UNIVERSITY OF OSLO

HEALTH ECONOMICS RESEARCH PROGRAMME

A Discrete Choice Analysis of Norwegian Physicians' Labor Supply and Sector Choice

Erik Magnus Sæther
The Ragnar Frisch Centre for Economic Research and HERO

Working Paper 2003: 19

A Discrete Choice Analysis of Norwegian Physicians' Labor Supply and Sector Choice

Erik Magnus Sæther

October 2003

Health Economics Research programme at the University of Oslo
HERO 2003

JEL Classification: C25, I10, J22.
Keywords: Physicians, discrete choice, labor supply.

Thanks to Professor Michael Hoel and Professor Steinar Strøm, University of Oslo, for valuable guidance. Thanks also to Professor Tor Iversen, Torbjørn Hægeland, Rolf Golombek and Sverre A.C. Kittelsen for comments and suggestions. This paper has benefited from discussions following presentations at the 4th iHEA World Congress and seminars at the University of Oslo. The project has received financial support from the Norwegian Research Council as part of the Health Economics Research Programme at the University of Oslo.

* PhD student, Department of Economics, University of Oslo.
Affiliation: Ragnar Frisch Centre for Economic Research, Gaustadalléen 21, N-0349 Oslo, Norway. Health Economics Research Programme at the University of Oslo (HERO). E-mail: e.m.sather@frisch.uio.no.

Health Economics Research programme at the University of Oslo
Financial support from The Research Council of Norway is acknowledged.
ISSN 1501-9071, ISBN 82-7756-125-3

Abstract

What is the effect of increased wages on physician's working hours and sector choice?
This study applies an econometric framework that allows for non-convex budget sets, non-linear labor supply curves and imperfect markets with institutional constraints. The physicians are assumed to make choices from a finite set of job possibilities, characterized by practice form, hours and wage rates. The individuals may combine their main position with an extra job, opening for a variety of combinations of hours in the respective jobs.
I take into account the complicated payment schemes for physicians, taxes and household characteristics when estimating labor supply on Norwegian micro data. The results show a modest response in total hours to a wage increase, but a reallocation of hours in favor of the sector with increased wages.

1. Introduction

In most countries the health authorities try to influence the physicians' choice of specialization, practice type and working hours. Regulation through quotas has been widely used in countries with a National Health Service (NHS). With the deregulation of health markets, incentives such as the physician's pay and practice income play a relatively more important role in the implementation of health policies. The purpose of this paper is to analyze how economic incentives affect the labor supply of physicians. Thus, I will estimate the effect of increased wages on the physicians' total working hours and their preferred combination of hours in the main job and hours in an extra job or private practice.

A combination of jobs is common for physicians and it is important to focus on the job mix as it seems reasonable to assume that the physicians work differently in public and private services, facing different sets of incentives and budget mechanisms. The interaction between the main job and the extra jobs is also of interest. Iversen (1997) analyses public consultants treating private patients in their spare time and the possible influences on priorities and efficiency during their public working hours. The consultants might be tempted to ease their effort in their hospital job to recruit enough patients to the private evening practice. The strength of these effects is arguable, but to assume that the health authorities have an idea of how physicians function in the different sectors or segments of the health care market, and which patients they serve, seems reasonable. An efficient implementation of the health priorities will thus embrace preferences of practice forms, including a preference of a whether a consultant should spend her spare time working extra hours in a public facility or in a private practice.

The resource use in the health care market is significant. The physician labor is an important input both directly, and as the 'captain of the ship' with responsibility for initiating the treatment and choosing the quality of the care provided. In most OECD countries the physicians are partially or fully publicly funded while practicing. The health authorities motivate the funding in their responsibility to ensure the population access to health services. Still, many countries suffer from personnel shortages in general or have an uneven distribution of personnel with shortages in the public sector, in certain medical specialties or practices and in some regions.

In a country like Norway with a NHS, the public sector dominates the job market for physicians. The largest employers are public hospitals, municipal primary care, central and local health administration, universities and research institutions. The private alternative is mainly self-employment in a private practice working with primary care or as a specialist in the secondary level. Private practices normally have a financial contract with the NHS. The public authorities strongly influences the earnings in the private practices by setting the fees refunded by the National insurance scheme. It is common to combine your main job with other engagements, particular a small private practice if you are an employed physician.

To implement the health priorities public authorities directly restrict the physician's access to specialist training by quotas, limits the access to public reimbursements and prohibits certain practice forms. An example is the 1986 restriction on new private inpatient facilities in Norway. Indirectly the governmental bodies achieve this through

financial means. Examples are wage setting in public facilities, and regulations of reimbursements and fees in private practices.

Pencavel (1986) summarizes the labor supply literature for men up to 1986 with the conclusion that the elasticities of hours with respect to wages are very small. As reported in Showalter and Thurston (1997), Heckman (1993) has gone so far as to suggest modifying George Stigler's dictum "all elasticities are 1 in absolute value" to "elasticities are closer to zero than one for hours-of-work equations estimated *for those who are working*" (Heckman, 1993; italics in the original). Much of the literature has been focused on low- and middle-income individuals and families. Work by Feenberg and Poterba (1993) and Feldstein (1995) on high-income individuals suggest that these individuals are responsive to incentives. However, series of other studies have found no such effect for the high-income group, as presented in the survey by Røed and Strøm (2002).

Showalter and Thurston (1997) present their analyses of US physicians as a continuation of the research on white-collar professions, and focus on tax effects on labor supply. A key finding is that self-employed physicians are sensitive to the marginal tax rate, with a supply elasticity of 0.33, whereas the effect is small and insignificant for employed physicians. In spite of a prosperous economic literature on physician behavior the labor supply studies are sparse. Those existing find that the wage elasticities of physicians who are not self-employed are modest. Examples are Sloan (1975) and Noether (1986). Rizzo and Blumenthal (1994) focus on the impact on labor supply of wage and non-wage income for a sample of self-employed US physicians. They find an uncompensated wage elasticity for male doctors of 0.23, with a compensated wage elasticity of 0.44. There are no published studies of physician labor supply on Norwegian data[1].

In the literature that studies high-income individuals, the question remains whether there is a positive labor supply response to wage increases at all, or if the income effect dominates the substitution effect. By choosing a Box-Cox utility function to allow for a non-linear labor supply curve, the framework presented here may be better able to cope with these competing effects than models based on linear restrictions. The Box-Cox utility function is a rather flexible functional form with linear as well as log linear utility function as special cases. A common critique to the traditional studies of labor supply is that they do not address the complications created by institutional constraints like contracted working hours and absence of individual worker choice. The choice framework presented here is an attempt to address such issues.

The physicians are, however, more flexible in their choice of working hours than many other professions. Even if they have fixed working hours in their main position, there are ample opportunities for extra work, e.g. working at the municipal causality clinic, with ambulant outpatient care, undertaking assessments for insurance

[1] However there is a working paper by Baltagi, Bratberg and Holmås (2003) analysing 1303 Norwegian physicians working as hospital consultants over the period 1993-97. They estimate a long-run wage elasticity of about 0.55, and reject the static model that estimate the short run wage elasticities to slightly above 0.3. A possible reason for their high elasticities compared to other studies might be their use of a log-linear framework, with no explicit modelling of taxes and not including seconds jobs in their analysis.

companies or private practice. Combinations of jobs are common in Norway, especially for public physicians. There is no general prohibition of private extra practice for NHS employees.

The observed fact that physicians work long hours may either be due to economic incentives or other attributes of the job. There are many attributes of a job that are partly or fully unobservable to the researcher. Examples are shift work, the possibility for maternity leave, expected working hours, workload, how challenging the work is, etc. These characteristics will in many cases determine the labor supply. These characteristics, except for sector choice are captured by random elements in preferences and choice sets.

The main finding is a limited response in the total labor supply to a wage increase, corresponding to results reported in the literature for high-income professionals and employed physicians. Knowing the physician's high initial workload, and the complicated institutional regulations, this seems reasonable. There are however potential for changes in sector mix in response to a sector-specific wage increase. The model predicts the observed changes in hours worked fairly satisfactory; the hours worked in the main job are slightly underpredicted whereas the hours in the extra job are slightly overpredicted.

The paper is organized as follows. The next section gives an overview of the characteristics of the physician labor market in Norway. The model and data are described in Section 3 and 4, while Section 5 present the results, and includes a section where the estimated parameters are utilized when predicting choices in 1997. The predictions are evaluated through comparison with the chosen alternatives. The final section provides conclusions and points out directions for further research.

2. Characteristics of the Physician Labor Market

In Norway the health services are mainly publicly financed and provided by the government. Norway spends about 8 percent of GDP on health. This is approximately 2,400 US$ PPP (purchasing power parities) annually (OECD 2002), of which 85 percent is publicly financed. The private share is mainly out-patient co-payments as in-patient services are offered free of charge. The primary care services are today mainly provided by private practitioners on public contracts, but as we are focusing on the time period prior to the 2001 family physician reform, there was a mix of 50 percent private providers with contract, 40 percent 'municipal health officers'. The rest where private providers with no or a part refund from the National Insurance Scheme, and interns in their final practice year before qualifying. The provision of outpatient services is shared between special wards at the hospitals and specialists in private practices. The inpatient services are covered by government providers or Non Governmental organizations (NGOs) with a public contract. There is waiting time for almost all non-acute health services that are publicly provided, normally months but in some low-priority cases, also years. In Norway it is prohibited to supply privately financed inpatient services, with the exemption of some hospitals with a National capacity below 100 beds. However, there is ample supply of private outpatient services offering the same services as hospital outpatient clinics for those who have sufficient willingness to pay. After public procurement to reduce NHS waiting lists, most private surgical procedures are paid out of pocket, as private health insurance

schemes covers only a minimal share of the population.

After 6 years at the university, the medical students continue in internship with 1 year of hospital practice and 6 months of primary care practice. To become a licensed specialist you must undertake a training program while practicing as a jr. physician at a hospital or in a similar arrangement for primary care providers (PCPs). The median number of years from authorization to licensing as a specialist is 10 years in our sample. Traditionally a central committee has controlled the distribution of junior physicians and hospitals consultants. During the nineties there seemed to be an increased tendency of local initiatives where hospitals strengthened their physician staff without such permits. In accordance with an increased market orientation in the health care sector there seems to be a tendency that wage and other job characteristics will be more important for the distribution of the physicians and as a means for the health authorities to attract personnel.

There is almost full work force participation among physicians, with few people working part time and an insignificant group working in non-health sectors. A normal pattern is to work extra hours, but many physicians also work in a second position or evening practice. According to the Norwegian Medical Association (2002) there were 15.300 physicians in Norway below 67 years at the end of 1999. A rapidly increasing share of women had reached 31 percent that year. 59 percent of the workforce were qualified specialists.

From 1994 to 1999 there were 1.900 Norwegians who completed their training and were licensed as physicians. In the same period a striking number of 6.000 from other nationalities received a permanent or a temporary license valid for six months of practice. The high number of licensed foreign physicians was due to active recruitment in the other Scandinavian countries and Germany. Many never arrived in Norway after all, whereas others returned after a period of practice. Approximately 2.300 physicians with other nationalities were active in 1999/2000 of which 1.500 had permanent residences and 800 temporary residences. 35 percent of the foreign physicians had a licensed specialty. In 1999 8.000 physicians worked mainly in public hospitals and 3.800 worked in primary care as municipal employees or in private practice with public funding. 800 specialists worked in private practice with public funding as their main practice. 300 physicians worked in companies, 600 in research and development and 400 in health administration. Private-for-profit hospitals where manned by a small number of full-time employees, supplemented by public hospital physicians working part time.

There were about 800 vacant public positions reported in 1997, the period this analysis focuses on. These vacancies existed in spite of campaigns to recruit foreign personnel, and as the increases in educational capacity were beginning to take effect. Even though the institutional set-up and physician coverage rate varies a lot between countries, it is easy to find similar challenges in guiding personnel to serve the population with highest needs, in the other Scandinavian countries and the UK.

As this paper is focusing on the supply side in the physician market, important aspects of the demand for physician labor is disregarded. The obvious reason is the need to simplify the model. The empirical argument is the many vacant positions that should support the assumption that there were few restrictions on the demand side and ample

opportunities for the physicians to find their preferred combination of jobs and working hours. On the other hand, the public providers faced block grants until July 1997 when an activity based funding was introduced. This budget restriction may have forced the hospital administration to cut down hours of planned overtime to keep the budget. But even with restrictions on public hours, the physicians are free to combine their hospital position with private practice or other jobs. Another motivation for public hospital physicians to have a second job in a private practice is the possibility to deduct practice related expenses from your earnings prior to taxation. The expenses include rents for an office in your own home, computer, books and journals. The register data utilised in this paper reports only income after deduction of these expenses.

There is a selection process driving the choice of specialty, sector, participation and working hours. As almost all physicians work full-time the variation in working hours consists of extended hours in the main job and/or extra private practice. The wage differentials between specialties and sectors are significantly compressed compared to in the US, and the matching process seems less driven by expected income than in many other countries. E.g. the acceptability of shift-work seems to be important for the sector choice. There are still specialty differences in status and gender mix, with a higher female share in primary care and psychiatrics. In private practice the importance of unobserved heterogeneity is probably more important as a determinant for earnings than for the other sectors.

All analyses are made conditional on the physicians' choice of specialty. Given the short-term perspective of this analysis it is not possible to model the selection into specialities like Nicholson and Soules (2001). However, the individual specific wages capture the effect speciality has on earnings. The five alternative job categories are made general enough to be relevant for all specialities. Each physician should find attractive jobs in all categories. Individual specific choice sets are not implemented in this paper.

When analyzing the labor supply of physicians we face some additional difficulties we are only partly able to deal with. The market for health personnel consists of a few large buyers in the public sector and a dominant public insurance scheme for the private practices. This implies that we have elements of a monopsonistic labor market where the buyers face an upward sloping supply curve. When considering a wage increase to attract the marginal worker, the hospital must take into account that they also must increase the wage for all physicians at the hospital. In the public sector the wage bargaining is centralized, and seniority, formal qualifications and working hours seems to determine earnings together with the amount of overtime. Hours per week are dependent on the number of physicians sharing a shift plan. This is partly decided by the chief physician at the ward level and her preferences. For a private practitioner with a public contract the earnings are decided by a block grant from the municipality, and fee for service with fixed fees. Private practitioners without a public contract, e.g. hospital physicians working private 'overtime', are more market based in their price setting.

In the following we let the physicians choose between five sectors or job types. The alternatives are given in Table 1: *Hospitals*, separated in Oslo and rest of the country due to the higher wage in Oslo, *Public primary care*, *Private practice* and *Other*

practices like health administration and research and development. To simplify the analysis, there is only one possible extra job when the main job is selected. The extra job is *Private practice*, except *Other practices* for those who are self-employed. In Appendix 1 Table A1 presents the distribution of main jobs actually chosen.

Table 1. Choice of sectors – Main job and extra job.

Main job	**Extra job – The most common alternative given the main job**
Hospitals outside of Oslo	Private practice
State and local hospitals in Oslo	Private practice
Public Primary Care/ Municipal Medical Officer	Private practice
Private practice	Other
Other	Private practice

3. Model and econometric issues

The approach presented here assumes that the agents choose among job packages, or more correct - combination of jobs, each being defined by a main job and an extra job with specific choices of hours. A job is described by hours in the main job *i*, H_i and a wage rate per hour in the main job $W_i(H_i)$ dependent on the hours worked. In addition the individual may work h_j hours in the extra job with a payment w_j per hour, independent of hours. In addition there are other job characteristics *i*, that may affect preferences and hence choices. As an example we may think of specific skills involved in the main job, patient mix or shift work.

The problem solved by the physician looks like the following:

$$\max_{(i,H_i,h_j)} U[f(W_i(H_i)H_i + w_j h_j, I), H_i + h_j, i] \tag{1}$$

s.t.

$$(H_i, h_j, W_i(H_i), w_j, i) \in B. \tag{2}$$

The *f(.)* function represents the net-of-tax income which is a compound of earnings in the main job, earnings in the extra job and other income as described below. The next element in the utility function is leisure time represented with the sum of hours worked in the two jobs. The last two elements is a representation of other characteristics of the jobs.

The set B is the opportunity set, i.e. it contains all the opportunities available to the individual. We exclude non-market opportunities from B[2] as the share of physicians not participating in the labor market is negligible. Thus for all physicians $H_i > 0$, but $h_j \geq 0$. The physicians do not differ in the number of available jobs, as I have chosen

[2] See Aaberge , Colombino, Strøm & Wennemo (1998) for an example including non-market opportunities.

5 job type categories that should be a feasible choice set to all physicians[3]. Note that for the same physician, wage rates may differ across jobs, and that the wage rates vary with hours worked at hospitals and in primary care. Knowing their contract we are able to derive the compensations schemes for extended hours.

The five alternative sectors or practice types are {Hospitals outside of Oslo, Hospitals in Oslo, Primary Care, Private practice, Other}. The physicians have a choice of H_i ={18, 22, 28, 35.5, 37.5, 40.5, 45.5, 50, 55} hours per week in main job *i*. The choice of zero hours in the main job is excluded from the choice set. In addition to a main job, the model opens for h_j = {0, 6, 12, 18, 24} hours per week in extra job. As presented in the previous section I assume that the physicians chose the same type of extra job, given their main job. E.g. if the main job is as a hospital consultant, the extra job is in a private practice, the most common type of extra job observed for each practice type.

In part of the analysis I restrict the alternatives to the choice between a hospital job with or without an extra job. I do, however, open up for a variety in the combinations of working hours in the two jobs. The reason for the focus on a subset of hospital physicians is the superiority of the data offering reliable observations of hours worked.

Let C_i be disposible household income after tax per year when the physician works H_i hours in the main job *i* and *h* hours in the extra job with $W_i(H_i)$ being wage per hour in main job and w_i wage per hour in the extra job given the choice of main job *i*. $W_i(H_i)$ is a piecewise linear wage relation in main job *i* capturing the agreed terms in overtime compensation. This is particularly important when analysing the labour supply of hospital consultants as they have a relatively moderate regular wage rate, but a complicated package of different compensations for extended working hours and night shifts[4]. When the extra job is set to private practice, the physicians face the same costs, reimbursements and fees for the marginal patient as the first. This is only an approximation as fixed costs like office rental and medical equipment are significant for some specialties. The earnings in the main job and extra job is represented by

$$R_i = W_i(H_i)\, H_i \qquad (3)$$
$$r_j = w_j h_j$$

Disposable income corresponding to the choice *i* is given by the budget constraint

[3] There are of course differences in choice sets related to specialties and geographic regions, but the broad categories of job types applied here should not be to limiting. The data restricts the number of jobs types we are able to model. E.g. we cannot separate income from a municipal casualty clinic or a private practice.

[4] A hospital consultant has a basic 37.5 hours working week, but shift work reduces this to 35.5 hours per week. Most physicians have agreed to a contract of extended working hours with 2.5 hours per week. This is paid with a regular wage rate, but compensated with an additional transfer of NOK 19900 per year. For the interval from 38 to 40.5 hours per week they are compensated with 50 percent extra on their regular wage. This increases to 100% for the next five hours, whereas shift plans with more than 45.5 hours per week compensate the additional hours with 200 % extra.

$$C_{ij} = R_i + r_j + I - T(R_i + r_j, I) \quad (4)$$

Where I is family income other than the physician's own earnings (capital income after tax, spouses income after tax, transfers) and T is the tax function. A non trivial assumption made is that the spouse's hours of work is exogenous as there is reason to believe that the spouses choice of working hours will correlate, either negatively, e.g. if one of the parents must look after the children, or positively as they have preferences for spending their leisure together.

Because preferences are not known to the analyst, I will assume a random utility model

$$U_i = V_i + \varepsilon_i, \quad (5)$$

where U_i is the utility when the physician works H_i hours in main job i and h_j hours in the corresponing extra job. V_i is the deterministic element in the utility function and ε_i is a stochastic term with a iid extreme value distribution with expected mean 0 and variance $\sigma^2\pi^2/6$. The random term ε_i captures the fact that attributes, here not observed, other than income and hours affect labor supply say type of job, shift work etc.

The deterministic part of the preferences is represented by the following "Box-Cox" type utility function,

$$V_i = \alpha \frac{(10^{-6} C_i)^{\lambda} - 1}{\lambda} + \beta(X) \frac{((8760 - H_i - h_j)/8760)^{\gamma} - 1}{\gamma} \quad (6)$$

where

$$\beta(X) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 \quad (7)$$

See for instance, Heckman and MaCurdy (1980) and Aaberge, Dagsvik and Strøm (1995) for empirical analyses applying this specification. An advantage with this specification is that it is flexible enough to yield both negative (back-ward bending labor supply curve) and positive wage elasticities. 8760 is the total number of annual hours, while α, λ, γ and the $\beta's$ are unknown parameters. For the utility function to be quasi-concave, we require λ<1 and γ<1. Note that if $\lambda \to 0$ and $\gamma \to 0$, the utility function converges to a log-linear function. The characteristics are: X_1= Age of the physician, X_2= Number of children below six years of age, X_3=1, if the spouse is not working, = 0 otherwise, X_4=1, if the individual is from Norway; =0 otherwise, X_5=1, if female;=0 otherwise. X_6=1, if the physician is a specialist in surgery, internal medicine or laboratory medicine, =0 otherwise.

In traditional labor supply offered wages are determined by human capital characteristics and offered hours are uniformly distributed. However, in real life wages may vary across sectors for observationally identically workers, and jobs with specific number of hours may be more available in the market than other jobs, say "full time" jobs. Thus, when the physicians make their choice with respect to labor

supply they choose between job-packages with different wage and hours profiles.

I assume that the physicians make their choices by maximizing utility, given the job-packages available in the market. As already mentioned, the analyst does not observe preferences neither does he observe all details of the job-packages available in the market. Let B be the (random) set of job-packages available to an individual and let $P_i(H_i, h_j)$ be the probability that H_i hours are worked in the main job *i* and *h* are worked in the side job with a wage rate that follows the choice of main job *i*. Hours in the side job is uniformly distributed. Thus

$$P_i(H_i, h_j) = \Pr(U_i = \max_{\{r, H_i, h_j\} \in B} U_r) \tag{8}$$

I follow the modeling explained in Aaberge, Colombino and Strøm (1999) and get

$$P_i(H_i, h_j) = \frac{\exp(V_i / \sigma) g_i(H_i, W_i)}{\sum_r \exp(V_r / \sigma) g(H_r, W_r)} \tag{9}$$

Due to the assumption of extreme value distributed utilities it follows readily that the choice probabilities are multinominal logit. By setting $g_i(.) = 1$ in (9) we get the standard multinominal logit. The reason why the $g_i(.)$ function enters the choice probabilities is due to job-specific offered hours and wages available in the market. The $g_i(.)$ function is a probability density and is related to the fact that the individual faces opportunity sets *B* that are random to the analyst. The interpretation of the opportunity density extended version of the standard multinominal logit given in (9) is that the attractiveness of a choice measured by $\exp(V_i / \sigma)$ is weighted by a function saying how available this choice is in the market. For more details about this methodology I refer to Aaberge, Colombino and Strøm (1999).

Next we have

$$g_i(H, W_i) = g_{1i}(H) g_{2i}(W_i) \tag{10}$$

where $g_{1i}(H_i)$ is the marginal probability density of offered hours. We will assume that offered hours are uniformly distributed except at full time hours. This density is assumed to reflect that offered hours, except for full time working load, is equally available in the market. Thus

$$g_{1i}(H) = \exp(\nu_1 K_i + \nu_2 L_i) \tag{11}$$

where $K_i = 1$ if the main job is full-time (35.5 hours per week or more), and $K_i = 0$ otherwise. $L_i = 1$ if main job is private, and $L_i = 0$ otherwise. The latter captures the fact that if the main job is private, the hours available in the market will be less (or not) regulated relative to jobs in the public sector.

The conditional wage density $g_{2i}(W_{|i} \mid H_i)$ is a log-normal probability density. In the

estimation of the model I have estimated $g_{2i}(W_{|i} \mid H_i)$ in a two-stage (Heckman) procedure. The estimated wage equation is then used to calculate disposable income. See Appendix 2 for the estimation of wages, conditional on offered hours.

It should be noted that the offered wages depend on hours worked; that is $W_i = W_i(H_i)$. This expression also enters the deterministic part of the utility function through disposable income C_i. The reason why I am able to identify V_i / σ and $g_{2i}(W_i \mid H_i)$ is because I use detailed institutional information to derive how offered wages W_i vary with hours worked. Given this institutional information wage equations are estimated to capture how human capital characteristics and sector-specific constants affect expected wages. The parameters $(\alpha, \lambda, \gamma, \beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \nu_1, \nu_2)$ are estimated in a maximum-likelihood procedure. Note that σ is not identified and is absorbed in α and β.

4. Sample and variable construction

This study is based on several of the administrative data registers covering Norwegian residents. Using the register of authorized health personnel as an identifier I link information about demography, income and employment relations. The main years of analysis are 1995 and 1997. Our trimming procedure excludes personnel below 28 and above 66 years of age, as many retire at 67. Some personnel categories have access to early retirement, but it was not common at that time. Individuals with inconsistent professional status, or missing important variables are excluded. Summary statistics for key individual level variables are provided in Appendix 1. The sample consists of 9663 individuals in 1995 and 12252 in 1997 as presented in Table A3. Some sets of analysis have additional restrictions and the number of observations is reported in the respective sections.

Authorized foreign physicians are excluded when they do not have a permanent residency in Norway, or if they have a permanent residency code, but no income or address in Norway. Some people in this group achieve an authorization but never arrive in Norway. Others, like many of the Scandinavians, work in Norway for a shorter period (up to 6 months). These physicians are often fully employed in their home countries and work in Norway in holidays or if they have a week off in their shift plan.

Data quality

I have information about the date of medical authorization and specialization for up to three specialist licenses for all physicians 'accumulated' in 1998. I assume that the latest achieved specialty is the one that is practiced. There are asymmetries in the information level depending on whether the physicians are employed or in private practice, and on the type of employer. For all groups I have information about annual earnings prior and after taxation, employment status, and demographic variables.

For employees I have days worked during the year and annual earnings by employer. Start and stop days are, however, a bit fuzzy as many employers report of an employment during the whole year even though the actual job was short term. Statistics Norway has developed an estimate of hours worked per year by employer

and totally. There is also a more robust measure with information about hours worked presented in broad categories: Less than 4 hours, 4-19 hours, 20-29 hours, and 30 hours or more per week. All employers are coded by the NACE Standard Industrial Classification, which gives us detailed information of their sector and type of activity. Institutional knowledge of the different industries and categories of employers provides information of regular working hours.

For employees in institutions owned by municipalities and county authorities I have in addition information on wages and regular working hours for one month during each year. For most of these institutions I also have the possibility of calculating the amount of planned and unplanned extra hours. The Norwegian Association of Local and Regional Authorities (NALRA) collects the data at October 1st. At this time of the year the central wage bargaining is completed but the local wage bargaining is not completed and thus not registered. There are some minor inconsistencies, which I ignore, between the monthly salary and the registered annual income from the same employer. In addition to the mentioned unregistered local wage increase, this is probably due to uneven workload throughout the year as the physicians work extra overtime in periods with high workload or when many physicians are on leave during summer, or other extraordinary activities, like campaigns to reduce patient waiting lists. The NALRA covers most hospitals, public primary care and local health administrations.

For those working at hospitals owned by the central government or contracted charities, I have access to their job contract for jr. physicians and specialist consultants. I also know that a physician working at one of the two hospitals owned by the central government has the same contract as those working for the municipality of Oslo. However, these prestigious hospitals have a reputation of 'demanding' an extra unpaid effort of aspiring physicians. Physicians working for non-profit private hospitals in other localities have the same terms as the non-Oslo NALRA employees. I am thus able to have a well-informed opinion about their regular and extended working hours knowing their annual income, years of experience and specialty for all physicians. The same goes for other public employers like central health authorities or general administration.

For self-employed physicians I have no information about hours worked in the register data. Using a study by Statistics Norway of self-reported working hours and income for primary care providers and private specialist consultants I have some guidance on the distribution of working hours for these groups. I assume that all of the self-employed's earnings are health related. Most of the PCPs and private specialist have a contract with their municipality or county council and the National Insurance scheme.

I approximate the private hourly income based on our knowledge on annual private income and average income per hour from survey data. This probably underestimates the private wages for hospital consultants, and thus overestimates the hours worked privately. Anecdotal evidence indicates an hourly wage of about NOK 1000, or three times the average of the estimated wage for fulltime private specialist practitioners. Looking at private income in detail there are significant variations between the specialties. Physicians working with ear, nose and throat and ophthalmology are on top with 20 percent of their total income from private practice, others like brain

surgery had a significantly lower share. The physicians have the right to deduct private practice expenses from their earnings prior to taxation. The expenses include home office rent, computer, literature, phone, broadband etc. and create an extra motivation for employees to work in a second job as a private practitioner. The register data only include private income after these deductions. This leads to a downward bias in the estimated hours.

Hourly wage is the applied earnings measure for the employees too. For most physicians this is straight forward, as I know the monthly regular wage and working hours. The centralized wage determination in the health sector, with almost identical wages and fees trough out the country simplifies this task. For 2775 physicians in 1995 and 1553 in 1997 I also know the compensation for working extended hours, and when the different overtime compensations (50%, 100% and 200%) take effect. Hospital physicians must work longer than their regular working hours of 37.5 hours per week or 35.5 hours per week for those working shifts. There is a national agreement to extend the weekly hours by 2.5. In addition there is local agreements at the ward level extending the total hours per week up to 48 hours per week in the shift plan for all physicians. The amount of planned overtime depends on factors like patient load, the number of vacant positions and shift plan. In addition there is a need for "unplanned" overtime work in situations with absent personnel or a high workload. Some wards split the overtime "fairly" and include almost all overtime in the planned part. Other wards may reduce the planned overtime all physicians must share, and leave the rest to unplanned overtime for those who volunteer.

Holders of multiple jobs have been assigned a main job and an extra job. Personnel working fulltime in NALRA jobs or other public hospitals have this job assigned as their main job. For the rest of the sample the main job is the one with highest annual earnings. Each individual are only assigned two jobs. It is not uncommon to have even more jobs, but these tend to be minor both in hours and income and are neglected. The annual taxable earnings do however include all jobs. Each individual is assigned an hourly wage not only in the sectors they are observed but also a predicted wage if they were to work in some of the other sectors. I exploit the richness of the register data in this procedure, including specialty, residency and observed experience from the previous 20 years. See Appendix 2 for the wages, and Appendix 3 for the taxes.

5. Empirical Results

This section presents the results from four sets of analysis. The first three are based on subsets of hospital physicians working in 1995, the fourth set is an analysis of all physicians working in 1997. Each analysis contains a discussion of the estimated parameters of the model, before the observed and predicted choices of working hours and sector mix are presented. For the hospital physicians I also present an 'experiment', using the parameters estimated on 1995 data to predict hours in 1997, utilizing hourly wages in 1997. This is no genuine panel data analysis, but a cross-sectional analysis from 1995 used to make out of sample predictions in 1997. I evaluate these predictions through comparisons with the observed choices in 1997.

The physicians choose between nine categories, or intervals, of hours in their main job and five categories of hours in the extra job. This is of course a simplification of

the actual variation in working time, but should cover the most common choices. E.g. a primary care physician may face the choice of a fulltime private practice or a combination of four days a week in the private practice and one day working at the local mother & child health center. For the hospital physicians a more common choice is whether to spend their spare time working extended hours at the public hospital, or in a private practice.

Table 2. Four samples – Choices, wage data, and sample sizes.

Sample	Main Job	Extra job	Wage Data	Parameters estimated* and Choices predicted on data from:	Sample size	Out of sample predictions (Table 7)	Sample size	Comments
Hospital physicians with data on overtime work (Table 4)	*Hospital* only	*Private*	NALRA & Estimates of private 'wages'	1995	*2775*	1997	*1553*	*Largest available dataset with high quality data*
Male Sr. Hospital Consultants only (Table 5)	*Hospital* only	*Private*	NALRA & Estimates of private 'wages'	1995	*1521*	1997	*790*	*Male Qualified specialists are more active in the private market*
Hospital physicians with complete dataset before and after pay reform (Table 6)	*Hospital* only	*Private*	NALRA & Estimates of private 'wages'	1995	*1036*	1997	*1036*	*Identical sample in 1995 & 1997 simplifies prediction evaluation*
All physicians (Table 9)	Choice of five sectors	*Private Other* if main job is *Private*	All available datasets	1997	*9528*	No		Complete sample, but less robust data on hours and wages

**All estimated parameters are presented in Table 3.*

Section 5.1 presents an analysis based on the largest available sets of hospital physicians with a complete NALRA dataset from 1995 or 1997. Section 5.2 limits the sample to male specialist consultants working with internal medicine, surgery or laboratory medicine. This is done to focus on a more homogenous group with a particular potential for private extra practice as their training is completed. Like section 5.1, the analysis in section 5.3 includes jr. and sr. physicians, but only those observed with complete records *both* in 1995 and 1997. Using an identical sample in 1995 & 1997 simplifies the prediction evaluation when predicting out of sample in 1997.

I assume that the hospital physicians have an extra job in a private practice. If they do not work in a job number two I regard this as zero hours in this job. In sections 5.1-5.3 I present the observed choices of hours in the hospital job and in the private job in 1995, prior to four predictions for the same year. The first prediction is based on the observed wages, the second with a ten percent wage increase in the hospital sector, then a similar increase in private 'wages' only, and finally a ten percent increase in both wages. Section 5.4 continues with an 'experiment' - using the estimates from 1995 to predict the choices for the hospital physicians in 1997 based upon observed wages this year. The predictions are compared with the observed choices in 1997.

Section 5.5 adapts a broader perspective and includes all physicians allocated to five alternative sectors. The advantage of this approach is the ability to predict the changes in average working hours for all physicians from sector specific wage increases. The disadvantage is that I rely on data with poorer quality than the NALRA data. The extra job is also here restricted to private practice, the most common choice observed. The exception is private practitioners with *other job types* as their extra job. This includes education and research, health administration, NGOs, industrial medical officer etc. Section 5.6 sums up the general results. Appendix 4 presents figures illustrating the observations and predictions for the four sets.

From Table 3 we observe that all parameters are sharply determined and that λ and γ are estimated to yield a quasi-concave utility function. On the data set considered to be of best quality λ is estimated to be close to 1, which implies that utility is a linear function of income. It is interesting to note that the estimates of λ and γ are similar across these three first data sets.

Table 3 Estimation of parameters of the utility function and opportunity densities

		Hospital physicians		Male specialist consultants		Hospital physicians 0bserved 95-97		All physicians	
		Estimate	P-value	Estimate	P-value	Estimate	P-value	Estimate	P-value
	Utility function								
β_0	Constant 'leisure element'	18.09	[.000]	20.83	[.000]	19.40	[.000]	4.80	[.000]
β_1	Age	0.05	[.068]	0.04	[.338]	0.13	[.013]	0.01	[.009]
β_2	Number of children below 6 years of age	1.33	[.000]	1.05	[.011]	1.56	[.005]	0.15	[.049]
β_3	=1 if spouse do not work, =0 otherwise	0.39	[.451]	1.46	[.068]	-0.41	[.655]	0.85	[.000]
β_4	=1 if the physician is from Norway, =0 otherwise	-0.87	[.109]	-1.23	[.120]	-0.25	[.793]	-0.21	[.042]
β_5	=1 if female, =0 if male	3.72	[.000]			3.95	[.000]	0.48	[.000]
β_6	=1 if Hospital specialist, =0 otherwise	-1.23	[.004]			-1.31	[.077]		
α	Constant 'consumption element'	2.23	[.000]	2.67	[.000]	2.79	[.000]	3.45	[.000]
λ	Exponent 'consumption element'	0.86	[.000]	0.85	[.000]	0.93	[.000]	0.59	[.000]
γ	Exponent leisure	-1.50	[.000]	-1.40	[.000]	-1.31	[.000]	-3.72	[.000]
	Opportunity density*								
v_1	=1 if Works fulltime, =0 otherwise	4.93	[.000]	5.08	[.000]	5.62	[.000]	-0.16	[.000]
v_2	=1 if Private practitioner, =0 otherwise							-2.10	[.000]
Number of observations		2775		1521		1036		9528	
Log likelihood		-8397.03		-4676.53		-3099.03		-32933.6	
McFadden's Rho		0.21		0.19		0.21		0.36	

** For the wage equation see Appendix 2.*

5.1 Hospital physicians

The first subset contains all physicians working at NALRA hospitals in 1995 or 1997, with a complete record of overtime compensations. This includes physicians under specialist training and consultants. The model parameters presented in Table 3 are all significant with the exception some of the βs in the leisure component. The income term in the utility function (6) is estimated with a λ of 0.86 and an α of 2.23. The γ in the leisure component is estimated to -1.50. β_2 and β_5 are significant and positive, meaning that individuals with a child below 6 years of age and women appreciate leisure more than the average. The opposite occurs for the hospital specialist represented by β_6. The elderly physicians appreciate leisure more than the average but this effect is not significant at the five percent level. The βs related to whether the spouse work or not and country background are less sharply determined. The *g*-function in (11) with a dummy representing a fulltime position is represented with the significant parameter v_1 of 4.93.

Table 4 Physicians at NALRA hospitals in 1995. Observed and Predicted Choices
Jr. Physicians and Hospital Consultants

	Observed hours		Predicted Hours		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in all wages	
Hours per week		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*
Hospital	42.3	*(6.2)*	41.8	*(1.2)*	42.5	*(1.4)*	41.7	*(1.2)*	42.4	*(1.4)*
Private extra practice	4.1	*(6.2)*	5.2	*(0.9)*	5.0	*(0.9)*	5.7	*(1.0)*	5.5	*(1.0)*
Total	46.5	*(8.6)*	47.0	*(1.9)*	47.5	*(2.1)*	47.4	*(2.0)*	47.9	*(2.1)*
Hours per year										
Hospital	2032	*(298)*	2008	*(60)*	2041	*(68)*	2002	*(59)*	2034	*(67)*
Private extra practice	198	*(296)*	250	*(43)*	240	*(41)*	275	*(49)*	264	*(47)*
Total	2230	*(413)*	2258	*(93)*	2281	*(98)*	2277	*(97)*	2299	*(102)*

Elasticities	Total		Main job		Extra job	
Effect of an increase in hospital wages	0.10*	*(0.05)*	0.16*	*(0.05)*	-0.40*	*(0.16)*
Effect of an increase in private wages	0.08*	*(0.02)*	-0.03*	*(0.01)*	0.99*	*(0.14)*
Effect of an increase in all wages	0.18*	*(0.06)*	0.13*	*(0.04)*	0.56*	*(0.26)*

N=2775

Standard deviations in brackets.
** Significantly different from zero at a 95 percent confidence level.*
This table corresponds to Table P4 in Appendix 5..

Table 4 presents the average hours in the hospital job and in the private extra practice. The corresponding Table P5 in the Appendix 4 presents the observed shares and predicted probabilities for the alternative choices of 'job-mix' for the nine categories of hours in the main job, in combination with the five possible alternatives in the extra job, which is used to derive the hours of work. The 2775 physicians have 'observed' average annual working hours per year of 2230. Their labor is shared between 2032 hours per year, or 42 hours per week, in their hospital job, and 198 hours per year in a private job, corresponding to 4 hours per week.

When I compare the 'observed' hours with the predictions from the model, I underpredict slightly hours in the hospital job (2008 hours versus 2032 hours) and overpredict of hours in the private practice (250 hours versus 198 hours), totaling to 28 hours less per year in average. The 'observed' hospital working hours lies within the predicted confidence interval (standard deviation of 60). The private practice hours are less accurately predicted with a standard deviation of 43. The model thus predicts the total hours reasonably well, but the predictions of sector mix are slightly

biased.

In a policy analysis I now regard a 10 percent wage increase at the hospital job, keeping private 'wages' constant. The predictions are a small increase in hours in the hospital job, 33 hours per year or a 1.6 percent increase. There is a predicted reduction in the private extra job of 10 hours per year, or a 4 percent reduction. The total effect is predicted to 23 hours increase or 1 percent. The opposite effect is occurring with a 10 percent 'wage-' (fee) increase in private practice - 6 hours less per year at the hospital, and 25 hours more in the private practice. With a 10 percent wage increase in both sectors, the model predicts a mean increase in labor supply of 41 hours per year, where the hospital job absorb 26 hours of the increase.

The wage elasticities are positive and significantly different from zero. Looking at changes in total hours from an increase in the hospital wage, I find a wage elasticity of 0.10. The sector specific elasticities are 0.16 in the hospital job and -0.40 in the private practice. The wage elasticity when increasing the private wages is 0.08 for total working hours, -0.03 in the hospital job and 0.99 in the private practice. With an increase in both wages the elasticity is 0.18, 0.13 at the hospital and 0.56 in the private practice. In all cases the total change in hours worked is moderate, with elasticities in the range of 0.1-0.2. The exception is the private practice with a small number of hours worked in the reference case creating high elasticities up to 1.

5.2 Male hospital consultants

Restricting the sample to male hospital consultants working with internal medicine, surgery or laboratory medicine leaves us with 1521 observations in 1995. This group is expected to be more active both in the main job and in particular the extra practice as their training is completed. Male physicians traditionally also have less leisure than their female colleagues. The model parameters are presented in Table 3. The income term in the utility function is estimated with a λ of 0.85 and an α of 2.67. The γ in the leisure component is estimated to - 1.40. β_2 is positive and significant, meaning that those with children below 6 years of age appreciate leisure more than the average. The $g_{1i}(H_i)$ g-function is represented with a parameter v_1 of 5.08.

The consultants have 'observed' average annual working hours per year of 2305, shared between 2086 hours per year, or 43.5 hours per week, in their hospital job, and 219 hours per year in a private job, corresponding to 4.6 hours per week.

Table 5
Male Hospital Consultants at NALRA Hospitals in 1995.
Observed and Predicted Choices

	Observed hours		Predicted hours		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in all wages	
Hours per week										
Hospital	43.5	*(6.1)*	42.9	*(1.0)*	43.9	*(1.1)*	42.7	*(1.0)*	43.7	*(1.1)*
Private extra practice	4.6	*(6.2)*	5.4	*(0.6)*	5.1	*(0.5)*	6.0	*(0.7)*	5.7	*(0.6)*
Total	48.0	*(8.3)*	48.3	*(1.1)*	49.0	*(1.2)*	48.7	*(1.2)*	49.4	*(1.2)*
Hours per year										
Hospital	2086	*(295)*	2061	*(47)*	2107	*(54)*	2052	*(46)*	2098	*(54)*
Private extra practice	219	*(299)*	257	*(27)*	244	*(26)*	288	*(31)*	275	*(30)*
Total	2305	*(398)*	2318	*(54)*	2352	*(59)*	2340	*(55)*	2373	*(60)*

Elasticities	Total hours		Main job		Extra job	
Effect of an increase in hospital wages	0.15*	*(0.03)*	0.23*	*(0.03)*	-0.49*	*(0.09)*
Effect of an increase in private wages	0.10*	*(0.02)*	-0.04*	*(0.01)*	1.21*	*(0.08)*
Effect of an increase in all wages	0.24*	*(0.03)*	0.18*	*(0.03)*	0.68*	*(0.12)*

N=1521
Standard deviations in brackets.
This table corresponds to Table P5 in Appendix 5.

Comparing the 'observed' hours with the predictions from the model as presented in Table 5, I find an under-prediction of hours in the hospital job (2061 hours versus 2086 hours) and over-prediction of hours in the private practice (257 hours versus 219 hours), totaling to 13 hours more per year in average. Like the first model the prediction of total hours is good, but the predictions of sector mix are biased. As expected this group works more in average in both jobs compared to the section above. Moving to the policy analysis I find a similar pattern as for the whole group of hospital physicians, but higher elasticities.

5.3 Hospital physicians with full dataset in 1995 and 1997

The next set is an analysis of 1036 hospital physicians with complete NALRA data of overtime work observed both in 1995 and 1997. An argument for looking at this group is to analyze the same individuals before and after the major wage increase in the health sector from 1995 to 1997, when undertaking the experiment in the next section.

As presented in Table 3, the income term in the utility function is estimated with a λ of 0.93 and an α of 2.79. The γ in the leisure component is estimated to - 1.31. Not all the variables in the β-function are significant, but the following are: age, number of children below six years of age, gender. The older the physician is, the more she appreciates leisure, and the same goes for parents with small children and women. The hospital specialists appreciate leisure less than the average but this effect is not significant at the five percent level.

Table 6
Hospital Physicians with full dataset in 1995 and 1997.
Observed and Predicted Choices. Jr. Physicians and Hospital Consultants

	Observed hours		Predicted hours		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in all wages	
Hours per week		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*
Hospital	44.4	*(5.8)*	43.3	*(1.5)*	44.5	*(1.7)*	43.1	*(1.4)*	44.3	*(1.7)*
Private extra practice	3.6	*(5.9)*	4.9	*(0.9)*	4.6	*(0.9)*	5.6	*(1.1)*	5.2	*(1.0)*
Total	48.0	*(8.4)*	48.2	*(2.0)*	49.1	*(2.2)*	48.7	*(2.1)*	49.5	*(2.2)*
Hours per year										
Hospital	2130	*(279)*	2079	*(70)*	2136	*(83)*	2070	*(68)*	2127	*(81)*
Private extra practice	174	*(283)*	234	*(43)*	219	*(41)*	267	*(52)*	251	*(49)*
Total	2304	*(403)*	2312	*(95)*	2355	*(103)*	2337	*(99)*	2378	*(107)*

Elasticities	Total hours		Main job		Extra job	
Effect of an increase in hospital wages	0.19*	*(0.06)*	0.27*	*(0.06)*	-0.60*	*(0.17)*
Effect of an increase in private wages	0.10*	*(0.03)*	-0.04*	*(0.01)*	1.41*	*(0.18)*
Effect of an increase in all wages	0.28*	*(0.06)*	0.23*	*(0.06)*	0.74*	*(0.27)*

N=1036
Standard deviations in brackets.
This table corresponds to Table P6 in Appendix.5.

From Table 6 we see that the hospital physicians have 'observed' average annual working hours per year of 2130 compared to the prediction of 2079 hours per year. The private hours is 'observed' with 174 hours and predicted with 234 hours per year. The sums are close with 48 hours per week - 2304 hours observed and 2312 hours predicted per year. Like the previous models the prediction of total hours is good, but the predicted sector mix is deviating from the observed. From Table P6 in Appendix 4 we observe that common 'job packages' with 45.5 or 50 hours per week at the hospital and no private income is under-predicted.

The next step is the policy analysis with a 10 percent wage increase at the hospital job, keeping private 'wages' constant. The prediction is an increase of 3 percent increase in the hospital hours, or 57 hours per year. The private hours is predicted to have a reduction of six percent or 15 hours per year. The total is an increase of 43 hours or 2 percent. Like in section 5.1 the opposite effect is occurring with a 10 percent 'wage-' (fee) increase in private practice. An average of 9 hours per year less in the hospital job or two percent reduction in hospital hours and 33 hours or 14 percent increase in private practice hours, corresponding to a one percent increase in total hours.

With a 10 percent wage increase in both sectors, the model predicts a mean increase in labor supply of 66 hours per year, where the hospital job absorbs 48 hours of the increase. Looking at changes in total hours from an increase in the hospital wage, I find a wage elasticity of 0.19. The sector specific elasticities are 0.27 in the hospital job and -0.60 in the private practice. The wage elasticity when increasing the private wages is 0.10 for total working hours, -0.04 in the hospital job and 1.41 in the private practice. With an increase in both wages the elasticity is 0.28, 0.23 at the hospital and 0.74 in the private practice. In all policy simulations the total change in hours worked is small, with wage elasticities from 0.1 to 0.3.

5.4 Predictions based on 1997 data

In this section I present an 'experiment' applying the models in 5.1-5.3 based on 1995 data to predict the labor supply in 1997. I use the 'observed' hourly wages in 1997, in

the meaning of the calculated wages based on income and available data on hours. Combining these wages with parameters estimated on 1995 data, gives an opportunity to evaluate the reliability of the predictions by comparing the predicted choices with the observed. Table 7 displays the three subsets of hospital physicians with private extra practice presented in the sections above.

Table 7 Prediction Experiment on 1997 Data
Observed Choices in 1997 and Predicted Choices in 1997.
Predictions based on 1995 Model Parameters and 1997 Wages.

	All Hospital Physicians N=1553				**Male Hospital Consultants** N=790				**Hospital Physicians observed in 1995 & 1997** N=1036			
	Observed 1997		Predicted with 1997 wages		Observed 1997		Predicted with 1997 wages		Observed 1997		Predicted with 1997 wages	
Hours per week		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*
Hospital	43.4	*(-7.1)*	42.7	*(-1.2)*	45	*(-6.8)*	44.1	*(-0.8)*	43.7	*(-6.5)*	42.7	*(-1.2)*
Private extra practice	3.6	*(-5.9)*	5.5	*(-1.3)*	4	*(-6.2)*	6.2	*(-0.9)*	3.2	*(-5.5)*	5.5	*(-1.3)*
Total	47	*(-9.1)*	48.2	*(-2.3)*	49	*(-9)*	50.3	*(-1.2)*	46.9	*(-8.6)*	48.2	*(-2.3)*
Hours per year												
Hospital	2082	*(-342)*	2049	*(-59)*	2160	*(-326)*	2116	*(-40)*	2096	*(-310)*	2049	*(-59)*
Private extra practice	171	*(-285)*	266	*(-60)*	194	*(-299)*	298	*(-44)*	156	*(-266)*	266	*(-60)*
Total	2254	*(-435)*	2315	*(-110)*	2354	*(-432)*	2414	*(-55)*	2252	*(-411)*	2315	*(-110)*

Standard deviations in brackets. This table corresponds to Table P7 in Appendix 5.

I find that the predictions overestimate the total hours in all alternatives, with up to three percent. In all samples, the average labor supply at hospitals are underestimated, whereas the private extra job is overestimated.

In the first set the predicted average hours in the hospital job is 2049 compared to 2082 hours per year observed. In the private practice, the model predicts 266 hours per year compared to our calculated 171. The total hours predicted for hospital consultants are 2414 compared to the 2354 hours observed per year. The private hours are also here significantly above those calculated based on survey data. For the group observed with a complete dataset in both years the prediction is 2049 hours per year in the hospital job and 266 in private practice, compared to the 2096 and 156 'observed'. The predicted total hours are thus 63 above the 'observed', corresponding to almost 3 percent. The largest deviation between predicted and observed is in the sample with the same individuals applied to estimate the parameters utilized in the predictions.

The predictions of total hours are fairly in the region of the observed choices, and the predictions have the correct direction of changes in the hospital hours from 1995 to 1997 when comparing Table 7 to Tables 4-6. The private hours are over predicted but the predicted direction is correct.

5.5 Changes in observed hours from 1995 to 1997.

In the light of the major increase in the hospital wages from 1995 to 1997 it is also interesting just to look at the changes in observed hours. The focus here will be on the hospital hours, observed with a complete dataset before and after the hospital pay reform. Table 8 reports two measures on hourly wages, a basic wage before compensations and benefits, and the mean of total income divided by total hours. We

know that the marginal wage when working overtime is three times the wage of the first hour. This wage equals what I have called the basic wage, supplemented with compensations for shift work and some other benefits. The mean basic wage was around NOK 150 in 1995 increasing with 12-14 percent the next two years after correcting for price increases. The total income divided by all hours gives a mean hourly wage of NOK 210-230 in 1995, increasing around 35 percent in 1997 due to changes in the payment structure for overtime work.

During the same period there is a small reduction in the mean hours worked, from 2130 hours per year to 2096 for the individuals with a complete dataset prior to and after the pay reform. This equals a reduction from 44.4 to 43.7 hours per week. Some specialists like anaesthetists typically work 48 hours per week, others no more than the general contract of 37.5 hours per week. In a period with a significant wage increase we thus observe a small reduction in hours worked. This result may be due to a strong income effect, or institutional mechanisms reducing physicians overtime in order to keep the budget in spite of a marked wage increase. For the two first subsets we however observe a positive labor supply response, about 4 percent for the male specialists.

Table 8
Changes in observed hours and mean hourly wages. Hospital physicians 1995-1997.

	N		Hospital hours			Basic hourly wage			Income/Hours		
	1995	1997	1995	1997	Change	1995	1997	Change	1995	1997	Change
Hospital physicians	**2775**	**1553**	2032	2082	2 %	146	166	12 %	211	278	33 %
			(298)	*(342)*		*(17.0)*	*(14.6)*		*(36.5)*	*(40.6)*	
Male consultants	**1521**	**790**	2086	2160	4 %	151	171	14 %	228	308	35 %
			(295)	*(326)*		*(14.1)*	*(9.5)*		*(28.7)*	*(23.8)*	
Hospital physicians obs. In 95-97	**1036**	**1036**	2130	2096	-2 %	150	169	12 %	214	291	36 %
			(279)	*(310)*		*(16.4)*	*(12.4)*		*(36.5)*	*(36.9)*	

1995 prices

The private hours are less reliable but are included in Figure 4 in Appendix 4. In all the sets of hospital physicians there is a reduction in private work. My calculations indicate a reduction in the extra job, with an average of about 20 hours per year. The direction of this change seems reasonable given the major increase in hospital wages, making it relatively more profitable to continue at the hospital instead of moving to a private practice. The size of the effect is however uncertain.

Table 9 All physicians in 1997. Observed and Predicted Choices.

	Observed share		Predicted choice		Predictions with 10% increase in *hospital* wages		Predictions with 10% increase in *primary care* wages		Predictions with 10% increase in *private* wages		Predictions with 10% increase in *other* wages		Predictions with 10% increase in *all* wages	
Hours per week		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*		*s.d.*
Main	40.7	*10.5*	39.5	*(4.7)*	40.5	*(5.4)*	39.6	*(4.6)*	39.3	*(4.3)*	39.4	*(4.7)*	40.5	*(4.9)*
Extra	7.6	*7.3*	9.1	*(1.4)*	8.7	*(1.6)*	9.1	*(1.4)*	9.5	*(1.6)*	9.3	*(1.4)*	9.2	*(1.5)*
Total	48.3	*11.7*	48.6	*(4.1)*	49.2	*(4.5)*	48.7	*(4.0)*	48.9	*(3.9)*	48.7	*(4.0)*	49.7	*(4.2)*
Hours per year														
Main	1953	*503*	1895	*(225)*	1946	*(260)*	1900	*(222)*	1888	*(208)*	1893	*(224)*	1945	*(235)*
Extra	365	*351*	439	*(68)*	417	*(77)*	436	*(66)*	458	*(77)*	446	*(67)*	440	*(74)*
Total	2319	*561*	2333	*(195)*	2363	*(215)*	2336	*(194)*	2347	*(187)*	2338	*(191)*	2385	*(200)*

Elasticities	Total hours		Main job		Extra job	
Wage increase in		*s.d.*		*s.d.*		*s.d.*
Hospitals	0.12	*(0.11)*	0.25	*(0.23)*	-0.51	*(0.47)*
Primary care	0.01	*(0.05)*	0.03	*(0.11)*	-0.04	*(0.16))*
Private practice	0.06	*(0.07)*	-0.02	*(0.22)*	0.45	*(0.63)*
Other jobs	0.02	*(0.03)*	-0.01	*(0.09)*	0.17	*(0.31)*
All sectors	0.22*	*(0.04)*	0.26*	*(0.06)*	0.01	*(0.15)*

Standard deviation in brackets.

This table corresponds to Table P9 in Appendix 5.

5.6 All physicians practicing in 1997

Expanding the sample to include all physicians practicing in 1997 gives an opportunity to analyze the impact on all sectors of changes in sector specific wages. The physicians have a job choice between five sectors as described by Table A8. 55 percent of the physicians have a main job in the hospital sector, 31 percent as private practitioners, 7 percent as municipal health officers and the remaining 6 percent in other jobs like health administration and research. The extra job is restricted to private practice, the most common choice observed. The exception is private practitioners with *other* as their extra job. As before, the working hours are set to zero if they do not work in an extra job.

The parameter estimation, as presented in Table 3, gives an income term in the utility function with a λ of 0.59 and an α of 3.45. The γ in the leisure component is estimated to –3.72. The older the physician is, the more she appreciates leisure, and the same goes for parents with small children, if the spouse do not work, if you have a non-Norwegian country background and if you are a woman. The g-function is estimated with a dummy for fulltime work and a dummy for private practitioners.

From Table 9 we see that the physicians have an 'observed' average of 1953 working hours per year in their main job, compared to the prediction of 1895 hours per year. The more uncertain estimate of the extra job is 'observed' with 365 hours and predicted with 439 hours per year. The sums are close with 2319 hours 'observed' and 2333 hours predicted per year. This sample has less precise predictions than the three subsets of hospital physicians, but the prediction of total hours is better than the predictions for the main job and the second job. The total working hours corresponds to 48 hours per week. The amount of hours in the extra job is higher than in the previous samples for hospital physicians. This is not only due to the inclusion of other sectors, but also that private practitioners with a public contract receive income from several sources. As I have not been able to aggregate these sources in this set, I register the block grant from the municipality as an extra job.

In the policy analysis, the prediction effect of an 10 percent increase in hospital wages, is an increase of 3 percent in the hospital hours, or 51 hours per year. The private hours are predicted to have a reduction of five percent or 22 hours per year. The total is an increase of 30 hours or one percent. A ten percent increase in wages in public primary care has small effects on the mean working hours for all physicians, partly due to their limited share of the total population also after a simulated wage increase. A ten percent wage increase results in a mean of 5 hours more worked in the main job, and 3 hours less in the extra job.

A 10 percent 'wage-' (fee) increase in private practice, reduces the hours in the main job for those working private practice as their *extra* job, and increases the hours for those working private in their *main* job. The result is a minimal predicted change of 7 hours less per year in the main job. There is a 4 percent increase in the hours in the extra job, driven by the hospital physicians with a second job in private practice. A similar policy experiment with an increase in *other* wages, predicts no major change in the main job, and a 1.5 percent increase in extra job hours.

If all wages are raised with 10 percent, there is a mean increase of 50 hours per year in the main job and no change in the extra job. The wage elasticity in this case is 0.22

and significantly different from zero. As reported in Table 9 the elasticities for all the other policy experiments are small and positive, but not significant.

5.7 Discussions

The previous sections have presented three samples of hospital physicians and one complete set of all physicians working in Norway. The reason for the focus on hospital physicians is the superiority of the data on working time compared to the other sectors. It is important to remember that this discrete choice application only is an approximation with 9 alternative hours in the main job and five alternatives when having a side job.

The observed and predicted choice of hours in their main job and extra job is presented in Figure 1 - Figure 3 in Appendix 4. The first bar to the left represents hours worked in 1995. The second is predicted hours with unchanged wages. The third represents a prediction of hours with a 10 percent increase in hospital wages. The two following bars represent similar policy experiments in private practice and for all sectors simultaneously. The two bars to the right represent observations in 1997 and predictions for 1997 in a policy experiment where I use the parameters estimated on 1995 data and the 'observed' wages from 1997 to predict the choices in 1997.

In all applications I find a modest response in the total hours worked from a wage increase in hospitals. The model predicts that the hospital physicians respond to a wage raise by increasing the hours at the hospital, and reducing their private hours. The opposite goes for an increase in the private practice fees. A similar pattern repeats in all samples of the model. The predictions are reasonable adequate, with a general tendency that the hours worked at the hospital are lightly under-predicted, whereas the private hours are over-predicted. When increasing the hospital wages alone the 'hospital specific' elasticity ranged from 0.16 to 0.27. Focusing at the total hours worked, the elasticities ranged from 0.10 to 0.19. When simulating an increase in all wages the elasticities are higher, ranging from 0.18 to 0.28.

Compared to the high quality of the data for hospital physicians, the hours in private sector must be seen as an approximation to the unobserved working hours. As presented in each table the effect on total labor supply of a wage increase is small. The wage elasticities, total and by sector, are presented in each table. There are no major deviations from this results related to gender, specialty and geographic region found in predictions not presented here. Of course, with such small behavioral responses predicted it is difficult to identify any differences. A reason for the lack of gender differences is probably that female hospital physicians choose to work, or are 'forced' to work, in the same shift plan as male physicians. A preference for shorter working hours would thus lead to a job choice in another sector like the health administration, as a municipal health officer/public primary care physician or a part-time private practice, where we do not have access to data of the same detail as the NALRA data. The regional similarities are probably due to the centralized wage determination in the health sector, with almost identical wages and fees trough out the country.

This section also presented an 'experiment' on the hospital physicians – predicting choices in 1997 using the parameter estimates from 1995 and the 'observed' wages from 1997. Whereas the predictions of total hours are in the region of the observed

choices, the predictions only have the correct direction of changes in the hospital hours in two of the three cases. The private hours are overpredicted and the observed changes are in the opposite direction of the predicted.

6. Conclusions

The aim of this paper has been to identify the effect of increased wages on working hours and sector choice. I find a modest wage elasticity for the physicians in our study when focusing on the total hours worked. This remains for the three sub-samples of employed hospital physicians, studied in detail due to their superiority in data quality. The predictions indicate, however, that the 'job specific' elasticities are higher, and that the effect on total hours are dampened by a change in the sector mix. Looking at the hospital physicians, a wage increase results in an increase in the hours worked at the hospital. The total effect is dampened by a reduction in the hours in the extra private practice. The opposite occur with an increase in the private wages or fees – an increase in hours in private practice and a reduction of hours at the hospital. A parallel pattern repeats in all sectors.

Due to the limited time period presented here, I am not able to document changes in specialization choice as a response to the significant wage increase in hospital sector utilized in this study. This is an interesting issue for further research, but requires data from a long time period as it takes 5-15 years from completing the university studies to the licensing as a specialist. The general tendency presented in anecdotal evidence, is that the physicians' preferences are changing towards shorter working hours and more leisure, and that the rapidly increasing share of female physicians is strengthening this trend. The Norwegian response to the increasing need for personnel, fueled by intensified specialization and institutional reforms, has been an increase in the educational capacity and an import of foreign personnel. The results presented in this paper indicate that the alternative of increasing the hours worked for those already participating by increasing wages would be demanding on public budgets.

In a policy perspective, this analysis predicts a modest response in total hours worked to a wage increase. The results are in line with the existing research on employed physicians and the more general literature on high-income professionals. A high-income group with full participation and many hours worked per year is not responsive to increased wages in their total labor supply. However, there might be a potential in influencing the choice of sector mix as documented by this study.

7. References

Aaberge, R., Dagsvik, J. R., Strøm, S.,1995. Labor supply responses and welfare effects of tax reforms. Scandinavian Journal of Economics 97: 635-59.

Aaberge, R., Colombino, U., Strøm, S., Wennemo, T., 1998. Evaluating Alternative Tax Reforms in Italy with a Model of Joint Labor Supply of Married Couples. Structural Change and Economic Dynamics. Vol. 9, 1998, 415-433.

Aaberge, R., Colombino, U., Strøm, S., 1999. Labour supply in Italy: An empirical analysis of joint household decisions, with taxes and quantity constraints. Journal of Applied Econometrics 14: 403-422.

Baltagi, B.H., Bratberg, E. and Holmås, T.H, 2003. A panel data study of physicians' labor supply: The case of Norway. Working paper 4/03, University of Bergen.

Feldstein, M., 1995. The effect of marginal tax rates on taxable income: A panel study of the 1986 Tax Reform Act, Journal of Political Economy 103(5) 551-572.

Feenberg, D., Poterba, J.M., 1993. Income inequality and the incomes of the very high taxpayers, in: James M. Poterba, ed., Tax policy and the economy, Vol. 7 (MIT Press, Cambridge) pp. 145-177.

Headen, A.E., 1990. Wage, returns to ownership, and fee responses to physician supply. Review of Economics and Statistics 72, 30-37.

Heckman, J.J., 1993. What has been learned about labor supply in the past twenty years? American Economic Review, 82, Papers and proceedings of the 105th annual meeting of the American Economic Association, 116-121.

Heckman, J.J., MaCurdy, T., 1980. A life cycle model of female labor supply. Review of Economic Studies 47, 47-74.

Iversen, T., 1997. The effect of a private sector on the waiting time in a national health service. Journal of Health Economics 16, 383-396.

Nicholson, S., 2002. Physician Speciality Choice under Uncertainty. Journal of labor Economics, 2002, vol. 20, no.4. The University of Chicago.

Noether, M., 1986. The growing supply of physicians: has the market become more competitive? Journal of Labor Economics, 4, 503-537.

Norwegian Medical Association, 2002. Homepage: www.legeforeningen.no.

OECD, 2002. OECD Health Data 2002. www.oecd.org.

Pencavel, J., 1986. Labor supply of men. In Ashenfelter, O., Layard, R., eds. Handbook of labor economics, pp. 3-102, North-Holland, Amsterdam.

Rizzo, J.A., Blumenthal, D., 1994. Physician labor supply: Do income effects matter? Journal of Health Economics 13, 433-453.

Røed, K., Strøm, S., 2001. Progressive Taxes and the Labour Market - Is the Trade-Off between Equality and Efficiency Inevitable? Journal of Economic Surveys, Vol 16, No1, 77-110,

Showalter, M. H., Thurston, N.K., 1997. Taxes and labor supply of high-income physicians. Journal of Public Economics 66, 73-97.

Sloan, F. 1975. Physician supply behavior in the short run. Industrial and Labor Relations Review 28, 549-569.

Statistics Norway, 1983. Standard Industrial Classification.

Statistics Norway. NACE Standard Industrial Classification.. *www.ssb.no*

Statistics Norway. General practitioner and specialist in private practice - Income and working hours in 1995 and 1998. Results from two surveys published as tables on *www.ssb.no*.

Appendix 1 Summary statistics

Table A1 Choice of sector in main job. Samples from 1995 and 1997

Alternative	Comment	Payment	Observed 1995	%	Observed 1997	%	7 sectors	5 sectors	3 sectors
Hospital consultant outside of Oslo	Work in a hopital outside of Oslo owned by local government (NALRA) or a private foundation with a NALRA wage contract.	Fixed wage with progressive overtime compensation	4013	*42*	4879	*40*	S_1	*S_1*	SZ_1
Hospital consultant in Oslo	Work in a hospital owned by the municipality of Oslo, at one of the National hospitals, or at a private foundation with a similar contract as the National Hospitals (Higher wage than NALRA).	Fixed wage with progressive overtime compensation	1268	*13*	*1696*	*14*	S_2	*S_2*	SZ_1
Municipal medical officer/Public primary care	Work with public health issues, health administration in the municipalities. Patient care in some areas.	Fixed wage	995	*10*	*1382*	*11*	S_3	*S_3*	SZ_3
Private practice without a municipal contract	Funding contract without a municipality or county (non-PCP specialists). The majority in this group is partially reimbursed from the National Insurance scheme.	Activity based	1051	*11*	1053	*9*	S_4	*S_4*	SZ_2
Private practice with municipal contract	Funding contract with the municipality or county (non-PCP specialists) in addition to reimbursement from the National Insurance scheme.	Activity based & municipal block grant	1323	*14*	1998	*16*	S_7	*S_4*	SZ_2
Medical research	Universities or in private research	Fixed wage	516	*5*	608	*5*	S_6	*S_5*	SZ_3
Other work	Central government, central health authorities, non-health industries, social work, non-governmental organisations (NGOs).	Fixed wage	497	*5*	636	*5*	S_5	*S_5*	SZ_3
			9663	*100*	12252	*100*			

Some of the individuals were dropped due to missing data .

Table A2 More restrictive data set used as a basis for the hospital analysis. Data used in section 5.1-5.4

Variable	Label	Mean	Std Dev
b970_5	No. of children below 6 years of age	0.47	*0.68*
ektejobb	Spouse do not work: 1=yes 0=No	0.31	*0.46*
ektelege	Spouse is physician: 1=Yes 0=No	0.19	*0.39*
ektespl	Spouse is Registred nurse: 1=Yes 0=No	0.17	*0.38*
cnorway	From Norway	0.83	*0.38*
female	Female	0.26	*0.44*
married	Married	0.78	*0.41*
age	Age	46.3	*8.85*
nonw	Nonwage income – spouse, capital, etc.	208000	*167000*
rek	Specialty with extra pay in hospitals	0.13	*0.34*
duma	Dummy if hospital	0.49	*0.5*
dumb	Dummy if private	0.32	*0.46*
dumc	Dummy for pai info	0.37	*0.48*
paitid	Pai info - more restrictive	0.31	*0.46*
ubehagd	Pai info – more complete	0.26	*0.44*
nonspes	Not qualified specialist	0.28	*0.45*
s_gp	Specialist GP/Primary Care Medicine	0.23	*0.42*
s_non_gp	Specialist (Except in GP/PCM)	0.49	*0.5*
s_surg	Spec.Surgery	0.14	*0.35*
s_int_me	Spec.Internal Medicine	0.2	*0.4*
s_psych	Spec.Psychiatry	0.07	*0.26*
s_lab	Spec.Laboratory Medicine	0.06	*0.23*
SECTORS			
Sector main job - dummies			
s_1	KS – Hospitals out of Oslo	0.35	*0.48*
s_2	OS – Oslo hospitals	0.14	*0.35*
s_3	Municipal primary care	0.09	*0.28*
s_4	Private without public contract	0.1	*0.31*
s_5	Other	0.05	*0.22*
s_6	Research and development	0.05	*0.23*
s_7	Private with public contract	0.21	*0.41*
Alternative sector allocation			
sm1	Hospitals	0.49	*0.5*
sm2	Private practice	0.32	*0.46*
sm3	Other	0.19	*0.39*
Extra job			
b_1	Hospital , no extra job	0.28	*0.45*
b_2	Hospital , with extra wage	0.12	*0.32*
b_3	Hospital , with extra non wage job	0.09	*0.28*
b_4	Private, no extra job	0.24	*0.42*
b_5	Private with extra job	0.08	*0.27*
b_6	Other, no extra job	0.07	*0.26*
b_7	Other, with extra job	0.12	*0.33*
HOURS			
HOURS MAIN JOB 4 alternatives			
h_m1	Part time <17.5 hours per week	0.07	*0.25*
h_m2	Part time <35 hours per week	0.08	*0.28*
h_m3	Full time	0.62	*0.48*
h_m4	Full time -extended hours >38 hours per week	0.22	*0.42*
Extra job - hours			
h_b1	0 (hours <1)	0.59	*0.49*
h_b2	1<hours<7*48	0.16	*0.37*
h_b3	Hours >7*48	0.24	*0.43*

N=8718

Table A3 Summary statistics
All Physicians in 1997 (After trimming). Data used in section 5.5

Variable		Mean	Std Dev
rekr9697	Specialist recruitment pay	0.12	*0.33*
kapinnt97	Capital income	49400	*155000*
overf97	Transfers	10100	*25700*
b970_5	Children < 6 years	0.54	*0.71*
statsp97	Savings	4200	*22600*
eies97	Spouse's income after tax	158000	*156000*
Nonw	Non wage income	208000	*199800*
Ektejobb	Spouse do not work=1	0.35	*0.48*
Ektelege	Spouse is physician=1	0.19	*0.39*
Ektespl	Spouse is nurse=1	0.16	*0.37*
Cnorway	Born in Norway=1	0.81	*0.40*
Female	Female	0.29	*0.45*
Married	Married	0.76	*0.43*
Age	Age	45.0	*9.1*
	Age - Hospital outside of Oslo	44.3	
	Age - Hospitals in Oslo	44.9	
	Age - Public Primary care	42.8	
	Age - Private practice	46.3	
	Age - Other	45.6	
S_1	Hospital outside of Oslo	0.35	*0.48*
S_2	Hospitals in Oslo	0.20	*0.40*
S_3	Public Primary care	0.07	*0.25*
S_4	Private practice	0.31	*0.46*
S_5	Other	0.06	*0.24*
we1	Wage per hour - S_1	242.8	*34.5*
we2	Wage per hour - S_2	218.9	*37.1*
we3	Wage per hour - S_3	199.3	*20.9*
we4	Wage per hour - S_4	265.0	*46.9*
we5	Wage per hour - S_5	191.1	*30.7*
h_b1	Hours extra job 1 *0 h/w*	0.30	*0.46*
h_b2	Hours extra job 2 *6 h/w*	0.39	*0.49*
h_b3	Hours extra job 3 *12 h/w*	0.14	*0.35*
h_b4	Hours extra job 4 *18 h/w*	0.08	*0.27*
h_b5	Hours extra job 5 *24 h/w*	0.09	*0.28*
h_m1	Hours main job 1 *18 h/w*	0.03	*0.18*
h_m2	Hours main job 2 *22 h/w*	0.03	*0.18*
h_m3	Hours main job 3 *28 h/w*	0.23	*0.42*
h_m4	Hours main job 4 35.5 *h/w*	0.03	*0.17*
h_m5	Hours main job 5 *37.5 h/w*	0.01	*0.10*
h_m6	Hours main job 6 *40.5 h/w*	0.13	*0.34*
h_m7	Hours main job 7 *45.5 h/w*	0.10	*0.30*
h_m8	Hours main job 8 *50 h/w*	0.42	*0.49*
h_m9	Hours main job 9 *55 h/w*	0.01	*0.10*

N=9528

Note that this is the sample after trimming. The allocation between sectors in this dataset is somewhat different than in table A3 which provides an attempt to separate private practice with and without public funding. This dataset is not provided with such contract information.

Appendix 2 Hourly wages

Annual income by sector
I have constructed sector-specific hourly wages for all physicians, including sectors where they not are participating. The first step in this process is to sort the jobs by the NACE standard industrial classification (supplemented with SAMDATA and NALRA hospital codes), and aggregate into sectors or job types. As described in table A3 I have choosen to use seven 'sectors' when I construct hourly wages: a) Local hospitals outside of Oslo, b) Oslo hospitals, c) Municipal Medical Officer/Public Primary Care, d) Private practice with a municipal contract, e) Private practice without a municipal contract, f) Medical research in Universities or Pharmaceutical Companies and g) Other work like in the central health authorities, NGOs etc.

Private nonwage income is allocated to private sector as well as wage income from private-for-profit health providers. The physicians are allocated to public jobs in hospitals and primary care if their working hours indicate that they work more hours in their public job than in their private practice. Otherwise the main job is the one with highest annual earnings. In the analysis I have aggregated the sectors to five: Local hospitals, Oslo hospitals, Municipal Medical Officer, Private practice, Other (*S_1-S_5*). For comparisons I have also used the alternative with three sectors: Hospitals, Private practice, Other (SZ_1-SZ_3).

I had to simplify the choice set of extra work and introduce the following rules:

- If you work at a *hospital* your extra job is *private*
- If you work at a in *public primary care* your extra job is *private*
- If you work *private* your extra job is *other*
- If you work in *other* your extra job is *private*

Hours
The most challenging task is to find the number of hours worked per year. I have used the best avaliable data in each sector, but their quality is very variable as described in section 4. For the NALRA hospitals this gives accurate observations, whereas we have reasonable good institutional knowledge for the other employees too.

Hourly wages in hospitals
Utilising the detailed NALRA data, I am able to observe the hourly wage dependent on hours worked. This is important, as the marginal wage for a hospital consultant is up to 200 percent higher when considering working an extra hour at the hospital or to continue at the private practice, compared to the moderate hourly wage the hospital consultants earn during their first 35.5 hours per week. I model the contract almost exact, based upon a basic wage, which I estimate in the cases they are not observable. The Oslo hospitals have the same wage structure as the rest of the country, but the basic wage is about 3 percent higher higher.

Hourly wages in private practice
For the self-employed we only have access to the group average of income and hours per year from a survey by Statistics Norway (1995 and 1998). I used this survey to calculate an average hourly wage for the general practitioners and for the private specialists. I then approximated the hours worked based on their reported income. An argument in defence of this practice is that all physicians with a public contract face

the same financing scheme. Private practitioners without such contracts will however have a greater variations in hourly wages. Anecdotal evidence suggests that some specialities the hourly wage may be considerably larger than the average reported in the survey. This is unobservable in our data.

Weeks per year
I assume that all physicians work 48 weeks per year, utilizing their 4 weeks of paid holiday. For a standard job in public administration this equals 1,800 hours per year.

Experience
In many empirical studies, a labor market experience is proxied by *potential* experience, i.e. age-education-7. This is a problematic upper bound for experience which is more upward biased for women which tend to have a looser connection to the labor market, alt least in connection with maternity leaves. Female physicians, however, generally work more hours per week than women in other professions and part time is not by far as common as for e.g. nurses. On the other hand, female physicians have the highest fertility rate of all educational groups in Norway, qualifying for one-year maternity leave per birth.

The first of our measures of experience, years since date of authorization, are troubled with some of these difficulties, but at least just related to the period after completion of internship. The other measure is constructed on earnings histories available from the Norwegian National Insurance Scheme, which was established in 1967. Individual 'pension entitlements' in this scheme are linked to their income histories. There are small differences between the alternatives, but after testing I choose to use the measure based on 'pension entitlements'.

Selection bias
Intuitively there is reason to believe that there is a selection into the different sectors driven by unobserved factors like preferences and productivity. When I estimate hourly wages for each individual, also in sectors where they do not work, I should take this selection into consideration. In practice there seems be no major differences between the hourly wages predicted by OLS and a Heckman two-step procedure. An effect is revealed in the hospital sector, but for reasons of comparisons, OLS is preferred. The wage regressions for 1995 are presented in table A4 and table A5. The regressions from 1997 are similar and not presented here.

Table A4 Wage Relation 1995

OLS		Public hospitals Basic wage	Public Primary Care Basic wage	Private practice w/o public contract	Private practice w/ public contract	Universities R & D	Other jobs
Female	**Female=1**	-0.0121	-0.0319	-0.0821	-0.1183	-0.0410	-0.1236
		(0.0032)	(0.0067)	(0.0331)	(0.0239)	(0.0220)	(0.0345)
Nonspes	**Not registered specialist=1**	-0.0750	-0.0247	-0.0750	0.0366	0.0656	0.1440
		(0.0042)	(0.0089)	(0.0330)	(0.0244)	(0.0228)	(0.0452)
s_surg	**Specialist in surgery=1**	-0.0037	0.0162	0.0510	0.0311	-0.0388	0.2324
		(0.0033)	(0.0366)	(0.0477)	(0.1138)	(0.0365)	(0.0667)
s_prim	**Specialist in primary care medicine=1**	-0.0394	0.0163	-0.0741	0.1011	-0.0665	0.0312
		(0.0058)	(0.0093)	(0.0293)	(0.0266)	(0.0444)	(0.0567)
s_social	**Specialist in social medicine/public health=1**	-0.0119	0.0387	0.1441	0.1458	0.1158	0.2792
		(0.0150)	(0.0154)	(0.1134)	(0.0786)	(0.0408)	(0.0485)
s_psych	**Specialist in psychiatri=1**	0.0164	0.0153	-0.0758	0.1030	-0.0363	0.0242
		(0.0045)	(0.0419)	(0.0551)	(0.0602)	(0.0392)	(0.0656)
s_lab	**Specialist in laboratory medicine=1**	0.0123	-0.0102	0.0943	(dropped)	0.1276	0.0859
		(0.0049)	(0.0511)	(0.1529)		(0.0294)	(0.1138)
Regionb	**Geographical region B =1**	0.0000	-0.0253	0.0333	0.0703	0.0112	-0.0969
	East except Oslo/Akershus	(0.0057)	(0.0154)	(0.0450)	(0.0285)	(0.0578)	(0.0627)
Regionc	**Geographical region C =1**	0.0115	-0.0055	0.0956	0.1269	-0.2278	0.0373
	West	(0.0051)	(0.0148)	(0.0430)	(0.0294)	(0.1296)	(0.0529)
Regiond	**Geographical region D =1**	0.0017	-0.0009	0.0235	0.1016	-0.0270	0.0744
	Middle	(0.0049)	(0.0135)	(0.0441)	(0.0310)	(0.0224)	(0.0489)
Regione	**Geographical region E =1**	0.0253	-0.0139	0.0960	0.0732	-0.0479	0.0473
	North	(0.0048)	(0.0144)	(0.0389)	(0.0321)	(0.0204)	(0.0529)
Age	**Age**	-0.1521	0.1896	0.8869	0.6346	0.0364	1.9380
		(0.0680)	(0.1745)	(0.8466)	(0.5769)	(0.4585)	(1.0886)
age2	**Age squared/10**	0.6106	-0.5437	-3.0331	-1.7766	-0.1830	-6.3723
		(0.2293)	(0.5965)	(2.7684)	(1.9298)	(1.4994)	(3.6865)
age3	**Age^3/1000**	-0.9815	0.6949	4.5466	2.1201	0.4259	9.3188
		(0.3381)	(0.8924)	(3.9726)	(2.8346)	(2.1447)	(5.4645)
age4	**Age^4/100000**	0.5598	-0.3346	-2.5333	-0.9110	-0.3289	-5.0985
		(0.1842)	(0.4935)	(2.1133)	(1.5441)	(1.1347)	(2.9940)
AgeAFP	**If age >=62 years then =1**	-0.0214	0.0308	0.2157	-0.0869	0.0526	0.3469
	Qualify for early retirement	(0.0132)	(0.0511)	(0.1340)	(0.1364)	(0.0648)	(0.1874)
erf95	**Years of Work Experience last 20 years**	0.0114	0.0067	0.0705	0.1192	0.1163	0.0418
		(0.0100)	(0.0182)	(0.1192)	(0.0840)	(0.1691)	(0.1911)
erf952	**Experience^2/10**	-0.1905	0.0742	-0.8405	-2.5934	-2.2459	-0.7048
		(0.1633)	(0.3057)	(1.9384)	(1.3299)	(2.3547)	(2.7971)
erf953	**Experience^3/1000**	1.4876	-1.1418	4.9185	17.7870	15.8168	4.7878
		(1.0414)	(2.0238)	(12.0914)	(8.1977)	(13.3914)	(16.6350)
erf954	**Experience^4/100000**	-3.7024	3.6146	-9.7911	-38.4166	-35.4875	-10.1518
		(2.2689)	(4.5491)	(25.7079)	(17.2955)	(26.7688)	(34.5831)
Cnordic	**From Nordic Country except Norway=1**	0.0083	0.0173	0.1105	-0.0249	-0.0563	-0.0621
		(0.0063)	(0.0150)	(0.0590)	(0.0421)	(0.0439)	(0.0762)
coecd_no	**From OECD Area except the Nordic Countries=1**	-0.0048	-0.0017	0.0338	-0.0151	-0.0329	-0.0241
		(0.0056)	(0.0123)	(0.0501)	(0.0403)	(0.0457)	(0.0533)
Cglobal	**Non-OECD Background=1**	-0.0060	-0.0332	-0.0717	-0.0095	-0.0182	-0.0577
		(0.0067)	(0.0135)	(0.0811)	(0.0455)	(0.0512)	(0.0912)
Married	**Married=1**	0.0111	-0.0141	-0.0074	0.0249	0.0126	0.0156
		(0.0032)	(0.0076)	(0.0327)	(0.0239)	(0.0201)	(0.0336)
b950_5	**No. Of Children Aged 0-5**	-0.0035	-0.0130	-0.0140	-0.0047	-0.0088	-0.0220
		(0.0020)	(0.0041)	(0.0220)	(0.0148)	(0.0134)	(0.0212)
kommsen1	**Centrality index 1 =1**	0.0183	0.0152	-0.0376	-0.0023	0.0198	0.0012
		(0.0069)	(0.0088)	(0.0709)	(0.0376)	(0.1028)	(0.0684)
kommsen2	**Centrality index 2 =1**	0.0174	0.0177	-0.1399	-0.0024	(dropped)	-0.0203
		(0.0058)	(0.0140)	(0.0963)	(0.0553)		(0.0988)
kommsen3	**Centrality index 3 =1**	0.0000	0.0126	0.0481	-0.0280	-0.0276	-0.1055
		(0.0045)	(0.0117)	(0.0707)	(0.0334)	(0.1233)	(0.0807)
kommsen4	**Centrality index 4 =1**	-0.0055	0.0002	-0.1090	-0.0236	(dropped)	-0.1024
		(0.0153)	(0.0130)	(0.0899)	(0.0551)		(0.1074)
kommsen5	**Centrality index 5 =1**	-0.0003	-0.0546	0.0091	-0.0358	(dropped)	-0.2751
		(0.0086)	(0.0218)	(0.0779)	(0.0427)		(0.1198)
kommsen6	**Centrality index 6 =1**	0.0058	0.0027	-0.0680	-0.0483	0.1169	0.0227
	Centrality index 7 = reference (most central)	(0.0046)	(0.0133)	(0.0432)	(0.0275)	(0.0725)	(0.0640)
Constant		6.0794	2.4814	-4.2482	-2.7055	4.3360	-17.1348
		(0.7441)	(1.8796)	(9.6029)	(6.3916)	(5.2087)	(11.9178)
R2 adjusted		0.5873	0.4446	0.0591	0.0766	0.4402	0.3404
Number of obs.		3636	570	770	1192	459	331

Dependent variable is log of hourly wage. Standard errors in parenthesis.

Table A5 Heckman selection correction as an alternative to OLS
Log basic wage per hour in the hospital sector

		Coef.	Std. Err.	z
Female	**Female=1**	-0.0104	*0.0035*	-2.97
Regionb	**East except Oslo/Akershus**	-0.0008	*0.005*	-0.17
Regionc	**West**	0.0029	*0.0056*	0.53
Regiond	**Middle**	-0.0014	*0.0051*	-0.28
Regione	**North**	0.0199	*0.0051*	3.91
Nonspes	**Not registered specialist=1**	-0.0994	*0.0044*	-22.72
s_surg	**Specialist in surgery=1**	-0.0037	*0.0037*	-1.02
s_prim	**Specialist in primary care medicine=1**	-0.0384	*0.0063*	-6.1
s_social	**Specialist in social medicine/public health=1**	-0.015	*0.0166*	-0.9
s_psych	**Specialist in psychiatri=1**	0.0242	*0.005*	4.83
s_lab	**Specialist in laboratory medicine=1**	0.0114	*0.0054*	2.12
erf95	**Years of Work Experience last 20 years**	-0.0267	*0.0107*	-2.51
erf952	**Experience^2/10**	0.3803	*0.1724*	2.21
erf953	**Experience^3/1000**	-1.6976	*1.0978*	-1.55
erf954	**Experience^4/100000**	2.876	*2.3881*	1.2
Constant		4.968	*0.0228*	218.21
Selection correction				
Female	**Female=1**	-0.2013	*0.064*	-3.15
Regionb	**East except Oslo/Akershus**	0.4422	*0.1086*	4.07
Regionc	**West**	0.7033	*0.1049*	6.71
Regiond	**Middle**	0.2221	*0.0852*	2.61
Regione	**North**	0.3698	*0.0866*	4.27
Cnordic	**From Nordic Country except Norway=1**	-0.0336	*0.1134*	-0.3
coecd_no	**From OECD Area except the Nordic Countries=1**	0.0081	*0.1117*	0.07
Cglobal	**Non-OECD Background=1**	-0.0559	*0.1288*	-0.43
Nonspes	**Not registered specialist=1**	0.1902	*0.0874*	2.18
s_surg	**Specialist in surgery=1**	0.1043	*0.0707*	1.48
s_prim	**Specialist in primary care medicine=1**	0.1571	*0.1282*	1.23
s_social	**Specialist in social medicine/public health=1**	0.3516	*0.3714*	0.95
s_psych	**Specialist in psychiatri=1**	-0.0548	*0.0892*	-0.62
s_lab	**Specialist in laboratory medicine=1**	0.1949	*0.1091*	1.79
erf95	**Years of Work Experience last 20 years**	0.2577	*0.1957*	1.32
erf952	**Experience^2/10**	-3.862	*3.2166*	-1.2
erf953	**Experience^3/1000**	22.7395	*20.6823*	1.1
erf954	**Experience^4/100000**	-49.2674	*45.3462*	-1.09
Age	**Age**	-2.6499	*1.3505*	-1.96
age2	**Age^2/10**	9.2902	*4.5359*	2.05
age3	**Age^3/1000**	-13.8651	*6.6622*	-2.08
age4	**Age^4/100000**	7.546	*3.6169*	2.09
AgeAFP	**If age >=62 years then =1**	-0.4121	*0.2563*	-1.61
Married	**Married=1**	-0.0355	*0.0638*	-0.56
b950_5	**No. Of Children Aged 0-5**	-0.0076	*0.0398*	-0.19
kommsen1	**Centrality index 1 =1**	0.2741	*0.1429*	1.92
kommsen2	**Centrality index 2 =1**	0.7319	*0.1586*	4.61
kommsen3	**Centrality index 3 =1**	0.4864	*0.1091*	4.46
kommsen4	**Centrality index 4 =1**	-0.3676	*0.2455*	-1.5
kommsen5	**Centrality index 5 =1**	0.1217	*0.1877*	0.65
kommsen6	**Centrality index 6 =1**	0.0752	*0.0982*	0.77
Constant		27.2178	*14.8384*	1.83
/athrho		-0.7242	*0.0978*	-7.4
/lnsigma		-2.4537	*0.0172*	-142.26
Rho		-0.6195	*0.0603*	
Sigma		0.086	*0.0015*	
Log likelihood		2638.6		
Number of obs.		4086		

Table A4 Heckman selection correction as an alternative to OLS

Table A6 A comparison of log basic wage per hour in the hospital sector.

	Obs	Mean	Std. Dev.	Min	Max
OLS	3636	4.98	0.09	4.73	5.13
Heckman	3636	4.99	0.09	4.77	5.10

The basic wage is supplemented by compensations for shift work, extended hours and personal benefits. A compensation of 50%, 100% or 200% is added to the salary when working overtime.

Table A7 Observed wage per hour by sector. Predicted if missing. 1995.

Sector	Variable	Mean	*Std. Dev.*
Basic wage – Hospital	new1	144.0	*13.7*
Hospitals	nwz1	210.4	*36.7*
Private w/o public contract	new4	274.1	*45.1*
Private w/o public contract	new7	268.6	*41.3*
Basic wage – Primary Care	new3	148.1	*8.8*
Universities, R&D	new6	154.7	*26.9*
Other	new5	190.4	*37.4*

N=9874

nwe1 and nwe3 are the basic salaries prior to a set of compensational benefits. I apply the exact compensation scheme. The other variables are total earnings divided by the estimated number of hours per year. The private sector categories are merged in the analysis. Universities and Other are also merged.

Appendix 3 Taxes

Income tax

Table A9 Tax rules applied in 1995
(Married class G4 and G5 and working singles)

Income = Y	Tax
0 – 20 954	0
20 954 – 143 500	0.302Y – 6 328
143 500 – 212 000	0.358Y – 14 364
212 000 – 239 000	0.453Y – 34 504
239 000 -	0.495Y – 44 542

Table A10 Tax rules applied in 1997
(Married class G4 and G5 and working singles)

Income = Y	Tax
0 – 22 344	0
22 344 – 156 500	0.302Y – 6 748
156 500 – 233 000	0.358Y – 15 512
233 000 – 262 500	0.453Y – 37 647
262 500 -	0.495Y – 48 672

Capital tax
Capital income is taxed with 28 percent.

Appendix 4 Figures

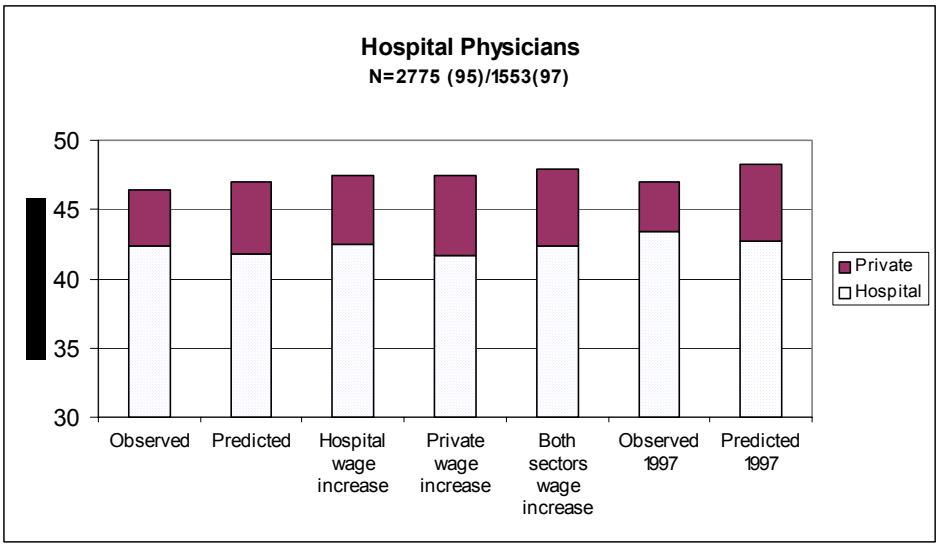

Figure 1
Hours worked at the hospital and in a private extra practice.
All hospital physicians with data on extra hours. Observed and predicted hours in hospital job and in private extra practice. a) Observed hours in 1995; Four predictions in 1995 based on: b) observed wages, c) a 10 percent wage increase in the hospital sector, d) a 10 percent 'wage' (fee) increase in the private sector and e) a 10 percent wage increase in both sectors. f) Observed hours in 1997 and g) predicted hours in 1997 based on observed wages and 'preferences' based on the 1995 data.

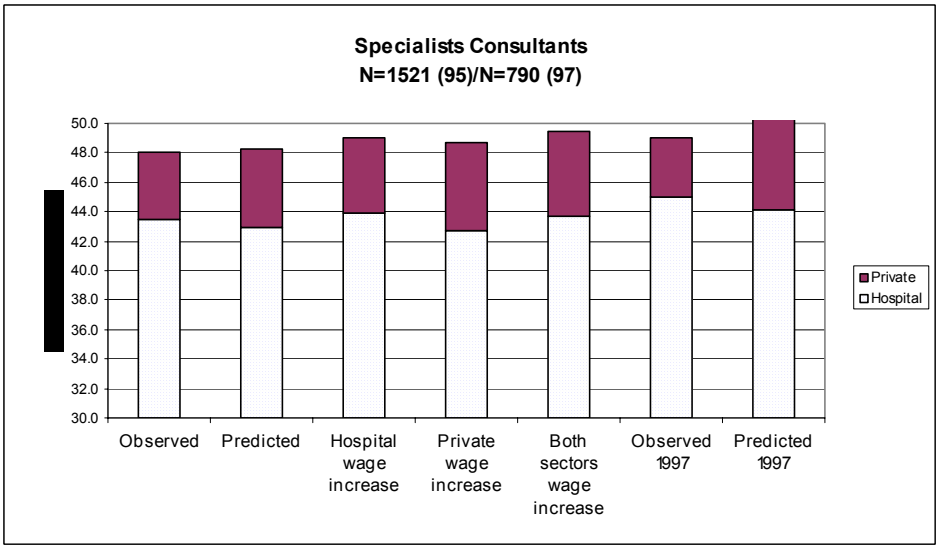

Figure 2
Male Hospital Consultants - Hours Worked at the Hospital and in a Private Extra Practice.
Male specialist consultants with data on extra hours. Observed and predicted hours in hospital job and in private extra practice. a) Observed hours in 1995; Four predictions in 1995 based on: b) observed wages, c) a 10 percent wage increase in the hospital sector, d) a 10 percent 'wage' (fee) increase in the private sector and e) a 10 percent wage increase in both sectors. f) Observed hours in 1997 and g) predicted hours in 1997 based on observed wages and 'preferences' based on the 1995 data.

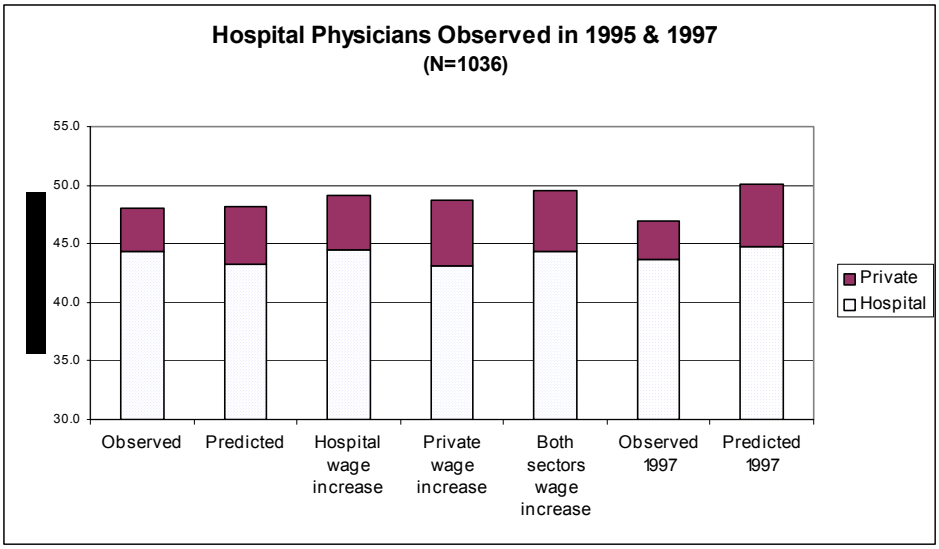

Figure 3

Hospital Physicians Observed in 1995 & 1997- Hours Worked at the Hospital and in a Private Extra Practice. Observed and predicted hours in hospital job and in private extra practice. a) Observed hours in 1995; Four predictions in 1995 based on: b) observed wages, c) a 10 percent wage increase in the hospital sector, d) a 10 percent 'wage' (fee) increase in the private sector and e) a 10 percent wage increase in both sectors. f) Observed hours in 1997 and g) predicted hours in 1997 based on observed wages and 'preferences' based on the 1995 data.

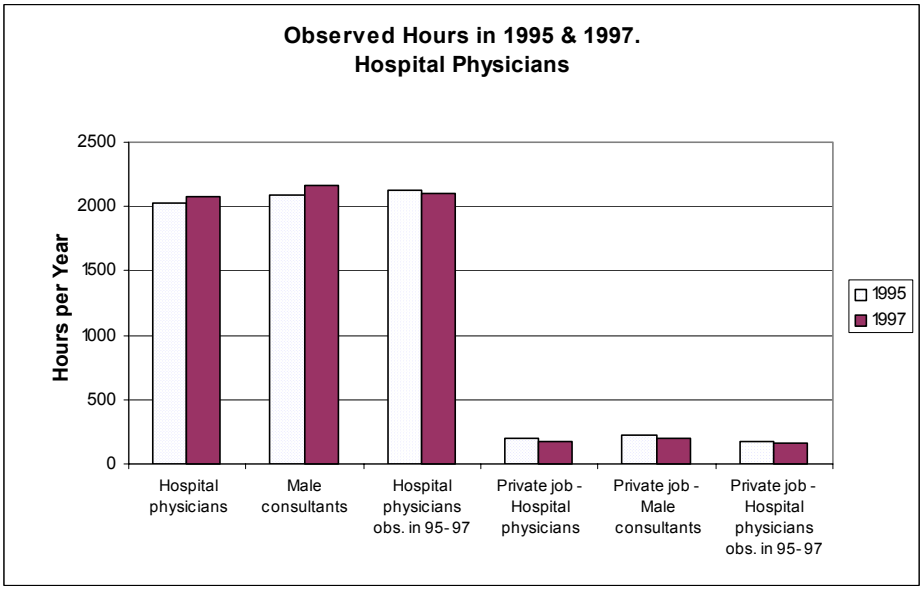

Figure 4

Observed hours per year in 1995 and 1997 in hospital job, and calculated estimate of hours in private practice for hospital physicians. *The salaries at public hospital increased significant during this period.*

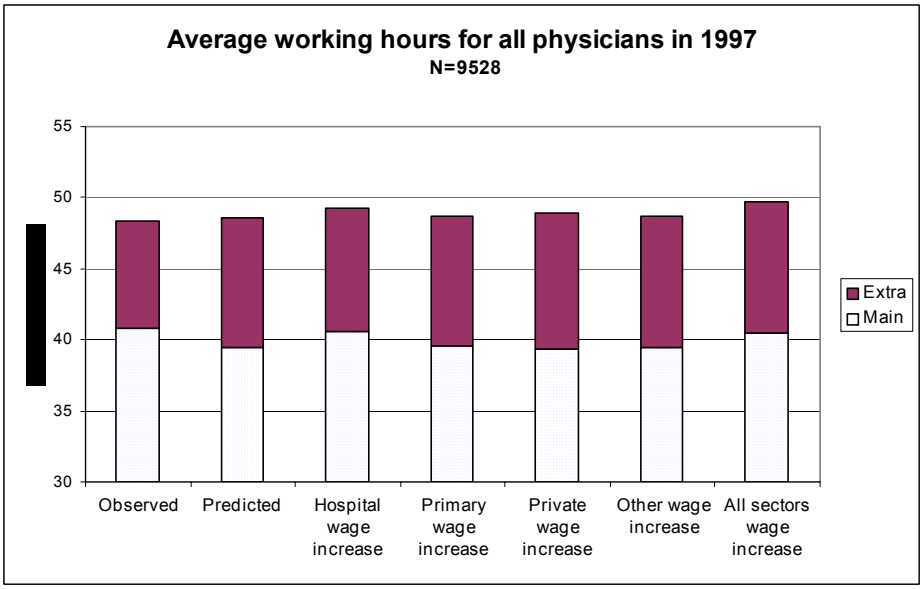

Figure 5

Average working hours per week for all physicians in 1997. - Main and extra job. a) Observed hours in 1997; Six predictions in 1997 based on: b) observed wages, c) a 10 percent wage increase in the hospital sector, d) a 10 percent wage increase in the public primary care sector , e) a 10 percent 'wage' (fee) increase in the private sector, e) a 10 percent wage increase in the remaining sectors, and f) a 10 percent wage increase in all sectors.

Appendix 5 Observed and predicted choices

Table P4
Physicians at NALRA hospitals in 1995. Observed and Predicted Choices
Jr. Physicians and Hospital Consultants

	Main Hours	Extra Hours	Observed shares		Predicted Probability		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in both wages	
PH11	18	0	0.0050	*0.0709*	0.0036	*0.0030*	0.0029	*0.0026*	0.0034	*0.0029*	0.0028	*0.0025*
PH12	18	6	0.0040	*0.0628*	0.0032	*0.0021*	0.0026	*0.0018*	0.0033	*0.0022*	0.0027	*0.0019*
PH13	18	12	0.0011	*0.0329*	0.0026	*0.0012*	0.0021	*0.0011*	0.0028	*0.0014*	0.0023	*0.0012*
PH14	18	18	0.0018	*0.0424*	0.0018	*0.0007*	0.0015	*0.0006*	0.0022	*0.0008*	0.0017	*0.0007*
PH15	18	24	0.0004	*0.0190*	0.0012	*0.0004*	0.0009	*0.0003*	0.0015	*0.0005*	0.0012	*0.0004*
PH21	22	0	0.0029	*0.0536*	0.0027	*0.0020*	0.0023	*0.0018*	0.0026	*0.0019*	0.0022	*0.0017*
PH22	22	6	0.0011	*0.0329*	0.0023	*0.0012*	0.0019	*0.0011*	0.0024	*0.0013*	0.0020	*0.0012*
PH23	22	12	0.0014	*0.0379*	0.0017	*0.0006*	0.0014	*0.0006*	0.0019	*0.0007*	0.0016	*0.0006*
PH24	22	18	0.0004	*0.0190*	0.0011	*0.0003*	0.0009	*0.0003*	0.0014	*0.0004*	0.0011	*0.0004*
PH25	22	24	0.0007	*0.0268*	0.0007	*0.0002*	0.0006	*0.0002*	0.0009	*0.0003*	0.0007	*0.0002*
PH31	28	0	0.0072	*0.0846*	0.0017	*0.0009*	0.0015	*0.0009*	0.0016	*0.0009*	0.0014	*0.0009*
PH32	28	6	0.0014	*0.0379*	0.0013	*0.0005*	0.0011	*0.0004*	0.0013	*0.0005*	0.0011	*0.0005*
PH33	28	12	0.0011	*0.0329*	0.0009	*0.0002*	0.0007	*0.0002*	0.0009	*0.0002*	0.0008	*0.0002*
PH34	28	18	0.0011	*0.0329*	0.0005	*0.0001*	0.0004	*0.0001*	0.0006	*0.0001*	0.0005	*0.0001*
PH35	28	24	0.0011	*0.0329*	0.0003	*0.0001*	0.0002	*0.0001*	0.0003	*0.0001*	0.0003	*0.0001*
PH41	38	0	0.1157	*0.3199*	0.1151	*0.0373*	0.1071	*0.0378*	0.1077	*0.0369*	0.1005	*0.0372*
PH42	38	6	0.0422	*0.2010*	0.0743	*0.0109*	0.0684	*0.0121*	0.0751	*0.0117*	0.0694	*0.0128*
PH43	38	12	0.0151	*0.1221*	0.0427	*0.0055*	0.0390	*0.0053*	0.0467	*0.0059*	0.0427	*0.0057*
PH44	38	18	0.0058	*0.0757*	0.0214	*0.0058*	0.0194	*0.0052*	0.0253	*0.0069*	0.0230	*0.0062*
PH45	38	24	0.0058	*0.0757*	0.0092	*0.0039*	0.0083	*0.0035*	0.0117	*0.0050*	0.0106	*0.0045*
PH51	37.5	0	0.0962	*0.2949*	0.0918	*0.0245*	0.0867	*0.0255*	0.0859	*0.0244*	0.0813	*0.0252*
PH52	37.5	6	0.0523	*0.2226*	0.0570	*0.0055*	0.0534	*0.0066*	0.0577	*0.0060*	0.0541	*0.0071*
PH53	37.5	12	0.0216	*0.1455*	0.0314	*0.0047*	0.0291	*0.0043*	0.0343	*0.0050*	0.0319	*0.0046*
PH54	37.5	18	0.0086	*0.0926*	0.0150	*0.0046*	0.0138	*0.0041*	0.0177	*0.0054*	0.0163	*0.0049*
PH55	37.5	24	0.0050	*0.0709*	0.0060	*0.0028*	0.0055	*0.0025*	0.0077	*0.0036*	0.0071	*0.0032*
PH61	40.5	0	0.0944	*0.2925*	0.0872	*0.0153*	0.0848	*0.0168*	0.0814	*0.0157*	0.0795	*0.0171*
PH62	40.5	6	0.0295	*0.1694*	0.0508	*0.0027*	0.0490	*0.0030*	0.0513	*0.0025*	0.0496	*0.0030*
PH63	40.5	12	0.0105	*0.1017*	0.0260	*0.0054*	0.0249	*0.0048*	0.0283	*0.0057*	0.0272	*0.0052*
PH64	40.5	18	0.0040	*0.0628*	0.0114	*0.0042*	0.0108	*0.0038*	0.0134	*0.0049*	0.0128	*0.0045*
PH65	40.5	24	0.0079	*0.0887*	0.0042	*0.0021*	0.0039	*0.0020*	0.0053	*0.0027*	0.0050	*0.0025*
PH71	45.5	0	0.1438	*0.3509*	0.0649	*0.0050*	0.0679	*0.0052*	0.0605	*0.0054*	0.0634	*0.0057*
PH72	45.5	6	0.0577	*0.2331*	0.0339	*0.0059*	0.0351	*0.0055*	0.0341	*0.0056*	0.0354	*0.0053*
PH73	45.5	12	0.0180	*0.1330*	0.0152	*0.0050*	0.0156	*0.0050*	0.0165	*0.0054*	0.0170	*0.0053*
PH74	45.5	18	0.0101	*0.1000*	0.0057	*0.0027*	0.0058	*0.0027*	0.0067	*0.0032*	0.0069	*0.0032*
PH75	45.5	24	0.0076	*0.0867*	0.0017	*0.0011*	0.0018	*0.0011*	0.0022	*0.0014*	0.0022	*0.0014*
PH81	50	0	0.1038	*0.3050*	0.0646	*0.0133*	0.0743	*0.0146*	0.0601	*0.0122*	0.0693	*0.0134*
PH82	50	6	0.0559	*0.2297*	0.0301	*0.0099*	0.0342	*0.0109*	0.0302	*0.0097*	0.0345	*0.0107*
PH83	50	12	0.0187	*0.1356*	0.0118	*0.0055*	0.0133	*0.0061*	0.0128	*0.0059*	0.0145	*0.0065*
PH84	50	18	0.0065	*0.0803*	0.0038	*0.0023*	0.0042	*0.0025*	0.0044	*0.0026*	0.0050	*0.0029*
PH85	50	24	0.0047	*0.0683*	0.0009	*0.0007*	0.0011	*0.0008*	0.0012	*0.0009*	0.0013	*0.0010*
PH91	55	0	0.0180	*0.1330*	0.0585	*0.0221*	0.0747	*0.0280*	0.0543	*0.0203*	0.0695	*0.0258*
PH92	55	6	0.0036	*0.0599*	0.0235	*0.0116*	0.0298	*0.0146*	0.0236	*0.0115*	0.0299	*0.0145*
PH93	55	12	0.0029	*0.0536*	0.0078	*0.0048*	0.0098	*0.0059*	0.0084	*0.0051*	0.0106	*0.0064*
PH94	55	18	0.0022	*0.0465*	0.0020	*0.0015*	0.0025	*0.0018*	0.0024	*0.0017*	0.0029	*0.0021*
PH95	55	24	0.0014	*0.0379*	0.0065	*0.0160*	0.0046	*0.0116*	0.0061	*0.0153*	0.0043	*0.0111*
			1.0000		1.0000		1.0000		1.0000		1.0000	

Standard deviations in italics

Hours per week										
Hospital	42.3	*6.2*	41.8	*1.2*	42.5	*1.4*	41.7	*1.2*	42.4	*1.4*
Private extra practice	4.1	*6.2*	5.2	*0.9*	5.0	*0.9*	5.7	*1.0*	5.5	*1.0*
Total	46.5	*8.6*	47.0	*1.9*	47.5	*2.1*	47.4	*2.0*	47.9	*2.1*
Hours per year										
Hospital	2032	*298*	2008	*60*	2041	*68*	2002	*59*	2034	*67*
Private extra practice	198	*296*	250	*43*	240	*41*	275	*49*	264	*47*
Total	2230	*413*	2258	*93*	2281	*98*	2277	*97*	2299	*102*

Elasticities	Total hours		Main job		Extra job	
Effect of an increase in hospital wages	0.1007*	*0.0490*	0.1627*	*0.0453**	-0.3961	*0.1604**
Effect of an increase in private wages	0.0831*	*0.0218*	-0.0304*	*0.0074**	0.9896	*0.1401**
Effect of an increase in all wages	0.1800*	*0.0598*	0.1318*	*0.0427**	0.5633	*0.2596**

N=2775

Table P5
Male Hospital Consultants at NALRA Hospitals in 1995.
Observed and Predicted Choices

	Main Hours	Extra Hours	Observed shares		Predicted Probability		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in all wages	
PH11	18	0	0.0033	*0.0573*	0.0017	*0.0008*	0.0013	*0.0007*	0.0016	*0.0007*	0.0012	*0.0006*
PH12	18	6	0.0039	*0.0627*	0.0019	*0.0008*	0.0014	*0.0007*	0.0019	*0.0008*	0.0015	*0.0007*
PH13	18	12	0.0007	*0.0256*	0.0018	*0.0007*	0.0013	*0.0006*	0.0020	*0.0008*	0.0015	*0.0006*
PH14	18	18	0.0013	*0.0363*	0.0015	*0.0005*	0.0011	*0.0004*	0.0018	*0.0006*	0.0013	*0.0005*
PH15	18	24	0.0000	*0.0000*	0.0011	*0.0004*	0.0008	*0.0003*	0.0014	*0.0005*	0.0010	*0.0004*
PH21	22	0	0.0020	*0.0444*	0.0015	*0.0006*	0.0012	*0.0005*	0.0013	*0.0005*	0.0011	*0.0005*
PH22	22	6	0.0007	*0.0256*	0.0015	*0.0005*	0.0011	*0.0005*	0.0015	*0.0005*	0.0012	*0.0005*
PH23	22	12	0.0013	*0.0363*	0.0013	*0.0004*	0.0010	*0.0003*	0.0014	*0.0004*	0.0011	*0.0004*
PH24	22	18	0.0000	*0.0000*	0.0010	*0.0003*	0.0007	*0.0002*	0.0012	*0.0003*	0.0009	*0.0003*
PH25	22	24	0.0007	*0.0256*	0.0006	*0.0002*	0.0005	*0.0002*	0.0008	*0.0003*	0.0006	*0.0002*
PH31	28	0	0.0000	*0.0000*	0.0010	*0.0003*	0.0009	*0.0003*	0.0009	*0.0003*	0.0008	*0.0003*
PH32	28	6	0.0013	*0.0363*	0.0009	*0.0002*	0.0007	*0.0002*	0.0009	*0.0002*	0.0007	*0.0002*
PH33	28	12	0.0007	*0.0256*	0.0007	*0.0001*	0.0006	*0.0001*	0.0008	*0.0002*	0.0006	*0.0002*
PH34	28	18	0.0000	*0.0000*	0.0004	*0.0001*	0.0004	*0.0001*	0.0005	*0.0001*	0.0004	*0.0001*
PH35	28	24	0.0020	*0.0444*	0.0002	*0.0001*	0.0002	*0.0001*	0.0003	*0.0001*	0.0003	*0.0001*
PH41	38	0	0.0815	*0.2737*	0.0906	*0.0179*	0.0804	*0.0181*	0.0833	*0.0170*	0.0740	*0.0171*
PH42	38	6	0.0388	*0.1932*	0.0663	*0.0089*	0.0584	*0.0097*	0.0670	*0.0091*	0.0591	*0.0099*
PH43	38	12	0.0151	*0.1221*	0.0419	*0.0051*	0.0366	*0.0055*	0.0465	*0.0056*	0.0408	*0.0060*
PH44	38	18	0.0059	*0.0767*	0.0224	*0.0039*	0.0195	*0.0037*	0.0272	*0.0047*	0.0237	*0.0045*
PH45	38	24	0.0039	*0.0627*	0.0099	*0.0026*	0.0085	*0.0023*	0.0131	*0.0035*	0.0114	*0.0031*
PH51	37.5	0	0.0631	*0.2433*	0.0744	*0.0125*	0.0673	*0.0130*	0.0683	*0.0120*	0.0619	*0.0124*
PH52	37.5	6	0.0598	*0.2372*	0.0520	*0.0054*	0.0466	*0.0063*	0.0525	*0.0055*	0.0472	*0.0064*
PH53	37.5	12	0.0263	*0.1601*	0.0311	*0.0034*	0.0278	*0.0036*	0.0345	*0.0036*	0.0309	*0.0039*
PH54	37.5	18	0.0131	*0.1140*	0.0157	*0.0028*	0.0139	*0.0026*	0.0190	*0.0034*	0.0169	*0.0032*
PH55	37.5	24	0.0066	*0.0808*	0.0065	*0.0018*	0.0057	*0.0016*	0.0086	*0.0023*	0.0076	*0.0021*
PH61	40.5	0	0.0828	*0.2757*	0.0779	*0.0093*	0.0732	*0.0103*	0.0715	*0.0093*	0.0673	*0.0100*
PH62	40.5	6	0.0342	*0.1818*	0.0503	*0.0028*	0.0469	*0.0038*	0.0507	*0.0028*	0.0474	*0.0038*
PH63	40.5	12	0.0092	*0.0955*	0.0276	*0.0028*	0.0255	*0.0028*	0.0305	*0.0029*	0.0283	*0.0030*
PH64	40.5	18	0.0039	*0.0627*	0.0126	*0.0024*	0.0115	*0.0022*	0.0152	*0.0029*	0.0140	*0.0027*
PH65	40.5	24	0.0079	*0.0885*	0.0046	*0.0014*	0.0042	*0.0012*	0.0061	*0.0018*	0.0056	*0.0017*
PH71	45.5	0	0.1368	*0.3437*	0.0662	*0.0045*	0.0680	*0.0046*	0.0607	*0.0049*	0.0625	*0.0050*
PH72	45.5	6	0.0592	*0.2360*	0.0372	*0.0023*	0.0379	*0.0018*	0.0374	*0.0022*	0.0382	*0.0017*
PH73	45.5	12	0.0178	*0.1321*	0.0174	*0.0026*	0.0176	*0.0025*	0.0192	*0.0028*	0.0195	*0.0026*
PH74	45.5	18	0.0099	*0.0988*	0.0066	*0.0016*	0.0066	*0.0016*	0.0080	*0.0020*	0.0080	*0.0019*
PH75	45.5	24	0.0072	*0.0848*	0.0020	*0.0007*	0.0020	*0.0007*	0.0026	*0.0009*	0.0026	*0.0009*
PH81	50	0	0.1446	*0.3519*	0.0781	*0.0116*	0.0900	*0.0125*	0.0714	*0.0110*	0.0828	*0.0120*
PH82	50	6	0.0789	*0.2697*	0.0380	*0.0067*	0.0434	*0.0071*	0.0381	*0.0066*	0.0438	*0.0071*
PH83	50	12	0.0243	*0.1541*	0.0151	*0.0037*	0.0172	*0.0040*	0.0166	*0.0040*	0.0189	*0.0044*
PH84	50	18	0.0092	*0.0955*	0.0048	*0.0016*	0.0054	*0.0017*	0.0057	*0.0019*	0.0065	*0.0021*
PH85	50	24	0.0053	*0.0724*	0.0011	*0.0005*	0.0013	*0.0005*	0.0015	*0.0006*	0.0017	*0.0007*
PH91	55	0	0.0230	*0.1500*	0.0830	*0.0220*	0.1086	*0.0285*	0.0757	*0.0203*	0.0999	*0.0265*
PH92	55	6	0.0053	*0.0724*	0.0339	*0.0101*	0.0440	*0.0129*	0.0339	*0.0101*	0.0443	*0.0130*
PH93	55	12	0.0046	*0.0677*	0.0110	*0.0040*	0.0142	*0.0050*	0.0120	*0.0043*	0.0156	*0.0055*
PH94	55	18	0.0026	*0.0512*	0.0027	*0.0012*	0.0035	*0.0015*	0.0033	*0.0014*	0.0042	*0.0018*
PH95	55	24	0.0013	*0.0363*	0.0020	*0.0050*	0.0013	*0.0033*	0.0017	*0.0042*	0.0012	*0.0030*
			1.0000		1.0000		1.0000		1.0000		1.0000	

Standard deviations in italics

Hours per week												
Hospital			43.5	*6.1*	42.9	*1.0*	43.9	*1.1*	42.7	*1.0*	43.7	*1.1*
Private extra practice			4.6	*6.2*	5.4	*0.6*	5.1	*0.5*	6.0	*0.7*	5.7	*0.6*
Total			48.0	*8.3*	48.3	*1.1*	49.0	*1.2*	48.7	*1.2*	49.4	*1.2*
Hours per year												
Hospital			2086	*295*	2061	*47*	2107	*54*	2052	*46*	2098	*54*
Private extra practice			219	*299*	257	*27*	244	*26*	288	*31*	275	*30*
Total			2305	*398*	2318	*54*	2352	*59*	2340	*55*	2373	*60*

Elasticities	Total hours		Main job		Extra job	
Effect of an increase in hospital wages	0.1461*	*0.0301*	0.2252*	*0.0342*	-0.4911*	*0.0928*
Effect of an increase in private wages	0.0957*	*0.0158*	-0.0434*	*0.0074*	1.2072*	*0.0792*
Effect of an increase in all wages	0.2390*	*0.0279*	0.1833*	*0.0337*	0.6773*	*0.1237*

N=1521

Table P6
Hospital Physicians with full dataset in 1995 and 1997.
Observed and Predicted Choices. Jr. Physicians and Hospital Consultants

	Main Hours	Extra Hours	Observed share		Predicted Probability		Predictions with 10% increase in hospital wages		Predictions with 10% increase in private wages		Predictions with 10% increase in all wages	
PH11	18	0	0.0019	*0.0439*	0.0017	*0.0016*	0.0012	*0.0013*	0.0015	*0.0015*	0.0011	*0.0012*
PH12	18	6	0.0029	*0.0538*	0.0016	*0.0012*	0.0011	*0.0009*	0.0017	*0.0012*	0.0012	*0.0010*
PH13	18	12	0.0000	*0.0000*	0.0013	*0.0007*	0.0009	*0.0006*	0.0015	*0.0009*	0.0011	*0.0007*
PH14	18	18	0.0010	*0.0311*	0.0010	*0.0004*	0.0007	*0.0004*	0.0013	*0.0006*	0.0009	*0.0005*
PH15	18	24	0.0000	*0.0000*	0.0007	*0.0003*	0.0005	*0.0002*	0.0010	*0.0004*	0.0007	*0.0003*
PH21	22	0	0.0010	*0.0311*	0.0013	*0.0010*	0.0010	*0.0009*	0.0012	*0.0010*	0.0009	*0.0008*
PH22	22	6	0.0000	*0.0000*	0.0011	*0.0007*	0.0008	*0.0006*	0.0012	*0.0007*	0.0009	*0.0006*
PH23	22	12	0.0019	*0.0439*	0.0009	*0.0004*	0.0006	*0.0003*	0.0010	*0.0004*	0.0007	*0.0004*
PH24	22	18	0.0000	*0.0000*	0.0006	*0.0002*	0.0004	*0.0002*	0.0008	*0.0003*	0.0006	*0.0002*
PH25	22	24	0.0000	*0.0000*	0.0004	*0.0002*	0.0003	*0.0001*	0.0005	*0.0002*	0.0004	*0.0002*
PH31	28	0	0.0039	*0.0620*	0.0008	*0.0005*	0.0006	*0.0004*	0.0007	*0.0005*	0.0006	*0.0004*
PH32	28	6	0.0000	*0.0000*	0.0006	*0.0003*	0.0005	*0.0002*	0.0006	*0.0003*	0.0005	*0.0002*
PH33	28	12	0.0000	*0.0000*	0.0004	*0.0001*	0.0003	*0.0001*	0.0005	*0.0001*	0.0004	*0.0001*
PH34	28	18	0.0010	*0.0311*	0.0003	*0.0001*	0.0002	*0.0001*	0.0003	*0.0001*	0.0002	*0.0001*
PH35	28	24	0.0000	*0.0000*	0.0001	*0.0001*	0.0001	*0.0000*	0.0002	*0.0001*	0.0001	*0.0001*
PH41	38	0	0.0772	*0.2671*	0.0998	*0.0373*	0.0857	*0.0370*	0.0914	*0.0364*	0.0790	*0.0357*
PH42	38	6	0.0232	*0.1505*	0.0657	*0.0129*	0.0558	*0.0142*	0.0669	*0.0137*	0.0572	*0.0149*
PH43	38	12	0.0068	*0.0820*	0.0381	*0.0065*	0.0321	*0.0066*	0.0432	*0.0071*	0.0366	*0.0073*
PH44	38	18	0.0010	*0.0311*	0.0191	*0.0058*	0.0160	*0.0050*	0.0241	*0.0073*	0.0203	*0.0063*
PH45	38	24	0.0048	*0.0693*	0.0080	*0.0037*	0.0067	*0.0031*	0.0113	*0.0053*	0.0094	*0.0045*
PH51	37.5	0	0.0753	*0.2640*	0.0783	*0.0247*	0.0687	*0.0254*	0.0717	*0.0243*	0.0633	*0.0246*
PH52	37.5	6	0.0309	*0.1731*	0.0494	*0.0072*	0.0429	*0.0086*	0.0502	*0.0077*	0.0439	*0.0091*
PH53	37.5	12	0.0048	*0.0693*	0.0273	*0.0047*	0.0235	*0.0046*	0.0309	*0.0051*	0.0267	*0.0050*
PH54	37.5	18	0.0039	*0.0620*	0.0129	*0.0042*	0.0110	*0.0036*	0.0163	*0.0053*	0.0140	*0.0046*
PH55	37.5	24	0.0048	*0.0693*	0.0051	*0.0024*	0.0043	*0.0021*	0.0071	*0.0035*	0.0061	*0.0030*
PH61	40.5	0	0.0985	*0.2981*	0.0812	*0.0180*	0.0745	*0.0199*	0.0743	*0.0182*	0.0684	*0.0197*
PH62	40.5	6	0.0270	*0.1622*	0.0478	*0.0037*	0.0434	*0.0052*	0.0485	*0.0038*	0.0443	*0.0054*
PH63	40.5	12	0.0068	*0.0820*	0.0243	*0.0049*	0.0219	*0.0044*	0.0275	*0.0052*	0.0249	*0.0048*
PH64	40.5	18	0.0029	*0.0538*	0.0105	*0.0038*	0.0093	*0.0034*	0.0132	*0.0048*	0.0118	*0.0042*
PH65	40.5	24	0.0058	*0.0759*	0.0037	*0.0019*	0.0033	*0.0017*	0.0052	*0.0027*	0.0046	*0.0024*
PH71	45.5	0	0.1834	*0.3872*	0.0668	*0.0065*	0.0678	*0.0076*	0.0609	*0.0073*	0.0622	*0.0083*
PH72	45.5	6	0.0714	*0.2577*	0.0346	*0.0046*	0.0349	*0.0038*	0.0351	*0.0043*	0.0355	*0.0035*
PH73	45.5	12	0.0164	*0.1271*	0.0152	*0.0045*	0.0152	*0.0042*	0.0172	*0.0049*	0.0173	*0.0046*
PH74	45.5	18	0.0097	*0.0978*	0.0055	*0.0025*	0.0055	*0.0024*	0.0069	*0.0031*	0.0069	*0.0030*
PH75	45.5	24	0.0097	*0.0978*	0.0016	*0.0009*	0.0015	*0.0009*	0.0022	*0.0013*	0.0022	*0.0013*
PH81	50	0	0.1535	*0.3606*	0.0832	*0.0160*	0.0970	*0.0167*	0.0757	*0.0147*	0.0888	*0.0157*
PH82	50	6	0.0792	*0.2701*	0.0379	*0.0108*	0.0439	*0.0115*	0.0384	*0.0107*	0.0446	*0.0114*
PH83	50	12	0.0261	*0.1594*	0.0143	*0.0060*	0.0165	*0.0066*	0.0161	*0.0067*	0.0186	*0.0073*
PH84	50	18	0.0068	*0.0820*	0.0043	*0.0024*	0.0049	*0.0027*	0.0054	*0.0030*	0.0062	*0.0034*
PH85	50	24	0.0077	*0.0876*	0.0010	*0.0007*	0.0011	*0.0008*	0.0014	*0.0010*	0.0016	*0.0011*
PH91	55	0	0.0319	*0.1757*	0.0962	*0.0345*	0.1313	*0.0454*	0.0873	*0.0312*	0.1199	*0.0414*
PH92	55	6	0.0087	*0.0928*	0.0372	*0.0168*	0.0504	*0.0219*	0.0376	*0.0167*	0.0512	*0.0221*
PH93	55	12	0.0029	*0.0538*	0.0116	*0.0065*	0.0156	*0.0086*	0.0130	*0.0073*	0.0176	*0.0096*
PH94	55	18	0.0039	*0.0620*	0.0028	*0.0019*	0.0037	*0.0025*	0.0035	*0.0024*	0.0047	*0.0032*
PH95	55	24	0.0019	*0.0439*	0.0037	*0.0108*	0.0022	*0.0068*	0.0035	*0.0101*	0.0021	*0.0064*
			1.0000		1.0000		1.0000		1.0000		1.0000	

Standard deviation in italics

Hours per week												
Hospital			44.4	*5.8*	43.3	*1.5*	44.5	*1.7*	43.1	*1.4*	44.3	*1.7*
Private extra practice			3.6	*5.9*	4.9	*0.9*	4.6	*0.9*	5.6	*1.1*	5.2	*1.0*
Total			48.0	*8.4*	48.2	*2.0*	49.1	*2.2*	48.7	*2.1*	49.5	*2.2*
Hours per year												
Hospital			2130	*279*	2079	*70*	2136	*83*	2070	*68*	2127	*81*
Private extra practice			174	*283*	234	*43*	219	*41*	267	*52*	251	*49*
Total			2304	*403*	2312	*95*	2355	*103*	2337	*99*	2378	*107*

Elasticities	Total hours		Main job		Extra job	
Effect of an increase in hospital wages	0.1855*	*0.0565*	0.2735*	*0.0601*	-0.6019*	*0.1688*
Effect of an increase in private wages	0.1048*	*0.0265*	-0.0434*	*0.0117*	1.4141*	*0.1752*
Effect of an increase in all wages	0.2821*	*0.0621*	0.2290*	*0.0558*	0.7402*	*0.2720*

N=1036

Table P7 A Prediction Experiment on 1997 Data
Observed Choices in 1997 and Predicted Choices in 1997.
Predictions based on 1995 Model Parameters and 1997 Wages.

			All Hospital Physicians				**Male Hospital Consultants**				**Hospital Physicians observed in 1995 & 1997**			
			N=1553				**N=790**				**N=1036**			
	Main Hours	Extra Hours	Observed 1997		Predicted with 1997 wages		Observed 1997		Predicted with 1997 wages		Observed 1997		Predicted with 1997 wages	
PH11	18	0	0.0064	*0.0800*	0.0025	*0.0022*	0.0025	*0.0503*	0.0009	*0.0004*	0.0029	*0.0538*	0.0025	*0.0022*
PH12	18	6	0.0013	*0.0359*	0.0024	*0.0015*	0.0000	*0.0000*	0.0012	*0.0004*	0.0000	*0.0000*	0.0024	*0.0015*
PH13	18	12	0.0019	*0.0439*	0.0020	*0.0009*	0.0025	*0.0503*	0.0013	*0.0004*	0.0019	*0.0439*	0.0020	*0.0009*
PH14	18	18	0.0013	*0.0359*	0.0016	*0.0005*	0.0013	*0.0356*	0.0013	*0.0005*	0.0010	*0.0311*	0.0016	*0.0005*
PH15	18	24	0.0032	*0.0567*	0.0011	*0.0004*	0.0051	*0.0710*	0.0012	*0.0005*	0.0010	*0.0311*	0.0011	*0.0004*
PH21	22	0	0.0058	*0.0759*	0.0020	*0.0015*	0.0038	*0.0615*	0.0008	*0.0003*	0.0048	*0.0693*	0.0020	*0.0015*
PH22	22	6	0.0019	*0.0439*	0.0018	*0.0010*	0.0025	*0.0503*	0.0010	*0.0003*	0.0010	*0.0311*	0.0018	*0.0010*
PH23	22	12	0.0013	*0.0359*	0.0014	*0.0005*	0.0000	*0.0000*	0.0010	*0.0003*	0.0010	*0.0311*	0.0014	*0.0005*
PH24	22	18	0.0000	*0.0000*	0.0010	*0.0002*	0.0000	*0.0000*	0.0009	*0.0003*	0.0000	*0.0000*	0.0010	*0.0002*
PH25	22	24	0.0019	*0.0439*	0.0007	*0.0002*	0.0025	*0.0503*	0.0007	*0.0003*	0.0000	*0.0000*	0.0007	*0.0002*
PH31	28	0	0.0097	*0.0978*	0.0014	*0.0008*	0.0013	*0.0356*	0.0007	*0.0002*	0.0077	*0.0876*	0.0014	*0.0008*
PH32	28	6	0.0019	*0.0439*	0.0011	*0.0004*	0.0000	*0.0000*	0.0007	*0.0002*	0.0019	*0.0439*	0.0011	*0.0004*
PH33	28	12	0.0026	*0.0507*	0.0008	*0.0001*	0.0000	*0.0000*	0.0006	*0.0001*	0.0010	*0.0311*	0.0008	*0.0001*
PH34	28	18	0.0039	*0.0621*	0.0005	*0.0001*	0.0038	*0.0615*	0.0005	*0.0001*	0.0019	*0.0439*	0.0005	*0.0001*
PH35	28	24	0.0019	*0.0439*	0.0003	*0.0001*	0.0025	*0.0503*	0.0003	*0.0001*	0.0000	*0.0000*	0.0003	*0.0001*
PH41	38	0	0.1120	*0.3155*	0.0967	*0.0392*	0.0506	*0.2194*	0.0633	*0.0140*	0.0956	*0.2941*	0.0967	*0.0392*
PH42	38	6	0.0212	*0.1443*	0.0663	*0.0115*	0.0127	*0.1119*	0.0548	*0.0074*	0.0154	*0.1234*	0.0663	*0.0115*
PH43	38	12	0.0058	*0.0759*	0.0412	*0.0056*	0.0025	*0.0503*	0.0412	*0.0057*	0.0039	*0.0620*	0.0412	*0.0056*
PH44	38	18	0.0019	*0.0439*	0.0228	*0.0075*	0.0000	*0.0000*	0.0263	*0.0060*	0.0000	*0.0000*	0.0228	*0.0075*
PH45	38	24	0.0026	*0.0507*	0.0110	*0.0058*	0.0013	*0.0356*	0.0139	*0.0048*	0.0019	*0.0439*	0.0110	*0.0058*
PH51	37.5	0	0.0824	*0.2751*	0.0786	*0.0275*	0.0633	*0.2436*	0.0535	*0.0107*	0.0936	*0.2915*	0.0786	*0.0275*
PH52	37.5	6	0.0373	*0.1897*	0.0519	*0.0064*	0.0266	*0.1610*	0.0443	*0.0049*	0.0405	*0.1973*	0.0519	*0.0064*
PH53	37.5	12	0.0097	*0.0978*	0.0310	*0.0051*	0.0063	*0.0794*	0.0315	*0.0041*	0.0135	*0.1155*	0.0310	*0.0051*
PH54	37.5	18	0.0052	*0.0716*	0.0164	*0.0060*	0.0025	*0.0503*	0.0189	*0.0044*	0.0048	*0.0693*	0.0164	*0.0060*
PH55	37.5	24	0.0058	*0.0759*	0.0074	*0.0042*	0.0013	*0.0356*	0.0094	*0.0033*	0.0058	*0.0759*	0.0074	*0.0042*
PH61	40.5	0	0.1017	*0.3024*	0.0776	*0.0204*	0.1316	*0.3383*	0.0593	*0.0099*	0.1245	*0.3303*	0.0776	*0.0204*
PH62	40.5	6	0.0258	*0.1585*	0.0482	*0.0028*	0.0367	*0.1882*	0.0453	*0.0032*	0.0319	*0.1757*	0.0482	*0.0028*
PH63	40.5	12	0.0071	*0.0839*	0.0268	*0.0059*	0.0101	*0.1002*	0.0295	*0.0035*	0.0097	*0.0978*	0.0268	*0.0059*
PH64	40.5	18	0.0026	*0.0507*	0.0130	*0.0056*	0.0025	*0.0503*	0.0160	*0.0038*	0.0029	*0.0538*	0.0130	*0.0056*
PH65	40.5	24	0.0045	*0.0670*	0.0054	*0.0033*	0.0051	*0.0710*	0.0070	*0.0026*	0.0068	*0.0820*	0.0054	*0.0033*
PH71	45.5	0	0.1410	*0.3482*	0.0637	*0.0081*	0.1291	*0.3355*	0.0581	*0.0071*	0.1448	*0.3521*	0.0637	*0.0081*
PH72	45.5	6	0.0528	*0.2237*	0.0356	*0.0050*	0.0392	*0.1943*	0.0384	*0.0009*	0.0483	*0.2144*	0.0356	*0.0050*
PH73	45.5	12	0.0116	*0.1071*	0.0175	*0.0060*	0.0190	*0.1366*	0.0213	*0.0029*	0.0125	*0.1114*	0.0175	*0.0060*
PH74	45.5	18	0.0077	*0.0876*	0.0073	*0.0039*	0.0114	*0.1062*	0.0096	*0.0026*	0.0068	*0.0820*	0.0073	*0.0039*
PH75	45.5	24	0.0032	*0.0567*	0.0025	*0.0018*	0.0038	*0.0615*	0.0034	*0.0014*	0.0039	*0.0620*	0.0025	*0.0018*
PH81	50	0	0.1436	*0.3508*	0.0722	*0.0103*	0.1696	*0.3755*	0.0819	*0.0108*	0.1458	*0.3530*	0.0722	*0.0103*
PH82	50	6	0.0534	*0.2250*	0.0362	*0.0103*	0.0759	*0.2651*	0.0468	*0.0050*	0.0550	*0.2281*	0.0362	*0.0103*
PH83	50	12	0.0219	*0.1464*	0.0156	*0.0073*	0.0367	*0.1882*	0.0220	*0.0043*	0.0203	*0.1410*	0.0156	*0.0073*
PH84	50	18	0.0116	*0.1071*	0.0056	*0.0036*	0.0190	*0.1366*	0.0082	*0.0026*	0.0097	*0.0978*	0.0056	*0.0036*
PH85	50	24	0.0071	*0.0839*	0.0016	*0.0013*	0.0114	*0.1062*	0.0023	*0.0010*	0.0029	*0.0538*	0.0016	*0.0013*
PH91	55	0	0.0419	*0.2003*	0.0750	*0.0221*	0.0570	*0.2319*	0.1051	*0.0212*	0.0415	*0.1996*	0.0750	*0.0221*
PH92	55	6	0.0200	*0.1399*	0.0327	*0.0146*	0.0266	*0.1610*	0.0502	*0.0106*	0.0193	*0.1377*	0.0327	*0.0146*
PH93	55	12	0.0090	*0.0945*	0.0119	*0.0073*	0.0152	*0.1224*	0.0192	*0.0055*	0.0077	*0.0876*	0.0119	*0.0073*
PH94	55	18	0.0039	*0.0621*	0.0035	*0.0027*	0.0051	*0.0710*	0.0056	*0.0022*	0.0039	*0.0620*	0.0035	*0.0027*
PH95	55	24	0.0006	*0.0254*	0.0043	*0.0103*	0.0000	*0.0000*	0.0006	*0.0015*	0.0010	*0.0311*	0.0043	*0.0103*
			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	
Standard deviations in italics														
Hours per week														
Hospital			43.4	*7.1*	42.7	*1.2*	45.0	*6.8*	44.1	*0.8*	43.7	*6.5*	42.7	*1.2*
Private extra practice			3.6	*5.9*	5.5	*1.3*	4.0	*6.2*	6.2	*0.9*	3.2	*5.5*	5.5	*1.3*
Total			47.0	*9.1*	48.2	*2.3*	49.0	*9.0*	50.3	*1.2*	46.9	*8.6*	48.2	*2.3*
Hours per year														
Hospital			2082	*342*	2049	*59*	2160	*326*	2116	*40*	2096	*310*	2049	*59*
Private extra practice			171	*285*	266	*60*	194	*299*	298	*44*	156	*266*	266	*60*
Total			2254	*435*	2315	*110*	2354	*432*	2414	*55*	2252	*411*	2315	*110*

Table P9 All physicians in 1997. Observed and Predicted Choices.

	Main Hours	Extra Hours	Observed share		Predicted choice		Predictions with 10% increase in *hospital* wages		Predictions with 10% increase in *primary care* wages		Predictions with 10% increase in *private* wages		Predictions with 10% increase in *other* wages		Predictions with 10% increase in *all* wages	
PH11	18	0	0.0091	0.0951	0.0088	*0.0077*	0.0082	*0.0078*	0.0087	*0.0077*	0.0077	*0.0070*	0.0084	*0.0074*	0.0069	*0.0066*
PH12	18	6	0.0106	0.1024	0.0132	*0.0088*	0.0121	*0.0090*	0.0131	*0.0087*	0.0122	*0.0082*	0.0130	*0.0086*	0.0107	*0.0080*
PH13	18	12	0.0043	0.0655	0.0183	*0.0097*	0.0164	*0.0102*	0.0180	*0.0095*	0.0178	*0.0095*	0.0183	*0.0095*	0.0155	*0.0092*
PH14	18	18	0.0048	0.0693	0.0232	*0.0107*	0.0204	*0.0115*	0.0227	*0.0103*	0.0239	*0.0117*	0.0235	*0.0102*	0.0206	*0.0107*
PH15	18	24	0.0047	0.0686	0.0263	*0.0125*	0.0228	*0.0131*	0.0258	*0.0118*	0.0290	*0.0155*	0.0269	*0.0114*	0.0246	*0.0131*
PH21	22	0	0.0057	0.0751	0.0118	*0.0090*	0.0111	*0.0092*	0.0117	*0.0090*	0.0105	*0.0083*	0.0113	*0.0085*	0.0095	*0.0080*
PH22	22	6	0.0079	0.0884	0.0165	*0.0095*	0.0153	*0.0100*	0.0164	*0.0094*	0.0154	*0.0088*	0.0163	*0.0093*	0.0138	*0.0089*
PH23	22	12	0.0054	0.0730	0.0212	*0.0095*	0.0193	*0.0104*	0.0210	*0.0093*	0.0207	*0.0092*	0.0213	*0.0094*	0.0185	*0.0094*
PH24	22	18	0.0063	0.0791	0.0247	*0.0097*	0.0221	*0.0108*	0.0244	*0.0093*	0.0256	*0.0104*	0.0251	*0.0093*	0.0226	*0.0101*
PH25	22	24	0.0068	0.0823	0.0255	*0.0106*	0.0224	*0.0114*	0.0251	*0.0101*	0.0281	*0.0131*	0.0262	*0.0099*	0.0245	*0.0115*
PH31	28	0	0.0826	0.2753	0.0170	*0.0110*	0.0162	*0.0114*	0.0169	*0.0109*	0.0156	*0.0106*	0.0163	*0.0103*	0.0143	*0.0102*
PH32	28	6	0.0569	0.2316	0.0213	*0.0103*	0.0200	*0.0111*	0.0212	*0.0102*	0.0202	*0.0097*	0.0210	*0.0100*	0.0187	*0.0101*
PH33	28	12	0.0330	0.1785	0.0242	*0.0088*	0.0224	*0.0101*	0.0241	*0.0087*	0.0240	*0.0082*	0.0244	*0.0090*	0.0222	*0.0093*
PH34	28	18	0.0276	0.1638	0.0245	*0.0078*	0.0224	*0.0092*	0.0243	*0.0076*	0.0255	*0.0078*	0.0251	*0.0079*	0.0235	*0.0086*
PH35	28	24	0.0324	0.1772	0.0213	*0.0077*	0.0191	*0.0084*	0.0211	*0.0074*	0.0234	*0.0091*	0.0220	*0.0075*	0.0214	*0.0086*
PH41	38	0	0.0055	0.0737	0.0199	*0.0118*	0.0193	*0.0122*	0.0199	*0.0118*	0.0190	*0.0123*	0.0191	*0.0108*	0.0178	*0.0117*
PH42	38	6	0.0092	0.0957	0.0214	*0.0097*	0.0205	*0.0104*	0.0214	*0.0097*	0.0209	*0.0098*	0.0212	*0.0094*	0.0200	*0.0102*
PH43	38	12	0.0057	0.0751	0.0203	*0.0072*	0.0193	*0.0081*	0.0203	*0.0072*	0.0206	*0.0067*	0.0206	*0.0075*	0.0198	*0.0080*
PH44	38	18	0.0055	0.0737	0.0165	*0.0053*	0.0154	*0.0060*	0.0164	*0.0052*	0.0174	*0.0049*	0.0170	*0.0058*	0.0167	*0.0060*
PH45	38	24	0.0035	0.0588	0.0108	*0.0041*	0.0100	*0.0043*	0.0108	*0.0040*	0.0120	*0.0044*	0.0113	*0.0044*	0.0115	*0.0047*
PH51	37.5	0	0.0020	0.0446	0.0210	*0.0125*	0.0205	*0.0129*	0.0210	*0.0125*	0.0203	*0.0134*	0.0202	*0.0114*	0.0192	*0.0126*
PH52	37.5	6	0.0038	0.0614	0.0216	*0.0100*	0.0208	*0.0107*	0.0216	*0.0100*	0.0213	*0.0104*	0.0214	*0.0097*	0.0205	*0.0107*
PH53	37.5	12	0.0018	0.0422	0.0194	*0.0072*	0.0185	*0.0080*	0.0194	*0.0072*	0.0197	*0.0069*	0.0197	*0.0075*	0.0192	*0.0081*
PH54	37.5	18	0.0009	0.0307	0.0146	*0.0050*	0.0138	*0.0056*	0.0146	*0.0050*	0.0155	*0.0046*	0.0151	*0.0055*	0.0151	*0.0058*
PH55	37.5	24	0.0012	0.0340	0.0088	*0.0035*	0.0082	*0.0037*	0.0088	*0.0035*	0.0098	*0.0037*	0.0092	*0.0038*	0.0095	*0.0041*
PH61	40.5	0	0.0324	0.1772	0.0257	*0.0117*	0.0251	*0.0122*	0.0258	*0.0117*	0.0250	*0.0134*	0.0249	*0.0105*	0.0239	*0.0124*
PH62	40.5	6	0.0489	0.2157	0.0248	*0.0081*	0.0239	*0.0089*	0.0248	*0.0081*	0.0247	*0.0090*	0.0246	*0.0078*	0.0239	*0.0093*
PH63	40.5	12	0.0252	0.1567	0.0205	*0.0051*	0.0195	*0.0058*	0.0205	*0.0051*	0.0211	*0.0050*	0.0207	*0.0053*	0.0206	*0.0061*
PH64	40.5	18	0.0106	0.1024	0.0139	*0.0036*	0.0131	*0.0040*	0.0139	*0.0036*	0.0149	*0.0036*	0.0143	*0.0040*	0.0145	*0.0042*
PH65	40.5	24	0.0139	0.1169	0.0072	*0.0027*	0.0068	*0.0027*	0.0072	*0.0027*	0.0081	*0.0031*	0.0076	*0.0029*	0.0079	*0.0031*
PH71	45.5	0	0.0261	0.1595	0.0345	*0.0093*	0.0347	*0.0096*	0.0348	*0.0094*	0.0338	*0.0121*	0.0337	*0.0081*	0.0334	*0.0106*
PH72	45.5	6	0.0381	0.1914	0.0293	*0.0052*	0.0291	*0.0054*	0.0295	*0.0052*	0.0295	*0.0065*	0.0292	*0.0047*	0.0295	*0.0061*
PH73	45.5	12	0.0187	0.1354	0.0205	*0.0040*	0.0202	*0.0039*	0.0207	*0.0040*	0.0214	*0.0042*	0.0208	*0.0039*	0.0215	*0.0041*
PH74	45.5	18	0.0079	0.0884	0.0112	*0.0035*	0.0109	*0.0033*	0.0113	*0.0036*	0.0122	*0.0039*	0.0115	*0.0036*	0.0123	*0.0037*
PH75	45.5	24	0.0121	0.1092	0.0044	*0.0021*	0.0042	*0.0020*	0.0044	*0.0022*	0.0050	*0.0025*	0.0046	*0.0021*	0.0050	*0.0024*
PH81	50	0	0.1285	0.3346	0.0573	*0.0205*	0.0613	*0.0234*	0.0578	*0.0202*	0.0546	*0.0175*	0.0564	*0.0208*	0.0584	*0.0198*
PH82	50	6	0.2146	0.4106	0.0424	*0.0166*	0.0448	*0.0182*	0.0428	*0.0164*	0.0421	*0.0151*	0.0423	*0.0166*	0.0451	*0.0164*
PH83	50	12	0.0436	0.2041	0.0248	*0.0118*	0.0259	*0.0125*	0.0250	*0.0118*	0.0258	*0.0119*	0.0250	*0.0117*	0.0275	*0.0124*
PH84	50	18	0.0172	0.1301	0.0107	*0.0065*	0.0110	*0.0066*	0.0108	*0.0065*	0.0117	*0.0071*	0.0108	*0.0064*	0.0124	*0.0073*
PH85	50	24	0.0132	0.1142	0.0031	*0.0024*	0.0031	*0.0024*	0.0031	*0.0024*	0.0035	*0.0028*	0.0031	*0.0024*	0.0037	*0.0028*
PH91	55	0	0.0048	0.0693	0.0998	*0.0679*	0.1177	*0.0833*	0.1008	*0.0673*	0.0928	*0.0586*	0.0991	*0.0684*	0.1101	*0.0734*
PH92	55	6	0.0025	0.0501	0.0605	*0.0440*	0.0702	*0.0525*	0.0610	*0.0437*	0.0592	*0.0411*	0.0604	*0.0440*	0.0696	*0.0496*
PH93	55	12	0.0018	0.0422	0.0273	*0.0222*	0.0313	*0.0259*	0.0275	*0.0221*	0.0282	*0.0225*	0.0274	*0.0221*	0.0328	*0.0263*
PH94	55	18	0.0002	0.0145	0.0084	*0.0079*	0.0095	*0.0090*	0.0084	*0.0079*	0.0091	*0.0086*	0.0084	*0.0079*	0.0105	*0.0098*
PH95	55	24	0.0008	0.0290	0.0014	*0.0060*	0.0013	*0.0059*	0.0014	*0.0060*	0.0011	*0.0044*	0.0014	*0.0056*	0.0009	*0.0039*
			1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000	
Standard deviation in italics																
Hours per week																
Main			40.7	*10.5*	39.5	*4.7*	40.5	*5.4*	39.6	*4.6*	39.3	*4.3*	39.4	*4.7*	40.5	*4.9*
Extra			7.6	*7.3*	9.1	*1.4*	8.7	*1.6*	9.1	*1.4*	9.5	*1.6*	9.3	*1.4*	9.2	*1.5*
Total			48.3	*11.7*	48.6	*4.1*	49.2	*4.5*	48.7	*4.0*	48.9	*3.9*	48.7	*4.0*	49.7	*4.2*
Hours per year																
Main			1953	*503*	1895	*225*	1946	*260*	1900	*222*	1888	*208*	1893	*224*	1945	*235*
Extra			365	*351*	439	*68*	417	*77*	436	*66*	458	*77*	446	*67*	440	*74*
Total			2319	*561*	2333	*195*	2363	*215*	2336	*194*	2347	*187*	2338	*191*	2385	*200*

Elasticities	Total hours		Main job		Extra job	
Wage increase in						
Hospitals	0.1236	*0.1134*	0.2527	*0.2299*	-0.5128	*0.4703*
Primary care	0.0141	*0.0518*	0.0307	*0.1131*	-0.0412	*0.1558*
Private practice	0.0603	*0.0689*	-0.0221	*0.2243*	0.4527	*0.6261*
Other jobs	0.0230	*0.0346*	-0.0097	*0.0884*	0.1677	*0.3073*
All sectors	0.2221*	*0.0400*	0.2636*	*0.0614*	0.0127	*0.1573*