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INEQUITY IN THE USE OF PHYSICIAN SERVICES IN NORWAY. CHANGING PATTERNS OVER TIME?

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Inequity in the use of physician services in Norway.
Changing patterns over time? *

by

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Abstract

We analyze and compare inequity in use of physician visits (GP and specialists) in Norway based on data from the Surveys of Living Conditions for the years 2000, 2002 and 2005. Within this period the Norwegian public health care system underwent two major reforms, both aimed at ensuring equitable access to health care services for the entire population. A list patient system was introduced in the primary health care sector in 2001, and in 2002 the ownership of hospitals was moved from the regional to the state level. At both care levels a real increase in public expenditures followed in the wake of the reforms. We apply the indirect standardization approach and estimate the relationship between health care use, need and other control variables by linear and nonlinear regression. We measure horizontal inequity in physician visits by concentration indices and investigate changes in inequity over time when decomposing the concentration indices into the contribution of its determinants. For specialist services we find pro-rich inequity in the probability of seeing an outpatient specialist in all three years. Estimated concentration indices are reduced in magnitude over time and no longer statistically significant in 2005. Inclusion of more information about need for medical care in 2002 and 2005, results in larger and statistical significant concentration indices. In sum, in a period with important changes in the health care system aimed at obtaining equity, inequity in medical specialist utilization has been reduced but not removed in Norway.

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1. Introduction

Health care systems in most countries are continuously under change, influenced both by the dynamics of private markets for health insurance and health care provision, and by governments imposing various actions in order to improve efficiency and comply with standards of equity in the provision of care. Monitoring the association between socioeconomic status and health care use is therefore of great health policy interest, and particularly so when changing markets or health policy reforms potentially affect the utilization of health care services.

With improved access to relevant data, a growing number of empirical analyses, both comparative across countries (Van Doorslaer, Koolman and Puffer (2002), Van Doorslaer, Koolman and Jones (2004), Van Doorslaer et al (2004), Bago d'Uva, Jones and Van Doorslaer (2007), Bago d'Uva and Jones (2009), Lu et al (2007)), and a range of single country studies (Sutton (2002), Atella et al (2004), Iversen and Kopperud (2005), van Ourti (2004), Bago d'Uva (2005), Bago d'Uva and Jones (2009)), show that countries pursuing equitable distribution of health care utilisation tend to succeed quite well at the primary health care level. When it comes to the utilisation of specialist medical care the picture is different. Inequity in favour of the well-off tends to be more of a rule rather than the exception. Even in countries with universal coverage of the population through public insurance schemes, ensuring access to high quality services at low or no financial cost, richer and higher educated individuals tend to use more specialist care, conditional on need and non-need factors (Iversen and Kopperud, 2005), (Bago d'Uva and Jones, 2009).

Having established that the utilisation of medical services in many populations is influenced by individual socioeconomic position, one further challenge is to improve our understanding of the mechanisms, policies and institutions that potentially contribute to a more equitable distribution of utilisation. Cross-country comparisons show that inequities are larger in economies were private insurance cover or private practice options open up for quicker or preferential access (Van Doorslaer et al, 2004), (Bago d'Uva and Jones, 2009). Yet, monitoring progress over time and evaluating programmes and reforms with regard to their effects on the distribution of utilisation is still a remaining task within this field of research. The present analysis contributes in this direction by taking advantage of comparable cross-sectional survey data on doctor utilisation in Norway before and after important health care reforms were imposed to facilitate equitable utilisation.

We analyse inequity in the use of GP and specialist care, using three years of cross-sectional data from the Norwegian Survey of Living Conditions (SLC). Our aim is i) to examine changes in patters of inequity over time by comparing estimates of equity indices across years, and ii) to

provide a more detailed analysis of income-related inequity in doctor utilisation when exploiting a broader set of need variables in the regression of health care use. With comparable data for the years 2000, 2002 and 2005 we can monitor the development of need standardised inequalities in health care services during a period when two major reforms were implemented in the health care sector to improve accessibility to services. In the primary health care sector a list patient system was established for the entire population in June 2001 in order to improve GP accessibility, strengthen the stability of the patient-doctor relationship and facilitate equity in the use of health care services. In the sector for specialised medical care a major reform of ownership and organisation of hospitals was implemented in January 2002. This too, to facilitate cost- and allocatively efficient health care. In both sectors, public expenditures increased considerably in the years after the reforms.

We do recognize that our analysis not can be seen as an impact evaluation of the effect on equity of any of the two reforms. Both the close timing of the implementation of the reforms and the fact that a market for private health insurance was established and rapidly growing during the period of our study, prevent isolation of the impact each of the institutional chances might have had. Nevertheless, from a health policy perspective it is of interest to establish whether equity actually has improved over the years before and after these reforms were implemented.

In what follows we first describe the Norwegian system for provision of physician services. Section 3 presents the method and section 4 the data underlying our analysis. The analysis and the results are presented and discussed in section 5 and 6, while section 7 concludes the paper.

2. Provision of physician services in Norway

The Norwegian health care system aims to serve the population with high quality care upon need, and independently of whether they live in urban areas or in the more remote and thinly settled parts of the country.[1] The system is characterized by tax-financed public provision and universal coverage. The provision of health services is since 2002 divided between the central government and the local municipalities. The central government, represented by the Ministry of Health, is in charge of the overall regulation, administration, and supervision of health care activities. As owner of the vast majority of central and regional hospitals, the central government is also responsible for the provision of hospital services as well as for the delivery of specialized medical care. Primary health care is the responsibility of the municipalities.

[1] A more detailed description of the organization and performance of the Norwegian health care sector at this time can be found in OECD Economic Surveys: Norway, OECD 2005.

Primary care

Most general practitioners (GPs) are self–employed with contracts administrated by the municipalities and remunerated on a mixed fee-for-service – capitation basis. The fees are partly paid by patients themselves (co-payment), and partly by the National Insurance Scheme. Before the Regular General Practitioner (RGP) Scheme was introduced in June 2001, GPs received a practice allowance from the municipality, the size depending on the number of auxiliaries. Some GPs, in particular in smaller municipalities, were on a fixed salary. By the end of the 1990s many municipalities, in particular in rural and remote regions, experienced difficulties attracting new GPs for vacant positions. Temporary contracts, and a general shortage of GPs, resulted in many places in frequent shifts of GPs and long waiting times for regular consultations.

The RGP Scheme was introduced in order to attract more GPs and to facilitate stability in the patient-doctor relationship. With the list patient system inhabitants in the municipality were assigned to a GP who then would be responsible for the provision of primary health care services to those assigned to his or her list. In addition to contract the patient-doctor relationship the practice allowances were replaced by a capitation component depending on list size. After the reform approximately 30% of the income earned by GPs is expected to come from capitation and the rest from the fee-for-service. The fee-for-service component used to represent a larger share of the GP's total income before the reform. Both prior to, and after the reform, the GPs have served as gatekeepers for medical treatment by a specialist and for elective hospital treatment. Consultation with private GPs operating outside the list patient system has also been possible both before and after the reform. GPs outside the list system are easier to access in rural areas, and must be paid fully by the patients themselves.

Nearly all GPs signed up for the RGP scheme which also attracted new GP entrants. On average, the number of physician-labour years per thousand inhabitants in primary care increased from 1.06 in 2000 to 1.15 in 2005.[2] The increase was larger in large municipalities and in municipalities with increasing populations. In 2005, 98.5% of the population were signed up on a list with a GP. Of these, 1.3 percent was on a vacant list. Still, the proportion of vacant lists was particularly high in thinly settled parts of the country.[3] Some of the larger municipalities also have GPs in private practices outside the patient list system. In some of the small and thinly settled municipalities GPs remained on salary also within the RGP system.

[2] Norwegian Social Science Data Services, Regional Database.
[3] In the counties of Finnmark, Nord-Trøndelag and Sogn-Fjordane, Styringsdata - The National Insurance Agency.

With the RGP scheme increased capacity and formal requirements about accessibility lead to improved access and increased stability in the doctor-patient relationship.[4] Evaluation based on a trial conducted prior to the reform suggested that patient shortage could generate physician induced demand, (Iversen, 2004). Later analysis of post reform data does not reveal such mechanisms (Grytten and Sörensen, 2007). Still, GPs report experience that with the RGP scheme their role as gatekeepers has weakened, (Carlsen and Nordheim, 2003). Heavier influence from patients on physician decisions may have implications for equity in the utilisation of services. Present analyses of equity in the use of physician services in Norway are using data from year 2000 (Iversen and Kopperud, 2005, and Van Doorslaer et al, 2004). Both report no evidence of inequity in utilisation of primary care services and some indication of inequity in favour of the well off for utilisation of specialised outpatient medical care.

Specialized medical care

Before 2002, the public hospitals were owned by the 19 regional counties. When the state took over ownership of public hospitals, five Regional Health Enterprises (RHE) were established, each reporting to the Ministry of health and responsible for delivering health services in their regions.[5] Specialist health care services are provided by the public hospitals, in-patient or out-patient, and by private, self-employed medical specialists or clinics serving the regional RHEs (or the county before 2002) based on contracted agreements about provision and funding of services. Private providers are paid on a fee-for-service basis. Medical specialists employed by public hospitals are salaried. They are also allowed to work extra hours in private practices outside the hospital. For the patients, the level of copayment is the same, regardless of whether treatment is received from a public or private provider as long as the private provider has a contract with an RHE.

The RHEs own the local "health trusts" and are responsible for monitoring their costs and quality of services. The Government decided to keep the main principles of the reimbursement system, with an increasing part of the block grants from the government being activity-based, and with the additional reimbursements from the NIA and the educational authority as before. The state is not obliged to balance the RHE-budgets ex post, but the Minister of Heath stand surety for the hospitals in the event of bankruptcy.

[4] Evalation of the RGP scheme. English summary. The Norwegian Research Council, 2005.
[5] Hagen and Kaarboe (2006) presents a detailed description of this reform.

In the wake of the 2002-reform most health trusts centralised administrative functions and many specialized in specific treatments, though with some scope of competition as health trust can compete with each other for patients which in principle are free in their choice of provider for elective treatment. Kjerstad (2003) shows that activity-based funding has led to increased activity both in terms of number of patients treated and production of Diagnosis Related Group (DRG) points, though DEA-analysis by Biorn et al (2003) reveal that this has not been cost efficient. Hagen and Kaarböe (2006) report that that the waiting lists for specialised care (inpatient and outpatient) were shortened considerably and waiting times reduced by 20% during the first two years after the reform in 2002. There are however regional variation in activity as well as expenditures. On average, annual growth in expenditures has been higher in the middle and the northern part of Norway, while at the same time annual increase in activity was lowest in the north (Beregningsutvalget, 2007). Summing up, Magnussen et al (2007) conclude that total costs has continued to increase at least at the same rate as before the 2002-recentralisation, that efficiency tend to have improved, while impacts on equity (inpatient services) are inconclusive.

As pointed out by van Doorslaer et al (2004), private health insurance may be an important contributor to inequities in health care utilisation. They find pro-rich contribution of private health insurance for specialist health care utilisation in France, Ireland, and the Unites States. In year 2000, private health insurance was virtually non-existent in Norway. Since then, a growing number of private insurance companies are offering supplementary private health insurance that guarantees specialist examination and treatment shortly after referral from a GP. From 2002 to 2005 the number of insured persons increased from approximately 10 000 to 70 000 (corresponding to approximately 2.7% of the labour force). Privately insured still constitutes only a very small proportion of the population, but this development should nevertheless be kept in mind when interpreting the results from the present analysis. It should be noted that also private insurers require referral from a GP for compensation of specialized medical services, while the treatment is usually delivered by private providers.

3. Methods for measuring and explaining inequity

We are interested in how the use of health services, denoted *y*, are distributed according to income, when *y* represents six different outcomes: the number of visits and the dichotomous, for both GP, private specialist, and hospital outpatient visits, respectively. The methods used are thoroughly

described in O'Donnel et al, 2008. Income-related *inequality* in use can be expressed by means of a concentration index *CI*, which is a measure of relative inequality:

$$CI = \frac{2}{\mu}\mathrm{cov}(y_i, R_i) \qquad (1)$$

where μ is the mean of *y* and R_i is the fractional rank of the *i*th person in the income distribution. Alternatively, CI can be estimated by "the convenient regression" approach, which in addition to the index itself gives its standard error.

To study the development in *inequity*, we first compute a concentration index for horizontal inequity, *HI*. This facilitates a comparison of inequity across different types of health care services and over time. *HI* is estimated based on a regression of *y* on explanatory variables *x*. The dependent variables studied call for non-linear models, and we have used a probit model for the dichotomous outcome variable and negative binominal models for the number of visits, although linear models are also estimated for comparison. In the following, we will focus on how results from non-linear models are derived. Given a defined set of need-variables x^N and non-need variables x^{NN}, the need-expected level of care can be predicted for each individual, which for a non-linear model is contingent upon the level of x^{NN}. Note that the non-need variables include income. Setting non-need variables equal to their sample means, need-predicted health care use $\hat{y}_i^N$ is estimated as (Bago d'Uva et al, 2007):

$$\hat{y}_i^N = E[y \mid x_i^N, \bar{x}^{NN}] = G(\textstyle\sum_N \hat{\beta}_N x_i^N + \sum_{NN} \hat{\beta}_{NN} \bar{x}^{NN}) \qquad (2)$$

HI is a concentration index for estimated individual need-standardized use y_i^{IS}, and can be computed using the "convenient regression" approach. In the non-linear case, need-standardized health care use is found as

$$y_i^{IS} = y_i - \hat{y}_i^N + \frac{1}{n}\sum_{i=1}^{n} \hat{y}_i^N \qquad (3)$$

Computing an HI index requires making explicit value judgements about what should be defined as "need" and "non-need" variables. Our second approach to analysing inequity leaves this task to the

reader, as inequality is decomposed and attributed to the covariates *k* as proposed by Wagstaff et al (2003).[6] In order to apply the decomposition method to non-linear explanatory models, we use a linear approximation (van Doorslaer, Koolman and Jones, 2004):

$$CI = \sum_k (\beta_k^m \bar{x}_k / \mu) C_k + GC_\varepsilon / \mu \qquad (4)$$

where β_k^m are partial effects of each variable, treated as fixed parameters and evaluated at sample means, C_k is the concentration index for variable *k* and GC_ε is the generalized concentration index for the error term and can be computed as a residual. The product $(\beta_k^m \bar{x}_k / \mu) C_k$ is covariate *k*'s contribution to the total inequality observed.

Our main interest is in the *change* in inequity over time, which can be analysed using a Oaxaca decomposition (Wagstaff et al, 2003, Oaxaca, 1973):

$$\Delta CI = \sum_k \eta_{k,t} (C_{k,t} - C_{k,t-1}) + \sum_k C_{k,t-1} (\eta_{k,t} - \eta_{k,t-1}) + \Delta GC_\varepsilon / \mu_t \qquad (5)$$

or alternatively:

$$\Delta CI = \sum_k \eta_{k,t-1} (C_{k,t} - C_{k,t-1}) + \sum_k C_{k,t} (\eta_{k,t} - \eta_{k,t-1}) + \Delta GC_\varepsilon / \mu_t \qquad (6)$$

$\eta_{k,t}$ is defined as the elasticity of *y* with respect to x_k at time *t*. In a non-linear setting, $\eta_{k,t}$ is equal to $\beta_{k,t}^m \frac{\bar{x}_{k,t}}{\mu_t}$.

It should be stressed that the analysis is descriptive and does not claim to reveal causal relationships. The literature has pointed to potential problems of omitted variable bias (Gravelle et al, 2003) and reversed causality, e.g. between self-reported health at a certain point in time and use of services that refers to the preceding period (Iversen and Kopperud, 2005).

4. Data

The data we use are from two different sources of the Norwegian Surveys of Living Conditions (SLC). Every year since 1996, with the exception of 1999, Statistics Norway (SN) has conducted

[6]Note that the set of covariates included will not influence on the inequality index (CI), but potentially on the horizontal inequity index (HI).

theme-rotating cross-sectional surveys. The main sample for the SLC is 5000 persons aged 16 + drawn according to SN's general sampling plan (institutionalized are excluded). In some years additional, externally funded samples are drawn. Data regarding working and housing conditions, health, leisure, living conditions in general, and the theme rotating topics are collected through a combination of personal interviews and postal questionnaires. In addition, data is merged with administrative records with information regarding income, social insurance benefits, education and additional demographics. Parallel to this, SN has also conducted a panel survey covering the years from 1997 to 2002. For this survey a separate sample of 5000 representative individuals aged 16+ have been drawn, with additional 16 years old added every year. All individuals included in this sample are approached every year, regardless of former response behavior. Hence, all waves of the panel can be treated as separate cross sections of the population. Collection of data is conducted according to the same procedures as in the cross sections, and formulation and selection of questions in the panel and the cross sections are to some extent overlapping across years. Since the questions regarding doctor utilization, and also several other relevant questions, are identical in the 2000-wave of the panel and the cross sections in 2002 and 2005, these years' samples were the natural candidates for our analysis.

In all three years respondents were asked about GP and medical specialist visits. For GP visits the questions used are two-fold: i) Have you, during the past 12 months, due to your own health condition, consulted a GP? And, if so, ii) how many times during the last 12 months have you consulted a GP? For medical specialists there are separate questions for poly-clinical (out-patient) consultations in hospital and consultations with private specialist/clinic, and for both cases it is asked for any visit and in addition, in case of at least one visit, for the total number of visits. Based on this, our chosen outcome variables are 1) the dichotomous for having any visit or not, 2) the continuous for number of visits, to a GP, a private specialist, or a hospital outpatient clinic, respectively.

For the need-standardisation of utilisation we include, in addition to age-gender dummies, the standard measure of health based on responses to the question on self-assessed health status as either very good, good, neither good nor bad, poor or very poor. In 2002 and 2005 we have more data on health status. In these years we can also include two questions regarding presence of any chronic physical or mental health condition and the possible degree of limitation in daily activities due to this, as well as a variable counting the number of conditions reported when respondents are presented with a list of 50 different diseases and health problems. In all regressions we follow van Doorslaer et al (2004) and include variables not directly related to need or health status, but still

relevant for the utilisation of health care services. Educational level, marital status and country of origin are expected to affect efficiency of health production and the propensity to seek care, while activity status and region of residence are expected to affect the time price of health care use. In the Norwegian setting, region of residence is also expected to capture differences in access to medical services, as many medical specialist services are located in urban areas and in the capital and surrounding areas in particular.

The response rate in cross sections of the SLC's is stable at around 70 percent, with the main reason for non-response being refusal to participate. The response rate in each wave of the panel is slightly higher. In year 2000 it is 72 percent. We decided to focus on the age group 16-69, because there are few individuals aged 70-79 in the 2000 sample and we wanted to have the samples comparable with respect to age composition.[7] After excluding observations with missing data on one or more variables except educational level, we are left with 3371 observations in 2000, 2965 in 2002 and 3002 in 2005. As immigrants typically are overrepresented among respondents with missing data on education, we decided to keep these observations in the sample and control for this in the regression analyses by including a dummy for missing data on education. Means and standard deviations for dependent variables and covariates in all three samples/years are listed in Table 1. Comparison of background characteristic across years shows that the samples are similar with respect to age/gender distribution and with how they are distributed across region of living and activity status. For self assessed health we see that, in year 2005, 10 percent more than in year 2000 report having a very good health. The difference is smaller when we compare proportions with either good or very good health. We believe the differences in self assessed health reflect minor sample differences related to educational status and county of origin (slightly more persons are born outside Norway in the 2005-sample) rather than a general improvement in health over the sampling period. The higher income variance in 2005 and the slightly smaller proportion of persons living in thinly settled areas in 2005 may reflect overall trends. Income inequality has increased during the first years of the millennium, mainly because capital income has increased among those in most upper part of the income distribution. Over our observation period there is also a trend of centralisation with respect to place of living, in particular because young adults tend to settle in larger cities and regional centres.

For utilisation of physician services we see that the percent of the respondents having consulted a GP at least once during the last 12 months is somewhat lower (70 percent) in 2005 than in 2000 (72

[7] Kamrul et al (2009) have shown that if the population ages, this will in itself result in an increase in income-related inequality in health over time.

percent). The average number of GP consultations as well is lower in 2005. We see that considerably fewer (35-38 percent) consult an outpatient medical specialist. The numbers in 2005 are not very different from those in 2000 but the trend goes in the opposite direction as for GPs. Again, the differences we find in average use may to some extent be related to sample differences. Still, comparison over time in average use indicates that neither the reforms nor the considerable increases in expenditures at both the general and specialised care level have initiated significant shifts in the average levels of service utilisation.

5. Results

Our examination of inequity takes as its starting point the observed income-related inequality in health care utilization. As table 2 shows, the unstandardised concentration index has different signs for different health delivery outcomes. In all years, indices concerning GP care and hospital outpatient use are negative, reflecting that use is concentrated among the poorer income groups. In contrast, the distribution of private specialist services is pro-rich, except for number of visits in 2005.

The unstandardised indices reported in table 2 take no account of how need vary by income, while our interest is in income-related inequality that cannot be explained by differences in need. Thus, our main results are based on equations (2) and (3) and reported in table 3. The horizontal inequity indices for the main specification are shown in the three columns to the left of table 3, where "need" is defined by age, gender and self-assessed health, while the two last columns utilize more health information that is available for 2002 and 2005 only: the number of specific diagnosis reported, and the existence and severity of a chronic disease. A comparison of tables 2 and 3 shows that for all outcomes, the need-standardized inequality index is more positive, or less negative, than the unstandardized inequality index, reflecting that need is concentrated among low income groups. For the same reason, it is interesting to compare horizontal inequity when more health information is included, i.e. for the years 2002 and 2005. We see that for all health utilisation measures, additional data on health makes the indices turn more pro-rich (or less pro-poor).

For most health delivery outcomes, the estimated inequity index is not statistically significant. However, the probability of a private specialist visit is distributed in favour of the rich both in 2000 and 2002 in the main specification. The estimated inequity decreases considerably over the five year period. Still, we find that with additional information on need, inequity in the use of a private specialist persists in 2005, with an inequity index of 0,0472.

In the following, the analysis will focus on inequity in the probability of a private specialist visit, and this inequity will be presented through a decomposition analysis of inequality. First, we have examined which factors contribute the most to inequality by decomposing the CI indices year-by-year, confer equation (4). Overall, marginal effects and single variables' elasticities have the expected sign, see tables A2 and 4, respectively[8]. From table 4 we learn that the most important explanatory variables that contribute to pro-rich inequality are, in addition to income itself, dummies for having more than upper secondary education (*highedu*) and being a woman aged 45-59. Individuals in these groups have a high propensity of seeing a private specialist and are well represented among the better off, i.e. the concentration index of the variable is positive. On the other hand, individuals with poor or very poor health also have a high positive elasticity cet.par., but these individuals tend to belong to the poorer income groups. Therefore, they give a negative contribution to the concentration index. There are clear geographical differences in the use of private specialists. Living outside the capital area is associated with lower use (confer *r2-r6),* especially for those who live in scarcely populated areas (confer *dens1, dens2).* However, concentration indices are so small that the impact on income-related inequality in use is limited. Covariates reflecting activity status do not seem important in explaining inequality, due to low elasticities.

It should be noted that the residual, i.e. the part of the concentration index that cannot be traced back to covariates included in the decomposition analysis, is large in 2005, both in absolute terms and especially relative to the total CI index. The residual has a positive sign, which implies that a lot of the positive association between income rank and use of private specialists is unexplained in 2005.

To further analyse the development in inequality and inequity, we have done an Oaxaca-type decomposition of change in CI between 2000 and 2005, confer equations (5) and (6). Results are reported in table 6. The total change to be explained is a decrease in inequality of 0,0243. Some of the variables that contribute a lot to the year-by-year indices are also important for explaining change: by far the largest negative contribution to change comes from income, because the elasticity of use with respect to income has been drastically reduced (the marginal effect of log of income is reduced from 2,9 % to 0,7 %, confer table A2). Dummies for self-assessed health also contribute to the decrease in inequality, but through another channel: their concentration indices have become more negative, meaning that individuals with worse than "very good health" have

[8] Although the propensity to visit a private specialist is higher the poorer is self-reported health (see table A2), the elasticity decreases with ill-health. This is due to lower means: for instance in 2000, the proportion reporting "good health" is 50,8 % while the proportion reporting poor or very poor health is only 5,5 %.

fallen behind in the income distribution. For instance, the concentration index for reporting poor or very poor health (*sah45*) is -0,206 in 2000 versus -0,232 in 2005, and the decrease is even more drastic for the group reporting good health (*sah2*). The impact of a given change in the concentration index of a covariate depends on the level of the elasticity, which is large for all self-assessed health categories.

Living in a scarcely populated area has a smaller impact on pro-rich inequality in 2005 than in 2000. It is associated with low use of private specialist services and with low income, and thus contributes to pro-rich inequality in both years, but to a lesser degree in 2005. Whether this is due to a change in the concentration index or the elasticity, depends on the base year used in the decomposition. The other variables reflecting geography, the regional dummies, show small changes each, but in sum they contribute to the decrease in inequality. There are large changes in contributions from the dummy for being married or the combined dummy for being a student or doing military service. In both cases, changes are clearly due to changes in the elasticities, but the forces behind are different: being a student or doing military service has a higher marginal effect in 2005 as well as a higher proportion in the 2005 sample and these individuals are predominantly found within the low income groups, thus their positive change in elasticity contributes to a decrease in inequality. For married people, the marginal effect declined as well as their sample proportion, and since they are well represented among the high income groups, this caused income-related inequality to decrease.[9]

The decomposition analysis leaves the definition of "need" and inequity to the reader. Still, if we return to the our original definition which classifies all inequality that is not associated with health, age or gender as inequitable, cf. table 3, we learn from table 6 that the large contributions to the decrease in inequity comes from income and covariates reflecting geographical variation, as well as dummies for student/military and married.

6. Discussion

Our finding that there is inequity, not in the use of primary physicians but in the use of specialist services, is well in line with the results from the OECD research group (van Doorslaer et al., 2004). In this study, we have split specialist services into private specialist and hospital outpatient services, and arrive at the same results as Iversen and Kopperud (2005) did in their analysis using data from

[9] For both students/military service and married people, the marginal effects changed sign from 2000 to 2005, but in opposite directions, confer table A2. The change in sign is not important, though, it is the direction of the change that matters.

2000: it is within the use of private specialists that inequity is found. This analysis show that although it has decreased substantially, inequity still persists by 2005.

The two previous studies mentioned above utilized self-assessed health, age and gender as the only health need indicators. There has been a discussion in the literature regarding how well the self-assessed health measure capture "need", i.e. whether there is a reporting bias by socioeconomic status so that inequity is systematically underreported (van Doorslaer and Gerdtham (2003), Lindeboom and van Doorslaer (2004), Bago d'Uva et al (2008)). Our results show that including a richer set of health status information with more detailed and perhaps "objective" measures, like the number of health problems reported from a list of 50 specific diagnoses, makes the estimated inequality indices more pro-rich, which is consistent with such a reporting bias. We see it as an illustration of the argument that including more health information removes some omitted variable bias, i.e. unobserved heterogeneity that are correlated both with income and the use of health services (Gravelle et al (2006)) .This underlines the importance of collecting population survey information on various health need indicators over time to be able to monitor inequity.

Since our health delivery outcomes call for non-linear models, we have applied binary choice or count data models.[10] Therefore, the estimated indices will depend on at what values of the covariates the marginal effects are estimated, confer equation (2). To test the sensitivity of our results, we have estimated the HI indices at median values of the x's. For the probability of a private specialist visit, the indices are very similar whether estimated at mean or median values.[11]

The bulk of the decrease in inequality is due to changes in the elasticities of the covariates. Above all, the large decrease in the impact of income itself on the probability of using a private specialist is remarkable. It cannot be explained by any changes in the real value of co-payments. Income may be related to accessibility and use in a way that the included variables (for instance, age, education, geography) do not fully pick up. In general, we interpret the changed elasticities as an indication that access to seeing a private specialist is less rationed in 2005: groups that had low propensity of seeing a private specialist in 2000, like students or individuals living in scarcely populated areas, have improved their access, and individuals with primary education only are less disfavoured. This could be due to the reform in General Practise: having a regular GP may have made it easier to get a referral to a private specialist. An alternative explanation is that an increase

[10]Overall, the results are not sensitive to choice of estimator; ordinary least squares or non-linear, which is a general finding in the literature (O'Donnell et al, 2008).

[11] In general, indices at mean and median values are very similar for binary outcomes, whereas there are some discrepancies for count data models (available from the authors upon request).

in the number of private specialists, with and without contract with health trusts, made access easier for everyone, and that this had the largest impact on groups who traditionally have had low use of services. Although regions have become more equal with respect to the use of private specialists, the impact of regional variation is small due to income being relatively equally distributed across the country.[12] Thus, the potential for the hospital ownership reform to have had any impact on income-related inequality is limited. Furthermore, as stated earlier, there have not been large changes in the allocation of resources by region after the 2002 reform.

Given that removing inequity is a declared ambition in health policy, the development unravelled in this analysis should be welcomed. Specialist services are more equally distributed in 2005 than in 2000: the inequity in use of private specialists is less and while the mean probability of seeing a private specialist has gone done slightly, there is an increase in mean use of hospital outpatient visits, which is equitably distributed. There are some caveats, however. A part of the decrease in health inequality is associated with high use individuals falling behind in the income distribution. The labour market was most favourable during the years studied[13] and the ability to benefit from the opportunities offered are most likely increasing in health. This illustrates that social inequality in health care utilisation is one among many forms of inequality.

7. Conclusions

This paper adds to our knowledge about how inequity in use of doctor services has developed in recent years in Norway, and what the sources of the inequality are. Using conventional and well-established methods to measure inequality, the analysis shows that inequality that cannot be explained by differences in need, usually referred to as horizontal inequity, has decreased during the period 2000-2005, but there is still significant inequity in the distribution of private specialist visits: more well-off individuals have a higher propensity to be treated by a specialist than less well-off individuals of equal need. The most important factor behind the decrease in horizontal inequity from 2000 to 2005 is the decrease in the marginal effect of income. Still, income and having higher education are the two covariates that give the major contributions to the observed pro-rich inequality in 2005.

[12] Region 3 has had an unexpected development in the concentration index: from -0,048 in 2000 to 0,057 in 2005. However, the impact is small due to low elasticity.

[13] There was a dip in the boom in the fall of 2001, but that does not affect our study of change from the income years 2000 to 2005.

The decreasing importance of income for specialist utilization lends support to the hypothesis that introduction of the RGP scheme that made GPs responsible for an assigned group of people has contributed to the reduction in horizontal inequity in specialist utilization. With the list-patient system access to a GP was improved for a substantial part of the population, and thereby also access to referrals to see a medical specialist. Hence, the option to bypass waiting lists in the public sector by utilizing private alternatives may have become less important. The last may also be the case as waiting lists in general were reduced with the change in activity that took place within hospitals in the wake of the 2002-reform when the state took over the ownership of all public hospitals.

Since 2005 the market for private health insurance has increased considerably in Norway. The number persons with private insurance passed 170 000 (nearly 5% of the adult population) by the end of 2008 and continues to grow. Data on background characteristics of the insured are not available, but the fact that the majority are insured by their employer, indicates that the persons in the upper part of the income distribution are overrepresented among the insured. Private insurance ensure quick access to investigations and treatment by specialist. With a growing private market for insurance and provision of services on one hand, and increasing pressure on provision of public health care services as the population grow older, there should be every reason for health authorities to monitor the development in equity in years to come.

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Tables

1. Means of dependent variables and covariates

	2000(n=3371)		2002(n=2965)		2005(n=3002)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
dependent variables:						
probability of GP visit	0.723	0.448	0.728	0.445	0.697	0.460
number of GP visits	2.934	4.355	2.798	4.198	2.771	4.548
probability of private specialist visit	0.164	0.371	0.171	0.377	0.157	0.364
number of private spesialist visits	0.387	1.708	0.343	1.489	0.305	1.211
probability of hospital outpatient visit	0.184	0.387	0.217	0.412	0.208	0.406
number of hospital outpatient visits	0.425	1.815	0.478	1.483	0.448	1.369
explanatory variables:						
log of household taxed income[14]	12.199	0.537	12.302	0.524	12.347	0.654
sah very good	0.295	0.456	0.355	0.479	0.397	0.489
sah good	0.508	0.500	0.483	0.500	0.441	0.497
sah fair	0.142	0.350	0.113	0.317	0.108	0.310
sah poor	0.047	0.212	0.045	0.207	0.042	0.201
sah very poor	0.008	0.091	0.005	0.069	0.011	0.106
number of specific diagnosis			0.487	1.026	0.469	0.973
no chronic disease			0.642	0.479	0.659	0.474
chronic disease, no limitations			0.045	0.207	0.041	0.199
chronic disease, some limitations			0.231	0.422	0.212	0.409
chronic disease, severe limitations			0.082	0.274	0.088	0.283
male, age 16-29	0.133	0.339	0.123	0.328	0.130	0.337
male, age 30-44	0.161	0.368	0.164	0.370	0.161	0.368
male, age 45-59	0.137	0.344	0.162	0.368	0.149	0.356
male, age 60-69	0.055	0.229	0.062	0.241	0.067	0.250
female, age 16-29	0.125	0.331	0.124	0.330	0.124	0.330
female, age 30-44	0.175	0.380	0.160	0.367	0.157	0.364
female, age 45-59	0.152	0.360	0.140	0.347	0.142	0.349
female, age 60-69	0.061	0.240	0.066	0.248	0.069	0.254
highest education is primary	0.144	0.351	0.124	0.329	0.116	0.321
highest education is <3 years secondary	0.325	0.469	0.290	0.454	0.272	0.445
highest education is 3 years secondary	0.265	0.442	0.297	0.457	0.298	0.457
highest education is above secondary	0.265	0.442	0.274	0.446	0.270	0.444
missing data on education	0.005	0.069	0.015	0.121	0.044	0.204
region 1 (capital and surroundings))	0.219	0.414	0.210	0.407	0.221	0.415
region 2(eastern except capital area)	0.263	0.440	0.266	0.442	0.277	0.448
region 3 (south-west)	0.142	0.349	0.149	0.356	0.129	0.335
region 4 (west)	0.175	0.380	0.167	0.373	0.181	0.385
region 5 (middle)	0.097	0.296	0.103	0.304	0.089	0.285
region 6 (north)	0.104	0.305	0.106	0.307	0.103	0.304

[14] NOK 2005, OECD-scale equivalised

1. Means of dependent variables and covariates, cont.

	2000(n=3371)		2002(n=2965)		2005(n=3002)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
population>20000 individuals	0.432	0.495	0.432	0.495	0.457	0.498
population 2000-20000 individuals	0.255	0.436	0.254	0.435	0.253	0.435
population <2000 individuals	0.314	0.464	0.314	0.464	0.290	0.454
single	0.245	0.430	0.227	0.419	0.260	0.439
married	0.521	0.500	0.517	0.500	0.464	0.499
cohabitating	0.144	0.352	0.172	0.378	0.183	0.387
divorced	0.067	0.250	0.066	0.249	0.070	0.255
widow_er	0.023	0.148	0.017	0.130	0.023	0.149
working >=30 hours a week	0.606	0.489	0.602	0.490	0.567	0.496
disabled	0.070	0.256	0.085	0.279	0.088	0.283
student	0.064	0.244	0.064	0.246	0.088	0.284
doing military service	0.004	0.064	0.004	0.063	0.002	0.041
working parttime	0.153	0.360	0.149	0.356	0.145	0.352
inactive in labour market	0.103	0.304	0.096	0.294	0.110	0.312
born in Norway	0.943	0.232	0.935	0.246	0.916	0.278
born in Europe except Norway	0.033	0.178	0.036	0.187	0.048	0.214
born outside of Europe	0.024	0.154	0.029	0.167	0.036	0.186

2. Inequality in the use of doctor services – unstandardised concentration indices

Dependent variable	2000	2002	2005
probability of GP visit	-0.0044	**-0.0156**	-0.0057
	-0.70	*-2.36*	*-0.81*
number of GP visits	**-0.0600**	**-0.0471**	**-0.0578**
	-3.94	*-2.97*	*-3.11*
probability of private specialist visit	**0.0543**	0.0427	0.0300
	2.44	*1.85*	*1.22*
number of private specialist visits	0.0219	0.0289	-0.0038
	0.44	*0.75*	*-0.09*
probability of outpatient hospital visit	-0.0037	-0.0136	-0.0261
	-0.18	*-0.68*	*-1.29*
number of outpatient hospital visits	-0.0031	-0.0406	-0.0203
	-0.07	*-1.30*	*-0.65*

notes: t-values are given in italics below each index. Statistically significant indices at 5 % level are shown in bold.

3. Inequity in the use of doctor services - horisontal inequity indices

Dependent variable	2000 (I)	2002 (I)	2005 (I)	2002 (II)	2005 (II)
probability of GP visit	0.0091	-0.0031	0.0050	0.0013	0.0068
	1.49	*-0.49*	*0.74*	*0.20*	*1.03*
number of GP visits	-0.0109	0.0053	-0.0066	0.0207	0.0072
	-0.78	*0.37*	*-0.38*	*1.48*	*0.41*
probability of private specialist visit	**0.0726**	**0.0496**	0.0449	**0.0571**	**0.0472**
	3.31	*2.16*	*1.87*	*2.50*	*1.97*
number of private specialist visits	0.0612	0.0622	0.0311	0.0781	0.0338
	1.23	*1.59*	*0.72*	*1.94*	*0.77*
probability of outpatient hospital visit	0.0275	0.0143	-0.0043	0.0222	0.0036
	1.37	*0.74*	*-0.22*	*1.16*	*0.19*
number of outpatient hospital visits	0.0381	-0.0021	0.0244	0.0129	0.0415
	0.81	*-0.07*	*0.79*	*0.43*	*1.36*

Specification (I) uses self-assessed health as the only health need indicator, while (II) includes additional health information. t-values are given in italics below each index. Statistically significant indices at 5 % level are shown in bold.

4. Inequality decomposition for probability of private specialist visit 2000, 2002, and 2005

	Elasticities [a]			Concentration indices			Contributions [b]			Contributions, %		
	2000	2002	2005	2000	2002	2005	2000	2002	2005	2000	2002	2005
sah2	0.129	0.084	0.187	0.011	-0.011	-0.020	0.0015	-0.0009	-0.0037	3	-2	-12
sah3	0.091	0.084	0.128	-0.047	-0.112	-0.060	-0.0043	**-0.0094**	-0.0077	-8	-22	-26
sah45	0.084	0.053	0.087	-0.206	-0.271	-0.232	**-0.0174**	**-0.0144**	**-0.0201**	-32	-34	-67
m30_44	-0.017	-0.006	-0.006	0.028	0.041	0.024	-0.0005	-0.0003	-0.0001	-1	-1	0
m45_59	0.033	0.023	-0.006	0.243	0.171	0.201	0.0080	0.0039	-0.0012	15	9	-4
m60_69	0.041	0.015	0.014	0.010	0.107	0.138	0.0004	0.0016	0.0020	1	4	7
f29	0.067	0.003	0.012	-0.175	-0.238	-0.265	**-0.0117**	-0.0008	-0.0031	-22	-2	-10
f30_44	0.101	0.021	0.032	-0.054	-0.041	-0.043	**-0.0055**	-0.0009	-0.0014	-10	-2	-5
f45_59	0.085	0.114	0.093	0.198	0.148	0.182	**0.0168**	**0.0169**	**0.0169**	31	40	56
f60_69	0.026	0.048	0.043	-0.250	-0.058	0.013	-0.0064	-0.0028	0.0006	-12	-7	2
disabled	0.000	0.005	0.011	-0.197	-0.208	-0.158	0.0000	-0.0011	-0.0018	0	-3	-6
studmil	-0.005	0.023	0.021	-0.342	-0.407	-0.421	0.0018	-0.0095	-0.0087	3	-22	-29
parttime	0.023	0.056	-0.001	-0.148	-0.187	-0.152	-0.0034	**-0.0105**	0.0002	-6	-25	1
inactive	0.008	0.021	-0.005	-0.289	-0.214	-0.171	-0.0022	-0.0045	0.0009	-4	-11	3
second1	0.105	0.058	0.025	-0.076	-0.056	-0.075	-0.0080	-0.0033	-0.0019	-15	-8	-6
second2	0.110	0.087	0.059	0.006	-0.050	-0.022	0.0007	-0.0044	-0.0013	1	-10	-4
highedu	0.089	0.087	0.078	0.206	0.213	0.211	0.0183	0.0186	0.0165	34	44	55
edumiss	-0.002	-0.003	0.001	0.228	-0.324	-0.220	-0.0004	0.0010	-0.0002	-1	2	-1
r2	-0.042	-0.077	-0.025	-0.023	-0.001	-0.013	0.0010	0.0001	0.0003	2	0	1
r3	-0.031	-0.069	-0.017	-0.048	-0.021	0.057	0.0015	0.0014	-0.0009	3	3	-3
r4	-0.018	-0.063	-0.002	-0.041	-0.078	-0.048	0.0007	**0.0049**	0.0001	1	11	0
r5	-0.037	-0.058	-0.028	-0.081	-0.064	-0.088	0.0030	**0.0037**	0.0024	6	9	8
r6	-0.021	-0.067	-0.038	-0.073	-0.038	-0.075	0.0015	0.0025	0.0028	3	6	9
dens1	-0.041	-0.036	-0.022	0.036	0.022	0.045	**-0.0015**	-0.0008	-0.0010	-3	-2	-3
dens2	-0.104	-0.060	-0.050	-0.086	-0.075	-0.046	0.0089	0.0045	0.0023	16	11	8
married	0.045	0.125	-0.034	0.095	0.116	0.158	0.0042	0.0145	-0.0053	8	34	-18
cohab	-0.003	0.017	-0.005	0.095	-0.001	0.041	-0.0003	0.0000	-0.0002	-1	0	-1
divorced	0.018	0.001	-0.008	-0.148	-0.192	-0.203	-0.0027	-0.0002	0.0015	-5	0	5
widow_er	0.006	-0.008	-0.007	-0.334	-0.085	-0.191	-0.0021	0.0007	0.0014	-4	2	5
b_europe	0.000	0.006	-0.006	-0.015	0.004	-0.058	0.0000	0.0000	0.0003	0	0	1
b_other	-0.007	0.006	0.006	-0.306	-0.397	-0.239	0.0022	-0.0024	-0.0015	4	-6	-5
x	2.135	1.129	0.562	0.020	0.020	0.023	0.0427	0.0226	0.0130	79	53	43
residual							0.0074	0.0117	0.0288	14	27	96
CI, unstandardised							0.0543	0.0427	0.0300			

a) Elasticities are based on marginal effects from probit estimations, confer table A2.

b) Contributions statistically significant at 5%-level in bold. Bootstrapped standard errors.

5. Inequality in probability of private specialist visits - overview of decomposition after probit, grouped covariates

variable group:	2000	2002	2005	Change 2000-2005
self-assessed health	-0.0202	-0.0246	-0.0315	-0.0113
age-sex	0.0011	0.0178	0.0136	0.0125
activity	-0.0038	-0.0257	-0.0094	-0.0056
education	0.0106	0.0120	0.0131	0.0025
regions	0.0078	0.0126	0.0047	-0.0030
density	0.0074	0.0037	0.0013	-0.0061
marital status	-0.0009	0.0150	-0.0026	-0.0017
country of birth	0.0022	-0.0024	-0.0011	-0.0033
income	0.0427	0.0226	0.0130	-0.0297
residual	0.0074	0.0117	0.0288	0.0214
CI, unstandardised	0.0543	0.0427	0.0300	-0.0243

The table shows each variable group's contribution to the unstandardised inequality index for each year.

6. Oaxaca-type decomposition for change in probability of private specialist visit 2000-05.

	Equation (5)		Equation (6)		
	changeCI*el	change_el*CI	changeCI*el	change_el*CI	total
sah2	-0.0059	0.0007	-0.0041	-0.0012	-0.0052
sah3	-0.0017	-0.0017	-0.0012	-0.0022	-0.0034
sah45	-0.0022	-0.0005	-0.0021	-0.0006	-0.0027
m30_44	0.0000	0.0003	0.0001	0.0003	0.0003
m45_59	0.0002	-0.0094	-0.0014	-0.0078	-0.0092
m60_69	0.0018	-0.0003	0.0052	-0.0036	0.0016
f29	-0.0011	0.0096	-0.0060	0.0145	0.0085
f30_44	0.0004	0.0037	0.0011	0.0030	0.0041
f45_59	-0.0015	0.0017	-0.0014	0.0015	0.0002
f60_69	0.0112	-0.0043	0.0067	0.0002	0.0069
disabled	0.0004	-0.0022	0.0000	-0.0018	-0.0018
studmil	-0.0016	-0.0088	0.0004	-0.0108	-0.0104
parttime	0.0000	0.0035	-0.0001	0.0036	0.0035
inactive	-0.0006	0.0037	0.0009	0.0022	0.0031
second1	0.0000	0.0061	0.0001	0.0060	0.0061
second2	-0.0017	-0.0003	-0.0031	0.0011	-0.0020
highedu	0.0004	-0.0022	0.0005	-0.0023	-0.0018
edumiss	-0.0005	0.0007	0.0009	-0.0007	0.0002
r2	-0.0003	-0.0004	-0.0004	-0.0002	-0.0007
r3	-0.0017	-0.0007	-0.0033	0.0009	-0.0025
r4	0.0000	-0.0007	0.0001	-0.0008	-0.0006
r5	0.0002	-0.0008	0.0003	-0.0008	-0.0006
r6	0.0001	0.0012	0.0000	0.0012	0.0013
dens1	-0.0002	0.0007	-0.0003	0.0009	0.0005
dens2	-0.0020	-0.0046	-0.0041	-0.0025	-0.0066
married	-0.0021	-0.0074	0.0029	-0.0124	-0.0096
cohab	0.0003	-0.0002	0.0002	-0.0001	0.0001
divorced	0.0004	0.0038	-0.0010	0.0052	0.0042
widow_er	-0.0011	0.0046	0.0009	0.0026	0.0036
b_europe	0.0003	0.0001	0.0000	0.0004	0.0004
b_other	0.0004	-0.0041	-0.0005	-0.0032	-0.0037
x	0.0018	-0.0315	0.0067	-0.0364	-0.0297
residual					0.0214
% of change	25 %	164%	8 %	180%	
total change in CI					-0.0243

Notes: the table shows contributions to change in CI index, which are attributed to changes in the elasticity or concentration index of each covariate.

Appendix

A1. Horizontal inequity indices for use of private specialist services, estimated at mean and median values

Dependent variable		2000 (I)	2002 (I)	2005 (I)	2002 (II)	2005 (II)
probability of GP visit	at mean	0.0074	-0.0057	0.0033	0.0006	0.0069
	at median	0.0074	-0.0045	0.0064	0.0042	0.0110
number of GP visits	at mean	0.0043	0.0311	0.0128	0.0204	0.0056
	at median	0.0033	0.0086	-0.0231	-0.0009	-0.0283
probability of private specialist visit	at mean	0.0734	0.0495	0.0479	0.0551	0.0489
	at median	0.0716	0.0490	0.0449	0.0535	0.0441
number of private specialist visits	at mean	0.0696	0.0735	0.0506	0.0649	0.0393
	at median	0.0773	0.0661	0.0243	0.0549	0.0168
probability of outpatient hospital visit	at mean	0.0306	0.0174	-0.0026	0.0232	0.0046
	at median	0.0274	0.0127	-0.0104	0.0139	-0.0103
number of outpatient hospital visits	at mean	0.0617	0.0149	0.0418	0.0103	0.0350
	at median	0.0435	-0.0094	0.0056	-0.0125	0.0010

Specification (I) uses self-assessed health as the only health need indicator, while (II) includes additional health information. Indices are estimated using the decomposition method (HImean vs HImedian).

A2. Probability of private specialist visit - partial effects after probit

	2000		2002		2005	
	dF/dx	P>|z|	dF/dx	P>|z|	dF/dx	P>|z|
sah2*	**0.0419**	0.006	0.0298	0.056	**0.0665**	0.000
sah3*	**0.1053**	0.000	**0.1268**	0.000	**0.1859**	0.000
sah45*	**0.2501**	0.000	**0.1834**	0.000	**0.2556**	0.000
m30_44*	-0.0172	0.547	-0.0066	0.832	-0.0055	0.846
m45_59*	0.0394	0.224	0.0240	0.463	-0.0063	0.834
m60_69*	**0.1202**	0.006	0.0424	0.299	0.0334	0.385
f29*	**0.0876**	0.003	0.0045	0.879	0.0149	0.586
f30_44*	**0.0954**	0.002	0.0225	0.475	0.0324	0.270
f45_59*	**0.0913**	0.007	**0.1398**	0.000	**0.1029**	0.002
f60_69*	0.0687	0.122	**0.1252**	0.006	**0.0968**	0.022
disabled*	-0.0003	0.990	0.0108	0.713	0.0200	0.457
studmil*	-0.0125	0.662	0.0587	0.097	0.0359	0.214
parttime*	0.0244	0.202	**0.0650**	0.004	-0.0014	0.947
inactive*	0.0124	0.606	0.0378	0.149	-0.0072	0.769
second1*	**0.0528**	0.016	0.0344	0.158	0.0143	0.543
second2*	**0.0679**	0.005	**0.0504**	0.049	0.0311	0.211
highedu*	**0.0552**	0.023	**0.0545**	0.038	0.0454	0.080
edumiss*	-0.0670	0.360	-0.0364	0.561	0.0037	0.925
r2*	-0.0262	0.143	**-0.0496**	0.008	-0.0141	0.444
r3*	-0.0364	0.072	**-0.0788**	0.000	-0.0201	0.355
r4*	-0.0165	0.406	**-0.0647**	0.001	-0.0014	0.944
r5*	**-0.0629**	0.006	**-0.0965**	0.000	**-0.0487**	0.048
r6*	-0.0332	0.149	**-0.1080**	0.000	**-0.0570**	0.013
dens1*	-0.0267	0.079	-0.0246	0.149	-0.0138	0.392
dens2*	**-0.0543**	0.000	-0.0328	0.051	-0.0269	0.097
married*	0.0141	0.484	0.0415	0.069	-0.0114	0.579
cohab*	-0.0036	0.875	0.0170	0.497	-0.0040	0.847
divorced*	0.0440	0.165	0.0027	0.937	-0.0172	0.555
widow_er*	0.0466	0.352	-0.0766	0.120	-0.0512	0.234
b_europe*	0.0024	0.943	0.0264	0.465	-0.0195	0.525
b_other*	-0.0482	0.206	0.0368	0.387	0.0272	0.455
x	0.0288	0.073	0.0157	0.311	0.0071	0.527
observed probability	0.164		0.171		0.157	
predicted probability	0.151		0.157		0.146	
n	3371		2965		3002	
Pseudo-R2	0.053		0.062		0.051	
Log likelihood	-1427.1		-1274.0		-1238.4	

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