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.\textsuperscript{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 $\Phi$ 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:
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\[
\frac{\Delta^2 \Phi(u)}{\Delta x_l^2} = [\Phi(u_{11}) - \Phi(u_{01})] - [\Phi(u_{10}) - \Phi(u_{00})]
\]

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

\[
h_i = b_0 + b_1 P_i + b_2 F_i + b_3 x_i + b_4 F_i x_i + b_5 w_i
\]

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:

\[
h^m = b_0 + b_1 P^m + b_2 0 + b_3 x^m + b_4 0 x^m + b_5 w^m = b_0 + b_1 P^m + b_3 x^m + b_5 w^m
\]

\[
h^f = b_0 + b_1 P^f + b_2 1 + b_3 x^f + b_4 1 x^f + b_5 w^f = b_0 + b_1 P^f + b_2 + (b_3 + b_4) x^f + b_5 w^f
\]

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

Subtracting \(h^f\) from \(h^m\)

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

\[
= (P^m - P^f) b_1 + (-b_4) x^f + [(-1) b_2 + (x^m - x^f) b_3 + (w^m - w^f) b_5]
\]
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\[ = (a) + (b) + (c) \]

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