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Regional disparities in health care supply in eleven

European countries: does politics matter?

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ABSTRACT

There are large differences both among and within European countries in the supply of health care facilities and personnel. In 1979 Smith posed the hypothesis that spatial disparities in health care supply will be smaller in countries with socialist (or social-democratic) governments. The aim of this paper is to examine this hypothesis by analysing whether or not regional disparities in health care supply within countries are smaller in countries that have been governed predominantly by socialist governments. We have collected regional data on the number of hospital beds and the number of physicians for 211 regions in 11 European countries for 1970 and 1990. Countries were classified according to the political composition of governments in the post-war era. It is concluded that: (1) the amount of regional variation is greater for hospital beds than for doctors; (2) for both aspects of supply, regional disparities decreased over time; (3) the decrease in regional disparities between 1970 and 1990, both for beds and for doctors in hospitals, was stronger for countries that had more years of socialist government in that period and (4) there is no relation between the number of years of socialist government between 1945 and 1990 and regional variation in health care supply in 1970, nor for government participation between 1970 and 1990 and variation in supply in 1990. © 1999 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Politics; Geography; Equality; Health care supply; Europe

1. INTRODUCTION

European countries differ greatly in the supply of health care facilities and personnel. In addition to this, there are large disparities within countries at the level of regions [2–5]. In 1979 David M. Smith, in his book ‘Where the Grass is Greener: Living in an Unequal World’, posed the hypothesis that regional disparities in

health care supply are smaller in countries with socialist or social-democratic governments [1]. This hypothesis was also put forward and has been refined by Hollingsworth [6], Light [7] and Westert [8]. In their studies, the role of the state in controlling health care, as opposed to professional control, is the mechanism explaining the difference between countries.

The aim of this article is to test the hypothesis about the role of the state by studying whether or not spatial disparities in care supply (hospital beds, doctors) within countries are smaller in countries dominated by socialist or social-democratic governments. In the sociology of inequality and social stratification there is a long tradition of research into the relation between socio-political contexts, ideologically differing in what the state can and should enforce, and the distribution of life chances, such as income, educational opportunities and occupational status position [9]. Empirical research into this relation shows that indicators of the political composition of governments are correlated with the income distribution in Western, industrial societies. Left-wing politics is positively associated to the income share of the lowest 20% of the income distribution and negatively to the highest 20% of the distribution [10].

The spatial aspect of the distribution of life chances has been disregarded in sociology, but is central to geographical analysis [11–14]. Smith [1] hypothesised that health care systems of countries that are governed by social-democratic or socialist parties show a more even spatial distribution of health care facilities and manpower. A systematic test of this hypothesis has, however, not taken place yet. The question to be answered in this study is therefore: *Is the spatial distribution of health care facilities and manpower more even in countries with a social-democratic or socialist government, compared to countries with a conservative (Christian-democratic and: or liberal) government?*

Apart from the article's main thesis two conditions have been taken into account:

- . the number of years social-democrats or socialists were in power in the post-war era;

- . geographical constraints in a country affecting the possibilities of realising equal access to health care facilities, indicated by variations in a country's population density and economic prosperity of the regions within a country.

First, it is hypothesised that the expected 'equalising' effect on spatial distribution of health care facilities will be stronger, the longer social democratic or socialist parties are in power.

Second, large differences in population density and large distances, as in Norway, Sweden, Finland and also in France, are assumed to coincide with larger inequalities in the distribution of health services (and other merit goods, such as education).

The mechanism behind this has to do with difficulties in the development of facilities in remote and sparsely populated areas and with staffing the facilities in these areas. However, it is hypothesised that left-wing governments advocate equal access to merit goods and put more effort in to realising equality, also in sparsely populated areas.

Finally, the economic prosperity of a country (or a single region) influences its potential to support health care facilities and to attract physicians. Again, it is hypothesised that left-wing governments will advocate policies to mitigate the effects of economic prosperity.

In sum, the following hypotheses are relevant to the main thesis-social democratic or socialist government coincides with a more equal spatial distribution of health care facilities and manpower in a country-of this article:

- . The longer the duration of social democratic or socialist governmental dominance, the more even the distribution of health care delivery within a country will be.

- . In countries that for a longer period are governed by socialist parties differences in care supply among regions varying in population density are smaller.

- . In countries that for a longer period are governed by socialist parties differences in care supply among regions varying in economic prosperity are smaller.

2. DATA AND METHODS

The countries studied are Norway, Denmark, Sweden, Finland, the United Kingdom, the Netherlands, Belgium, France, Switzerland, Austria and Germany. Health care supply is the dependent variable in this study. The spatial distribution of health care supply within countries will be linked to the political composition of government in the period preceding assessment of spatial disparities. The latter was done for two points in time: 1970 and 1990. The arguments for choosing two points in time are that this provides a possibility of having a double cross-sectional test and also a possibility of testing the effect of political composition on longitudinal data: the change in spatial disparities between 1970 and 1990. The chosen periods, from 1945 to 1970 and from 1970 to 1990, are quite different. The former period is characterised as the reconstruction period in which the hospital sector expanded. In the latter period economic constraints decelerated further expansion.

To indicate health care supply we chose:

- . the number of (active, non-psychiatric) physicians per capita, practising either inside or outside hospitals;
- . the number of hospital beds per capita in acute and somatic (non-psychiatric) care.

We used these broad empirical definitions for hospital beds and physicians because otherwise international data that can be disaggregated to the level of regions or districts are incomparable or unavailable. To minimise the effect of data incomparability, coefficients of variation were calculated for the eleven countries separately. These coefficients of variations, showing the standard deviation as a percentage of the mean, can safely be compared and related to the explanatory variables at the level where we want to draw conclusions: countries.

The selected countries enjoy comparable levels of wealth, but vary in political preferences. The data on the political composition of governments were taken from Woldendorp et al. [15]. They used a five-point scale to indicate the ideological composition of the 271 governments that came to power in the post-war era of the eleven countries under study.

The unit of analysis is the region or district: we collected data for 211 regions for two points in time². Table 1 gives an overview of the regional levels used for each of the countries.

The reason for this is that the data collection in the UK was troublesome. First, Northern Ireland and Wales had to be left out. Second, we have done everything we could to get the data on a lower level than the Regional Health Authority in England, but surprisingly these were not available for 1970. Because of a 10-fold difference in average population size between the English and Scottish regions, we decided to analyse the regional data for Scotland and England separately.

Table 1 shows that the regional scale of the units in England, France and Germany is much higher than in the other countries. Because regional disparities tend to decline with increasing scale differences in scale are problematic. These are caused by limitations in data availability. We shall come back to this issue in the final section of the paper.

To test the influence of population density and economic prosperity on regional distribution of care supply we used the following indicators:

- . number of residents per square kilometre (1970, 1990) in the region;
- . gross value-added of the region (1990).

The association between a country's political composition and regional disparities in supply was tested by means of the nonparametric version of the Pearson correlation coefficient (Spearman's rho), based on the ranks of the data rather than on the actual values. The relation between population density (and economic prosperity) and regional supply of beds or doctors was tested with the Pearson coefficient of correlation for the twelve countries separately. Afterwards the influence of politics was tested by checking the size of the coefficients for two groups of countries: more or less than 15 years of social democratic dominance.

[TABLE 1]

3. RESULTS

Table 2 shows the national average of hospital bed and physician supply per 1000 population, for both 1970 and 1990. The figures were aggregated from the regional data. In some cases these national figures deviate from what is known from other data sources and studies [8].

Fig. 1 shows per region the number of hospital beds or doctors per capita divided by the national average (location quotient). Light grey means a negative deviation from the national average (grey) and dark grey represents the opposite. The first two maps show data for hospital beds in 1970 and 1990. The second pair show the data for supply of physicians in 1970 and 1990.

Table 3 shows per country the central explanatory variable “years of ‘left-wing’-dominance” in the post-war era, for 1945–1970 and 1970–1990, separately.

Regional differences in supply of hospital beds and physicians per capita, indicated by coefficients of variation, for each country separately and for two points in time are also shown in Table 3. The coefficient of variation for Dutch hospital beds in 1970 is 15, meaning that the range of regional bed supply is approximately determined by 70% (minimum) to 130% (maximum) of the national average, which is 5.2 hospital beds per capita (see Table 2). In Switzerland this range is much larger: 40–160% of the overall supply in the whole country (6.2 beds per capita, see Table 2).

From Table 3 and the four maps we can draw the following conclusions:

- . regional variation in hospital bed supply is smaller than in supply of physicians, both in 1970 and in 1990 and;
- . regional differences in supply of hospital beds and physicians declined; the overall decline between 1970 and 1990 was approximately 25%.

The rank correlation between the number of years that socialists or social democrats from 1945 to 1970 dominated governmental cabinets and the coefficients of variation of regional supply of hospital beds and physicians in 1970 should be negative. However, there is no relation. Spearman’s rho is $=0.22$ ($P \setminus 0.05$) for beds and 0.21 ($P \setminus 0.05$) for physicians.

The same hypothesis was tested for the number of years that governmental cabinets were dominated by social democrats between 1970 and 1990. The results are the same. Spearman’s rho is $=0.15$ ($P \setminus 0.05$) for beds and 0.02 ($P \setminus 0.05$) for physicians.

However, the analyses of the change of regional variation support the hypothesis: the rank correlation between ‘number of years that governmental cabinets were dominated by social-democrats between 1970 and 1990’ and the change in regional variation in supply of hospital beds and physicians in 1990 compared to 1970 (indicated by the country-specific coefficient of variation) is positive. The decline in regional variation is larger for countries that were longer governed by socialists or social democrats. For hospital beds the rank correlation is 0.48 ($P=0.06$) and for physicians 0.47 ($P=0.06$).

The results of the statistical tests do have the expected sign and are statistically borderline ($P=0.06$, $n=12$). Fig. 2 shows the results of the latter tests in a scatterplot. This figure shows two things. First, it becomes clear that for both hospital beds and physicians decrease in regional disparities is larger in countries with more years of political dominance by left-wing parties. Second, the association between the two variables is slightly disturbed by two outliers; one when regional disparities of hospital bed are plotted by years of socialist dominance (Belgium) and one when physician supply is analysed (Finland). When these two were left out,

[TABLE 2]

[TABLE 3]

[FIGURE 1]

[FIGURE 2]

Spearman's rank correlation increased to 0.74 ($P < 0.01$, $n = 11$, hospital beds) and to 0.58 ($P < 0.05$, $n = 11$, physicians). Finally, Table 4 shows per country the correlations between population density in 1970, population density in 1990 and economic prosperity in 1990 *and* hospital beds on the one hand and doctors per capita on the other hand. The countries printed in italics experienced more than 15 years of left-wing dominated cabinets in the post-war era. Contrary to our hypothesis, the number of times that there is no relation in 'socialist' countries is about the same as in the remaining countries. This means that 'left-wing' governments do not catch the eye in their efforts to mitigate the effects of economic prosperity and population density. Table 4 shows that regional supply of doctors is strongly associated with population density, both in 1970 and in 1990. The relation between regional bed supply and population density or economic prosperity is much weaker (1990).

[TABLE 4]

4. DISCUSSION

There are large differences in supply of health services between countries in Europe and within countries between regions. In this paper we have looked at the variation in supply of acute hospital beds and physicians within eleven European countries. Regional variation in the number of physicians per 1000 population is larger than variation in the number of acute beds per 1000 population. Variation in both supply indicators has decreased over the period 1970–1990.

We have looked for an explanation of regional variations in health services supply in the theory that the political colour of governments influences the distribution of access to scarce goods, such as education, work, income, and also health care. We hypothesised that the regional variations in health services supply would be lower as a function of the length of the period of socialist or social-democratic government participation. As an implication of the central hypothesis, we expected that other influences on the spatial distribution of services, such as

economic prosperity and population density, would be weaker with socialist or social-democratic government participation.

To rule out an alternative explanation of regional differences in supply it was checked whether or not regional disparities are associated with differences in demographic composition of regional populations, indicating differences in demand for health care. The crucial factor here is the percentage of elderly in a region. In three out of 24 comparisons—12 countries and two variables indicating care supply in 1990—the percentage of elderly was positively associated with care supply. The maximum decrease in regional variation caused by this demographic factor was only 19%: Finland's coefficient of variation for bed supply in 1990 dropped from 11 to 9.7. The observed regional disparities in care supply can hardly be explained by differences across regions in this indicator of demand.

The main hypothesis was not supported when supply was measured at one point in time. However, when the decrease in spatial disparities between 1970 and 1990 is correlated with political colour of government from 1970 to 1990, the hypothesis is supported. What is a plausible reason for this equivocal outcome? The longitudinal test measures the progress that has been made by governments to push back disparities between two points in time and correlates the result with the political colour of cabinets in the same period. In the cross-sectional test spatial disparities at one point in time are correlated to the political colour in the years preceding the moment disparities were measured. The latter test is much harder to pass because spatial disparities measured at one point in time (1970 or 1990) reflect also—at least partly—disparities that evolved much further back in history.

When the decrease in disparities (beds, doctors) was related to political colour two outliers were detected: Belgium, Finland. Can we explain the fact that their position in Fig. 2 is not in line with our thesis? The only thing that—afterwards—can be said about Belgium is that Belgium's *laissez-faire* politics in the health care sector has resulted in an abundant supply of various care components: GP's, medical specialists, hospital beds and home care [8]. The deviant position of Finland can partly be explained by the fact that the Finnish cabinets in fact seem to be more 'left-wing' than is suggested by party allegiance. Finland's history, with a politically noisy neighbour in the East, explains this. Partly also, an explanation can be found in the data used. These include for hospital beds the beds in health centres, which only started after 1970 and are more decentralised.

Because the longitudinal test supports the hypothesis for both hospital beds and medical doctors we can conclude that political colour does seem to matter in our study, but also that other tests of this hypothesis are necessary.

A second reason why we probably found support for our hypothesis in the longitudinal analysis, but not in the cross-section, has to do with the large differences between countries in the institutional structure of their health care and political systems. The 'effect of left-wing government' hypothesis is, just as all social science hypotheses, essentially a *ceteris paribus* hypothesis. However, having such a small number of cases (we shall come back to this point later) it is impossible to use the strategy of multivariate analysis. In a parallel study we found empirical support for the hypothesis tested under the condition of a shared institutional structure. This was the case in a recent analysis of regional variation in hospital beds within German *Bundesländer* [16]. When using the decrease of regional variation in a country as the dependent variable, in a way we controlled for differences between countries that influence the geographical variation in care supply at one point in time.

It is difficult to pin down the mechanism that causes left-wing politics to coincide with decreasing regional disparities in health care supply. In some health care systems the opportunities to influence the spatial distribution of health resources are less than in others. Nationalised health care systems are characterised by predominantly one central base of power controlled by the state, e.g. the NHS in the UK and similar systems in the Scandinavian countries. In systems that have less 'state control', control is divided between the state, professional organisations and health insurance bodies, both public (para-state) and private, like the situation in

Belgium, the Netherlands and Germany [8]. Countries with a state-controlled health system and governed by socialist parties will realise more equality in the distribution of care supply than countries with a state-controlled health system and governed by parties that are not 'left-wing'. This hypothesis could, however, not be tested properly in this study, because-with no more than twelve countries-social democratic dominance coincides with the presence of a national health system in a country.

Methodologically, the issue of small numbers is an important problem. It takes a lot of effort to collect regional data on health care supply. We hope to expand the number of countries in this data set gradually in the near future, with countries not only in Southern Europe, but also in Central Europe.

A final issue is the regional scale that was used. It was at this point not possible to collect data at a comparable regional scale for all countries. Especially, the difference between England and Scotland in this respect is striking. The regional scale used in England, France and Germany was higher than in the other countries, but we do not think that this has disturbed the results of the analysis. At the aggregate level we found no correlation between regional disparities in bed supply in a country (indicated by the coefficient of variation) and the regional scale level (indicated by average population size of the regions). Variation in supply of doctors and regional scale did, however, correlate negatively. This means that in countries with a higher scale level (England, France and Germany) regional disparities in doctor supply are slightly camouflaged. As said before, our main finding will not be influenced by this data problem. Ideally, in future we should use a comparable regional scale level for all countries, but the results of this paper will not change dramatically because of these efforts.

The support for the article's hypothesis on the influence of left-wing policy on spatial disparities in health care supply makes it worthwhile to invest in better and more comparable regional data for a larger sample of countries. The regained dominant position of social democrats in many national governments in Western Europe is a good reason to provide a stronger test of the hypothesis in the near future.

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Tables

Table 1
The units of analysis within the countries under study (average population size, *N*)

| Country | National name of the regional unit | Population size average unit in 1990 ($\times 1000$) | Number of regional units |
|----------------|------------------------------------|--|--------------------------|
| Belgium | Province | 1112 | 9 |
| Netherlands | Province | 1250 | 11 |
| Switzerland | Canton | 278 | 24 |
| Finland | Sairaanhoitopiiri | 241 | 21 |
| France | Region | 2574 | 22 |
| Germany (West) | Regierungsbezirk | 2128 | 30 |
| Austria | Bundesland | 866 | 9 |
| England | Regional health authority | 3456 | 14 |
| Scotland | Health board region | 342 | 15 |
| Denmark | Amt | 313 | 14 |
| Norway | Fylk | 238 | 18 |
| Sweden | Sjukvårdhuvudman | 358 | 24 |

² The data used here were taken from statistical yearbooks and national reports on health care supply. A country-specific list of data sources can be obtained on request.

Table 2
National average supply of hospital beds and physicians in 1970 and 1990 in the countries under study

| Country | Beds (1970) | Beds (1990) | Doctors (1970) | Doctors (1990) |
|-------------|-------------|-------------|----------------|----------------|
| Sweden | 2.4 | 3.9 | 1.1 | 2.3 |
| Norway | 4.6 | 3.5 | 1.1 | 2.9 |
| Denmark | 5.5 | 5.1 | 1.0 | 2.1 |
| England | 7.6 | 5.3 | 1.3 | 1.5 |
| Scotland | 3.9 | 3.3 | 1.4 | 1.7 |
| Austria | 6.2 | 6.2 | 1.3 | 1.9 |
| Germany | 7.9 | 7.4 | 1.5 | 2.6 |
| France | 5.0 | 4.6 | 0.8 | 1.8 |
| Finland | 5.5 | 9.2 | 0.8 | 2.0 |
| Belgium | 3.0 | 3.5 | 1.5 | 2.7 |
| Netherlands | 5.2 | 4.4 | 0.8 | 1.2 |
| Switzerland | 6.2 | 6.4 | 0.8 | 1.4 |

Table 3
Number of years national governments dominated by socialist or social-democratic parties in the period 1945-1990 and coefficients of variation for supply of hospital beds and physicians in 1970 and 1990 in a selection of European countries^a

| Country | Left-wing years (1945-1990) | Left-wing years (1945-1990) | Beds (1970) | Doctors (1970) | Left-wing years (1945-1990) | Beds (1990) | Doctors (1990) |
|-------------|-----------------------------|-----------------------------|-------------|----------------|-----------------------------|-------------|----------------|
| Sweden | 39 | 24 | 16.9 | 39.7 | 15 | 13.1 | 21.0 |
| Norway | 30 | 17 | 20.6 | 29.3 | 13 | 13.3 | 24.5 |
| Denmark | 23 | 15 | 18.7 | 20.1 | 8 | 17.2 | 15.0 |
| England | 17 | 12 | 20.3 | 8.6 | 5 | 18.8 | 4.5 |
| Scotland | 17 | 12 | 26.6 | 27.5 | 5 | 23.8 | 23.0 |
| Austria | 16 | 0 | 29.3 | 36.8 | 16 | 15.0 | 33.4 |
| Germany | 11 | 1 | 19.4 | 29.0 | 10 | 12.6 | 16.5 |
| France | 7 | 0 | 17.8 | 26.9 | 7 | 13.2 | 20.3 |
| Finland | 4 | 3 | 16.9 | 50.9 | 1 | 11.0 | 32.6 |
| Belgium | 0 | 0 | 26.5 | 28.0 | 0 | 12.3 | 24.0 |
| Netherlands | 0 | 0 | 15.0 | 18.5 | 0 | 15.6 | 20.2 |
| Switzerland | 0 | 0 | 29.3 | 27.4 | 0 | 29.1 | 27.3 |
| All (mean) | | | 21.4 | 28.6 | | 16.2 | 21.9 |

^a Data source (column 2,3 and 6): Woldendorp et al. (1993) [15].

Table 4
Correlations (within countries) between population density (1970, 1990), economic prosperity (1990) and beds versus doctors per capita

| Country | Population density (1970) | | Population density (1990) | | Economic prosperity (1990) ^a | |
|--------------------|---------------------------|---------|---------------------------|---------|---|---------|
| | Beds | Doctors | Beds | Doctors | Beds | Doctors |
| <i>Sweden</i> | 0.05 | 0.55* | -0.09 | 0.38* | -0.02 | 0.34 |
| <i>Norway</i> | 0.55* | 0.87* | -0.07 | 0.67* | -0.23 | 0.53* |
| <i>Denmark</i> | 0.78* | 0.87* | 0.83* | 0.87* | -0.15 | 0.13 |
| <i>England</i> | -0.04 | -0.07 | 0.03 | -0.11 | 0.35 | 0.49* |
| <i>Scotland</i> | 0.60* | 0.36 | 0.60* | 0.45* | -0.11 | -0.03 |
| <i>Austria</i> | 0.14 | 0.49* | -0.05 | 0.43 | 0.15 | 0.80* |
| <i>Germany</i> | 0.17 | -0.06 | -0.26 | 0 | 0.30 | 0.61* |
| <i>France</i> | 0.21 | 0.46* | 0.03 | 0.34 | 0.18 | 0.16 |
| <i>Finland</i> | 0.69* | 0.87* | -0.26 | 0.75* | -0.14 | 0.21 |
| <i>Belgium</i> | 0.53* | 0.57* | 0.60* | 0.56* | 0.09 | 0.04 |
| <i>Netherlands</i> | 0.37 | -0.03 | 0.29 | 0.13 | 0.55 | 0.44 |
| <i>Switzerland</i> | 0.07 | 0.41* | 0 | 0.50* | 0 | 0.48* |

^a Data not available for 1970.

* $P < 0.05$; if number of regions below 10 $P < 0.10$ (Belgium, Austria).

Figures

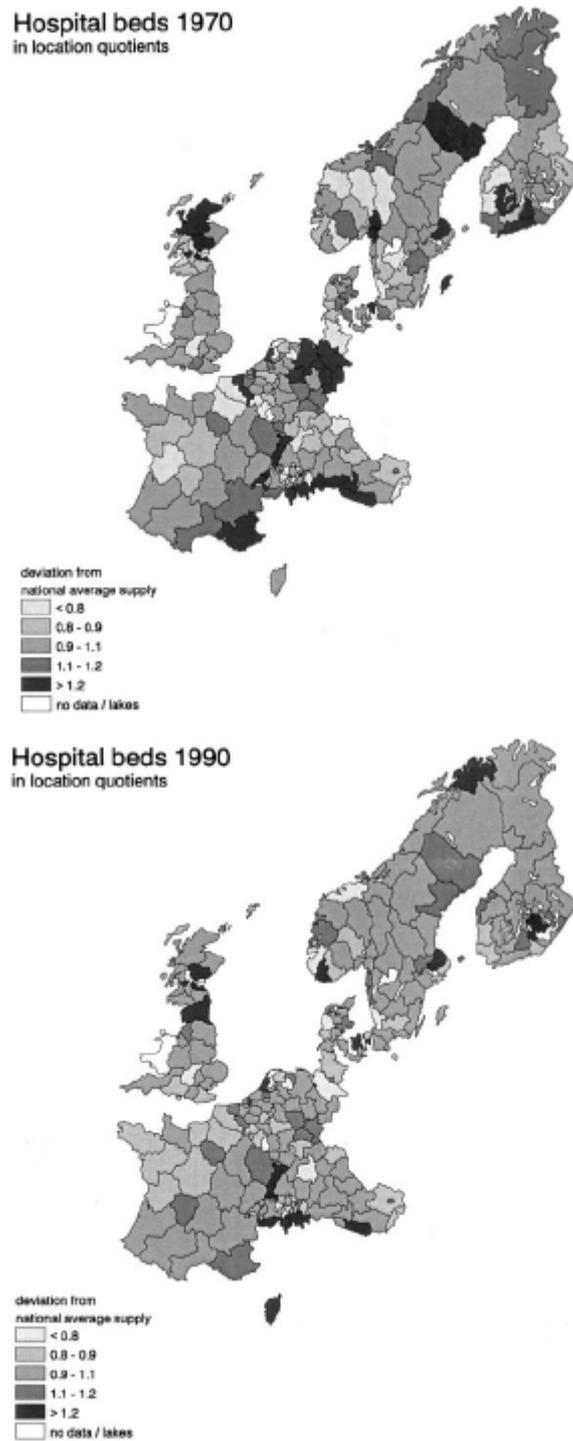
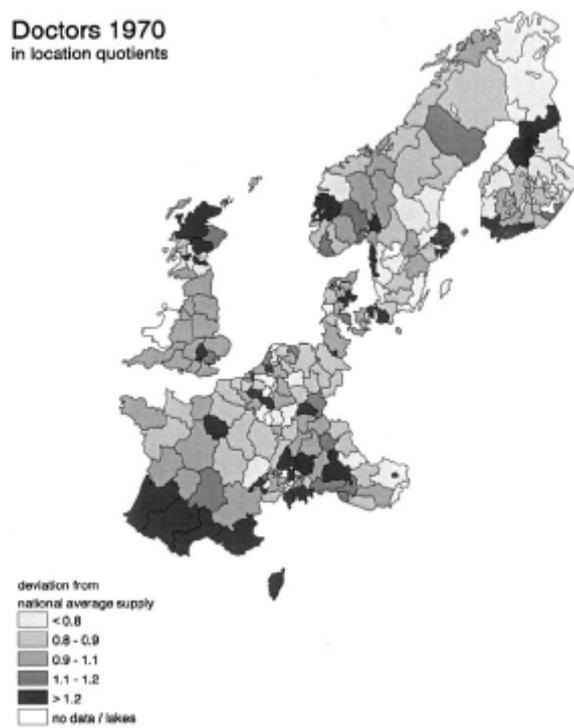


Fig. 1. Number of hospital beds and physicians per capita, expressed as location quotients, in 1970 and 1990 per region.

Doctors 1970
in location quotients



Doctors 1990
in location quotients

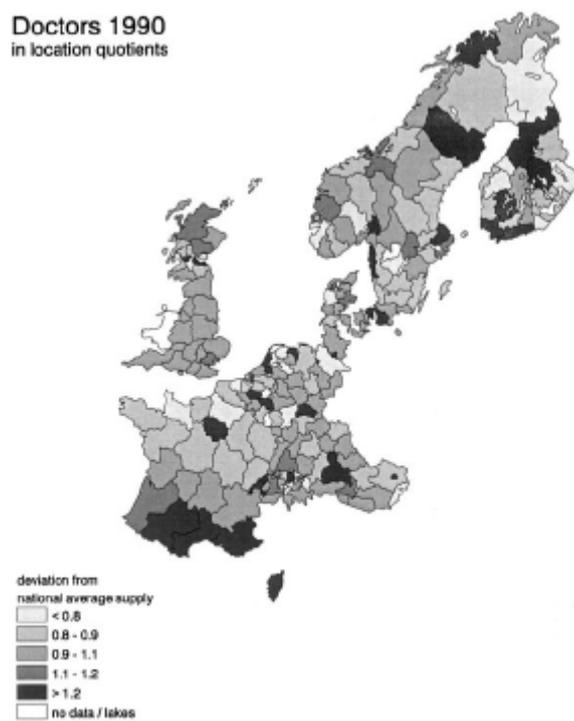


Fig. 1. (Continued)

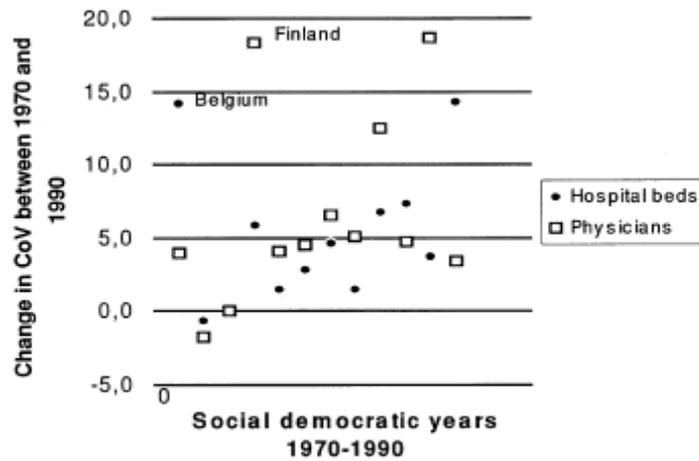


Fig. 2. Change in coefficients of variation (CoV) for supply of hospital beds and physicians between 1970 and 1990 and number of years national governments were dominated by social democratic parties.