Appendix 1. Calculation of marginal effects and standard errors from the probit model of part/full-time choice (Results in Supplementary Table 1).

Following Norton *et al*,[1] the estimated marginal effect of a continuous variable, x_k, in the probit model is given by:

$$\frac{\partial \Phi(u)}{\partial x_k} = b_k \Phi'(u)$$

where Φ is the standard normal cumulative distribution and u is the regression equation $b_1 x_1 + b_2 x_2 + \cdots + b_K x_K$ evaluated at the means of the variables. If the continuous variable is interacted with another variable x_l the marginal effect is given by:

$$\frac{\partial \Phi(u)}{\partial x_k} = (b_k + b_{kl} x_l)\Phi'(u)$$

where b_{kl} is the coefficient for the interaction term. The *interaction effect* depends on whether x_l is discrete or continuous. When x_l is discrete the interaction effect is given by:

$$\frac{\Delta(\partial \Phi(u)/\partial x_k)}{\Delta x_l} = (b_k + b_{kl})\Phi'(u_1) - b_k \Phi'(u_0)$$

where u_1 and u_0 denotes the regression equation with x_l set to 1 and 0 respectively and the remaining variables are set to their mean values.

The marginal effect of a discrete variable, x_k, is given by:

$$\frac{\Delta \Phi(u)}{\Delta x_k} = \Phi(u_1) - \Phi(u_0)$$

where u_1 and u_0 denotes the regression equation with x_k set to 1 and 0 respectively and the remaining variables are set to their mean values. The *interaction effect* of a discrete variable, x_k, interacted with another discrete variable, x_l, is given by:

$$\frac{\Delta^2\Phi(u)}{\Delta x_k \Delta x_l} = \left[\Phi(u_{11}) - \Phi(u_{01})\right] - \left[\Phi(u_{10}) - \Phi(u_{00})\right]$$

where u_{xx} denotes the regression equation with: both x_k and x_l set to 1 (u_{11}), both x_k and x_l set to 0 (u_{00}), x_k set to 0 and x_l set to 1 (u_{01}), x_k set to 1 and x_l set to 0 (u_{10}). Standard errors of the marginal effects are estimated using the delta method.

Decompositions of differences in mean hours of male and female GPs

The estimated OLS hours regression equation in Supplementary Table 2 is

$$h_i = b_0 + b_1P_i + b_2F_i + b_3x_i + b_4F_ix_i + b_5w_i$$

where h_i is weekly hours worked for GP i, P_i is a (1,0) indicator variable for part-time or full-time status, F_i is a (1,0) indicator variable for female or male, x_i is a vector of variables whose effect may vary by gender, and w_i a vector of variables whose effects are the same for male and female GPs. The actual mean hours worked for male and female GPs are equal to the estimated regression coefficients multiplied by the mean values of the variables for male and female GPs:

$$h^m = b_0 + b_1P^m + b_20 + b_3x^m + b_40x^m + b_5w^m = b_0 + b_1P^m + b_3x^m + b_5w^m$$

$$h^f = b_0 + b_1P^f + b_21 + b_3x^f + b_41x^f + b_5w^f = b_0 + b_1P^f + b_2 + (b_3 + b_4)\,x^f + b_5w^f$$

where the superscripts denote the mean value of the variables for males and female GPs.

Subtracting h^f from h^m

$$h^m - h^f = (P^m - P^f)b_1 + [b_3 - (b_3 + b_4)]x^f + (0 - 1)b_2 + (x^m - x^f)b_3 + (w^m - x^w)b_5$$

$$= (P^m - P^f)b_1 + (-b_4)x^f + [(-1)b_2 + (x^m - x^f)b_3 + (w^m - w^f)b_5]$$

= (a) + (b) + (c)

so that the difference in mean hours worked by male and female GPs is decomposed into components due to

(a) male GPs' lower probability of working part-time ($P^m < P^f$) and the reduction in the hours of part-time GPs ($b_1 < 0$);

(b) the differential effect of the family circumstance variables (x) on male and female GPs;

(c) the differences between the average values of the personal and practice characteristics of male and female GPs.

Reference

1. Norton EC, Wang H, Ai C. Computing interaction effects and standard errors in logit and probit models. *The Stata Journal* 2004; **4:** 154–167.

