Is precarious employment associated with women remaining childless until age 35 years? Results from an Australian birth cohort study

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STUDY QUESTION: Does time in casual employment (while not studying full time) affect the likelihood of a woman having a child by age 35?

SUMMARY ANSWER: Duration of time spent in casual employment is associated with an increased likelihood of childlessness at age 35 years, irrespective of socio-economic background as indicated by educational level.

WHAT IS KNOWN ALREADY: Precarious employment conditions have become increasingly prevalent in recent decades in Western countries. The relationship between precarious employment conditions and age at first childbirth has been examined in several European countries with varying results.

STUDY DESIGN, SIZE, DURATION: A retrospective cross-sectional component (n = 663) was added to an existing study based on a cohort of women born during 1973–1975. An event history calendar instrument was used to obtain data regarding a range of life domains over a 20-year period.

PARTICIPANTS/MATERIALS, SETTING, METHODS: Using data from the Life Journeys of Young Women Project carried out in Adelaide, South Australia, Cox proportional hazards models were applied to investigate the research questions.

MAIN RESULTS AND THE ROLE OF CHANCE: The likelihood of childbirth by around age 35 was reduced for every year spent in casual employment, irrespective of socioeconomic status, partner’s education and parents’ birthplace. The likelihood was reduced by 8, 23 and 35% for 1, 3 and 5 years spent in casual employment, respectively.

LIMITATIONS, REASONS FOR CAUTION: Women with longer employment histories (and greater age at first birth) had more opportunities for errors in recall, but it is unlikely that such errors were systematic and led to bias in the results. While we included variables reflecting partner’s education and length of time with a live-in partner, partner’s employment histories were not taken into account.

WIDER IMPLICATIONS OF THE FINDINGS: Duration of time spent in casual employment is associated with an increased likelihood of childlessness at age 35 years, and this association is present across the spectrum of socioeconomic status. We suggest that upstream labour market reforms could be considered in order to reduce barriers to childbearing.

Key words: casual employment / childbearing / maternal age / socioeconomic status / temporary contract

Introduction

Maternal age at first childbirth has increased in most Western countries since the 1970s (Organization for Economic Co-operation and Development, 2011). In Australia, by 2000, 10% of first-time mothers were aged >35 years (Australian Institute of Health and Welfare, 2011).

There are a number of health consequences of naturally occurring and assisted pregnancy and childbirth at an older age: for women, increased risks of pregnancy and birth complications; for the fetus, increased risks of chromosomal abnormalities and congenital anomalies (Cleary-Goldman et al., 2005). Postponing childbearing increases the likelihood that women will have fewer children than desired or no children at all
(Lattimore and Pobke, 2008). It is therefore important to understand barriers to starting a family, particularly those who may be amenable to policy change.

Macro-societal factors that affect individuals’ economic security, such as the extent of unemployment and business/industrial relations, may be important determinants of the timing of childbirth. Having children is associated with feeling secure about one's financial future (McDonald, 2000a), so it has been proposed that in situations of economic uncertainty women (together with their partners) delay making long-term commitments, such as the decision to start a family (McDonald, 2000a; Billari et al., 2002; Mills and Blossfeld, 2005). This may not apply to some women from disadvantaged backgrounds who become mothers, outside of a committed relationship, at a young age. These women often have transient and fragile relationships with the men with whom they became pregnant; others reject the baby’s father for inappropriate behaviour or simply do not wish to be bound to him (McDermott and Graham, 2005). Such women choose single motherhood because there are few other ways to gain security and create meaning in their lives, with job opportunities very limited. Through motherhood, they seek to affirm their status as adults and build a world around a loving relationship with their child (Friedman et al., 1994; McDermott and Graham, 2005).

Precarious employment conditions, arguably a form of economic uncertainty, may be an important pre-cursor of older childbearing. Precarious employment is a sociological construct defined for our purpose as the lack of regulations that support ‘standard’ employment (Hadden et al., 2007). In Australia, standard employment means holding a job on an on-going basis, with access to paid annual, sick and long service leave. In contrast, a fixed-term contract means the job has an expiry date and the employee may not have access to all types of paid leave (e.g. a high school teacher with a 1-year contract). An individual working under casual employment conditions is paid only for hours worked, set by the employer (e.g. bar staff and waiters, rostered staff in a child care centre), with no other employee rights and benefits (Australian Bureau of Statistics, 2007). Casual employment is known as ‘temporary contract’ in many Western countries, and has become increasingly prevalent (Watson et al., 2003; International Labour Organization, 2011). In Australia, the proportion of the labour force in casual employment escalated in the early 1980s, reaching 16% in 1984 and 28% in 2003 (Campbell, 2004).

The relationship between precarious employment and the timing of childbirth has been examined in several European countries with varying results (e.g. Francesconi and Golsch, 2005; Liebkoer, 2005; Santarelli, 2011; Lundström and Andersson, 2012; Schmitt, 2012). Many studies include socioeconomic status as a covariate and do not explicitly explore how any relationship between precarious employment and age at first childbirth differs between socioeconomic groups (e.g. Francesconi and Golsch, 2005; Liebkoer, 2005). Pailhe and Solaz (2012) is a notable exception in that they found precarious employment reduced the likelihood of motherhood in the succeeding year, and that the effect of precarious employment on timing of birth was greater for women with higher levels of education.

We hypothesized that, in Australia, longer time spent in casual employment (as the main job) will decrease the likelihood of having a child by age 35 years, taking into account the socioeconomic status of the woman and her partner, the time spent in cohabiting relationships and migrant background.

**Materials and Methods**

**Study population**

The study was based on data collected from a cohort of Australian women for the Life Journeys of Young Women Project (LJYWP), which has been described previously (Steele et al., 2011). The LJYWP study sample was drawn from a cohort (n = 974) assembled from female babies born 1973–1975 at a large hospital in Adelaide, South Australia (see March et al., 2010).

Women included in the LJYWP were born in Adelaide, the fourth largest city in Australia at that time. While a selected sample, they are similar to all women born in South Australia between 1973 and 1975, and South Australia was demographically similar to Australia overall in the 1970s (from Australian Bureau of Statistics, 1977). Of note, the ‘white Australia’ migration policy was in place from 1901 to 1973. This policy favoured immigration from certain European countries, especially the UK, creating an ethnically narrow population, even after its formal abolition (Windschuttle, 2004). Thus in the 1970s, ethnic differences between Australian states were not marked.

All cohort members were invited to participate in the LJYWP and interviews were conducted in 2007–2009, when participants were aged between 32 and 35 years old. For the present analyses, women who identified as non-heterosexual were excluded (n = 15). The LJYWP was approved by the Human Ethics Committee of the University of Adelaide and all participants gave written informed consent. All study procedures conformed with the Declaration of Helsinki.

**Study design**

The LJYWP was a cross-sectional study in which life-course data were collected retrospectively in event history format (Blossfeld and Rohwer, 2002). An event history calendar instrument was used to obtain dates regarding a range of life domains including relationships, childbirth and employment. The calendar captured information from the age of 15 years to the time of the study interview. Fifteen years of age was chosen as the starting point for recall because it was the minimum age of school leaving for this cohort. It is also the conventional age of the beginning of fecund life for a woman. Interviews were usually conducted over the telephone. A simplified version of the calendar was sent to each participant prior to interview.

**Statistical analyses**

**Outcome variable**

The outcome was age at first childbirth minus 1 year (for mothers) or age at study interview (the ‘censoring’ time for non-mothers). Age was lagged for mothers, consistent with other studies (Adsera, 2011), to reflect the timing of conception rather than the birth itself.

**Exposure variable**

An exposure variable was constructed that described the total time spent in casual employment over the period of observation, which started in the month that participants turned 15 years old and ended in the month of first birth or censoring. Each month was categorized according to the participant’s employment arrangement (casual, fixed-term contract, permanent, self-employed, unemployed, not in the labour force or in full-time study). When a participant had concurrent jobs, the main job—the job that paid the most money—was used for classification purposes. If a participant was studying full time, she was considered to be a student and employment during this period was not taken into account. The total number of months spent in casual employment over the period of observation was calculated and divided by 12 so that the variable was expressed in years.
Covariates
We used educational attainment as the indicator of socioeconomic status in the analyses, as it is considered especially appropriate for women and is largely free from problems of reverse causation that may affect other indicators, such as occupation (Braveman et al., 2005). In a life-course study, a major consideration with using other indicators, such as occupation or income, is the stage of life to which the indicator relates. We wanted to characterize socio-economic status of women when they embarked on adulthood (not when they were aged 35). Occupation and income in early adulthood are unstable, while father’s occupation is problematic for migrant families. Hence, we used (own) educational attainment as the indicator, categorized as some high school, completed high school, Technical and Further Education (TAFE) qualification (known in some countries as Polytechnic, Vocational Technical College or Community College) or university qualification.

Time spent in live-in relationships, partner’s highest educational attainment and parents’ birthplaces were identified as covariates most likely to affect the relationship between employment patterns and age at first childbirth (Yusuf, 1986; Jain and McDonald, 1997; McDonald, 2000b; de Vaus, 2002). Time spent in live-in relationships (de facto or married) up to age at first birth or age of censoring was categorized as none, < 4.5 or 4.5 years or more. We included partner’s highest educational attainment at outcome as an additional covariate to take into account the effect of a partner’s resources on the timing of first birth. Partner’s educational attainment was classified using the same categories as for the women. Parental birthplace was classified as having neither parent born overseas (that is, outside of Australia) or at least one parent born overseas (neither parent born overseas assumed for 11 women). Migrant families often place especially high importance on family formation (Yusuf, 1986), so that women with at least one overseas born parent may be more likely to have a child, and at a younger age than other women.

Time spent in the labour force was also included in statistical models to recognize that participants were only ‘at risk’ of casual employment during periods they were in the labour force (which includes periods seeking employment; Australian Bureau of Statistics, 2007). A continuous variable representing the total years spent in the labour force was constructed as the sum of time spent unemployed, self-employed, and in casual, fixed-term contract and permanent employment. A categorical variable (split at median: ≤ 9 years, > 9 years) was then created to be used in examining the assumption of proportional hazards for time spent in the labour force (see the section Analytical methods).

Analytical methods
Our formulation of the research questions (and statistical model) was in accordance with an ‘accumulation hypothesis’ from a life-course perspective (Kuh et al., 2003), wherein the total duration of time in casual employment, collated across episodes, is the relevant exposure. Thus, time-constant models were appropriate, and accordingly, the effect of each additional year spent in casual employment on the likelihood of having had a child by age 35 was examined by fitting Cox proportional hazards regression models. Linear and quadratic terms for the number of years in casual employment were included in the fitted models. The effect of educational attainment on any relationship between time in casual employment and age at first birth was then examined through the inclusion of interaction terms. Log-likelihood ratio tests were used to ascertain if there was a significant difference between the models with and without the interaction term, and with and without the quadratic and linear component of casual employment duration. Time in the labour force, in live-in relationships, and parental ethnicity were included as categorical variables in all models. In all analyses, the assumption of proportional hazards was assessed using a graphical method proposed by Grambsch and Therneau (1994).

Results
Of 974 cohort members, 970 were subsequently eligible to participate in the LJYWP and 663 completed an LJYWP interview, resulting in overall participation of 68%. LJYWP participants were similar to the remainder of the cohort in terms of marital status and parents’ birthplace, but LJYWP participants were somewhat more likely to be employed, have a university qualification and have lived in a more advantaged area when in primary school (Steele et al., 2011). Five participants were excluded from analyses because they had their first child before the age of 15 and a further 15 women were excluded as they self-identified as non-heterosexual. Thus, 643 participants formed the analysis sample.

At the time of interview, 442 (67%) of the analysis sample had given birth to at least one child, and the remaining 201 women were nulliparous. Characteristics of the women at the time of the study interviews and at the time of censoring are shown in Table I. The majority of women at the time of censoring or birth of first child was permanently employed, and a further 11% were casually employed. Almost one-third of women held a university qualification and 75% were in a live-in relationship at that time.

Around one-third of the women (n = 225) had spent no time in casual employment (while not studying full time). As shown in Fig. 1, the distribution of time spent in casual employment was heavily left skewed. The median time spent in casual employment was 1.4 years (range 1 month to 17.4 years).

Table II summarizes participants’ time in casual employment by level of educational attainment. Around two-thirds of participants in each educational group spent some time in casual employment.

It is notable that among the university educated women who spent any time in casual employment, 127 (61%) worked casually in their main job after they completed their first university qualification (median duration 1.2 years, range 1 month to 9.8 years); 30% of these were managerial or professional (as classified by the Australian and New Zealand Standard Classification of Occupations; Trewin and Pink, 2006). Of these women, 35% (n = 45) were working casually in their main job 2 or more years after graduation.

By the time of first birth or censoring, 112 participants (17%) spent no time in live-in relationships. The median time for other participants was 4.5 years (range 1 month to 16.6 years).

In fitting the Cox proportional hazards models, the assumption of proportional hazards was not met for time spent in the labour force and live-in relationship variables. Therefore the models were stratified, with separate baseline hazard functions estimated for these variables. The assumption of proportional hazards was met in the final (stratified) model. Neither the interaction between educational attainment and
years in casual employment nor the quadratic term associated with casual employment were statistically significant in the final model, which included the number of years of casual employment, parents’ birthplace, partner’s educational attainment and educational attainment. The HRs and 95% CIs associated with each term in the final model are presented in Table III. Our results show that the likelihood of having had a child by around age 35 was reduced by 8% for a year spent in casual employment in the period of observation, in all educational groups; for 3 and 5 years, the reduction was 23 and 35%, respectively.

Discussion
This study considered the association between time spent in precarious employment arrangements (while not studying full time) and age at first birth for different socioeconomic groups (as indicated by education). The results suggest that a greater amount of time spent in casual employment is associated with a lower likelihood of having a child by age 35 years, across the range of socioeconomic circumstances, and taking relationship status, partner’s education and parental birthplace into account.

Our results, based on a selected cohort of women born in Adelaide in the early 1970s, support the proposition that economic uncertainty, and specifically one form of precarious employment, is associated with a delay in family formation. Our findings suggest that, regardless of their socioeconomic circumstances, women generally aspire to economic security prior to starting a family. This finding is important because it challenges the pervasive media representations of delayed childbirth as a phenomenon arising from highly educated women choosing to delay motherhood to focus on their careers (Singer, 2005; Shaw and Giles, 2009).

A recent French study investigated how employment histories, including periods of temporary employment, affected the timing of first birth. 

![Figure 1](https://example.com/image1.jpg)

**Table I** Characteristics of 643 participants in the Life Journeys of Young Women Project at the time of censoring and at the time of interview.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Time of censoring</th>
<th>At the time of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1 year before child birth or interview), n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>402 (62)</td>
<td>309 (48)</td>
</tr>
<tr>
<td>Fixed-term contract</td>
<td>42 (7)</td>
<td>46 (7)</td>
</tr>
<tr>
<td>Casual</td>
<td>73 (11)</td>
<td>82 (13)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>33 (5)</td>
<td>35 (9)</td>
</tr>
<tr>
<td>Full-time student</td>
<td>32 (5)</td>
<td>19 (3)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>29 (5)</td>
<td>7 (1)</td>
</tr>
<tr>
<td>Not in labour force</td>
<td>32 (5)</td>
<td>125 (19)</td>
</tr>
<tr>
<td>Highest level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school not completed</td>
<td>57 (9)</td>
<td>57 (9)</td>
</tr>
<tr>
<td>Only high school completed</td>
<td>198 (31)</td>
<td>89 (14)</td>
</tr>
<tr>
<td>TAFEa completed</td>
<td>190 (29)</td>
<td>290 (45)</td>
</tr>
<tr>
<td>University completed</td>
<td>198 (31)</td>
<td>207 (32)</td>
</tr>
<tr>
<td>Partnering statusb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>158 (25)</td>
<td>117 (18)</td>
</tr>
<tr>
<td>Defacto</td>
<td>182 (28)</td>
<td>145 (23)</td>
</tr>
<tr>
<td>Married</td>
<td>301 (47)</td>
<td>379 (59)</td>
</tr>
<tr>
<td>Parents’ ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both parents born in Australia</td>
<td>312 (49)</td>
<td>312 (49)</td>
</tr>
<tr>
<td>≤1 parent born in Australia</td>
<td>331 (51)</td>
<td>331 (51)</td>
</tr>
<tr>
<td>SEIFA score when woman was in primary school (mean, SD)</td>
<td>980 (80.0)</td>
<td>980 (80.0)</td>
</tr>
</tbody>
</table>

SEIFA, socioeconomic index for areas (indicator of relative socioeconomic disadvantage).

aTechnical and further education.

b2 women declined to answer questions about partnering status, defacto = cohabiting but not legally married.

![Table II](https://example.com/image2.jpg)

**Table II** Summary of participants’ years in casual employment as their main job from the age of 15 years to age 1 year before first birth or censoring.

<table>
<thead>
<tr>
<th>Highest level of educational attainment (n)</th>
<th>Spent time in casual employment, n (%)</th>
<th>Years in casual employment for participants who spent any time, median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school (57)</td>
<td>34 (60)</td>
<td>1.25 (0.08–8.83)</td>
</tr>
<tr>
<td>Completed high school (89)</td>
<td>56 (63)</td>
<td>1.38 (0.08–11.33)</td>
</tr>
<tr>
<td>TAFEa (290)</td>
<td>201 (69)</td>
<td>1.67 (0.08–17.42)</td>
</tr>
<tr>
<td>University (207)</td>
<td>127 (61)</td>
<td>1.17 (0.08–9.83)</td>
</tr>
</tbody>
</table>

aWhilst not studying full time.

bTechnical and further education.
Precarious employment and maternal age

While women with longer employment histories (and older age at first birth) had more opportunities for errors in recall, it is unlikely that such errors were systematic and led to bias in the results (Steele et al., 2011). Additional research is required, in Australia and other settings, to deepen our understanding of the barriers to family formation that arise through societal structures. Current policy responses generally provide financial and other support to parents after they have children; there remains a need to develop complementary policies to facilitate the ability of couples to commit to family formation.

In summary, this study has shown that the duration of time spent in casual employment is associated with an increased likelihood of childlessness at age 35 years, in a cohort of Australian women, and this association is present across the spectrum of socioeconomic status. Since all socioeconomic groups are implicated, we suggest that upstream labour market reforms could be considered in order to remove barriers to childbearing.

**Acknowledgements**

The authors wish to thank the women who participated in the LJYWP, without whom this study would not have been possible. The authors also thank Kendall Smith and Nanette Kretschmer for study coordination; Carol Hunter, Hong Le, Nadine Levy, Amelia Russin, Rebecca Short and Dr Tanya Zivkovic for conducting study interviews; the many staff members involved in database construction and data entry and Professor Philip Ryan for PhD panel membership.

**Authors’ roles**

M.J.D. and V.M.M. were the principal investigators of the LJYWP. Together with E.J.S., they formulated the research question reported in the manuscript and directed its implementation. E.J.S. and L.C.G. drafted the statistical analysis plan and L.C.G. conducted the statistical analyses. All authors contributed to interpretation of analyses, drafting the article and critically revising the important intellectual content of the manuscript. All authors have approved the final version of the manuscript submitted for publication.

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**Conflict of interest**

None declared.

**References**


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### Table III HR and 95% CI from final fitted Cox proportional hazards model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual employment (years)</td>
<td>0.92</td>
<td>0.87–0.97</td>
</tr>
<tr>
<td>Highest educational attainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not completed high school (referent)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Completed high school</td>
<td>0.56</td>
<td>0.38–0.81</td>
</tr>
<tr>
<td>Completed TAFE*</td>
<td>0.40</td>
<td>0.29–0.56</td>
</tr>
<tr>
<td>Completed University</td>
<td>0.17</td>
<td>0.12–0.25</td>
</tr>
<tr>
<td>Parent’s place of birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both in Australia (referent)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>None or one in Australia</td>
<td>0.77</td>
<td>0.64–0.94</td>
</tr>
<tr>
<td>Partner’s highest educational attainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not completed high school (referent)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>No partner</td>
<td>0.40</td>
<td>0.24–0.68</td>
</tr>
<tr>
<td>Completed high school</td>
<td>0.95</td>
<td>0.62–1.46</td>
</tr>
<tr>
<td>Completed TAFE*</td>
<td>1.11</td>
<td>0.81–1.52</td>
</tr>
<tr>
<td>Completed University</td>
<td>0.72</td>
<td>0.49–1.07</td>
</tr>
</tbody>
</table>

*Model is stratified by time spent in live-in relationship and time spent in the labour force.  
Technical and further education.*

(Pailhe and Solaz, 2012). In accord with our findings that study showed that being in precarious employment reduced the likelihood of motherhood in the succeeding year, but these authors also found that the effect of precarious employment on timing of first birth was greater for more highly educated women than those with lower levels of education.

Casual employment has typically been most common for individuals working in low-skill occupations, and this remains the case in Organization for Economic Co-operation and Development countries (International Labour Organization, 2011). However, there has been an increase in the prevalence of such arrangements (as well as in subjective job insecurity) in high-skilled occupations, at least in some countries (Pailhe and Solaz, 2012). In accord with our findings that study showed that working in low-skilled occupations, and this remains the case in Organ-

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McDonald P. Low fertility in Australia: evidence, causes and policy responses. People Place 2000b;8:6 – 21.


