Preferences for job characteristics: the case of non-consultant career grade doctors in the NHS.

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Abstract

The question of what job attributes matter to non-consultant career grade (NCCG) doctors is addressed by application of a discrete choice experiment (DCE). Non-consultant career grade doctors are a group of experienced doctors who have either chosen not to become consultants or do not have opportunities for career progression or training. There are fears that a lot of potential consultants are held up in this group, hence greatly limiting the supply of consultants in the NHS.

We use random effects probit models in regressions of doctors' preferences. Survey data from a sample of 518 non-consultant career grade doctors in Scotland is used to analyse the relative importance of pecuniary and non-pecuniary job attributes using monetary valuations. Our results show that the most important attributes are opportunities to fully use skills, continued professional development, reductions in the number of sessions and increased incomes, respectively. Significant differences in strength of preferences are also observed across sub-groups of doctors. For example, associate specialists and staff grade doctors have strong preferences for extensive opportunities to take professional development and training, while doctors from different ethnic groups have varying preferences for number of sessions worked per week. The results suggest the need for policy to consider ways of providing further training to NCCG doctors. It also provides insight into issues around recruitment and retention of doctors.

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1. Introduction

With United Kingdom (UK) health spending expected to rise from £65.4 billion (7.7% of GDP) to £106 billion (9.4% of GDP) over five years, a high proportion of this will be spent on NHS staff. However, there is little evidence about those factors influencing the recruitment and retention of the various staff groups. One group of doctors in the NHS that is of particular concern is non-consultant career grade doctors (NCCG).

Non-consultant career grade (NCCG) doctors comprise about 9% of all medical and dental staff in the UK NHS, and include all hospital doctors who are not consultants or doctors in training. NCCGs include staff grades, associate specialists, hospital practitioners and clinical assistants, although different job titles are often assigned to these groups (BMJ, 2001). The doctors in training include house officers, senior house officers and specialist registrars. The staff grade was introduced in 1988 (Department of Health, 1987) to provide a career in hospital medicine for those doctors who did not wish to achieve consultant status. Staff grades do not normally undertake out-of-hours work and by the year 2000, comprised over 3% (ISD, 2002) of all medical and dental staff in NHS Scotland. Staff grades were reported to be mostly females (Baker et al 1999) and by September 2001, there were 41% males and 59% females (Table 1). It has also been found that doctors in the staff grade do not have opportunities for continued professional development and career progression where it is desired (SCOPME, 1994; RCP, 1996; Baker et al., 1999; Norcliffe and Finlan, 2001).

The associate specialist grade was created in 1981 for senior hospital doctors. The posts are personal appointments for doctors who are committed to a career in hospital medicine but who have been unable to complete higher professional training or do not wish to become a consultant. Each associate specialist is responsible to a named consultant and is required to have completed ten years medical work since qualification and also to have been in the registrar or staff grade for a minimum of four years. The ISD data shows that there were 181 associate specialists in the medical and dental professions in NHS Scotland in 2000. Hospital practitioners are those who have opted for a career in hospital medicine and clinical assistants are those who work alongside (and usually complementarily) the other grades of

medical and dental practitioners in NHS hospitals. These include GPs working part time in hospitals.

The objective of this research is to investigate the preferences of non-consultant career grade doctors with a view to finding out ways to enhance recruitment and retention. In the light of this, we use discrete choice experiments to value job characteristics and econometric techniques to analyse data. The discrete choice experiments are intended to help elicit the relative strengths of doctors preferences using monetary valuations and also to ascertain how preferences differ across personal and job characteristics.

2. Methods

2.1. Data

Data were collected using a questionnaire administered to 881 career grade doctors in NHS Scotland. Addresses were obtained from the Medical and Dental Census held at the Information and Statistics Division (ISD) of NHS Scotland, for September 2001. The questionnaire asked about current working practices and also contained a discrete choice experiment (DCE). The DCE used in the data collection followed the stages elicited by Ryan and Farrar (2000). This included, establishing the attributes, assigning levels to the attributes, presenting scenarios, establishing preferences and estimating total and marginal utilities.

The attributes used in the DCE were identified from a literature review, from focus groups and individual interviews with 18 doctors. The doctors interviewed were broadly representative of the different grades and were from different parts of Scotland. Four important aspects of doctors' jobs were identified. Table 2 shows the attributes, the levels, the coding used for the design and for the analysis and the units of measurement. These were as follows:

Change in number of sessions worked per week: "The increase or decrease in number of sessions worked compared to your current job. It includes NHS, University work and non-NHS medical work, but excludes on-call hours. Possible levels: -2, -1, no change, +1". This

attribute was measured in number of sessions instead of hours because in the focus groups and individual interviews doctors talked about sessions and not about hours of work. Changes in the number of sessions, rather than the actual number of sessions, were used so that the levels were relevant to doctors working both part time and full time.

Change in total NHS income: "The annual change in your total NHS income, including discretionary points, after tax. Possible levels: no change, +10%, +20%". This attribute and the levels have been used in similar questionnaires for consultants. The income changes were presented in percentages so that the levels would make sense to both doctors who worked part time and full time.

Opportunities to take professional development and/or training, with two levels; "some" and "extensive", and

Opportunities to fully use my skills, with two levels; "limited" and "extensive"

We wanted to include some job characteristics, apart from income and time worked, which may affect their job choice. Access to training and continuing professional development have been reported as particular problems for career grade doctors and so were included.

The attributes and levels selected for the pilot questionnaire gave a full factorial design of 48 possible scenarios ($4 \times 3 \times 2^2 = 48$). This was thought to be too many for an individual to respond to, so a fractional factorial design with 16 scenarios was used. From these 16 scenarios, one constant scenario was chosen. Three potential constant scenarios were chosen on the basis of having non-extreme levels. Each of the possible constant scenarios, when paired up with all other scenarios had different statistical properties. The properties are those of orthogonality, level balance, minimal overlap and utility balance, as identified by Zwerina et al (1996). It was therefore necessary to choose the constant scenario that best satisfied these properties.

Orthogonality "ensures that the attributes presented to respondents are varied independently from one another" (Pearmain et al. 1991; 29). This avoids multicollinearity between

attributes (so that the individual effects of each attribute cannot be distinguished from the combined effect).

Level balance is satisfied when the levels of each attribute appear with equal frequency.

Minimal overlap is satisfied when the alternatives within each choice set have non-overlapping attribute levels.

Utility balance is satisfied when the utilities of alternatives within choice sets are the same.

Due to the length of the whole questionnaire it was necessary that the discrete choice experiment was no longer than two pages. The fifteen pairs of scenarios were split across three questionnaires (or blocks) with five pairs for each. Two versions had one internal consistency test and one version had two internal consistency tests. The choices were also split into blocks because it was necessary to ensure that all levels were represented in each block a similar number of times (to achieve level balance). Two different combinations of blocks were tested using random answers. There were no differences between the two sets of blocks.

Pilot questionnaires were sent out to the 18 doctors who participated in the focus groups and interviews, and seventeen responses were received. The questionnaire included a ranking exercise and informed the ultimate questionnaire design. This helped to ensure that the attributes and levels selected were the most relevant to doctors when choosing a job, and to identify any that were missed.

Each version of the final questionnaire was randomly allocated to those in the sample. The questionnaire presented doctors with two hypothetical jobs to choose from (job A and job B). A typical choice is shown in Figure 1. Job A presented a constant scenario (with the same job attributes presented in all cases), while job B's attributes varied accordingly.

2.2. Plan for data analysis

Two regression models were estimated in which the dependent variable was whether the respondent chose job A or job B. The dependent variable was a binary response variable indicating whether the respondent chose job A or job B. The independent variables were the differences between the levels of each attribute of job A and job B. The two models developed for analysis are as follows;

Model 1

$$Ui = F(?\ S, ?\ Y, ?\ O, ?\ L) + e + \mu \qquad (1)$$

Where Ui = utility of the i-th doctor. This represents the difference in utility between the two jobs (job A and job B). We can observe the choice of job and not the utility derived from them, hence the dependent variable is binary and depends on a latent variable y^*. $Ui = 1$ if $y^* > 0$ and $Ui = 0$ otherwise. $?\ S$ is the change in the number of sessions worked per week, $?\ Y$ is the change in total annual NHS income (after tax), $?\ O$ is the change in opportunities to take professional development and training, and $?\ L$ is the change in opportunities to fully use skills. The actual independent variables are calculated as changes in the attributes, that is sessions, income, continued professional development and skills. e is the error term due to differences among observations and μ is the error term due to differences among respondents (since respondents provided multiple responses). The variable on income change was measured in percentage terms and multiplied by each doctor's actual income to obtain actual income changes. This is relevant for the calculation of Willingness To Pay (WTP) estimates.

It is expected that doctors prefer to reduce the number of sessions worked per week rather than increase them, that they prefer an increase in income rather than a decrease, that they prefer extensive rather than some opportunities to take professional development, and extensive rather than limited opportunities to fully use their skills.

Model 2

$$Ui = a + b\ X + d\ XZ + e + \mu \qquad (2)$$

Model 2 is an extension of model 1 and shows interactions between changes in job attributes (X) and those social, economic and job characteristics that are thought to have an effect on doctors' utility (Z). The coefficients can be interpreted as scale transformations of the marginal utility of each attribute (Fowkes and Wardman, 1988). e and μ are error terms as in equation 1 above.

Given that respondents provided multiple observations, this leads to unobserved heterogeneity (the explanatory variables generated by each respondent may not be strictly exogenous, hence there may be correlation of observations within an individual respondent), the two models above are estimated using random effects probit estimation techniques in Stata. Subsequent analysis of results would follow the design of the questionnaire in the discrete choice experiments.

Table 3 presents the codings of the independent variables and how the models are analysed. The analysis of model 2 begins with a general approach by including all possible characteristics to interact with the main attributes considered in model 1. The insignificant interaction terms are then eliminated in a backward stepwise approach. The criterion for elimination of variables is based on a 10% significance level.

As mentioned above, the dependent variable in both models one and two is a qualitative binary variable representing the choice of job A (represented as 0) or job B (represented as 1). Underlying the choice of either job A or job B is a latent continuous variable measuring doctors' utility. Utility is not observed, but a doctor's choice of job is assumed to reflect which job provides more utility to him, given the attributes of the job chosen. We therefore model the effect of a change in the job attributes on the probability of choosing either job A or job B, depending on which job provides higher underlying utility[1]. The parameters of

[1] This assumes that doctors will chose the job that provides higher utility, given the attributes of that job.

both models will be analysed as partial effects of changes in job attributes on the probability of choosing job A or job B.

A positive coefficient would indicate doctors' choice of job B, and if statistically significant, the attribute will be analysed according to the value of the independent variable shown in Table 3.

A negative coefficient would indicate doctors' choice of job A (with the constant attributes), and if statistically significant, the attribute will be analysed according to the value of the independent variable shown in Table 3.

Non-significant attributes would be interpreted as the attribute not having any effect on the job (depending on whether the choice is job A or job B).

The relative importance of attributes would be examined by calculating the Marginal rate of Substitution (MRS), which assumes that doctors are willing to trade between attributes[2]. The MRS is defined here as the rate at which doctors trade off an improvement in one attribute against a worsening in another, while keeping the same level of utility. It is calculated as the ratio of any two parameters (from attributes) in the model.

We also calculate doctors' willingness to pay (WTP) for attributes as an indicator of the utility they derive from attributes. WTP is a monetary valuation of benefit/utility from the attributes and is calculated as the ratio of any attribute coefficient to the income coefficient in the model. The WTP per session is calculated per week while WTP for other attributes (extensive opportunities to take professional development/training and to fully use skills) will be calculated.

[2] A direct comparison by the magnitude of the coefficients is not plausible since different measures were used for different attributes.

3. Results

3.1. Descriptive Statistics

The final data collected (from respondents) are representative of the overall ISD data set in terms of age, ethnicity, location and specialty. The response rate was 58.2% (513/881). Doctors' ages ranged between 29 and 68, with an average age of respondents calculated at 46 years. Summary statistics of respondents are presented in Tables 4 and 5 below. Table 4 compares the current sample of NCCGs with overall ISD data set of NCCGs in Scotland while further descriptive statistics of variables used can be found in Table 5.

A total of 339 (or 64.2%) respondents were female while 189 (or 35.8%) were male doctors. 188 doctors (128 female and 60 male) work in NHS hospitals located in major cities, 319 (198 female and 121 male) work in towns while 21 (13 female and 8 male) work in NHS hospitals in remote areas. 23% of all doctors report excellent states of health (65% of them female, 35% male), while 2% report poor health (60% female and 40% male). 48% of doctors plan to retire at 60 years of age. 18% of them are definitely going to retire at age 60, 44% are very likely, 32% quite likely and 6% unlikely to retire at 60 years of age.

From the sample, 264 Doctors (134 females and 130 males) work on whole time contracts, 228 (178 female and 50 male) are on ordinary part time contracts and 10 (8 female and 2 male) do locum work. A total of 304 Doctors have modified their career to accommodate their children and dependants. One hundred and twenty-four (124) (about 25%) are contracted to and actually work at weekends while 304 (about 60%) are not. However, 14% (73) of the doctors work at weekends, even though they are not contracted to work during these periods. Two hundred and twenty-three (223) doctors (155 female and 68 male) have trained as a GP prior to their current posts. Very few doctors undertake any non-NHS medical work (these are 40 females and 30 males). Thirty-five (35) percent of them (75 female and 107 male) would consider a career as a consultant.

3.2. Econometric results

To prepare the dataset for analysis, inconsistent responses were deleted from the dataset. In all, 42 doctors provided inconsistent responses, a majority of them female doctors in their 40s (33% of inconsistent responses). In terms of speciality group, the most inconsistent responses came from doctors in general medicine (31%), psychiatry (21%) and general surgery (17%). In the light of this, 210 observations (from 42 doctors) were deleted due to inconsistency. The analyses therefore proceeded with 2271 observations[3] (from 454 doctors).

Two variants of the main effects model were estimated – the one with actual income changes and another with percentage changes in income. Both these models are statistically significant, with the same signs and almost the same size coefficients (see table 6). The actual changes in income are considered in a bid to calculate doctors' willingness to pay for attributes. The model with percentage changes in income is reported because it is statistically more significant and fits the data better than the one with actual income changes[4]. The measure of the correlations within observations is also statistically significant indicating that the choice of a random effects specification was appropriate for the analysis. The constant term in the model is statistically significant and negative. This reflects left bias in doctors' choice of hypothetical jobs presented in the questionnaire. This left bias could be explained by the possibility that unobservable factors may have informed (or influenced) doctors' choice of "job A", or it could also reflect the presence of the constant scenario with which respondents were more familiar.

All four attributes are statistically significant at a 5% level. All variables have the expected signs. The variables on income, continued professional development (C.P.D.) and skiils are positively signed, while the sessions variable is negatively signed as expected, confirming the theoretical validity of the discrete choice technique used. The results show an increase in doctors' utility following an increase in income, a change from some to extensive opportunities for development and training and a change from limited to extensive

[3] Similar models estimated including the inconsistent responses did not yield expected results. The results are not reported here however.

[4] The model with percentage changes in income has a lower log likelihood and higher pseudo R^2 than the one with actual changes in income.

opportunities to fully use their skills. Furthermore, doctors' utility is lower for those who work more sessions per week.

Marginal rates of substitution[5] (MRS) are also calculated for the four attributes (from the model on actual changes in income - see table 7). This measures the relative value of the attributes and shows how much of one attribute a doctor is willing to sacrifice for one more unit of another attribute. The results show that doctors value extensive opportunities to fully use their skills, to take professional development, reduced sessions and increased income respectively. For example, doctors would be willing to work an extra session per week to gain a five percent increase in their income. They would also be willing to give up about one percent of their opportunities to take professional development and training to have extensive opportunities to fully use their skills.

Willingness to pay estimates[6] (table 8) also reflect how doctors value the attributes. This also indicates the relative importance of the attributes. A positive sign indicates that doctors would be willing to forgo income to have more of the attribute, while a negative sign shows what they would have to be paid to have more of the attribute. Assuming they are willing to trade attributes, doctors would be willing to pay about £512 for extensive opportunities to fully use their skills and about £379 for extensive opportunities to take professional development and training. Alternatively, it would cost £213 to induce doctors to work an extra session per week or about £60 to work an extra hour.

The second model (see table 6) incorporates doctors' job and personal characteristics, not to replace the first model but to provide further evidence on how these characteristics affect overall doctors' utility on the job. It shows how the marginal valuation of each attribute differs across doctor and job characteristics. The analysis begins with a very general approach by including all possible characteristics to interact with the main attributes considered in model one. The insignificant interaction terms are then eliminated in a backward stepwise approach to form a more parsimonious model. All the main attributes

[5] This is calculated as the ratio of any two coefficients from the main effects model with percentage change in all variables, e.g. b1/b2 gives the MRS of attribute b1 for b2.
[6] This is calculated as the ratio of any of the coefficients from the main effects model (with actual incomes) to the coefficient for actual income.

drop out of the model, once differences in doctors' job and personal characteristics are accounted for.

The log likelihood ratio shows that the main effects model provides a better fit than the model with interaction terms (see table 6). The analysis of the interaction terms, like that for model one, proceeds using the coding methods adopted by Vick and Scott (1998). To interpret the coefficients of the interaction terms, the coding for the main attributes are multiplied with the coding of the characteristics variables they are interacting with, to obtain the coding for the interaction terms. The coding (of the interaction term) is then multiplied by the coefficient of the interaction to indicate which job was chosen for that particular interaction[7]. For example, for the interaction term "opportunities to fully use skills **X** consider a career as a consultant";

The coding for opportunities to fully use skills is (0, 1) representing limited (0) and extensive (1). This coding is multiplied by 1 if the doctor will consider a career as a consultant and by 0 if he/she will not. If job A provides limited opportunities and job B extensive opportunities to take professional development and training, the marginal effect is negative (1 * 1 * 0. 289 = -0.289). Thus, doctors who will consider a career as a consultant are more likely to choose job B over job A, relative to those who will not consider a career as a consultant. By implication, the doctors who will consider a career as a consultant want extensive opportunities to fully use their skills[8].

Significant differences are noticeable between the two largest groups of NCCG doctors – the associate specialists and the staff grade[9]. The results show that the associate specialists have stronger preferences for reduced sessions per week, as well as extensive opportunities for continued professional development, compared to staff grades and clinical assistants.

[7] This then shows which job had the higher utility (between job A and job B) and was therefore chosen by the doctors.

[8] This is relative to those doctors who will not consider a career as a consultant.

[9] The staff grade form 53.18% while associate specialists form 21.19% of the sample of NCCG doctors for this research. Other groups in the sample represent clinical assistants and other doctors who had more than one job title in this grade.

The staff grades also have strong preferences for continued professional development (CPD). Those doctors who work weekends would prefer some opportunities to fully use their skills, while those who would consider a consultant career have stronger preferences for higher income, as well as extensive opportunities to fully use their skills.

Personal characteristics that influence work-life balance are an important determinant of preferences. Female doctors are less likely to prefer an increase in their annual NHS income relative to males. White doctors have stronger preferences for reduced sessions, higher income and extensive opportunities for CPD and to fully use their skills, relative to other ethnic groups. Those doctors who prefer to work more sessions per week are likely to be in excellent health (relative to reporting otherwise). The interaction between the age variable and the main attributes shows that older doctors are attracted to more sessions per week, as well as some (relative to extensive) opportunities both to fully use their skills and to take professional development and training. With respect to family circumstances, doctors are more likely to prefer extensive opportunities for professional development and training if they have modified their careers to suit their partners, and some opportunities if they have modified their working hours to suit their partners. This result holds even though there is no significant interaction between being married/having a partner and any of the main attributes considered in model one. Those of them who have children below five years of age are more likely to prefer higher income, as well as extensive opportunities to take professional development and training. They are also more likely to prefer extensive opportunities for CPD.

The proportion of doctors having preferences for various attributes in the interactions model is presented in Table 9 and serves to corroborate the results of model two in a different way. This table is intended to show the percentage of those who have strong preferences for the various attributes and in a way also shows doctors' characteristics that have greater influences on their preferences for job attributes. It sums up the proportions of doctors having preferences for the significant attributes and attempts to highlight consensus on the attributes most sought after. For example, the highest proportion of doctors have stronger preferences for extensive opportunities to take professional development and training and these preferences were held by associate specialists, staff grades, those who have

modified their careers to suit their partners, those with children and those of white ethnic origins. Very few doctors prefer to work more sessions per week, apart from those who are older and those in excellent health.

Some factors such as rurality, specialty, marital status and number of adult children were not significant in the interaction model and hence did not influence doctors job preferences.

4. Discussion

This paper sampled the opinions of 518 non-consultant career grade doctors to ascertain ways of making their work more flexible and to help improve recruitment and retention of this category of NHS doctors. It is thought that this group of doctors, supposedly made up of those who did not wish to achieve consultant status[10], and mostly females, do not have opportunities for continued professional development and career progression. Four major attributes, identified from focus group discussions and reviews of the relevant literature, were used to model doctors' job choices. The results showed that non-consultant career grade doctors had strong preferences for a reduced number of sessions per week, increase in income, and extensive opportunities, both for continued professional development and to fully use their skills.

Judging by corresponding MRS and WTP estimates, the most important attributes were those of opportunities to fully use skills and to take professional development, followed by changes in the number of sessions worked per week and annual NHS income after tax. WTP estimates showed that doctors had strong preferences for non-pecuniary, as opposed to pecuniary aspects of their jobs.

Some differences in preferences were also noticeable among sub-groups of doctors. For example, while greater age and excellent health states were associated with strong preferences for increased sessions, associate specialists and white doctors preferred a reduction in the number of sessions worked per week. Doctors were also more likely to

[10] Our results show otherwise – some doctors plan to achieve consultant status.

prefer an increase in income if they considered a career as a consultant, if they had more children below five years old and if they were white. For female doctors, increased income was not a priority. While older doctors and those who had modified their working hours to suit their partners had weaker preferences for CPD, associate specialists, staff grades, those with more children (between 0 and 17) and those who had modified their careers to suit their partners, had stronger preferences for CPD. White doctors and those who aspired to become consultants had strong preferences for extensive opportunities to fully use their skills while older doctors and those who worked weekends did not attach much value the attribute. No significant differences were noticeable between doctors in cities, towns and remote areas.

Above all else, doctors had strong preferences for extensive opportunities to fully use their skills. Hitherto, such opportunities have been very minimal and very limited. In a briefing (BMJ, 2001), Khan asserted that non-consultant career grade doctors were trapped in "dead-end jobs" and expressed fears of a serious problem of "deskilling" among doctors. Doctors should be given greater freedom to treat patients more often under supervision by consultants. Their existing qualifications and career longevity should also aid in determining the amount of freedom/supervision they get. The objective is to provide more opportunities for doctors to fully use their skills. This would not only be beneficial in increasing labour supply, it would also help them meet the changing needs of technological advancement in the medical profession.

It is observed that even though the non-consultant career grade doctors are generally construed not to have any career aspirations, a large proportion of doctors had strong preferences for CPD (see table 9). This clearly highlights the need to introduce staff development/training schemes for these doctors. Provision of such opportunities would not only improve working conditions and job satisfaction, it would also improve competence, which could benefit patients and healthcare in Scotland. Such career development schemes could also satisfy doctors' aspirations and subsequently increase the supply of much-needed consultant labour in the NHS if these doctors train to become consultants. Government policy could do well to provide for such non-pecuniary aspects of doctors' jobs in the interest of continued job satisfaction and improved healthcare.

To encourage those doctors who prefer extensive opportunities to take professional development, government could do well to either completely remove or alleviate some of the barriers that prevent them from attaining these goals. It is noted that doctors complain about lack of time, insufficient clinical cover and lack of funding as their major barriers to continued professional development[11]. One way to provide ample time is to encourage part time or shift working among doctors, so as to provide the time needed for continued professional development (C.P.D). Opportunities for study leave as well as funding could also help in this regard. The recent increase in NHS expenditure could be partly channelled to train non-consultant career grade doctors. In the wake of complaints about staff shortages, locum work could be encouraged although it may be expensive and patients may not trust the quality of such services. Working in shifts could also provide more clinical cover, as more doctors would have more time on their hands.

Gender differences showed that men had stronger preferences for increased income. Clark (1997) argued that women's expectations were lower than men's and men are more concerned with 'extrinsic' aspects of their jobs. It could also be argued that men are generally more ambitious about their careers.

Some interaction terms marked deviations from the main effects model. Worthy of note were the strong preferences for increased sessions by older doctors and those who reported excellent health. It could be argued that those who are older become more committed to their jobs than their younger counterparts. As Capelli and Sherer (1988) argued, greater age increases job satisfaction because it provides greater opportunity to find a good 'match' between worker characteristics and jobs. It could be more or less a situation of 'getting wiser and loving it more', although the interaction with job tenure did not produce any significant results.

The variable on ethnicity produced significant results when interacted with the main job attributes. For example, the interactions between ethnicity and sessions, income, C.P.D. and

[11] Part of the findings from analysis of doctors' responses from the questionnaire administered for this research.

skills respectively all had significant effects on doctors' job choices. This may not be unusual as doctors of white origin (used as the reference group) form 76.43 percent of the sample used in estimations and hence, had a dominating effect in the models.

The above discussion and subsequent policy responses have been made on the assumption that this research has its theoretical and practical limitations. First and foremost, it may be asking too much to assume that other job characteristics of NCCG doctors' jobs (apart from the ones we considered) are constant across all doctors, although our questionnaire asked doctors to assume this. The assumption of holding all other job characteristics constant was made in a bid to study the effects of those attributes that were mostly talked about during focus group discussions and review of relevant literature. Furthermore, we assumed that doctors were rational in choosing between the hypothetical jobs that we presented to them in the choice experiment and that they were willing and able to trade between the attributes presented. If doctors had such a choice, we would definitely not be studying problems of recruitment and retention.

With the NHS acting as the only employer of labour for non-consultant career grade (NCCG) doctors, this highlights the need for some useful changes to be made to provide better working conditions for this category of doctors. There is also a further call to researchers to develop better ways to investigate the problems faced by the healthcare labour market in the UK, especially with regards to the NCCG doctors in the NHS.

Tables

Table 1: All medical – headcounts (ISD as at 30 September 2000).

Staff description	Both sexes	Male (%)	Female (%)
All medical staff	12,777	7,734 (60.5)	5,043 (39.5)
NCCG doctors	767	357 (47)	461 (53)
Staff grade			
hospital - medical	349	175 (50)	174 (50)
community services - medical	99	8 (8)	91 (92)
Associate specialists			
hospital – medical	152	72 (47)	80 (53)
community services – medical	11	0	11 (100)
Hospital practitioners			
medical	131	96 (73)	35 (27)
Clinical assistants			
assistant medical practitioner	25	6 (24)	19 (76)

ISD Scotland – last updated: January 2002.

Table 2: attributes, levels and coding used for design and analysis

Attributes	Levels	Coding
Change in number of sessions worked per week	-2	-2
	-1	-1
	0	0
	1	1
Change in total annual NHS income (after tax)	No change	0
	+10%	10
	+20%	20
Change in opportunities for development and training	Some	0
	Extensive	1
Change in opportunities to fully use skills	Limited	0
	Extensive	1

Table 3: Coding of the independent variables used

Independent variable	Job A (constant)	Coding	Job B (variable)	Coding	Coding Differences (B-A). Value of independent variable.
Change in number of sessions worked per week	No change	0	Reduction	-2	-2
			Reduction	-1	-1
			No change	0	0
			Increase	1	+1
Change in total annual NHS income (after tax)	10% increase	+10	No change	0	-10
			10% increase	10%	0
			20% increase	20%	+10
Change in opportunities for development and training	Some	0	Some	0	0
			Extensive	1	1
Change in opportunities to fully use skills	Extensive	1	Limited	0	-1
			Extensive	1	0

Table 4: summary characteristics of doctors

Characteristic	ISD database		Sample of doctors	
	Number (%)	Mean (S.D.)	Number (%)	Mean (S.D.)
Gender				
Male	471 (43.3)		189 (35.8)	
Female	617 (56.7)		339 (64.2)	
Age (years)	1088	46.25 (8.7)	528	46.17 (8.2)
Ethnic origin				
White	819 (75.3)		360 (76.43)	
Bangladeshi	1 (0.1)			
Black – African	23 (2.1)		7 (1.49)	
Black – Caribbean	2 (0.2)		1 (0.21)	
Black – other	4 (0.4)			
Chinese	6 (0.6)		1 (0.21)	
Indian	131 (12.0)		52 (11.04)	
Pakistani	21 (1.9)		11 (2.34)	
Any other	62 (5.7)		30 (6.37)	
Refusal	8 (0.7)		3 (0.64)	
Not known	11 (1.0)		6 (1.27)	
Hospital location				
Major cities	389 (35.7)		189 (35.8)	
Town	652 (59.8)		318 (60.2)	
Remote area	50 (4.6)		21 (4.0)	

Table 5: Descriptive statistics of variables used

Variable	Sample	Mean	% of sample	Min	Max
Prefer (indep. variable)	2271	0.339		0	1
Sessions	2360	-0.517		-2	1
Income (actual)	2280	-105.526		-800	800
Income (% change)	2360	-2.788		-10	10
C.P.D.	2360	0.539		0	1
Skills	2360	0.532		-2	1
Job classification	2360				
Staff grades	1255		53.18		
Associate specialists	500		21.19		
Health status	2345				
Excellent health	520		22.17		
Modified working hours	1975				
Yes	835		42.28		
No	1140		57.72		
Modified career	1975				
Yes	980		49.62		
No	995		50.38		
Consider consultant career	2315				
Yes	820		35.42		
No	1495		64.58		
Work weekends	2325				
Yes	570		24.52		
No	1755		75.48		
Children – pre5	2350				
At least 1 child	445		18.14		
Children – teenage	2360				
At least 1 child	460		19.49		

Table 6: Results from Model 1 and Model 2

Variable	Coefficient b (s.e.)		
	Model 1a	**Model 1b**	**Model 2**
Sessions	-0.3525 (.031))**	-0.3503 (0.031)**	
Income (actual income changes - £)	0.0017(0.0001)**		
Income (percentage change)		0.0704 (0.004)**	
C.P.D	0.6268 (0.068)**	0.6551 (0.068)**	
Skills	0.8442 (0.070)**	0.8526 (0.068)**	
SESSIONS			
Sessions*associate specialists			-0.1885 (.090)**
Sessions*excellent health			0.1712 (.086)**
Sessions*white			-0.1498 (.026)**
Sessions*age			0.0189 (.005)**
INCOME			
Income*female			-0.0234 (.014)*
Income*pre5 (children 0 – 4)			0.0174 (.009)*
Income*consultant career			0.0263 (.013)*
Income*white			0.0098 (.002)**
C.P.D			
C.P.D*associate specialists			0.5087 (.191)**
C.P.D*staff grade			0.3394 (.152)**
C.P.D*pre5 (children 0 – 4)			0.3397 (.119)**
C.P.D* teenage (children 13 – 17)			0.2259 (.121)*
C.P.D*age			-0.0236 (.011)**
C.P.D*modified working hours			-0.3225 (.171)*
C.P.D*white			0.1251 (.063)**
C.P.D*modified career			0.3724 (.173)**
SKILLS			
Skills* consultant career			0.2890 (.171)*
Skills*age			-0.0389 (.011)**
Skills*white			0.3033 (.057)**
Skills*work weekend			-0.2529 (.148)*
Constant	-0.4745 (0.070)**	-0.4724 (0.070)**	-0.4534 (0.095)**
N	2196	2271	1387
Log likelihood	-1104	-1120	-634
Pseudo R^2	0.21	0.23	0. 02
Wald chi2 (prob > chi2)	386.24 (0.0000)	424.10 (0.0000)	261.98 (0.0000)
Sigma_u	0.5266(.060)**	0.5286 (0.059)**	0.632 (0.076)**

Rho	0.2171 (0.038)**	0.2184 (0.038)**	0.286 (0.049)**
Lrtest of rho=0 (prob chibar2)	39.98 (0.000)	41.21 (0.000)	41.41 (0.0000)

** 5% level of significance; * 10% level of significance

C.P.D = Continued Professional Development (opportunities to take professional development and training).

Pseudo R^2 = 1 - L1/L0 : where LO and L1 are the constant-only and full model log likelihoods respectively.

Table 7: MRS~ between attributes in model 1

Variable	Coefficient	b**x** / b**income**	b**x** / b**session**	b**x** / b**c.p.d**	b**x** / b**skills**
Sessions	-.350331	-4.974115	-	-.534801	-.410878
Income change	.070431	-	-.201041	.107517	.082603
C.P.D	.655068	9.300878	-1.869856	-	.768282
skills	.85264	12.10607	-2.433814	1.301605	-

~ Calculated from the model with percentage changes in income

The negative sign in MRS estimates indicates what doctors are willing to accept for an extra unit of the attribute and a positive sign indicates what they are willing to give up.

Table 8: Willingness to pay / accept for hospital doctors*

Variable	Coefficient (model 1a)	WTP / WTA in GB£ (Std. errors°)
Sessions	-.352511	-213.4104 (17.77)
Income	.001652	-
C.P.D	.62684	379.4891 (777.08)
Skills	.844231	511.09771 (-130.54)

*calculated from the model with actual income changes

WTP = Willingness To Pay,

WTA = Willingness To Accept

C.P.D = Continued Professional Development (opportunities to take professional development and training).

° = these standard errors are calculated from Taylor series approximation to the variance of a function of random variables (see Propper, 1995).

Table 9: proportion of doctors having preferences for various attributes

Staff characteristic	**Proportions (%)**							
	Sessions		Income		C.P.D.		Skills	
	Increase	*Reduce*	*Increase*	*Reduce*	*Extensive*	*Some*	*Extensive*	*Some*
•Age	46.28*					46.28*		46.28*
•Associate specialists		21.19			21.19			
•Staff grade					53.18			
•Excellent health	22.17							
•White doctors		76.43	76.43		76.43		76.43	
•Female doctors				67.94				
•Consultant career			35.42				35.42	
•Pre5 children			19.28		19.28			
•Teenage children					19.49			
•Modified career					49.62			
•Modified working hours						42.28		
•Work weekends								38.58
Average percentage	**7.69**	**10.97**	**14.74**	**7.64**	**26.89**	**9.96**	**12.57**	**9.54**

*Age – percentage above the average age of about 46 years

Figure 1: An example of the choices presented to respondents

Instructions about completing Section B – please read.

Imagine you are looking for a new post and have been offered two jobs, A and B. You have negotiated terms and conditions. In each of the four questions on the next page you are asked to choose which job you prefer. The two jobs differ according to the characteristics outlined below. Please take a moment to read through these before answering the questions on the next page.

Change in number of session worked per week

The increase or decrease in number of sessions worked compared to your current job. It includes NHS, University work and non-NHS medical work, but excludes on call hours. Possible levels: -2, -1, no change, +1

Change in total NHS income

The annual change in your total NHS income, including distinction awards and discretionary points, after tax. Possible levels: no change, +10%, +20%

Opportunities to take professional development and/or training

Possible levels are: some, extensive

Opportunities to fully use my skills

Possible levels are: limited, extensive

When answering the four questions:

- assume all other characteristics are the same between jobs
- answer all choices- assume that these are only options available to you
- there are no right or wrong answers
- job A is the same for all four questions, and job B is different.

Please tick one box for every choice

12a) Which job would you prefer?	**Job A**	**Job B**
Change in number of sessions worked per week *(including NHS and non-NHS but excluding on call)*	-1	No change
Change in total NHS-income (after tax)	No change	+20%
Opportunities to take professional development and/or training	Some	None
Opportunities to fully use my skills	None	Some
	Prefer job A ☐	Prefer job B ☐

(tick one box only)

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