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Why Have the Labour Force Participation Rates of Older Men Increased Since the Mid-1990s?

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Abstract

This paper seeks to explain the substantial increases in older men's labour force participation rates that have been observed since the mid-1990s. Using data from the U.S. March Current Population Survey, the Canadian Labour Force Survey, and the U.K. Labour Force Survey, I investigate the hypothesis that husbands treat the leisure time of their wives as complementary to their own leisure at older ages. I exploit the cohort effects driving recent increases in older women's participation rates to identify the effect of a wife's participation decision on her husband's participation decision. Given this complementarity in leisure time, a large portion of the increase in older men's participation rates may be explained as a response to the recent increases in older women's participation in the labour force. The methodology of Dinardo, Fortin, and Lemieux (1996) is used to decompose the changes in older married men's participation rates, demonstrating that increases in wives' participation in the labour force can explain roughly one quarter of the recent increase in participation in the U.S., almost one half of the recent increase in participation in Canada, and roughly one third of the recent increase in the U.K. Older men's educational attainment is also an important factor explaining recent increases in participation, yet cannot be expected to drive further increases in participation rates. In contrast, expected increases in older wives' participation over the next decade are expected to drive further increases in older men's participation rates.

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1 Introduction

The participation rates of men age 55-64 had fallen steadily through most of the 20th century in most OECD countries. Since the mid-1990s, however, most of these countries have seen a remarkable increase in the participation rates of older men. What might explain this striking reversal in participation rates? The primary goal of this study is to determine the extent to which recent increases in the participation rates of older women have driven recent increases in the participation rates of older men.

There are two main routes through which we can expect wives' participation decisions to affect the participation decisions of husbands. First, we can expect an income effect whereby the husband is able to enjoy more leisure given the extra family income earned by a participating wife. This income effect will reduce a husbands' likelihood of participating in the labour force. Second, we can expect that couples have some preferences for shared leisure time, especially at older ages. Husbands may not enjoy their leisure time as much when their spouse is participating in the labour force. This shared leisure effect will result in a higher likelihood of participation among husbands whose wives are participating in the labour force.[1] If shared leisure effects dominate any income effects associated with wives' participation, we would expect to see increases in the participation rates of older men in response to increases in the participation rates of older women.

The existing literature provides considerable evidence that shared leisure effects play an important role in older men's retirement and participation decisions. The notion that a wife's leisure is complementary to her husband's is evidenced by the fact that in the United States 62% of older men report that they look forward to retiring only if their spouse can retire as well (Coile (2004b), Maestas (2001)).[2] In Canada, older couples tend to rate the quality of their relationship higher when both spouses are not in the labour force than when they are both in the labour force or have retired alone (Chalmers and Milan (2005)). The prevalence of joint retirement suggests that this preference for shared leisure is an important determinant of participation and retirement decisions. Gustman and Steinmeier (2000) find that a wife's retirement status significantly affects the retirement preferences of a husband, although the husband's retirement does not appear to affect the retirement preferences of the wife. Coile

[1] A positive response to wives' participation may also reflect husbands' reluctance to abandon their role as the primary 'bread-winner', following for example the identity models of behaviour proposed by Akerlof and Kranton (2000). What I refer to as a shared leisure effect may also capture this reluctance and the empirical analysis in this study is not able to clearly identify which mechanism is driving this relationship.

[2] This is based on responses to the question in the Health and Retirement Study: How much do you agree or disagree with the statement: "I look forward to retiring only if my wife can retire at about the same time." Responses include Strongly agree (14%), agree (48%), disagree (35%) and Strongly disagree (3%). Both authors are using samples of married men age 51-61 in 1992, restricted to couples in which neither spouse had retired by 1992.

(2004b) examined how the retirement incentives of husbands and wives are influenced by their own financial incentives to retire and the incentives of their spouse, and finds that husbands are very responsive to their wives' financial incentives to enter retirement. Coile also provides evidence that husbands are even more responsive to wives' incentives when they indicate that they enjoy sharing leisure time with their spouse. Blau (1998) provides further evidence that preferences for shared leisure affect retirement decisions, showing that the high incidence of joint retirements cannot be explained by financial incentives and that the non-employment of one spouse has a positive effect on the labour force exit rates of the other spouse.

The empirical analysis in this paper begins by estimating the effect of a wife's participation decision on the participation decision of a husband. Here, I model the participation decisions of husbands and wives as a system of simultaneous equations. As an instrument for the wife's participation decision, I create a measure of cohort effects that captures the general increase that has occurred with each successive cohort in women's likelihood of participating over their entire life cycle. With respect to the period of interest here, consider that the average wives of 55-64 year old men in 1995 were among the first women to have access to the birth control pill. By 2005, most of these wives would have had full legal access to the pill and as Bailey (2006) has shown, this led to increased participation in the labour force. These changes across cohorts are useful for predicting the current participation decisions of older wives. The resulting model estimates confirm that a husband is more likely to participate in the labour force when his wife is also participating.

The empirical analysis continues with an examination of the explanatory power of wives' participation for recent increases in older men's participation. Here, a decomposition of older married men's participation rates in three countries is undertaken using the methodology of DiNardo, Fortin and Lemieux (1996). The primary sources of data are the March Current Population Survey (United States), the master files of the Labour Force Survey (Canada), and the Quarterly Labour Force Survey (United Kingdom).

Despite having very different policy environments and macroeconomic performance in recent years, in each of these countries a substantial portion of the recent increase in married men's participation can be attributed to shared leisure effects. Comparison of the results across the various countries will illustrate how differences in the magnitudes of the effects of wives participation on husbands decisions and the magnitudes of changes in women's participation rates over time have driven changes in older men's participation. I also investigate the role played by changes in the age structure and educational attainment of this group of men and show that these factors can explain a substantial portion of the recent increase in participation, especially in the United States. Looking forward to how each of these factors

will affect future trends in older men's participation rates, changes in older wives' participation will continue to place upward pressure on older married men's participation rates. However, the education levels of the upcoming cohort of men do not differ substantially from the current cohort. As such, it appears that the effects of education have been exhausted and cannot be relied upon to further increase older men's participation rates.

The remainder of this paper is organized in the following manner. I begin with a description of recent trends in the participation rates of older individuals, demonstrating the potential explanatory power of changes in wives' participation for recent increases in men's participation rates. In section 3, I provide empirical evidence that shared leisure effects associated with a wife's participation dominate income effects in the participation decisions of older men. In this section I also address other factors that may be important for retirement or participation decisions, such as health, macroeconomic effects, and stock market fluctuations. In section 4, I describe the methodology used to decompose the changes in participation rates, and present the results of the decomposition. In section 5 I present some evidence suggesting we may expect further increases in participation over the next decade. Finally, I offer some conclusions in section 6.

2 Data and Recent Trends in Participation

In this section, I begin by introducing the data used in this study. I then document trends in older men's and women's participation rates and demonstrate the potential explanatory power of wives' participation for the recent increases in older men's participation rates.

2.1 Data

Several micro data files are used to analyze older men's labour force participation in the U.S., Canada, and the U.K.. U.S. samples are taken from the Current Population Survey Annual Demographic Files (March CPS) while Canadian samples are taken from the master files of the Canadian Labour Force Survey (CLFS) and samples for the U.K. are taken from the U.K.'s Labour Force Survey (UKLFS). Each of these data sources provide information regarding the labour force status, education, and demographic characteristics of individuals and their spouses. The details of sample selection, the construction of key variables, and other data sources used in this paper are described in the appendix (A). Generally speaking, the samples exclude individuals whose information is missing, and for the purposes of the decomposition exercise that follows I further exclude from the samples any husband who is more than 15 years younger or 15 years older than his wife.

The analysis in this paper focuses on married men age 55-64. Descriptions of these samples are provided for years representing low and high points in older men's participation rates in Tables 1, 2, and 3 for the U.S., Canada, and the U.K. respectively. In each of these countries, the observed increase in labour force participation coincides with substantial increases in educational attainment for this group of men.[3] Interestingly, the average age of these men fell slightly over the decade, reflecting a slight change in the age structure of this group.[4] Perhaps surprisingly, the likelihood of having children at home had not increased.

Notably, the likelihood of wives' participation in these samples increased substantially over the past decade. The increase is most striking for the Canadian wives of men age 55-64, whose participation rates increased by twelve percentage points between 1995 and 2005. Men whose wives are in the labour force are more likely to participate in the labour force. However, these men also tend to be slightly younger and more educated than men whose wives are not in the labour force.

2.2 Trends in Participation

The participation rates of older men in Canada, the U.S., and the U.K. had fallen steadily through most of the 20th century.[5] Figure 1 shows that the participation rate of men age 55-64 in Canada had fallen by nineteen percentage points between 1976 and 1995. The participation rate of these men also declined substantially in the U.S., by ten percentage points between 1976 and 1994. In the U.K., the participation rate of men age 55-64 fell by 23 percentage points between 1977 and 1995.[6]

Since the mid-1990s, the participation rates of older men in each of these countries has been increasing. In Canada the participation rate of men age 55-64 increased by 8 points between 1995 and 2005. In the U.S. the participation rate of men age 55-64 rebounded by more than half of the earlier decline, increasing by 6 percentage points between 1994 and 2005. A similar pattern is observed in the U.K. where the participation rate of these men increased by 5 percentage points between 1995 and 2005. Similar trends in the participation

[3]Note that educational attainment is not directly comparable across the different countries. For example, Canadian men appear to have much higher attainment of post-secondary education than American men in part due to the fact that Canadian surveys include trade certificates as post-secondary education while U.S. surveys do not. Also, U.K. categories of education are defined by an individuals' qualifications, which may differ slightly from the concept of education in the Canadian and U.S. surveys.

[4]There are clear changes across the distribution of age indicating the group became 'younger' over time in each country as the baby boom cohort begins to enter the 55-64 year old age group.

[5]Ransom and Sutch (1986) find that the participation rates of men age 60 and over in the United States decline after 1930. Johnson (1994) finds there was no clear trend in the participation rates of men age 60-64 in England and Wales up to the 1960s.

[6]Note that the definition of unemployment changed over the early years of the survey and is only consistently defined after 1984.

rate of men age 55-64 can be found in several other European countries, some of which are presented in Figure 2.[7]

The participation rate of older women has also increased substantially in recent years, as shown in Figures 1 and 2, although earlier trends in their participation rates were often very different from their male counterparts. In Canada, the participation rate of women age 55-64 increased by 13 percentage points between 1995 and 2005 after increasing by less than 5 percentage points over the previous two decades. In the U.S., the participation rate for these women increased by 7 percentage points between 1994 and 2005. In the U.K., their participation rate increased by 8 percentage points between 1995 and 2005. Again, similar trends are found in other European countries.

The recent increases in older women's participation may be largely explained by cohort effects. The age-participation profiles for selected birth cohorts of women in the U.S., Canada, and the U.K. are presented in Figure 3. Consider, for example, the cohort of women who are married to men age 55-64 in 1995. On average, these women would have been born in the late 1930s and early 1940s and turned 18 a few years before the introduction of the birth control pill in 1960. Among the next cohort of women (married to men age 55-64 in 2005), a majority would have had full legal access to the birth control pill. Goldin and Katz (2002) found that for college women, access to oral contraception led to a later age at first marriage and greater representation of women in professional occupations. Bailey (2006) presents evidence that legal access to the pill increased the number of women participating in the paid labour force. This type of event contributes to the resulting changes in women's life cycle labour supply that can be seen in figure 3 and the most recent increases in older women's participation rates.[8]

In Figure 4 the participation rates of men and women age 60-64 by marital status are plotted for the U.S., Canada, and the U.K.. In all three countries, the recent increases in women's participation are common to single and married women. Notably, however, the participation rates of married and single men in this age group have followed different trends. In both the U.S. and the U.K., the participation rate of single men age 60-64 has remained fairly constant since the mid-1980s. Similarly, in Canada the participation rates of older single men remained fairly constant through the 1990s and did not increase until after 2002. As such, the recent increases seen in the participation rates of older men has largely been driven by an increase in the participation of older married men.

The similar trends in married men's and women's participation rates suggest that hus-

[7]Similar trends are also found in Sweden and Denmark. See Gruber and Wise (2005) for a brief discussion of recent trends in these countries.

[8]See Beaudry and Lemieux (1999) for a cohort analysis of female labour force participation rates in Canada.

bands may be responding to the higher likelihood of participation among wives. The following sections examine the decisions of individuals directly, evaluating how the labour force participation decisions of married men have been affected by the participation decisions of their wives.

3 Leisure Complementarity and Participation Decisions

There are several behavioural models that could be used to describe the labour supply decisions of husbands and wives.[9] Here, husbands' and wives' labour supply decisions are jointly determined and their participation decisions are described by the latent variables L^{H*} and L^{W*} where

$$L_{it}^{H*} = U^H(C_{it}, \ell_{it}^H, X_{it}^H, \ell_{it}^W | L_{it}^H = 1) - U^H(C_{it}, \ell_{it}^H, X_{it}^H, \ell_{it}^W | L_{it}^H = 0) \quad (1)$$

represents the husband's utility associated with participating in the labour force ($L_{it}^H = 1$) relative to non-participation ($L_{it}^H = 0$). Participation in the labour force is chosen when $L_{it}^{H*} > 0$. The husband's utility depends on his own consumption and leisure time (C_{it}, ℓ_{it}^H). His characteristics (X_{it}^H) and his wife's leisure time (ℓ_{it}^W) act as preference shifters that affect his preferences over leisure and consumption. If there exists some complementarity in leisure time, then non-participation of a wife should increase the marginal utility of the husband's leisure time (which I refer to as a shared leisure effect). At the same time, however, non-participation of a wife will reduce income available for consumption, having an income effect that would increase the husband's likelihood of participating in the labour force.

$$L_{it}^{W*} = U^W(C_{it}, \ell_{it}^W, X_{it}^W, \ell_{it}^H | L_{it}^W = 1) - U^W(C_{it}, \ell_{it}^W, X_{it}^W, \ell_{it}^H | L_{it}^W = 0) \quad (2)$$

represents the wife's utility associated with participating in the labour force relative to non-participation and is similarly defined. Following the model described by equations (1) and (2), the couple's participation decisions may be represented by a set of simultaneous probit equations.

[9]The econometric model that follows would result from a simple static model of couple's labour supply decisions in which the husband and wife maximize utility independently and each spouse treats some share of the other's income as non-labour income. The standard traditional model of family labour supply is specified such that the husband's labour supply decisions are independent of his wife's behaviour and income. Lundberg (1988) notes that joint utility models of labour supply may be inappropriate given the revocability of the marriage decision. Lundberg (1988) also notes that bargaining models can be considered a general alternative within which joint utility and traditional models may be nested and "[r]egardless of the particular behavioural model chosen, we can treat the labor supply of husband and wife as being jointly determined, and specify a pair of simultaneous equations".

A reduced form model is used to estimate this system of simultaneous probit equations, which can be stated as

$$L_{it}^{H*} = \gamma^H L_{it}^W + X_{it}\beta^H + \epsilon_{it}^H \quad (3)$$

$$L_{it}^{W*} = X_{it}\beta_1^W + Z_{it}^W\delta + \epsilon_{it}^W \quad (4)$$

and thought of as analogous to the reduced form equations used in a two-stage least squares model.[10] Here, if the shared leisure effects associated with a wife's participation dominate any income effects, we would expect γ^H to be positive.[11] Identification of the model relies on the instrument Z_{it}^W, representing characteristics of the wife that would not affect the participation decisions of her husband.

As the instrument (Z^W) for the wife's labour force status, I use the cohort-specific labour force participation rates of women at age forty. Details of how this measure is constructed can be found in the data appendix (A). Cohorts are defined by the wife's year of birth. This instrument is designed to capture the step function observed across cohorts in the age participation profiles of women, indicated in Figure 3, with each successive cohort being more likely to participate in the labour force at all ages.[12] As such, there is substantial variation in the participation rates of each cohort of women at age forty and we can expect the cohort's participation rates to be strongly correlated with wives' current participation decisions.

Use of this instrument also requires that the past participation rates of a wife's cohort do not directly affect a husband's current participation decision. Given the joint nature of husbands' and wives' lifetime consumption and leisure choices, we would expect that a 'young' husband's plans for retirement will depend on his expectations of his wife's future labour market activity. These expectations may depend on his wife's labour market activity at the time (or in the past) and her characteristics. However, it is reasonable to assume that the labour market activity of other women (in his wife's cohort) will not play a separate and

[10]The reduced form model is used here because valid instruments are not available for the husband's participation decision within the data sets used in this paper. As such, I am unable to identify the effect of a husband's participation decision on the participation decision of the wife. Furthermore, the simultaneous probit model suffers from logical inconsistency, whereby the relationship between (ϵ^H, ϵ^W) and (L^H, L^W) is not one to one.

[11]Although I am unable to estimate the effect of a husband's participation on the wife's participation decision, evidence from Gustman and Steinmeier (2000) and Coile (2004b) suggest older wives may not be as responsive to husbands' labour supply choices as we expect husbands to be. Further, Blau and Kahn (2005) find that wive have become much less responsive to their husbands' wages over time. They find that married women's cross wage elasticity fell by 38-47% between 1980 and 2000. The also find that estimates of women's own wage elasticity fell by 50-56% over this period.

[12]Although it may be preferable to measure the intercept in the age-participation profiles (ie. participation rates at age 20 for each cohort), reliable estimates are not available for earlier time periods.

direct role in forming those expectations or his retirement plans.[13]

3.1 The Effect of Wives' Participation

Using data from the past decade for each country, I begin by estimating the husband's participation decision in isolation with a simple probit model.[14] For a set of baseline estimates (that are later used in the decompositions), I include the husband's education, age, and the number of own children in the household as characteristics that would affect his participation decision. A full set of year indicators are also included. Education and age will capture the husband's earnings potential. The husband's age will also affect his preferences for leisure, with the expectation that an individual's marginal utility of leisure is increasing in age. Results for the United States, Canada, and the United Kingdom are presented in the first two columns of Tables 4, 5, and 6, respectively.

In each of the countries, the large positive and significant marginal effects of a wife's participation suggest that shared leisure effects dominate any income effects associated with the wife's participation in the labour force. In the U.S., the presence of a wife in the labour force is expected to increase a husband's likelihood of participating by 19 percentage points while in Canada the presence of a wife in the labour force increases the husband's likelihood of participating by 23 percentage points. The effect appears to be slightly larger in the U.K., where the presence of a wife in the labour force increases the husband's likelihood of participating by 27 percentage points.[15]

The results also show that in all three countries educational attainment is also an important determinant of the participation decision, as more educated men are more likely to participate in the labour force. As expected, age also has a significant effect as married men are less likely to participate in the labour force as they get older.[16]

The reduced form model represented by equations (3) and (4) is then estimated as a bivariate probit model, again using data from the past decade for each country. The results for the U.S., Canada, and the U.K. are presented in the last two columns of Tables 4, 5, and 6, respectively. In Canada and the U.S., the resulting marginal effects of a wife's participation

[13] Also note that we do not see similar cohort effects playing a role in the participation decisions of men. Between the ages of 25 and 54, the age-participation profiles of men do not vary substantially by cohort.

[14] The years 1995-2005 are used in the Canadian and U.K. estimates, the years 1994-2005 are used in the U.S. estimates.

[15] These marginal effects are evaluated for a 60 year old high school graduate (A level or equivalent in the U.K.) in 2005 whose wife is in the labour force and no children are at home.

[16] In the retirement literature it is suggested that a coefficient on age may also be picking up policy effects as many retirement income programs use age as the key variable defining eligibility. For this reason, models estimating retirement hazards will use a more flexible functional form for age (ie. a set of indicator variables). Such spikes do not appear as clearly for the participation decision and a linear function of age in the equation is reasonable.

are not significantly different from the probit model estimates. In the U.K., however, the resulting marginal effect is much smaller than the probit estimate, suggesting the probit estimates were biased upward. This could, for example, be a reflection of assortative matching in the marriage market whereby individuals with similar preferences over work and leisure are more likely to match. To note, the estimated marginal effects of other variables are not significantly affected by the use of the bivariate probit model.

3.2 Robustness Checks and Other Factors to Consider

The estimates presented thus far have not addressed several important factors that could potentially be important for explaining changes in the participation decisions of older men. For example, several studies have demonstrated that health is a significant determinant of retirement decisions.[17] However, it appears that the health status of Canadian men has not changed in recent years. In 1996 and 2003, 7% of Canadian men age 55-64 described their health as poor. The portion of these men reporting good to excellent health had not changed either, remaining stable at 78%.[18] Using data from the March CPS, a variable indicating poor health was added to the baseline specification. While poor health was a significant determinant of husbands' participation, the addition of this variable did not significantly change the estimated effect of a wife's participation (see Panel A in Table 7).

The decline in employer-provided defined-benefit pension plans has been cited as part of the explanation for increased participation of older men in the U.S. (Gruber and Wise, 2005). However, the percentage of workers participating in defined benefit plans was 21% in both 1999 and 2004.[19] Furthermore, between 1999 and 2004 the percentage of private sector employees participating in retirement plans actually increased from 48% to 50%.[20] In Canada, the portion of men in the labour force covered by a registered pension plan fell only slightly since the mid 1990s, from 35% in 1995 to 33% in 2002.[21] As such, it is unlikely that changes in pension coverage could explain the substantial increases in participation.

It has been suggested that the performance of the stock market in the U.S. has had an impact on older individuals' participation decisions. For example, Coronado and Perozek

[17]Several studies have found such results including Au et al. (2005); Schirle (2007); Coile (2004a); Coile and Gruber (2000) and Dwyer and Mitchell (1999).

[18]Based on responses in the Survey of Labour and Income Dynamics of a sample of men age 55-64.

[19]Bureau of Labour Statistics series EBUDBINC000000AP. Percent of employees participating in defined benefit pension plans, all private industry.

[20]Bureau of Labour Statistics series EBUALLRET00000AP. Percent of employees participating in all retirement plans, all private industry.

[21]The portion of male paid workers covered by a RPP fell from 44% in 1995 to 41% in 2001, however most of this decrease occured between 1995 and 1998 and the coverage rates remained stable thereafter. Source: Statistics Canada, Canada's Retirement Income Programs: a statistical overview. Catalogue no. 74-507-XCB.

(2003) find that individuals who received unanticipated equity gains during the market boom of the late 1990s retired earlier than they had anticipated. The stock market bust of 2000 seems to be an unlikely explanation for changes in participation rates, however, given that a fair portion of the increase in older men's participation occurred prior to the stock market bust in the fall of 2000. Furthermore, Coile and Levine (2004) demonstrate that the stock market bust could not feasibly explain the recent increases in participation in the U.S. given that very few households have substantial stock holdings. Similarly, only 11% of Canadian households held stocks in 1999 and the median value of stocks (conditional on holding some positive value) was merely $10000 (Milligan, 2005). In the current sample of married men age 55-64 in the U.S., only 28% had any positive stock dividends and among those with dividends, the median value was only $600. When dividend income is added to the baseline specifications for the United States, the coefficient on stock dividend income is significant, but incredibly small in size.[22] Furthermore, the addition of this variable does not change the effect of a wife's participation on her husband's participation decision (see Panel A of Table 7).

Macroeconomic effects are also important to consider here. To address this, specifications of the baseline model for the United States that included state specific participation rates of 25-54 year olds were also estimated. In the U.S., the macroeconomic effects were barely significant and would be unlikely to explain any increase in participation given that the participation rates of younger workers have been falling in recent years. Again, and more important for the current analysis, the addition of macroeconomic effects to the baseline model did not change the marginal effect of wives' participation. The estimates from similar specifications using Canadian data demonstrated that macroeconomic effects were a significant factor, but again did not change the marginal effect of wives' participation (presented in Panel A of Table 7).[23]

The model represented by equations (3) and (4) did not allow for the possibility that the effect of a wife's participation in the labour force has changed over time and this could be important in the decompositions that follow (see section 4.3). In Panel B of Table 7 the model estimates using single years of data for the U.S. are presented. The magnitudes of the marginal effects of wives' participation on husbands' decisions change substantially over time but are not significantly different over time.[24]

[22]From the model estimates, a $1000 increase in stock dividends would reduce the likelihood of participation by less than two tenths of a percentage point.

[23]The baseline model adding the unemployment rate of 25-54 year olds in each economic region as a covariate was estimated.

[24]Testing the hypothesis $H_o : \gamma^H_{2005} = \gamma^H_{1994}$ results in a z-score=0.8. Similar results are found for Canada and the U.K. and are presented in the appendix. The coefficients are significantly different over time for the U.K.

Several other specification tests have been done to check the robustness of the estimated effect of a wife's participation on the husband's participation decision. In Panel C of Table 7, the wife's age is added as a covariate in the model. The addition of this covariate increases the estimated effect of wives' participation, as expected, since the wife's age is effectively controlling for age differences between the husband and wife.[25] In a dynamic context, the age difference between husbands and wives may matter for the retirement decision. For example, if a husband is significantly older than his wife he can expect his wife to be able to support his retirement longer. If retirement is a relatively permanent action, a younger wife provides the husband with some financial security. As such, controlling for age differences would capture some of the income effect associated with a wife's participation.

Similarly, the inclusion of the wife's wage income captures some of the income effect associated with a wife's participation in the labour force. A specification for the U.S. that included the wife's wage income (not presented here) resulted in the wife's participation having a slightly larger marginal effect. The inclusion of the wife's hourly wages in Canada had the same effect. The inclusion of a potential wage (predicted based on the wife's age and education) did not, however, have a substantial effect on the magnitude of the effect of a wife's participation.

As noted in earlier sections, the econometric model used here does not allow us to simultaneously estimate the effect of a husband's participation decision on his wife's participation decision. To address this, I estimated a model similar to that proposed by Lewbel (2005) which uses the spouse's labour force status interacted with an indicator variable for which spouse acts first in the bivariate probit model.[26] Making the assumption that the older spouse makes the participation decision first, the results using U.S. data support the hypothesis that husbands' and wives' leisure time are complementary to each other. Although the use of this model is informative and addresses the problem of logical inconsistency in the simultaneous equations model, the estimates are not useful in the decomposition of participation rates.

Finally, if the framework for understanding older men's participation decisions is appropriate we would expect to see different effects for different age groups. For example, among younger married men the income effects associated with a spouse's participation in the labour force may be stronger given expected lower levels of wives non-labour income

[25] Adding the wife's age as a covariate is also going to capture some cohort effect since, with the inclusion of year dummy variables, entering the wife's age is practically equivalent to entering her year of birth.

[26] That is, the model is stated as

$$L_i^{H*} = \gamma^H (1 - D_i) * L_i^W + X_i^H \beta_1^H + X_i^W \beta_2^H + \epsilon_i^H \quad (5)$$

$$L_i^{W*} = \gamma^W D_i * L_i^H + X_i^H \beta_1^W + X_i^W \beta_2^W + Z_i^W \delta + \epsilon_i^W \quad (6)$$

where $D_i = 1$ when the husband is older and zero otherwise. See Lewbel (2005), section 3.4.

at younger ages. As well, given the different focus on leisure activities when younger, the preferences for shared leisure may not affect the relative value of leisure as much. When the husband's participation equation is estimated using a sample of younger married men age 25-34, the marginal effect of a wife's participation is relatively small as presented in Panel D of Table 7. I would expect this positive effect is in part capturing assortative matching in the marriage market. Among older married men, income effects may be smaller as older individuals may face a lower earnings capacity and the non-labour income of each spouse may actually be higher when both the husband and wife are not working.[27] When the husband's participation equation is estimated for married men age 65-74 the marginal effect of a spouse's participation is significantly larger.

Overall, the results of the baseline models reasonably describe the effects of wives' participation on the participation decision of husbands and are robust to the inclusion of other determinants of older men's participation decisions. The baseline model's estimates will be used in the following sections in the decomposition of older men's participation rates.

4 Decomposing the Changes in Participation

The purpose of the decompositions in this section is to establish what portion of the increase in older married men's participation rate can be attributed to changes in wives' likelihood of participating in the labour force. I begin by using the estimates from the probit and bivariate probit models of the previous section in a decomposition of the total change in older men's participation rates since the mid-1990s. Here, I use a decomposition methodology similar to that of DiNardo et al. (1996) which easily allows for the use of non-linear functions of covariates in the estimation of the participation decision. In this decomposition, I investigate how (1) changes in older men's characteristics, and (2) changes in the likelihood of married women to participate in the labour force can explain the observed increases in older married men's participation rates. Later in this section, I also consider how changes over time in the parameters describing the husbands participation decision can help explain the recent increases in older men's participation rates and provide additional evidence of the explanatory power of wives' participation for husbands' participation decisions. At the end of this section, I also present a simple decomposition of historical participation rates to further illustrate how changes in men's characteristics and older wives' participation have influenced the participation decisions of husbands.

[27]For example, joint social security benefits in the US depend on each spouse's retirement status. In Canada, income-tested benefits such as the Guaranteed Income Supplement and Spousal Allowance are available after age 65.

4.1 DFL Decomposition of Changes in Participation

The procedure for decomposing the total change in older married men's participation rates since the mid-1990s follows the work of DiNardo et al. (1996). The procedure is similar in spirit to the familiar Oaxaca (1973) decomposition of changes in means, however is easily generalized to allow for the use of non-linear functions of covariates in the estimation of participation rates.

In each stage of the decomposition, counterfactual participation rates are created representing what the participation rate in 2005 (time t) would be if each factor had remained at its mid-1990s levels. For the decomposition of U.S. participation rates, the comparison year (time s) is 1994. For Canada and the U.K., the comparison year is 1995.

The decomposition is sequential in that once the 2005 participation rate has been adjusted for a factor, that factor remains adjusted in the next stage of the decomposition. In the primary order decomposition of older married men's participation rates described below, I begin by adjusting the 2005 participation rate for changes in older men's characteristics (including educational attainment, age structure, and whether there are children at home) followed by adjusting this participation rate for changes in the likelihood of married women to participate in the labour force.

To understand the estimation procedure, it is useful to view each individual observation as a vector (L^H, X^H, L^W, t) made up of the husband's labour force participation status (L^H), the husband's characteristics (X^H), the wife's labour force participation status (L^W), and a date t, all of which are discrete random variables.[28] Each observation belongs to a joint distribution $F(L^H, X^H, L^W, t; \beta, \gamma, \rho)$, where β, γ, and ρ are the population parameters that characterize the distribution.[29] The joint distribution at one point in time is the conditional distribution $F(L^H, X^H, L^W | t; \beta, \gamma, \rho)$. The probability function of L^H at one point at time t may be written as

$$
\begin{aligned}
f_t(L^H) &= \sum_{X^H} \sum_{L^W} f(L^H, X^H, L^W | t_{L^H, X^H, L^W} = t; \beta, \gamma, \rho) && (7) \\
&= \sum_{X^H} \sum_{L^W} \Big[f(L^H | X^H, L^W, t_{L^H | X^H, L^W} = t; \beta, \gamma, \rho) \\
&\qquad \cdot f(X^H | L^W, t_{X^H | L^W} = t) \cdot f(L^W | t_{L^W} = t) \Big]. && (8)
\end{aligned}
$$

To obtain the participation rate of husbands, the probability function above is evaluated for

[28] For ease of notation, in the following I use the same notation to represent the random variables L^H, X^H and L^W and their set of values. I also omit any subscripts that would identify each function F and f.

[29] Where $\rho = Corr(\epsilon^H, \epsilon^W)$ is the correlation coefficient between the error terms of the latent variable model of the husband's and wife's participation, presented in equations (3) and (4). See also footnote 31.

$L^H = 1$.[30]

The decomposition then involves different 'datings' for the different explanatory factors. For the first stage of the decomposition, a hypothetical probability function is created to represent the participation decisions of husbands that would have prevailed in time t had the distribution of husbands' characteristics remained as it was in time s. That is, the counterfactual probability function

$$\begin{aligned} f_{c_1 t}(L^H) &= \sum_{X^H}\sum_{L^W}\Big[f(L^H|X^H, L^W, t_{L^H|X^H,L^W} = t; \beta, \gamma, \rho) \\ &\qquad \cdot f(X^H|L^W, t_{X^H|L^W} = s) \cdot f(L^W|t_{L^W} = t)\Big] \qquad (9) \\ &= \sum_{X^H}\sum_{L^W}\Big[f(L^H|X^H, L^W, t_{L^H|X^H,L^W} = t; \beta, \gamma, \rho) \\ &\qquad \cdot \psi_{X^H|L^W} f(X^H|L^W, t_{X^H|L^W} = t) \cdot f(L^W|t_{L^W} = t)\Big] \qquad (10) \end{aligned}$$

is created, where

$$\psi_{X^H|L^W} = \frac{f(X^H|L^W, t_{X^H|L^W} = s)}{f(X^H|L^W, t_{X^H|L^W} = t)} \qquad (11)$$

is a reweighting function that captures the changes that have occurred in the distribution of older married men's characteristics between the years s and t. Note that by applying Bayes' rule, this reweighting function may be written as

$$\psi_{X^H|L^W} = \frac{f(t_{X^H|L^W} = s|X^H, L^W)/f(t_{X^H|L^W} = s|L^W)}{f(t_{X^H|L^W} = t|X^H, L^W)/f(t_{X^H|L^W} = t|L^W)}. \qquad (12)$$

For the second stage of the decomposition, a second counterfactual probability function is created to also account for changes in older wives' likelihood to participate in the labour force. That is, the counterfactual probability function

$$\begin{aligned} f_{c_2 t}(L^H) &= \sum_{X^H}\sum_{L^W}\Big[f(L^H|X^H, L^W, t_{L^H|X^H,L^W} = t; \beta, \gamma, \rho) \\ &\qquad \cdot \psi_{X^H|L^W} f(X^H|L^W, t_{X^H|L^W} = t) \cdot f(L^W|t_{L^W} = s)\Big] \qquad (13) \\ &= \sum_{X^H}\sum_{L^W}\Big[f(L^H|X^H, L^W, t_{L^H|X^H,L^W} = t; \beta, \gamma, \rho) \\ &\qquad \cdot \psi_{X^H|L^W} f(X^H|L^W, t_{X^H|L^W} = t) \cdot \psi_{L^W} f(L^W|t_{L^W} = t)\Big] \qquad (14) \end{aligned}$$

[30] That is, $f_t(1) = P_t(L^H = 1)$.

where the reweighting function

$$\psi_{L^W} = \frac{f(L^W|t_{L^W} = s)}{f(L^W|t_{L^W} = t)} \tag{15}$$

captures changes in older wives' participation decisions. This second counterfactual probability function then represents the participation decisions of husbands had the distribution of their characteristics and the likelihood of their wives not changed since time s.

Once estimates of the reweighting functions in equations (12) and (15) are found, they can be used to estimate counterfactual participation rates.

To begin, an estimate of the participation rate at any point in time is simply a weighted average of individual's predicted likelihood to participate in the labour force. That is,

$$\widehat{P}_t(L^H = 1) \quad = \quad \frac{\sum_i \omega_{it} G(X^H_{it}\hat{\beta} + \hat{\gamma} L^W_{it})}{\sum_i \omega_{it}} \tag{16}$$

where ω_{it} are sample weights for individuals in time t, $G(\cdot)$ represents the cumulative normal distribution function, and the predicted likelihood of participation is based on the latent variable model described in section 3.1 where $L^H_{it} = 1$ when $\epsilon^H_{it} \geq -(X^H_{it}\beta + \gamma L^W_{it})$ and $L^W_{it} = 1$ when $\epsilon^W_{it} \geq -(X^H_{it}\beta^W + Z^W_{it}\delta)$. The assumption is made that $\rho = Corr(\epsilon^H, \epsilon^W) = 0$ when the husband's decision is estimated using the probit model and $-1 \leq \rho \leq 1$ when the husband's decision is estimated using the bivariate probit model.[31] Note that ρ does not enter the calculation of any reweighting functions.

To obtain estimates of the reweighting function in equation (12), $\widehat{\psi}_{X^H|L^W}$, estimates are needed for the conditional probability of being in each year t and s. The probability of being in the year t, given men's characteristics X^H and wives' participation L^W, can be estimated using the probit model

$$P(t_{X^H|L^W} = t|X^H, L^W) = P(\epsilon > -\delta H(X^H, L^W)) = G(\delta H(X^H, L^W)) \tag{17}$$

where $H(X^H, L^W)$ is a vector of covariates that is a function of X^H and L^W, G is again the cumulative normal distribution, and the model is estimated by pooling observations from the years t and s and using a dummy variable indicating that the individual is observed in year t or s as the dependent variable. Here, $H(X^H, L^W)$ is a set of dummy variables indicating each possible combination of individual's education-age-child-wife's participation status. The conditional probability $P(t_{X^H|L^W} = t|L^W)$ is similarly estimated using a probit

[31] Note also that the assumption is made that the parameters describing the participation decision (β, γ, ρ) do not change over time. This assumption is relaxed and such changes accounted for in section 4.3.

model with wive's participation as the only covariate.

To obtain estimates for the second reweighting function in equation (15), $\widehat{\psi}_{L^W}$, first note that the function may be defined as

$$\psi_{L^W} = \frac{f(L^W|t_{L^W}=s)}{f(L^W|t_{L^W}=t)} = \begin{cases} \frac{P(L^W=1|t_{L^W}=s)}{P(L^W=1|t_{L^W}=t)} & \text{if } L^W=1 \\ \frac{P(L^W=0|t_{L^W}=s)}{P(L^W=0|t_{L^W}=t)} & \text{if } L^W=0 \end{cases} \tag{18}$$

since the wife's participation status L^W can only take values of 1 or 0. The probability $P(L^W=1|t_{L^W}=s)$ is then estimated as the participation rate of wives in the year s. The other probabilities are similarly estimated.

These estimated reweighting functions are then multiplied by the sample weights used in equation (16) to create counterfactual participation rates. That is, the $t=2005$ participation rate that would have prevailed had the distribution of men's characteristics remained as they were in the mid-1990s is

$$\widehat{P}_{c_1 t}(L^H=1) = \frac{\sum_i \omega_{it}\widehat{\psi}_{X^H|L^W} G(X_{it}^H\hat{\beta}+\hat{\gamma}L_{it}^W)}{\sum_i \omega_{it}\widehat{\psi}_{X^H|L^W}}. \tag{19}$$

Similarly, the 2005 participation rate that would have prevailed had the distribution of men's characteristics and wive's likelihood of participation remained as they were in the mid-1990s is estimated as

$$\widehat{P}_{c_2 t}(L^H=1) = \frac{\sum_i \omega_{it}\widehat{\psi}_{X^H|L^W}\widehat{\psi}_{L^W} G(X_{it}^H\hat{\beta}+\hat{\gamma}L_{it}^W)}{\sum_i \omega_{it}\widehat{\psi}_{X^H|L^W}\widehat{\psi}_{L^W}}. \tag{20}$$

One drawback of the sequential decomposition is that the effect of a given factor may depend on the order of the decomposition. A reverse order decomposition is therefore undertaken, where changes in wives' participation is considered first and followed by changes in men's characteristics, to check whether the impact of wives' participation is overstated in the primary order decomposition. In the reverse order decomposition, the relevant reweighting functions are defined as

$$\psi_{L^W|X^H} = \frac{f(t_{L^W|X^H}=s|X^H,L^W)/f(t_{L^W|X^H}=s|X^H)}{f(t_{L^W|X^H}=t|X^H,L^W)/f(t_{L^W|X^H}=t|X^H)} \tag{21}$$

$$\psi_{X^H} = \frac{f(t_{X^H}=s|X^H)/f(t_{X^H}=s)}{f(t_{X^H}=t|X^H)/f(t_{X^H}=t)} \tag{22}$$

and can be estimated in a similar manner to that described above. Note that the reweighting

function $\psi_{L^W|X^H}$ can also be stated as

$$\psi_{L^W|X^H} = \frac{\psi_{X^H|L^W}\psi_{L^W}}{\psi_{X^H}}. \quad (23)$$

A summary of the reweighting functions used in the various decompositions that follow is provided in Table 8.

4.2 DFL Decomposition Results

The results of the primary and reverse order decompositions are presented in Table 9 for the United States, Canada, and the United Kingdom. The first column for each country are the results of the decomposition when the probit model estimates are used. The second column for each country uses the bivariate probit model estimates in the decomposition.

In the United States, the participation rates of married men age 55-64 increased by 6.4 percentage points. Considering the results of the primary order decomposition, if men's characteristics had not changed since 1994 their participation rates would have been 2.4 percentage points lower in 2005. As such, the changes we've observed in men's characteristics can explain 37% of the total change in older married men's participation rates. If the likelihood of wives to participate in the labour force had not changed since 1994, the participation rate of married men age 55-64 would have been 1.5 percentage points lower in 2005, explaining 23-27% of the total change.[32]

Results are similar for Canada and the United Kingdom. In both countries, however, the effect of changes in men's characteristics is much smaller, explaining between 13% and 17% of the total change in the participation rates of married men age 55-64. In part, this is due to a slightly larger change in the age structure of men in the United States relative to the same groups of men in Canada and the United Kingdom. Although changes in educational attainment are difficult to compare across the countries, it also appears that educational attainment increased more in the United States than in the other two countries. In Canada, the portion of the total change in married men's participation rates explained by changes in wives' labour force participation is much larger than in the United States, explaining between 42% and 46% of the total change. The increase in wives' participation rates was also much larger in Canada (12 percentage points between 1995 and 2005) than in the United States (7 percentage points between 1994 and 2005). In the United Kingdom, the portion explained by changes in wives' participation is slightly lower than in Canada, explaining

[32]The unexplained portion (0.026 or 40%) represents the the portion that is not explained by changes in characteristics or wives' participation. Here, in the prediction of participation the omitted year dummy is for 2005, so the unexplained portion is effectively the coefficient on the 1994 year dummy variable.

between 28% and 34% of the total change in married men's participation rates. While the U.K. saw increases in wives' participation comparable to the increases in the U.S., the probit estimates of the marginal effect of wives' participation on husbands' participation decisions was slightly larger for the U.K. than the U.S..

4.3 Additional Evidence

As mentioned in section 4.1, it is useful to consider the results of a reverse order decomposition. Qualitatively, the reverse order decomposition results are similar to the primary order decomposition results. However, the results suggest that the order of the decomposition matters here. In all three countries, the effect of changes in wives' labour force participation is much smaller when accounted for in the first stage of the decomposition. The effect is still fairly large, however, explaining more than 12% in the U.S., 28% in Canada, and 24% in the U.K.. Furthermore, the effect of changes in men's characteristics is much larger in the reverse order decompositions. This is largest in the United States where changes in men's characteristics explain 48% of the total change in older married men's participation rates.

In the decompositions presented above, it is assumed that the parameters describing the husband's participation decision do not change over time. Relaxing this assumption and accounting for changes in the parameters over time does not substantially change the results of the decompositions. Although not significantly different, the change in marginal effects has a moderate impact on the reverse order decomposition results, presented in Table 10.[33]. In the primary order decomposition, the change in coefficients is accounted for in the first stage and the results of the decomposition are similar to the results in Table 9. In the reverse order decomposition, however, the portion of the total change in older married men's participation explained by changes in wives' participation is much larger, at 22%, since the larger marginal effect in 2005 is used in the creation of the counterfactual participation rate. Overall, however, even when potential changes in parameters over time is accounted for in these decompositions, a large portion of the total change in the participation rate of married men age 55-64 can be explained as husbands responding to the higher likelihood of wives to participation in the labour force.

4.4 Historical Evidence

To further illustrate the role of changes in the likelihood of wives to participate in the labour force, and changes in men's characteristics, it is useful to consider how these factors played a role in older men's participation rates prior to the mid-1990s. Using the same decomposition

[33]Results are similar for Canada and the United Kingdom, as in Tables 20 and 21

methods as before, I illustrate how the participation rates of married men age 55-64 would have been different in the United States (from 1980-2005) had their wives' participation, their age structure, and their education remained as it was in 1980.

I begin by estimating the probit model represented by equation (3) using the March CPS data from 1980-2005.[34] I then create reweighting functions similar to those discussed in section 4.1. Specifically, the predicted participation rate for each year ($t \in [1981, 2005]$) is first adjusted using the reweighting function

$$\psi_{X^H|L^W} = \frac{f(t_{X^H|L^W} = 1980|X^H, L^W)/f(t_{X^H|L^W} = 1980|L^W)}{f(t_{X^H|L^W} = t|X^H, L^W)/f(t_{X^H|L^W} = t|L^W)}. \tag{24}$$

to create the participation rates that would have prevailed had the education and age structure of men age 55-64 not changed after 1980. I then adjust this series of counterfactual participation rates using the reweighting function

$$\psi_{L^W} = \frac{f(L^W|t_{L^W} = 1980)}{f(L^W|t_{L^W} = t)} \tag{25}$$

which captures the changes in older wives' participation.

The resulting historical series are presented in Figure 5. Between 1980 and 1994 there appears to be little difference between the predicted participation rates and the counterfactual participation rates holding age and education constant after 1980. Interestingly, this group became slightly 'older' over the 1980s. If their age structure had been held constant since 1980, participation rates would have been higher than observed. Increases in educational attainment over the 1980s counteracted this so that these two effects combined appear negligible.[35] Over the 1990s, the group becomes slightly younger and more educated. If this had not occurred, participation rates would have been much lower.

The counterfactual participation rates holding wives' likelihood of labour force participation constant over time are much more interesting. Wives' participation does not have much of an impact on husbands' participation until the late 1980s when we first see the participation rates of older women in the United States increase. If wives' likelihood of participation had not increased after 1980, participation rates of married men age 55-64 would have been

[34] Covariates include a full set of year dummies. Indicators for age are used instead of a linear function. The coding of education is slightly different in this specification than that used in previous sections to be historically consistent. See the data appendix for details. Also, I have excluded from this specification the number of own children in the household given difficulties in consistently identifying children in earlier years of the CPS.

[35] That is, if we assessed the effects of age and education separately, the participation rates over the 1980s would have been much higher had the age structure not changed and they would have been much lower had educational attainment not increased.

roughly 2.3 percentage points lower than observed in 1994. The results also suggest that if wives' participation, men's age structure, and men's educational attainment had not changed after 1980, we would not have observed any substantial increases in older men's participation after the mid-1990s.

5 Future Trends

Can we expect the participation rates of older men to continue to increase? This will largely depend on the characteristics of the cohort of men that will be approaching retirement ages in the near future. Consider the characteristics of men who are currently age 45-54 (presented in Table 11) relative to those men who were 45-54 in previous cohorts. While the group of married men age 55-64 became slightly younger between 1995 and 2005 in all three countries considered here (i.e. 45-54 year olds became younger between 1985 and 1995), it appears that by 2015 this group of 55-64 year olds will become a bit older. As older individuals are less likely to participate, this will act to reduce participation rates. Working in the opposite direction, we can expect the education levels of married men age 55-64 to increase over the next decade in Canada and the United Kingdom. In these countries, the increase in educational attainment will counteract the effects of aging. In the United States, however, the education levels of the upcoming cohort do not differ substantially from the current cohort and cannot be expected to influence participation rates.

To place some magnitudes on the future effects of changes in the age structure and education of this group, projected participation rates are created using the probit estimates presented in Tables 4, 5, and 6, and a reweighting function similar to that in equation (22) based on the changes we observe in the distribution of characteristics of 45 to 54 year olds between 1995 and 2005. More specifically, I create the reweighting function

$$\psi_X = \frac{f(t_X = 2005|X^H, Age \in [45,54])}{f(t_X = 1995|X^H, Age \in [45,54])} \tag{26}$$

$$\approx \frac{f(t_X = 2015|X^H, Age \in [55,64])}{f(t_X = 2005|X^H, Age \in [55,64])} \tag{27}$$

where X^H includes a full set of age-education interaction dummy variables. Use of this reweighting function effectively adjusts the distribution of age and education among older married men to reflect the distribution we expect to see in 2015.[36] The resulting participation

[36]The reweighting function created here does not account for the fact that survival probabilities are lower at higher ages or that survival probabilities could be different across education groups. For similar reasons, it would be inappropriate to to use the function $f(t_X = 2005|X^H, Age \in [45,54])/f(t_X = 2005|X^H, Age \in [55,64])$.

rates indicate that in the United States and Canada, the changes we can expect in the age structure and educational attainment of this group may have the effect of slightly reducing participation rates (by only half a percentage point, as summarized in Table 12). In the United Kingdom, the effect of expected increases in education attainment on participation rates appear to completely offset the effect of changes in the age distribution.

Further increases in wives' participation could drive further increases in the participation rates of older men in all three countries, however it is difficult to forecast the participation rates of next cohort of wives. Although we do not see large increases in the participation rates of wives (of men age 45-54) between 1995 and 2005, the age participation profiles of these women have flattened at younger ages for recent cohorts (as was shown in Figure 3). If these profiles also flatten at older ages, we may see the increases in older women's participation continue over the next decade. To predict the potential effect of increases in wives' participation, the reweighting function

$$\psi_{L^W} = \begin{cases} \frac{Pr(L^W=1|t_{L^W}=2015)}{Pr(L^W=1|t_{L^W}=2005)} & \text{if } L^W = 1 \\ \frac{Pr(L^W=0|t_{L^W}=2015)}{Pr(L^W=0|t_{L^W}=2005)} & \text{if } L^W = 0 \end{cases} \tag{28}$$

is applied in a similar manner as the reweighting function in equation (18) assuming a participation rate for wives in 2015. Assuming increases in older wives' participation rates comparable to those seen over the past decade, we would expect to see a 1.5 percentage point increase in the participation rates of older men in the United States over the next decade, attributable to husbands' preferences for sharing leisure time with their wives. Similarly, we would expect to see a 2.5 percentage point increase in older men's participation rates in the United Kingdom and a 3 percentage point increase in Canada as husbands respond to the higher likelihood of their wives to participate in the labour force.

6 Conclusions

This study's main finding is that a substantial portion of the recent increases in older married men's participation rates may be explained by the recent increase in the participation rates of their wives. Wives' participation in the labour force has this substantial explanatory power because wives leisure time is complementary to the leisure time of their husbands, as evidenced by the positive effect of wives' participation on husbands' participation decisions. This leisure complementarity has led to husbands participating more in the labour force as their wives have become more likely to participate. The creation of counterfactual participation rates and the resulting decompositions of older married men's participation rates

demonstrates that in the United States, roughly third of the increase can be explained as a response to changes in wives' labour force participation. Nearly one half of the observed increase in Canada and one third of the increase in the United Kingdom can also be explained as a response to changes in wives' participation.

Increases in the educational attainment of older men and changes in the age structure of men age 55-64 are also shown to have significant explanatory power for the recent increase in older men's participation rates. Changes in their characteristics account for up to one half of the increase in older married men's participation rates in the United states, and up to one third of the increase in Canada and the United Kingdom.

Considering future trends in older men's participation rates, we might expect the upward trend in older men's participation rates to continue if the participation rates of older women continue to increase. Such trends would alleviate some concerns associated with our aging populations. To keep in mind, however, this study has left a large portion of the increase in older men's participation 'unexplained'. If, for instance, the performance of the labour market in the United States continues to worsen or the health of Canadians declines, this upward trend may not materialize.

Table 1: Characteristics of Married Men Age 55-64, United States

	All Married Men		Wife in LF		Wife not in LF	
	1994	2005	1994	2005	1994	2005
Participation Rate	0.67	0.74	0.76	0.81	0.56	0.61
Age	59.39	59.12	58.87	58.69	60.02	59.81
Education						
Grade 8 or less	0.11	0.05	0.08	0.03	0.14	0.07
HS dropout	0.11	0.07	0.11	0.06	0.12	0.09
HS grad	0.34	0.30	0.35	0.28	0.32	0.33
Some PS	0.15	0.17	0.15	0.17	0.14	0.15
PS	0.05	0.08	0.05	0.08	0.04	0.07
University	0.14	0.19	0.14	0.21	0.13	0.16
Grad/Prof.	0.11	0.16	0.12	0.17	0.11	0.14
Spouse						
In Labour Force	0.55	0.62	1	1	0	0
Age	56.35	56.22	55.03	55.27	57.94	57.77
Age Difference	3.05	2.89	3.84	3.42	2.08	2.04
Child at Home	0.33	0.31	0.34	0.34	0.31	0.28
Number of Kids	0.47	0.46	0.50	0.50	0.44	0.40

Notes: See Appendix A for a description of the March CPS sample and variables.

Table 2: Characteristics of Married Men Age 55-64, Canada

	All Married Men		Wife in LF		Wife not in LF	
	1995	2005	1995	2005	1995	2005
Participation Rate	0.61	0.68	0.76	0.79	0.47	0.53
Age	59.32	59.09	58.62	58.56	59.94	59.87
Education						
Grade 8 or less	0.22	0.10	0.18	0.08	0.27	0.13
HS dropout	0.20	0.12	0.20	0.12	0.20	0.13
HS grad	0.15	0.17	0.15	0.18	0.15	0.16
Some PS	0.04	0.05	0.05	0.05	0.04	0.05
PS	0.25	0.33	0.26	0.34	0.23	0.32
University	0.07	0.13	0.09	0.13	0.06	0.11
Grad/Prof.	0.06	0.10	0.08	0.11	0.05	0.09
Spouse						
In Labour Force	0.47	0.59	1	1	0	0
Age	56.09	56.06	54.25	54.84	57.72	57.86
Age Difference	3.23	3.02	4.37	3.72	2.22	2.01
Child at Home	0.37	0.32	0.43	0.37	0.32	0.24
Number of Kids	0.56	0.49	0.64	0.58	0.48	0.36

Notes: See Appendix A for a description of the CLFS sample and variables.

Table 3: Characteristics of Married Men Age 55-64, United Kingdom

	All Married Men		Wife in LF		Wife not in LF	
	1995	2005	1995	2005	1995	2005
Participation Rate	0.65	0.71	0.80	0.85	0.48	0.52
Age	59.33	59.16	58.66	58.55	60.05	60.06
Education						
No qualifications	0.28	0.19	0.27	0.16	0.30	0.23
Other qualifications	0.12	0.11	0.12	0.11	0.12	0.12
CSE below grade 1	0.01	0.01	0.01	0.01	0.01	0.01
GCSE A-C or equivalent	0.07	0.11	0.07	0.11	0.06	0.10
A level or equivalent	0.34	0.32	0.34	0.33	0.33	0.30
Higher educ., below degree	0.07	0.09	0.07	0.09	0.06	0.08
Degree or higher	0.11	0.17	0.11	0.18	0.11	0.15
Spouse						
In Labour Force	0.52	0.60	1	1	0	0
Age	56.53	56.72	55.07	55.33	58.12	58.77
Age Difference	2.80	2.44	3.59	3.22	1.93	1.28
Child at Home	0.30	0.29	0.34	0.35	0.27	0.21
Number of Kids	0.41	0.42	0.45	0.49	0.37	0.31

Notes: See Appendix A for a description of the UKLFS sample and variables.

Table 4: Model Estimates, United States

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.504	0.186	0.592	0.219
	(.014)	(.005)	(.076)	(.028)
Education				
Grade 8 or less	-0.205	-0.072	-0.191	-0.065
	(.026)	(.009)	(.028)	(.011)
HS dropout	-0.134	-0.046	-0.130	-0.044
	(.024)	(.009)	(.025)	(.009)
Some PS	0.124	0.039	0.121	0.037
	(.021)	(.006)	(.021)	(.007)
PS degree	0.109	0.035	0.105	0.033
	(.030)	(.009)	(.030)	(.009)
University degree	0.309	0.091	0.304	0.088
	(.021)	(.006)	(.022)	(.007)
Grad/Prof. degree	0.448	0.125	0.444	0.121
	(.023)	(.006)	(.023)	(.007)
Age	-0.121	-0.040	-0.118	-0.038
	(.002)	(.001)	(.003)	(.002)
Number of Kids	0.086	0.028	0.085	0.027
	(.009)	(.003)	(.009)	(.003)
Constant	7.374		7.158	
	(.151)		(.242)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1994-2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate in 2005 whose wife is in the labour force and there are no children at home.

Table 5: Model Estimates, Canada

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.604	0.228	0.522	0.198
	(.011)	(.004)	(.044)	(.016)
Education				
Grade 8 or less	-0.138	-0.048	-0.148	-0.053
	(.018)	(.006)	(.019)	(.007)
HS dropout	-0.052	-0.018	-0.055	-0.019
	(.018)	(.006)	(.018)	(.006)
Some PS	0.007	0.002	0.007	0.003
	(.026)	(.009)	(.026)	(.009)
PS degree	0.066	0.022	0.065	0.022
	(.016)	(.005)	(.016)	(.006)
University degree	0.008	0.003	0.009	0.003
	(.022)	(.007)	(.022)	(.008)
Grad/Prof. degree	0.241	0.075	0.244	0.077
	(.024)	(.007)	(.024)	(.008)
Age	-0.111	-0.037	-0.114	-0.039
	(.002)	(.001)	(.002)	(.001)
Number of Kids	0.128	0.043	0.131	0.045
	(.007)	(.003)	(.008)	(.003)
Constant	6.663		6.880	
	(.115)		(.161)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1995-2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate in 2005 whose wife is in the labour force and there are no children at home.

Table 6: Model Estimates, United Kingdom

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.785	0.268	0.560	0.191
	(.011)	(.005)	(.059)	(.020)
Education				
No qualifications	-0.284	-0.084	-0.319	-0.102
	(.015)	(.005)	(.017)	(.006)
Other qualifications	-0.006	-0.002	-0.018	-0.005
	(.019)	(.005)	(.021)	(.006)
CSE below grade 1	-0.095	-0.026	-0.103	-0.030
	(.056)	(.016)	(.062)	(.019)
GCSE A-C or equivalent	-0.043	-0.011	-0.052	-0.015
	(.022)	(.006)	(.024)	(.007)
Higher educ., below degree	-0.057	-0.015	-0.050	-0.014
	(.022)	(.006)	(.025)	(.007)
Degree or higher	0.051	0.013	0.048	0.013
	(.019)	(.005)	(.021)	(.006)
Age	-0.105	-0.027	-0.114	-0.032
	(.002)	(.001)	(.003)	(.002)
Number of Kids	0.041	0.011	0.045	0.013
	(.008)	(.002)	(.009)	(.003)
Constant	6.422		7.098	
	(.125)		(.210)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1995-2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old with A-level qualifications in 2005 whose wife is in the labour force and there are no children at home.

Table 7: Estimated Effect of Wives' Participation, United States

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Baseline	0.504	0.186	0.592	0.219
	(.014)	(.005)	(.076)	(.028)
A. Specification Includes:				
Poor Health[a]	0.505	0.178	0.613	0.216
	(.015)	(.006)	(.087)	(.031)
Stock Market Dividends[b]	0.503	0.186	0.594	0.220
	(.014)	(.005)	(.076)	(.028)
Macroeconomic Effects[c]	0.504	0.187	0.590	0.219
	(.014)	(.005)	(.075)	(.028)
B. Years Sampled:				
1994	0.421	0.159	0.505	0.190
	(.047)	(.018)	(.240)	(.089)
2005	0.486	0.181	0.791	0.293
	(.043)	(.016)	(.258)	(.093)
C. Specification Includes:				
Age & Wife's Age[d]	0.501	0.167	0.810	0.288
	(.014)	(.005)	(.391)	(.140)
D. Samples from Age Group[e]:				
25-34	0.166	0.019	-	-
	(.024)	(.003)		
35-44	0.252	0.036	-	-
	(.019)	(.004)		
45-54	0.340	0.069	-	-
	(.016)	(.004)		
65-74	0.842	0.272	-	-
	(.018)	(.008)		

Notes: Standard errors are in parentheses. Baseline estimates refer to the estimates presented in Table 4.
[a] Only data from 1996-2005 is used here. An indicator for poor health is used, set to 0 for the calculation of marginal effects.
[b] The value of stock dividends is used here, set to $555 for the calculation of marginal effects.
[c] Specifications include year-state specific unemployment rates of 25-54 year olds, set at 4% for the calculation of marginal effects.
[d] A set of age indicators and wife's age group are used. The full set of estimates are available from the author upon request.
[e] Samples include married men in each age group, excluding husbands who are more than 15 years older or younger than their wives, years 1994-2005. Marginal effects are evaluated for a 30/40/50/70 year old high school graduate in 2005 with no children and whose wife is in the labour force.

Table 8: Weights and Coefficients used in the Decompositions

Primary Order Decompositions				
Sample Used[a] :	Pooled 1994/5-2005		Annual 1994/5&2005	
	Weights	Coef.[b]	Weights	Coef.
2005 participation rate	ω_{i05}	β_p	ω_{i05}	β_{05}
Accounting for:				
Δ coefficients	-	-	ω_{i05}	β_{95}
Δ men's characteristics	$\omega_{i05}\psi_{X^H\|L^W}$	β_p	$\omega_{i05}\psi_{X^H\|L^W}$	β_{95}
Δ wives' participation	$\omega_{i05}\psi_{X^H\|L^W}\psi_{L^W}$	β_p	$\omega_{i05}\psi_{X^H\|L^W}\psi_{L^W}$	β_{95}
1994/5 participation rate	ω_{i95}	β_p	ω_{i95}	β_{95}
Reverse Order Decompositions				
Sample Used:	Pooled 1994/5-2005		Annual 1994/5&2005	
	Weights	Coef.	Weights	Coef.
2005 participation rate	ω_{i05}	β_p	ω_{i05}	β_{05}
Accounting for:				
Δ wives' participation	$\omega_{i05}\psi_{L^W\|X^H}$	β_p	$\omega_{i05}\psi_{L^W\|X^H}$	β_{05}
Δ men's characteristics	$\omega_{i05}\psi_{L^W\|X^H}\psi_{X^H}$	β_p	$\omega_{i05}\psi_{L^W\|X^H}\psi_{X^H}$	β_{05}
Δ coefficients	-	-	$\omega_{i05}\psi_{L^W\|X^H}\psi_{X^H}$	β_{95}
1995 participation rate	ω_{i95}	β_p	ω_{i95}	β_{95}

Notes: [a] U.S. decompositions are using 1994, Canada and U.K. decompositions are using 1995.
[b] β_p refers to the estimates presented in Tables 4, 5, and 6, noting the models include a set of dummy variables indicating each year.

Table 9: Decomposition Results

	United States		Canada		United Kingdom	
	(1)[a]	(2)[b]	(1)	(2)	(1)	(2)
Predicted participation rate 2005	0.734	0.732	0.681	0.683	0.714	0.719
Predicted participation rate 1994/5	0.670	0.668	0.609	0.61	0.648	0.656
Total change	0.064	0.064	0.072	0.073	0.066	0.062
Primary Order Decomposition						
Effect of:						
Change in men's characteristics	0.024	0.023	0.01	0.011	0.009	0.01
	(37%)	(36%)	(14%)	(15%)	(13%)	(17%)
Change in wives participation	0.015	0.017	0.033	0.03	0.023	0.017
	(23%)	(27%)	(46%)	(42%)	(34%)	(28%)
Unexplained	0.026	0.024	0.029	0.032	0.034	0.034
	(40%)	(38%)	(40%)	(44%)	(52%)	(55%)
Reverse Order Decomposition						
Effect of:						
Change in wives participation	0.008	0.009	0.02	0.017	0.016	0.011
	(12%)	(14%)	(28%)	(23%)	(24%)	(17%)
Change in men's characteristics	0.031	0.030	0.024	0.024	0.016	0.017
	(48%)	(48%)	(33%)	(32%)	(24%)	(27%)
Unexplained	0.026	0.024	0.029	0.032	0.034	0.034
	(40%)	(38%)	(40%)	(44%)	(52%)	(55%)

Notes: [a] First column results for each country use the probit model estimates of the husband's labour force participation, presented in Tables 4, 5, and 6.
[b] Second column results for each country use the bivariate probit model estimates.

Table 10: Decomposition Results (Using Annual Estimates), United States

	$(1)^a$	$(2)^b$
Predicted participation rate 2005	0.735	0.726
Predicted participation rate 1994	0.670	0.669
Total change	0.065	0.057
Primary Order Decomposition		
Effect of:		
Change in coefficients	0.029	0.020
	(45%)	(35%)
Change in men's characteristics	0.022	0.021
	(34%)	(37%)
Change in wives participation	0.014	0.016
	(21%)	(28%)
Reverse Order Decomposition		
Effect of:		
Change in wives participation	0.008	0.012
	(12%)	(22%)
Change in men's characteristics	0.032	0.030
	(49%)	(52%)
Change in coefficients	0.026	0.015
	(39%)	(27%)

Notes: [a] Estimates using the probit model estimates of the husband's labour force participation, presented in Table 13.
[b] Estimates using the bivariate probit model estimates of the husband's labour force participation, presented in Table 13.

Table 11: Characteristics of Married Men Age 45-54

A. Age Structure

	United States			Canada			United Kingdom		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
Age (mean)	49.42	49.15	49.39	49.36	49.09	49.26	49.40	49.21	49.38
Age 45	0.11	0.12	0.11	0.11	0.12	0.11	0.11	0.10	0.11
Age 46	0.10	0.11	0.10	0.10	0.11	0.11	0.11	0.11	0.11
Age 47	0.10	0.13	0.11	0.10	0.12	0.11	0.10	0.12	0.10
Age 48	0.10	0.11	0.11	0.10	0.11	0.10	0.11	0.12	0.11
Age 49	0.10	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Age 50	0.10	0.09	0.11	0.10	0.10	0.11	0.10	0.09	0.09
Age 51	0.10	0.09	0.09	0.09	0.08	0.09	0.09	0.09	0.10
Age 52	0.10	0.10	0.10	0.10	0.09	0.83	0.09	0.10	0.09
Age 53	0.09	0.08	0.09	0.09	0.08	0.09	0.10	0.08	0.10
Age 54	0.10	0.08	0.10	0.09	0.08	0.08	0.10	0.08	0.10

B. Educational Attainment

United Kingdom					Canada		
	1985	1995	2005		1985	1995	2005
No qualifications	0.48	0.19	0.12	Grade 8 or less	0.26	0.11	0.04
Other qualifications	0.08	0.13	0.10	HS dropout	0.19	0.11	0.06
CSE below grade 1	0.00	0.02	0.03	HS	0.29	0.26	0.28
GCSE A-C or Equiv.	0.09	0.09	0.13	Some PS	0.06	0.06	0.06
A level	0.17	0.33	0.33	PS	0.10	0.29	0.34
Higher ed., < degree	0.06	0.08	0.09	University	0.10	0.18	0.22
Degree or higher	0.12	0.15	0.20				

United States			
	1985	1995	2005
Grade 8 or less	0.10	0.05	0.04
HS dropout	0.13	0.06	0.05
HS	0.36	0.29	0.31
Some College	0.17	0.24	0.26
College Grad	0.24	0.35	0.34

C. Wives' Participation in the Labour Force

	United States			Canada			United Kingdom		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
Rate	0.65	0.75	0.76	0.75	0.80	0.84	0.69	0.78	0.80

Notes: Samples include married men age 45-54 in each year from the March CPS, CLFS and the UKLFS. See Appendix A for details.

Table 12: Forecasted Changes in Men's Participation Rates

	U.S.	Canada	U.K.
Predicted 2005 Participation Rate	0.734	0.681	0.714
Effect of 2005-2015			
Change in Age and Education	-0.004	-0.005	-0.001
Change in Wives Participation[a]	0.015	0.032	0.025
Unexplained[b]	0.026	0.029	0.034
Forecasted 2015 Participation Rate	0.771	0.737	0.772

Notes: [a] Assumes the same increase in wives participation as observed in the previous decade.
[b] Assumes the same unexplained increase in participation observed over the previous decade, an obviously unfounded assumption.

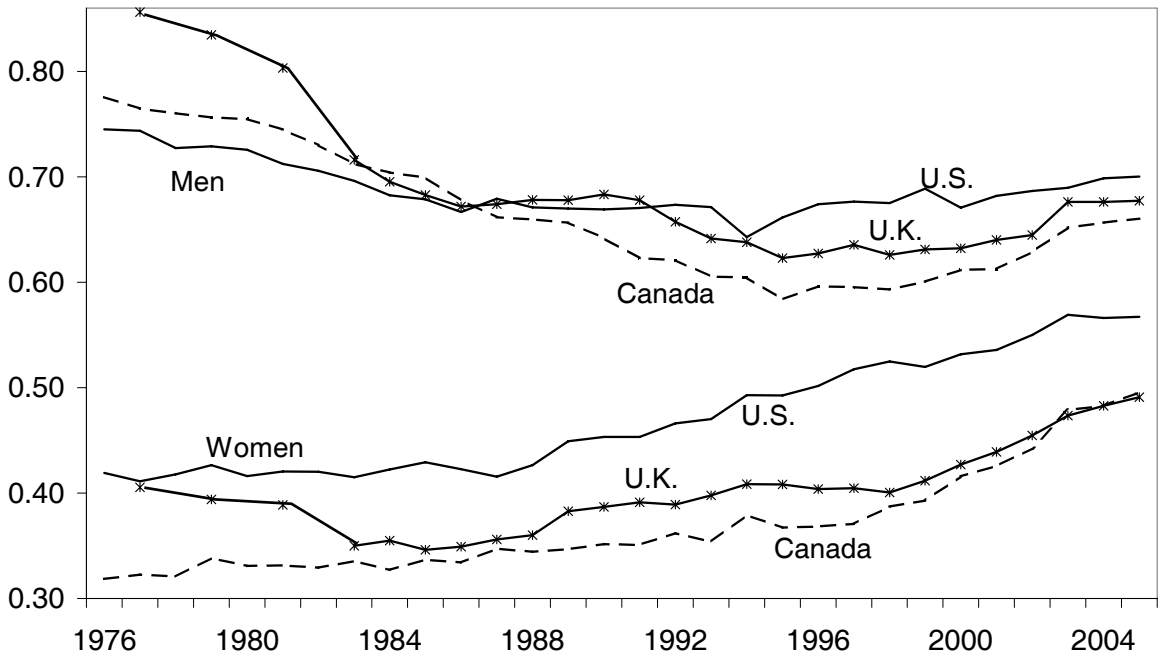


Figure 1: Participation Rates of Individuals Age 55-64, by Sex, 1976-2005
Source: Constructed using the March CPS, CLFS and UKLFS. See Appendix A for details.

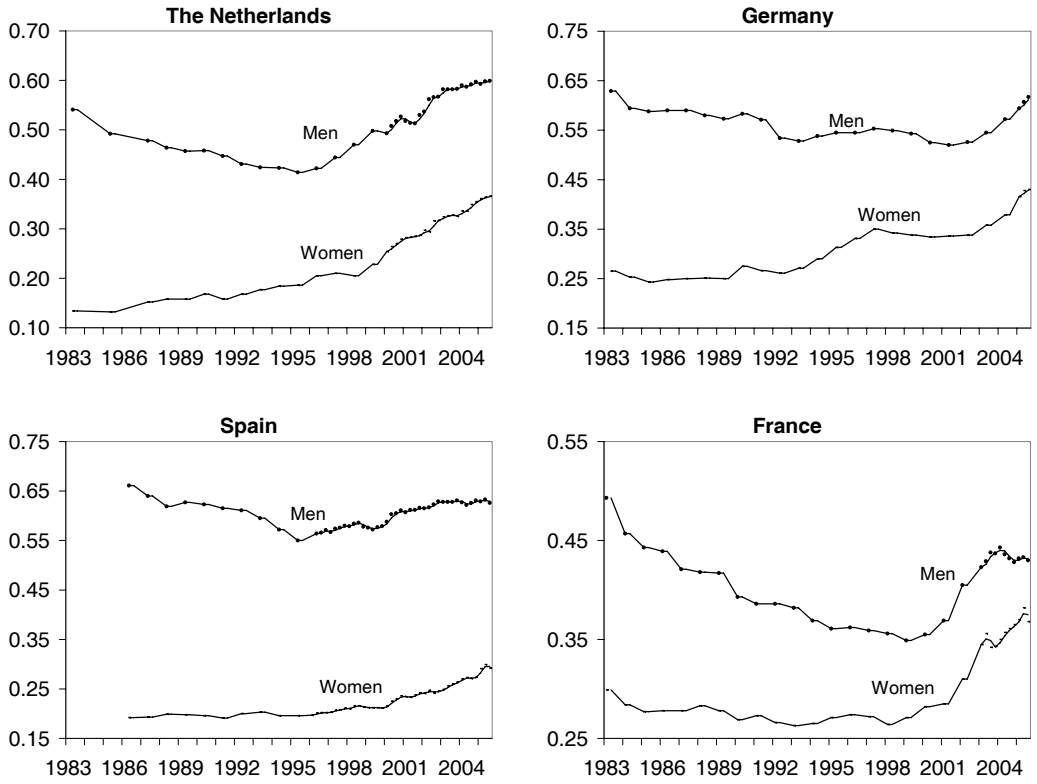
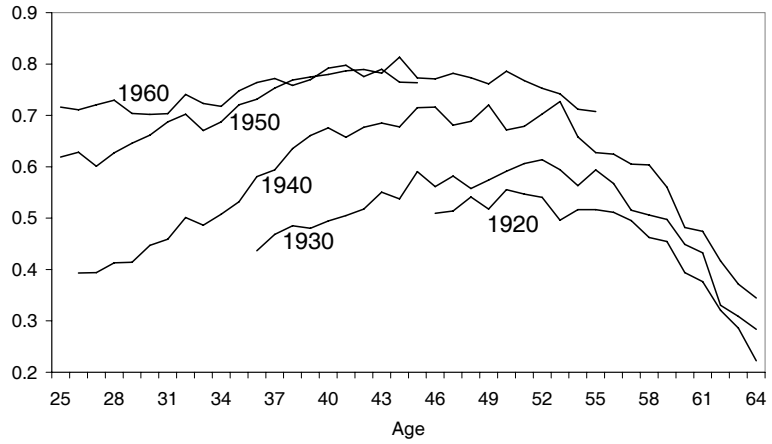
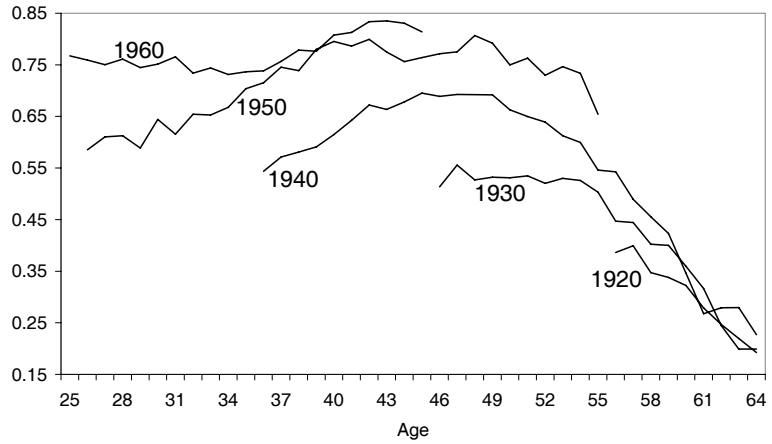


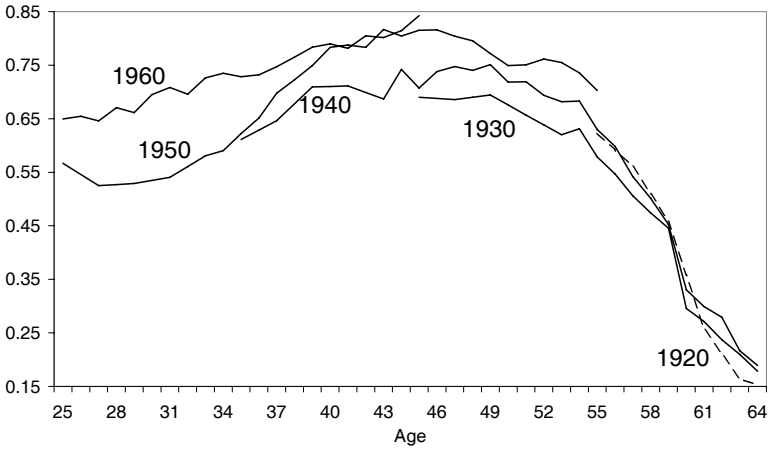
Figure 2: Participation Rates of Individuals Age 55-64, by Sex, 1983-2005
Source: Eurostat. See Appendix A for details.



A. United States

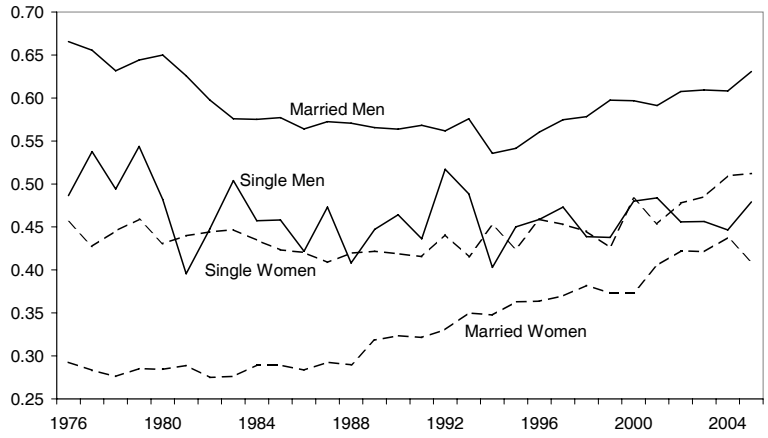


B. Canada

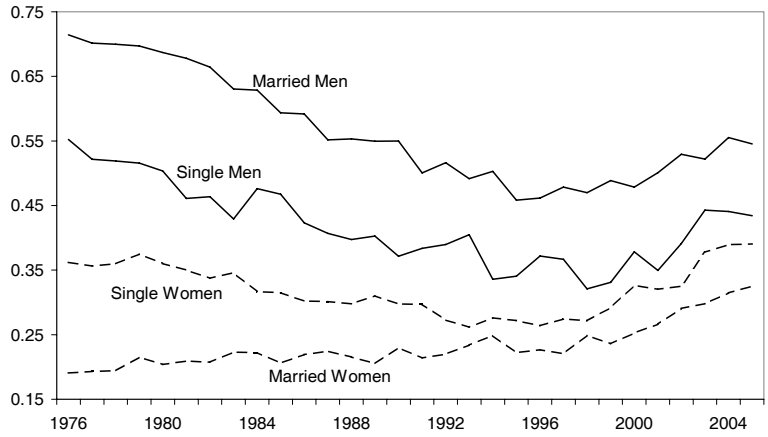


C. United Kingdom

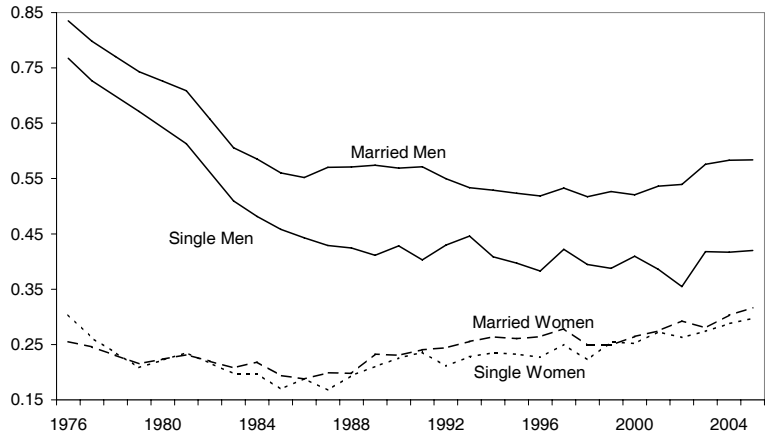
Figure 3: Age-Participation Profiles for Selected Birth Cohorts of Women
Source: Constructed using the March CPS, CLFS and UKLFS. See Appendix A for details.



A. United States



B. Canada



C. United Kingdom

Figure 4: Participation Rates of Individuals Age 60-64, by Sex and Marital Status, 1976-2005
Source: Constructed using the March CPS, CLFS and UKLFS. See Appendix A for details.

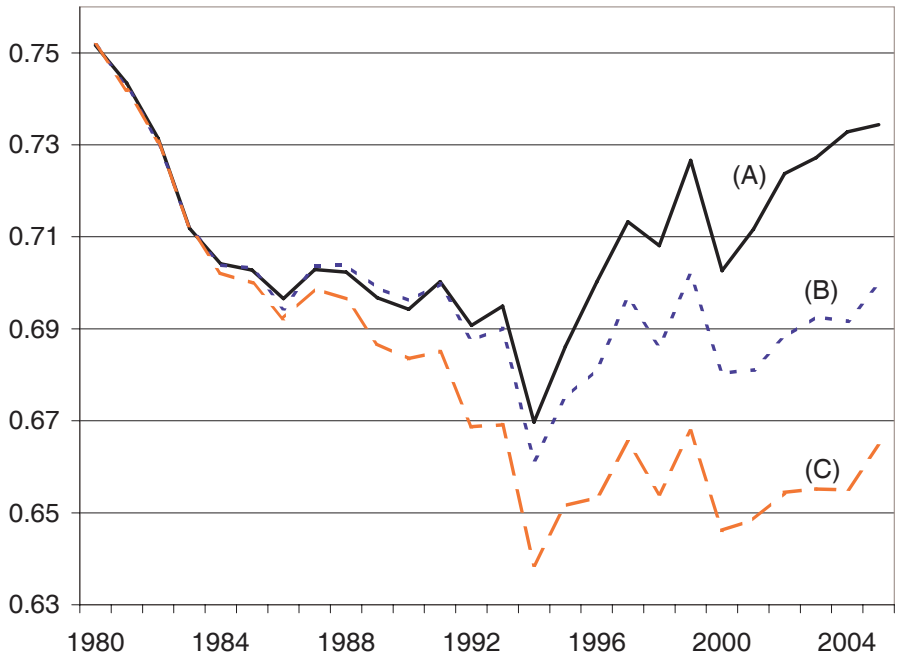


Figure 5: Decomposition of U.S. Participation Rates, Married Men Age 55-64, 1980-2005
Note – (A) Predicted values, (B) Holding age structure and education constant at 1980 values, (C) Holding age structure, education and wives' participation constant at 1980 values.

APPENDIX

A Sample Selection and Construction of Key Variables

A.1 United States

Current Population Survey Annual Demographic Files (March CPS)

The March CPS provides fairly extensive information on individuals' labour force status, income, job characteristics, and demographics. Each individual in a household is interviewed, allowing us to match an individual to their spouse and other family members.

All samples exclude individuals whose labour force status, or spouse's labour force status, is unknown or missing. This effectively excludes all individuals who are married but the spouse is not present in the household, individuals who are in the armed forces, and individuals whose spouses are in the armed forces. This exclusion drops roughly one percent of observations in each year. In 2005, for example, this results in samples of 6538 married men age 55-64 and 2056 single men age 55-64.

For the descriptive statistics in Table 1 and the decompositions, I use samples of married men age 55-64 and I further exclude any husbands that are 15 years older or 15 years younger than their wives. On one hand, this will exclude some observations where individuals have been incorrectly coded as spouses. For legitimately married individuals that are coded properly, we can expect this to exclude husbands who are least likely to be influenced by their wives' participation decisions. These exclusions leave me with 6277 observations in 2005. For the pooled samples 1994-2005, I have 56754 observations.

Marital Status – In the March CPS, only legally married spouses are coded as married. In earlier years, cohabiting spouses were coded the same as roommates and are only recently identified as 'unmarried partners'. To be consistent, I have only included those legally married in my married samples.

Education – Generally, individual's highest level of educational attainment has been recoded into the categories (i) completion of grade 8 or less, (ii) attended high school but did not graduate, (iii) graduated high school, (iv) some post-secondary education, (v) obtained post-secondary degree, (vi) bachelor's degree (vii) graduate level or professional degree. In the Oaxaca decompositions, this is recoded into five categories following Jaeger (1997) to be historically consistent – (i) completion of grade 8 or less, (ii) attended high school but did not graduate, (iii) graduated high school, (iv) some college, and (v) college graduate.

Number of Kids – Any children that are the legal or adopted son or daughter of the husband or the wife are included in the count of children in the family. Children of any age may be included here. This count may include never married children living away from home in college dormitories. The variable is constructed by using the individual's line number, the spouse line number and parent line numbers within each household to match individuals with their children. The variable for whether there are children at home is simply an indicator variable equal to one if the number of kids is positive.

Cohort-specific participation rates at age 40 – Estimates for women born 1926-1965 are obtained by estimating participation rates of 40 year old women using the March CPS files for 1966-2005. Only women whose labour force status is unknown are excluded from these samples. For women born 1920-1925, estimates of the participation rates of women age 40-45 in 1960-1965 from the OECD Statistics Compendium (series U16213291) are used. Reliable estimates of participation rates for women at the age of 40 for women born before 1920 are not available, so the participation rate of women born 1920 is used here. Less than 0.02% of wives in the sample of husbands 1994-2005 were born before 1920. Only 0.2% of wives in the 1994 sample were born before 1920.

A.2 Canada

Labour Force Survey Master Files (CLFS)

The CLFS is a monthly survey that provides information regarding individuals' labour force status, job characteristics and demographics. The master files (as opposed to the public use files) provide more detailed information, including an individual's age rather than an age group. The LFS surveys the same dwelling for 6 months. Only the incoming rotation group is used in the sample. Information for each member of a sampled dwelling is collected and spousal information is provided as part of an individual's observation.

Exclusions to the samples are nearly identical to those made in the March CPS. In addition to the exclusions for the CPS, for several years of the CLFS there are a handful of individuals who are coded as single (never married) yet spousal information is provided for the individual and are also excluded from the samples.

Marital Status – Prior to 1999, no distinction is made in the CLFS between legally married and common-law couples. Although the distinction is made in the more recent files, for the purposes of being historically consistent the Canadian common-law couples will be treated the same as legally married couples.

Education – Generally, education represents the highest level of schooling completed and is recoded into the categories (i) completion of grade 8 or less, (ii) attended high school but did not graduate, (iii) graduated high school, (iv) some post-secondary education, (v) obtained post-secondary degree, (vi) bachelor's degree, and (vii) graduate level or professional degree. As the education variable changes in 1990, for the Oaxaca decomposition education is recoded into the categories (i) completion of grade 8 or less, (ii) grade 9-10 (high school drop out), (iii) grades 11-13 (high school), (iv) some post-secondary education, (v) obtained post-secondary degree, (vi) university degree.

Number of Kids – The number of children in the household is derived by adding up the number of "own children" in the household, already matched to the individual in the LFS. This includes children by birth, adoption or marriage of any age and may include children who are away at school.

Cohort-specific participation rates at age 40 – Estimates for women born 1936-1965 are obtained by estimating participation rates of 40 year old women using the CLFS master files for 1976-2005. Only women whose labour force status is unknown are excluded from these samples. For women born 1915-1935, the participation rates of women age 35-44 from 1955-1975 are used as estimates, obtained from various issues of Canada, Women's Bureau, *Women in the labour force: facts and figures*, Ottawa : Labour Canada, Women's Bureau, 1965-1977. Note these estimates match the participation rates provided by the OECD Statistical Compendium (series 316212291) 1960-1975.

A.3 United Kingdom

Labour Force Survey (UKLFS)

The UKLFS has been conducted as a quarterly survey since 1992. For the years 1992-2005, the spring quarterly household files are used. The survey is conducted biannually from 1975-1983 and annually from 1984-1991 with interviews conducted March-May. Estimates of participation rates presented for 1976, 1978, 1980, and 1982 in this paper are averages of adjoining years. Exclusions to the sample are the same as those for the March CPS.

Marital Status – In this paper, common-law couples have been defined as married. Prior to 1989, however, cohabiting couples were not separately identified in the UKLFS.

Education – The UKLFS reports an individual's highest qualification, the coding of which is expanded over the years to include more detailed categories. I have recoded this to (i) degree or higher (which includes university degrees), (ii) higher education, below degree, (iii) A level or equivalent, (iv) GCSE A-C or equivalent, (v) CSE below grade 1 or equivalent, (vi) other qualifications, and (vii) no qualifications. The qualifications are coded in much more detail and are easily categorized consistently after 1993.

Number of Kids – The number of children represents all children of the individual in the same family unit. This will only include never-married children and children who are not parents themselves. This will include any other adult children in the household.

Cohort-specific participation rates at age 40 – Estimates for women born 1935-1965 are obtained by estimating the participation rate of women age 40 in each available year 1975-2005. For women age 40 in the years 1976, 1978, 1980, and 1982, an average of previous and following cohorts is used. Participation rates for earlier years are not readily available. For women born 1916-1932, estimates of the participation rate of women age 40-44 in Great Britain are constructed using various issues of the *Annual Abstract of Statistics* which provide estimates of the number of employees (employed women and women registered as unemployed) and population estimates for each year 1956-1972. Note that this series closely matches that constructed by Sprague (1988), except that the Sprague (1988) estimates are slightly higher given that she attempts to estimate the number of unregistered unemployed women over this time period based on the number of men not registered 1971 onwards. For women born 1933 and 1934, the participation rate at age 40 is filled with linearly interpolated values based on values for the 1932 and 1935 cohorts.

A.4 Other Data

Eurostat

The European participation rates presented in Table 2 were constructed using the series for "Inactive population as a percentage of the total population (of a given sex) by age groups (%)" for each country from Eurostat (http://epp.eurostat.cec.eu.int). The series is reported quarterly since 1983 and is based on the EU Labour Force Survey.

B Additional Tables and Figures

I expect the following tables and figures will be removed from any future versions of this paper.

Table 13: Annual Estimates, United States

Dependent Variable: Husband's Labour Force Participation								
	Probit				Bivariate Probit			
	1994		2005		1994		2005	
	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.
Wife Participates	0.421	0.159	0.486	0.181	0.505	0.190	0.791	0.293
	(.047)	(.018)	(.043)	(.016)	(.240)	(.089)	(.258)	(.093)
Education								
Grade 8 or less	-0.303	-0.112	-0.210	-0.074	-0.290	-0.106	-0.166	-0.054
	(.079)	(.030)	(.090)	(.033)	(.087)	(.035)	(.098)	(.035)
HS dropout	-0.032	-0.011	-0.178	-0.063	-0.028	-0.009	-0.152	-0.049
	(.081)	(.028)	(.084)	(.030)	(.082)	(.028)	(.087)	(.030)
Some PS	0.111	0.037	0.138	0.044	0.112	0.037	0.121	0.036
	(.073)	(.024)	(.064)	(.020)	(.073)	(.024)	(.066)	(.020)
PS degree	0.026	0.009	0.042	0.014	0.026	0.009	0.020	0.006
	(.113)	(.039)	(.086)	(.028)	(.113)	(.038)	(.086)	(.026)
University degree	0.202	0.066	0.439	0.126	0.202	0.065	0.406	0.106
	(.076)	(.024)	(.064)	(.018)	(.076)	(.024)	(.071)	(.023)
Grad/Prof. degree	0.287	0.091	0.548	0.150	0.288	0.089	0.518	0.128
	(.088)	(.026)	(.072)	(.018)	(.088)	(.026)	(.079)	(.025)
Age	-0.133	-0.046	-0.094	-0.031	-0.130	-0.044	-0.083	-0.026
	(.009)	(.003)	(.008)	(.003)	(.012)	(.006)	(.013)	(.006)
Number of Kids	0.083	0.029	0.101	0.034	0.082	0.028	0.094	0.029
	(.030)	(.011)	(.028)	(.010)	(.030)	(.011)	(.029)	(.010)
Constant	8.058		5.723		7.837		4.909	
	(.524)		(.475)		(.824)		(.879)	

Notes: Standard errors are in parentheses. Samples includes married men age 55-64 in 1994 or 2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate whose wife is in the labour force and there are no children at home.

Table 14: Annual Estimates, Canada

Dependent Variable: Husband's Labour Force Participation								
	Probit				Bivariate Probit			
	1995		2005		1995		2005	
	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.
Wife Participates	0.633	0.244	0.588	0.220	0.701	0.269	0.375	0.141
	(.035)	(.013)	(.034)	(.013)	(.130)	(.048)	(.179)	(.067)
Education								
Grade 8 or less	-0.160	-0.058	-0.178	-0.062	-0.155	-0.056	-0.204	-0.074
	(.057)	(.021)	(.065)	(.023)	(.058)	(.021)	(.069)	(.026)
HS dropout	-0.053	-0.019	-0.131	-0.045	-0.054	-0.019	-0.137	-0.050
	(.057)	(.020)	(.062)	(.021)	(.057)	(.020)	(.062)	(.023)
Some PS	0.107	0.036	-0.133	-0.046	0.103	0.034	-0.141	-0.051
	(.095)	(.032)	(.084)	(.029)	(.096)	(.032)	(.083)	(.031)
PS degree	0.075	0.026	0.038	0.012	0.071	0.024	0.035	0.012
	(.056)	(.019)	(.051)	(.017)	(.057)	(.019)	(.051)	(.018)
University degree	0.140	0.047	-0.075	-0.025	0.134	0.044	-0.076	-0.027
	(.082)	(.027)	(.066)	(.023)	(.083)	(.028)	(.066)	(.024)
Grad/Prof. degree	0.387	0.121	0.166	0.052	0.378	0.115	0.167	0.056
	(.087)	(.025)	(.070)	(.022)	(.088)	(.027)	(.070)	(.023)
Age	-0.124	-0.044	-0.109	-0.036	-0.122	-0.042	-0.117	-0.041
	(.006)	(.003)	(.006)	(.002)	(.008)	(.004)	(.009)	(.004)
Number of Kids	0.108	0.038	0.177	0.059	0.106	0.037	0.186	0.065
	(.022)	(.008)	(.026)	(.009)	(.023)	(.008)	(.027)	(.011)
Constant	7.331		6.580		7.151		7.135	
	(.378)		(.381)		(.515)		(.582)	

Notes: Standard errors are in parentheses. Samples includes married men age 55-64 in 1995 or 2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate whose wife is in the labour force and there are no children at home.

Table 15: Annual Estimates, United Kingdom

Dependent Variable: Husband's Labour Force Participation								
	Probit				Bivariate Probit			
	1995		2005		1995		2005	
	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.	Coef.	M.E.
Wife Participates	0.769	0.282	0.829	0.277	0.357	0.133	1.002	0.334
	(.036)	(.013)	(.039)	(.013)	(.178)	(.066)	(.203)	(.068)
Education								
No qualifications	-0.190	-0.062	-0.353	-0.102	-0.155	-0.056	-0.354	-0.096
	(.045)	(.015)	(.053)	(.016)	(.054)	(.020)	(.059)	(.020)
Other qualifications	0.023	0.007	-0.014	-0.004	-0.005	-0.002	-0.015	-0.003
	(.061)	(.018)	(.066)	(.017)	(.071)	(.025)	(.069)	(.016)
CSE below grade 1	0.182	0.051	-0.340	-0.098	0.273	0.087	-0.407	-0.113
	(.184)	(.048)	(.180)	(.058)	(.226)	(.066)	(.185)	(.059)
GCSE A-C or	-0.035	-0.011	-0.045	-0.011	0.020	0.007	-0.042	-0.010
equivalent	(.075)	(.023)	(.068)	(.017)	(.088)	(.031)	(.070)	(.017)
Higher educ.,	0.009	0.003	0.008	0.002	0.057	0.020	-0.009	-0.002
below degree	(.075)	(.022)	(.074)	(.018)	(.087)	(.030)	(.076)	(.017)
Degree or higher	0.139	0.040	0.016	0.004	0.176	0.058	0.006	0.001
	(.063)	(.018)	(.059)	(.014)	(.075)	(.024)	(.061)	(.014)
Age	-0.103	-0.031	-0.100	-0.025	-0.120	-0.042	-0.093	-0.021
	(.007)	(.002)	(.007)	(.002)	(.010)	(.005)	(.012)	(.004)
Number of Kids	0.070	0.021	0.005	0.001	0.062	0.022	0.004	0.001
	(.027)	(.008)	(.028)	(.007)	(.032)	(.011)	(.030)	(.007)
Constant	6.146		6.171		7.352		5.608	
	(.394)		(.440)		(.646)		(.803)	

Notes: Standard errors are in parentheses. Samples includes married men age 55-64 in 1995 or 2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old with A-level qualifications whose wife is in the labour force and there are no children at home.

Table 16: Effect of Wives' Participation, United States

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.501	0.167	0.810	0.288
	(.014)	(.005)	(.391)	(.140)
Education				
Grade 8 or less	-0.204	-0.070	-0.159	-0.048
	(.026)	(.009)	(.067)	(.026)
HS dropout	-0.134	-0.045	-0.117	-0.035
	(.024)	(.008)	(.034)	(.013)
Some PS	0.127	0.040	0.115	0.031
	(.021)	(.006)	(.027)	(.010)
PS degree	0.109	0.034	0.095	0.026
	(.030)	(.009)	(.035)	(.011)
University degree	0.311	0.094	0.295	0.073
	(.021)	(.006)	(.033)	(.016)
Grad/Prof. degree	0.449	0.130	0.434	0.100
	(.023)	(.006)	(.035)	(.019)
Age				
55	0.419	0.122	0.404	0.094
	(.032)	(.008)	(.040)	(.019)
56	0.306	0.092	0.292	0.072
	(.031)	(.008)	(.038)	(.016)
57	0.265	0.080	0.256	0.064
	(.031)	(.009)	(.034)	(.014)
58	0.203	0.063	0.192	0.050
	(.031)	(.009)	(.035)	(.013)
59	0.098	0.031	0.093	0.025
	(.030)	(.009)	(.031)	(.010)
61	-0.120	-0.040	-0.118	-0.035
	(.030)	(.010)	(.030)	(.010)
62	-0.401	-0.142	-0.391	-0.127
	(.030)	(.011)	(.035)	(.020)
63	-0.551	-0.200	-0.535	-0.181
	(.030)	(.012)	(.042)	(.026)
64	-0.627	-0.230	-0.604	-0.207
	(.031)	(.012)	(.050)	(.032)

— Continued —

Table 16 Continued

Dependent Variable: Husband's Labour Force Participation				
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife's Age				
40-44	-0.064	-0.021	-0.102	-0.030
	(.056)	(.019)	(.074)	(.021)
45-49	-0.084	-0.028	-0.125	-0.037
	(.028)	(.010)	(.057)	(.014)
50-54	0.010	0.003	-0.016	-0.004
	(.019)	(.006)	(.037)	(.010)
60-64	-0.013	-0.004	0.033	0.009
	(.019)	(.006)	(.063)	(.016)
65+	-0.054	-0.018	0.063	0.017
	(.034)	(.012)	(.155)	(.039)
Number of kids	0.092	0.030	0.093	0.026
	(.009)	(.003)	(.009)	(.004)
Constant	0.219		0.022	
	(.033)		(.259)	

Notes: Standard errors are in parentheses. Samples includes married men age 55-64 in 1994 - 2005. See Appendix A for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate whose wife is in the labour force and there are no children at home.

Table 17: Robustness checks – Model Estimates, Pooled Samples, United States

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.506	0.187	1.329	0.484
	(.014)	(.005)	(.098)	(.033)
Grade 8 or less	-0.205	-0.072	-0.067	-0.019
	(.026)	(.009)	(.032)	(.009)
HS dropout	-0.134	-0.046	-0.080	-0.022
	(.024)	(.009)	(.025)	(.007)
Some PS	0.124	0.039	0.086	0.022
	(.021)	(.006)	(.021)	(.005)
PS degree	0.109	0.035	0.067	0.017
	(.030)	(.009)	(.030)	(.008)
University degree	0.309	0.092	0.247	0.060
	(.021)	(.006)	(.023)	(.006)
Grad/Prof. degree	0.448	0.126	0.379	0.085
	(.023)	(.006)	(.026)	(.007)
Age	-0.122	-0.040	-0.105	-0.028
	(.003)	(.001)	(.004)	(.002)
Wife's age	0.001	0.0003	0.020	0.006
	(.002)	(.001)	(.003)	(.001)
Number of Kids	0.087	0.029	0.092	0.025
	(.009)	(.003)	(.009)	(.003)
Constant	7.368		4.728	
	(.151)		(.433)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1994-2005. See the data appendix (A) for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate in 2005 whose 55 year old wife is in the labour force and there are no children at home.

Table 18: Robustness checks – Model Estimates, Pooled Samples, Canada

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.612	0.231	0.695	0.262
	(.011)	(.004)	(.287)	(.106)
Grade 8 or less	-0.137	-0.048	-0.128	-0.044
	(.019)	(.006)	(.039)	(.016)
HS dropout	-0.052	-0.018	-0.049	-0.016
	(.018)	(.006)	(.021)	(.008)
Some PS	0.006	0.002	0.005	0.002
	(.026)	(.009)	(.026)	(.009)
PS degree	0.066	0.022	0.066	0.021
	(.016)	(.005)	(.017)	(.005)
University degree	0.008	0.003	0.007	0.002
	(.022)	(.007)	(.022)	(.007)
Grad/Prof. degree	0.240	0.075	0.237	0.072
	(.024)	(.007)	(.027)	(.012)
Age	-0.114	-0.038	-0.114	-0.037
	(.002)	(.001)	(.004)	(.004)
Wife's age	0.004	0.001	0.006	0.002
	(.001)	(.000)	(.009)	(.003)
Number of Kids	0.132	0.044	0.131	0.043
	(.008)	(.003)	(.008)	(.005)
Constant	6.634		6.396	
	(.115)		(.850)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1995-2005. See the data appendix (A) for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year old high school graduate in 2005 whose 55 year old wife is in the labour force and there are no children at home.

Table 19: Robustness checks – Model Estimates, Pooled Samples, United Kingdom

Dependent Variable: Husband's Labour Force Participation				
	Probit		Bivariate Probit	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Wife Participates	0.806	0.279	0.809	0.279
	(.012)	(.005)	(.344)	(.122)
No qualifications	-0.283	-0.085	-0.301	-0.090
	(.015)	(.005)	(.033)	(.018)
Other qualifications	-0.003	-0.001	-0.008	-0.002
	(.019)	(.005)	(.024)	(.007)
CSE below grade 1	-0.095	-0.026	-0.097	-0.027
	(.056)	(.016)	(.063)	(.019)
GCSE A-C or equivalent	-0.041	-0.011	-0.049	-0.013
	(.022)	(.006)	(.025)	(.007)
Higher educ., below degree	-0.057	-0.016	-0.052	-0.014
	(.022)	(.006)	(.025)	(.007)
Degree or higher	0.052	0.014	0.050	0.013
	(.019)	(.005)	(.021)	(.005)
Age	-0.113	-0.030	-0.113	-0.030
	(.002)	(.001)	(.006)	(.005)
Wife's age	0.011	0.003	0.010	0.003
	(.001)	(.000)	(.010)	(.002)
Number of Kids	0.057	0.015	0.054	0.014
	(.009)	(.002)	(.011)	(.003)
Constant	6.314		6.346	
	(.126)		(1.106)	

Notes: Standard errors are in parentheses. Sample includes married men age 55-64 in 1995-2005. See the data appendix (A) for details regarding sample selection and explanatory variables. The models include a full set of year dummies. Marginal effects are evaluated for a 60 year with A-level qualifications in 2005 whose 55 year old wife is in the labour force and there are no children at home.

Table 20: Decomposition Results (Using Annual Estimates), Canada

	$(1)^a$	$(2)^b$
Predicted participation rate 2005	0.682	0.684
Predicted participation rate 1995	0.609	0.607
Total change	0.073	0.076
Primary Order Decomposition		
Effect of:		
Change in coefficients	0.021	0.022
	(29%)	(29%)
Change in men's characteristics	0.016	0.015
	(22%)	(20%)
Change in wives participation	0.036	0.039
	(50%)	(51%)
Reverse Order Decomposition		
Effect of:		
Change in wives participation	0.020	0.012
	(27%)	(16%)
Change in men's characteristics	0.022	0.022
	(30%)	(29%)
Change in coefficients	0.031	0.042
	(43%)	(55%)

Notes: [a] Estimates using the probit model estimates of the husband's labour force participation, presented in Table 14.
[b] Estimates using the bivariate probit model estimates of the husband's labour force participation, presented in Table 14.

Table 21: Decomposition Results (Using Annual Estimates), United Kingdom

	$(1)^a$	$(2)^b$
Predicted participation rate 2005	0.714	0.706
Predicted participation rate 1995	0.648	0.656
Total change	0.065	0.050
Primary Order Decomposition		
Effect of:		
Change in coefficients	0.033	0.026
	(51%)	(51%)
Change in men's characteristics	0.008	0.010
	(13%)	(21%)
Change in wives participation	0.023	0.014
	(36%)	(27%)
Reverse Order Decomposition		
Effect of:		
Change in wives participation	0.016	0.020
	(25%)	(40%)
Change in men's characteristics	0.018	0.017
	(27%)	(34%)
Change in coefficients	0.031	0.012
	(47%)	(24%)

Notes: [a] Estimates using the probit model estimates of the husband's labour force participation, presented in Table 15.
[b] Estimates using the bivariate probit model estimates of the husband's labour force participation, presented in Table 15.

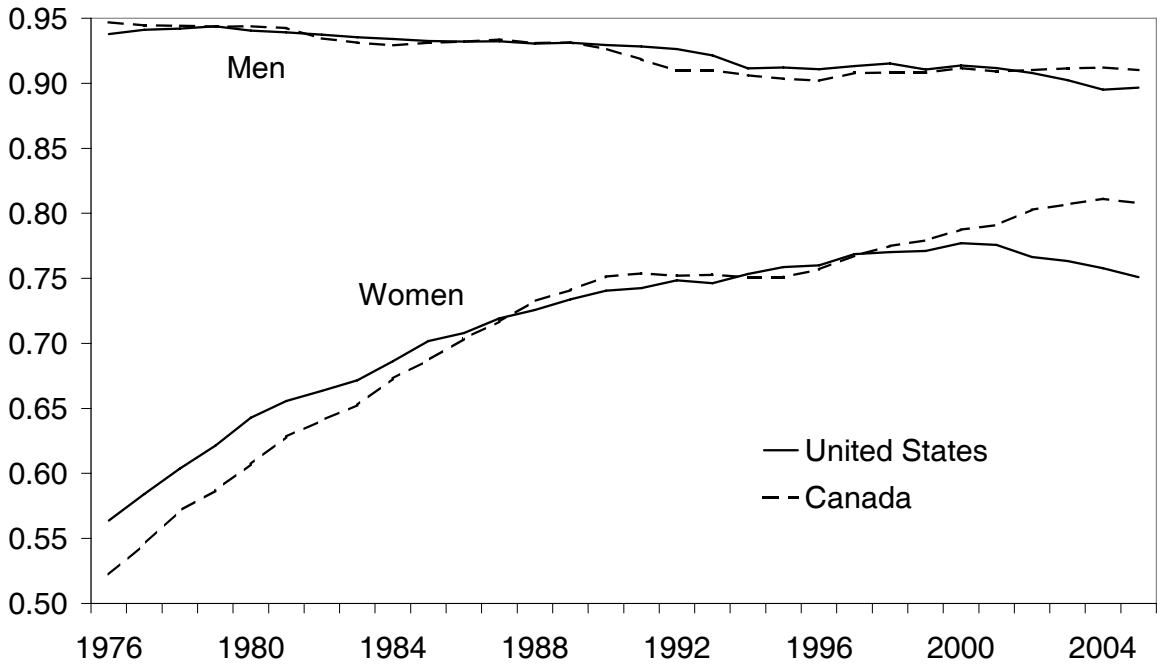


Figure 6: Participation Rates of Individuals Age 25-54, by Sex, 1976-2005

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