The consequences of early menopause and menopause symptoms for labour market participation

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ABSTRACT

Using a difference-in-difference estimator we identify the causal impact of early menopause and menopause symptoms on the time women spend in employment through to their mid-50s. We find the onset of early natural menopause (before age 45) reduces months spent in employment by 9 percentage points once women enter their 50s compared with women who do not experience early menopause. Early menopause is not associated with a difference in full-time employment rates. The number of menopause symptoms women face at age 50 is associated with lower employment rates: each additional symptom lowers employment rates and full-time employment rates by around half a percentage point. But not all symptoms have the same effects. Vasomotor symptoms tend not to be associated with lower employment rates, whereas the employment of women who suffer psychological problems due to menopause is adversely affected. Every additional psychological problem associated with menopause reduces employment and full-time employment rates by 1–2 percentage points, rising to 2–4 percentage points when those symptoms are reported as particularly bothersome.

1. Introduction

The onset of menopause can lead to a range of health problems which can be debilitating. Symptoms can be numerous and can persist for some years. They can include physical health difficulties, such as vasomotor problems (hot flushes, and night sweats), psychological issues (such as tearfulness, irritability, anxiety and depression) or a combination of symptoms. The early onset of menopause (before age 45) can lead to additional health complications. Although there is a growing social science and medical literature on the antecedents to early menopause, and increased recognition of the needs of those suffering debilitating symptoms, there is little research into the employment and career consequences of menopause for women. Indeed, the issue is still taboo in some quarters, leading *Financial Times* journalist Janina Conboye to argue that "in most workplaces it remains an uncomfortable topic" (Conboye, 2021). Nevertheless, some maintain that the menopause results in millions of days lost through absenteeism and that, when faced with employers' lack of understanding and poorly developed policies and practices to assist women facing menopausal issues, many women choose to leave employment rather than tackle their employers on the issue.

The small literature on the impact of menopause on labour market participation, reviewed in Section Two, suggests that it can have substantial impacts on women's absenteeism, their career progression, and their treatment by colleagues and supervisors. However, in a recent systematic review of the literature Brewis et al. (2017: 67) conclude: "there is no work in the evidence base that estimates the cost of the menopause transition for women's economic participation in the UK".

We contribute to this literature by providing those estimates. We do so by identifying the causal effect of early menopause and menopausal symptoms on the time women spend in employment and full-time employment through to age 55 for a birth cohort of women born in a single week in 1958. Using a difference-in-difference estimation strategy described in Section Three we find the early onset of menopause (before age 45) reduces months spent in employment by 9 percentage points once women enter their 50s compared with women who do not experience early menopause. Early menopause is not associated with a difference in full-time employment rates. The number of menopause symptoms women face as they approach age 50 is associated with lower employment rates: each additional symptom lowers employment rates and full-time employment rates by around half a percentage point. These effects are larger for symptoms which women say "bother me a lot". For

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each bothersome symptom employment rates fall by around 2 percentage points, and full-time employment rates fall by a little over half a percentage point. But not all symptoms have the same effects. Vasomotor symptoms tend not to be associated with lower employment rates, whereas the employment of women who suffer psychological problems due to menopause is affected. Every additional psychological problem associated with menopause reduces employment and full-time employment rates by 1–2 percentage points, rising to 2–4 percentage points when those symptoms are reported as particularly bothersome.

The remainder of the paper is set out as follows. Section Two reviews the previous literature on the effects of menopause on labour market outcomes. Section Three describes the data and estimation strategy used in the paper. Section Four presents findings and Section Five concludes.

2. Previous literature

Menopause is the point in a woman's life when she stops menstruating and has been 12 months without a menstrual period. This commonly occurs around the age of 50, though the transition (perimenopause) begins earlier and symptoms can begin during the perimenopause and may continue for some years after menopause. Those symptoms can be many and varied, and include sweats, joint aches and pains, hot flushes, night sweats, trouble sleeping, fatigue, palpitations, dizziness, severe headaches and migraines, irritability and mood swings, anxiety and depression, tearfulness, panic, forgetfulness and poor concentration. There is some debate as to which symptoms are specifically related to menopause rather than other age-related transitions (Mishra and Kuh, 2012; Kuh et al., 1997). Women can experience a variety of these symptoms in combination and experience them as more or less 'bothersome'. We shall present data on their incidence and how 'bothersome' the symptoms were in our sample of women born in 1958 in Section Three.

In a recent critical review of the literature Atkinson et al. (2021) argue that symptoms experienced around menopausal transition can affect women's experience of work but, at the same time, work can exacerbate a woman's symptoms. They cite studies suggesting that women's concerns about the reactions of colleagues and supervisors make it difficult to discuss menopausal symptoms at work: "where women disclose, they may be brushed aside, made fun of, criticised, bullied or become subject to performance management and ongoing capability monitoring" (op. cit. p.52). The authors cite three UK employment tribunal cases in which women have successfully argued that they have been subject to unfair dismissal and direct sex discrimination based on their menopausal status. However, it appears more common for women simply to quit their jobs when confronted by such attitudes. In most cases, women choose not to disclose their menopause-related health problems (Griffiths et al., 2013).

In the absence of support, women often over-compensate by "working extremely hard to hide their self-perceived shortcomings resulting from their menopausal symptoms" (Kopenhager and Guidozzi, 2015: 373). This often results in emotional exhaustion and 'burnout' (Converso et al., 2019). In a large American survey of women in midlife, those reporting menopausal symptoms reported significantly lower levels of health-related quality of life, work impairment and greater healthcare utilization than observationally equivalent women who did not report menopausal symptoms (Whiteley et al., 2013).

Not all studies find menopause impacts women at work. For example, in a small study of midlife women in the UK Hardy et al. (2018) found menopausal status was not associated with women's self-reported work performance and absence. Using panel data from the American National Longitudinal Survey of Young Women Mvundura (2007) finds few differences in labour force participation during menopause transition, and no effect of early menopause. But in reviewing the literature Brewis et al. (2017: 24–29) indicate that most studies find a negative relationship between menopausal symptoms and performance at work, and that these are more pronounced with more severe symptoms.

A sizeable proportion of perimenopausal and menopausal women not in receipt of hormone therapy report moderate or severe menopausal symptoms (Reed et al., 2009). In a large American study those who sought medical care for their symptoms, as identified through medical health care insurance claims, had significantly higher sickness absence and lower hourly and annual productivity relative to a matched sample of women not making such claims (Kleinman et al., 2013). A much smaller survey of Dutch women in midlife indicated that those with severe menopausal symptoms were more likely to have serious problems dealing with the physical and mental demands of their work, risking prolonged sickness absence (Geukes et al., 2016). These studies lend support to the idea that those suffering particularly severe symptoms face particularly adverse employment consequences.

The most effective treatment for serious adverse symptoms of menopause is Hormone Replacement Therapy (HRT). There are concerns regarding adverse health consequences of HRT including a potential elevated risk of ovarian cancer (Collaborative Group on Epidemiological Studies of Ovarian Cancer (2015). Nevertheless, using data from the American Medical Expenditure Panel Survey Daysal and Orsini (2014) find HRT use increases short-term employment of women aged 40 to 55 by 2.4 percent. The short-term employment effects are estimated to have been much larger among a group of women who were induced to stop taking HRT due to adverse publicity about the long-term health consequences of HRT. (Concerned about the potential endogeneity of HRT use due to women with greater motivation to work taking up HRT they instrument for its use using the panel structure of their data. Specifically, they use the age of women at the time public health warnings were issued following the publicity surrounding findings from the Women's Health Initiative Study (WHIS) in 2002 and its impact on subsequent HRT take-up).

In their review of the literature for the Department of Education Brewis et al. (2017: 64) suggest that bothersome physical and psychological menopause symptoms may affect both the extensive and intensive margins of women's labour supply. At the extensive margin, loss of employment results in lower earnings and employment benefits, as well as accrued pension rights, together with the lost psychological benefits of working such as self-esteem.

The menstrual cycle prior to menopause also impacts women's earnings and career progression. In their study of personnel records from a single Italian bank Ichino and Moretti (2009) show the absence taking of women under age 45 follows a 28-day cycle that is not apparent among men nor among women aged 45 and over. This is consistent with a causal impact of the menstrual cycle on absence taking. The increase in absenteeism due to the menstrual cycle feeds through to lower earnings, accounting for 2 of the 13.5 percentage point gender wage gap among these workers. It also explains part of the gender gap in the probability of promotion to management.

3. Data and estimation

3.1. Data

Our data are the National Child Development Survey (NCDS) which is a birth cohort survey following all those born in one week in England, Scotland and Wales in 1958 (http://www.cls.ucl.ac.uk/ncds). We use data collected at birth and in subsequent follow up surveys at ages 7, 11, 16, 23, 33, 42, 44, 46, 50 and 55 including work histories from which we construct participation in employment and full-time employment pre- and post-menopausal onset. Because ours are panel data containing multiple observations on individuals over time we cluster standard errors at the level of the individual in our estimation.

Our dependent variables are time in employment and time in full-time employment derived from work histories in which survey respondents report the month and year in which employment spells started and ended. We derive cohort members' main employment activity each month for the 35 years from age 20 to age 55 and then use these to

establish what the respondent's main activity was over the course of the year. Periods of employment include all paid work (as an employee or self-employed), whether the respondent knows hours of work or not. Full-time employment includes only those spells as an employee or self-employed where the respondent says she works at least 30 h per week.

Of the 4897 women in the sample 583 had missing work history data in at least 5 years. These observations were dropped from the estimation sample. We reran estimates including these cases to see how sensitive results were to their omission. Doing so meant imputing missing years using the averages across those years in which their work history data were not missing. Results were robust to their inclusion.

Our data permit us to identify women who had surgery removing their ovaries or womb and those who had hormone replacement therapy (HRT) before the end of menstruation. These can affect the experience of menopause and its timing, as well as influencing labour market prospects. We remove these women (unweighted N = 909) from our baseline estimation sample but check the sensitivity of our results to their inclusion. We refer to these robustness checks in the text.

Among the estimation sample (those with fewer than 5 years missing work history data who had not had surgery or HRT, N = 3405) the mean employment rate between the ages of 20 and 55 was 72 percent (minimum of 59 percent, maximum of 83 percent) while the mean full-time employment rate was considerably lower at 47 percent (minimum of 39 percent and a maximum of 59 percent).

To illustrate trends in women's employment over the life-course Fig. 1 presents employment rates (blue line) and full-time employment rates (red line) by age between ages 20 and 55 for those in our estimation sample. Women's employment rates rise from their late 20s, peaking in their late 40s, after which point they fall. Full-time employment follows a very different pattern. Women's relatively high full-time employment rates fall precipitously during their 20s, reaching a low point in their early 30s before rising steadily in their 30s and 40s before dipping once again in their 50s.

3.1.1. Menopause treatment variables

Information on menstrual periods was collected at age 44/45, 50 and 55 in the NCDS. Women were asked if they had menstrual periods in the past 12 months. In the presence of amenorrhea, they were asked if they had had periods in the past 3 months. Women with no periods in the past 12 months were asked about their age and month at their final menstrual period and the reason for amenorrhea. All women were also asked about changes in the regularity of their menstrual cycles in the last few years or before their final menstrual period. Natural menopause was defined as at least 12 consecutive months of amenorrhea not induced by surgery or other medical treatment. If this occurred before age 45 we classified women as having gone through early menopause. The age cut off for early menopause we use is also the one used by the National Health

Service (https://www.nhs.uk/conditions/early-menopause/) and in the literature (Mishra et al., 2019). Five percent of our estimation sample had done so (Table 1).

Our analyses of the impact of menopause symptoms on employment and full-time employment are based on the number and type of menopause symptoms reported in the 12 months prior to the survey interview at age 50. Women were asked: "Some women report a number of symptoms associated with menopause. The next few questions are about any symptoms you may have experienced over the last 12 months". They were asked whether or not they had suffered any symptoms in the last 12 months and, if so, the extent to which the symptom "didn't bother me", "bothered me a little" or "bothered me a lot". Where respondents said "a lot" we counted these as "bad" symptoms. They were prompted with 20 symptoms namely: trouble sleeping; joint aches and pains; breast tenderness; hot flushes; palpitations; dizziness; pins and needles in hands; skin crawling sensation; irritability; anxiety/depression; tearfulness; feelings of panic; forgetfulness; cold sweats/night sweats; vaginal dryness; difficulties with intercourse; more frequent passing of urine; passing urine when didn't mean to; painful passing of urine; frequent severe headaches/migraine. They were also asked to identify any others. Respondents reported up to 22 symptoms with a mean of 7.55, and up to 18 'bothersome' symptoms with a mean of 1.63.

We ran factor analysis from a tetrachoric correlation matrix for the binary variables for each symptom with varimax rotation to establish whether there were high inter-item correlations between some symptoms suggesting that they loaded on a common factor. We identified two factors with eigenvalues above one with high scale reliability coefficients. The first was based on six items capturing aspects of psychological health, namely anxiety/depression, tearfulness, panic, forgetfulness, palpitations and irritability. Using these six items we constructed an additive scale, which we termed psychological health symptoms. The scale had a reliability coefficient (alpha) of 0.73 and ran from 0 to 6 with a mean of 2.76. The second factor captured vasomotor-related symptoms, namely hot flushes and night sweats, together with trouble sleeping which is likely a result of the night-time symptoms. The alpha scale reliability coefficient for this three-item scale was 0.64 and had a mean of 1.76.

3.1.2. Control variables

Throughout we condition on variables derived from the first six waves of NCDS through to age 33. The choice of controls was informed by parallel work using these data examining the antecedents to early menopause (Peycheva et al., 2021) and our knowledge of factors influencing employment outcomes over the life-course in NCDS (Parsons et al., 2021; Bryson et al., 2020). Initially we experimented with the full set of risk factors linked to menopausal experiences identified by Peycheva et al. (2021) in their review of the literature and their own empirical work with NCDS (and the British Cohort Study). The final set of controls used in our estimation are the subset of variables which played some role in one or more models. They include the following sets
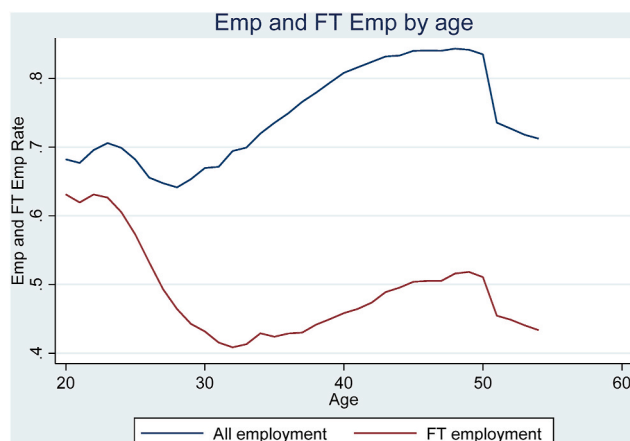

Fig. 1. Employment and full-time employment rates over the life-course.

Table 1

Descriptive information on early menopause and menopause symptoms.

	Min	Max	Mean	St. Dev.
Treatment:				
Early menopause	0	1	.051	.219
Number of menopause symptoms	0	22	7.55	4.13
Number of 'bothersome' menopause symptoms	0	18	1.63	2.39
Number of psychological health menopause symptoms	0	6	2.66	1.84
Number of 'bothersome' psychological health menopause symptoms	0	6	.551	1.12
Number of vasomotor symptoms	0	3	1.67	1.13
Number of 'bad' vasomotor symptoms	0	3	.275	.446

Notes: (1) This baseline sample excludes those on HRT and those who had womb or ovaries removed. (2) N observations = 3405.

of variables. First, those collected at the time of the cohort member's birth:

- father's social class provided by the cohort member's mother and coded to the Registrar-General's social classes;
- birth weight recorded by the midwife;
- number and age of siblings.

Second, we include controls collected during the cohort member's childhood, namely:

- time breast-fed (collected from the mother at Sweep 1 in 1965);
- score on conduct behavioural adjustment problems at age 7 using the Rutter parental questionnaire (Rutter et al., 1970). Our additive scale sums the number of times the mother identifies a problem that applies to their child;
- score on the Bristol Social Adjustment Guide completed by the teacher when the child was aged 7 (Shepherd, 2013; Stott, 1987);
- count of childhood illnesses and health difficulties reported by mother at age 7;
- standardised reading and maths scores administered to cohort members at age 11 by teachers (Shepherd, 2012);
- Body Mass Index (BMI) calculated in medical examination at age 16;
- ever smoked asked of cohort member at 16;
- had an alcoholic drink in week before cohort member interviewed at age 16;
- frequency of physical exercise asked of cohort member at age 16.

Third, we include controls collected at later sweeps from the cohort member in adulthood, namely:

- number of children at ages 23 and 33;
- highest qualification at age 33;
- self-assessed health, long-standing illness, number of health problems, and score on a Malaise Inventory capturing psychological distress and depression (Rutter et al., 1970), all recorded at age 33;
- and ever taken a contraceptive pill by age 42.

We also include the number of survey sweeps responded to and the number of years in which work history data are missing to net-out sources of noisiness in the data. To retain sample size we retain cases with item non-response on categorical variables by incorporating an additional 'missing' category. We recode missing observations on continuous variables to their mean values and add a dummy variable to identify those observations (Little and Rubin, 2020). In the robustness checks including those with HRT or surgery we also incorporate dummy variables for these variables Descriptive statistics on these controls for the estimation sample are presented in Appendix Tables A1 and A2.

3.2. Difference-in-difference estimation

To estimate the impact of menopause symptoms and early menopause on employment we adopt a difference-in-difference strategy which compares employment rates for affected women (the 'treated' women) and unaffected women (the 'control' group) in a pre-treatment period with their employment rates in a post-treatment period. Let the variable M denote menopausal treatment. In the case of early menopause this is a dummy variable where 0 indicates individuals who do not go through early menopause, the control group, and 1 indicates individuals who go through early menopause. The difference in the mean differences between the treated and control groups in the pre- and post-treatment periods is our estimate of the impact of early menopause on employment participation. In the case of menopause symptoms M is a count variable identifying the number of symptoms a woman reports, so our estimates will capture the intensity with which menopause symptoms were experienced.

Formally the difference-in-difference estimator takes the following form:

$$y_i = \propto + \beta M_i + \gamma t_i + \delta(M_i.t_i) + \varepsilon_i$$

where y_i is our outcome of interest – either employment or full-time employment – for individuals i, $\propto$ is a constant term; β is the coefficient capturing the treatment group specific effect in the pre-treatment period (to account for average permanent differences between the treated and control groups); γ is the time trend common to control and treatment groups; δ is the parameter capturing the treatment effect, which is the interaction between treatment and being observed in the post-treatment period; ε is a random unobserved error term containing all determinants of y_i which are omitted from our model.

To estimate effects of menopause using a difference-in-difference strategy one needs to establish a moment in the lifecycle that clearly pre-dates menopause ('before') and one that post-dates menopause ('after'). This is not straightforward because although there are identifiable reproductive stages in women's lives (pre-menopause, perimenopause, climacteric and post-menopause) there is debate about when these stages stop and start, in part reflecting heterogeneity in women's experiences (Harlow et al., 2012; Brewis et al., 2017: 17–19).

In our data menopause symptoms are captured at age 50 for the previous year, while early menopause status is identified as the cessation of menstruation before age 45, a variable derived from information asked of women at surveys undertaken at ages 44/45 (biomedical sweep), 50 and 55 (see Section 3.1.1).

We measure employment rates in the 'before' stage as employment between the ages of 20 and 33. Employment rates in the 'post' period are measured between age 50 and age 55. The t_i variable capturing time in the above estimator is a categorical variable dividing age into the pre-period (before age 33), which is used as the reference category, the period between ages 33 and 49, and the post-period between ages 50 and 55. It is the interaction between the 'post-period' and treatment status that captures the difference-in-difference impact of menopause on employment.

We cluster standard errors at the level of the individual to account for autocorrelation and heteroskedasticity. Using a robust estimator we found no evidence of serial correlation, something that can affect difference-in-difference estimates (Bertrand et al., 2004).

3.2.1. Common trends assumption

The credibility of causal inference in difference-in-difference estimation relies on the assumption that, in the absence of treatment, trends over time in the dependent variable would have been common across treated and control groups. The assumption is not testable because the counterfactual employment trends that would have obtained in the post-period for treated in the absence of their treatment is not observed. Instead, it is common practice to test for common trends in the pre-period. If this test is satisfied one might reasonably infer common trends would have obtained in the post-period in the absence of treatment. We do not account for potential biases that may arise when treatment effects may vary over time (Goodman-Bacon, 2021).

We test for common trends by running employment and full-time employment models through to age 33 incorporating the controls described above, together with terms interacting the cohort member's age with subsequent treatment status. We test for the joint statistical significance of these interaction terms. If an F-test rejects their joint significance we can assert that employment trends did not depart significantly in the pre-period among those who go on to be treated and those who are their controls. The p-values for those F-tests are presented in Appendix Table A3. They are statistically non-significant (except in one instance when the dependent variable is full-time employment, but even here they are only on the margins of statistical significance). We infer, therefore, that the common trends assumption on which causal inference with difference-in-difference is based is not violated in our

case. Results are almost identical throughout when we rerun the models with the age*interaction terms only having dropped the control variables.

4. Results

4.1. Early menopause

Fig. 2 illustrates the employment patterns of women who go on to experience early menopause versus those who do not. The employment rates of women who experience early menopause rise until their 40s at which point they flatten before declining in their mid-40s. In contrast, the employment rates of those who do not experience early menopause continue to rise until their 50s. Both groups of women experience rapid declines in their employment rates in their 50s, but the decline is much steeper for those who had experienced early menopause. It is notable that employment rates for women who go onto experience early menopause are below other women in their 20s too, something we might not have expected. Although the dip in their employment in their early 20s appears steeper than that for other women, this proves not to be the case statistically (see Section 3.2.1).

The picture for participation in full-time employment in Fig. 3 looks quite different. The full-time rate of those who go on to experience early menopause lies below that of those who do not in their 20s, though the decline in full-time employment rates over that period follows a similar course. Full-time employment rates for those who experience early menopause appear to track other women's full-time employment rates subsequently. If anything, those who experience early menopause seem to be a little more likely to be found in full-time employment.

Table 2 presents the employment and full-time employment rates of women who experience early menopause and those who do not for three separate episodes in their lives, namely between the ages of 20 and 32, 33 to 49, and 50 to 55. The differences in the rates up to age 32 and from age 50 to 55 capture the raw difference-in-difference estimates without controlling for potential confounders. The 9-percentage point deficit in employment rates associated with early menopause is statistically significant at a 95 percent confidence level. There is no significant difference in full-time employment rates.

Table 3 presents difference-in-difference estimates of the impact of early menopause on employment and full-time employment rates implementing the equation in Section 3.2. The full models are presented in Appendix Table A4. Column 1 shows that the employment rates among women rose significantly after age 33 compared to earlier years (0.113, t = 19.27) then fall a little when women are in their 50s, though
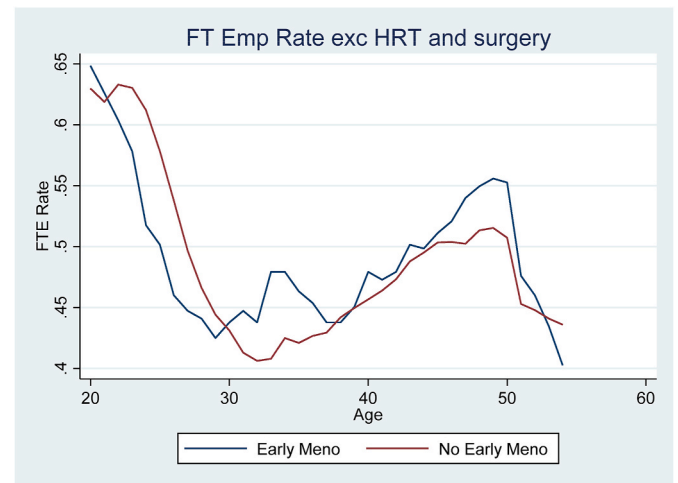

Fig. 3. Full-time Employment Rates over the Life-course: those who experience early menopause versus those who do not.

they remained well above their employment rates in their 20s and early 30s (0.076, t = 9.89). There is no significant difference in the employment rates of women who go on to experience early menopause and those who do not when they are in their 20s and early 30s (−0.006, t = 0.27), nor in their mid-30s and 40s (−0.019, t = 0.70). However, the employment rates of women in their 50s are significantly lower among women who had experienced early menopause than among those who had not, when compared against differences in their employment rates before the age of 33: the difference-in-difference is around 9 percentage points (−0.086, t = 2.35). The difference is a little smaller when the estimation sample includes women who had surgery removing their ovaries or womb and those who had hormone replacement therapy (HRT) before the end of menstruation (−0.07, t = 2.61). The difference-in-difference estimate of early menopause effects on employment rates is also a little smaller when estimated on the sample including those women with missing work histories for 5 or more years (−0.06, t = 1.63 excluding HRT/surgery cases and −0.06, t = 2.17 including HRT/surgery cases).

However, there is no evidence from column 2 that early menopause affected the full-time employment rates of women (0.023, t = 0.60). The implication is that the reduction in employment rates among those experiencing early menopause is primarily related to their reduced likelihood of engaging in part-time employment. These results are apparent whether one conditions on other potential confounders (Table 3) or not (Table 2).

The point estimates and standard errors in both the employment and full-time employment models are identical when using a robust estimator to account for potential serial correlation.

Since our definition of early menopause is at least 12 months of amenorrhea before age 45 it is arguable that we should be using age 45 and over as the cut-off defining the post-treatment employment spells. If we do this, results are very similar to those reported above, with a difference-in-difference estimate of employment rates of 8 percentage points (−0.081, t = 2.44) and no significant effect on full-time employment rates (0.028, t = 0.73).

4.2. Number of menopause symptoms in the year before age 50

As noted earlier, women cited up to 22 different menopause symptoms they were suffering in the year prior to their survey interview at age 50. Few (2.7 percent) suffered no symptoms, with the mean being 8 symptoms. The effects of menopause symptoms on women's employment and full-time employment are presented in columns 1 and 2 of Table 4 respectively.
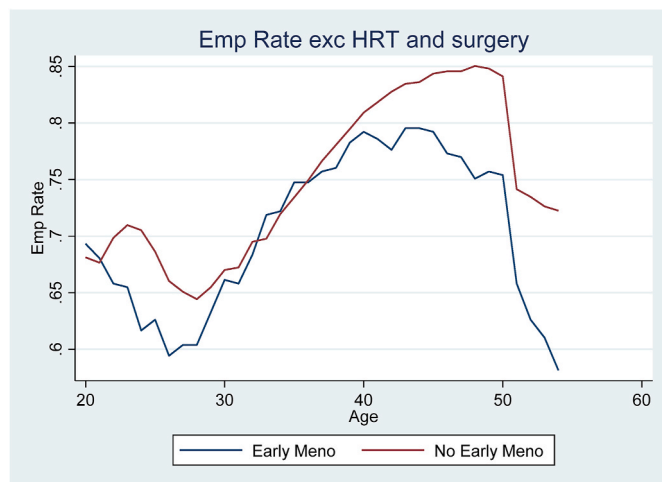

Fig. 2. Employment Rates over the Life-course: those who experience early menopause versus those who do not.

Table 2
Employment and Full-time Employment Rates by age for Women Who Experience Early Menopause and Those Who Do Not.

	Employment Rates			Full-time Employment Rates		
	No early menopause	Early menopause	Difference	No early menopause	Early menopause	Difference
20–32 years	.68	.65	-.03 (1.61)	.55	.53	-.02 (0.82)
33–49 years	.80	.74	-.06 (2.27)**	.47	.47	+.01 (0.24)
50+ years	.76	.64	-.12 (3.67)***	.46	.46	+.00 (0.03)
All	.75	.69	-.06 (2.87)**	.50	.49	-.00 (0.18)
Difference-in-difference			-.09 (2.35)**			+.02 (0.60)

Notes: (1) Sample N = 119,175 person-year observations and N = 3405 persons (2) Those using HRT and those with surgery are excluded. (3) The difference-in-difference figures in the bottom row are simply the difference in employment and full-time employment rates in the pre-treatment (aged 20–32) and post-treatment (aged 50+) periods for those who go through early menopause and those who do not. (4) t-statistics in parentheses (5) * = significant at 90% confidence level; ** = significant at 95% confidence level; *** = significant at 99% confidence level.

Table 3
Difference-in-difference estimates of the impact of early menopause on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.113 (19.27)***	-.084 (10.70)***
50+ Years	.076 (9.89)***	-.091 (9.60)***
Early Menopause	-.006 (0.27)	-.008 (0.34)
Early*33–49	-.019 (0.70)	.030 (0.91)
Early*50+	-.086 (2.35)**	.023 (0.60)
Constant	.334 (5.44)***	.507 (7.08)***
Adj. r-sq.	.089	.107

Notes: (1) Sample N = 119,175 person-year observations and N = 3405 persons (2) Those using HRT and those with surgery are excluded. (3) OLS estimation with standard errors clustered at the individual level. (4) Models contain all control variables included in Appendix Tables A1 and A2. (5) t-statistics in parentheses (6) * = significant at 90% confidence level; ** = significant at 95% confidence level; *** = significant at 99% confidence level.

Table 4
Difference-in-difference estimates of the impact of menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.128 (10.97)***	-.083 (5.30)***
50+ Years	.111 (7.12)***	-.053 (2.78)***
Menopause Symptoms	-.002 (2.04)**	-.004 (3.24)***
N symptoms*33–49	-.002 (1.57)	.000 (0.02)
N symptoms*50+	-.005 (2.85)***	-.005 (2.23)**
Constant	.351 (5.66)***	.555 (7.53)***
Adj. r-sq.	.090	.101

Notes: (1) See Table 3 for notes.

Each additional symptom reduced women's employment rates in their 50s by half a percentage point (−0.005, t = 2.85), compared to employment rates before age 33. This was also the case with respect to full-time employment rates (−0.005, t = 2.23). (The estimated effects were identical in the absence of conditioning variables.) Thus, a woman experiencing the mean number of symptoms might expect a reduction in her employment and full-time employment rates by around 4 percentage points, compared to a similar woman with no menopausal symptoms.

The effects of symptoms were similar when extending the sample to include those who had been on HRT or had surgery (−0.008, t = 4.89 in the case of employment rates and −0.005, t = 2.48 for full-time employment rates).

Going on to experience menopause symptoms just before age 50 was associated with a lower employment rate and lower full-time employment rate when women were in their 20s and early 30s as indicated by the coefficient for menopause symptoms in row 3 of Table 4. However, as noted earlier and as indicated in Appendix Table A2 row 2, employment trends did not differ in women's 20s and early 30s according to the

number of menopausal symptoms suffered subsequently, suggesting the common trends assumption holds.

Table 5 presents similar estimates where women report 'bothersome' menopause symptoms. These affected over half (56 percent) of women aged 50. The mean number of bothersome symptoms experienced was 1.9 symptoms. Each additional bothersome symptom lowered employment rates for women in their 50s by 1.7 percentage points (−0.017, t = 5.11) relative to those who had no bothersome symptoms, having controlled for employment differences prior to age 33 (column 1). Effects were about half the size for full-time employment (−0.008, t = 2.14 in column 2).

Once again, coefficients and standard errors for these effects were identical in the absence of control variables. Effects of bothersome symptoms on employment were even larger with the retention of HRT and surgery cases in the sample (−0.022, t = 8.27) but the effects for full-time employment were nearly identical (−0.007, t = 2.36).

4.3. Number of psychological health menopause symptoms in the year before age 50

As noted earlier, our factor analysis identified a factor based on six menopause symptoms relating to aspects of psychological health, namely anxiety/depression, tearfulness, panic, forgetfulness, palpitations and irritability. To establish the impact of these psychological health symptoms on women's employment we summed those six symptoms and interacted them with women's age to identify the difference in employment rates in their 50s between women who did and did not suffer these symptoms by age 50, compared to differences in these women's employment when they were aged less than 33 years. In identifying the effects of mental health problems brought on by menopause we ignore the other menopausal symptoms women may suffer. They are not controlled for in this analysis.

Table 6 column 1 presents the employment impact of psychological health problems accompanying menopause. The coefficient interacting the number of psychological health symptoms with being aged 50 or over indicates that employment rates fell by 1.3 percentage points (−0.013, t = 3.08) for each additional psychological health symptom. This suggests that women with the mean number of psychological health

Table 5
Difference-in-difference estimates of the impact of 'bothersome' menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.120 (17.35)***	-.088 (9.61)***
50+ Years	.099 (10.97)***	-.078 (6.92)***
N Bothersome Menopause Symptoms	-.004 (1.98)**	-.005 (2.23)**
N bothersome symptoms*33–49	-.005 (2.02)**	.004 (1.22)
N bothersome symptoms*50+	-.017 (5.11)***	-.008 (2.14)**
Constant	.361 (5.86)***	.528 (7.32)***
Adj. r-sq.	.092	.107

Notes: (1) See Table 3 for notes.

Table 6

Difference-in-difference estimates of the impact of psychological health menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.132 (13.27)***	-.065 (4.87)***
50+ Years	.105 (8.06)***	-.052 (3.19)***
N Psychological Health Menopause Symptoms	-.003 (1.31)	-.008 (2.71)***
N Psychological Health Menopause symptoms*33–49	-.008 (2.45)**	-.007 (1.67)
N Psychological Health Menopause symptoms*50+	-.013 (3.08)***	-.015 (2.93)***
Constant	.346 (5.60)***	.540 (7.51)***
Adj. r-sq.	.090	.109

Notes: (1) See Table 3 for notes.

symptoms due to menopause (2.76) had an employment rate in their 50s which was 3.6 percentage points lower than it would have been in the absence of those symptoms. Effects on full-time employment, presented in column 2, are comparable (−0.015, t = 2.93). Effects are identical in the absence of controls. And they are similar when including those on HRT and those who had undergone surgery (−0.019, t = 5.02 for employment and −0.014, t = 3.23 for full-time employment).

Table 7 runs similar estimates but focuses on 'bothersome' psychological health symptoms which are relatively uncommon: women report a mean of 0.61 bothersome psychological health symptoms associated with menopause. Their employment effects are sizeable: a single 'bothersome' psychological health menopause symptom leads to a 3.9 percentage point drop in employment rates after age 50 relative to women without such symptoms (−0.039, t = 5.59). The effect is a little smaller for full-time employment (−0.025, t = 3.25). Results are robust to the removal of control variables. Employment effects are a little larger when retaining the HRT and surgery cases in the sample (−0.049, t = 8.18) but smaller for full-time employment (−0.022, t = 3.34).

4.4. Number vasomotor symptoms in the year before age 50

The factor analysis identified a factor capturing vasomotor-related symptoms, namely hot flushes and night sweats, together with trouble sleeping which is likely a result of the night-time symptoms. It has a mean of 1.76. One-sixth (19 percent) of women reported no vasomotor symptoms in the year approaching their 50th birthday, while one-third (35 percent) reported all three symptoms.

Table 8 reports estimates of the impact of vasomotor symptoms on women's employment in their 50s based on our preferred sample which

Table 7

Difference-in-difference estimates of the impact of 'bothersome' psychological health menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.121 (19.04)***	-.079 (9.21)***
50+ Years	.093 (11.29)***	-.076 (7.40)***
N bothersome Psychological Health Menopause Symptoms	-.003 (0.67)	-.005 (0.97)
N bothersome Psychological Health Menopause symptoms*33–49	-.016 (3.05)***	-.007 (1.11)
N bothersome Psychological Health Menopause symptoms*50+	-.039 (5.59)***	-.025 (3.25)***
Constant	.353 (5.73)***	.526 (7.32)***
Adj. r-sq.	.092	.108

Notes: (1) See Table 3 for notes.

Table 8

Difference-in-difference estimates of the impact of vasomotor menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.104 (10.18)***	-.105 (7.74)***
50+ Years	.084 (6.15)***	-.093 (5.57)***
N vasomotor symptoms	-.004 (1.00)	-.004 (0.96)
N vasomotor symptoms*33–49	.005 (0.91)	.013 (1.97)*
N vasomotor symptoms*50+	-.007 (1.05)	.002 (0.20)
Constant	.337 (5.46)***	.515 (7.16)***
Adj. r-sq.	.089	.107

Notes: (1) See Table 3 for notes.

excludes women who had surgery removing their ovaries or womb and those who had HRT before the end of menstruation. The number of vasomotor symptoms reported does not affect employment (column 1) or full-time employment (column 2) rates: both coefficients for the vasomotor and over-50s interaction are small and statistically non-significant. The number of vasomotor symptoms led to a statistically significant reduction in employment (−0.012, t = 2.02) once the model was run on an estimation sample including women who had HRT and those who had surgery, but the effect on full-time employment remained statistically non-significant (0.004, t = 0.47). Furthermore, when we include women who had HRT and those who had surgery the common trends assumption is not supported. The F-tests reveal that the age*-treatment interactions are jointly statistically significant in the pre-period through to age 32.

Two-thirds (69.6 percent) of women reported no bothersome vasomotor symptoms. Only six percent reported all three vasomotor symptoms as being bothersome. The mean number was 0.51. Table 9 presents the effects of bothersome vasomotor symptoms on employment and full-time employment rates. Every additional bothersome vasomotor symptom leads to a reduction of over 2.5 percentage points (−0.026, t = 2.91) in women's employment in their 50s but has no effect on their full-time employment rates (−0.004, t = 0.39). Results are insensitive to the exclusion of controls. Employment effects are stronger (−0.036, t = 4.74) when the estimation sample is extended to include women on HRT and those who had had surgery, while the effects on full-time employment remain non-significant (−0.001, t = 0.11).

5. Conclusions

Our paper is the first to estimate the effects of early menopause and menopausal symptoms on employment and full-time employment rates among women. We exploit prospective birth cohort data for all women born in a particular week in 1958 to estimate the causal effects of menopause on employment rates using a difference-in-difference strategy. This technique compares the gap in employment rates during their

Table 9

Difference-in-difference estimates of the impact of bothersome vasomotor menopause symptoms on employment and full-time employment.

	Employment	Full-time employment
Age (ref: 20–32 years)		
33–49 Years	.114 (17.43)***	-.093 (10.69)***
50+ Years	.083 (9.77)***	-.088 (8.36)***
N bothersome vasomotor symptoms	-.001 (0.17)	-.003 (0.49)
N bothersome vasomotor symptoms*33–49	-.004 (0.64)	.022 (2.50)**
N bothersome vasomotor symptoms*50+	-.026 (2.91)***	-.004 (0.39)
Constant	.335 (5.46)***	.505 (7.03)***
Adj. r-sq.	.089	.107

Notes: (1) See Table 3 for notes.

20s and early 30s with the employment gap in their 50s for women who went onto experience early menopause versus those who did not. We make similar comparisons between women according to the intensity with which they experienced menopausal symptoms when aged 50. In doing so we control for a rich array of variables collected at birth, in childhood, and in early adulthood which can affect employment prospects and experiences of menopause. We show employment and full-time employment trends during their 20s and early 30s did not differ significantly between the 'treated' group – those who went on to experience early menopause or more menopausal symptoms – and their 'control' groups who did not experience early menopause or did not suffer many menopausal symptoms. This provides some assurance that their employment rates may have trended in similar fashions later in their lives if they had not experienced menopause differently.

We find women's employment rates, and their full-time employment rates fall as the number of menopausal symptoms they report rises. Effects are larger for symptoms that are reported as 'bothersome'. The effects are quantitatively large. For instance, a woman who experiences the mean number of menopausal symptoms at age 50 can expect to have an employment rate in her 50s that is 4 percentage points lower than a woman who has no menopausal symptoms.

Different types of menopause symptom have different employment effects. For instance, vasomotor symptoms do not affect full-time employment rates, and they only affect employment rates where they are considered 'bothersome'. In contrast, psychological health problems associated with menopause significantly lower employment and full-time employment rates, and effects are much larger when those symptoms are 'bothersome'.

Early menopause is associated with a very large (9 percentage point) reduction in employment rates once women reach their 50s, yet it has no statistically significant effect on women's full-time employment rates. It is unclear why early menopause should affect employment rates, but not full-time employment rates. This issue is worthy of further investigation.

It is striking that the inclusion and exclusion of potential confounders makes very little difference to the impact of early menopause and menopause symptoms on employment and full-time employment rates. Even though their inclusion increases the variance in employment rates explained by our models (as indicated by the adjusted R-squared) the coefficient and statistical significance of the interaction capturing the impact of menopause are nearly identical in all cases. Following Oster (2019) we take coefficient stability in the face of adjustments to conditioning covariates as an indication that results are unlikely to be biased by omitted variables.

There are some limitations to this study. First, although women are asked specifically to identify health-related symptoms due to the menopause, in some cases those symptoms may be due to other changes women are going through at the same time which are not directly linked to the menopause. Second, our data only collect information on symptoms related to menopause in the year leading up to the survey interview at age 50. Some women may have experienced symptoms earlier which did not persist to age 50, leading to some error in our ability to accurately capture symptoms related to menopause. Some women who experienced symptoms, but not at age 50, will be misclassified as having no symptoms. However, assuming symptoms experienced earlier than age 50 also have a detrimental impact on employment, this will mean our estimates of symptoms' effects on employment are downwardly biased. Third, it is worth recalling that the Great Recession hit when the women in the study reached age 50. This was a very severe recession creating what were, at the time, unprecedented labour market problems

for many. It would be valuable to see whether our results are replicated in more benign labour market conditions.

These negative employment effects of early menopause and menopausal symptoms are cause for some concern, not only because the size of the effects is large, but also because so many women suffer these problems. As we have shown, the mean number of menopausal symptoms experienced by women in this birth cohort when aged 50 was 8, including 2 particularly 'bothersome' symptoms. Five percent of women in the estimation sample had experienced early menopause.

These employment effects of early menopause and menopause symptoms add to the personal costs they have for women suffering from them in terms of their physical and mental health, and potentially their effects on women's private lives, although we do not quantify them here. They also have costs for society, in terms of the health care costs of treating women's symptoms, potential productivity losses from women's lost hours of work and ability to work productively. It is conceivable that they will also affect women's retirement decisions and thus pension entitlements.

Having identified the size and extent of the problem government and employers should consider steps that could be taken to ameliorate the problems women face in their working lives due to the menopause. That said, this is the first study of its kind, so there is value in seeking to replicate and extend research investigating the impact of early menopause and menopausal symptoms on labour market outcomes. First, it would be valuable to know whether the effects we identify might vary for other cohorts of women including more recent entrants to the labour market. Second, there would be value exploring the heterogeneity of menopausal effects and whether there are aspects of women's experiences that may ameliorate the effects of menopause. For instance, it may be that women are better able to manage menopause symptoms where they have greater opportunities to manage working patterns or working hours, as might be the case among self-employed women or employees in workplaces with policies and practices expressly intended to assist women affected by menopause. Third, we know very little about the effects of early menopause and menopausal symptoms on other aspects of women's labour market experiences. We would have a better picture if studies were undertaken to investigate the impacts of menopause on women's wellbeing at work, their job satisfaction and their earnings. Finally, we know of no studies piloting policies or practices in the workplace that might assist women in raising health-related problems they may have during menopause, nor in coping with those problems. These evaluations are needed to provide the evidence base employers and government need so they know what actions to take to improve women's working lives.

Credit author statement

Acknowledgment

Appendices.

Appendix Table A1
Descriptive Statistics for Categorical Control Variables (n = 3405)

Variables:	Percent
Social class of father at birth:	
I and II Professional and Managerial/Technical	19.9
III Non-manual	9.8
III Manual	43.4
IV and V Partly Skilled and Unskilled	17.7
No father in household	4.4
Missing	4.7
Birth weight (kilograms):	
<2.5	4.8
2.5–2.9	19.0
3–3.49	36.3
3.5–3.9	22.5
≥4	6.9
Missing	10.4
Breast fed:	
No	25.6
Yes, <1 month	20.9
Yes ≥ 1 month	41.7
Missing	11.8
Siblings at birth:	
None	22.2
Older sibs only	21.8
Younger sibs only	25.6
Older and younger sibs	21.3
Missing	9.2
BMI at age 16:	
Underweight	1.1
Normal	58.5
Overweight	6.1
Very overweight	1.6
Missing	32.5
Ever smoked by age 16:	
Never	54.3
Ever	23.6
Missing	22.1
Had alcoholic drink in week before age 16 interview:	
No	46.2
Yes	31.8
Missing	22.0
Physical activity at age 16:	
Monthly or less often	46.8
Weekly	29.9
Missing	23.4
Highest qualification age 23:	
None	11.0
CSE	10.6
O-level	26.1
A-level	14.2
Degree	19.2
Post-graduate	0.3
Missing	18.5
Number of children at age 23:	
None	67.2
1	24.2
2	6.8
3+	1.2
Missing	0.5
Highest qualification age 33:	
None	8.9
CSE	11.8
O-level	29.0
A-level	13.4
Degree	26.9
Post-graduate	1.4
Missing	8.5
Number of children at age 33:	
None	22.6
1	23.1
2	34.2
3+	15.6
Missing	4.4
General health at age 33:	
Poor	0.9

Appendix Table A1 (*continued*)

Variables:	Percent
Fair	8.6
Good	47.1
Excellent	33.8
Missing	9.6
Long-standing illness, disability or infirmity at age 33:	
No	79.7
Yes	11.5
Missing	8.8
Malaise score at age 33:	
Normal	84.4
Malaise (8+)	5.7
Missing	9.9
Ever taken contraceptive pill by age 42:	
No	9.5
Yes	75.5
Missing	15.0

Appendix Table A2
Descriptive Statistics for Continuous Control Variables (n = 3405)

Variables:	Mean	Min	Max
Rutter scale	5.59	0	19
N Rutter items missing	2.72	0	23
Score on Bristol Social Adjustment Guide	5.61	0	47
If missing on BSAG	0.10	0	1
Number of illnesses/health difficulties as a child	4.44	0	17
Reading score at age 11	0.19	−2.54	3.02
Reading score at age 11 missing	0.13	0	1
Maths score at age 11	0.19	−1.61	2.26
Maths score missing at age 11	0.13	0	1
Number of physical health problems ever had through to age 33 (retrospective)	1.36	0	15
Number of survey interviews conducted	5.53	2	6
Number of years work history missing	0.86	0	5

Appendix Table A3
Joint Statistical Significance of Age*Treatment Interactions between Age 20 and Age 32

	Employment	Full-time Employment
Treatment:		
Early menopause	.511	.632
Number of menopause symptoms	.321	.105
Number of 'bothersome' menopause symptoms	.212	.099*
Number of psychological health menopause symptoms	.525	.948
Number of 'bothersome' psychological health menopause symptoms	.622	.442
Number of vasomotor symptoms	.172	.102
Number of 'bothersome' vasomotor symptoms	.795	.486

Notes: (1) Figures are p-values for Prob > F capturing joint significance of age*treatment interactions using Stata's testparm command. (2) All models exclude HRT/surgery cases. (3) N observations = 44,265 for 3405 individuals (4) * denotes significance at a 90% confidence level.

Appendix Table A4
Difference-in-Difference Estimates of the Impact of Early Menopause on Employment and Full-time Employment (Full Model)

	Employment	Full-time Employment
Age (ref: 20–32 years)		
33–49 Years	.113 (19.27)***	-.084 (10.70)***
50+ Years	.076 (9.89)***	-.091 (9.60)***
Early Menopause	-.006 (0.27)	-.008 (0.34)
Early*33–49	-.019 (0.70)	.030 (0.91)
Early*50+	-.086 (2.35)**	.023 (0.60)
Social class of father at birth (ref: I and II)		
III Non-manual	.045 (3.44)***	.031 (1.73)*
III Manual	.027 (2.74)***	.043 (3.33)***
IV and V	.018 (1.38)	.034 (2.12)**
No father in household	.031 (1.50)	.101 (3.92)***
Missing	-.004 (0.15)	-.024 (0.76)
Birth weight in kilograms (ref: 3-3.49 kg):		

Appendix Table A4 (*continued*)

	Employment	Full-time Employment
<2.5	.006 (0.36)	-.000 (0.00)
2.5–2.9	.002 (0.20)	.010 (0.81)
3.5–3.9	.002 (0.26)	.009 (0.77)
≥4	.008 (0.56)	.017 (0.87)
Missing	.020 (1.19)	.039 (1.85)*
Breastfed (ref: No):		
Yes, <1 month	-.000 (0.04)	-.004 (0.31)
Yes ≥ 1 month	-.011 (1.22)	-.007 (0.56)
Missing	-.027 (0.62)	.049 (0.79)
Siblings at birth (ref: None):		
Older sibs only	-.009 (0.82)	-.005 (0.38)
Younger sibs only	-.008 (0.75)	.013 (0.98)
Older and younger sibs	-.011 (0.93)	.026 (1.83)*
Missing	-.014 (0.71)	-.019 (0.82)
Rutter scale	.001 (0.83)	-.001 (0.35)
N Rutter items missing	.000 (0.18)	-.002 (0.64)
BSAG score	-.001 (1.27)	-.002 (0.26)
If missing on BSAG	.015 (0.86)	.016 (0.70)
Number of illnesses/health difficulties as a child	-.003 (1.66)	.001 (0.35)
BMI at age 16 (Ref: Normal)		
Underweight	-.073 (2.13)**	-.070 (1.71)*
Overweight	.016 (1.23)	.018 (0.99)
Very overweight	.007 (0.23)	.075 (1.99)**
Missing	-.029 (2.84)***	-.002 (0.17)
Ever smoked by age 16 (Ref: Never):		
Ever	.004 (0.53)	.004 (0.37)
Missing	-.008 (0.10)	-.016 (0.23)
Had alcoholic drink in week before age 16 interview (ref: No):		
Yes	.003 (0.31)	.017 (1.06)
Missing	.028 (0.35)	-.002 (0.03)
Physical activity at age 16 (ref: Monthly or less often)		
Weekly	.034 (4.24)***	.027 (2.55)***
Missing	.006 (0.21)	.067 (1.84)*
Reading score at age 11	.003 (0.48)	.017 (2.05)**
Reading score missing	.253 (7.41)***	.048 (1.17)
Maths score at age 11	-.002 (0.30)	.003 (0.34)
Maths score missing	-.248 (7.32)***	-.036 (0.88)
Highest qualification age 23 (ref: None)		
CSE	-.014 (0.54)	-.029 (0.93)
O-level	.036 (1.87)*	.039 (1.68)*
A-level	-.029 (1.43)	-.014 (0.54)
Degree	-.006 (0.34)	-.027 (1.05)
Post-graduate	-.145 (2.22)**	-.132 (1.59)
Missing	.027 (1.24)	.020 (0.80)
Highest qualification age 33 (ref: None)		
CSE	.101 (3.69)***	.074 (2.31)**
O-level	.065 (2.89)***	.052 (1.99)**
A-level	.096 (4.09)***	.087 (3.07)***
Degree	.102 (4.63)***	.103 (3.86)***
Post-graduate	.082 (2.60)***	.075 (1.50)
Missing	-.185 (4.27)***	-.374 (6.41)***
Number of children at age 23 (ref:None)		
1	-.026 (2.51)**	-.005 (0.36)
2	-.069 (3.82)***	-.009 (0.42)
3+	-.088 (1.95)**	-.019 (0.46)
Missing	-.085 (1.07)	-.108 (1.17)
Number of children at age 33 (ref:None)		
1	-.067 (6.79)***	-.195 (13.94)***
2	-.110 (11.87)***	-.301 (23.38)***
3+	-.184 (13.13)***	-.375 (21.39)***
Missing	.051 (1.74)*	.026 (0.69)
General health at age 33 (ref: excellent)		
Poor	-.103 (2.07)**	-.031 (0.55)
Fair	-.058 (3.46)***	-.034 (1.75)*
Good	.007 (0.84)	-.001 (0.06)
Missing	.069 (1.87)*	.065 (1.44)
Long-standing illness, disability or infirmity at age 33 (ref: No)		
Yes	-.042 (3.27)***	-.030 (1.91)*
Missing	.183 (3.77)***	.340 (5.52)***
Malaise score at age 33 (ref: Malaise 8+)		
Normal	.047 (2.50)***	.042 (2.07)**
Missing	-.025 (0.47)	-.064 (1.32)
Number of physical health problems ever had through to age 33	.001 (0.34)	-.001 (0.35)
Ever taken contraceptive pill by age 42 (ref: yes)		
No	-.054 (3.75)***	-.042 (2.70)***
Missing	.006 (0.57)	.023 (1.64)

Appendix Table A4 (*continued*)

	Employment	Full-time Employment
Number of survey interviews conducted	.061 (6.90)***	.018 (1.77)*
Number of years work history missing	-.017 (5.85)***	-.021 (5.96)***
Constant	.334 (5.44)***	.507 (7.08)***
Adj. r-sq.	.089	.107

Notes: (1) Sample N = 119,175 person-year observations and N = 3405 persons (2) Those using HRT and those with surgery are excluded. (3) OLS estimation with standard errors clustered at the individual level. (4) t-statistics in parentheses (5) * = significant at 90% confidence level; ** = significant at 95% confidence level; *** = significant at 99% confidence level.

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