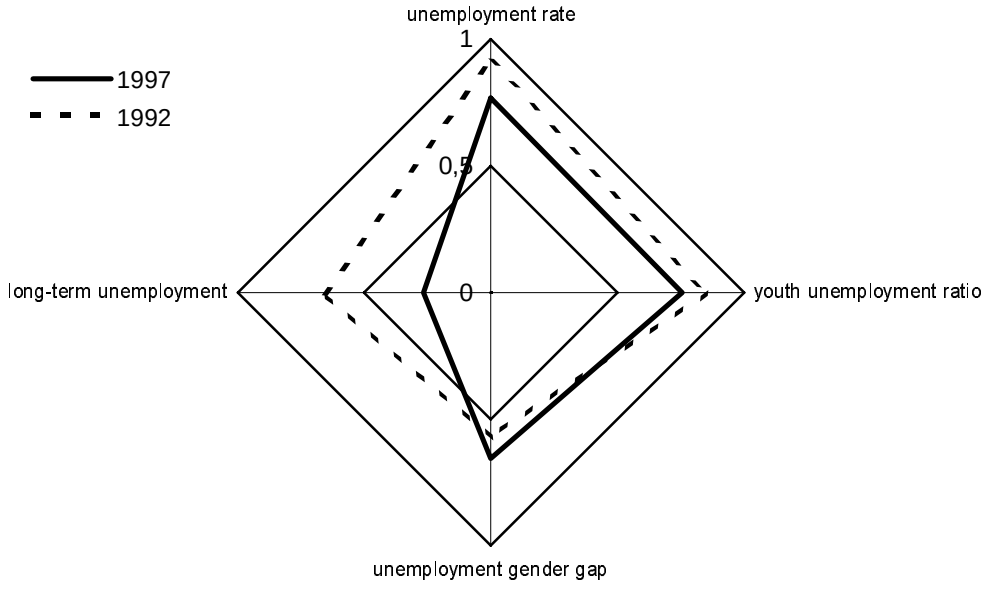
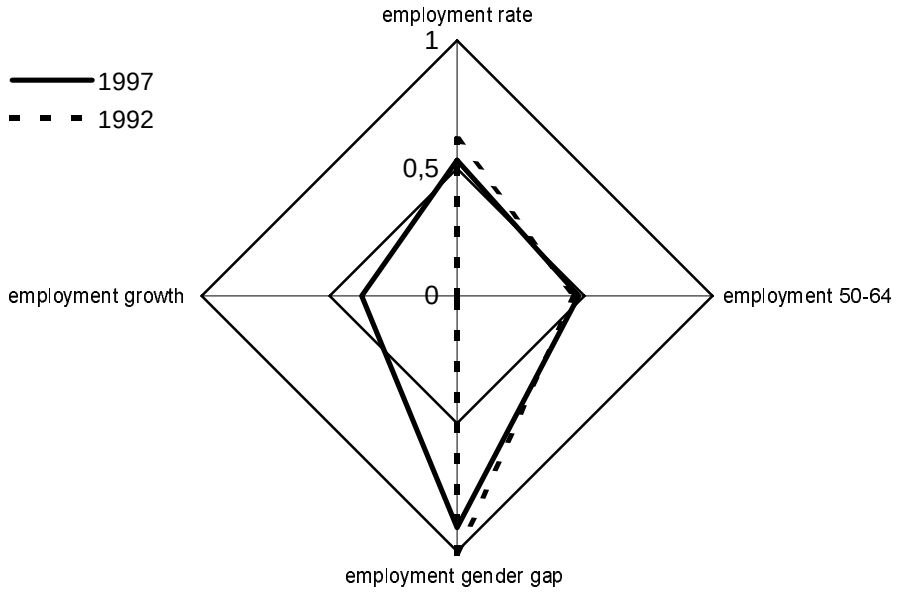
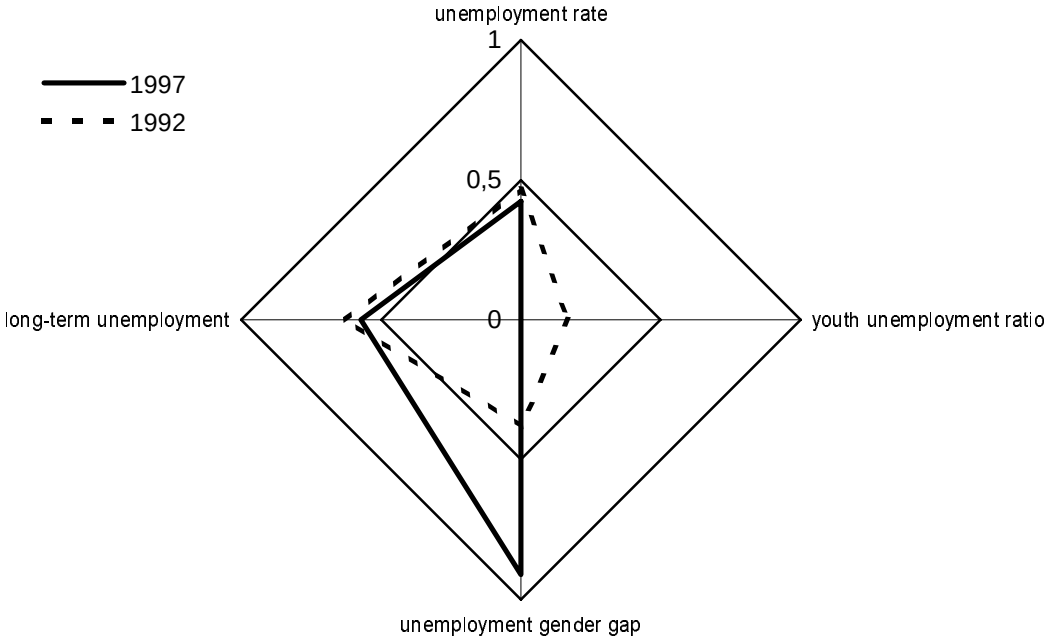


FINLAND

Employment indicators

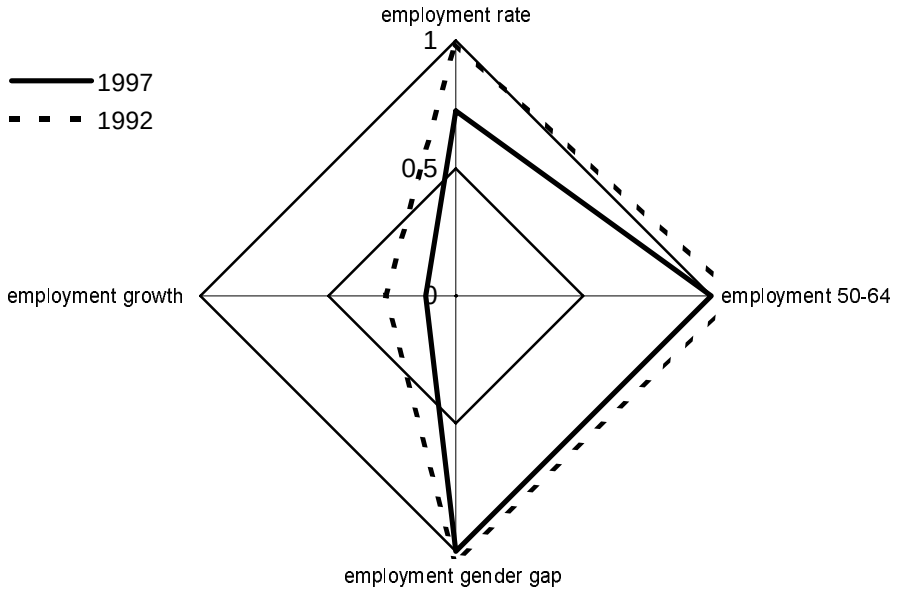


Unemployment indicators

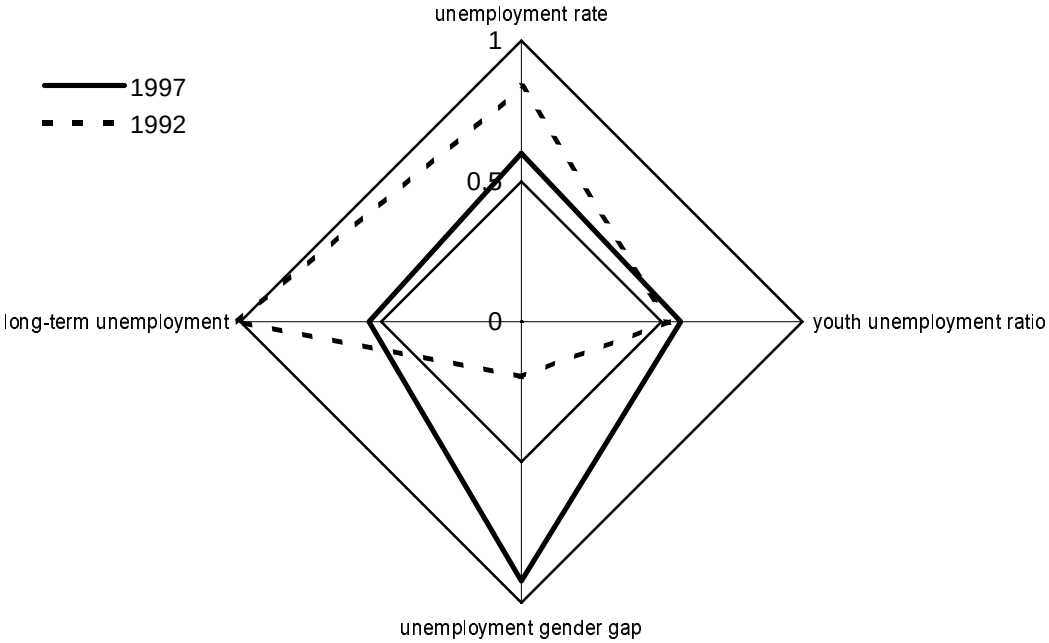


SWEDEN

Employment indicators

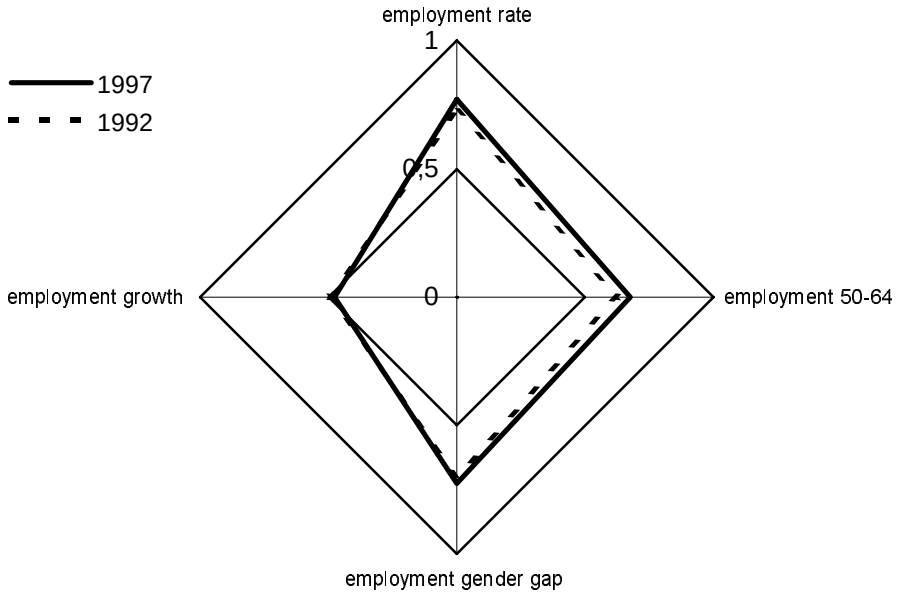


Unemployment indicators

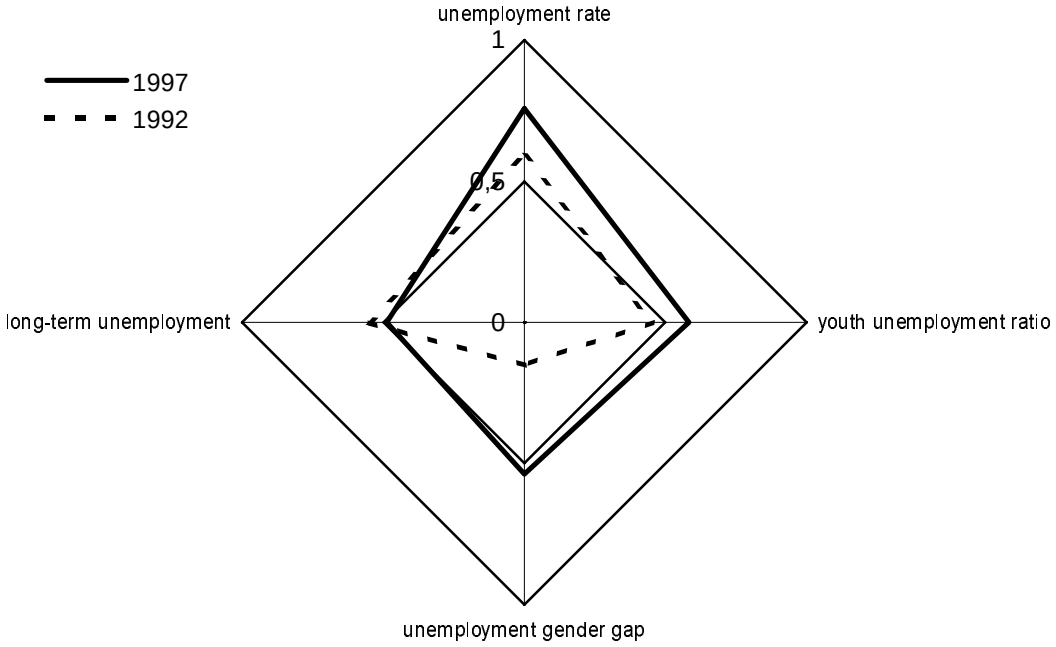


UNITED KINGDOM

Employment indicators

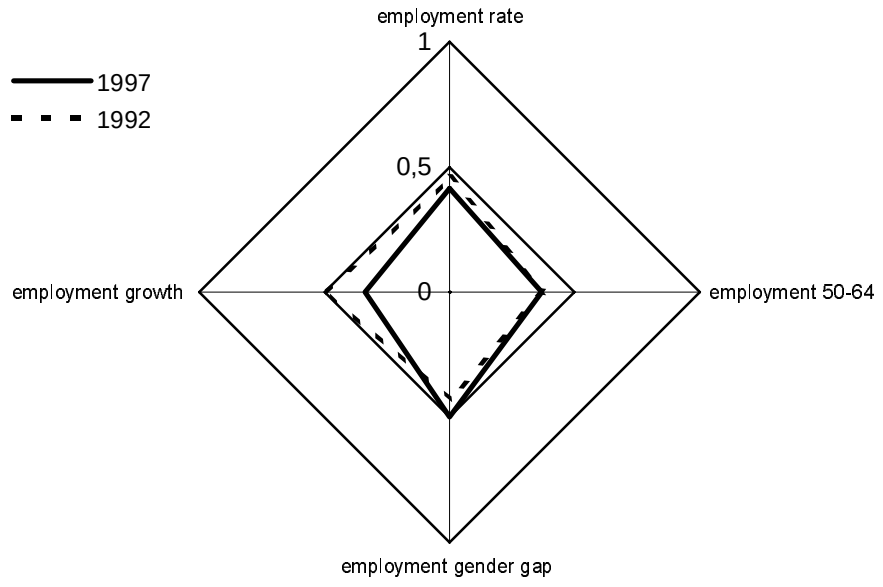


Unemployment indicators



EUROPEAN UNION

Employment indicators



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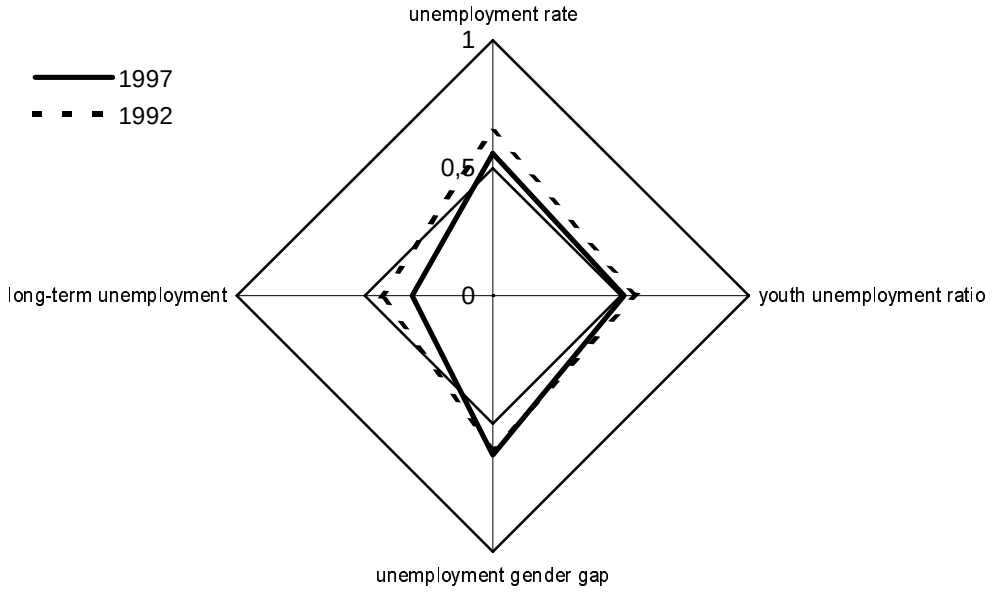
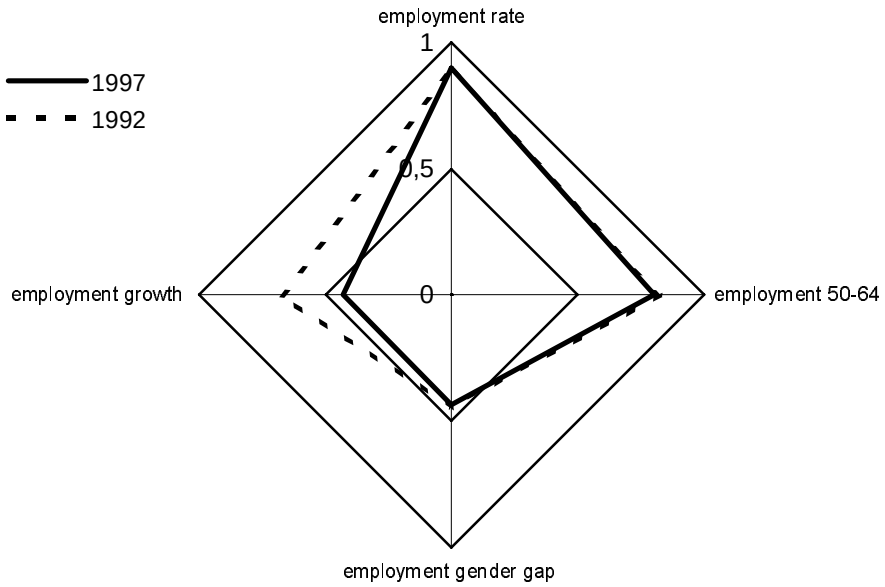
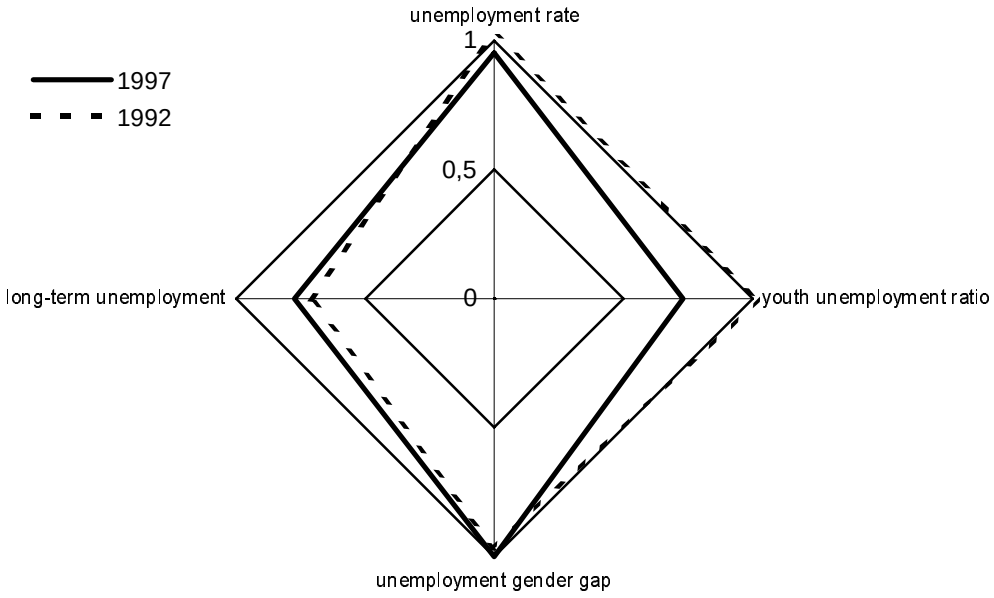


JAPAN

Employment indicators



Unemployment indicators



UNITED STATES

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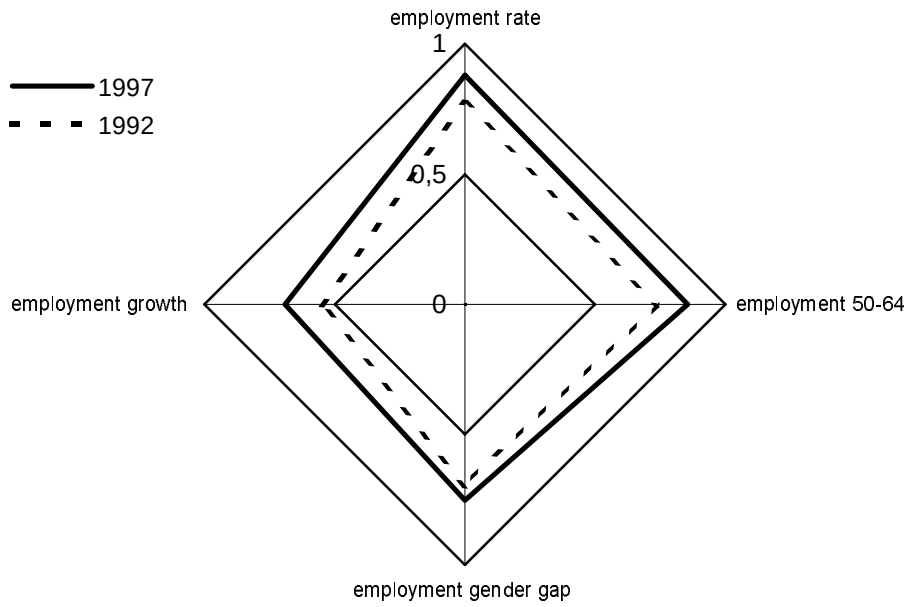
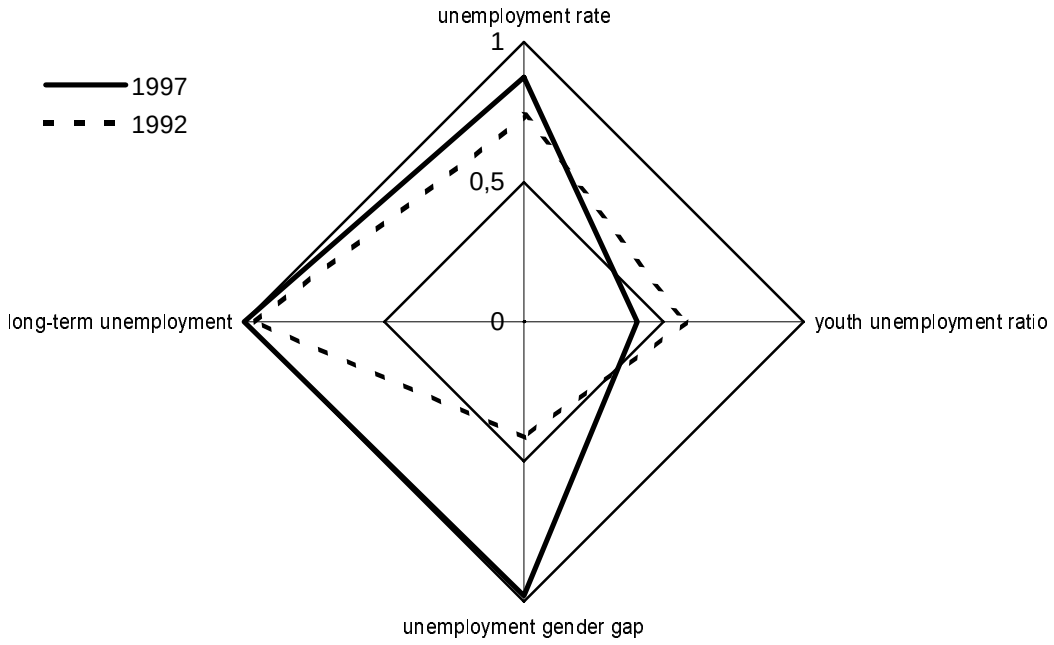
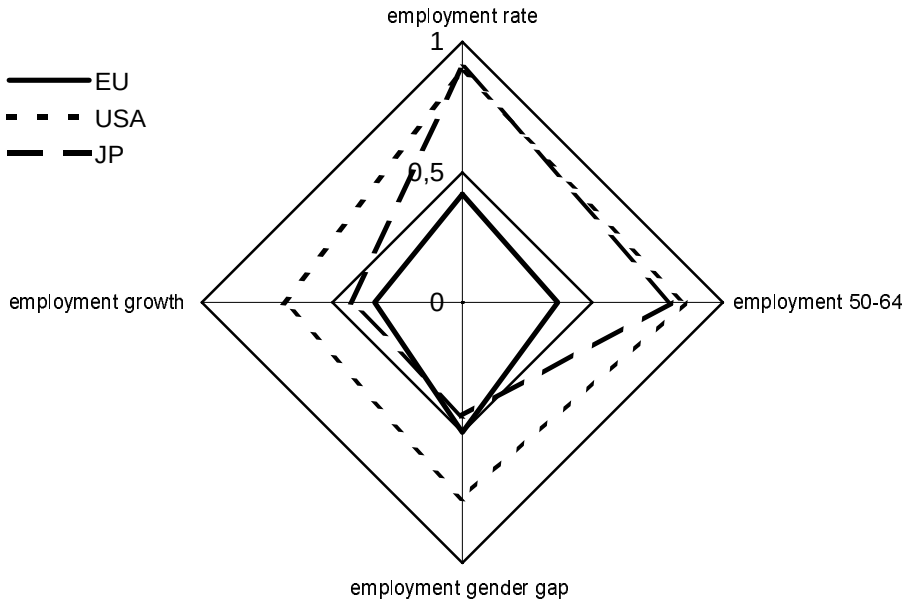


Unemployment indicators

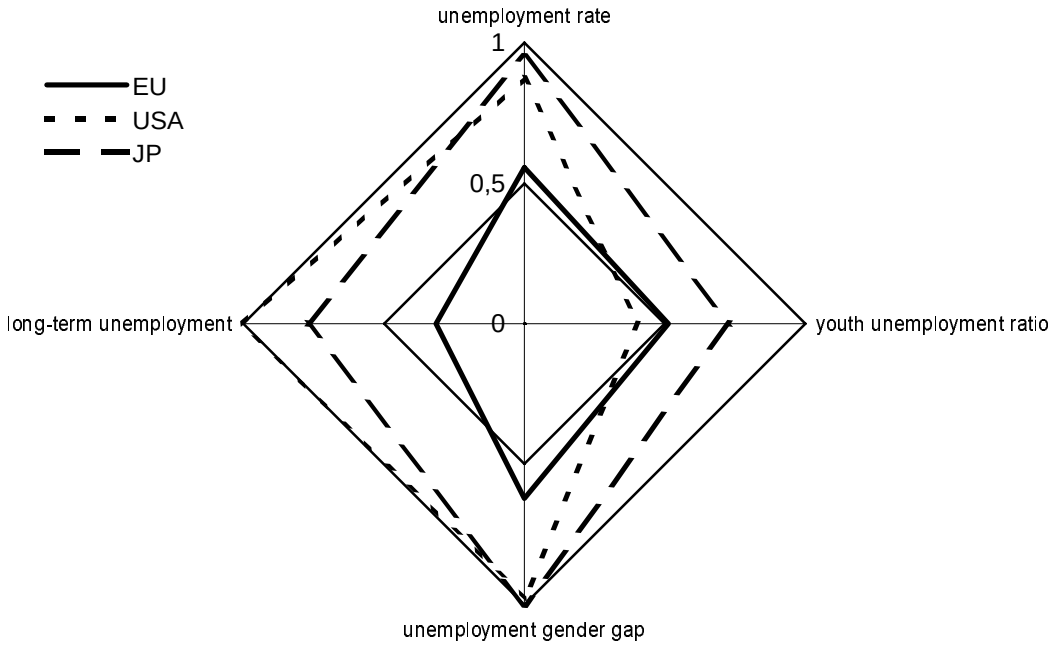


EU - USA - JAPAN 1997

Employment indicators

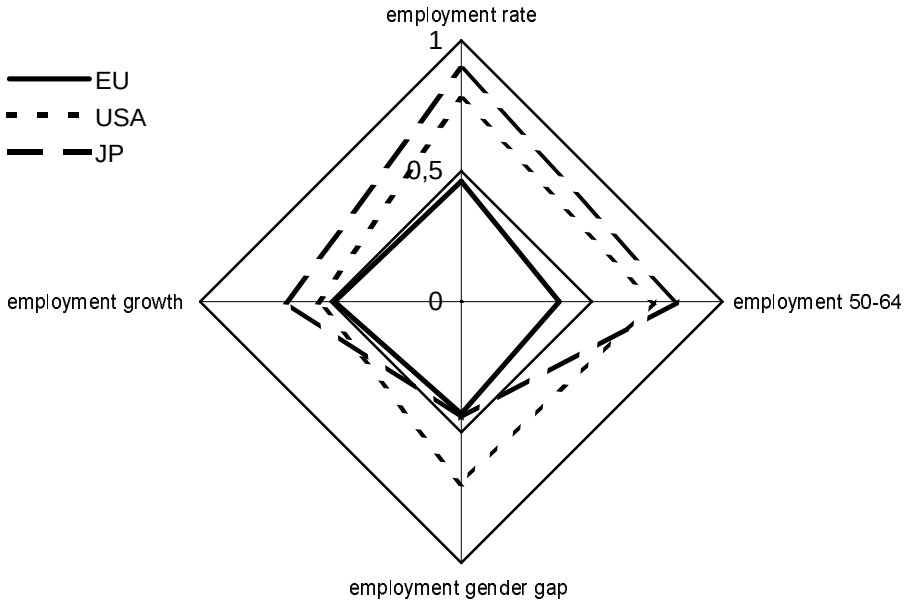


Unemployment indicators

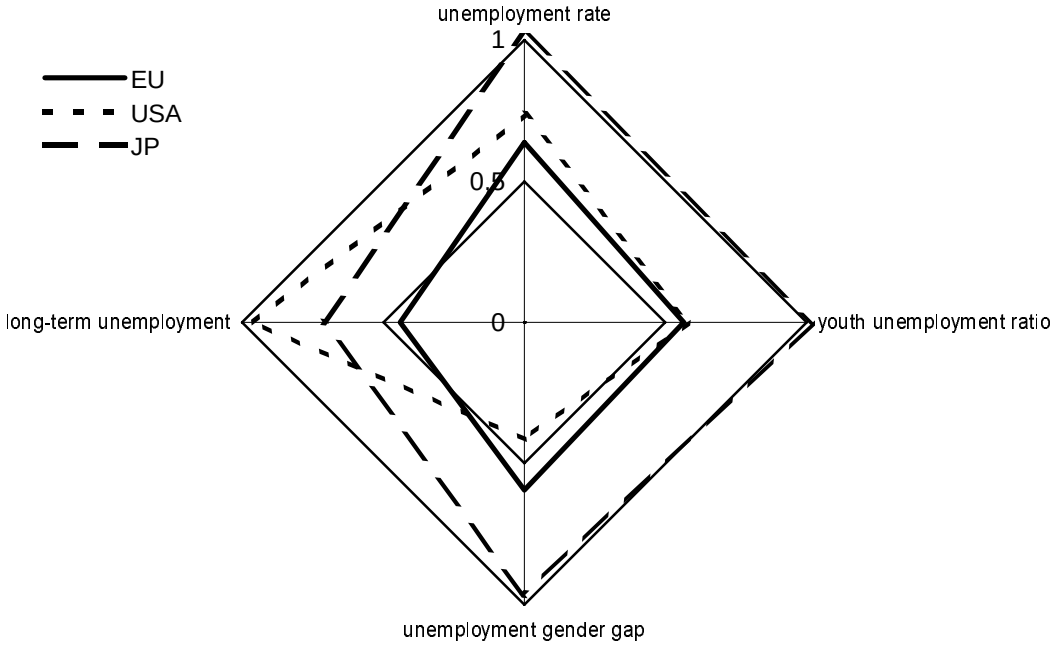


EU - USA - JAPAN 1992

Employment indicators



Unemployment indicators



7 Appendix B: Explanation of Methodology

Standardization of the labour market indicators and interpretation of the radar charts

Standardization of the data is important for the radar chart benchmarking presentation in order to depict multiple performance goals with comparable data on the same scale and to use the area of the polygon formed by connecting the data points on the radar chart as a composite indicator of overall performance.

In each case the underlying labour market indicators for the years 1997 and 1992 are transformed into index values with a common scale in which the benchmark (best performance) value in 1997 is always equal to "1" and the lowest value in 1997 or 1992 (worst performance) is equal to "0." The performance values for the other countries reflect their relative position in the range between best and worst performance (0 to 1.0) so that, for example, the 0.5 marker on the scale indicates performance half way between the best and worst performer for an indicator. The reported radar chart values are thus always relative to the values for the best and worst performers in the comparison group.

In this benchmark scoring procedure best performance, i.e. the best performer, and not a theoretical or an EU institutional benchmark, is the primary point of reference. In order to make possible a direct comparison between performance at two points in time, data for 1997 and 1992 are standardized using the same benchmarks (best and worst performance values). In comparison with separate benchmarks for each year, this pooled analysis has the advantage of making the results for the two years directly comparable, i.e. a higher benchmark value in 1997 over 1992 is also indicative of superior performance on the underlying indicator. Otherwise the radar charts would depict only relative national standing in the two respective years with respect to other countries included in the comparison. While best performance is defined exclusively in terms of performance in 1997, worst performance at the negative end of the relative benchmarking scale is defined as the lowest value attained on the indicators examined either in 1997 or 1992. This scoring convention allows values greater than ”1” in some cases in which performance in 1992 surpassed that in 1997 but rules out negative values for technical reasons.

The data for the original values (x) for the indicators reported in Table 2 were transformed to the radar chart values (r) reported in Table 3 according to the formula (a) or (b) below, depending on whether the best performer benchmark is a maximum or a minimum value for the particular indicator.

(a) For all indicators in which the minimum values represent the benchmark (i.e. unemployment rate, youth unemployment ratio, share of long-term employed):

$r = 1- ((min-x)/min) * F)$

where $F= min / (min-max)$; x = original value; r = radar chart standardized value.

Thus for $x = min$, $r = 1 - 0 = 1$

$x = max$, $r = 1 - 1 = 0$

(b) For all indicators in which the maximum values represent the benchmark (i.e. employment rate, employment 50-64, employment growth, gender gaps in employment and unemployment):

$r = 1- ((max-x)/max) * F)$

where $F= max / (max-min)$; x = original value; r = radar chart standardized value.

Thus for $x = max$, $r = 1 - 0 = 1$

$x = min$, $r = 1 - 1 = 0$

It should be noted that, although the indicators and data used in this report are identical with those in the 1998 **Joint Employment Report,** there are some technical changes in the methodology used: 1) No minimum values are used in computing the standardized values for the performance indicators in this report in contrast to the minimum value of ”0.1” used in the **JER** ; 2) ”Best performance” benchmarks are based on the single best performer, including the USA and Japan, instead of being defined in terms of the average of the top three performers among EU Member States. These changes do not affect the relative standing of any country on the indicators examined but only the way in which their performance is scored.

SMOP: Surface measure of overall performance

The surface area of the polygon formed by the data points on the axes of the radar chart is used as a composite indicator for overall performance. In the standardized form of the radar chart used in this benchmarking exercise, the maximum value on any single performance dimension is "1" (best performer).[12] On the basis of the formula for calculating the surface of the polygon, the maximum value of a polygon with, for example, four sides and a maximum length of 1 = 2. The maximum size of the surface depends on the number of sides in the polygon (i.e. performance dimensions) but is constant for a polygon

12 As explained above, this is the case only for the 1997 reference values. Values for 1992 may in some cases exceed the 1997 benchmark value.

with any given number of axes (2,3,4,5,6 etc.), independent of the empirical indicators used. For the calculation of the surface measure of overall performance (SMOP), the following standard mathematical formula is used:

SMOP = ((P1*P2)+(P2*P3)+(P3*P4)+(P4*P1)) * sin 90°/2,

or generally:

SMOP = (P1*P2)+(P2*P3)+(P3*P4)+(P4*P5)+(P5*P6)+....+(Pn*P1)) * sin (360/n)/2,

where P is the data point on the axis of the radar chart.

Two methodological points related to the construction of a composite indicator of overall performance (SMOP) based on the surface area of the polygon should be noted: (1) standardization of the data and (2) the impact of the sequence of the axes in the radar chart.

First, standardization of the underlying data is necessary since the use of values with different scales to compute the surface area of polygon (SMOP) as a composite indicator may result in an unequal weighting of the performance dimensions if the values of the underlying indicators diverge significantly. The procedure described above addresses this problem by standardizing all indicators between ”0” and ”1” based on their distance to the benchmark values for the given indicator. The relative nature of the benchmarking standardization procedure used may, however, result in markedly higher or lower average scores if the benchmark scores are affected by extreme outliers.

Second, the surface area of the polygon is not unambiguously defined by the radial values in the radar chart but is also affected by their sequence. In some hypothetical extreme cases, a change in the sequence of the axes may lead to dramatically different results. Thus the radar chart based on the indicators P1=1, P2=0.1, P3=0.1, P4=1 and P1=1,P2=0.1, P3=1, P4=0.1 seem to have the same performance, but the first generates a SMOP over three times bigger than the second. We carried out a number of sensitivity test to assess the impact of the sequence of the indicators in the radar chart on the surface area of the polygon and found the SMOP indicator to be in practice robust. Nevertheless, in order to rule out any element of arbitrariness, we have adopted the following revised methodology: The reported SMOP indicators for the employment and unemployment radar charts are based on the average result of the three theoretically possible combinations of the axes in computing the surface area of the polygon. Since the number of theoretical possibilities is too large to apply the same procedure to the total (8 indicator) SMOP, the latter is now calculated as the simple sum of the employment and unemployment SMOPs computed on the averaging basis described above.

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