Female labour force participation in the United Kingdom: evolving characteristics or changing behaviour?

Maria Gutiérrez-Domènech *

and

Brian Bell **

Working Paper no. 221

* Structural Economic Analysis Division, Bank of England.
maria.gutierrez-domenech@bankofengland.co.uk

** Satoha Capital (UK) LLP.

The authors are grateful to Pablo Burriel-Llombart for sharing his knowledge about the Labour Force Survey and to Ian Bond, Mike Joyce, Stephen Nickell, Simon Price and Jonathan Thomas for fruitful suggestions. The paper also benefited from comments of seminar participants at the Bank of England and two anonymous referees. The views expressed are those of the authors and do not necessarily reflect those of the Bank of England. All remaining errors are our own.

Copies of working papers may be obtained from Publications Group, Bank of England, Threadneedle Street, London, EC2R 8AH; telephone 020 7601 4030, fax 020 7601 3298, e-mail mapublications@bankofengland.co.uk.

Working papers are also available at www.bankofengland.co.uk/wp/index.html.

The Bank of England's working paper series is externally refereed.

ISSN 1368-5562

Contents

Abstract

The working-age female participation rate in the United Kingdom increased by 7 percentage points between 1984 and 2002. The purpose of this paper is to quantify how much of the rise reflects changes in the socio-demographic structure of the female population and how much can be attributed to changes in behaviour or other uncontrolled factors. The paper uses a time series of cross-sections from the Labour Force Survey, and applies a method of growth accounting. The results show that, between 1984 and 2002, changes in the structure of the female population contributed to two thirds of the growth in female participation, whereas one third is explained by changes in behaviour or other factors.

Key words: Female participation, probit.

JEL classification: J10, J21.

Summary

The period 1984–2002 was characterised by a substantial increase in female participation rates in the United Kingdom, whereas the opposite trend was observed for males. Understanding participation trends in the United Kingdom is important for monetary policy, since participation affects the supply capacity of the economy. The balance between that capacity and aggregate demand in turn affects inflationary outturns.

Because males and females have experienced such different participation trends, it is necessary to analyse them separately. This paper focuses mainly on females and uses an accounting framework to quantify how much of the rise in female participation was related to changes in the characteristics of the female population, and how much was linked to changes in behaviour and other uncontrolled factors. This exercise suggests that two thirds of the growth in female participation over 1984–2002 was associated with changes in the socio-demographics of the female population, especially education and fertility. As these two variables may be endogenous to participation, we cannot say anything about causality. The remaining one third of the rise in female participation was linked to changes in behaviour, such as women with the same observable characteristics responding differently over the period, and/or driven by changes in other variables not accounted for in the model.

Most of the increase in female participation between 1984 and 2002 took place in 1984–92, when both characteristics and 'behaviour' contributed positively to participation growth. In the 1980s, changes in behaviour contributed significantly to participation growth. The majority of the increase over the 1990s was driven by changes in the characteristics of the female population, whereas the slowdown in participation growth was mainly accounted for by a reversal of the behavioural effects.

The paper uses the same method to analyse briefly the evolution of male participation. The data reveal that the decline in male participation was mainly driven by changes in behaviour, especially after 1993.

1 Introduction

Female participation rates[1] have increased substantially between 1984 and 2002 in the United Kingdom, whereas the opposite trend is observed for males. This pattern is common in all OECD countries.[2] One reason why understanding participation trends in the United Kingdom is important is that participation rates affect the supply capacity of the economy, and the latter matters for inflationary outturns.

Because males and females experience such different participation trends, it is necessary to analyse them separately. This paper focuses mainly on female participation: a companion study (Bell and Smith (2004)) aims to explain the fall in male participation and draws attention to its links to changes in disability insurance benefits.

This paper seeks to assess the extent to which the rise in female participation reflects changes in the characteristics of the female population that make them more likely to participate, as opposed to changes in the impact of these characteristics on participation behaviour. Our methodology is inspired by Gomulka and Stern (1989) who analyse the employment of married women in the United Kingdom between 1970 and 1983. They disentangle the source of the rise in employment into two channels. First, changes in the variables describing the female population (eg age and education); and second, changes in the coefficients (eg the impact of age on participation). They find that the increase in employment was mostly due to changes in behaviour. By contrast, our results suggest that, between 1984 and 2002, changes in the distribution of the micro variables contribute to two thirds of the growth in female participation, whereas one third is explained by changes in behaviour.

For our analysis, we use the 1984–2002 annual waves of the Labour Force Survey (LFS), which interviews about 60,000 households per year and is a rich source of information on labour force status and a variety of background variables including age and education. However, there is no information on incomes and wages for the whole period. These variables have been made comparable across all years. Our data are not a panel, but a collection of annual cross-sections.

The remainder of the paper is structured as follows. Section 2 summarises some of the literature on female participation. Section 3 describes female participation trends. In

---

(1) The participation rate is the proportion of those who are either employed or unemployed as a fraction of the total labour force in the relevant population group.
(2) See OECD (2003).

Section 4 the data and the choice of variables are examined. Section 5 explains the model and the empirical methodology. In Section 6 we assess the implications of our estimates for understanding female participation. We also look at males in this section. The final section concludes.

2 Previous literature

Here we summarise some of the main contributors to the literature on female participation in the United Kingdom. Many authors investigate the micro-based factors that determine the labour supply decision, which in turn have an impact on participation. For example, Joshi (1986) uses the Women and Employment Survey in 1980 to analyse female participation in Britain. She constructs an index of each woman's earning potential and looks at its impact on female participation. She also pays special attention to the effect of work interruptions on female low pay.

Blundell, Ham and Meghir (1987) estimate (using the British Family Expenditure Survey) a cross-sectional model for married female labour supply that embodies the possibility that there are unemployed workers who want to work at their perceived market wage but are unable to find a job. This means that zero hours of work represent not only non-participation but also unemployment. They find significant differences with respect to the model where zero hours reflect a desire to be out of work. The same authors have extended this research to discouraged workers (Blundell, Ham and Meghir (1998)).

Blundell, Duncan and Meghir (1998) use the Family Expenditure Survey to investigate the responsiveness of female labour supply to exogenous changes in wage rates and non-labour income. In particular, they analyse various tax reforms that took place over the 1980s. Because changes in taxes affected some individuals only, they can use this setting to identify labour supply responses in a difference-in-differences approach.[3] They find that wage elasticities are positive and other income elasticities are rather small, the latter being negligible for women without children.

Another branch of literature analyses the trends in female participation. Joshi, Layard and Owen (1985) build a time series of aggregate data (1950–81) to explain the increasing number of women at work. They analyse the impact of wages, education, and fertility on female employment. They show that fertility had a small effect in the period 1951–70, whereas the decline in the number of children produced a significant rise in employment

(3) For another example of the difference-in-differences approach see Blundell, Dias, Meghir and Van Reenen (2002).

between 1971 and 1981. Evans (1998) studies the fall in unemployment in Britain, which he suggests, is mostly due to the decrease in female unemployment. He finds that the decline in female unemployment is associated with a fall in their inflow rate, which is highly concentrated among women with young children. He argues that the latter reflects a reduction of market frictions that women experience after childbearing.

Most of the recent work is focused on the evaluation of the impact of specific taxation policies (eg WFTC) on female employment (Blundell, Dungan, McCrae and Meghir (2000)) and are estimated using data covering limited time periods. Less research has been done to analyse the increasing rates of female participation from the 1980s onwards. The aim of this paper is to fill this gap and learn more about the trend. How much of the increase is explained by the female population acquiring those characteristics that make them more likely to be in the labour market? How much is due to the evolution of behaviour or anything else that we have not been able to capture in our specification such as maternity leave and taxation policies? To explore these issues, we follow the approach of Gomulka and Stern (1989) in their analysis of the employment of married women in the United Kingdom between 1970 and 1983 with the Family Expenditure Survey.

3 Trends in female participation

Table A: Female[(1),(2)] participation rates (%) by category in 1984 and 2002

Years	*Total*	*Marital Status*		*Dependent Children, Married*				*Qualifications*	
		Married	*Single*	*One*	*Two*	*Three +*	*None*	*Degree*	*None*
1984	65	62	76	61	55	39	71	79	58
2002	72	74	68	77	74	55	79	88	48

(1) All females aged between 16 and 59 years old. For the estimation, we take a sub-sample of females aged 16–59 who are either the heads of the household or their partners. They have an increase of participation from 62% to 73%.

(2) Married stands for married and cohabiting women.

The participation rate of women aged between 16 and 59 years old increased from 65% in 1984 to 72% in 2002. This trend has not been the same for all women. Table A shows different rates of female participation rates sorted by the major characteristics. For example, single women have experienced a decline in participation rates from 76% to 68%, whereas married women have seen participation rates rise from 62% to 74%. The rise in participation has been substantial for women with dependent children who are either married or cohabiting. Rates have increased by 16 percentage points for married/cohabiting women with one dependent child, 19 percentage points for those with two, and 16 percentage points for those with three or more dependent children. Thus, there is evidence that the increase in total participation rates has been driven substantially by married/cohabiting women with dependent children.

In the period 1984–2002, the gap in participation across education levels has widened. Participation rates for women with a degree have increased from 79% to 88%, whereas those for women without any sort of qualifications have dropped from 58% to 48%.

Concerning age groups, the youngest women (those aged between 16 and 24 years old) have experienced a decline of 5 percentage points in participation rates due primarily to a rise in their enrolment rates in higher education. The rest of the age groups (25–34, 35–44 and 45–54) have increased their participation, especially for those women aged between 25–34 (whose rates rise by 15 percentage points).

4 Data and constructed variables

We use the Spring quarter waves of the LFS from 1984 to 2002 and limit our sample to women aged between 16 and 59 years old, who are either the head of the household or the partner of the head. The annual number of women aged 16–59 in the sample is about 46,000. Our selection criteria reduce the sample to around 36,000 annual observations.

The reason for taking this sub-sample is that there is a trade-off between controlling for the number of biological children (restricting the sample to heads or heads' partners) and controlling for the number of dependent children in the household (not restricting the sample). This is because it is not possible to match children to their biological parents in early LFS data. That is, for early years, we can only match children to single women if they live on their own, and to married or cohabiting women.

We have decided to restrict the sample to ensure that the children accounted for belong to the individual. However, this implies that we have to eliminate those women who live with others and are likely to study (ie non-participate). We are therefore overpredicting the rise in participation rates since this removed group (who are non-participators) is growing over time. For example, participation rates for the sample of women aged 16–59 grew from 65% to 72% over the period 1984–2002, whereas participation rates for the sample of women aged 16–59 who are either the heads or the partners of the heads increased from 62% to 73%.

In order to asses how serious this sample selection was, we also undertook the same analysis for the whole group of females aged 16–59 and controlled for the number of dependent children in the household, irrespective of any biological linkage to the individual. The results concerning the drivers of participation trends (either coefficients or characteristics) were very similar to those presented later. Therefore, this selection does not seem to harm the main conclusions of the paper.

Participation (this includes those who are employees, the self-employed, those in government employment and training programmes, unpaid family workers, and the ILO unemployed) is our dependent variable. It takes a value of one if a woman participates and zero otherwise. The percentage of women participating in our sample (aged between 16–59 who are either the head or their spouse) increases from 62% in 1984 to 73% in 2002. The explanatory variables are:(4) age, education, ethnicity, region, children, marital status, lone parent status, education, and employment status of the partner. We control for age using interval dummies (16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54 and 55–59). We take the age group 35–39 as our reference group.

Education is defined by nine dummy variables (from the lowest to the highest,) as follows: *Edu1* (no qualifications, our omitted category); *Edu2* (other professional/vocational qualifications); *Edu3* (CSE); *Edu4* (completed apprenticeship, including City and Guilds); *Edu5* ('O' level); *Edu6* (mid vocational, ONC, OND); *Edu7* ('A' level); *Edu8* (high vocational, BTEC, HNC, HND and nurses); and *Edu9* (degree, including teachers).

Other characteristics are marital status (*Married* takes value 1 if the individual is married or is cohabiting, 0 otherwise); *Non–White* (dummy with value 1 being non-white); number of children in each age group (*Ndep0–2*, *Ndep3–4*, *Ndep5–10* and *Ndep11–15*); dummies 0-1 if the woman has at least a child in each of the age groups (*Ddep0–2*, *Ddep3–4*, *Ddep5–10* and *Ddep11–15*);(5) and a dummy for being a single parent (*HOHSingle*).

For those women who are married or cohabiting, it is important to control for their partner's education (*EduP1–EduP9*) and employment status (0-1 dummy *EmpP*). This gives an indicator of their external income,(6) which theory predicts will affect female participation decisions. By doing this, we assume that females take their partner's income as exogenous in making their participation decision, rather than modelling a joint family problem. Finally, we control for region of residence (*Region1–Region12*) to account for

(4) The definition and label of the explanatory variables are summarised in the appendix.
(5) We include both types of children dummies in order to disentangle the effect of having at least one child from the effect of the number of children in each group.
(6) The LFS lacks income and wage variables for the whole period 1984–2002. Thus, partners' education and employment status is a proxy for external income whenever the individual is married or cohabiting.

regional effects.

5 Method

As mentioned in the introduction, we wish to disentangle the sources of the increase in female participation into two main effects: changes over time in the measured characteristics and changes in the coefficients of the participation model. We follow the approach of Gomulka and Stern (1989), which in turn uses the methodology of growth accounting proposed by Stoker (1985). The aim is to decompose the change of an aggregate variable (here the proportion of women who participate) into a change of the behavioural micro model (coefficients of the probit estimation[(7)] for a series of cross-sections) and a change in the distribution of the micro variables (education, fertility, marital status, etc).

The coefficient estimates for each year differ because behaviour evolves over time; that is, people with the same characteristics do not react in an identical way in different years. This may also reflect the fact that some factors that may influence female decisions have been excluded from our specification. For instance, some policy regulations (eg maternity leave and taxation) have changed between 1984 and 2002 and are likely to affect females' choices, *ceteris paribus*. A summary of the main policy changes is shown in Table B.

To illustrate the mechanism, we first show the decomposition for the linear case (due to Oaxaca (1973)). We assume that our dependent variable y can be explained by a linear regression as follows

$$y = \beta X + \varepsilon \qquad \textbf{(1)}$$

where β is the vector of coefficients, X the vector of exogenous variables and ε the error term.[(8)] This equation is valid for each year. Then, for a given year

$$\bar{y} = \hat{\beta}\bar{X} \qquad \textbf{(2)}$$

(7) The probit model for participation informs about how characteristics impact on the probability of participating in the labour market. This probabilistic model has underlying it the framework of time allocation developed by Becker (1981) and the family supply models used in Cigno (1991), among others.
(8) The error term is assumed to have $E(\varepsilon|X) = 0$.

Table B: History of institutional changes linked to female participation in the United Kingdom: 1979–2002

Years	*New policies*
1979	• Introduction of the Right of Reinstatement (possibility to return to the same job after motherhood) for specific eligibility conditions. • Introduction of the Maternity Pay for specific eligibility conditions.
1987	• Maternity Pay is extended.
1988	• Family Credit (in-work-benefits) replaced Family Income Supplement (dating from 1971) with increased generosity.
1990	• Joint taxation is substituted by separate taxation for married couples.
1994	• The Right of Reinstatement is applicable to all working women, no matter how long they are employed. Extra leave is possible under certain conditions.
1999	• Working Family Tax Credit replaces Family Credit, with increased generosity and childcare support.
2000	• The Right of Reinstatement is extended and the eligibility for the longer leave is relaxed. • Working Family Tax Credit increased in generosity.

where $\hat{\beta}$ is the ordinary least-squares estimate of β and $\bar{y}$ and $\bar{X}$ are the means across the observed individuals. Changes in $\bar{y}$ can be decomposed into changes in $\hat{\beta}$ and changes in $\bar{X}$. That is, we can decompose the variation in two given periods, indexed by 0 and 1 in the following way:

$$\bar{y}^1 - \bar{y}^0 = (\hat{\beta}^1 - \hat{\beta}^0)\bar{X}^1 + (\bar{X}^1 - \bar{X}^0)\hat{\beta}^0 \qquad \textbf{(3)}$$

The first term shows the change that comes from the changes in the coefficients at constant values of the variables, which is the contribution of a shift in behaviour. The second term captures the difference arising from changes in the variables, at constant coefficients, which measures changes in the average population.[(9)]

(9) Alternatively, we can decompose equation **(3)** as $\bar{y}^1 - \bar{y}^0 = (\hat{\beta}^1 - \hat{\beta}^0)\bar{X}^0 + (\bar{X}^1 - \bar{X}^0)\hat{\beta}^1$ or take the average of the two. However, these different types of decomposition do not change our final conclusions of the overall role of characteristics and ‘behaviour’ on participation growth.

As in Gomulka and Stern (1989), our dependent variable is dichotomous and we use a probit model. This means that, for our decomposition, the change in the aggregate proportion of women who participate depends not only on the change in the means of the variables but also their distributions. The expected value of a binary variable y, that takes value one when a woman participates in the labour market and zero otherwise, at given set of characteristics and year is a function of X and β

$$Pr(y = 1|X) = f(\beta, X) \quad \textbf{(4)}$$

For a probability density function for X, $\phi(X)$, then the expectation in the population of the variable y is

$$E(y) = \int f(\beta, X)\phi(X)dX \quad \textbf{(5)}$$

If $\hat{\beta}$ is a consistent estimate of β, and X is a random sample (this could be another sample than the one used to estimate $\hat{\beta}$), then it can be shown that the right-hand side of **(5)** can be consistently estimated by the sample average across individuals i

$$\hat{y} \equiv \bar{f}(\hat{\beta}, X) \equiv \frac{1}{N}\sum_i f(\hat{\beta}, X) \quad \textbf{(6)}$$

The left-hand side of **(5)** is estimated consistently by the sample mean $\bar{y}$.

As with the linear case, we have that the change in the expected value of y in two different years, 0 and 1, can be written as

$$E(y^1) - E(y^0) = \int (f(\beta^1, X) - f(\beta^0, X))\phi^1(X)dX + \int (\phi^1(X) - \phi^0(X))f(\beta^0, X)dX \quad \textbf{(7)}$$

The first integral in **(7)** measures the effects of changes in the values of the coefficients given the distribution of the explanatory variables. The second part evaluates the impact of a change in the distribution of the explanatory variables for given values of the coefficient, β^0.

We disentangle the change in the average value in the sample $\hat{y}^1 - \hat{y}^0$ as:

$$\hat{y}^1 - \hat{y}^0 = (\bar{f}(\hat{\beta}^1, X^1) - \bar{f}(\hat{\beta}^0, X^1)) + (\bar{f}(\hat{\beta}^0, X^1) - \bar{f}(\hat{\beta}^0, X^0)) \qquad \textbf{(8)}$$

where $\bar{f}(\hat{\beta}^i, X^j)$ is the average across the sample X^j of the predicted probability using the coefficients $\hat{\beta}^i$. In our analysis, $\bar{f}(\hat{\beta}^i, X^j)$ is a 19×19 matrix because we have 19 years.

We would also like to know the contribution of the different variables to the change in the predicted probability. That is, suppose we find that changes in the explanatory variables between two given years explain a significant part of the increase in female participation. Then, the next step is to identify which variables have a greater weight. Notice, however, that we have to be cautious with the interpretation since this exercise is meaningful if we assume that individuals do not respond over time to labour markets by changing their characteristics.

In order to calculate this, we use the marginal effects of our probit estimation. These provide the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables. In this exercise, one leaves the rest of the variables at their means. The mechanism is as follows. First, we compute the difference between each explanatory variable in two years, say for example 1984 and 2002. We then multiply each difference by the estimated marginal effect in 1984. This will give us the link between the increase in the probability of participation and the change in that variable between the two years while keeping the rest of the variables at their means.

It is possible that estimates are biased following a failure to control for cohort effects. Part of the effect captured by the variables could be reflecting a change of tastes, rather than the effect of the variable itself. That is, individuals born at different cohorts with equal characteristics may take different decisions because they have different tastes. To account for this we would need to control for cohorts. However, this requires either a longitudinal survey or the creation of a pseudo-panel, and is beyond the scope of the current paper.

6 Main results

6.1 The impact of observable characteristics on the probability of female participation

Table A.1 in the Appendix reports the proportions and standard deviations of all variables used in the analysis. It shows the increase in female education, the decline in fertility and the drop in married/cohabiting women.

The standard participation model assumes that women decide to participate in the labour market by maximising their utility subject to their budget and time constraints (see Becker (1981) or Cigno (1991) for further details on family-labour supply [10] models). The models suggest several predictions. One is that education has a positive effect on participation. This is because the higher the qualifications, the more value an individual has in the labour market and the higher the opportunity cost of non-participating. Another is that women with higher external income are expected to have less incentives to participate, *ceteris paribus*. Furthermore, especially for mothers, these models propose that, for given preferences, family and taxation policies have an impact on the women's budget (eg subsidies for childcare) and time constraint (publicly available childcare or flexible hours) and, consequently, play an important role in female's participation.

Table A.2 in Appendix shows the marginal effects of the probability of female participation for each variable and year. We observe that the women aged between 30 and 34 and between 35–39 (our reference group) are more likely to participate. There is also evidence that non-whites have a smaller probability of participating and this negative effect became stronger from the late 1980s onwards. The regional dummies show that higher participation is predicted in southern areas and this pattern persists across the years.

Unsurprisingly, higher levels of education increase the probability of participation. Moreover, the positive effect of education is increasing through time since the magnitudes of the coefficients are becoming consistently larger. That is, those without any qualification (our base group) are less likely to participate, *ceteris paribus*, in 2002 than in 1984, compared to someone who has formal qualifications.

The structure of the family has an important role in explaining female participation. The number of dependent children in each age category, 0–2, 3–4, 5–10 and 11–15 reduces the

(10) Some models also include household bargaining.

probability of being employed or unemployed.[11] This negative effect is larger the younger the age of the children. Simultaneously, fertility dummies (eg *Ddep0–2* is 1 if the individual has at least one child of 0–2 years old) are also negative up to the age of ten (the comparison group is childless women). Notice that these children dummies appear to be more significant and greater in absolute value in the earlier years. One possible explanation could be that the negative effect of young children is falling in later years, due, for example, to changes in maternity and taxation policies.

Married women are less likely to participate.[12] However, there is a partial offset for those with working partners.

The expected sign of the dummy variable for partner's employment status is not obvious. On the one hand, women whose partners are non-employed may want to participate because they have greater needs for income. If so, we would expect a negative sign. But if the welfare system helps couples without any source of income, then this negative correlation may, if it removes incentives to work for women with an unemployed partner, disappear. On the other hand, household members may be affected by similar labour market shocks. This would lead to a positive sign for the working partners dummy. We find in practice that there is a positive marginal effect, which is broadly stable throughout the period 1984–2002. This means that women whose partners are employed are more likely to participate. This is in line with the fact that both males and females are affected by similar labour market conditions and/or that subsidies discourage them to work, even if their partners are non-employed.

If the partner's income is exogenous to the female participation decision, theory predicts that higher partners' income reduces the probability of participation (Becker (1981)). Although we do not have this information directly, we proxy it with partner's education. We find that those women whose partners have the highest qualifications are indeed less likely to participate, *ceteris paribus*.

---

(11) Notice that the causality between number of children and female participation could go either way. Also, our analysis inevitably omits the relevant variable 'preference for work'. Since the number of children is negatively related to 'preference for work', the estimator for number of children is likely to be biased downwards.

(12) It is interesting to know if the probability of participation for married and single women is different with respect to the number of children. We re-estimated the model including interactions between marital status and number of children in each age category. Results show that married women with children are more likely to participate than single women with children, *ceteris paribus*. This could be due to the fact that couples share childcare.

6.2 Decomposition of the increase in female participation

In Table C, we report the decomposition of female participation growth.[13] If we read along a row we observe the average of the predicted probabilities for year *i* and coefficients of the probit between 1984 and 2002. For example, the first row takes the sample of 1984 and gives (from left to right) the mean of the predicted probability of participation, taking the coefficients previously estimated with sample 1984, then using those coefficients estimated with sample 1985 and so on. This tells us the average predicted probability of female participation if our explanatory variables had remained as in 1984, but the behaviour (captured by the coefficients) or other non-specified variables (such as maternity or taxation policies) had changed across years.

Looking down the table, we fix the coefficients and look at the mean of the predicted probabilities for changes in the distribution of characteristics; that is, changes due to variation in the explanatory variables from 1984 to 2002. For instance, the first column fixes the coefficients estimated in 1984, and calculates the mean of the probabilities for different year samples. Consequently, the diagonal entry corresponds to the mean of the predicted probability for the year using the coefficients estimated for that year and unsurprisingly are equal to the mean of female participation in the sample.

From Table C, we can conclude that around two thirds of the increase in female participation between 1984 and 2002 is associated with changes in the characteristics of the female population. The other third is attributed to changes in the estimated coefficients of the model. This proportion is found as follows. By subtracting the first row from the last row in Table C, we obtain, for each coefficient, the increase that it is caused by changes in characteristics between 1984 and 2002. These differences are in the range 5.1–9.3 percentage points. The average of these numbers (6.6 percentage points) gives an approximation of the growth in female participation in the period 1984–2002 because of changes in the distribution of variables. Similarly, by subtracting the first column from the last column, we have for each sample year, the difference that it is caused by changes in coefficients. These numbers range between 1.0 and 5.2 percentage points. If we average these differences, we obtain 3.3 percentage points growth between 1984 and 2002 due to behavioural changes.

---

(13) Asymptotic standard errors are roughly 0.2 in all cells.

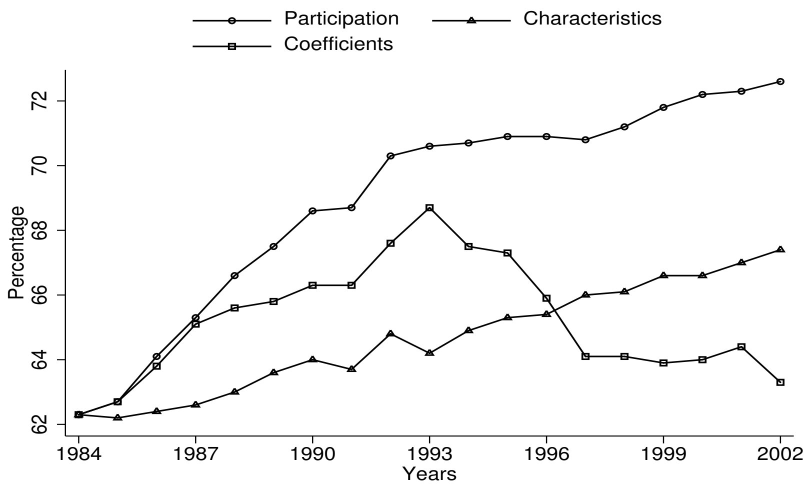
Table C: Predicted sample: Percentage of female participation in the United Kingdom using coefficients for year *j* and sample for year *i*

Sample year	Coefficient year 1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1984	62.3	62.7	63.8	65.1	65.6	65.8	66.3	66.3	67.6	68.7	67.5	67.3	65.9	64.1	64.1	63.9	64.0	64.4	63.3
1985	62.2	62.7	63.9	64.9	65.8	65.9	66.4	66.6	67.5	68.6	67.6	67.3	65.9	64.3	64.0	64.0	64.1	64.5	63.5
1986	62.4	63.0	64.1	65.0	65.9	66.0	66.6	66.7	67.7	68.7	67.7	67.4	66.0	64.4	64.0	64.0	64.2	64.8	63.6
1987	62.6	63.1	64.2	65.3	66.0	66.1	66.7	66.8	67.9	68.8	67.8	67.5	66.3	64.6	64.5	64.4	64.5	65.1	63.9
1988	63.0	63.6	64.7	65.7	66.6	66.7	67.3	67.5	68.4	69.3	68.4	68.2	66.7	65.3	65.0	65.1	65.2	65.8	64.7
1989	63.6	64.2	65.5	66.4	67.3	67.5	68.1	68.4	69.2	70.1	69.3	69.1	67.8	66.4	66.2	66.2	66.4	66.9	65.8
1990	64.0	64.6	65.9	66.9	67.8	68.0	68.6	68.9	69.8	70.7	69.9	69.7	68.5	67.2	67.1	67.1	67.3	67.8	66.6
1991	63.7	64.4	65.7	66.5	67.5	67.7	68.2	68.7	69.3	70.3	69.5	69.2	68.0	66.7	66.5	66.6	66.9	67.3	66.3
1992	64.8	65.3	66.6	67.6	68.4	68.6	69.2	69.5	70.3	71.2	70.5	70.2	69.2	68.0	68.0	68.0	68.2	68.6	67.7
1993	64.2	64.7	66.1	67.0	67.9	68.1	68.6	69.0	69.7	70.6	69.9	69.6	68.7	67.4	67.4	67.5	67.7	68.1	67.2
1994	64.9	65.4	66.8	67.8	68.7	68.9	69.4	69.9	70.5	71.3	70.7	70.5	69.6	68.6	68.6	68.7	68.9	69.4	68.5
1995	65.3	65.8	67.1	68.2	69.0	69.3	69.8	70.3	70.9	71.7	71.1	70.9	70.4	69.5	69.6	69.7	69.9	70.2	69.5
1996	65.4	66.0	67.3	68.5	69.3	69.5	70.1	70.6	71.2	72.1	71.5	71.2	70.9	70.0	70.2	70.3	70.5	70.6	70.1
1997	66.0	66.6	67.9	69.1	69.9	70.1	70.8	71.3	71.8	72.6	72.1	71.9	71.6	70.8	71.0	71.2	71.3	71.5	70.9
1998	66.1	66.7	68.0	69.2	70.0	70.2	70.9	71.4	71.9	72.7	72.2	72.1	71.7	70.9	71.2	71.4	71.5	71.7	71.1
1999	66.6	67.1	68.4	69.6	70.5	70.7	71.3	71.8	72.3	73.1	72.7	72.5	72.1	71.4	71.6	71.8	72.0	72.2	71.6
2000	66.6	67.1	68.4	69.6	70.5	70.8	71.3	71.9	72.4	73.2	72.8	72.6	72.2	71.5	71.8	72.0	72.2	72.4	71.8
2001	67.0	67.3	68.6	69.7	70.7	70.9	71.4	71.8	72.5	73.2	72.8	72.6	71.9	71.0	71.2	71.4	71.6	72.3	71.3
2002	67.4	67.9	69.2	70.3	71.3	71.5	72.0	72.6	73.1	73.8	73.5	73.3	72.9	72.2	72.5	72.7	72.9	73.2	72.6
Pii[(1)]	62.3	62.7	64.1	65.3	66.6	67.5	68.6	68.7	70.3	70.6	70.7	70.9	70.9	70.8	71.2	71.8	72.2	72.3	72.6

[(1)] *Pii* stands for the mean of the predicted probability for year *i* using the coefficients estimated for the same year *i*.

Thus we find that changes in the structure of the population explain two thirds of the growth in female participation between 1984 and 2002, whereas one third is associated to changes in behaviour or other unspecified variables in our model. This is in marked contrast to the results of Gomulka and Stern (1989). Their results show that a major part of the growth in married women's employment between 1970 and 1983 is generated by changes in coefficients.[14]

Chart 1: Female participation, predicted participation due to changes in characteristics[1] and predicted participation due to changes in coefficients[2]



(1) Keeping coefficients as in 1984.
(2) Keeping characteristics as in 1984.

Interestingly, most of the increase in female participation between 1984 and 2002 takes place in 1984–92 (about 8 points of the total 10 percentage points). Notice in Table C and Chart 1 that, in the 1980s, changes in coefficients (ie behaviour) contribute significantly to the participation growth, whereas the majority of the growth in the 1990s is driven by characteristics.[15] This suggests that, if changes in policies cause changes in the coefficients, new policies had a greater impact on the growth in participation in the 1980s

(14) Notice, however, that we analyse participation whereas Gomulka and Stern (1989) focus on employment, which means that the results are not completely comparable.
(15) As an illustration, we divided the whole period 1984–2002 into 1984–91 and 1992–2002 and calculated the increase in female participation related to characteristics and behaviour. We find that about two thirds of the whole period rise due to changes in characteristics happens between 1992 and 2002. By contrast, changes in coefficients between 1984 and 1991 contribute significantly to the rise in female participation. However, this positive effect is partially offset by the small negative impact that changes in behaviour have on female participation between 1992 and 2002, which makes that over the whole period 1984–2002, changes in coefficients account for less than changes in characteristics.

compared to the 1990s.[16] There is scope for further research in order to identify the elements that cause part of the one third rise in female participation that is associated with changes in coefficients. This goes, however, beyond the scope of this paper.

It is important to recognise that the separation between the effect of the coefficients and characteristics on participation growth could be biased if the characteristics are not truly exogenous but evolve in response to changes in the coefficients. For example, in a given year, women might decide to study longer because they perceive that education increases their probability of employment and therefore participation. We believe, however, that this mechanism is generally weak and is unlikely to affect the overall conclusions of this paper.

Finally, we disentangle which of the individual variables has played an important role. As explained in Section 5, we use the concept of marginal effects. We select the marginal effects in 1984 and we multiply them by the change in the explanatory variables between 1984 and 2002. We find that changes in female education contribute significantly, as well as fertility explanatory variables. However, because of the endogeneity concern discussed earlier, we cannot make causality inferences.

6.3 Evidence on male participation

In marked contrast to the rise in female participation, male participation has declined - from 89.5% in 1984 to 83.7% in 2002. Interestingly, only about 1 percentage point of the drop in 5.8 percentage points has occurred in the 1980s and most of the fall was from 1993 onwards.

Although a detailed analysis of male participation is beyond the scope of this paper, for comparison we have reproduced the prediction of participation for different year coefficients and samples for men (Table D and Chart 2). This exercise allows us to identify whether the decline in male participation is mainly caused by changes in characteristics or if it is due to changes in coefficients.

---

(16) Table B shows the chronological order of new policies. For example, the right of reinstatement (a period of unpaid leave after which the mother has the right to return to her previous job) is qualified from 1980 onwards and in 1994, conditions for its eligibility are relaxed. In 1988, the Family Credit (in-work benefits for children) replaced the Family Income Supplement with increased generosity. In 1990, taxation moved from a joint basis (the sum of the earnings of a couple) to a separate basis, which was expected to increase participation among married women.

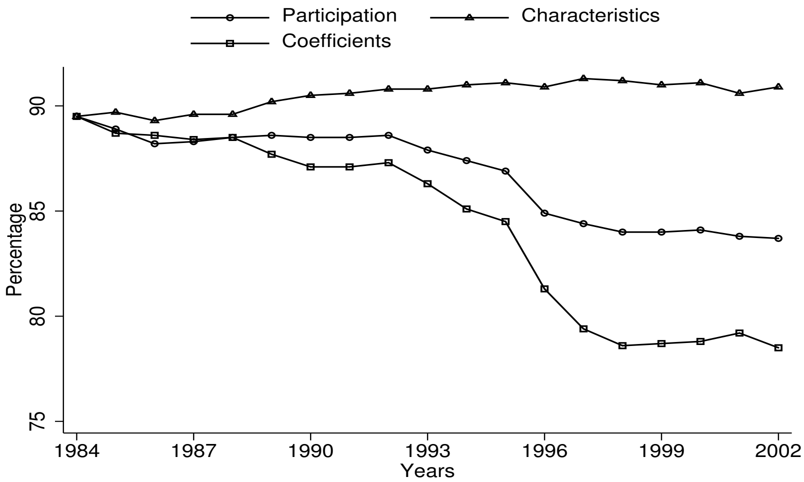
Table D: Predicted sample: Percentage of male participation in the United Kingdom using coefficients for year *j* and sample for year *i*

Sample year	Coefficient year 1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1984	89.5	88.7	88.6	88.4	88.5	87.7	87.1	87.1	87.3	86.3	85.1	84.5	81.3	79.4	78.6	78.7	78.8	79.2	78.5
1985	89.7	88.9	88.8	88.6	88.7	87.9	87.4	87.3	87.5	86.5	85.4	84.8	81.6	79.8	79.1	79.2	79.2	79.6	79.0
1986	89.3	88.5	88.2	88.0	88.1	87.3	86.6	86.7	87.1	86 .0	84.9	84.2	80.8	78.8	78.0	77.9	77.9	78.2	77.6
1987	89.6	88.8	88.5	88.3	88.5	87.6	87.0	87.1	87.3	86.4	85.2	84.5	81.3	79.3	78.6	78.5	78.6	78.9	78.3
1988	89.6	88.8	88.5	88.3	88.5	87.7	87.1	87.2	87.3	86.3	85.3	84.5	81.3	79.5	78.8	78.7	78.7	79.2	78.5
1989	90.2	89.5	89.4	89.2	89.2	88.6	88.1	88.1	87.9	87.1	86.1	85.5	82.7	81.0	80.5	80.5	80.6	81.2	80.4
1990	90.5	89.8	89.7	89.5	89.6	88.9	88.5	88.4	88.3	87.4	86.5	85.9	83.3	81.7	81.2	81.2	81.3	82.0	81.1
1991	90.6	89.9	89.8	89.6	89.6	89.9	88.6	88.5	88.4	87.5	86.6	86.0	83.4	81.7	81.2	81.3	81.3	82.1	81.2
1992	90.8	90.2	90.1	89.8	89.9	89.4	89.0	88.9	88.6	87.8	87.0	86.4	83.8	82.2	81.8	81.9	81.9	82.8	81.8
1993	90.8	90.2	90.2	89.9	90.0	89.4	89.1	88.9	88.7	87.9	87.1	86.4	83.9	82.4	81.9	82.0	82.0	82.8	82.0
1994	91.0	90.5	90.5	90.2	90.3	89.8	89.5	89.3	88.9	88.1	87.4	86.8	84.5	83.1	82.7	82.8	82.8	83.8	82.8
1995	91.1	90.6	90.6	90.3	90.3	89.9	89.7	89.4	88.9	88.2	87.5	86.9	85.1	84.0	83.6	83.8	83.8	84.4	83.8
1996	90.9	90.4	90.3	90.0	90.1	89.6	89.3	89.1	88.7	88.0	87.3	86.6	84.9	84.1	83.7	83.8	83.9	84.2	83.8
1997	91.3	90.7	90.7	90.3	90.5	90.0	89.8	89.6	89.1	88.4	87.7	87.1	85.5	84.4	84.1	84.2	84.3	84.7	84.2
1998	91.2	90.6	90.6	90.2	90.4	89.9	89.7	89.5	89.0	88.2	87.6	87.0	85.4	84.3	84.0	84.1	84.2	84.6	84.1
1999	91.0	90.5	90.5	90.1	90.3	89.8	89.6	89.4	88.8	88.1	87.5	86.9	85.3	84.2	83.9	84.0	84.1	84.6	84.0
2000	91.1	90.5	90.5	90.1	90.3	89.8	89.6	89.4	88.8	88.1	87.5	86.9	85.3	84.2	83.9	84.0	84.1	84.6	84.0
2001	90.6	90.1	90.0	89.5	89.9	89.4	89.2	88.9	88.2	87.6	87.0	86.4	84.2	82.5	82.3	82.3	82.4	83.8	82.4
2002	90.9	90.4	90.3	89.9	90.1	89.7	89.5	89.2	88.6	87.9	87.2	86.7	85.1	83.8	83.6	83.7	83.7	84.4	83.7
Pii[1]	89.5	88.9	88.2	88.3	88.5	88.6	88.5	88.5	88.6	87.9	87.4	86.9	84.9	84.4	84	84	84.1	83.8	83.7

[1] *Pii* stands for the mean of the predicted probability for year *i* using the coefficients estimated for the same year *i*.

Table D shows that the pattern for males is explained by changes in coefficients, in contrast to our conclusions regarding female participation. Variation in coefficients between 1984 and 2002 generate a decline in male participation of about 8.7 percentage points, whereas changes in characteristics account for an increase of male participation of about 2.9 percentage points. Therefore, had behaviour[17] not changed, the net trend in characteristics would have caused a slight increase in male participation. Notice that of the total decline in the predicted participation in the period 1984–2002 due to coefficients, only one fifth occurs in the 1980s and the rest from 1991 onwards. Changes in characteristics have a smoother impact on the probability of male participation, with three fifths of the changes happening in the 1980s.

Chart 2: Male participation, predicted participation due to changes in characteristics[1] and predicted participation due to changes in coefficients[2]



[1] Keeping coefficients as in 1984.
[2] Keeping characteristics as in 1984.

6.4 Summary

To summarise, the key results are the following. Around two thirds of the growth in female participation over the period 1984–2002 are explained by changes in characteristics and the other third by changes in coefficients. However, greater changes in participation occur in years where coefficients play a bigger role. This reflects the fact that coefficients have first moved participation upwards and then downwards, offsetting each other. In the males' case, changes in coefficients have caused the decrease in their participation.

[17] Or other unobserved factors not accounted for in the model.

7 Conclusions and further remarks

This paper analyses the increase in female participation between 1984 and 2002. In order to describe the female participation profile, we decompose the growth in participation into two sources. On the one hand, changes in the characteristics of the female population such as education, fertility and marital status. On the other hand, changes in the impact of such characteristics on participation that capture both differences in behaviour across these years and changes in other variables not included in our specification.

Female participation in our sample (aged between 16–59 who are either the heads or their spouse) has risen from 62% to 73% over the period 1984–2002. We find that two thirds of the growth in female participation is associated with changes in the female population structure. The other third of the rise in female participation is due to changes in the coefficients, interpretable as changes in behaviour. This means women with the same observable characteristics respond differently across these years, and/or a change in other variables not accounted for in the model. The pattern is rather different from men, whose decline in participation is mainly driven by changes in behaviour, especially after 1993.

Most of the increase in female participation between 1984 and 2002 takes place in 1984–92 (about 8 points of the total 11 percentage points), when both characteristics and 'behaviour' have a positive impact on female participation growth. After that, the growth of female participation slowed down mainly because 'behaviour' reversed its positive effect. Thus, in the 1980s, changes in behaviour contribute significantly to the participation growth, whereas the majority of the growth in the 1990s is driven by characteristics. Overall, results suggest that periods of greater female participation changes are those in which changes in behaviour have a positive significant impact.

Appendix: Labels for the variables and tables

Labels

- Age: 0–1 dummies indicating if individual belongs to each age band. These are *Ag16–19*, *Ag20–24*, *Ag25–29*, *Ag30–34*, *Ag35–39*, *Ag40–44*, *Ag45–49*, *Ag50–54*, and *Ag55–59*. The base group is *Ag35–39*.

- *Non–White*: dummy 0–1 where 1 means non-white.

- Regions: twelve 0-1 dummies. *Region1* (North East, reference group), *Region2* (Yorkshire), *Region3* (East Midlands), *Region4* (East Anglia), *Region5* (London), *Region6* (South East), *Region7* (South West), *Region8* (West Midlands), *Region9* (North West), *Region10* (Wales), *Region11* (Scotland) and *Region12* (Northern Ireland).

- Education: nine 0–1 dummies, being the lowest level *Edu1* the base group. These are *Edu1* (no qualifications, our omitted category), *Edu2* (other professional/vocational qualifications), *Edu3* (CSE), *Edu4* (completed apprenticeship, including City and Guilds), *Edu5* (‘O’ level), *Edu6* (mid vocational, ONC, OND), *Edu7* (‘A’ level), *Edu8* (high vocational, BTEC, HNC, HND and nurses) and *Edu9* (degree, including teachers).

- Number of dependent children in age bands. *Ndep0–2* (number of dependent children aged between 0 and 2 years), *Ndep3–4* (aged between 3 and 4), *Ndep5–10* (aged between 5 and 10), *Ndep11–15* (aged between 11 and 15).

- Four 0–1 dummies if a woman has at least one child in each of the age groups. These are *Ddep0–2*, *Ddep3–4*, *Ddep5–10* and *Ddep11–15*.

- *Married*: dummy 0–1 if the individual is either married or in cohabitation.

- Partner employment status (*EmpP*): 0–1 dummy that takes value one for those females whose partner is employed, zero otherwise.

- Partner education status: nine 0–1 dummies (*Edu1P–Edu9P*) with the same criteria as females and *Edu1P* being the omitted variable.

- *HOHSingle*: 0–1 dummy for those individuals who are single parents.

Table A.1: **Means and standard of the variables in probit model**

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
N. Observ	37016	37793	37761	37171	37650	37320	35997	35636	38821	39448	38738	37698	36420	37137	36446	36083	35125	34227	34503
Ag16–19	0.01	0.009	0.008	0.007	0.008	0.006	0.006	0.004	0.008	0.007	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.006
	(0.098)	(0.092)	(0.090)	(0.083)	(0.089)	(0.078)	(0.076)	(0.065)	(0.086)	(0.083)	(0.082)	(0.085)	(0.086)	(0.085)	(0.089)	(0.086)	(0.082)	(0.082)	(0.078)
Ag20–24	0.084	0.081	0.077	0.075	0.071	0.067	0.061	0.058	0.073	0.068	0.068	0.065	0.058	0.056	0.054	0.051	0.052	0.049	0.053
	(0.278)	(0.273)	(0.267)	(0.263)	(0.256)	(0.250)	(0.239)	(0.234)	(0.261)	(0.253)	(0.252)	(0.247)	(0.233)	(0.230)	(0.225)	(0.220)	(0.222)	(0.216)	(0.224)
Ag25–29	0.13	0.135	0.131	0.13	0.128	0.129	0.128	0.128	0.137	0.138	0.135	0.131	0.127	0.125	0.120	0.116	0.110	0.101	0.099
	(0.337)	(0.341)	(0.338)	(0.337)	(0.335)	(0.335)	(0.334)	(0.334)	(0.344)	(0.345)	(0.342)	(0.338)	(0.333)	(0.330)	(0.325)	(0.320)	(0.313)	(0.301)	(0.298)
Ag30–34	0.143	0.144	0.144	0.143	0.140	0.140	0.143	0.144	0.148	0.155	0.156	0.153	0.155	0.157	0.154	0.156	0.151	0.149	0.148
	(0.350)	(0.351)	(0.351)	(0.350)	(0.347)	(0.347)	(0.350)	(0.351)	(0.355)	(0.362)	(0.362)	(0.360)	(0.362)	(0.364)	(0.361)	(0.363)	(0.358)	(0.356)	(0.355)
Ag40–44	0.127	0.13	0.134	0.145	0.154	0.157	0.159	0.160	0.145	0.138	0.136	0.133	0.134	0.134	0.134	0.138	0.138	0.145	0.150
	(0.333)	(0.337)	(0.340)	(0.352)	(0.361)	(0.363)	(0.365)	(0.367)	(0.352)	(0.345)	(0.343)	(0.339)	(0.340)	(0.341)	(0.341)	(0.345)	(0.345)	(0.352)	(0.357)
Ag45–49	0.119	0.116	0.119	0.118	0.123	0.126	0.129	0.130	0.138	0.142	0.142	0.146	0.149	0.140	0.133	0.131	0.131	0.126	0.127
	(0.324)	(0.321)	(0.323)	(0.323)	(0.329)	(0.332)	(0.336)	(0.337)	(0.345)	(0.349)	(0.349)	(0.353)	(0.356)	(0.347)	(0.340)	(0.337)	(0.338)	(0.331)	(0.333)
Ag50–54	0.113	0.113	0.111	0.113	0.115	0.118	0.12	0.121	0.111	0.109	0.111	0.116	0.119	0.129	0.139	0.141	0.14	0.142	0.136
	(0.316)	(0.316)	(0.314)	(0.316)	(0.319)	(0.322)	(0.325)	(0.326)	(0.314)	(0.312)	(0.314)	(0.320)	(0.323)	(0.335)	(0.346)	(0.348)	(0.347)	(0.349)	(0.342)
Ag55–59	0.119	0.116	0.115	0.116	0.114	0.113	0.112	0.111	0.102	0.103	0.101	0.105	0.106	0.103	0.106	0.106	0.110	0.118	0.123
	(0.324)	(0.320)	(0.319)	(0.321)	(0.317)	(0.316)	(0.315)	(0.314)	(0.303)	(0.304)	(0.302)	(0.307)	(0.308)	(0.304)	(0.308)	(0.308)	(0.313)	(0.323)	(0.329)
Non–White	0.106	0.109	0.11	0.108	0.113	0.111	0.108	0.114	0.110	0.107	0.113	0.088	0.059	0.069	0.069	0.074	0.074	0.129	0.083
	(0.308)	(0.312)	(0.313)	(0.310)	(0.316)	(0.314)	(0.311)	(0.318)	(0.313)	(0.310)	(0.317)	(0.283)	(0.236)	(0.253)	(0.254)	(0.261)	(0.262)	(0.335)	(0.275)
Region2	0.089	0.088	0.087	0.085	0.084	0.085	0.084	0.086	0.084	0.085	0.084	0.086	0.085	0.087	0.087	0.087	0.089	0.089	0.089
	(0.284)	(0.284)	(0.281)	(0.279)	(0.277)	(0.279)	(0.277)	(0.281)	(0.278)	(0.279)	(0.278)	(0.281)	(0.278)	(0.282)	(0.282)	(0.281)	(0.285)	(0.285)	(0.285)
Region3	0.067	0.065	0.069	0.069	0.069	0.067	0.068	0.069	0.068	0.07	0.069	0.069	0.069	0.07	0.071	0.071	0.069	0.072	0.072
	(0.251)	(0.246)	(0.253)	(0.253)	(0.254)	(0.251)	(0.252)	(0.254)	(0.252)	(0.255)	(0.254)	(0.253)	(0.253)	(0.256)	(0.257)	(0.256)	(0.254)	(0.258)	(0.259)
Region4	0.036	0.037	0.038	0.035	0.036	0.034	0.036	0.035	0.035	0.035	0.035	0.037	0.038	0.036	0.037	0.037	0.037	0.039	0.036
	(0.186)	(0.188)	(0.190)	(0.184)	(0.186)	(0.182)	(0.185)	(0.183)	(0.184)	(0.184)	(0.183)	(0.189)	(0.190)	(0.186)	(0.190)	(0.189)	(0.190)	(0.193)	(0.185)
Region5	0.095	0.098	0.098	0.105	0.105	0.103	0.099	0.099	0.104	0.107	0.108	0.109	0.103	0.111	0.108	0.111	0.110	0.110	0.109
	(0.293)	(0.297)	(0.297)	(0.307)	(0.307)	(0.304)	(0.299)	(0.299)	(0.305)	(0.310)	(0.310)	(0.312)	(0.304)	(0.314)	(0.311)	(0.314)	(0.313)	(0.312)	(0.311)
Region6	0.175	0.175	0.178	0.178	0.176	0.172	0.176	0.177	0.184	0.185	0.184	0.187	0.186	0.186	0.189	0.187	0.186	0.193	0.197
	(0.380)	(0.380)	(0.382)	(0.383)	(0.381)	(0.378)	(0.381)	(0.382)	(0.387)	(0.389)	(0.387)	(0.390)	(0.389)	(0.389)	(0.392)	(0.390)	(0.389)	(0.394)	(0.398)
Region7	0.074	0.076	0.073	0.072	0.075	0.082	0.078	0.074	0.078	0.078	0.078	0.081	0.077	0.079	0.08	0.0817	0.082	0.085	0.086
	(0.262)	(0.264)	(0.260)	(0.259)	(0.264)	(0.274)	(0.268)	(0.262)	(0.268)	(0.269)	(0.269)	(0.273)	(0.267)	(0.270)	(0.272)	(0.274)	(0.274)	(0.279)	(0.280)
Region8	0.088	0.086	0.089	0.087	0.081	0.086	0.087	0.085	0.089	0.085	0.086	0.088	0.088	0.091	0.091	0.0913	0.086	0.086	0.087
	(0.283)	(0.280)	(0.285)	(0.282)	(0.273)	(0.280)	(0.281)	(0.278)	(0.284)	(0.279)	(0.281)	(0.283)	(0.283)	(0.288)	(0.288)	(0.288)	(0.281)	(0.281)	(0.281)
Region9	0.105	0.108	0.107	0.106	0.106	0.102	0.104	0.109	0.105	0.104	0.104	0.108	0.109	0.106	0.103	0.1032	0.103	0.096	0.096
	(0.306)	(0.310)	(0.309)	(0.307)	(0.308)	(0.303)	(0.306)	(0.311)	(0.306)	(0.306)	(0.305)	(0.311)	(0.312)	(0.308)	(0.304)	(0.304)	(0.304)	(0.295)	(0.295)
Region10	0.048	0.051	0.048	0.046	0.045	0.044	0.047	0.047	0.047	0.046	0.047	0.048	0.05	0.049	0.048	0.0474	0.049	0.048	0.049
	(0.213)	(0.219)	(0.213)	(0.209)	(0.208)	(0.204)	(0.211)	(0.212)	(0.212)	(0.209)	(0.211)	(0.215)	(0.217)	(0.215)	(0.214)	(0.212)	(0.216)	(0.214)	(0.217)

continued on next page

Table A.1: ***continued***

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Region11	0.098 (0.297)	0.090 (0.287)	0.087 (0.282)	0.093 (0.291)	0.096 (0.295)	0.098 (0.297)	0.098 (0.298)	0.093 (0.290)	0.090 (0.286)	0.091 (0.288)	0.089 (0.285)	0.093 (0.291)	0.095 (0.293)	0.094 (0.291)	0.096 (0.294)	0.0952 (0.293)	0.094 (0.293)	0.094 (0.292)	0.091 (0.288)
Region12	0.071 (0.256)	0.072 (0.258)	0.070 (0.255)	0.068 (0.251)	0.069 (0.254)	0.067 (0.251)	0.068 (0.251)	0.07 (0.256)	0.062 (0.241)	0.058 (0.234)	0.063 (0.244)	0.037 (0.189)	0.034 (0.182)	0.036 (0.187)	0.036 (0.185)	0.034 (0.182)	0.039 (0.193)	0.035 (0.185)	0.034 (0.182)
Edu2	0.056 (0.230)	0.055 (0.228)	0.069 (0.253)	0.072 (0.259)	0.084 (0.278)	0.089 (0.285)	0.087 (0.282)	0.077 (0.266)	0.080 (0.272)	0.073 (0.260)	0.095 (0.293)	0.106 (0.308)	0.1 (0.300)	0.112 (0.315)	0.111 (0.314)	0.112 (0.315)	0.108 (0.310)	0.105 (0.307)	0.100 (0.300)
Edu3	0.041 (0.199)	0.043 (0.204)	0.046 (0.209)	0.04 (0.197)	0.043 (0.202)	0.044 (0.205)	0.043 (0.202)	0.041 (0.199)	0.047 (0.211)	0.048 (0.214)	0.055 (0.228)	0.06 (0.238)	0.044 (0.205)	0.047 (0.211)	0.047 (0.211)	0.043 (0.203)	0.043 (0.202)	0.041 (0.199)	0.041 (0.198)
Edu4	0.048 (0.213)	0.047 (0.211)	0.03 (0.171)	0.039 (0.193)	0.036 (0.187)	0.057 (0.233)	0.062 (0.241)	0.067 (0.250)	0.076 (0.265)	0.092 (0.288)	0.096 (0.294)	0.084 (0.277)	0.073 (0.260)	0.081 (0.272)	0.08 (0.272)	0.081 (0.273)	0.082 (0.274)	0.085 (0.278)	0.088 (0.283)
Edu5	0.162 (0.369)	0.169 (0.375)	0.171 (0.376)	0.176 (0.381)	0.187 (0.390)	0.185 (0.388)	0.198 (0.398)	0.199 (0.399)	0.205 (0.404)	0.179 (0.384)	0.196 (0.397)	0.211 (0.408)	0.220 (0.415)	0.226 (0.418)	0.218 (0.413)	0.216 (0.411)	0.216 (0.411)	0.213 (0.410)	0.210 (0.407)
Edu6	0.007 (0.083)	0.008 (0.089)	0.007 (0.084)	0.007 (0.085)	0.009 (0.096)	0.013 (0.113)	0.015 (0.122)	0.015 (0.120)	0.019 (0.135)	0.017 (0.131)	0.018 (0.133)	0.017 (0.130)	0.019 (0.137)	0.026 (0.160)	0.029 (0.168)	0.034 (0.182)	0.037 (0.189)	0.040 (0.196)	0.045 (0.208)
Edu7	0.043 (0.204)	0.047 (0.211)	0.047 (0.211)	0.048 (0.213)	0.050 (0.219)	0.052 (0.222)	0.056 (0.230)	0.059 (0.235)	0.056 (0.231)	0.054 (0.225)	0.061 (0.239)	0.059 (0.235)	0.061 (0.240)	0.063 (0.244)	0.066 (0.247)	0.066 (0.247)	0.066 (0.248)	0.069 (0.253)	0.069 (0.254)
Edu8	0.048 (0.214)	0.051 (0.22)	0.053 (0.223)	0.051 (0.221)	0.052 (0.222)	0.052 (0.221)	0.052 (0.223)	0.053 (0.225)	0.064 (0.244)	0.073 (0.259)	0.079 (0.270)	0.078 (0.269)	0.081 (0.272)	0.079 (0.269)	0.082 (0.275)	0.083 (0.276)	0.084 (0.278)	0.085 (0.278)	0.085 (0.279)
Edu9	0.078 (0.268)	0.083 (0.275)	0.084 (0.277)	0.083 (0.276)	0.083 (0.275)	0.087 (0.282)	0.091 (0.288)	0.092 (0.290)	0.103 (0.304)	0.110 (0.313)	0.111 (0.315)	0.115 (0.319)	0.117 (0.322)	0.123 (0.328)	0.128 (0.334)	0.139 (0.345)	0.146 (0.353)	0.151 (0.358)	0.161 (0.368)
Ndep0–2	0.18 (0.437)	0.184 (0.446)	0.178 (0.438)	0.177 (0.431)	0.179 (0.435)	0.175 (0.431)	0.173 (0.429)	0.176 (0.441)	0.171 (0.426)	0.172 (0.422)	0.171 (0.425)	0.163 (0.414)	0.16 (0.409)	0.156 (0.405)	0.157 (0.405)	0.152 (0.400)	0.153 (0.401)	0.144 (0.388)	0.137 (0.384)
Ndep3–4	0.123 (0.347)	0.123 (0.346)	0.120 (0.343)	0.118 (0.340)	0.120 (0.345)	0.120 (0.343)	0.120 (0.344)	0.122 (0.347)	0.114 (0.333)	0.119 (0.341)	0.117 (0.338)	0.119 (0.342)	0.112 (0.329)	0.110 (0.327)	0.109 (0.328)	0.106 (0.323)	0.108 (0.326)	0.105 (0.320)	0.102 (0.315)
Ndep5–10	0.338 (0.650)	0.346 (0.662)	0.348 (0.662)	0.345 (0.663)	0.345 (0.667)	0.359 (0.682)	0.358 (0.675)	0.351 (0.674)	0.324 (0.645)	0.338 (0.659)	0.337 (0.656)	0.337 (0.660)	0.34 (0.661)	0.338 (0.655)	0.334 (0.650)	0.333 (0.652)	0.337 (0.652)	0.332 (0.642)	0.325 (0.634)
Ndep11–15	0.349 (0.659)	0.337 (0.641)	0.317 (0.618)	0.304 (0.604)	0.289 (0.592)	0.276 (0.575)	0.279 (0.581)	0.275 (0.579)	0.256 (0.565)	0.267 (0.575)	0.268 (0.580)	0.267 (0.576)	0.264 (0.573)	0.263 (0.573)	0.264 (0.573)	0.267 (0.575)	0.272 (0.576)	0.275 (0.583)	0.279 (0.588)
Ddep0–2	0.159 (0.365)	0.161 (0.367)	0.157 (0.364)	0.157 (0.364)	0.159 (0.365)	0.155 (0.362)	0.153 (0.360)	0.154 (0.361)	0.152 (0.359)	0.154 (0.361)	0.153 (0.360)	0.147 (0.354)	0.144 (0.351)	0.141 (0.348)	0.141 (0.349)	0.137 (0.344)	0.137 (0.344)	0.13 (0.336)	0.123 (0.328)
Ddep3–4	0.118 (0.322)	0.118 (0.322)	0.114 (0.318)	0.112 (0.316)	0.113 (0.317)	0.114 (0.318)	0.114 (0.318)	0.116 (0.320)	0.109 (0.312)	0.113 (0.317)	0.112 (0.316)	0.113 (0.317)	0.107 (0.310)	0.106 (0.308)	0.104 (0.306)	0.101 (0.302)	0.102 (0.303)	0.101 (0.302)	0.098 (0.297)
Ddep5–10	0.249 (0.432)	0.252 (0.434)	0.255 (0.436)	0.25 (0.433)	0.249 (0.432)	0.258 (0.438)	0.259 (0.438)	0.254 (0.435)	0.237 (0.425)	0.246 (0.431)	0.246 (0.431)	0.244 (0.430)	0.247 (0.431)	0.247 (0.431)	0.245 (0.430)	0.244 (0.429)	0.248 (0.432)	0.248 (0.432)	0.243 (0.429)
Ddep11–15	0.258 (0.437)	0.253 (0.435)	0.243 (0.429)	0.234 (0.423)	0.223 (0.416)	0.216 (0.412)	0.218 (0.413)	0.213 (0.410)	0.197 (0.398)	0.204 (0.403)	0.204 (0.403)	0.204 (0.403)	0.203 (0.402)	0.202 (0.401)	0.202 (0.402)	0.205 (0.404)	0.211 (0.408)	0.211 (0.408)	0.213 (0.410)

continued on next page

Table A.1: ***continued***

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Married	0.847	0.841	0.832	0.836	0.819	0.819	0.814	0.808	0.808	0.803	0.79	0.78	0.777	0.773	0.767	0.764	0.763	0.758	0.751
	(0.360)	(0.365)	(0.373)	(0.379)	(0.385)	(0.385)	(0.389)	(0.394)	(0.394)	(0.398)	(0.407)	(0.414)	(0.416)	(0.419)	(0.422)	(0.425)	(0.425)	(0.428)	(0.432)
EmpP	0.708	0.697	0.686	0.679	0.686	0.696	0.700	0.68	0.667	0.652	0.644	0.642	0.639	0.636	0.637	0.635	0.637	0.636	0.629
	(0.455)	(0.459)	(0.464)	(0.467)	(0.464)	(0.460)	(0.458)	(0.466)	(0.471)	(0.476)	(0.479)	(0.479)	(0.480)	(0.481)	(0.481)	(0.481)	(0.481)	(0.481)	(0.483)
EduP2	0.028	0.030	0.039	0.049	0.061	0.063	0.06	0.051	0.053	0.056	0.075	0.08	0.074	0.084	0.083	0.079	0.075	0.074	0.075
	(0.164)	(0.170)	(0.194)	(0.216)	(0.239)	(0.243)	(0.238)	(0.219)	(0.224)	(0.230)	(0.264)	(0.271)	(0.261)	(0.277)	(0.276)	(0.270)	(0.263)	(0.262)	(0.263)
EduP3	0.019	0.019	0.02	0.015	0.021	0.017	0.017	0.017	0.021	0.023	0.025	0.027	0.019	0.022	0.022	0.023	0.021	0.023	0.022
	(0.136)	(0.136)	(0.139)	(0.123)	(0.143)	(0.129)	(0.128)	(0.128)	(0.142)	(0.151)	(0.157)	(0.163)	(0.138)	(0.145)	(0.148)	(0.149)	(0.143)	(0.150)	(0.147)
EduP4	0.209	0.202	0.133	0.16	0.145	0.225	0.225	0.222	0.229	0.215	0.212	0.208	0.202	0.2	0.193	0.189	0.185	0.178	0.173
	(0.406)	(0.401)	(0.339)	(0.367)	(0.352)	(0.417)	(0.418)	(0.415)	(0.420)	(0.411)	(0.409)	(0.406)	(0.401)	(0.400)	(0.395)	(0.391)	(0.388)	(0.382)	(0.378)
EduP5	0.076	0.080	0.080	0.069	0.083	0.072	0.076	0.075	0.079	0.074	0.08	0.082	0.083	0.085	0.084	0.083	0.084	0.087	0.088
	(0.265)	(0.272)	(0.271)	(0.254)	(0.275)	(0.258)	(0.264)	(0.264)	(0.271)	(0.262)	(0.272)	(0.274)	(0.276)	(0.279)	(0.278)	(0.276)	(0.278)	(0.282)	(0.283)
EduP6	0.021	0.022	0.018	0.018	0.019	0.022	0.024	0.024	0.024	0.018	0.02	0.019	0.021	0.023	0.025	0.025	0.028	0.03	0.032
	(0.143)	(0.147)	(0.134)	(0.131)	(0.138)	(0.147)	(0.153)	(0.153)	(0.153)	(0.132)	(0.139)	(0.135)	(0.142)	(0.150)	(0.157)	(0.157)	(0.165)	(0.171)	(0.176)
EduP7	0.034	0.037	0.036	0.036	0.036	0.035	0.038	0.041	0.038	0.037	0.041	0.039	0.041	0.042	0.041	0.042	0.043	0.043	0.043
	(0.183)	(0.189)	(0.186)	(0.186)	(0.187)	(0.184)	(0.192)	(0.198)	(0.191)	(0.188)	(0.198)	(0.193)	(0.198)	(0.200)	(0.198)	(0.200)	(0.202)	(0.202)	(0.204)
EduP8	0.032	0.034	0.031	0.031	0.035	0.033	0.036	0.039	0.046	0.05	0.056	0.058	0.058	0.058	0.06	0.061	0.061	0.06	0.057
	(0.177)	(0.182)	(0.172)	(0.174)	(0.183)	(0.180)	(0.186)	(0.194)	(0.209)	(0.219)	(0.230)	(0.233)	(0.235)	(0.234)	(0.238)	(0.239)	(0.240)	(0.238)	(0.233)
EduP9	0.091	0.097	0.102	0.099	0.097	0.096	0.100	0.102	0.112	0.121	0.116	0.119	0.118	0.119	0.122	0.128	0.133	0.134	0.135
	(0.287)	(0.295)	(0.302)	(0.298)	(0.296)	(0.294)	(0.300)	(0.303)	(0.315)	(0.326)	(0.320)	(0.324)	(0.323)	(0.323)	(0.327)	(0.334)	(0.339)	(0.341)	(0.341)
HOHSingle	0.149	0.171	0.179	0.177	0.192	0.194	0.191	0.206	0.196	0.207	0.22	0.225	0.227	0.229	0.234	0.238	0.239	0.244	0.251
	(0.356)	(0.376)	(0.384)	(0.381)	(0.394)	(0.395)	(0.393)	(0.405)	(0.397)	(0.405)	(0.414)	(0.418)	(0.419)	(0.420)	(0.424)	(0.426)	(0.426)	(0.429)	(0.434)

Table A.2: **Marginal effects of probit estimation (standard errors in brackets)**

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Ag16–19	-0.1977	-0.2575	-0.2127	-0.1476	-0.2222	-0.1317	-0.2416	-0.2644	-0.1937	-0.2023	-0.2512	-0.2042	-0.2256	-0.2523	-0.1366	-0.2182	-0.1881	-0.2033	-0.1621
	(0.031)	(0.0319)	(0.0329)	(0.0354)	(0.0329)	(0.0376)	(0.039)	(0.0455)	(0.0337)	(0.0347)	(0.0353)	(0.0349)	(0.0341)	(0.0344)	(0.0325)	(0.0349)	(0.0362)	(0.0377)	(0.0378)
Ag20–24	-0.0422	-0.0725	-0.0557	-0.0545	-0.0816	-0.0612	-0.0828	-0.1327	-0.0711	-0.0973	-0.1281	-0.1044	-0.1142	-0.1283	-0.1089	-0.1504	-0.1608	-0.1568	-0.1176
	(0.014)	(0.0139)	(0.0139)	(0.014)	(0.0142)	(0.0142)	(0.0151)	(0.0156)	(0.0133)	(0.0137)	(0.014)	(0.0141)	(0.0149)	(0.0149)	(0.0151)	(0.0156)	(0.0157)	(0.0162)	(0.0155)
Ag25–29	0.0114	0.0051	0.0099	0.022	-0.0112	-0.0006	-0.0106	-0.0263	-0.0052	-0.0147	-0.0196	0.0004	-0.024	-0.0296	-0.0105	-0.0207	-0.0279	-0.0475	-0.0345
	(0.0114)	(0.0112)	(0.011)	(0.0109)	(0.0111)	(0.0109)	(0.0111)	(0.0113)	(0.0102)	(0.0102)	(0.0102)	(0.0101)	(0.0107)	(0.0106)	(0.0104)	(0.0105)	(0.0108)	(0.0114)	-0.0114
Ag30–34	-0.0129	-0.0019	0.018	0.0292	0.0189	0.0172	0.0115	-0.0112	-0.0019	0.001	-0.0033	-0.0051	0.0098	0.0007	0.0118	0.0112	0.0039	-0.0019	-0.007
	(0.0104)	(0.0101)	(0.0097)	(0.0097)	(0.0097)	(0.0097)	(0.0098)	(0.0101)	(0.0093)	(0.0091)	(0.0091)	(0.0092)	(0.0092)	(0.0091)	(0.009)	(0.0089)	(0.009)	(0.0092)	(0.0092)
Ag40–44	-0.0463	-0.0297	-0.0323	-0.0334	-0.0294	-0.0327	-0.0361	-0.0298	-0.0245	-0.037	-0.0291	-0.0274	-0.0207	-0.0197	-0.0147	-0.0281	-0.0153	-0.0275	-0.0251
	(0.0109)	(0.0106)	(0.0104)	(0.0103)	(0.010)	(0.010)	(0.0101)	(0.0102)	(0.0098)	(0.0099)	(0.0099)	(0.010)	(0.0101)	(0.0099)	(0.0098)	(0.0098)	(0.0097)	(0.0098)	(0.0096)
Ag45–49	-0.1007	-0.0882	-0.0884	-0.0859	-0.0951	-0.0793	-0.0957	-0.0907	-0.073	-0.0983	-0.0848	-0.0752	-0.0709	-0.082	-0.0584	-0.0574	-0.065	-0.0691	-0.0566
	(0.0118)	(0.0117)	(0.0116)	(0.0117)	(0.0116)	(0.0115)	(0.0118)	(0.0117)	(0.0108)	(0.0109)	(0.0109)	(0.0108)	(0.011)	(0.0111)	(0.0109)	(0.0109)	(0.011)	(0.0113)	(0.0111)
Ag50–54	-0.1611	-0.1781	-0.1786	-0.1628	-0.1819	-0.1589	-0.1887	-0.1781	-0.1642	-0.1765	-0.1715	-0.1616	-0.1704	-0.149	-0.1372	-0.1455	-0.137	-0.1527	-0.132
	(0.0123)	(0.0121)	(0.0122)	(0.0123)	(0.0123)	(0.0123)	(0.0126)	(0.0126)	(0.0122)	(0.0124)	(0.0123)	(0.0124)	(0.0125)	(0.012)	(0.0118)	(0.0117)	(0.0118)	(0.012)	(0.012)
Ag55–59	-0.2898	-0.2854	-0.287	-0.2716	-0.2807	-0.2644	-0.2965	-0.2909	-0.289	-0.3085	-0.2931	-0.2668	-0.2867	-0.2943	-0.2717	-0.2673	-0.2545	-0.2753	-0.2585
	(0.0119)	(0.0119)	(0.012)	(0.0122)	(0.0123)	(0.0126)	(0.0128)	(0.0129)	(0.0126)	(0.0126)	(0.0128)	(0.013)	(0.0131)	(0.013)	(0.0131)	(0.013)	(0.0131)	(0.0131)	(0.0129)
Non–White	0.0208	-0.0348	-0.0268	-0.0563	-0.0388	-0.0362	-0.066	-0.0924	-0.0439	-0.0665	-0.0745	-0.0887	-0.1764	-0.2143	-0.2169	-0.2213	-0.2299	-0.1139	-0.2205
	(0.0152)	(0.0149)	(0.0143)	(0.0144)	(0.0134)	(0.0132)	(0.014)	(0.014)	(0.0121)	(0.0121)	(0.0123)	(0.0126)	(0.0126)	(0.0118)	(0.0119)	(0.0116)	(0.0118)	(0.0085)	(0.0114)
Region2	-0.002	0.0268	0.0271	0.0206	0.0075	0.0069	0.0083	0.0065	0.0243	0.0397	0.0262	0.0265	0.098	0.0107	0.0442	0.016	0.0324	0.0337	0.0097
	(0.0146)	(0.0138)	(0.0137)	(0.0138)	(0.0137)	(0.0134)	(0.0135)	(0.0136)	(0.0125)	(0.012)	(0.0126)	(0.0123)	(0.0101)	(0.0129)	(0.0121)	(0.0127)	(0.0123)	(0.0124)	(0.0129)
Region3	0.012	0.0436	0.0284	0.005	0.0199	0.0397	0.0397	0.0275	0.0382	0.0482	0.0188	0.041	0.1044	0.0447	0.0554	0.0397	0.0542	0.0449	0.0362
	(0.0153)	(0.0145)	(0.0143)	(0.0146)	(0.0141)	(0.0135)	(0.0136)	(0.0139)	(0.0128)	(0.0123)	(0.0132)	(0.0126)	(0.0103)	(0.0127)	(0.0123)	(0.0126)	(0.0124)	(0.0126)	(0.0128)
Region4	-0.0432	0.0181	0.0063	-0.0052	0.0219	0.0015	0.0449	0.0145	0.0165	0.0264	0.0349	0.029	0.0843	0.0088	0.0413	0.0229	0.0318	0.0504	0.032
	(0.0187)	(0.0173)	(0.0171)	(0.0178)	(0.0168)	(0.0171)	(0.0161)	(0.017)	(0.0158)	(0.0154)	(0.0155)	(0.0152)	(0.0128)	(0.0161)	(0.0149)	(0.0154)	(0.0151)	(0.0146)	(0.0155)
Region5	0.0103	0.0632	0.02	0.0024	-0.005	-0.0172	0.0113	0.0093	-0.0064	0.0215	-0.0085	0.0171	0.0987	0.0387	0.0557	0.0408	0.0464	0.0074	0.0195
	(0.0146)	(0.0133)	(0.0137)	(0.0137)	(0.0136)	(0.0135)	(0.0133)	(0.0135)	(0.0128)	(0.0122)	(0.013)	(0.0123)	(0.0098)	(0.0121)	(0.0117)	(0.0119)	(0.0119)	(0.0128)	(0.0126)
Region6	0.0003	0.029	0.015	0.0112	0.0081	0.0031	0.0214	0.0122	0.0294	0.0274	0.0175	0.0309	0.0961	0.024	0.0493	0.0241	0.0416	0.0422	0.0319
	(0.0132)	(0.0125)	(0.0124)	(0.0125)	(0.0123)	(0.012)	(0.012)	(0.0122)	(0.0111)	(0.011)	(0.0115)	(0.011)	(0.0094)	(0.0114)	(0.0109)	(0.0113)	(0.0111)	(0.0111)	(0.0113)
Region7	-0.0325	0.034	-0.0056	0.0124	0.0062	0.0082	0.0141	0.0186	0.0163	0.0418	0.0215	0.0378	0.0934	0.025	0.0549	0.0354	0.047	0.0443	0.0354
	(0.0154)	(0.0142)	(0.0146)	(0.0144)	(0.0141)	(0.0135)	(0.0138)	(0.0139)	(0.0129)	(0.0122)	(0.0129)	(0.0123)	(0.0104)	(0.0129)	(0.0121)	(0.0124)	(0.0122)	(0.0123)	(0.0125)
Region8	-0.0099	0.0583	0.0246	0.0124	0.0094	0.0092	0.0185	0.0179	0.0085	0.0417	0.0267	0.0307	0.0968	0.0211	0.055	0.0459	0.0532	0.0426	0.0308
	(0.0147)	(0.0135)	(0.0136)	(0.0138)	(0.0138)	(0.0133)	(0.0133)	(0.0135)	(0.0126)	(0.012)	(0.0125)	(0.0122)	(0.01)	(0.0125)	(0.0117)	(0.0119)	(0.0118)	(0.0122)	(0.012)
Region9	0.0122	0.0633	0.0461	0.0333	0.0376	0.0225	0.01	0.0093	0.0175	0.0294	0.004	0.0104	0.0802	-0.0034	0.0255	0.0088	0.0189	0.0345	0.0292
	(0.014)	(0.0128)	(0.0129)	(0.0131)	(0.0127)	(0.0127)	(0.013)	(0.013)	(0.0121)	(0.0118)	(0.0125)	(0.0121)	(0.0101)	(0.0127)	(0.0122)	(0.0124)	(0.0123)	(0.0122)	(0.0123)

continued on next page

Table A.2: ***continued***

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Region10	-0.0363	-0.0052	-0.0182	-0.0256	-0.03	-0.0302	-0.007	-0.0015	-0.021	-0.0069	-0.0279	0.0039	0.0582	-0.0062	0.0123	-0.0134	-0.0045	-0.0102	-0.013
	(0.0171)	(0.016)	(0.0164)	(0.0166)	(0.0164)	(0.0163)	(0.0158)	(0.0158)	(0.0152)	(0.0148)	(0.0155)	(0.0145)	(0.0125)	(0.0149)	(0.0146)	(0.0152)	(0.015)	(0.0154)	(0.0153)
Region11	-0.0403	0.0127	-0.0136	-0.01	-0.023	-0.0159	0.0014	-0.0181	0.0032	0.001	-0.007	0.0156	0.0636	-0.0086	0.0259	0.0049	0.0249	0.0231	0.018
	(0.0146)	(0.0139)	(0.0141)	(0.0139)	(0.0138)	(0.0134)	(0.0134)	(0.0139)	(0.0128)	(0.0126)	(0.0131)	(0.0124)	(0.0107)	(0.0131)	(0.0123)	(0.0127)	(0.0124)	(0.0126)	(0.0127)
Region12	-0.0554	0.0358	0.0141	0.0035	-0.0066	-0.0096	0.0391	0.0625	0.0158	0.018	0.021	0.0516	0.0304	-0.0112	0.0026	-0.0231	-0.0319	-0.0098	-0.0204
	(0.0222)	(0.0198)	(0.0198)	(0.0199)	(0.0192)	(0.019)	(0.018)	(0.0171)	(0.0172)	(0.0169)	(0.0169)	(0.0171)	(0.0147)	(0.0164)	(0.0161)	(0.0169)	(0.0166)	(0.0167)	(0.0172)
Edu2	0.0801	0.0921	0.1041	0.1036	0.0734	0.0901	0.1071	0.1087	0.1076	0.0932	0.0998	0.1123	0.1187	0.1389	0.1486	0.1535	0.143	0.1524	0.1484
	(0.0111)	(0.0108)	(0.0094)	(0.0091)	(0.0086)	(0.0081)	(0.0079)	(0.0082)	(0.0074)	(0.0078)	(0.0071)	(0.0067)	(0.0067)	(0.0062)	(0.0059)	(0.0057)	(0.0059)	(0.0058)	(0.0058)
Edu3	0.0632	0.0719	0.0536	0.0596	0.0548	0.0823	0.0717	0.0913	0.0606	0.0553	0.0849	0.0958	0.1002	0.1294	0.122	0.1157	0.135	0.1463	0.1311
	(0.0137)	(0.013)	(0.0127)	(0.013)	(0.0124)	(0.0114)	(0.0118)	(0.0113)	(0.0107)	(0.0103)	(0.0093)	(0.0088)	(0.0098)	(0.0086)	(0.0086)	(0.0089)	(0.0082)	(0.0079)	(0.0083)
Edu4	0.0713	0.0543	0.1178	0.0937	0.0807	0.0739	0.0806	0.0841	0.0817	0.0901	0.1115	0.1019	0.1262	0.1316	0.1505	0.1535	0.1652	0.1673	0.1686
	(0.012)	(0.0121)	(0.0134)	(0.0121)	(0.0123)	(0.01)	(0.0095)	(0.0091)	(0.0081)	(0.0073)	(0.0069)	(0.0074)	(0.0073)	(0.007)	(0.0065)	(0.0062)	(0.0059)	(0.0058)	(0.0056)
Edu5	0.0967	0.1227	0.1159	0.1188	0.1258	0.1264	0.1314	0.1425	0.1278	0.1189	0.1267	0.1356	0.1525	0.1705	0.1894	0.1725	0.1787	0.19	0.1846
	(0.0077)	(0.0072)	(0.0072)	(0.0069)	(0.0066)	(0.0065)	(0.0063)	(0.0062)	(0.0059)	(0.006)	(0.006)	(0.0059)	(0.0058)	(0.0057)	(0.0054)	(0.0055)	(0.0054)	(0.0053)	(0.0053)
Edu6	0.1825	0.1626	0.1599	0.164	0.1722	0.1748	0.1766	0.1974	0.1497	0.1331	0.1552	0.1831	0.1781	0.2016	0.2099	0.2106	0.2136	0.2009	0.2084
	(0.0255)	(0.0241)	(0.0246)	(0.0234)	(0.0187)	(0.0155)	(0.0139)	(0.0125)	(0.0122)	(0.0131)	(0.0115)	(0.0101)	(0.0099)	(0.0073)	(0.0063)	(0.0055)	(0.0052)	(0.0056)	(0.0049)
Edu7	0.073	0.0796	0.0971	0.087	0.1064	0.1098	0.1252	0.1403	0.1062	0.1113	0.1261	0.1258	0.1326	0.1526	0.1672	0.1721	0.183	0.1877	0.1679
	(0.0129)	(0.0122)	(0.0116)	(0.0115)	(0.0105)	(0.0101)	(0.0093)	(0.0087)	(0.0088)	(0.0086)	(0.008)	(0.0081)	(0.0078)	(0.0072)	(0.0065)	(0.0061)	(0.0057)	(0.0055)	(0.006)
Edu8	0.2067	0.2056	0.2077	0.2063	0.1946	0.2062	0.1952	0.2060	0.1872	0.1840	0.2003	0.1918	0.2031	0.2239	0.2254	0.2268	0.2229	0.2247	0.2244
	(0.0097)	(0.0092)	(0.0087)	(0.0084)	(0.0081)	(0.0075)	(0.0075)	(0.0071)	(0.0064)	(0.0061)	(0.0055)	(0.0058)	(0.0055)	(0.0049)	(0.0046)	(0.0044)	(0.0044)	(0.0043)	(0.0042)
Edu9	0.2096	0.2256	0.2289	0.2207	0.2217	0.2298	0.2185	0.2241	0.2162	0.2115	0.2316	0.2238	0.2322	0.2479	0.2538	0.2565	0.2514	0.2601	0.2623
	(0.0089)	(0.0081)	(0.0076)	(0.0074)	(0.0070)	(0.0065)	(0.0064)	(0.0062)	(0.0055)	(0.0054)	(0.0050)	(0.0052)	(0.0051)	(0.0047)	(0.0044)	(0.0043)	(0.0044)	(0.0043)	(0.0043)
Ndep0–2	-0.2195	-0.2048	-0.1926	-0.1958	-0.1666	-0.1863	-0.1656	-0.1359	-0.1907	-0.1929	-0.1613	-0.1555	-0.1492	-0.1565	-0.1436	-0.1171	-0.1241	-0.1664	-0.1941
	(0.0211)	(0.0195)	(0.0197)	(0.0201)	(0.0185)	(0.0186)	(0.0186)	(0.0179)	(0.0178)	(0.0181)	(0.0174)	(0.0183)	(0.0193)	(0.0196)	(0.0188)	(0.0188)	(0.0189)	(0.0208)	(0.0206)
Ndep3–4	-0.1317	-0.1500	-0.1642	-0.0977	-0.0625	-0.0981	-0.0798	-0.0420	-0.0664	-0.1313	-0.0933	-0.1845	-0.1604	-0.1373	-0.0767	-0.0890	-0.0671	-0.0972	-0.0957
	(0.0367)	(0.0372)	(0.0349)	(0.0337)	(0.0317)	(0.0329)	(0.0308)	(0.0328)	(0.0331)	(0.0310)	(0.0316)	(0.0312)	(0.0368)	(0.0355)	(0.0330)	(0.0325)	(0.0317)	(0.0366)	(0.0365)
Ndep5–10	-0.0909	-0.0802	-0.0663	-0.0688	-0.0618	-0.0586	-0.0605	-0.0522	-0.0652	-0.0753	-0.0781	-0.0437	-0.0712	-0.0783	-0.0727	-0.0780	-0.0697	-0.0676	-0.0739
	(0.0098)	(0.0092)	(0.0091)	(0.0091)	(0.0087)	(0.0083)	(0.0085)	(0.0085)	(0.0083)	(0.0080)	(0.0081)	(0.0081)	(0.0081)	(0.0083)	(0.0083)	(0.0082)	(0.0083)	(0.0086)	(0.0087)
Ndep11–15	-0.0503	-0.0346	-0.0587	-0.0415	-0.0270	-0.0465	-0.0425	-0.0389	-0.0453	-0.0522	-0.0440	-0.0371	-0.0384	-0.0513	-0.0271	-0.0439	-0.0564	-0.0775	-0.0481
	(0.0094)	(0.0097)	(0.0101)	(0.0105)	(0.0105)	(0.0109)	(0.0107)	(0.0109)	(0.0103)	(0.0101)	(0.0100)	(0.0102)	(0.0106)	(0.0103)	(0.0105)	(0.0103)	(0.0102)	(0.0101)	(0.0100)
Ddep0–2	-0.1593	-0.1602	-0.1673	-0.1437	-0.1379	-0.1123	-0.1372	-0.1498	-0.0962	-0.0711	-0.1129	-0.1146	-0.1101	-0.0844	-0.1034	-0.1202	-0.1014	-0.0539	-0.0354
	(0.0258)	(0.0244)	(0.0248)	(0.0253)	(0.0239)	(0.0238)	(0.0244)	(0.0240)	(0.0230)	(0.0228)	(0.0231)	(0.0242)	(0.0253)	(0.0250)	(0.0247)	(0.0253)	(0.0252)	(0.0260)	(0.0253)
Ddep3–4	-0.1226	-0.0661	-0.0614	-0.1237	-0.1596	-0.0915	-0.1289	-0.1593	-0.1322	-0.0599	-0.0985	-0.0005	-0.0054	-0.0229	-0.1153	-0.0659	-0.0912	-0.0893	-0.0870
	(0.0413)	(0.0413)	(0.0391)	(0.0393)	(0.0379)	(0.0383)	(0.0372)	(0.0400)	(0.0404)	(0.0359)	(0.0381)	(0.0335)	(0.0393)	(0.0391)	(0.0406)	(0.0385)	(0.0389)	(0.0441)	(0.0441)
Ddep5–10	-0.0543	-0.0686	-0.0904	-0.0630	-0.0548	-0.0605	-0.0571	-0.0537	-0.0533	-0.0440	-0.0424	-0.0741	-0.0545	-0.0335	-0.0243	-0.0144	-0.0223	-0.0377	-0.0173
	(0.0151)	(0.0146)	(0.0146)	(0.0146)	(0.0140)	(0.0136)	(0.0138)	(0.0139)	(0.0134)	(0.0130)	(0.0131)	(0.0135)	(0.0135)	(0.0133)	(0.0133)	(0.0130)	(0.0133)	(0.0137)	(0.0134)

continued on next page

Table A.2: ***continued***

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Ddep11–15	0.0142	-0.0087	0.0212	0.0109	-0.0127	0.0186	-0.0092	-0.0086	0.0083	0.0045	-0.0111	-0.0157	-0.0056	0.0138	-0.0123	0.0093	0.0132	0.0475	0.0051
	(0.0142)	(0.0146)	(0.0146)	(0.0151)	(0.0153)	(0.0152)	(0.0155)	(0.0157)	(0.0149)	(0.0146)	(0.0148)	(0.0151)	(0.0154)	(0.0147)	(0.0153)	(0.0148)	(0.0145)	(0.0139)	(0.0145)
Married	-0.2075	-0.0956	-0.0560	-0.2233	-0.0941	-0.0536	-0.0566	0.0177	-0.1125	-0.1081	-0.0726	-0.1292	-0.0959	-0.0884	-0.1819	-0.1072	-0.0804	-0.1218	-0.0280
	(0.0200)	(0.0211)	(0.0219)	(0.0252)	(0.0197)	(0.0223)	(0.0352)	(0.0240)	(0.0180)	(0.0212)	(0.0230)	(0.0280)	(0.0385)	(0.0430)	(0.0427)	(0.0453)	(0.0546)	(0.0454)	(0.0602)
EmpP	0.2590	0.2505	0.2707	0.2528	0.2694	0.2649	0.2529	0.2362	0.2519	0.2587	0.2679	0.2915	0.2704	0.2541	0.2410	0.2378	0.2509	0.2541	0.2300
	(0.0083)	(0.0081)	(0.0080)	(0.0079)	(0.0082)	(0.0086)	(0.0088)	(0.0084)	(0.0075)	(0.0072)	(0.0074)	(0.0076)	(0.0078)	(0.0078)	(0.0081)	(0.0082)	(0.0083)	(0.0085)	(0.0084)
EduP2	-0.0060	-0.0218	-0.0187	-0.0062	0.0054	-0.0063	-0.0009	0.0076	0.0068	-0.0284	-0.0293	-0.0176	-0.0180	-0.0033	-0.0274	-0.0232	-0.0418	-0.0484	-0.0333
	(0.0169)	(0.0162)	(0.0142)	(0.0127)	(0.0113)	(0.0113)	(0.0117)	(0.0124)	(0.0116)	(0.0116)	(0.0109)	(0.0107)	(0.0112)	(0.0106)	(0.0111)	(0.0112)	(0.0118)	(0.0122)	(0.0119)
EduP3	0.0344	0.0291	0.0031	0.0364	0.0545	0.0018	0.0293	0.0434	0.0366	0.0385	0.0353	0.0413	0.0212	0.0502	0.0151	0.0530	0.0321	0.0095	0.0146
	(0.0202)	(0.0201)	(0.0198)	(0.0214)	(0.0175)	(0.0206)	(0.0202)	(0.0196)	(0.0171)	(0.0159)	(0.0157)	(0.0154)	(0.0186)	(0.0168)	(0.0179)	(0.0163)	(0.0179)	(0.0183)	(0.0180)
EduP4	0.0161	0.0086	0.0086	0.0128	0.0126	0.0224	0.0054	0.0248	0.0127	0.0138	0.0123	0.0121	0.0106	0.0188	0.0197	0.0159	0.0103	-0.0130	0.0017
	(0.0076)	(0.0077)	(0.0087)	(0.0082)	(0.0083)	(0.0074)	(0.0077)	(0.0075)	(0.0073)	(0.0073)	(0.0079)	(0.0082)	(0.0083)	(0.0085)	(0.0087)	(0.0088)	(0.0090)	(0.0095)	(0.0094)
EduP5	-0.0193	-0.0112	-0.0215	-0.0225	-0.0038	-0.0185	-0.0126	-0.0129	-0.0001	0.0180	0.0066	0.0101	0.0215	0.0206	0.0017	0.0113	-0.0099	-0.0136	0.0133
	(0.0114)	(0.0111)	(0.0110)	(0.0117)	(0.0106)	(0.0114)	(0.0113)	(0.0114)	(0.0105)	(0.0105)	(0.0107)	(0.0109)	(0.0108)	(0.0108)	(0.0113)	(0.0111)	(0.0115)	(0.0118)	(0.0112)
EduP6	-0.0079	0.0352	-0.0263	0.0302	-0.0039	0.0102	-0.0006	0.0058	0.0074	0.0332	0.0285	0.0068	-0.0025	0.0164	0.0131	0.0278	-0.0008	-0.0156	0.0129
	(0.0199)	(0.0187)	(0.0210)	(0.0207)	(0.0197)	(0.0184)	(0.0183)	(0.0178)	(0.0169)	(0.0187)	(0.0182)	(0.0197)	(0.0191)	(0.0177)	(0.0175)	(0.0169)	(0.0171)	(0.0174)	(0.0162)
EduP7	-0.0797	-0.0799	-0.0949	-0.1000	-0.0764	-0.0753	-0.0676	-0.0308	-0.0158	-0.0451	-0.0327	-0.0424	-0.0433	-0.0102	-0.0489	-0.0442	-0.0750	-0.0669	-0.0420
	(0.0164)	(0.0159)	(0.0160)	(0.0160)	(0.0156)	(0.0160)	(0.0157)	(0.0149)	(0.0146)	(0.0149)	(0.0147)	(0.0155)	(0.0152)	(0.0147)	(0.0156)	(0.0153)	(0.0160)	(0.0162)	(0.0155)
EduP8	-0.0440	-0.0454	-0.0330	-0.0238	-0.0208	-0.0133	-0.0143	-0.0180	-0.0233	-0.0216	-0.0133	-0.0055	-0.0107	-0.0216	-0.0146	-0.0257	-0.0397	-0.0289	-0.0286
	(0.0165)	(0.0160)	(0.0167)	(0.0165)	(0.0154)	(0.0157)	(0.0156)	(0.0150)	(0.0136)	(0.0130)	(0.0127)	(0.0128)	(0.0130)	(0.0132)	(0.0131)	(0.0131)	(0.0135)	(0.0138)	(0.0138)
EduP9	-0.0907	-0.1051	-0.1264	-0.1213	-0.0917	-0.0927	-0.1143	-0.1073	-0.0954	-0.0861	-0.1018	-0.0842	-0.1052	-0.1031	-0.1130	-0.1115	-0.0970	-0.1258	-0.1073
	(0.0121)	(0.0117)	(0.0114)	(0.0116)	(0.0115)	(0.0120)	(0.0121)	(0.0121)	(0.0113)	(0.0108)	(0.0117)	(0.0118)	(0.0121)	(0.0122)	(0.0124)	(0.0122)	(0.0122)	(0.0126)	(0.0124)
HOHSingle	-0.0515	0.0533	0.0951	-0.1248	0.0647	0.0910	0.0550	0.1209	-0.0350	-0.0318	0.0191	-0.0317	-0.0080	-0.0040	-0.1365	-0.0298	0.0011	-0.0525	0.0468
	(0.0259)	(0.0212)	(0.0204)	(0.0367)	(0.0197)	(0.0207)	(0.0349)	(0.0195)	(0.0214)	(0.0251)	(0.0241)	(0.0345)	(0.0438)	(0.0480)	(0.0638)	(0.0542)	(0.0605)	(0.0570)	(0.0583)

References

Becker, G (1981), *A treatise on the family*, Harvard University Press.

Bell, B and Smith, J (2004), 'Health, disability insurance and labour force participation', *Bank of England Working Paper no. 218*.

Blundell, R, Dias, M C, Meghir, C and Van Reenen, J (2002), 'Evaluating the employment impact of a mandatory job search assistance program', *Institue for Fiscal Studies no. 01/20*.

Blundell, R, Duncan, A, McCrae, J and Meghir, C (2000), 'The labour market impact of the working families' tax credit', *Fiscal Studies*, Vol. 21, No. 1.

Blundell, R, Duncan, A and Meghir, C (1998), 'Estimating labor supply responses using tax reforms', *Econometrica*, Vol. 66, pages 827–61.

Blundell, R, Ham, J and Meghir, C (1987), 'Unemployment and female labour supply', *The Economic Journal Supplement: Conference Papers*, Vol. 97, pages 44–64.

Blundell, R, Ham, J and Meghir, C (1998), 'Unemployment, discouraged workers and female labour supply', *Research in Economics*, Vol. 52, pages 103–31.

Cigno, A (1991), *Economics of the family*, Oxford University Press.

Evans, P (1998), 'Why has female unemployment rate fallen so much in Britain?', *Bank of England Working Paper no. 87*.

Gomulka, J and Stern, N (1989), 'The employment of married women in the United Kingdom 1970–83', *Economica*, Vol. 57, pages 171–99.

Joshi, H (1986), *Participation in paid work: evidence from the Women and Employment Survey*, Cambridge University Press.

Joshi, H, Layard, R and Owen, S (1985), 'Why are more women working in Britain?', *Journal of Labor Economics*, Vol. 3, No. 1, pages 147–76.

Oaxaca, R (1973), 'Male-female wage differentials in urban labor markets', *International Economic Review*, Vol. 14, No. 3, October, pages 693–709.

OECD (2003), *Labour Force Statistics 1982–2002*, OECD.

Stoker, T M (1985), 'Aggregation, structural change, and cross-section estimation', *Journal of American Statistical Association*, Vol. 80, pages 720–29.