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DISTRIBUTING PUBLIC FUNDING TO THE NHS IN ENGLAND: TAKING ACCOUNT OF DIFFERENCES IN LOCAL LABOUR MARKET CONDITIONS ON NHS RECRUITMENT AND RETENTION

Key Messages

1. The costs of recruiting and retaining NHS professionals differ between localities in England
2. The formula that distribute funding for the health service should include a Market Forces Factor (MFF) to reimburse these cost differences
3. An MFF is appropriate for nurses but not doctors

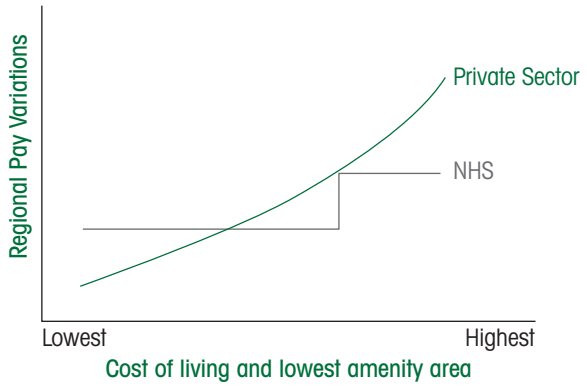
Background

In the financial year 2008-09 the Treasury's current expenditure was £441 billion. 25% (£111 billion) was spent on health with just under £96 billion going to the NHS in England. Central government funds for the health service in England are distributed according to a formula. The formula measures the need for health services and variations in the costs of providing these services. The adjustment for cost takes account of unavoidable differences in the local price of labour, land and the other inputs that are required to provide these services and is called the Market Forces Factor (MFF). This research reviewed the theoretical underpinnings for that formula and hence the case for an MFF. The research was commissioned as part of a review of the resource allocation formula conducted by the Department of Health in England.

The theory underpinning the MFF is that the recruitment and retention of medical and nursing professionals to the NHS is strongly influenced by what happens in private sector labour markets. We observe that pay in the private sector differs between regions. These differences are driven by the need to compensate employees for differences in the cost-of-living and the amenities (the attractiveness) of working in different parts of England. The regional pattern of private sector pay therefore indicates the appropriate pattern of pay for NHS staff and is used to generate the MFF.

However the way that pay is set in the NHS is very different from the way it is set in the private sector. In the NHS it is set by Review Bodies, which establish national, UK-wide, rates of pay. Pay in the NHS reveals much less regional variation than pay in the private sector. As a result the wage premium for working in the highest cost, least attractive area is less in the NHS than it is in the private sector. A stylised representation of the differences in the regional patterns of pay in the two sectors is shown in Figure 1.

Figure 1: Regional Patterns of Pay after controlling for all Measurable Differences



Where the regional pattern of pay in the private sector differs from the regional pattern for pay in the NHS, this will affect the ability of the NHS to attract and retain the staff it needs. The NHS will experience higher indirect labour costs, higher labour turnover and vacancies, in those areas in which the regional wage premium is less than in the private sector.

The regional patterns of pay in the private sector and NHS can be identified and mapped by estimating Standardised Spatial Wage Differentials (SSWDs). SSWDs control for all measurable differences between regions in the composition of the workforce and industries, for we know that that such factors alter pay levels. Once we have controlled for these differences we can test for an association between differences in the patterns of pay and measures of recruitment and retention in the NHS. In the study vacancy rates were used to measure recruitment and retention, and multiple regression techniques are used to estimate the relationship between them and the regional patterns of pay.

Method

SSWDs for the private sector are generated by estimating:

$$\ln(w_{ij}) = x'\,\beta + v_j + \varepsilon_{ij}$$

where w_{ij} is the hourly earnings of individual i who works in the private sector of the economy in area j, the vector x contains all the control variables (age, age^2, gender, year dummies, industry dummies and occupational dummies), v_j are the area-specific effects and ε_{ij} are the individual-specific error terms. The area-specific effects represent the SSWDs and are estimated using a dummy variable for each area.

The SSWDs are expressed on the log scale but the MFF is required as an adjustment on the original wage scale. The MFF is obtained by exponentiating the smoothed SSWDs and expressing these relative to the SSWD for all of Britain ($\bar{v}$):

$$\mathrm{MFF}_j = 100^* \frac{\exp(v_j)}{\exp(\bar{v})}$$

We tested for an association between vacancies and the SSWD gap, calculated as the private sector SSWD *minus* the NHS SSWD. Thus it measures differences between the premia employees in the private sector and those in the NHS receive for working in a particular area. The specification is as follows:

$$V_{jk} = \alpha + \gamma\,(\mathrm{SSWD}_j^{\mathrm{RIVATE}} - \mathrm{SSWD}_k^{\mathrm{NHS}}) + z'\delta + \varepsilon_{jk}$$
$$= \alpha + \gamma\,\mathrm{SSWD}_{jk}^{\mathrm{GAP}} + z'\delta + \varepsilon_{jk}$$

where the dependent variable is the vacancy rate, k denotes the k^{th} hospital trust which is located within LAD j, $\mathrm{SSWD}_k^{\mathrm{NHS}}$ is the SSWD for the NHS staff group at trust k, $\mathrm{SSWD}_j^{\mathrm{PRIVATE}}$ is the SSWD for the private sector in LAD j, and z is a vector of control variables. We expect to find a positive relationship between the MFF gap and vacancies.

Data

The empirical analysis uses improved data from the Annual Survey of Hours and Earnings (ASHE). ASHE is an annual employer survey where the sample frame is a 1% random sample of the employed population. This gives approximately 200,000 observations per year. The data was made available at the individual level for 2003-5. The data include part-timers, uses the ASHE employee population weights and pools observations across three years. The geography of labour markets in England is specified as 354 Local Authority Districts (LADs).

Results

Table 1 reveals the importance of standardising in the construction of the MFF. The results show clearly that as we add in further controls in Columns (2) to (4) the scale of wage variation decreases; the standard deviation and the decile range steadily decrease, the minimum increases and the maximum reduces. The adjusted R^2 rises steadily from 0.139 without controls to 0.640 using the full set of controls available.

Table 1: Distribution of estimated MFFs with different control variables

Statistic	(1)	(2)	(3)	(4)	(5)
	LAD identifiers only	Model (1) with age and sex dummies added	Model (2) with occupational dummies added	Model (3) with industry dummies added	Model (4) with part-time dummy added
Mean	103.3	103.1	101.3	101.2	101.2
Standard Dev.	21.2	19.6	10.9	10.2	10.1
Minimum	61.5	72.6	80.8	82.1	82.5
10th centile	84.4	85.7	91.2	91.8	91.6
50th centile	98.1	97.9	98.6	98.5	98.4
90th centile	128.6	126.4	114.4	114.9	114.7
Decile range	44.2	40.7	33.2	23.1	23.1
Maximum	250.4	237.7	166.6	159.4	158.6
Adj. R^2	0.139	0.334	0.621	0.639	0.640

For the calculation of these statistics, each LAD value assumes equal weight. The decile range is the difference between the 90th and 10th centiles of the distribution.

In Table 2 the results of the model for nurses is reported. The gap between the SSWDs for all employees in the private sector and SSWDs for NHS nurses, (GLM-NHS) is constructed using data from ASHE. For nurses, the MFF gap is significantly ($p<0.05$) and positively associated with vacancies as predicted: the greater the gap between the regional premia in the private sector and those in the NHS the higher the NHS nursing vacancy rate. Controls are included but not reported for hospital types.

The results are different for doctors; they are presented in Table 3. The relationship between vacancy rates and the MFF gap is negative. Vacancies are lowest where the gap is higher – vacancies are lower in high cost areas. The model was extended by including a measure of the private earnings of doctors in different areas. If doctors earn more from private practice in high cost areas this may explain lower vacancy rates in these areas. However it is insignificant - though this may be because it is measured at an aggregate Strategic Health Authority level. The coefficients on all the dummies for hospital type are positive. In particular, the coefficient for Acute, Community, Multi-services and Others hospital types are significant, indicating that these hospitals find it easier to fill vacancies relative to the reference category, Acute Specialist hospitals.

Table 2: Zero Inflated Negative Binomial regression model of number of nurse vacancies

Source of NHS pay data	ASHE		
Variable	Coefficient	Standard Deviation	Significance
SSWD Gap (GLM-NHS)	0.023	0.006	0.000
Log likelihood	-1250.956		
Cragg & Uhler's R^2	0.377		
Vuong test (ZINB vs NB)	0.72 (sig = 0.2358)		

Dispersion = Nr of established posts, Nr of obs = 260 hospital trusts. Standard errors are clustered by LAD geography and are robust. All estimations are inflated by the gap SSWD, other variables are excluded from the inflation process due to multicollinearity.

Table 3: Zero Inflated Negative Binomial regression model of number of doctor vacancies

Model	GLM		
Variable	Coefficient	Standard Deviation	Significance
SSWD Gap (GLM-NHS)	-0.008	0.003	0.018
Foundation Trust	-0.449	0.168	0.008
Private earnings	-0.005	0.014	0.722
Hospital type[1]			
Acute	0.781	0.295	0.008
Teaching	0.139	0.324	0.667
Community	0.803	0.324	0.013
Multi-services	1.473	0.304	0.000
Other	1.167	0.333	0.000
Constant	-3.809	0.386	0.000
Log-likelihood	-881.625		
Cragg & Uhler's R^2	0.396		
Vuong test (ZINB vs NB)	1.89 (sig 0.0291)		

Dispersion = Nr of established posts, Nr of obs = 245 hospital trusts. Standard errors are clustered by LAD geography and are robust. All estimations are inflated by the gap SSWD, other variables are excluded from the inflation process due to multicollinearity.

Discussion

The analysis reveals a significant association between the spatial pattern of pay in the private sector and the vacancy rates of nurses. The findings reveal that the labour markets in which the NHS recruits nurses are connected to the private sector and the differences in the patterns of regional pay variations between the NHS and private sector alter the recruitment and retention of nurses. These findings provide empirical underpinnings for the application of an MFF for nurses.

In contrast the analysis reveals that there is no association between the spatial pattern of private sector pay and NHS doctor vacancy rates. Indeed the analysis suggests that doctors are attracted to areas where the cost of living is higher and area amenities are lower. The analysis shows that the choice over job location for medical staff is determined less by current pay than by other factors and hospitals located in high costs areas find it easier to fill medical vacancies. There is no case for an MFF for doctors.

References

Elliott, R. A Ma, A Scott, D Bell, and E Roberts (2007) "Geographically differentiated pay in the labour market for nurses", *Journal of Health Economics*, Vol. 26, Issue 1, pp. 191-212.

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