Trends in Women's Labour Force Participation in Australia: 1984-2002*

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Abstract

Women's workforce participation increased strongly over the 1980s and 1990s, with the increases being generally larger for married than non-married women, and with the increases being especially large in middle age, as shown by ABS data. Multivariate analysis of IsssA data covering this period shows that there is actually rather little time trend per se. Instead, underlying the apparent shift over time, there are large compositional changes in the female population and there is a strong "birth cohort or "vintage" effect such that succeeding cohorts of women have higher propensities to work throughout their lives than did their predecessors. Among the compositional changes, the strong rise in women's educational attainments and the large decline in fertility both exert substantial influences elevating women's workforce participation and hours worked. There were no evident time effects associated with particular policy initiatives, but some of these are too colinear with time to analyse separately. We tested many interactions with time to assess in particular whether the effects of education and of family situation are declining over time, but no significant interactions with time were found. Thus, for example, there are now many more highly educated women, leading to higher rates of women's employment overall, but the relative importance of education has not changed significantly. Similarly, there are now more childless women, and women with children have fewer of them, so declining fertility has elevated employment, but the impacts of childlessness and of diverse family sizes have not changed, according to these models. Finally, note that we tested a number of potential effects of the family of origin, but none was significant, suggesting that analyses of women's labour force participation and hours worked using datasets that lack these variables probably do not suffer from omitted variables bias.

1. Introduction

1.1. Long term trends in Australian women's workforce engagement

1.1.1 All women

In the 19th century, perhaps the most typical employment experience for women was a series of posts as servant during their teen and young adult years. After these servants married in their mid or late twenties, many of them in turn, became employers of young, single, household servants (Larson 1994; Reekie 1994), a system also familiar from Western Europe (Hajnal 1982; Laslett 1977; McIntosh 1984). Overall, from the mid 19th century to the mid 20th century, women's labour force activity held quite steady with about 30% of women participating and the vast majority of these participants being unmarried (Alford 1984; Jones 1987)).

Then, as the decades passed after the Second World War, more and more women stayed in the workforce and they were working in different jobs. The high wages and higher prestige of office and factory jobs drew the increasingly highly educated young women of Australia into clerical and blue collar work, and domestic service dwindled to a niche market. Moreover, at least since the 1940s, nearly all Australian women have, some time in their lives, held a paid job at least briefly: 90% or more of them have held jobs for at least a while during their early 20s, but there is substantial variation among women born at different times in the amount of time they devote to the labour force (Santow and Bracher 1994). Over the second half of the twentieth century, Australia's pattern is a middling one for a developed country, with women's employment rates lower than in the US, but higher than in the Netherlands (Henkens, Meijer, and Siegers 1993; Jones 1993; Kempeneers and Lelievre 1993).

1.1.2 Married women

The trends in workforce participation for married and unmarried women were quite different during the 1950s, 1960s, and 1970s in Australia. Australia entered the post-war period with very few married women in employment (Ware 1976; Young 1975). As recently as 1950, only one wife in 10 had a paid job, a figure that skyrocketed to 4 or 5 in 10 by the late 1970s (Eccles 1982; Evans 1988a; Gregory, McMahon, and Whittingham 1985) and then climbed very gradually over the 1980s and 1990s, reaching 57% by 2002 (Evans 2003), with the most dramatic changes occurring between the mid-1950s and the late 1960s or early 1970s

(Santow 1990). The dramatic growth of women's labour force participation in the third quarter of the twentieth century was brought about almost entirely by changes in married women's behaviour, with single women's participation holding constant or declining as more young, single women undertook further education across the postwar period (Bracher 1990; Daly 1990; Santow 1991; Young 1989; Young 1999). During the 1980s and 1990s, unmarried women's labour force participation began to climb again, albeit more slowly than did wives' participation (Evans 2003). The reasons for these changes, and the pervasiveness of their consequences remain controversial.

1.1.3 The institutional setting

In Australia, substantial disincentives to married women's labour force participation were enshrined in law and custom until well after the Second World War. For example, job contracts common in large organizations such as the Commonwealth Public Service often specified termination of employment upon marriage and lower pay to women than to men in the same job. In addition, according to anecdotal evidence, friends and neighbours rained disapproval upon employed mothers (Young 1989). Moreover, in the early part of the postwar period, most girls left school after Year 8 (Yates 1993), so that their potential wages were low relative to the value of their homemaking activities (Gregory, McMahon, and Whittingham 1985), and the prestige of the paid jobs they could get was, on average, lower than that of being a housewife.

In the late 1960s to early 1970s, a series of judicial initiatives and legislative decisions steadily removed the formal, legal disincentives to women's employment, a trend that culminated in firm legal support for equal employment opportunity and for equal pay for equal work (see (Young 1989) for a detailed assessment of policies affecting women's employment in the postwar period in Australia; compare (Dex and Shaw 1986) on Britain and the USA). Good estimates indicate that, by the 1980s, the reality had come to approximate the legal ideal in Australia, with only a very small wage gap separating men and women when relevant productivity-related factors are controlled (Chapman and Mulvey 1986; Marks and Fleming 1998; Marks, Hillman, and Beavis 2003), despite persistent occupational segregation (Hayes 1991; Jones and Davis 1988; Western 1994). The postwar period has also been a time of erratically rapid expansion of education in Australia, so that young women today are much more highly educated than their peers of 50 years ago (Marks, Fleming, Long, and McMillan 2001; Yates 1993).

Because of education's continuing close connection with the quality of jobs and level of pay workers can command in Australia (Broom, Jones, McDonnell, and Williams 1980; Evans and Kelley 2002; Marks, Hillman, and Beavis 2003; McMillan and Marks 2003)), being a full-time homemaker would "cost" these young women much more than in prior generations (Gregory, McMahon, and Whittingham 1985). Thus, in a way, we need to be asking why so many Australian women remain outside the job market, as well as asking why so many now participate.

1.2. Prior research

1.1.4 Why study women's workforce involvement

Women's labour force participation is a fascinating issue for theoretical both theoretical and practical reasons. In terms of social theory, modernisation theory has long predicted the convergence of gender roles, as rapid growth in industrial productivity and the consequent strong wage gains have drawn first men and then women out of home production and into work in offices and factories (Blumberg 1984; Inglehart 1997). And there is supporting evidence that favourable labour markets do draw more women into employment (Cotter, DeFiore, Hermsen, Kowalewski, and Vanneman 1998). In terms of practicality, how well societies weather the transition to old age structures is likely to depend on how successful they are in getting people to work longer into the life span and in how much people save from their labour incomes at younger ages (McDonald and Kippen 2001).

1.1.5 Time

The focus of this paper is on time and women's labour force participation. In particular, we investigate the degree to which the rise in women's labour force participation reflects the changing composition of the female potential workforce in ways that favour employment (e.g. rising education, falling fertility), to what degree there are unmeasured social forces affecting women of all ages to the same degree at particular times ("period effects"), and to what degree unmeasured factors associated with socialisation processes have continually ratcheted up women's workforce engagement by launching successive cohorts of young women on increasingly job-oriented ways of life ("vintage" or "cohort" effects).

The great majority of prior research concerns variables relevant to the compositional changes, so we begin with them.

1.1.6 Effects of education

Education encourages married women's labour force participation in Australia (Evans and Kelley 2001; Evans 1984; Gregory, McMahon, and Whittingham 1985; Kelley and Evans 2002; Miller and Volker 1983; Santow 1991) as in many other countries (England, Kilbourne, Farkas, and Dou 1988; Kerckhoff 2001; Rosenfeld 1996; South 2001).[1] Educational attainments have risen substantially in Australia in the postwar period (Kelley 2001; Marks, Fleming, Long, and McMillan 2001; Yates 1993), thereby shifting more women into the part of the educational distribution where labour force participation is more common. Education appears to draw women into the workforce both by instilling in them more career-oriented attitudes and by enhancing their potential wages in the labour market (Evans 1988a), but we will not attempt a decomposition here, being more concerned to establish the magnitude of the effect which can be done much more precisely with the large samples available today than with the yesterday's small samples, and to establish whether that effect is changing over time. It is conceivable that education could have mattered more during the transition to postindustrial society while employment outside the home was becoming a normal activity for women, and that that now employment is taken for granted among women at all educational levels (Inglehart 1990).

1.1.7 Effects of family context

Women still substantially curtail their labour force participation whilst there are babies and toddlers at home in Australia (Bracher and Santow 1990; Daly 1990; Evans 2000; Marks, Fleming, Long, and McMillan 2001; Santow 1991), and also in other developed countries such as the US (Budig and England 2001; Rosenfeld 1996; Wenk and Garrett 1992). Accordingly, we expect to find a deterrent effect of small children on women's work force participation, even net of a wide range of socioeconomic variables. School age children also reduce work force participation, but the effect is smaller (Daly 1990; Evans 2000; Santow 1991).

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[1] Student status temporarily depresses labour force involvement, but the effect seems to be entirely transitory (Blossfeld and Huinink 1991; Hoem 1986; Santow and Bracher 1994).

1.1.8 Effects of marital status

Marrying per se does not much affect women's labour force participation in the US, as newlyweds high demand for asset building prior to the birth of the first child makes women's workforce participation a normal part of a family strategy (Rosenfeld 1996). This tends to be true in Australia as well, at least since the middle 1980s (Bracher and Santow 1990; Kelley and Evans 2002; Marks, Hillman, and Beavis 2003).

1.1.9 Family Background

The effects of family background on women's workforce participation have not been extensively studies, so our investigation of them will be of a largely exploratory nature. The chief reason for wanting to investigate them is that prior research has shown a number of aspects of family background to have very important influences in labour market related domains such as education (Crook 1995; Marks, Fleming, Long, and McMillan 2001) and occupational status (Evans and Kelley 2002; Hayes 1991; Kelley 1990; McMillan and Marks 2003). Accordingly, we investigate the effects of childhood urban residence, parents' religious denomination and church attendance, migration status, parental divorce, experience of a step-parent, father's occupational status, and parents' age when respondent was born. Another important reason to examine family background effects in this dataset in which many of them are available is in order to establish whether or not their absence from many datasets important to the study of labour market behaviour (such as the Census) introduces omitted variables bias into coefficients estimated in the absence of family background data.

2. Data and measurement

2.1. Source

The data used in this report are from the IsssA-Pool (the pooled cross-sections of the International Social Science Survey/ Australia) conducted by the International Survey Centre under the auspices of the Melbourne Institute of Applied Economic and Social Research at the University of Melbourne.

The IsssA collects a variety of types of data, those used in the body of this report are simple pooled cross-sections of primary respondents selected at random from the electoral rolls. The IsssA also collects data on primary respondents' siblings, but those are not used in this report The IsssA also collects panel data, but they do not cover the full period under consideration here (our data series begins in 1984 and the panel data do not begin until later), so we do not use them in the main analyses of trends. We do use some of the panel data later to assess the reliability of some of the retrospective measures. We also discuss some data from the Australian Bureau of Statistics on long term trends in women's labour force participation.

2.2. Population sampled

The population sampled by the IsssA consists of citizens of Australia who reside at the address which they have provided to the Electoral Office, who can read English sufficiently well to answer a self-completion questionnaire, and who are not too cognitively impaired to answer a self-completion questionnaire. For simplicity, we refer to this population as "Australians". The selection on citizenship should have little effect, since prior research shows that non-citizen immigrants differ from citizen immigrants principally in their duration of residence, with few or no differences in issues that would be more relevant to this report, namely marital status and stratification characteristics (Evans 1988b).

2.3. A note on sample size

The IsssA is based on a simple random sample from its target population. This is the optimal type of sample for most purposes, and the type of sample implicitly assumed by most statistical packages, so ordinary standard errors based on it are correct and do not require the inflating factors that cluster samples do. Simple random samples such as the IsssA are more efficient than the cluster samples necessarily used in almost all face-to-face surveys.

A reasonable rule of thumb for high quality cluster designs is that they are worth approximately two-thirds as much as simple random samples (NORC 1987: 435). Thus an IsssA sample of about 9,400 (as for this report) would provide as reliable information as a good cluster sample of around 14,000 cases.

2.4. Sample restrictions

This analysis is based mainly on the IsssA-Pool file's 9,412 women, aged 25 to 64. The restriction to women under age 65, the notional retirement age for men and for women in more recent cohorts, is because almost all older women have retired by that age, so that labour force involvement is no longer an issue.[2] More specifically, labour force participation rates at ages 65 to 69 have never exceeded 3% and at ages 70 and over have never exceeded 2% in the period covered by the IsssA data(Kelley and Evans 2002).

The omission of women under age 25 is necessary to ensure that those in the analysis have had time to complete their education. The database includes 18 to 24 year-olds but we have not included them in the analysis because many are still in tertiary education. It is well known in the status attainment literature that including them could seriously bias estimates of education's causes and consequences, which are important here.[3]

2.5. Data collection procedures

The IsssA surveys are sent by post, individually addressed by name, to simple random samples of Australian citizens drawn by the Electoral Commission from the compulsory electoral rolls (which are public documents) using a minor modification of Dillman's Total Response Method (Dillman 1993). First, a personally-addressed preliminary letter announces the survey; offers a free telephone contact number for queries; and provides information on how to decline to participate . Then the survey booklet itself arrives in the post about two weeks later (together with its pre-paid return envelope and a further cover letter). These average around 64 pages, ranging from 32 to 84 pages, are attractively laid out, and are printed in black and white. The covers feature a map of Australia and are usually glossy white, with the map in a colour that varies from year to year.

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[2] There is an argument for including older women nonetheless, since "0 hours worked" is a perfectly good answer and the larger sample size would give greater precision in estimates of, for example, correlations among family background variables. The offsetting disadvantage is due to social change: older cohorts have rather different attitudes, values, and life histories in a number of relevant ways. Those would need to be modelled. The uncertainty introduced by that would, in our judgment, more than offset any gains in precision from the larger sample size.

[3] There is still some residual bias for the youngest groups because some complete tertiary qualifications as adults, after age 25.

For non-respondents, this is typically followed by four follow-up mailings, two with fresh copies of the questionnaire, over a 6 to 12 month period. For further information on the fieldwork procedures and details on the data entry process see (Evans and Kelley 2002: Data, Measurement, and Method).

2.6. Representativeness

A very important feature of samples is their representativeness – the degree to which their social and economic composition mirrors that of the target population, for it is on this basis that one can make generalisations to the large population which is a key goal of most survey research. Indeed, modern survey research textbooks generally emphasise that completion rates/ response rates are only of interest because a very low completion rate may be a symptom of non-representativeness (Babbie 1995). The representativeness of IsssA achieved samples has been clearly established in prior research (Bean 1991; Sikora 1997).

2.7. Variable definitions

1.1.9.1 Women's Employment Variables

Labour force participation [*LfQ*] is defined as a dichotomous (dummy) variable scored 1 for women who are unemployed and looking for work or who are engaged in any amount of work for pay, and zero for everyone else.

Hours worked [*hrs_wkq*] is a count of the hours respondent normally works per week in her current job (even if temporarily away from her job at survey date).

Preliminary analyses and sensitivity tests used alternative dependent variables including (i) the labour force participation dummy variable; (ii) a trichotomy (full-time labour force participation=1, part-time labour force participation=0.5, no labour force participation=0) and (iii) the continuous measure of hours worked. The results suggest that the continuous measure is the most revealing. Nonetheless, for better comparability with prior analyses which often focus on the dummy, we conduct parallel analyses using both dummy and continuous specifications of the dependent variable.

In investigating these variables it should be remembered that the degree of explained variance will probably be low because female employment tends to be quite volatile (Hakim 1996).

1.1.9.2 Family Background Variables

Father's Occupational Status/ Social Class [*fastatm*] The effects of father's occupational status been widely studied, most notably in the vast tradition of sociological research stemming from the Blau-Duncan paradigm (Blau and Duncan 1967; Featherman and Hauser 1978). There are many available measures of occupational status, mostly highly correlated. Here we use the Worldwide Status Scores (Evans and Kelley 2002: Appendix). Test-retest reliability over a 5 year period is good (r=.81, based on over 1,100 cases).

Parents' age when respondent was born [*pntagem*] There is some suspicion that older parents are more successful in raising children than are young parents, especially teen-aged parents. Parents age was measured by direct questions about mother's age when respondent was born, and father's age, with the two answers averaged to give parents' age.

Whether or not a respondent's **parents divorced** [*pntdv14x*] by the time respondent was age 14 was measured by a direct question. The contrast group is non-divorced families. These are mostly intact married couples, but they also include situations where a parent died and situations where a parent never married.

Whether or not respondent lived with a **step parent** [*steppntx*] at age 14 is measured by a direct question.

Number of siblings [*nsibsm*] is also measured by a direct question.

Migrants in the first generation [*mig1genq*] are those born overseas. **Second generation** migrants [*mig2ndq*] are those born in Australia, one or both of whose parents were born overseas.

Parents' church attendance [*lnpntchm*] is the log of number of services attended per year (counting half per year for the lowest category), from direct questions. For some surveys this refers particularly to mother's church attendance; for others to separate questions on mother's and father's, averaged; and for yet other surveys it refers to a global "parents". Preliminary analysis showed that the log specification is superior to simple count of number per year. Test-retest reliability over a 5 year period is good (r=.71, based on over 1,100 cases).

Catholic [*pcathq*] is measured by a specific question on parents' denomination (or in some surveys, to mother's denomination). **Anglican** [*panglq*] is measured in the same way.

For both the reference (or omitted) category is other Protestants, together with “no religion” and a few non-Christians. Test-retest reliability for denomination over a 5 year period is good (r=.87 for Catholic and r=.78 for Anglican, based on over 1,100 cases).

Christian belief [*cbeliefm*] is a reliable 4-item scale covering belief in God, heaven, hell, and life after death (Kelley, Evans, and Headey 1993). Test-retest reliability over a 7 year period is very good (r=.85, based on 826 cases).

Size of place where family lived when respondent was age 14 (**urban at age 14**) [*lnurb14m*] is defined as the natural log of the number of people living in that place. The answers are categorical bands of numbers of people “a Farm or property” (arbitrarily assigned a population size of 10), a "Village (under 1,000)”; “Town (to 20,000)”; 11.00 “Mid-sized city (to 100,000)”; “City (to 500,000)”; Metropolitan (500,000+).” Preliminary analysis showed that log place size was a better measure for women’s workforce analyses than was than raw number of residents.

1.1.9.3 Socio-economic and Life-Cycle Variables

Current **urban residence** [*lnurbanm*] is measured and scored in the same way as lnurb14m, above3.

Respondent's **education** [*educm*] was ascertained by a series of questions on years of primary and secondary schooling and details on highest educational qualification. These were coded into the Australian Bureau of Statistics' 3 digit educational code and then recoded into usual years of schooling. Test-retest reliability over a 5 year period is very good (r=.87, based on over 1,100 cases).

Life cycle position derived from questions on marriage and number and ages of children. We distinguish **never married** (the omitted or reference category); **single mothers** (unmarried with children of any age); **young married without children** (married, under age 40, no children yet); **married, children under 5**; **married, school age children**; and **married, children grown** (married, over age 40, all children beyond school age). [The variable names are, respectively: *sngl_mox, marnox, kid5x, kid10x, kidgonex*]. Prior research suggests that people who are cohabiting behave more like single people than like married people (Khoo 1987), so we treat cohabiting women as non-married in this analysis

Spouse's income [sp$1km], in thousands of dollars per year, is from a direct question. Spouse employed [sp_lfm] includes spouses working full-time, part-time, or unemployed.

1.1.9.4 Age and Time Variables

Age is age at the time of the survey. Preliminary analysis suggested that the crucial age bands for this analysis (which is restricted to people 25 to 64) are age 45 to 54 and age 55 to 64 [*age4554q* and *age5564q*].

Year born [*yrbornq*] is date of birth. Note that the surveys on which this analysis are based were conducted over many years, from 1984 to 2002, so age and year of birth are not colinear, as they would be in a single survey. There are, for example, 30 year olds in the 1990 survey (born in 1960) and 30 year olds in the 2000 survey (born 1970) as well as 40 year olds in the 2000 survey (from the same 1960 cohort who were 30 year olds in the earlier survey).

Year of survey [*year80q*] is the year the survey was conducted. To reduce rounding error, and without loss of generality, it is rescored so that 1980 is 0; 1981 is 1; etc.

1.1.9.5 Variables of interest that could not be used in the analysis

There are a number of variables that we wanted to use but were unable to use, either through lack of data or because of multicollinearity problems.

Eligibility for the age pension varies (for women) from age 60 for older cohorts to age 65 for younger, with a gradual transition for those born after July 1935 and before January 1949. It would be desirable to estimate the impact of this change on women's labour force involvement. However, age of eligibility is correlated r=.91 with year born. The high correlation between the two variables make it impossible to reliably separate their effects even with a sample as large as ours. We therefore omit this variable from the analysis.

Social context, specifically the **prevalence of employed role models** while respondent was growing up, could be a valuable variable for the analysis. We measured it by the percent with working mothers among those in respondent's birth cohort. So, for example, 13% of respondents born in 1935 had mothers who worked during respondent's childhood, while 22% of those born in 1945 had working mothers, as did 28% of those born in 1955, and so on. So there were more working role models for those in recent cohorts than in the past. Unfortunately, this measure is too highly correlated with year of birth, r=.88, for us reliably to separate their effects, even with our large sample size. We therefore (reluctantly) omit this variable from the analysis.

Policy context would also be a valuable variable, with substantial changes taking place at various dates. Policy changes in the social security system since 1985 -- for example, paying income support payments separately to both members of a couple and introduction of Family Tax Benefit (particularly part B) – and especially reforms around 1996 may be important. We worked with a detailed overview of the timing and content of relevant changes in benefits provided by FaCS and we had hoped to analyse them via a set of dummy (indicator) variables picking out key dates such as 1996. However, analysis of year-by-year changes (as we will see in Table 2) does not reveal any straightforward pattern of change corresponding to these policy changes. Indeed, all changes over time taken together fail to be significant at the .001 level we use in this paper because of the large sample size it is appropriate to use a stricter level of significance than the .05 which is traditional in sociology.[4] We have therefore omitted dummy variables for policy changes from the analysis, but the influence of time can be minutely examined in Table 2.

Local availability of childcare. We had hoped to estimate the impact of local availability of childcare. Unfortunately, it turns out that childcare data at the postcode level from the FaCS childcare census is not available for the full span of the study, so it would not be practical to include it into the models for this project. If, however, a file/table could be produced from the childcare census giving availability of childcare by postcode by year for the dates when this is available, future research could augment the models from this project with that additional data and re-estimate the models to discover the impact of the availability effect and to discover whether including that alters the estimates of effects of variables now included in the model.

3. Methods and models

3.1. Statistical significance

Since the IsssA-Pool database provides a very large sample – over 9,000 cases for most analyses – we use the conservative the .001 level as the criterion of statistical significance.

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[4] They are significant at the less stringent .01 level ($F=9.75$, 11 df, $p<.01$).

3.2. Models

This paper is based on recursive models. Estimates are by ordinary least squares regression (for hours worked and other continuous dependent variables) and logistic regression (for labour force participation, a dichotomous dependent variable). Given the causal order and recursive model we have assumed, these are optimal.

The basic model (Table 1) is:

LfQ or hrs_wkq =
fastatm + pntagem + pntdv14x + steppntx + nsibsm + + mig1genq + mig2ndq
+ lnpntchm + pcathq + panglq + cbeliefm + lnurb14m + lnurbanm + educm +
+ sngl_mox + marnox + kid5x + kid10x + kidgonex + sp$1km+ sp_lfm
+ age4554q + age5564q+ yrbornq + year80q + e_1 *(Eq. 3)*

Where the variables are those given above in the measurement section, and e1 is a random error term with the usual properties.

The model of Table 2 extends the age and time variables to include dummy variables for each survey year, so capturing all measurable time effects without any assumption as to their exact description:

LfQ or hrs_wkq =
fastatm + pntagem + pntdv14x + ...etc... + yrbornq
+ dummy variables for year of survey + e_2 *(Eq. 4)*

The model of Table 3 extends the basic model of Eq. 3 to cater for the possibility that the impact of key variables are different in different time periods. It does that by including multiplicative interaction terms with year of survey. For example, for education:

*EducXYear = Education * Year_of_Survey* *(Eq. 5)*

This allows the effect of education to be larger (bEducXYear > 0), the same (bEducXYear = 0), or smaller (bEducXYear < 0) in recent years than it was in the past.

4. Background

Before turning to the detailed examination of married women's labour force engagement (participation and hours worked), it is worthwhile developing a context by comparing the long-term trends in participation for both married and non-married women.

For this purpose, appropriate data are available from the Australian Bureau of Statistics, which conducts a large monthly survey of workforce participation and related issues. For present purposes, we averaged these monthly rates for each year. The ABS data are of very high quality, involving well-trained interviewers, straightforward questions, and large samples based on good sampling frames.

There are a few caveats here.

1) The definition of labour force participation changed slightly in April 2001, so it is not clear whether the subsequent rise is genuine or an artefact of definitional change. It should also be noted that the ABS data consistently show slightly lower employment rates than do non-governmental surveys. To what extent this reflects people's greater willingness to report "grey" employment to non-governmental surveys, to what extent it reflects the generously resourced governmental surveys' greater success in contacting difficult-to-locate respondents is not known. For present purposes, that does not much matter, because the focus is on changes within the ABS series, so, to the extent that the biases are consistent over time it will not distort the results.

2) Another data limitation that should be noted here is that this series does not differentiate married women according to the presence and ages of children, so married women are a very heterogeneous category including the full spectrum of family sizes (and this is, to a lesser extent, true of non-married women). Moreover, this will change over time: more of today's wives are childless or have small families than was true in the past.

3) The ABS includes de facto women in with married women, whereas in the rest of the paper, we have grouped the de facto women into the non-married category, for substantive reasons (McMillan and Marks 2003; Rindfuss and VandenHeuvel 1990). This makes for some non-comparability between this section and the rest of the paper.

Consider first the overall rates of workforce participation of married and unmarried women. To compare them over time, they were adjusted using the method of direct standardisation so that both groups have the same age structure over the entire time period. This standardisation is needed in order to "net out" (1) the differences in age composition between married and unmarried women and (2) changes over time in age composition.

The chosen age structure is a uniform age structure with equal numbers in each age group across the prime working ages – rather like the uniform age structure towards which Australia appears to be moving.

The age-specific rates of workforce participation available from the ABS are then aggregated up using this imaginary age structure for each marital status group for each year. The advantage of this procedure is that the issue of interest here is not the changing age structure, but the implication of the underlying pattern of age-specific trends. This standardisation provides a simple simulation of what the overall participation rates would have been if the age specific rates had remained as they actually were, but the imaginary uniform age structure had prevailed across the entire span. Note that this standardisation corrects only for differences in age structure, not for other things such as the declining fertility of married women.

In 2002, if the participation rates of married and unmarried women in each age group had remained as they actually were, but the age composition of both the married and unmarried groups had been transformed to have equal numbers at each of the prime working ages, then the workforce participation rate for unmarried women age 25 to 64 would have been 64 per cent, and the corresponding rate for married women would have been nearly the same, 62 per cent. Thus, the underlying patterns of participation have become strongly similar (although this can be temporarily disguised in the raw figures by changes in age composition).

Convergence occurred gradually across the whole period, with the gap beginning at 10 or 11 percentage points throughout the early 1980s. It then declined to 6 or 7 percentage points through the late 1980s and early 1990s, and shrank further to 4 or 5 percentage points in the middle and late 1990s. The gap finally became essentially nugatory at about 2 points in the new century. More details on these changes are available in (Evans and Kelley 2003).

Note that this change was not simply a matter of married women becoming more like unmarried women. Instead, unmarried women's rates and married women's rates were both rising over most of the period (except for an apparent stall in the early 1990s), but married women's rates were rising faster.

Married women's rates have climbed at all the prime working ages, with the most notable rises being a gain of twenty five percentage points at ages 45 to 54 and a gain of twenty three percentage points at ages 55 to 59. Among unmarried women, the age group 55 to 59 experienced the largest change, with a 20 percentage point rise being nearly as large as the gain among married women. Thus, the changes of the past two decades have been to a substantial degree changes in the employment patterns of middle-aged women.

These changes have previously been noted in IsssA data (Evans and Kelley 2001; Kelley and Evans 2002).

5. Multivariate results

This section presents the models of women's workforce engagement – both participation and hours worked. The general expectation when presenting such models in parallel is that they will show broadly the same results, but with more significant results evident in the more powerful OLS regression analysis of hours worked than in the logistic regression analysis.

Table 1 presents the results of our basic model of women's labour force engagement, including both potential long-term effects of characteristics of the respondent's family of origin and effects of respondent's current situation. These are estimates that assume no reciprocal effects – for example, they posit that the partial correlation between education and hours worked comes about entirely because education influences hours worked. For many of the variables here temporal ordering or basic logic there could be no reciprocal causation (for example, it is a nonsense to think of an adult's hours worked as potentially causing her father's occupational status decades before, or to think of year of survey as influenced by hours worked). For the other variables, those potentially subject to reciprocal causation, the estimates of effects shown here in this forced one-way causation model provide an upper bound on the true effect. In other words, if there is reciprocal causation on these variables, their genuine effect on hours worked cannot be larger than that shown here.

5.1. Family of origin

The first important point in Table 1 is that there are no statistically significant direct effects of any of the characteristics of the family of origin either in the OLS estimates of effects on women's hours worked for pay (left panel of Table 1) or in the logistic regression estimates of women's probability of being in the labour force (right panel of Table 1).

In detail, neither father's occupational status, nor parents' age when respondent was born, nor whether respondent's parents were divorced, nor whether respondent lived with a step-parent, nor respondent's number of siblings, nor whether respondent was a first generation migrant, nor whether respondent was a second generation migrant, nor the frequency of church attendance of respondent's parents, nor religious denomination has a statistically significant

effect on either hours worked for pay or labour force participation in these models. Because the IsssA-Pool provides a very large sample, over 9,000 cases for this analysis and because labour force participation rates do not involve extreme splits in this population which makes it easier to achieve greater precision, this paper uses the .001 level as its criterion of statistical significance, but even less stringent criteria would lead to the decision that most of these effects cannot reliably be distinguished from zero.

These null effects are important because they suggest that models of women's workforce engagement in other datasets lacking family background variables are probably not seriously mis-specified by the omission of those variables.

There is also an important substantive point about these findings, namely that the way of life in one's family of origin, insofar as that is represented by the extensive set of variables in these models, is probably inconsequential for women's labour force engagement as adults.

The other noteworthy aspect of these findings is that the pattern is essentially identical for hours worked and for labour force participation. In other words, there is not one effect that is significant on hours of work, but not on labour force participation, and, conversely, there is not one effect that is significant on labour force participation but not on hours worked.

5.2. Education

Education has a substantial influence in this model, as indeed it normally does in models assuming this causal direction on both labour force participation and on hours worked weekly (Table 1, Panels A and B). This is a large association, as shown by the standardised regression coefficient of 0.20. The coefficient estimates suggest that each additional year of education increases hours worked as an adult by 1.4 hours a week, on average, all else equal. So, for example, a university graduate (15 or 16 years of education) can be expected to work 8 to 10 hours a week longer than an otherwise comparable woman who left school at the end of year 9. Note that here again, parallel results are found for labour force participation and for hours worked.

Table 1. Basic model of women's workforce involvement. OLS regression on hours worked for pay; logistic regression on labour force participation. Women, age 25 to 64. Australia 1984-2002. N=9,412.

	Hours worked (OLS)				Labour force participation (Logistic regression)			
	B	SE B	Beta	T	B	S.E.	Wald	Exp(B)
Father's occupational status	ns	ns	ns	-0.06	ns	ns	5.17	ns
Parents' age when R born	ns	ns	ns	-1.48	ns	ns	0.99	ns
Parents divorced	ns	ns	ns	-0.30	ns	ns	0.14	ns
Lived with step parent	ns	ns	ns	-0.08	ns	ns	0.24	ns
Number of siblings	ns	ns	ns	-0.41	ns	ns	0.01	ns
Migrant: First generation	ns	ns	ns	0.43	ns	ns	2.15	ns
Second generation migrant	ns	ns	ns	-1.56	ns	ns	6.16	ns
Parents church attendance (ln)	ns	ns	ns	2.27	ns	ns	2.19	ns
Catholic	ns	ns	ns	-0.34	ns	ns	0.00	ns
Anglican	ns	ns	ns	0.64	ns	ns	0.09	ns
Christian belief	ns	ns	ns	-2.97	ns	ns	3.72	ns
Urban at age 14 (ln)	-0.18	0.05	-0.04	-3.45	ns	ns	0.86	ns
Urban resident (ln)	0.27	0.05	0.05	4.96	0.04	0.01	33.23	1.04
Education	1.36	0.07	0.20	18.79	0.17	0.01	267.59	1.19
Never married (reference)	0.00	--	--	--	0.00	--	--	--
Single mother	-8.06	0.83	-0.10	-9.71	-0.81	0.11	53.01	0.44
Young married, no children	ns	ns	ns	1.14	ns	ns	1.56	ns
Married, children under 5	-17.62	0.68	-0.32	-25.94	-2.16	0.10	507.21	0.12
Married, school age children	-5.68	0.58	-0.12	-9.81	-0.60	0.08	53.60	0.55
Married, children grown	-2.33	0.54	-0.06	-4.32	-0.41	0.07	30.81	0.66
Spouse's income	-0.06	0.01	-0.09	-8.49	-0.01	0.00	43.27	0.99
Spouse employed	3.37	0.48	0.08	7.08	0.74	0.07	122.24	2.10
Age: 45 to 54	ns	ns	ns	0.19	ns	ns	3.44	ns
Age: 55 to 64	-7.79	0.98	-0.16	-7.99	-0.99	0.13	56.97	0.37
Year born	0.27	0.04	0.16	7.41	0.04	0.01	62.33	1.04
Year of survey	-0.18	0.04	-0.05	-4.22	ns	ns	4.38	ns
(constant; R-squared)	-510.5		(20%)		-80.13			

ns -- not statistically significant at p<.001, two-tailed.

n = 9412

Source: IsssA-Pool databease, 1984-2002.d.

5.3. Marital situation

A woman's marital situation appears to be influential in some respects, but not in others. The comparison (or reference) group for these effects is never married, childless women under age 40.

The non-significant regression coefficient on hours worked for the category “married, no children” means that we cannot reject the hypothesis that this effect is zero. Thus the evidence suggests that women in this category do not systematically differ from non-married women in the number of hours they work each week, all else equal.

Nor do they differ in the probability of being in the labour force. Thus, at least in these models, there is no compelling evidence that childless married women work more (or less) than childless non-married women, all else equal.

However, some of the husband's workforce-related behaviours do have statistically significant connections to women's workforce engagement. The models estimate that there is a positive association between the husband's being employed (rather than unemployed or out of the workforce) and his wife's labour force participation (Table 1, Panel B), and the number of hours she works (Table 1, Panel A), all else equal. In substantive terms, the regression coefficient in the model of hours worked implies that wives of employed men work 3.37 hours a week more than do others, ceteris paribus. It is worth noting that the causality in this connection is not clear; disentangling it does not form a part of this project, but it is one that would certainly merit exploration in a future project.

By contrast, the magnitude of the husband's income is associated with lower levels of women's workforce engagement. The models discover significant positive links between husband's income and wife's labour force participation (Table 1, Panel B) and between husband's earnings and wife's hours worked (Table 1, Panel A), all else equal. In substantive terms, the -.06 estimated regression coefficient suggests that each extra $1000 the husband gets reduces his wife's weekly hours of employment by .06 of an hour or 3.6 minutes, all else equal and assuming that the causal direction posited by the model is correct.

Although marriage per se appears to have no significant independent influence on women's participation, most married women have working husbands, and these husbands earn an income. The net effect of these three variables is that married women's labour force participation is higher than that of their peers, according to the coefficients in this model, and with other variables set to their sample means (details of the simulation in the Methods section and in Table 4).

Note that, once again, exactly the same patterns of effects hold for labour force participation and for hours worked weekly.

Although statistically significant, the coefficients representing the influence of husband's income and the influence of husband's being employed are of only of small importance, as shown by their standardised regression coefficients being a little under 0.10.

5.4. Children

Children, by contrast, are quite consequential for women's workforce engagement in these models.

First note that the statistically significant negative coefficient estimates representing the effect of being a single mother both in the model of hours worked weekly (Table 1, panel A) and in the model of labour force participation (Table 1, Panel B) single mothers work significantly less than do non-married childless women, all else equal. The coefficient estimate of the effect on hours worked weekly suggests that the difference amount to about 8 hours a week, on average, and all else equal. Even in this large sample, there were not enough single mothers to enable reliable estimation of differences according to the ages of the children.

According to these models, married women with preschool children are significantly less likely to be in the workforce and work significantly fewer hours than do non-married childless women, all else equal (Table 1, Panel B and Table 1, Panel A). To the extent that the coefficient estimate from the model of hours worked weekly is correct it suggests that married women with preschool children, on average, work 17.6 hours a week less than non-married childless women, ceteris paribus. This is the single most important influence in the model, as shown by the fact that its standardised regression coefficient of 0.32 is half again as large as the next largest influence (0.20 for education).

Of course, other variables are normally not equal, so being a married mother with preschool age children normally entails being under age 40, having a husband in the labour force, and a husband's income. The joint effect of these three variables is to lower the labour force participation and hours worked weekly of married women with preschool age children below that of their peers, according to the coefficients in this model, and with other variables set to their samples means (see Table 4, below).

The coefficient estimates for married women with children of school age are statistically significant both in the model of labour force participation and in the model of hours worked weekly (Table 1). According to the model of hours worked weekly, married women with children of school age work 5.7 hours a week less than do non-married childless women, on average, all else equal. That is about one third the size of the effect of having preschool children.

This is a moderately important effect, having a standardised regression coefficient larger than that of husband's income and employment, but smaller than the standardised regression coefficients for preschool children and for education.

Turning again to the simulation, consider a married mother under age 40 with school age children, whose husband is in the labour force and has an income. In this case, working jointly, these variables would raise labour force participation back to the level prevailing for young non-married childless women, and hours worked weekly a long way back towards the level prevailing for young non-married childless women according to the coefficients in this model, and with other variables set to their samples means (see Table 4, below). For 2002, that would mean a labour force participation rate of 68% for married mothers of school age children and for young non-married women (details of simulation in the methods section and in Table 4). The simulation also indicates that under its assumptions, married women with school-age children would be working somewhat shorter hours than young non-married childless women – 18 versus 22 hours weekly-- in 2002 all else equal.

Moreover, there appears to be some small persisting difference in preferences associated with children, or some lingering effect of employment choices while children were young. The coefficient estimates suggest that married women with grown children work about 2 hours less a week, than do unmarried childless women, on average, all else equal. The standardised regression coefficient of just –0.06 emphasises that, although statistically significant, this is an effect of small importance.

To develop a sense of how this effect combines with the others in the model, the simulation may again be useful. For this purpose, let us focus on a married mother with grown children, whose husband is in the labour force and has an income, and is average on all other variables in the model. The joint effect of these variables is to raise labour force participation slightly above the level prevailing for young non-married women, according to the coefficients in this model, and with other variables set to their sample means (see Table 4, below). In terms of hours worked weekly, a married woman with grown children would be working the same number of hours a week as a young, non-married, childless woman, on average, and all else equal, according to the model. For 2002, that would mean a labour force participation rate of 72% for married mothers of grown children compared to 68% for young non-married women, and 22 hours worked weekly, on average, for both groups (details of simulation in the methods section and in Table 4).

5.5. Age

There are few age differences per se, in these models. The life course stage differences just described account for most apparent age differences, but not quite all.

Even net of marital status, ages of children, and workforce involvement of the husband, there is still a negative effect of being age 55 to 64 on both workforce participation and on hours worked weekly. The coefficient estimates in these models suggest that, compared to women aged 25 to 44, women age 45 to 54 do not differ significantly in their work hours, but women age 55 to 64 work 7.8 hours less on average, all else equal (Table 1). This is in conformity with prior research highlighting the drop in workforce involvement at these ages (e.g. Evans and Kelley 2002c). The standardised regression coefficient of -0.16 makes it tied for 3rd most important determinant of hours worked weekly in the model: less important than being married with preschool age children; less important than education; tied with year of birth; more important than husband's income; more important than husband's employment; more important than having school age children; more important than having grown children; more important than being married or not; more important than urban residence; more important than family background or religion; and more important than year of survey.

To develop a sense of how this effect combines with the others in the model, the simulation may again be useful. For this purpose, let us focus on a 60 year old married woman with grown children, whose husband is in the labour force and has an income, and is average on all other variables in the model. According to the simulation (Table 4, below), her labour force participation would be sharply lower than that of an otherwise similar woman 10 years younger, according to the coefficients in this model, and with other variables set to their samples means (see Table 4, below). In terms of hours worked weekly, by the time she reached this life course stage, a married woman with grown children would be working about two thirds as many hours a week as a young, non-married, childless woman or a married women with grown children aged 50, on average, and all else equal, according to the model. For 2002, that would mean a labour force participation rate of 49% for 60-year-old married mothers of grown children compared to 75% for 50-year-old married mothers of grown children and 68% for young non-married childless women. Applying the simulation to hours worked weekly in 2002 gives 14 hours a week on average for 60-year-old married mothers of grown children compared to an average of 22 hours worked weekly by 50-year-old married mothers of grown children and young non-married childless women (details of simulation in the methods section and in Table 4).

5.6. Time

The pattern of time effects is complex and interesting, in part because different currents seem to be pulling in difference directions. The two aspects of time that focused on in this report are “period effects” or year of survey, and “vintage” or “birth cohort” effects. Note that age, which, in a way is another dimension of time is controlled in the models.

One of the striking and important results in Table 1 is the strong effect of year of birth. In these models “vintage” or “birth cohort” has a strong positive estimated coefficient representing its effects on both labour force participation and hours worked weekly. The coefficient suggests that each year later in the 20th century that a women was born would raise her weekly hours worked by about 15 minutes (0.27 of an hour), on average, and all else equal. The moderately large standardised regression coefficient of 0.16 indicates that this variable is tied for third place in importance among the many variables in this model as an influence on hours worked weekly. The IsssA-Pool data used here cover a 17 year span, which gives us many occasions on which to view these cohort differences, so this large effect is based on a firm evidentiary foundation. It means, in effect that each succeeding generations or cohorts has a slightly higher probability of being in the work forces and engages in slightly more work each week, throughout their working lives, and apart from general “period effects” that have a common effect on the workforce as a whole at a particular time (e.g. business cycles).

Eligibility for the age pension varies (for women) from age 60 for older cohorts to age 65 for younger, with a gradual transition for those born after July 1935 and before January 1949. Unfortunately, age of eligibility is correlated r=.91 with year born. The high correlation between the two variables make it impossible reliably to separate their effects even in this large sample, so age at eligibility had to be omitted from the analysis.

In contrast to the strong positive effect of year of birth, there is something of a partially countervailing current in that, net of these vintage or cohort effects, year of survey has a smaller negative effect on hours worked weekly, in this model. The effect on labour force participation is not statistically significant in this model. Note that the specification of year of survey in this model is as a linear effect which only allows the model to detect an influence that exerts a constant strength over time.

Because this may not be realistic, and because there have been a number of important policy changes that might be expected to exert rather strong effects at particular times, it also behoved this project also to examine a more flexible specification of year of survey. A great many different such specifications are possible, but all the issues that have been raised in FaCS comments can be answered by a full dummy variable specification.

Accordingly, the model of hours worked weekly in Table 1 was re-estimated with the linear term for year of survey replaced by a full set of dummy variables representing each survey year, with 1984 being the reference (or omitted) category. The results are shown in Table 2.

Table 2. Changes over time in hours worked. Australian

Year of survey	b	s.e.	t	Significance
1984 (Reference)	0	--	--	--
1986	2	0.90	2.75	p<.01
1987	3	0.86	3.21	p<.01
1989	3	0.73	4.01	p<.01
1990	-4	1.02	-4.39	p<.01
1993	0	0.87	-0.10	ns
1994	1	0.99	0.91	ns
1995	0	0.86	-0.09	ns
1996.5	0	0.84	-0.20	ns
1999	-1	0.96	-0.77	ns
2001	0	1.08	0.00	ns
2002	-3	1.01	-2.62	p<.01
Joint significance test for differences over time				*F=9.75, 11 df, p<.01*
Controled but not shown: All variables in the model of Table 1.				

Source: IsssA-Pool database

ns -- not statistically significant at p<.01, two-tailed

[1] The model is that of Table 1, first panel, with year of survey replaced by a set of dummy (indicator) variables, with 1984 the reference category. R-squared: 21%.

The main message from Table 2 is that there is no very consistent effect of time on hours worked weekly, net of the gradually growing intensity of work across cohorts, on average and all else equal.

There is a fairly clear pattern of increase in the late 1980s. The metric regression coefficient for 1986 indicates a two hour rise in hours worked weekly compared to 1984, on average and all else equal. Similarly the corresponding coefficients for 1987 and 1989 indicate that, all else equal, women were working three more hours a week than in 1984, on average.

But, thereafter, the coefficients either do not differ significantly from the 1984 baseline, or are even below it. Note that this in no way implies that women's workforce engagement has not increased since the early 1980s, but rather suggests that the changes are due to changing composition (more education, fewer children, cohort replacement as less work-oriented cohorts leave the working ages and more work-oriented cohorts succeed them, etc). As noted earlier, there are a large number of policy initiatives which might have been expected to influence women's workforce engagement, but the evidence here does reveal any upward shifts at any of the times that might have been expected.

We had originally intended to include several other causal variables that represent some important substantive changes over time. In particular, the prevalence of employed role models while respondent was growing up, could be a valuable variable for the analysis. We measured it by the percent with working mothers among those in respondent's birth cohort. So, for example, 13% of respondents born in 1935 had mothers who worked during respondent's childhood, while 22% of those born in 1945 had working mothers, as did 28% of those born in 1955, and so on. Unfortunately, this measure is too highly correlated with year of birth, r=.88, for the models reliably to separate their effects, even with this large sample size. We therefore (reluctantly) omitted this variable from the analysis.

Returning to the linear specification, it is also possible that time might operate more subtly – not as a sweeping effect that shapes the destinies of women in all walks of life in the same ways and to the same degree, but rather as a social force that has differential effects on women with different socio-economic resources, or in different stages of life.

Accordingly, this project also investigated the possibility of interaction effects. To this end, the model of Table 1 was re-estimated to include a new set of interaction variables representing the multiplicative interactions of time with many of the focal variable in the project. The results are shown in Table 3.

The augmented model (Table 3) included interactions of time with education, being a single mother (compared to being non-married and childless), being a married mother with children under school age (compared to being non-married and childless), being a married mother with school age children (compared to being non-married and childless), being a married mother with grown children (compared to being non-married and childless), being age 45 to 54 (compared to being age 25 to 44), or being age 55 to 64 (compared to being age 18 to 44).

Table 3. Changes over time in the impact of key determinants of women's workforce involvement. OLS regression on hours worked for pay with multiplicative interactions. Women, age 25 to 64. Australia 1984-2002. N=9,412.

	b	s.e.	t
Father's occupational status	0.00	0.01	ns
Paarents' age when R born	-0.04	0.03	ns
Parents divorced	-0.15	0.74	ns
Lived with step parent	-0.06	0.73	ns
Number of siblings	-0.05	0.10	ns
Migrant: First generation	0.17	0.44	ns
Second generation migrant	-1.21	0.75	ns
Parents church attendance (ln)	0.27	0.12	ns
Catholic	-0.27	0.48	ns
Anglican	0.20	0.45	ns
Christian belief	-0.02	0.01	ns
Urban at age 14 (ln)	-0.18	0.05	-3.37
Urban resident (ln)	0.28	0.05	5.01
Education	1.32	0.17	7.80
Single mother	-12.57	1.91	-6.57
Young married, no children	3.67	2.19	ns
Married, children under 5	-20.72	1.51	-13.75
Married, school age children	-7.40	1.39	-5.32
Married, children grown	-5.46	1.36	-4.03
Spouse's income	-0.06	0.01	-8.59
Spouse employed	3.54	0.48	7.32
Age: 45 to 54	-0.22	1.41	ns
Age: 55 to 64	-7.10	1.76	-4.03
Year born	0.27	0.04	7.31
Year of survey	-0.37	0.17	ns
Interactions with year of survey:		*F=2.64,*	
Education X year of survey	0.00	0.01	ns
Single mother X year of survey	0.39	0.14	ns
Young married, no children X year	-0.19	0.16	ns
Married, children under 5 X year of survey	0.29	0.12	ns
Married, school age children X year of survey	0.15	0.10	ns
Married, children grown X year of survey	0.24	0.09	ns
Age: 45 to 54 X year of survey	0.04	0.09	ns
Age: 55 to 64 X year of survey	-0.05	0.11	ns
(constant; R-squared)	-507.78	(20%)	

Source: IsssA-Pool database

ns -- not statistically significant at p<.001 two-tailed.

As Table 3 shows, not one of these interactions has a significant t-value at p<.001. But even more strikingly, inclusion of the entire group of them does not significantly improve the fit of the original model, as show by their joint F-value of 2.64 with 8 degrees of freedom. The absence of significant interactions here suggest that time has not had differential effects on different groups of women (remember that this is time net of cohort which has strong positive effects on both participation and on hour worked). This issue is taken up further in the discussion.

To the extent that these models are capturing real effects and real absences of effects, the results can be summarised by saying that all else equal there is no very consistent pattern of changes over time (recall that this is net of composition and "vintage" changes), and that the effects of education and life course stage have not substantially altered over this 18-year period.

Thus, the results suggest stability in several important effects over time. Education is an important effect whose influence has not significantly declined over time. Similarly, being married with young children has not, over time, significantly reduced its influence on weekly hours worked.

6. Implications: Projections to 2020

Next, let us consider the substantive implications for the future of the time patterns discovered here. To Table 4 presents the predicted values that hours worked weekly and labour force participation would have in 2002 and projected forward to 2020 for women in different family arrangements, if everyone had the average values on the variables in the model other than year of birth, year of survey, age, and family arrangements, and if these variables were translated into weekly hours worked accordingly to the weights indicated by the regression coefficients in Table 1.

For present purposes, the key feature of Table 4 is that it traces through the joint implications of the year-of-birth and year-of-survey trends for future workforce engagement, were the levels of other variables to remain at their sample means, and were the causal linkages between each variable and workforce engagement to be specified by the coefficient estimates in Table 1. To make these changes less abstract, the simulation produces values for young, non-married, childless women, young married women with no children, young married women with preschool children, married women with children of school age, married women with grown children past school age, and married women around age 60 with grown children.

For all the married women, the husband's employment situation is set to currently working and his income is set to $25,000 annually.

Table 4. Predicted values from Table 1 for women's labour force participation and hours worked per week, by life cycle stage, for women average in family background, religion, place of residence and other respects.[1]

	Age and life-cycle stage						
	Young single	Young married, no children	Young married, children under 5	Married, children in school	Married, children past school	Age 50, married, children past school	Age 60, married, children past school
Panel A: In 2002							
Predicted labour force participation	0.68	0.77	0.31	0.68	0.72	0.75	0.49
Predicted hours worked	22	25	6	18	22	22	14
Panel B: Projected for 2020							
Predicted labour force participation	0.78	0.84	0.43	0.78	0.81	0.83	0.61
Predicted hours worked	23	26	8	20	23	23	15

[1] Predicted values from the equations given in Table 1, adjusting all other factors to the population mean. Assmes that after marriage the husband works and earns $25,000 per year. Education, fertility, and cohort differences are assumed to remain unchanged through 2020. Young are those under 40. The assumption that future birth cohorts will continue to shift toward employment at the same rate past cohorts have done so, net of educational and other compositional changes, may be problematic.

According to the simulation in Table 4, young non-married, childless women would have a labour force participation rate of 68% in 2002 if they had the average sample values on other variables, and this would rise to 78% in 2020, if the trends prevailing in Table 1 were to continue to hold into the future. For this same group over this same period, hours worked weekly would rise by 1 from 22 to 23, according to these same assumptions.

Under these same conditions, young married, childless women would have a labour force participation rate of 77% in 2002 and this would rise to 84% in 2020. Their average hours worked weekly would rise from 25 to 26. (Note that, in the simulation, the husband's employment situation is set to currently working and his income is set to $25,000 annually.)

Still according to these same assumptions, young, married women with working husbands earning $25,000 per year and preschool age children would have a work force participation rate in 2002 of 31% which would rise to 43% by 2020. On average, their hours worked weekly would rise from 6 to 8.

Continuing with the same stipulations on the simulation, married women with working husbands earnings $25,000 per year and school age children would be participating in the work force at 68 percent in 2002, climbing to 78 percent by 2020. There would be a two hour gain in hours worked, from 18 to 20, on average.

As the children grow up past school age, married women's labour force participation would climb from 68% to 72% in 2002, and from 78% to 81% in 2020, all else equal, according to the simulation (including the assumptions that their husbands are employed and that their husbands earn $25,000 annually). Hours worked weekly would rise from 18 to 22 across this life course transition in 2002 and from 20 to 23 in 2020, on these same assumptions.

As aging continues, according to the simulation, participation turn down again. Married women age 50 (whose husbands work and have annual incomes of $25,000) with grown children would have a labour force participation rate of 75% in 2002, under the assumptions of the simulation, which would decline to 49% at age 60. According to the simulation, the rate for married women age 50 with grown children would climb to 83% in 2020, and the rate for their peers age 60 would be 61%. Hours worked weekly for married women age 60 with grown children would climb from 14 to 15, on average, on these same assumptions.

7. Discussion

The fact that none of the **family of origin** characteristics investigated in this report has a statistically significant impact on either labour force participation or hours worked suggests that disadvantageous characteristics of the family of origin do not necessarily impair capacity building for independence and self-reliance. These results also have the important implication for other studies that omission of family background characteristics in studies of women's labour force participation and hours worked will, on the evidence here, not lead to mis-specified models. Under these circumstances it seems reasonable to take as a working hypothesis the assertion that models without these variable will not, on that account, suffer from omitted variables biases. Nonetheless, it should be mentioned that this project has used a combined index of mother's and father's education, as is conventional in our field, and it remains possible that they might have different effects. Future research could investigate this by merging all the large existing datasets with the requisite information, although this would be a massive undertaking.

Education is, not surprisingly, a robust influence on women's hours worked and on their labour force participation, and is one that underlies a good deal of the rise in married women's labour force participation since 1984. Importantly, there is no significant decline in education's influence over time, in the models estimated by this project. Education seems to be the only legacy of childhood that matters to workforce participation: None of the other family background measures that we examined had a significant effect.

This is an important result, because it suggests that omitted family background variables do not bias coefficient estimates in research on women's workforce involvement that is based on datasets lacking information on family background. Naturally, this should be regarded as a working hypothesis rather than as established fact, until it is replicated on other datasets.

The results further suggest that **being married**, on its own, does not significantly affect women's degree of workforce engagement, but that particular aspects of marriage do have such effects and/or associations. **Husband's income** has a negative association with women's workforce engagement, all else equal, whereas **husband's employment** has a positive association with women's workforce engagement, all else equal. Even in this large database, there are not enough cases to contrast the situation of women whose husbands or partners are unemployed with those who are out of the labour force. However, one could merge this dataset with HILDA to achieve a large enough number of cases for a suitable analysis.

In this report, we have contrasted married women to non-married women, but it would be very interesting in future research to extend the analyses to comparisons across a more detailed breakdown of marital statuses and living arrangements: never formally married and living alone; never formally married but de facto; formally married; divorced and living alone; divorced and de facto; widowed and living alone; widowed and de facto. Such an investigation should now be feasible, because one could combine the IsssA pooled file with HILDA to get a large enough database with the requisite variables. We have conducted some exploratory analyses which suggest that never-formally-married de facto women appear to differ rather sharply from formally divorced women in de facto relationships. Nevertheless, it is possible that such an analysis will reveal that the crucial factor in labour force engagement is not formal marriage, but rather partnering per se: One can only know by doing the analysis.

Another issue concerning marital status that should be born in mind is that formal marriage may not be an exogenous process if women and men select marriage partners in ways that are unmeasured by the survey but are relevant to the labour market. If so, then the apparent effects of husband's employment and income would really reflect the unmeasured pre-existing differences rather than having any intrinsic influence of their own. This issue could be addressed in future research via a two-pronged strategy: (1) using fixed effects models in panel data to attempt to control for unmeasured pre-existing difference; and (2) expanding the range of potentially relevant characteristics that are measured in new survey data. The presence of **young children** is a large influence on women's labour force participation and work intensity, and there is no significant decline in its effect over time.

Other influences – the gradual increase over the generations in workforce engagement, higher levels of education and the like – mean that the mothers of young children today are more deeply engaged in the workforce than were the mothers of young children 18 years ago, but, insofar as the models in this project are correct, this is because the levels of the other influences have changed, not because the effect of having young children has changed. It is also noteworthy that today's mothers of young children are more likely to have only one child, so that also elevates their participation rates relative to mothers in the 1980s and early 1990s (without the employment rates of mothers of only children changing more than those of single childless women born in the same cohorts).

The lack of an **interaction effect between time and family** variables is one of the striking findings of this paper. There is an appearance of change in the impact of family, if one merely compares workforce engagement of mothers today with mothers of 15 or 20 years ago. But that is misleading, because the change is not limited to the mothers, but is common to the cohorts as a whole. The differential according to fertility within cohorts remains. Of course, this could change in the future, and is an issue that bears continued monitoring.

To the extent that the models are correct, the **time trends** discovered by the model, particularly the rather dynamic increases from generation to generation in both participation and hours worked weekly, will continue to generate rises in workforce engagement, to the extent that they continue into the future. There were no evident time effects associated with particular policy initiatives, but some of these are too strongly correlated with time to analyse separately. Note that these cohort or "vintage" increases in employment-intensity are not due to education, nor to changes in family background over time, but to something that is not measured in our models. Discovering what this "something" is could lead to great improvements in forecasts as well as advancing knowledge.

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