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TO REGIONAL  
EARNINGS  
DIFFERENCES

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# Where Did the Physicians Go? A Study of the Response to Regional Earnings Differences\*

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## Abstract

This paper examines the geographical movements of physicians in Finland 1987–2001 and what affected their choice of the region of the workplace. For this purpose earnings equations for the different regions are also estimated. In addition to gender and family variables, the variables for physicians qualifications explain a significant part of the income differences. The effect of the expected earnings on the choice of region is ambiguous. It is argued that a likely reason for the lack of a clear effect of the expected income on the choice of the region of the workplace is that there are omitted variables, which are correlated with the earnings of the physicians and which strongly affect the attractiveness of the job. To achieve an appropriate distribution of physician services across the regions giving attention to a broader set of factors influencing the possibilities for education and the working conditions of the physicians is likely to be more useful.

## 1 Introduction

The number of physicians in Finland have been growing steadily in recent decades [Snellman, 2005]. Nevertheless the demand for physicians was larger than the supply of them at the turn of the century and the deficit of physicians was most severe in remote areas. The aim of this study is to examine which factors affect the physicians' decision to move and especially the effects on movements of expected earnings. The results are expected to be useful for policy makers for understanding how to increase the supply of physicians in remote areas.

In this paper the decision to move is divided into two parts that for convenience are analysed separately. The first part of the decision according to this division is whether to move or not. This decision can be seen as based mainly on the characteristics of the current job and hospital district as well as the characteristics of the labour market for physicians in general at the time. The second part of the decision is the choice of the region of the new workplace. In the analysis of this choice an attempt is made to use the expected income in different regions as an explanatory variable besides the variables varying only across individuals.

The topic in this study is different from that in studies on choice of specialty or choice to practice in rural areas since there are hospitals with a broad range of specialties in all hospital districts in Finland, although the most highly specialised services are to be found at the university hospitals. Thus also specialised physicians of different kinds move to hospital districts without university hospitals, although the most qualified and specialised are likely to have a propensity to stay at the university hospitals in which the highly specialised care is located. University hospitals may also attract physicians pursuing specialisation studies or studies for a Doctor of Medical Science degree, as university hospitals are likely

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to provide better research facilities. It is uncertain to what extent physicians are willing to trade of such factors for higher pay.

The analysis is based on human capital models of migration. Migrating can be seen as an investment by the individual and individuals may therefore choose to move in different directions because of differences in human capital and in other personal characteristics. This approach to migration was introduced by Sjaastad [1962] and has been followed by a large number of researchers. The physicians can be assumed to differ with respect to their preferences concerning for example further investments in human capital, how much to work and the costs of changing hospital districts and regions. The characteristics of the regions are also likely to affect the movement decisions. Although the movements may take place in response to considerations of expected long-term outcomes, this study concentrates on responses to short-term differences in pay. One argument for such an approach is that Finnish physicians have been moving across regions rather frequently and that they therefore may respond to short-term differences in pay. However, this approach means that any long-term effects such as on the accumulation of human capital are disregarded. For a survey of much of the early literature on migration see Greenwood [1975]. Studies of migration bringing new perspectives and using new techniques were Mincer [1978] and Robinson and Tomes [1982]. Recent Finnish studies of migration include Häkkinen [2000], Kauhanen and Tervo [2002] and Pekkala [2003]. There are rather few studies of the geographical movements of the personnel in the health care sector. Only Benarroch and Grant [2004] examines the responsiveness of physician flows to differences in earnings across regions. However, the Candian setting they examine is rather different from the Finnish one and in addition they only examine the effect of aggregate and average variables on the provincial level and assume that the coefficients are constant across regions and over time. Some other studies examine the physicians' choice of location type [Newhouse et al., 1982], the choice of region in combination with the choice of speciality and practice mode [Hurley, 2000], or the effect of special financial incentives on the choice of region [Bolduc et al., 1996]. According to these studies physicians respond rather strongly to economic incentives. However, the North American labour market for physicians is rather different from the Finnish one and the differences in earnings in Finland may not have been large enough compared to other factors to have directed the physician flows.

In the following section the data set is presented. Then follows a section in which the physicians' decision to move or not to move is analysed. In the fourth section earnings equations for the different regions are estimated. The fifth section uses the conditional logit model to estimate which factors affect the choice of the region of the work place. The sixth section concludes.

## 2 A short presentation of the data set

The data set used in the study is a part of a sample from the employment statistics. Half of the persons who in some year in the period 1987–2001 were living in Finland and had an educational code whose second number was 7, meaning that they had an education for health care or social services, were sampled. This means that also approximately every second physician is included in the sample and that the sample is representative with respect to the characteristics of the physicians except for random variations. In this study we include for any given year all physicians below 63 years from this sample.<sup>1</sup> Some of the physicians got their exam and entered the labour market after the beginning of the period. Some of the physicians also retired, emigrated or died before the end of the period. This means that information is missing for some physicians in some years. Excluded from the estimations of income and choice of region of the workplace are also all those physicians who were not working in the health care sector at the time. The reason for this exclusion is that limiting the estimation to those employed in the health care sector gives a more homogenous data set with respect to unobserved variables such as the working environment. The number of physicians included in the estimations thus varies depending on what year and what conditions are set for inclusion but for all regions together the number of physicians included are several thousands. The data set covers all of the years 1987–2001. For the first two years some information is missing, which implies that the estimations mostly will be made for the years 1989–2001.

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<sup>1</sup>Physicians mean all persons who in some year in the period 1987–2001 had one of the educational codes 772101 (Licentiate of Medicine), 775101 (Specialist Degree in Medicine) and 875101 (Doctor of Medical Science).

The data include information on age and sex as well as on family, education and job characteristics. For the income variable low incomes may to some extent reflect that the physician has been on leave, because the employment variables are based on whether there is an employment contract.

In the estimations of the hospital districts are grouped into three regions. The Hospital District of Helsinki and Uusimaa forms Region 1. The hospital districts in which the other university hospitals are located forms Region 2. This region thus includes the Hospital Districts of Varsinais-Suomi, Pirkanmaa, Pohjois-Savo and Pohjois-Pohjanmaa. Region 3 includes all the other hospital districts; that is the Hospital Districts of Satakunta, Kanta-Häme, Päijät-Häme, Vasa, Etelä-Pohjanmaa, Kymenlaakso, Etelä-Karjala, Etelä-Savo, Itä-Savo, Pohjois-Karjala, Keski-Suomi, Keski-Pohjanmaa, Kainuu, Länsi-Pohja and Lapland.<sup>2</sup>

### 3 The choice to move

It might be useful to consider the process of changing the hospital districts of the workplace as separable into two steps. The first step is then the decision to change hospital district and the second is the decision concerning which region or hospital district to move to.<sup>3</sup> In the analysis in this section I concentrate on the first decision and attempt to explain the movements away from hospital districts. As table 1 indicates, the large majority of movements between hospital districts were movements between hospital districts in different regions. Since there is no need to reduce the number of chosen alternatives when one examines what affects the choice whether to move or not, in this section all movements between hospital districts are analysed. The variations in the share of physicians changing hospital district and region of their workplace take a procyclical form as the share is lower during the depression years 1993–1995. However the lowest levels were reached somewhat later for physicians than for the population in general. An explanation for this might be that the physicians were mostly employed in the public sector, which implied that the unemployment hit them later. For studies of movements for the population in general in Finland, see for example Häkkinen [2000], Kauhanen and Tervo [2002] and Pekkala [2003].

The movement decision is assumed to depend on the characteristics of the physician as well as of the job and the hospital district in which it is located. To estimate the effect of different variables on the decision to move we employ a probit model. The linear model of the latent variable  $M_i^*$  is

$$M_i^* = \beta x_i + \epsilon_i, \quad (1)$$

in which  $\beta$  is the vector of coefficients to be estimated,  $x_i$  is a vector of explanatory variables and includes characteristics of the physician as well as the hospital district, in which he or she works the first of the two years, and  $\epsilon_i$  is an error term. In reality it is only observed whether the physician moves or not. The dichotomous variable  $M_i$  takes the value 0 for physician  $i$  if the physician is observed to have his or her workplace in the same hospital district in the end of next year as in the end of the current year, and the value 1 if the hospital district of the workplace has changed by the end of next year. If for either of the two years the physician does not have a workplace and a hospital district in which it is situated, the observation is omitted. The probit estimation is based on the assumption that the error term in equation (1) is normally distributed. In the estimations the latent variable  $M_i^*$  and the dichotomous observed variable  $M_i$  are defined to be related as follows:

$$M_i = \begin{cases} 1 & \text{if } M_i^* > 0 \\ 0 & \text{if } M_i^* \leq 0 \end{cases} \quad (2)$$

Since the effects of the variables are likely to vary with the business cycle and the changes in the physicians labour market environment, a separate estimation of the effect on the probability of changing

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<sup>2</sup>Observations of physicians employed at the Åland islands are excluded from the analysis. This part of the country is different from the rest of the country and therefore the moving behaviour of these physicians is likely to differ from that of other physicians.

<sup>3</sup>Clearly the decision is dependent on that there exists at least one good alternative. If there is none, there is no change of hospital district. However, this only adds an error term meaning that the actual change of hospital districts does not correspond exactly to the latent variable that the individual is unsatisfied.

Table 1: The percentage of physicians moving between hospital districts and regions respectively. Calculations are based on the hospital district or region of the work place.

Year	Percentage having changed hospital districts	Percentage having changed regions
1988	8.65	6.75
1989	8.25	6.54
1990	7.21	5.78
1991	6.81	5.43
1992	7.35	6.05
1993	5.45	4.48
1994	5.83	4.85
1995	6.40	5.17
1996	7.27	5.48
1997	6.71	5.25
1998	6.44	5.30
1999	7.24	6.15
2000	7.16	5.87
2001	7.09	5.82

hospital districts is made for each year. As is shown in table 2 the extent to which the models can explain the changes of hospital districts varies from year to year. Because it is uncertain whether or not commuting between hospital districts and previous movements should be included as explanatory variables, three different specifications are estimated. The coefficients of the dummies for previous changes of hospital districts are significantly different from zero. The variable for that the physician has commuted is also strongly associated with the movement decision and the explanatory power when it is excluded in estimation 3 is much lower. However, both commuting and previous movements can be middle stages and a part of the same process as the change of hospital district observed in the dependent variable. Both the variable "commuted" and the variables for change of hospital district in the preceding years can therefore be argued to reflect the same independent variables as the dependent variable and thus to be endogenous. An alternative that could reduce the influence of transitory states on the estimations is to estimate changes of hospital districts over a longer time period. Using a longer time period would give more weight to long-term decisions.

Since movement decisions might be related both to the age, the education level and the accumulated experience, both age variables, dummy variables for level of education, and variables for experience since receiving the degree are included. Included are also variables indicating the family situation of the physician, such as family type and the existence of small children. A dummy for the hospital district of the physician's work place during the first of the two years is included as well as a variable for earned income. Dummies for unemployment and not having been employed all of the year are included but the employment variables are imperfect and low income may sometimes be a consequence of the fact that the physician has been on leave. The inclusion of family and gender variables are also intended as an attempt to control for this. A complete list of the explanatory variables in the  $x$ -vector is provided in tables 3 and 4, which present the effects of the explanatory variables on the movement decisions for the last year in the data set.

In the tables of the results from the estimations of the probit equation the marginal effects of the variables at mean on the probability for a movement are presented. Exceptions are the dummy variables, whose coefficients show the effect on the probability of movement of a change in the dummy variable from 0 to 1.<sup>4</sup>

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<sup>4</sup>Experience since Specialist Degree were dropped for 1987–89, experience since Specialist Degree squared for 1987–90, and the Specialist Degree dummy for 1987, because no physician received a Specialist Degree before 1987 and only 2 received

Table 2: Pseudo- $R^2$ ,  $\chi^2$ , degrees of freedom of the model, and number of observations in the probit estimations of the effect of different factors on changing the hospital district of the work place by the end of next year with (estimation 1) and without (estimations 2 and 3) dummy (D) variables for whether the physician changed hospital district of the workplace in the two preceding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded.

Year	Estimation 1				Estimation 2				Estimation 3			
	Ps.- $R^2$	$\chi^2$	M. df	Obs.	Ps.- $R^2$	$\chi^2$	M. df	Obs.	Ps.- $R^2$	$\chi^2$	M. df	Obs.
1987					0.31455	783.59	41	4232	0.15875	396.25	40	4233
1988					0.35077	836.64	41	4171	0.18808	448.60	40	4171
1989	0.27993	462.58	44	3659	0.28824	617.76	42	4146	0.14832	317.87	41	4146
1990	0.32318	553.29	44	4022	0.30723	694.84	44	4571	0.16656	376.70	43	4571
1991	0.28601	491.36	46	4075	0.29210	718.05	45	4681	0.17010	418.15	44	4681
1992	0.23572	334.26	45	4135	0.24451	489.13	45	4711	0.15920	318.46	44	4711
1993	0.26305	417.80	45	4181	0.26544	557.64	44	4704	0.16733	351.52	43	4704
1994	0.28184	438.67	46	4229	0.29107	676.45	45	4873	0.19955	463.75	44	4873
1995	0.33568	578.41	47	4340	0.34562	913.28	45	5058	0.22437	592.89	44	5058
1996	0.26282	477.59	47	4626	0.26923	716.20	45	5394	0.18190	483.89	44	5394
1997	0.27885	536.42	47	4860	0.25810	692.88	45	5611	0.14739	395.66	44	5611
1998	0.23797	514.81	47	5095	0.26005	786.82	45	5809	0.15269	462.00	44	5809
1999	0.23230	549.75	47	5205	0.23212	703.03	45	5863	0.14188	429.69	44	5863
2000	0.26942	668.02	47	5363	0.25739	785.91	45	5961	0.15729	480.28	44	5961

The results in table 3 confirm that living and working in different hospital districts (commuted) is the most important single variable for predicting a change in the hospital district by the end of next year. Changes of the hospital district of the work place in preceding years also predict a change of the hospital district of the work place in the current year. This may reflect the fact that the physicians have not rooted yet after a recent change of work place. Alternatively the first move was intended to be temporary.

Generally the hospital districts with physician education (Hospital Districts of Helsinki and Uusimaa, Varsinais-Suomi [the comparison category], Pirkanmaa, Pohjois-Savo and Pohjois-Pohjanmaa) seem to have somewhat lower probabilities for that their physicians move to another hospital district. The physicians in the hospital districts of Itä-Savo, Keski-Pohjanmaa and Vasa were most likely to have moved to another hospital district.

The large standard error for the unemployment coefficient is a consequence of the fact that there are very few observations of physicians who had been unemployed for at least one month. Table 5 shows that the relatively large effect of having been unemployed in table 3 is not repeated consistently for other years but the estimates are still uncertain. Unemployment does not seem to be of any greater significance for the movements of the physicians.

As opposed to the effects of the variable "Outside" in table 3, the effects in table 6 indicate that having been non-working generally have been positively related to changing hospital district of the working place. However, much of the effect of this variable disappears in estimation 2 and estimation 1, when the dummy variables for commuting and for having moved in previous years are included. Then the effects also become statistically insignificant for most years. A possible explanation is that physicians are outside working life mostly only in the beginning of their careers.

According to the estimates in table 3 the earned income is not significantly related to the movement

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it in 1987. Foreign citizenship was dropped for 1989–94 in estimation 1 and for 1987–89 in estimation 2 and 3 because it predicted that the physician stays perfectly. As is the dummy variable "Family type unknown" for 1992–93 in estimation 1. For the same reason the unemployment dummy was dropped for 1988 in estimations 2 and 3 and for 1990 in estimation 1. Only individuals who have a job in the end of the year are included.

Table 3: Estimations using probit of the marginal effects at mean of different factors on changing the hospital district of the work place from 2000 to 2001 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district of the workplace in the years 1999–2000 and 1998–99. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. The comparison category consists of fully employed Finnish-speaking male Licentiates of Medicine with Finnish citizenship, who do not have a family and work as well as live in the Hospital District of Varsinais-Suomi. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
Woman (D)	-0.00378	0.00486	-0.00566	0.00510	-0.00377	0.00566
Foreign citizenship (D)	-0.01964	0.01054	-0.02173	0.01245	-0.02252	0.01542
Swedish-speaking (D)	-0.01855	0.00830	-0.01799	0.00958	-0.01864	0.01144
Other mother tongue (D)	0.02911*	0.02193	0.03542*	0.02307	0.05071**	0.02682
Age	0.00223	0.00434	-0.00045	0.00425	0.00106	0.00476
Age squared	-0.00004	0.00005	-0.00002	0.00005	-0.00004	0.00006
Moved last year (D)	0.01520**	0.00891				
Moved two years ago (D)	0.02508***	0.00956				
Commuted (D)	0.24333***	0.02792	0.26489***	0.02455		
Specialist Degree (D)	-0.02758**	0.01132	-0.02974**	0.01110	-0.04333***	0.01180
Doctor of Medical Science (D)	-0.02045	0.01045	-0.01534	0.01186	-0.02726	0.01164
Exp. since Lic. Med.	-0.00580***	0.00203	-0.00628***	0.00191	-0.00853***	0.00213
Exp. since Lic. Med. squared	0.00014**	0.00006	0.00015**	0.00006	0.00019***	0.00007
Exp. since Specialist Degree	-0.00156	0.00393	-0.00141	0.00449	-0.00453	0.00497
Exp. since Specialist Degree squared	-0.00011	0.00037	-0.00014	0.00042	0.00006	0.00046
Exp. since D.Med.Sc.	-0.00203	0.00271	-0.00386	0.00289	-0.00492	0.00325
Exp. since D.Med.Sc. squared	0.00003	0.00012	0.00009	0.00013	0.00011	0.00014
Children below 18 (D)	-0.02396**	0.01019	-0.01938*	0.01062	-0.03313***	0.01200
Children below 7 (D)	0.01288*	0.00767	0.00785	0.00770	0.00237	0.00803
Married without children (D)	-0.01485**	0.00628	-0.02485***	0.00566	-0.02833***	0.00650
Married with children (D)	0.00124	0.00942	-0.01027	0.01037	-0.00267	0.01126
Mother / father with children (D)	0.01984	0.01735	0.00968	0.01515	0.01151	0.01694
Cohabitators with children (D)	-0.01274	0.01037	-0.02184*	0.00897	-0.02113	0.01198
Cohabitators without children (D)	-0.00857	0.00832	-0.00916	0.00810	-0.01555	0.00836
Family type unknown (D)	-0.02745	0.00789	-0.00585	0.03538	0.03273	0.06704
Ln(Earned income)	0.00193	0.00705	0.00152	0.00708	0.00659	0.00794
Unemployed (D)	0.11055**	0.07630	0.04711	0.04259	0.04748	0.04474
Outside (D)	-0.00008	0.00709	-0.00014	0.00684	-0.00214	0.00747

Table 4: Estimations using probit of the effects on the probability at mean of the hospital district on changing the hospital district of the work place from 2000 to 2001 with estimations as described in table 3. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Estimation 1		Estimation 2		Estimation 3	
	Effect	St. error	Effect	St. error	Effect	St. error
HUS (D)	-0.00868	0.00911	-0.02071**	0.00813	-0.02274**	0.00939
Satakunta (D)	0.04080**	0.02512	0.02876*	0.02082	0.08647***	0.03207
Kanta-Häme (D)	0.00807	0.01769	0.00958***	0.01778	0.08061	0.03444
Pirkanmaa (D)	0.01697	0.01466	0.00660	0.01201	0.01995	0.01533
Päijät-Häme (D)	0.04527**	0.02677	0.04671**	0.02472	0.08582***	0.03164
Kymenlaakso (D)	0.03872*	0.02921	0.03121	0.02547	0.06291**	0.03305
Etelä-Karjala (D)	0.05010**	0.03394	0.01844	0.02404	0.05457**	0.03470
Etelä-Savo (D)	0.04729*	0.03413	0.04352*	0.03078	0.10346***	0.04374
Itä-Savo (D)	0.18827***	0.06901	0.16147***	0.06117	0.20406***	0.06733
Pohjois-Karjala (D)	0.01694	0.02243	-0.00090	0.01686	0.00556	0.02129
Pohjois-Savo (D)	0.02173	0.01766	0.00986	0.01435	0.01274	0.01644
Keski-Suomi (D)	0.06063***	0.02776	0.03586**	0.02114	0.04885**	0.02482
Etelä-Pohjanmaa (D)	0.02389	0.02209	0.00492	0.01643	0.03372*	0.02473
Vasa (D)	0.08554***	0.03962	0.05705***	0.02939	0.09077***	0.03628
Keski-Pohjanmaa (D)	0.14234***	0.05685	0.11236***	0.04709	0.16624***	0.05554
Pohjois-Pohjanmaa (D)	0.01457	0.01514	0.00402	0.01214	0.00763	0.01419
Kainuu (D)	0.02867	0.03271	0.04503*	0.03430	0.05856**	0.03899
Länsi-Pohja (D)	-0.01261	0.01590	-0.00909	0.01918	0.06035*	0.04759
Lapland (D)	0.04527*	0.03457	0.04287*	0.03055	0.06843**	0.03707

Table 5: Estimations using probit of the effect of having been unemployed at least one month during the previous year (compared to having been either unemployed or out of the labour force) on the probability for having changed hospital district of the work place to next year during the period 1987–1999 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Effect	St. error	Effect	St. error	Effect	St. error
1987			0.00353	0.05576	0.00090	0.06361
1988			.	.	.	.
1989	0.16292	0.26357	0.18510	0.18071	0.20695	0.18423
1990	.	.	0.47559**	0.38196	0.48748**	0.32923
1991	0.03997	0.06447	0.02583	0.04507	0.06113	0.06073
1992	-0.00295	0.00876	-0.00975	0.00717	-0.00156	0.01125
1993	-0.00024	0.01183	-0.00707	0.00758	0.01101	0.01235
1994	0.00471	0.01300	0.00040	0.00804	0.00530	0.00943
1995	-0.01141	0.00425	-0.00629	0.00667	-0.00203	0.00887
1996	-0.00296	0.01053	-0.00535	0.00955	-0.00490	0.01096
1997	-0.00860	0.01064	-0.00113	0.01200	0.01072	0.01656
1998	0.00216	0.02278	0.00391	0.01639	0.00525	0.01855
1999	0.00569	0.02891	0.00924	0.02102	-0.00522	0.02273

Table 6: Estimations using probit of the effect of having been registered as either unemployed or out of the labour force at least one month during the previous year (the variable "outside" in table 3) on the probability for having changed hospital district of the work place to next year during the period 1987–1999 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 2	
	Effect	St. error	Effect	St. error	Effect	St. error
1987			0.03140***	0.00981	0.04088***	0.01085
1988			0.00844	0.00701	0.01808**	0.00861
1989	0.00845	0.00750	0.00623	0.00730	0.01322*	0.00841
1990	0.00654	0.00616	0.01427**	0.00713	0.03283***	0.00903
1991	0.01875***	0.00802	0.02280***	0.00791	0.03300***	0.00937
1992	0.00016	0.00363	0.00667	0.00553	0.01347**	0.00667
1993	0.01486**	0.00792	0.01353**	0.00737	0.02057***	0.00852
1994	0.00801	0.00648	0.01216*	0.00713	0.02170***	0.00818
1995	0.00547	0.00491	0.01283**	0.00628	0.02467***	0.00777
1996	0.01202*	0.00792	0.01469**	0.00771	0.01813**	0.00862
1997	0.00515	0.00697	0.01731**	0.00787	0.01541**	0.00838
1998	-0.00248	0.00693	0.00029	0.00704	-0.00035	0.00786
1999	0.01381*	0.00925	0.01941**	0.00882	0.02097**	0.00942

decision, which is also confirmed by the estimated coefficients in table 7. According to the estimates the effect of higher earned income on the probability of moving has in general been negative. However, during the depression the effect on the probability of moving tended to be positive or less negative. One explanation for the negative and weak effect of income may be omitted investments in human capital. Such investments may be reflected in the pay, because physicians, who are allowed to make intensive investments in human capital on the job (for example assistant physicians), are paid less. Alternatively, a high pay may partly reflect a higher than wanted on duty work load or a high work intensity, which make the physician search for other jobs. The higher income may not compensate enough for the disutility of having to work intensively.

Table 7: Estimates using probit of the marginal effect of logged earned income on the probability for having changed hospital district of the work place to next year during the period 1987–99 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceeding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
1987			-0.00532	0.00759	-0.00365	0.00851
1988			0.00114	0.00634	-0.00416	0.00703
1989	-0.00572	0.00410	-0.00648	0.00458	-0.00944*	0.00501
1990	-0.00027	0.00363	-0.00061	0.00440	-0.00425	0.00477
1991	-0.00956*	0.00492	-0.00990*	0.00516	-0.01269**	0.00610
1992	-0.00107	0.00330	-0.00874**	0.00442	-0.00903**	0.00470
1993	0.00938	0.00708	0.00160	0.00655	0.00277	0.00717
1994	0.00833	0.00659	0.00004	0.00657	0.00322	0.00713
1995	-0.00396	0.00540	-0.00422	0.00633	-0.00864	0.00706
1996	-0.00615	0.00606	-0.00233	0.00660	-0.00313	0.00734
1997	-0.01133*	0.00603	-0.00574	0.00647	-0.00830	0.00737
1998	-0.01005	0.00686	-0.01359**	0.00670	-0.01617**	0.00741
1999	-0.00102	0.00734	0.00151	0.00715	0.00133	0.00768

Although, these results do not support a strong effect of income on movement decisions, in the next section the determinants of earned income are examined and expected earnings for the physicians in different regions are calculated. The expected income estimates are necessary for an examination of how earnings expectations influence the choice of region of the workplace. However, one has to conclude that as the income variable does not appear very influential on the decision to stay (table 7), it might be unlikely that the expected earnings would affect the choice of region very strongly.

In section 5 the effects of expected earnings on the movement decisions are analysed. Then it will for identification purposes be necessary to omit some variable used as explanatory variable in the earnings equation. This variable should not have any direct effects on the choice of region of the work place. An examination of the coefficients in the estimations of what affects the decision whether to move or not may give some information concerning whether the variables are appropriate to omit in the equations for choice of region to identify the effect of expected earnings.

One alternative would be to omit the experience variables (and their squares). To examine whether the experience variables might satisfy the requirement of having no effect on movement decisions the coefficients of the unsquared experience variables are listed in tables 8–10.<sup>5</sup> The experience after having

<sup>5</sup>For experience squared the significance of the coefficients are usually lower than for the unsquared difference. Therefore they are not listed.

received the Licentiate of Medicine degree at least in some years seem to have had a negative effect on mobility. The evidence concerning experience after having received a Specialist degree is weaker and for experience after having received a Doctor of Medical Science degree the coefficients seem to vary randomly around zero. At least for experience after the latter two degrees the estimates thus do not give any strong support for an effect of experience on mobility.

Table 8: Estimates using probit of the marginal effect of experience after the Licentiate of Medicine degree for those with no higher degree on the probability for having changed hospital district of the work place to next year during the period 1987–99 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceeding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
1987			-0.00007	0.00289	-0.00321	0.00314
1988			-0.00414*	0.00220	-0.00451*	0.00253
1989	-0.00408*	0.00249	-0.00344	0.00234	-0.00429*	0.00265
1990	0.00289	0.00205	0.00233	0.00211	0.00029	0.00241
1991	0.00142	0.00219	-0.00194	0.00205	-0.00319	0.00237
1992	0.00051	0.00139	0.00005	0.00151	-0.00003	0.00167
1993	-0.00271	0.00200	-0.00225	0.00187	-0.00328	0.00210
1994	-0.00301*	0.00182	-0.00502***	0.00182	-0.00465**	0.00198
1995	-0.00125	0.00150	-0.00356**	0.00163	-0.00467**	0.00190
1996	-0.00213	0.00177	-0.00434**	0.00176	-0.00603***	0.00195
1997	-0.00135	0.00180	-0.00159	0.00175	-0.00287	0.00200
1998	-0.00154	0.00204	-0.00272	0.00192	-0.00442**	0.00213
1999	-0.00523**	0.00216	-0.00603***	0.00198	-0.00784***	0.00215

An alternative for identification purposes in the later stage might be to omit the age variables. If they are omitted any dependence of the stage of life on the choice of region would be captured by the experience and family variables. The idea to omit the age variables in the estimation of choice of region could be that different regions give different possibilities to work long hours and that income differences might reflect these. The coefficients of the age variables were small and insignificantly different from zero in table 3. For other years the coefficients of the unsquared age appear in table 11. The estimated coefficients are generally not significantly different from zero.

## 4 Expected earnings in different regions

To determine the effect of pay on decisions to work in a certain region I estimate expected earnings in different regions for the physicians working in the health care sector.<sup>6</sup> The pay of physicians is strongly influenced by the regulations of the public sector. These regulations require the physicians to meet certain demands to be accepted for a job and in many cases stipulate the remuneration for the physicians.

<sup>6</sup>Like in most studies the dependent variable is the logged income. Mincer [1974] has greatly influenced the earnings estimation by providing an approach for estimating the return to investments in human capital. For a presentation of and criticism of studies concerning earnings estimation building on the work of Mincer see Heckman et al. [2005]. For physicians the number of years required for completing the Specialist degree and Doctor of Medical Science degree vary greatly, partly as a result of the fact that the investments for taking these degrees usually are made while also doing ordinary physician work. There is thus far too little information available for calculating the cost of investing in higher degree.

Table 9: Estimates using probit of the marginal effect of experience after the Specialist degree in Medicine for those with no higher degree on the probability for having changed hospital district of the work place to next year during the period 1990–99 (earlier there were too few specialists for the variable to be included) with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
1990	-0.02532*	0.01436	-0.04044**	0.01711	-0.04053**	0.01719
1991	-0.02491	0.01652	-0.02593	0.02035	-0.01733	0.02292
1992	-0.00501	0.00749	-0.00494	0.01090	-0.00910	0.01163
1993	-0.00888	0.00891	-0.01301	0.01010	-0.01666	0.01111
1994	-0.00807	0.00694	-0.01062	0.00844	-0.01741**	0.00878
1995	0.00937	0.00599	0.01192	0.00808	0.01155	0.00909
1996	0.00153	0.00515	-0.00603	0.00616	-0.00719	0.00686
1997	-0.00349	0.00493	-0.00337	0.00609	-0.00131	0.00690
1998	-0.00203	0.00463	-0.00464	0.00548	-0.01260**	0.00610
1999	-0.00520	0.00425	-0.00599	0.00492	-0.00758	0.00547

Table 10: Estimates using probit of the marginal effect of experience after the Doctor of Medical Science degree on the probability for having changed hospital district of the work place to next year during the period 1987–99 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included are as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
1987			-0.00367	0.00651	-0.00442	0.00720
1988			0.00894	0.00890	0.01328	0.01035
1989	0.00190	0.00465	0.00053	0.00553	-0.00147	0.00572
1990	-0.00192	0.00293	-0.00309	0.00378	-0.00226	0.00461
1991	0.00080	0.00357	0.00053	0.00446	0.00157	0.00514
1992	0.01142*	0.00386	0.00997	0.00544	0.01015	0.00585
1993	0.00073	0.00312	-0.00237	0.00311	-0.00326	0.00339
1994	0.00178	0.00327	0.00024	0.00393	0.00097	0.00446
1995	-0.00029	0.00303	-0.00107	0.00428	-0.00060	0.00476
1996	0.00303	0.00323	0.00273	0.00391	0.00254	0.00430
1997	0.00179	0.00300	0.00308	0.00369	0.00192	0.00398
1998	0.00097	0.00368	-0.00043	0.00431	-0.00050	0.00467
1999	-0.00225	0.00257	-0.00308	0.00297	-0.00355	0.00321

Table 11: Estimates using probit of the marginal effect of age on the probability for having changed hospital district of the work place to next year during the period 1987–99 with (estimation 1) and without (estimations 2 and 3) dummy variables for whether the physician changed hospital district in the two preceeding years. In estimation 3 the variable (commuted) for whether workplace and home were located in different hospital districts was also excluded. Other variables included as in tables 3 and 4. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Estimation 1		Estimation 2		Estimation 3	
	Marg. effect	St. error	Marg. effect	St. error	Marg. effect	St. error
1987			0.00209	0.00743	0.00246	0.00815
1988			0.00712	0.00567	0.00394	0.00638
1989	0.01179*	0.00610	0.01076*	0.00599	0.00787	0.00666
1990	-0.00779	0.00481	-0.00260	0.00530	-0.00160	0.00603
1991	-0.00554	0.00513	-0.00259	0.00538	-0.00646	0.00608
1992	0.00169	0.00342	0.00113	0.00407	0.00345	0.00461
1993	-0.00024	0.00447	-0.00327	0.00433	-0.00234	0.00486
1994	-0.00126	0.00397	-0.00372	0.00417	-0.00608	0.00456
1995	-0.00284	0.00336	-0.00239	0.00378	-0.00303	0.00433
1996	-0.00074	0.00381	0.00031	0.00403	-0.00033	0.00452
1997	0.00014	0.00389	-0.00227	0.00401	-0.00070	0.00459
1998	-0.00299	0.00452	-0.00177	0.00456	-0.00007	0.00508
1999	0.00818*	0.00474	0.00497	0.00446	0.00667	0.00487

Especially there is a specific training in general medical practice, after the physician has received his Licentiate of Medicine degree. To be able to work completely independently the physician must have passed this specific training. Moreover, a growing share of physicians also have acquired a Specialist Degree in Medicine, which is necessary to be able to work as a specialist. For those acquiring these formal qualifications there are jobs with somewhat less pay that allow the physicians to accumulate human capital. Because the dependent variable is yearly earnings and working hours are likely to vary with age, both age and age squared are included as explanatory variables in addition to the variables for experience since having received a degree.

Because the structure of demand and the supply of physicians vary across hospital districts, the possibilities to obtain a high pay differ across hospital districts. As the pay system has been rather formalised with pay being dependent on the position of the physician, an undersupply of physicians is most likely to be seen in the form of faster careers in hospital districts with a lack of physicians so that young and unexperienced physicians are able to earn more in these. The regions may also differ in the extent that they can offer or demand on duty work and offer possibilities to earn money on the side for example in the private sector. The extent to which experience and age explain income may therefore differ across regions. The division of the country into regions was based on the assumption that the hospital districts in the same region face similar labour markets for physicians. In the estimations of logged earned yearly income the dummies for formal qualifications ("Specialist degree" and "D.Med.Sc."), the experience variables and the age variables are therefore interacted with the dummy variables for the regions (R1–R3).

Included are also family and gender variables, since these are likely to affect working hours and income. Gender variables and variables for whether there are children less than 18 or 7 years old are also interacted with the regional variables, since the effects of gender and children may vary across regions.

To get comparable observations and estimates of yearly income those cases in which physicians have not been employed for some time during the year are excluded from the estimations. In consequence, neither of the variables "Unemployed" and "Outside" are included as explanatory variables. Excluded are also physicians who mainly have worked in some other industry than the care industry. To minimise measurement errors the regional allocation of physicians in these earnings estimations is based on the

regional location of the work place of the job at which the physician spent most of the year. Because this information is missing for 1987 and 1988, expected earnings are not estimated for these years.

Table 12: General statistics for the earnings equations.

Year	$R^2$	F-statistic	Model df	Observations
1989	0.20532	17.11971	50	3364
1990	0.24313	23.41183	50	3695
1991	0.29850	30.54077	53	3858
1992	0.27342	27.98861	53	3996
1993	0.22288	21.21282	53	3974
1994	0.24590	23.55188	53	3882
1995	0.25352	25.61251	53	4051
1996	0.26678	32.35543	53	4767
1997	0.27718	36.02431	53	5033
1998	0.28667	39.51353	53	5265
1999	0.26864	36.23215	53	5282
2000	0.24743	32.94598	53	5365
2001	0.25596	34.79685	53	5415

As the statistics in table 12 indicates there are considerably less explanatory power for the years 1989 and 1990. No test is made for the differences in explanatory power but one possible explanation to a rise in the share of the variation that can be explained after the first years in the examined period is the introduction of the Specialist Degree in Medicine, which became more general in the 1990s. Before its spreading the measurement of the physicians' knowledge and qualifications was worse.<sup>7</sup> A possible explanation to the decline in the share of the variation that can be explained towards the end of the period is that the influence of pay regulation diminished. An alternative explanation is income from the private sector. It was large in particular in the beginning and end of the period.

The estimated coefficients for the earnings equation in year 1990, 1995 and 2000 are listed in table 13. For other years estimated coefficients for selected variables are listed in appendix. The estimates in table 13 indicate that there might be differences across regions in earnings related to qualifications and experience but the standard errors are relatively large.

Age has generally been of greater importance for pay in regions 1 and 2 than in region 3 (tables 15 and 16 in appendix). In region 3 the coefficients for the effect of age are usually insignificantly different from zero and become more similar to that in the other regions only in the last years of the period.

Especially in 1990 those with less experience and less qualifications (physicians who recently received their Med. Lic. degree) tended to earn less in the regions with university hospitals (regions 1 and 2) and those with some experience earning more in these regions than in region 3, especially if they also had a D.Med.Sc. degree. From 1990 to 2000 the return to experience after receiving the Med. Lic. degree for those having no higher degree has declined. However, the coefficients of the squared experience turn positive indicating that old physicians with a licentiate degree still earn well. This applies for all regions (see also tables 17 and 18 in appendix). This change might be a consequence of changes in educational patterns of those who have just received a Med. Lic. degree.

The pay off from a Specialist degree is positive in all regions but the size of additional income gain of experience after having received the degree is too small to be significantly different from zero (table 13 and tables 19, 20 and 21 in Appendix). The income gain associated with having a Doctor of Medical Science degree was generally higher in the beginning of the period, especially in region 1, as can be seen in table 22 in Appendix. However, the income gain for doctors has remained rather constant for region 3. Experience after having received the degree has become somewhat more important for earnings, although

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<sup>7</sup>The square of the experience since getting the Specialist Degree were excluded for 1989 and 1990, because no physician had received one before 1987.

Table 13: Estimations of the coefficients of the variables in the earnings equation for the years 1990, 1995 and 2000. The comparison group is those male physicians who have a Med. Lic. degree but no experience and who work in Region 2 but have no family or children. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Year 1990		Year 1995		Year 2000	
	Coeff.	S. e.	Coeff.	S. e.	Coeff.	S. e.
R(egion)1 (D)	0.19790	0.70627	0.04555	0.54279	0.05306	0.43275
R(egion)3 (D)	1.45153**	0.72105	0.98783*	0.52469	0.38576	0.41477
Woman*R1 (D)	-0.22489***	0.04204	-0.18377***	0.02907	-0.16933***	0.02568
Woman*R2 (D)	-0.16027***	0.04817	-0.14750***	0.03533	-0.20457***	0.02685
Woman*R3 (D)	-0.25447***	0.04701	-0.14328***	0.03026	-0.13333***	0.02499
Age*R1	0.05502*	0.02621	0.04700**	0.01996	0.05242***	0.01665
Age*R2	0.06871***	0.02627	0.04007**	0.01989	0.05370***	0.01468
Age*R3	0.00241	0.02782	-0.00433	0.01876	0.04077***	0.01549
Age squared*R1	-0.00050*	0.00029	-0.00055**	0.00023	-0.00059***	0.00019
Age squared*R2	-0.00077**	0.00031	-0.00042*	0.00023	-0.00058***	0.00017
Age squared*R3	0.00004	0.00032	0.00004	0.00022	-0.00049***	0.00017
Specialist degree*R1 (D)	0.25945**	0.11435	0.18476**	0.07633	0.19448***	0.06813
Specialist degree*R2 (D)	0.21240**	0.10615	0.22105***	0.07229	0.11177**	0.05501
Specialist degree*R3 (D)	0.11313	0.12053	0.27868***	0.08061	0.15817**	0.06429
D.Med.Sc.*R1 (D)	0.32677***	0.10754	0.19742**	0.08286	0.14352**	0.06674
D.Med.Sc.*R2 (D)	0.21712**	0.10597	0.26828***	0.08135	0.14918**	0.06216
D.Med.Sc.*R3 (D)	0.22222	0.16320	0.32649***	0.10535	0.21171***	0.07604
Experience as Med. Lic.*R1	0.02078*	0.01130	0.01002	0.00849	-0.00250	0.00749
Experience as Med. Lic.*R2	0.01568	0.01179	0.01862**	0.00865	-0.00024	0.00693
Experience as Med. Lic.*R3	0.00997	0.01153	0.03126***	0.00786	0.00509	0.00710
Experience as Specialist*R1	-0.01584	0.08405	0.01378	0.03566	0.00229	0.01684
Experience as Specialist*R2	0.02034	0.07036	0.02576	0.03366	0.01889	0.01415
Experience as Specialist*R3	0.00932	0.07368	0.02927	0.03657	0.01728	0.01529
Experience as D.Med.Sc.*R1	0.00347	0.01182	0.02892***	0.00936	0.02902***	0.00749
Experience as D.Med.Sc.*R2	0.02210	0.01388	0.00727	0.01034	0.02066***	0.00799
Experience as D.Med.Sc.*R3	-0.03275	0.02894	0.03454**	0.01713	0.01176	0.01224
Experience as Med. Lic. sq.*R1	-0.00058*	0.00031	0.00000	0.00025	0.00038*	0.00021
Experience as Med. Lic. sq.*R2	-0.00010	0.00035	-0.00025	0.00026	0.00027	0.00020
Experience as Med. Lic. sq.*R3	-0.00014	0.00035	-0.00058**	0.00024	0.00019	0.00020
Experience as Specialist sq.*R1	.	.	0.00090	0.00557	-0.00017	0.00145
Experience as Specialist sq.*R2	.	.	-0.00114	0.00519	-0.00106	0.00128
Experience as Specialist sq.*R3	.	.	-0.00223	0.00511	-0.00056	0.00128
Experience as D.Med.Sc. sq.*R1	-0.00007	0.00042	-0.00061*	0.00032	-0.00051**	0.00025
Experience as D.Med.Sc. sq.*R2	-0.00027	0.00058	0.00015	0.00039	-0.00043	0.00031
Experience as D.Med.Sc. sq.*R3	0.00176	0.00123	-0.00098	0.00067	-0.00001	0.00050
R1*Child<7 years (D)	-0.04570	0.05017	-0.07478**	0.03488	-0.08830***	0.03448
R2*Child<7 years (D)	-0.06942	0.04335	-0.04229	0.03440	-0.06554**	0.03139
R3*Child<7 years (D)	-0.07775*	0.04218	-0.06894**	0.03166	-0.04620	0.03107
R1*Child<18 years (D)	0.02896	0.05122	0.01240	0.03544	0.04983	0.03320
R2*Child<18 years (D)	0.08040	0.04935	0.04332	0.03705	0.00625	0.03212
R3*Child<18 years (D)	0.05772	0.04813	0.01703	0.03319	0.00876	0.03212
R1*Woman*Child<7 years (D)	-0.35367***	0.07295	-0.03997	0.04975	0.02651	0.04682
R2*Woman*Child<7 years (D)	0.02219	0.06902	-0.05281	0.04987	-0.00233	0.04214
R3*Woman*Child<7 years (D)	-0.04497	0.07062	0.03529	0.04793	0.00974	0.04529
R1*Woman*Child<18 years (D)	-0.10017	0.06649	-0.08482*	0.04492	-0.10272***	0.03998
R2*Woman*Child<18 years (D)	-0.16644**	0.06944	-0.11526**	0.04896	-0.04818	0.03881
R3*Woman*Child<18 years (D)	-0.03756	0.06908	-0.08289*	0.04372	-0.09617***	0.03623
Married without children (D)	0.05345*	0.03227	0.01107	0.02266	0.02074	0.01837
Married with children (D)	0.06289*	0.03508	0.07803***	0.02429	0.04770**	0.02089
Mother/Father with children (D)	0.07662	0.04750	0.07215**	0.03157	0.11135***	0.02719
Cohabitators with children (D)	0.06503	0.06409	0.13251***	0.03930	0.12301***	0.03185
Cohabitators without children (D)	0.07480	0.05060	0.05900*	0.03364	0.01696	0.02557
Family type unknown (D)	0.19877	0.26924	-0.12663	0.11591	0.03315	0.10517

the standard errors are so large that it is difficult to draw any certain conclusions (tables 23 and 24 in Appendix). As opposed to what was the case for experience after having received the Specialist degree the coefficients for experience after the Doctor of Medical Science degree are significantly different from zero at least in region 1.

In addition to regional differences and differences related to age, qualifications and experience, the coefficients of gender and the family variables indicate that these are strongly related to earnings. The significance of the variables for indication of that not only experience and productivity matter but also choices of how long hours to work. An examination of table 25 in Appendix confirms the impression from table 13 that gender differences have decreased in importance in region 1 and 3 but the coefficients for being woman are still clearly negative. The coefficients still indicate more than 15 percent lower pay for women in the end of the examined period.

Tables 26–29 in Appendix give additional information on gender differences and how these interact with the presence of children. Although there is no additional negative effect for women of having children younger than seven years on earnings, the general effect of there being children younger than 7 years in the household is slightly negative. However, the negative effect of children below 18 on women’s earnings does not have any correspondence in any negative effect on men’s earnings. Everything else being similar, female physicians with a child younger than 18 years have earned several percents less than a female physician without a child below 18 during the whole period. However, persons in families with children generally earn more, as is shown in tables 30 and 31 in Appendix.

## 5 Estimations of the choice of region

In section 3 what influences the choice to move was estimated. In this section what affects the choice of region of the work place is examined. As pointed out in the classical article of Roy [1950] and in the study of choice of education by Willis and Rosen [1979], the characteristics of the individuals often determine what job they choose. Because the average characteristics of jobs and work places may differ between regions, physicians may choose the region of the work place in a similar way. However, the differences in the individuals’ characteristics are not always observed. Besides comparative advantages in production these characteristics may also include preferences concerning different kinds of consumption and such variables are also likely to determine the choice of region of the workplace. For the estimation of the influence of earnings on the choice of region of the work place expected earnings in different regions are calculated on the basis of the observable variables used in the earnings equations. Obviously self-selection based on unobserved variables may be one explanation to the persistent differences in pay for physicians with similar observable characteristics. Such self-selection would imply sample selection and that the estimates of the expected earnings in other regions than the physician actually has chosen are biased. A method for attaining unbiased estimators would be to use methods for estimating the value of unchosen alternatives such as in Robinson and Tomes [1982] and Lee [1995]. However, it is very uncertain whether the assumed conditions concerning the distribution of the error terms would be satisfied and whether the resulting estimates actually would be unbiased. An additional problem is the fact that the very few physicians moving across regions would make the estimates very uncertain. The estimates below can hopefully be assumed to give an indication of how important expected earnings are for attracting physicians.

In the estimations of choice of region of the work place most variables refer to the characteristics of the individual. However, the estimates of expected earnings made on the basis of the estimated earnings equations in the previous section are also used as explanatory variables. For the purpose of estimating what affects the choices a conditional logit model with the same three-region division as in the estimation of earnings is employed. See Greene [2000] for an introduction to conditional logit models. The conditional logit model to be estimated can be denoted as that for all  $i$  one maximises the total likelihood for the choices made. The probability for individual  $i$  choosing alternative  $j$  is then

$$Prob(Y_i = j) = \frac{e^{\beta x_{ij} + \alpha_j w_i}}{\sum_{j=1}^3 e^{\beta x_{ij} + \alpha_j w_i}}, \quad (3)$$

in which  $\beta$  is the (vector of) coefficient(s) of the (vector of) explanatory variable(s)  $x$  that varies across

individuals and regions and  $x_{ij}$  is the value it takes for individual  $i$  and region  $j$ . The variable vector  $w_i$  denotes the variables which vary only across individuals and  $\alpha_j$  is the coefficient vector for them for region  $j$ , ( $j = 1, 2, 3$ ). In this case only the expected income varies also across regions and  $\beta$  is hence a scalar. To enable identification of  $\alpha$  one region has to be chosen as a reference category so that the elements in  $\alpha$  is set to zero for this. The model is estimated separately for physicians living in the three different regions in the beginning of each three-year period. The reference category in the estimations is the region in which the physicians lived in the beginning of the period. Thus the coefficients denote the effect on the probability that the physician works in the other two regions relative to that he/she works in the same region as he/she lived in at the start of the period. A negative coefficient implies a negative effect of the variable on the probability of choosing the region and a positive and larger coefficient implies a positive effect of the variable on choosing this region relative to the reference region. For the expected income the coefficient is the same for all regions, since there is variation across regions.

Because the estimates of the expected earnings are uncertain, the expected earnings are calculated as an average for all three years in the period. Only those physicians for whom there are values for all three years are included as observations in the estimations and this requires the persons to have got their Licentiate of Medicine degree before the end of the first year in the period.

The estimates in section 3 may be useful for determining which variables to omit for identifying the effect of expected earnings. According to those estimates the effect of experience after the Specialist and Doctor of Medical Science degrees had only a weak effect on the choice to move. As had the age variables. Both of these sets of variables are now used to identify the effect of expected income.

First I omit the experience variables. In light of the estimations in section 3 it might be optimistic, at least for experience as Med. Lic., to assume that experience after the exam does not affect the choice of region. Therefore I include it. The explanatory variables and estimated coefficients when the experience and experience squared after the Specialist degree and the Doctor of Medical Science degree are omitted (experience after the Med. Lic. degree is also set to zero for those with a higher degree) are listed in tables 32 (physicians living in region 1 in the beginning of the period), 33 (physicians living in region 2 in the beginning of the period) and 34 (physicians living in region 3 in the beginning of the period). In these tables estimates for the choice of region in 1992, 1995, 1998 and 2001 are displayed with the beginning of the period at which the region in which the physician originates is determined at the end of 1989, 1992, 1995 and 1998 respectively. Because experience since exam is omitted for Specialists and those with a D.Med.Sc degree to enable identification of the effects of expected income, it is assumed that this experience affect the choice of region only through its effect on the expected income in the different regions. However dummies for Specialist degrees and Doctor of Medical Science degrees are included to take into account differences in job opportunities for these different categories of physicians. An argument in favour of this method is that the formalised pay system based only on formal qualifications has enabled a faster career in regions with a smaller supply of physicians. Such regions (most likely to apply to region 3) may therefore attract physicians by offering some of them better earnings opportunities.

Characteristics not directly associated with the job are assumed to also affect the choices made. Age and family variables are thus included as explanatory variables. To control for the effect of family size on the choice of region of the work place the variable "Family size", the number of members of the family, is included. The price of housing is likely to be of larger relative importance for large families. Ideally more family variables should be included (like in section 3) but the small number of observations of physicians who have chosen a different region than the one they lived in at the start of the period severely limits the possibilities to include additional explanatory variables.

Tables 32, 33 and 34 display the results of the estimations of the conditional logit model. Few of the estimated coefficients of the explanatory variables are significantly different from zero. Especially this concerns the coefficients for the expected income, whose signs also tend to vary from period to period. That the standard errors are large and many coefficients are insignificantly different from zero reflect the fact that the large majority of the physicians remain in the hospital district in which they lived in the beginning of the period.

Turning to table 32 one can see that especially few of those who lived in region 1 moved to any of the other hospital districts with a university hospital (region 2). Nevertheless, as is seen in table 32, the age variables combined with region 2 have coefficients significantly or almost significantly different from zero.

Table 32: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 1. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income averaged from the previous section for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 2	6.897	6.943	0.432	7.910	0.036	6.083	4.759	5.378
Region 3	4.867	4.235	4.678	6.132	6.991	4.861	2.747	4.252
Logged expected income	-0.109	1.540	-8.518	5.41155	-3.268	4.372	-2.851	3.096
Woman (D)								
Region 2	0.331	0.531	0.412	0.525	-0.129	0.389	-0.540	0.394
Region 3	-0.493*	0.290	0.348	0.416	0.017	0.338	-0.493*	0.268
Age								
Region 2	-0.543	0.365	-0.228	0.416	-0.144	0.324	-0.335	0.281
Region 3	-0.278	0.220	-0.215	0.327	-0.362	0.247	-0.162	0.215
Age squared								
Region 2	0.006	0.004	0.003	0.005	0.001	0.004	0.004	0.003
Region 3	0.003	0.003	0.001	0.004	0.004	0.003	0.001	0.002
Family size								
Region 2	0.053	0.153	0.209	0.168	-0.176*	0.107	0.021	0.120
Region 3	-0.062	0.073	-0.133	0.082	-0.257**	0.077	-0.134**	0.068
Exp. as Med. Lic.								
Region 2	-0.021	0.201	-0.112	0.225	0.076	0.180	-0.125	0.153
Region 3	-0.088	0.092	-0.203	0.128	-0.174	0.125	-0.067	0.101
Exp. as Med. Lic. sq.								
Region 2	-0.002	0.007	-0.001	0.009	-0.004	0.006	0.001	0.005
Region 3	0.001	0.003	0.008**	0.004	0.004	0.003	0.002	0.003
Specialist degree (D)								
Region 2	0.963	1.303	-1.716	1.579	0.430	1.250	-1.699	1.157
Region 3	-0.461	0.667	-0.505	0.824	-0.896	0.900	-0.234	0.747
D.Med.Sc. degree (D)								
Region 2	-0.177	1.559	-1.489	1.660	0.018	1.208	-1.405	1.132
Region 3	-1.657**	0.821	-1.387	1.054	-1.284	0.876	-0.761	0.738
Individuals	1319		1352		1606		1773	
Staying in region 1	1215		1271		1501		1658	
Moving to region 2	19		18		31		31	
Moving to region 3	85		63		74		84	
Pseudo- $R^2$	0.7386		0.7914		0.7692		0.7616	
$\chi^2$	2140.66		2351.05		2714.40		2967.09	

The estimates indicate that at least for young physicians age has had a negative effect on the probability for moving to region 2. To some extent this also applies to choosing region 3. Women also seem to have been less likely to move to region 3. Somewhat surprisingly larger families seem to have been somewhat less likely to move to region 3. The coefficients for the expected income was negative, although mostly not significant, for those originating from region 1.

Turning to those starting the period living in region 2 in table 33 leads to somewhat different conclusions than in the preceding table, although the small number of physicians moving between the hospital districts with university hospitals is a general phenomenon. In table 33 the coefficients of the expected income are mostly positive as expected. However, the size of the coefficients vary considerably from period to period. Also women in region 2 are unlikely to move to region 3. Moreover, large families make the physician unlikely to change the location of the workplace to region 3 and especially to region 1. Especially in the early periods those with a specialist degree were more likely to move to region 3.

Among those living in hospital districts without university hospital (region 3) in the beginning of the periods moves to hospital districts with a university hospital were much more frequent than the moves between hospital districts with university hospitals in tables 33 and 32. As can be seen in table 34, the estimates also differ in several respects. The sign of the coefficient of the estimated expected income varies over the periods but is not significantly different from zero. It is not possible to find any consistent effects of experience, age or gender on the chosen region in the end of the period. As one might have expected physicians in region 3 have been less likely to move to region 1, if they have had a larger family.

I also attempted to exclude both experience as Med. Lic. and its square together with the other experience variables. However, this did not affect the estimates of the effect of expected income much.

The alternative to exclude both age and age squared for identification purposes but include all experience variables is then attempted. To motivate this alternative one might argue that differences in earnings relate to differences in opportunities across regions for working on the side, for example in the private sector. As can be seen in tables 35, 36 and 37 neither this alternative method of identification of income effects produced any coefficients that are consistently significantly different from zero for the expected income variable, although for those originating in region 3 the coefficients are clearly negative. For other variables there were not any larger differences compared to the results in the previous tables.

The large size of the coefficients of the variable "Logged expected income" in the presented estimations indicates that this variable might be influential on the choice of region. However, the standard errors of the estimates are very high and the sign of the coefficients also varies. There may have been variations in the labour market and the working conditions of the physicians that have made the estimated effects of expected pay vary from year to year and across regions. These working conditions and characteristics of the labour market may include the prevalence of on duty work, heavy work load in general and labour demand from the private sector on the labour market. These may be associated with higher pay but the pay rise may not be enough to compensate for disutilities on the job such as heavy work load, which may have a stronger effect on the attractiveness of the jobs. Attempts were made to use the productivity at the hospitals of the hospital districts as an approximation for work load but this variable turned out to not have any significant effect on movements neither for physicians at hospitals nor for all physicians in the health care sector. However, this variable may have been too crude and it is not possible to say to what extent work load are associated with the expected income variable.

An additional explanation to the fact that the coefficient of the variable "Logged expected income" is negative in some cases, is that work with lower pay may be associated with better possibilities to invest in human capital and acquire qualifications which give higher pay later on. Also it has not been possible to control completely for physicians being on leave (e.g. for doing research), because they are registered as working if they have an employment contract. Since investments in human capital are most important in the beginning of the career, older physicians should be more responsive to the expected earnings. To test for this the coefficient of the "Logged expected income" was allowed to vary with age in the estimation in such a way that the term "Logged expected income" is interacted with a dummy for the physician being at most 35 years old (the results are available on request). However, such estimations did not produce coefficients of the interaction variable that were significantly different from zero.

Table 33: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 2. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income from the previous section averaged for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 1	-10.961	6.781	-2.916	5.624	-0.826	4.391	-2.875	3.738
Region 3	5.974	4.063	-1.405	5.242	-2.944	4.282	-4.957	3.040
Logged expected income	-0.394	1.851	1.088	3.575	2.519	4.135	4.417	2.864
Woman (D)								
Region 1	-0.072	0.407	-0.191	0.354	-0.461	0.314	-0.194	0.300
Region 3	-0.169	0.183	-0.565	0.307	-0.538*	0.325	-0.664***	0.235
Age								
Region 1	0.554	0.377	0.123	0.299	0.026	0.235	0.073	0.197
Region 3	-0.275	0.214	0.149	0.271	0.150	0.203	0.283*	0.157
Age squared								
Region 1	-0.007	0.005	-0.002	0.004	-0.001	0.003	-0.001	0.002
Region 3	0.003	0.003	-0.003	0.003	-0.002	0.002	-0.004**	0.002
Family size								
Region 1	-0.349***	0.102	-0.300***	0.095	-0.347***	0.085	-0.388***	0.083
Region 3	-0.116**	0.054	-0.065	0.050	-0.149***	0.052	-0.202***	0.047
Exp. as Med. Lic.								
Region 1	-0.377***	0.142	-0.220	0.152	-0.138	0.133	-0.109	0.125
Region 3	-0.196**	0.078	-0.277***	0.093	-0.205***	0.069	-0.211***	0.069
Exp. as Med. Lic. sq.								
Region 1	0.012**	0.005	0.004	0.006	0.004	0.005	0.001	0.004
Region 3	0.005*	0.003	0.008**	0.003	0.005**	0.002	0.006***	0.002
Specialist degree (D)								
Region 1	-1.727*	0.958	-1.122	0.857	-0.547	0.801	-0.933	0.767
Region 3	-0.136	0.502	-1.009	0.540	-1.170***	0.455	-1.089**	0.432
D.Med.Sc. degree (D)								
Region 1	-2.072*	1.079	-1.005	0.955	0.396	0.752	-0.748	0.785
Region 3	-1.929***	0.647	-2.312***	0.791	-2.139***	0.601	-1.552***	0.436
Individuals	1412		1503		1851		2066	
Moving to region 1	33		37		52		54	
Staying in region 2	1211		1282		1630		1793	
Moving to region 3	168		184		169		219	
Pseudo- $R^2$	0.6317		0.6222		0.6429		0.6276	
$\chi^2$	1959.75		2054.73		2614.62		2848.85	

Table 34: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 3. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income from the previous section averaged for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 1	-1.759	5.066	-3.455	4.627	-3.373	5.005	5.940	4.312
Region 2	2.527	5.098	2.846	5.906	-6.275	5.019	6.472	3.481
Logged expected income	-0.534	1.898	-4.525	3.919	-6.580	4.165	2.845	3.107
Woman (D)								
Region 1	-0.257	0.349	-0.438	0.375	-0.586*	0.309	0.006	0.289
Region 2	0.077	0.220	-0.385	0.372	-0.770**	0.342	0.136	0.262
Age								
Region 1	0.017	0.273	0.090	0.242	0.111	0.260	-0.300	0.223
Region 2	-0.115	0.279	-0.254	0.303	0.315	0.254	-0.311*	0.177
Age squared								
Region 1	-0.000	0.003	-0.001	0.003	-0.002	0.003	0.002	0.003
Region 2	0.000	0.004	0.003	0.003	-0.005	0.003	0.003	0.002
Family size								
Region 1	-0.243***	0.078	-0.084	0.074	-0.128*	0.066	-0.277***	0.079
Region 2	-0.139**	0.062	0.082	0.071	-0.108*	0.056	-0.025	0.056
Exp. as Med. Lic.								
Region 1	-0.011	0.116	-0.128	0.102	-0.066	0.110	-0.010	0.110
Region 2	-0.044	0.105	0.129	0.134	0.038	0.100	0.072	0.086
Exp. as Med. Lic. sq.								
Region 1	-0.004	0.005	0.001	0.003	0.000	0.003	0.001	0.003
Region 2	-0.001	0.004	-0.014**	0.006	-0.007	0.004	-0.005*	0.003
Specialist degree (D)								
Region 1	-1.628*	0.970	-2.419***	0.828	-0.809	0.803	0.033	0.797
Region 2	-0.961	0.752	-0.834	0.819	-0.700	0.578	-0.383	0.601
D.Med.Sc. degree (D)								
Region 1	-2.060	1.391	-1.193	0.997	-0.196	0.901	1.349*	0.767
Region 2	-0.068	0.879	-0.818	1.161	0.060	0.749	0.301	0.599
Individuals	1441		1533		1848		1833	
Moving to region 1	63		72		91		69	
Moving to region 2	114		95		152		161	
Staying in region 3	1264		1366		1605		1603	
Pseudo- $R^2$	0.6424		0.6628		0.6237		0.6438	
$\chi^2$	2034.10		2232.58		2532.47		2592.87	

Table 35: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 1. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income from the previous section averaged for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 2	-3.197***	0.822	-3.369***	0.862	-2.673***	0.740	-1.664***	0.566
Region 3	-0.722*	0.414	-0.418	0.385	-0.122	0.394	-1.170**	0.468
Logged expected income	0.485	1.518	-3.652	4.098	-0.035	3.597	1.783	3.493
Woman (D)								
Region 2	0.278	0.543	0.458	0.522	-0.019	0.391	-0.414	0.392
Region 3	-0.539*	0.290	0.079	0.369	-0.169	0.316	-0.701**	0.276
Family size								
Region 2	0.008	0.152	0.193	0.162	-0.188*	0.105	0.006	0.116
Region 3	-0.082	0.071	-0.156*	0.080	-0.290***	0.074	-0.145**	0.067
Exp. as Med. Lic.								
Region 2	-0.196	0.145	-0.215	0.165	-0.018	0.129	-0.265**	0.115
Region 3	-0.182***	0.064	-0.334***	0.068	-0.325***	0.074	-0.164**	0.064
Exp. as Med. Lic. sq.								
Region 2	0.003	0.005	0.002	0.007	-0.003	0.005	0.005	0.004
Region 3	0.003	0.002	0.009***	0.002	0.007***	0.002	0.004*	0.002
Specialist degree (D)								
Region 2	0.238	0.941	-1.774	1.324	0.203	0.930	-2.987**	1.463
Region 3	-1.629**	0.742	-0.919*	0.513	-1.293**	0.638	-0.187	0.583
Exp. as Spec.								
Region 2	-2.443	1.707	-0.123	1.347	-0.361	0.452	0.445	0.675
Region 3	1.132	1.098	-0.636	0.450	-0.561*	0.340	-0.352*	0.209
Exp. as Spec. sq.								
Region 2	0.910	0.592	-0.051	0.312	0.030	0.056	-0.062	0.075
Region 3	-0.364	0.424	0.070	0.089	0.058	0.041	0.022	0.020
D.Med.Sc. degree (D)								
Region 2	-1.731	1.553	-5.177*	3.088	-2.358	1.722	-1.961*	1.029
Region 3	-2.297**	0.899	-8.551*	4.704	-2.060***	0.706	-1.509**	0.753
Exp. as D.Med.Sc.								
Region 2	-0.007	0.188	0.917	0.687	0.365	0.288	-0.086	0.155
Region 3	0.038	0.191	1.615	1.195	0.040	0.151	0.122	0.173
Exp. as D.Med.Sc. sq.								
Region 2	0.003	0.006	-0.047	0.037	-0.015	0.012	0.004	0.005
Region 3	-0.004	0.009	-0.099	0.073	-0.005	0.007	-0.008	0.007
Individuals	1319		1352		1606		1773	
Staying in region 1	1215		1271		1501		1658	
Moving to region 2	19		18		31		31	
Moving to region 3	85		63		74		84	
Pseudo- $R^2$	0.7397		0.7947		0.7711		0.7630	
$\chi^2$	2143.79		2360.64		2721.07		2972.48	

Table 36: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 2. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income from the previous section averaged for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 1	-1.165**	0.514	-1.288**	0.560	-1.217**	0.521	-1.645***	0.455
Region 3	0.197	0.401	0.266	0.302	-0.428	0.365	-0.479	0.323
Logged expected income	1.197	1.745	2.902	1.936	2.519	2.315	5.561**	2.378
Woman (D)								
Region 1	0.016	0.400	-0.149	0.362	-0.417	0.306	-0.244	0.302
Region 3	-0.167	0.182	-0.734	0.229	-0.535**	0.236	-0.726***	0.213
Family size								
Region 1	-0.321***	0.103	-0.292***	0.097	-0.358***	0.083	-0.386***	0.083
Region 3	-0.133**	0.054	-0.067	0.048	-0.139***	0.050	-0.191***	0.045
Exp. as Med. Lic.								
Region 1	-0.234***	0.091	-0.192	0.124	-0.166	0.109	-0.088	0.102
Region 3	-0.287***	0.058	-0.265***	0.053	-0.176***	0.049	-0.154***	0.049
Exp. as Med. Lic. sq.								
Region 1	0.005*	0.003	0.002	0.005	0.002	0.004	-0.000	0.004
Region 3	0.006***	0.002	0.005**	0.002	0.004**	0.002	0.002	0.002
Specialist degree (D)								
Region 1	-1.167	0.852	-0.663	0.741	-1.222	0.772	-0.865	0.633
Region 3	-0.811**	0.370	-0.603*	0.341	-0.597	0.386	-0.673**	0.303
Exp. as Spec.								
Region 1	-0.224	1.117	-0.362	0.601	-0.005	0.398	0.042	0.259
Region 3	0.124	0.538	-0.601**	0.256	-0.242	0.197	-0.178	0.126
Exp. as Spec. sq.								
Region 1	0.159	0.367	0.036	0.123	-0.000	0.049	-0.007	0.025
Region 3	-0.138	0.217	0.069	0.053	0.011	0.026	0.009	0.012
D.Med.Sc. degree (D)								
Region 1	-1.994	1.288	-7.160**	3.348	-0.566	0.745	-0.767	0.762
Region 3	-3.495***	0.907	-1.478**	0.646	-2.311***	0.694	-1.431***	0.449
Exp. as D.Med.Sc.								
Region 1	0.264	0.392	1.465**	0.739	-0.166	0.157	0.014	0.127
Region 3	0.096	0.178	-0.353	0.595	0.032	0.144	0.017	0.134
Exp. as D.Med.Sc. sq.								
Region 1	-0.024	0.028	-0.076*	0.040	-0.010	0.008	-0.002	0.005
Region 3	-0.003	0.008	-0.042	0.117	-0.003	0.006	-0.006	0.007
D.Med.Sc. degree (D)								
Region 1								
Region 3								
Individuals	1412		1503		1851		2066	
Moving to region 1	33		37		52		54	
Staying in region 2	1211		1282		1630		1793	
Moving to region 3	168		184		169		219	
Pseudo- $R^2$	0.6299		0.6319		0.6432		0.6272	
$\chi^2$	1954.33		2086.81		2615.75		2847.20	

Table 37: Estimations of the coefficients when the variable "Logged expected earnings" is included in the conditional logit model for choice of region of the work place at the end of four periods for those starting the period living in Region 3. The explanatory variables are from the year preceding the end year except the expected earnings variable which is the calculated logged expected income from the previous section averaged for the last three years of the period. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Variable	Years 1990–1992		Years 1993–1995		Years 1996–1998		Years 1999–2001	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
Constant								
Region 1	-1.480***	0.497	-1.551***	0.388	-1.664***	0.373	-1.396***	0.485
Region 2	-0.555	0.425	-1.845***	0.416	-1.600***	0.406	-1.090***	0.413
Logged expected income	-1.258	1.603	-4.962**	2.350	-8.352***	2.238	-6.990**	2.817
Woman (D)								
Region 1	-0.356	0.335	-0.480	0.310	-0.695***	0.259	-0.329	0.285
Region 2	0.078	0.217	-0.432	0.293	-0.873***	0.249	-0.445*	0.253
Family size								
Region 1	-0.252***	0.076	-0.094	0.072	-0.122*	0.064	-0.289	0.077
Region 2	-0.145**	0.061	0.062	0.068	-0.097*	0.054	-0.061	0.054
Exp. as Med. Lic.								
Region 1	0.016	0.084	-0.082	0.062	-0.045	0.062	-0.177**	0.072
Region 2	-0.126*	0.071	0.047	0.094	0.088	0.075	-0.069	0.060
Exp. as Med. Lic. sq.								
Region 1	-0.004	0.003	0.000	0.002	-0.001	0.002	0.004	0.002
Region 2	-0.001	0.003	-0.011**	0.005	-0.011***	0.004	-0.003	0.002
Specialist degree (D)								
Region 1	-1.344	1.143	-1.224	0.836	0.216	0.545	-0.085	0.669
Region 2	-1.787***	0.684	-0.628	0.629	-0.245	0.515	-0.913**	0.460
Exp. as Spec.								
Region 1	1.313	2.191	-0.600	0.773	-0.445*	0.269	-0.507**	0.245
Region 2	0.788	1.431	-0.470	0.523	-0.210	0.235	-0.159	0.179
Exp. as Spec. sq.								
Region 1	-0.697	0.981	0.076	0.143	0.032	0.034	0.034	0.022
Region 2	-0.510	0.656	0.032	0.107	0.012	0.029	-0.002	0.017
D.Med.Sc. degree (D)								
Region 1	0.950	1.229	1.568*	0.901	-0.164	1.346	-0.021	0.713
Region 2	-5.527	3.740	-2.769	2.250	-0.207	0.940	-1.338**	0.681
Exp. as D.Med.Sc. Lic.								
Region 1	-32.769	1.0e+07	-0.435*	0.246	1.010	0.948	0.192	0.170
Region 2	1.515	1.209	0.910	0.783	-0.003	0.221	0.192	0.151
Exp. as D.Med.Sc. sq.								
Region 1	1.209	4.0e+05	0.011	0.012	-0.196	0.160	-0.011	0.008
Region 2	-0.115	0.095	-0.081	0.064	-0.005	0.012	-0.009	0.007
Individuals	1441		1533		1848		1833	
Moving to region 1	63		72		91		69	
Moving to region 2	114		95		152		161	
Staying in region 3	1264		1366		1605		1603	
Pseudo- $R^2$	0.6440		0.6676		0.6259		0.6446	
$\chi^2$	2039.11		2248.87		2541.33		2595.96	

## 6 Conclusion

This study has examined what affects the geographical movements of physicians. According to the estimates there are no clear effect of the expected income of the physicians in different regions, although there are differences in expected earnings between the regions. The results indicate that younger and less experienced physicians are more mobile. However, these are also the group which is likely to be most dependent on the opportunities for further education. Neither did the attempt to allow for a different coefficient of expected income for young physicians produce a coefficient significantly different from zero.

The lack of clear effect of expected earnings may be a consequence of that much of the variation in pay is associated with variations in variables that are omitted in the estimations. These variables include measures of the working conditions and work load in the different regions. For further research it would be useful to have some variables measuring these variations across regions. Any policy aimed at attracting physicians should also not hope for any greater achievements in from small pay rises. Other factors are likely to be of greater importance.

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## Appendix

Table 14: Estimations of the coefficients of the dummy variables for the regions (Comparison region: Region 2, other hospital districts with university hospitals) and gender in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Region 1		Region 3	
	Coefficient	St. error	Coefficient	St. error
1989	0.48687	0.75352	1.35202*	0.76879
1990	0.19790	0.70627	1.45153**	0.72105
1991	0.63866	0.57812	1.46054**	0.60173
1992	1.11461**	0.56879	1.51501***	0.57281
1993	0.95067	0.58716	1.12055*	0.57515
1994	0.93087*	0.56193	1.53215***	0.55055
1995	0.04555	0.54279	0.98783*	0.52469
1996	-0.50418	0.45968	0.35162	0.42792
1997	0.16768	0.43205	1.27411***	0.41538
1998	0.37490	0.41623	0.83247**	0.40766
1999	-0.20574	0.43881	0.46882	0.41803
2000	0.05306	0.43275	0.38576	0.41477
2001	0.33894	0.42399	0.61201	0.41154

Table 15: Estimations of the coefficients of the variables for age in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Age*R1		Age*R2		Age*R3	
	Coefficient	St. error	Coefficient	St. error	Coefficient	St. error
1989	0.03114	0.02840	0.06856**	0.02746	0.00077	0.03047
1990	0.05502**	0.02621	0.06871***	0.02627	0.00241	0.02782
1991	0.04633**	0.02047	0.08945***	0.02227	0.01916	0.02251
1992	0.01189	0.01985	0.07643***	0.02175	0.00194	0.02047
1993	0.01871	0.02109	0.07169***	0.02178	0.01534	0.02040
1994	0.03642*	0.01927	0.08145***	0.02128	0.00517	0.01888
1995	0.04700**	0.01996	0.04007**	0.01989	-0.00433	0.01876
1996	0.05372***	0.01736	0.02311	0.01611	0.00786	0.01534
1997	0.05020***	0.01651	0.05189***	0.01499	-0.00493	0.01539
1998	0.04288***	0.01615	0.05883***	0.01406	0.02358	0.01570
1999	0.05591***	0.01694	0.04492***	0.01479	0.02382	0.01558
2000	0.05242***	0.01665	0.05370***	0.01468	0.04077***	0.01549
2001	0.04665***	0.01559	0.06688***	0.01494	0.04017***	0.01487

Table 16: Estimations of the coefficients of the variables for age squared in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Age squared*R1		Age squared*R2		Age squared*R3	
	Coefficient	St. error	Coefficient	St. error	Coefficient	St. error
1989	-0.00022	0.00032	-0.00081**	0.00032	0.00002	0.00036
1990	-0.00050*	0.00029	-0.00077**	0.00031	0.00004	0.00032
1991	-0.00043*	0.00023	-0.00105***	0.00026	-0.00019	0.00026
1992	-0.00011	0.00022	-0.00087***	0.00025	-0.00003	0.00024
1993	-0.00015	0.00024	-0.00080***	0.00025	-0.00015	0.00024
1994	-0.00037*	0.00021	-0.00087***	0.00024	-0.00003	0.00022
1995	-0.00055**	0.00023	-0.00042*	0.00023	0.00004	0.00022
1996	-0.00061***	0.00020	-0.00027	0.00018	-0.00008	0.00018
1997	-0.00057***	0.00019	-0.00055***	0.00017	0.00001	0.00018
1998	-0.00048***	0.00018	-0.00063***	0.00016	-0.00029	0.00018
1999	-0.00062***	0.00019	-0.00051***	0.00017	-0.00028	0.00017
2000	-0.00059***	0.00019	-0.00058***	0.00017	-0.00049***	0.00017
2001	-0.00051***	0.00017	-0.00074***	0.00017	-0.00048***	0.00017

Table 17: Estimations of the regional coefficients of experience (years) since receiving the degree Licentiate of Medicine in the earnings equation. The variable takes the value zero for those with a Specialist Degree in Medicine or with a Doctor of Medical Science Degree. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Exp.M.L.*R1		Exp.M.L.*R2		Exp.M.L.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.03896***	0.01244	0.01267	0.01202	0.01918	0.01283
1990	0.02078*	0.01130	0.01568	0.01179	0.00997	0.01153
1991	0.02741***	0.00874	0.01370	0.00954	0.01612*	0.00936
1992	0.02956***	0.00824	0.00926	0.00939	0.02348***	0.00832
1993	0.01891**	0.00903	0.00564	0.00979	0.01608*	0.00840
1994	0.00819	0.00812	0.00130	0.00942	0.02516***	0.00783
1995	0.01002	0.00849	0.01862**	0.00865	0.03126***	0.00786
1996	0.00465	0.00748	0.02036***	0.00708	0.02153***	0.00645
1997	0.00614	0.00736	0.01417**	0.00663	0.02930***	0.00652
1998	0.01045	0.00722	0.00926	0.00626	0.01488**	0.00687
1999	0.00142	0.00767	0.01124*	0.00667	0.01357**	0.00688
2000	-0.00250	0.00749	-0.00024	0.00693	0.00509	0.00710
2001	-0.00701	0.00715	-0.00788	0.00721	0.00295	0.00680

Table 18: Estimations of the regional coefficients of experience (years) squared since receiving the degree Licentiate of Medicine in the earnings equation. The variable takes the value zero for those with a Specialist Degree in Medicine or with a Doctor of Medical Science Degree. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Exp.M.L.squared*R1		Exp.M.L.squared*R2		Exp.M.L.squared*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S. e.
1989	-0.00111***	0.00035	0.00006	0.00036	-0.00028	0.00040
1990	-0.00058*	0.00031	-0.00010	0.00035	-0.00014	0.00035
1991	-0.00066***	0.00025	-0.00003	0.00029	-0.00023	0.00028
1992	-0.00060**	0.00024	0.00002	0.00028	-0.00034	0.00026
1993	-0.00049*	0.00026	0.00006	0.00029	-0.00020	0.00026
1994	-0.00011	0.00023	0.00017	0.00028	-0.00048**	0.00024
1995	0.00000	0.00025	-0.00025	0.00026	-0.00058**	0.00024
1996	0.00020	0.00022	-0.00021	0.00021	-0.00030	0.00020
1997	0.00012	0.00021	-0.00010	0.00020	-0.00039**	0.00020
1998	0.00001	0.00020	0.00006	0.00019	-0.00001	0.00020
1999	0.00030	0.00021	0.00004	0.00020	-0.00003	0.00020
2000	0.00038*	0.00021	0.00027	0.00020	0.00019	0.00020
2001	0.00049**	0.00020	0.00046**	0.00020	0.00020	0.00019

Table 19: Estimations of the regional coefficients for the dummy variable for having a Specialist Degree in Medicine but not a Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	S.D.*R1		S.D.*R2		S.D.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.25124**	0.12179	0.12305	0.11149	0.12239	0.11914
1990	0.25945**	0.11435	0.21240**	0.10615	0.11313	0.12053
1991	0.36323***	0.08278	0.17809**	0.08488	0.26815***	0.09686
1992	0.24541***	0.09101	0.11637	0.08345	0.21140**	0.09148
1993	0.12349	0.09013	0.05863	0.08329	0.14100	0.08738
1994	0.10381	0.07475	0.08111	0.08071	0.20812***	0.07519
1995	0.18476**	0.07633	0.22105***	0.07229	0.27868***	0.08061
1996	0.19168***	0.07013	0.23757***	0.05929	0.19019***	0.06300
1997	0.19310***	0.06942	0.22401***	0.05512	0.29463***	0.06377
1998	0.23703***	0.06521	0.20398***	0.05077	0.23613***	0.06540
1999	0.19565***	0.06809	0.21505***	0.05315	0.23595***	0.06411
2000	0.19448***	0.06813	0.11177**	0.05501	0.15817**	0.06429
2001	0.18165***	0.06500	0.06674	0.05749	0.12664**	0.06152

Table 20: Estimations of the regional coefficients of experience (years) since receiving the Specialist Degree in Medicine. The variable takes the value zero for those with a Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	S.exp.*R1		S.exp.*R2		S.exp.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	-0.02814	0.19712	0.09743	0.19112	-0.38394***	0.13874
1990	-0.01584	0.08405	0.02034	0.07036	0.00932	0.07368
1991	0.01889	0.11380	0.05323	0.08946	-0.09004	0.10180
1992	0.17257*	0.08862	-0.01722	0.07007	0.06067	0.07865
1993	0.09775	0.06452	0.03939	0.05101	0.03702	0.05934
1994	0.03221	0.04151	-0.02067	0.03970	0.04241	0.03971
1995	0.01378	0.03566	0.02576	0.03366	0.02927	0.03657
1996	0.01947	0.02907	0.03728	0.02324	0.03768	0.02565
1997	-0.01045	0.02446	-0.00070	0.01984	0.03599*	0.02081
1998	-0.00089	0.01916	0.00282	0.01704	0.01708	0.01923
1999	-0.01182	0.01811	0.03128**	0.01556	0.01346	0.01697
2000	0.00229	0.01684	0.01889	0.01415	0.01728	0.01529
2001	-0.00472	0.01471	-0.00308	0.01286	0.01245	0.01348

Table 21: Estimations of the regional coefficients of experience (years) squared since receiving the Specialist Degree in Medicine. The variable takes the value zero for those with a Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	S.exp.squared*R1		S.exp.squared*R2		S.exp.squared*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	.	.	.	.	.	.
1990	.	.	.	.	.	.
1991	-0.01692	0.04430	-0.00988	0.03314	0.03183	0.03416
1992	-0.03706	0.02339	0.01996	0.01894	-0.01014	0.01926
1993	-0.01645	0.01374	-0.00105	0.01146	-0.00467	0.01181
1994	-0.00241	0.00767	0.00820	0.00723	-0.00526	0.00666
1995	0.00090	0.00557	-0.00114	0.00519	-0.00223	0.00511
1996	-0.00145	0.00387	-0.00301	0.00319	-0.00254	0.00313
1997	0.00207	0.00282	0.00194	0.00240	-0.00220	0.00232
1998	0.00056	0.00202	0.00157	0.00186	-0.00051	0.00190
1999	0.00198	0.00171	-0.00175	0.00155	-0.00016	0.00152
2000	-0.00017	0.00145	-0.00106	0.00128	-0.00056	0.00128
2001	0.00060	0.00119	0.00128	0.00106	-0.00023	0.00104

Table 22: Estimations of the regional coefficients for the dummy variable for the Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	D.Med.Sc.*R1		D.Med.Sc.*R2		D.Med.Sc.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.34497***	0.12031	0.21211*	0.10971	0.31549*	0.17472
1990	0.32677***	0.10754	0.21712**	0.10597	0.22222	0.16320
1991	0.36025***	0.08301	0.19369**	0.08738	0.29962**	0.13249
1992	0.41363***	0.08356	0.20724**	0.09081	0.34123***	0.11466
1993	0.30985***	0.08758	0.11689	0.09208	0.20469*	0.11601
1994	0.18792**	0.07634	0.10464	0.09093	0.37422***	0.10780
1995	0.19742**	0.08286	0.26828***	0.08135	0.32649***	0.10535
1996	0.17380**	0.06955	0.32102***	0.07053	0.31203***	0.08783
1997	0.20991***	0.06425	0.30926***	0.06542	0.47851***	0.09474
1998	0.28376***	0.06597	0.22422***	0.05741	0.26657***	0.08261
1999	0.22152***	0.06924	0.29230***	0.06475	0.27427***	0.07840
2000	0.14352**	0.06674	0.14918**	0.06216	0.21171***	0.07604
2001	0.12538*	0.06509	0.09297	0.06632	0.27792***	0.07598

Table 23: Estimations of the regional coefficients of experience (years) since receiving the Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	D.Med.Sc.exp.*R1		D.Med.Sc.exp.*R2		D.Med.Sc.exp.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.00551	0.01246	0.01742	0.01456	0.00069	0.03234
1990	0.00347	0.01182	0.02210	0.01388	-0.03275	0.02894
1991	0.01244	0.00955	0.01767	0.01124	0.00147	0.02171
1992	0.02121**	0.00968	0.01012	0.01099	0.00926	0.01933
1993	0.00047	0.00913	0.01631	0.01073	0.01742	0.01859
1994	0.01124	0.00841	0.00902	0.01026	0.00466	0.01680
1995	0.02892***	0.00936	0.00727	0.01034	0.03454**	0.01713
1996	0.02965***	0.00820	0.01028	0.00871	0.01955	0.01460
1997	0.02313***	0.00724	0.00451	0.00790	0.00619	0.01452
1998	0.01902**	0.00778	0.01958**	0.00776	0.02509**	0.01231
1999	0.02333***	0.00785	0.01468*	0.00809	0.01057	0.01167
2000	0.02902***	0.00749	0.02066***	0.00799	0.01176	0.01224
2001	0.02142***	0.00706	0.01873**	0.00763	-0.01763	0.01246

Table 24: Estimations of the regional coefficients for experience (years) squared since receiving the Doctor of Medical Science Degree in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	D.Med.Sc.exp.sq.*R1		D.Med.Sc.exp.sq.*R2		D.Med.Sc.exp.sq.*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	-0.00014	0.00045	0.00008	0.00060	0.00024	0.00141
1990	-0.00007	0.00042	-0.00027	0.00058	0.00176	0.00123
1991	-0.00031	0.00035	0.00006	0.00047	0.00007	0.00092
1992	-0.00049	0.00035	0.00025	0.00045	-0.00021	0.00080
1993	0.00009	0.00033	0.00003	0.00042	-0.00035	0.00075
1994	-0.00005	0.00029	0.00021	0.00038	0.00008	0.00065
1995	-0.00061*	0.00032	0.00015	0.00039	-0.00098	0.00067
1996	-0.00059**	0.00028	0.00005	0.00033	-0.00052	0.00058
1997	-0.00035	0.00024	0.00014	0.00028	0.00002	0.00054
1998	-0.00021	0.00027	-0.00032	0.00029	-0.00059	0.00049
1999	-0.00040	0.00028	-0.00012	0.00030	0.00005	0.00047
2000	-0.00051**	0.00025	-0.00043	0.00031	-0.00001	0.00050
2001	-0.00028	0.00024	-0.00026	0.00028	0.00109**	0.00050

Table 25: Estimations of the coefficients of the interaction variables of the gender dummy and the regional dummies in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Woman*R1		Woman*R2		Woman*R3	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
1989	-0.24254***	0.04419	-0.17380***	0.04974	-0.20978***	0.05142
1990	-0.22489***	0.04204	-0.16027***	0.04817	-0.25447***	0.04701
1991	-0.23712***	0.03404	-0.17134***	0.03938	-0.22196***	0.03752
1992	-0.17879***	0.03307	-0.19697***	0.03764	-0.16388***	0.03537
1993	-0.20228***	0.03210	-0.20833***	0.03719	-0.14429***	0.03491
1994	-0.16681***	0.02985	-0.19986***	0.03562	-0.12946***	0.03140
1995	-0.18377***	0.02907	-0.14750***	0.03533	-0.14328***	0.03026
1996	-0.18232***	0.02643	-0.17210***	0.02827	-0.13143***	0.02529
1997	-0.17456***	0.02563	-0.20610***	0.02733	-0.11967***	0.02529
1998	-0.12873***	0.02507	-0.22574***	0.02626	-0.10703***	0.02449
1999	-0.13477***	0.02619	-0.19912***	0.02666	-0.10944***	0.02470
2000	-0.16933***	0.02568	-0.20457***	0.02685	-0.13333***	0.02499
2001	-0.15188***	0.02498	-0.27267***	0.02624	-0.15241***	0.02446

Table 26: Estimations of the coefficients for the dummy variables for having children below 7 years in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Child7*R1		Child7*R2		Child7*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.02633	0.05381	-0.03697	0.04559	-0.11077**	0.04488
1990	-0.04570	0.05017	-0.06942	0.04335	-0.07775*	0.04218
1991	0.00434	0.04029	-0.06510*	0.03690	-0.08063**	0.03551
1992	-0.02375	0.03978	-0.06989*	0.03618	-0.02833	0.03358
1993	-0.10514***	0.03904	-0.05182	0.03688	-0.02916	0.03304
1994	-0.07166**	0.03586	-0.03545	0.03509	-0.02142	0.03093
1995	-0.07478**	0.03488	-0.04229	0.03440	-0.06894**	0.03166
1996	-0.08593***	0.03290	-0.05233*	0.02953	-0.02510	0.02720
1997	-0.06973**	0.03134	-0.04144	0.02950	-0.05417*	0.02786
1998	-0.07164**	0.03101	-0.01828	0.02906	-0.03660	0.02788
1999	-0.02243	0.03249	-0.05803*	0.03065	-0.03652	0.02953
2000	-0.08830***	0.03448	-0.06554**	0.03139	-0.04620	0.03107
2001	-0.12756***	0.03447	-0.04139	0.03158	-0.03590	0.03230

Table 27: Estimations of the coefficients for the dummy variables for having children below 18 years in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Child18*R1		Child18*R2		Child18*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	0.05845	0.05628	0.05996	0.05240	0.14123***	0.05255
1990	0.02896	0.05122	0.08040	0.04935	0.05772	0.04813
1991	0.00264	0.04146	0.00293	0.04131	-0.01865	0.03911
1992	0.05807	0.04003	0.00485	0.03889	-0.01642	0.03716
1993	0.06320*	0.03839	-0.01867	0.03908	-0.00395	0.03622
1994	0.03038	0.03626	-0.00917	0.03720	-0.01641	0.03305
1995	0.01240	0.03544	0.04332	0.03705	0.01703	0.03319
1996	0.00898	0.03269	-0.00152	0.03059	0.00650	0.02828
1997	0.02549	0.03160	-0.02290	0.03048	-0.00265	0.02905
1998	0.04807	0.03049	-0.03172	0.02917	0.03049	0.02823
1999	0.02520	0.03257	-0.03965	0.03128	0.02809	0.02886
2000	0.04983	0.03320	0.00625	0.03212	0.00876	0.02930
2001	0.07951**	0.03258	-0.05190*	0.03146	-0.00800	0.02896

Table 28: Estimations of the coefficients for the dummy variables for being woman and having children below 7 years in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Woman*Child7*R1		Woman*Child7*R2		Woman*Child7*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	-0.13080*	0.07942	-0.02065	0.07067	-0.11570	0.07354
1990	-0.35367***	0.07295	0.02219	0.06902	-0.04497	0.07062
1991	-0.28364***	0.05789	0.02832	0.05721	-0.06823	0.05906
1992	-0.21020***	0.05605	-0.00417	0.05349	-0.07491	0.05463
1993	0.01068	0.05483	-0.03480	0.05303	0.01057	0.05175
1994	-0.02701	0.05021	-0.04576	0.05123	-0.00389	0.04744
1995	-0.03997	0.04975	-0.05281	0.04987	0.03529	0.04793
1996	0.01607	0.04574	0.00512	0.04190	0.01960	0.04156
1997	0.00423	0.04410	0.01338	0.04104	0.05886	0.04247
1998	0.00328	0.04304	-0.03941	0.03992	0.03458	0.04197
1999	-0.04659	0.04526	0.00027	0.04200	0.04780	0.04343
2000	0.02651	0.04682	-0.00233	0.04214	0.00974	0.04529
2001	-0.02108	0.04648	0.00569	0.04185	-0.03865	0.04631

Table 29: Estimations of the coefficients for the dummy variables for being woman and having children below 18 years in the earnings equation. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Woman*Child18*R1		Woman*Child18*R2		Woman*Child18*R3	
	Coeff.	S.e.	Coeff.	S.e.	Coeff.	S.e.
1989	-0.09286	0.07270	-0.10782	0.07160	-0.05043	0.07503
1990	-0.10017	0.06649	-0.16644**	0.06944	-0.03756	0.06908
1991	-0.04238	0.05333	-0.18160***	0.05567	-0.03209	0.05562
1992	-0.10164**	0.05128	-0.10425**	0.05269	-0.03238	0.05232
1993	-0.11614**	0.04921	-0.06329	0.05197	-0.07616	0.05055
1994	-0.09825**	0.04592	-0.05051	0.05027	-0.09031**	0.04537
1995	-0.08482*	0.04492	-0.11526**	0.04896	-0.08289*	0.04372
1996	-0.07939*	0.04074	-0.08438**	0.04011	-0.08205**	0.03722
1997	-0.08306**	0.03931	-0.04660	0.03899	-0.10218***	0.03696
1998	-0.11467***	0.03826	-0.01009	0.03765	-0.11672***	0.03586
1999	-0.12233***	0.03982	-0.05341	0.03858	-0.12592***	0.03624
2000	-0.10272***	0.03998	-0.04818	0.03881	-0.09617***	0.03623
2001	-0.14797***	0.03883	-0.00509	0.03805	-0.05965*	0.03574

Table 30: Estimations of the coefficients for the dummy variables for type of family (Married without and with children, singles with children) to which the physician belongs in the earnings equation. Reference category: single with no children. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Married, no ch.		Married with ch.		Single with ch.	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
1989	0.00406	0.03413	0.00508	0.03737	0.00302	0.05056
1990	0.05345*	0.03227	0.06289*	0.03508	0.07662	0.04750
1991	0.06211**	0.02641	0.10703***	0.02844	0.09388**	0.03896
1992	0.04889*	0.02570	0.09422***	0.02702	0.06789*	0.03712
1993	0.02597	0.02533	0.08627***	0.02653	0.09362***	0.03611
1994	-0.01523	0.02341	0.06237**	0.02483	0.07587**	0.03339
1995	0.01107	0.02266	0.07803***	0.02429	0.07215**	0.03157
1996	-0.00391	0.01939	0.04978**	0.02066	0.05178*	0.02758
1997	0.02043	0.01858	0.06201***	0.02066	0.06537**	0.02719
1998	0.00774	0.01798	0.04947**	0.01994	0.03704	0.02641
1999	0.01144	0.01830	0.05045**	0.02100	0.07759***	0.02773
2000	0.02074	0.01837	0.04770**	0.02089	0.11135***	0.02719
2001	0.00098	0.01779	0.04174**	0.02035	0.10629***	0.02674

Table 31: Estimations of the coefficients for the dummy variables for type of family (Cohabitors with and without children, unknown) to which the physician belongs. Reference category: single with no children. To denote significance \*\*\*, \*\* and \* follow after the coefficient, if it is significantly different from zero (two-side test) on the 1-, 5- and 10-percent level respectively.

Year	Coh. with ch.		Coh., no ch.		Unknown	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
1989	0.03156	0.07035	-0.06995	0.05306	-0.01062	0.19288
1990	0.06503	0.06409	0.07480	0.05060	0.19877	0.26924
1991	0.14007***	0.05345	0.03780	0.03794	0.05061	0.17553
1992	0.10609**	0.04493	0.05945	0.03657	-0.11591	0.11606
1993	0.08696*	0.04719	0.04585	0.03639	-0.17689	0.21523
1994	0.11757***	0.04239	0.02460	0.03519	-0.13692	0.15350
1995	0.13251***	0.03930	0.05900*	0.03364	-0.12663	0.11591
1996	0.05772*	0.03333	-0.00067	0.02757	-0.13090	0.13279
1997	0.11050***	0.03233	0.03157	0.02567	-0.07483	0.09931
1998	0.07708**	0.03120	0.01945	0.02507	-0.04657	0.09121
1999	0.08737***	0.03223	-0.01443	0.02555	0.07574	0.10304
2000	0.12301***	0.03185	0.01696	0.02557	0.03315	0.10517
2001	0.10795***	0.03134	0.01270	0.02602	-0.48401***	0.11533