Lifecourse Pathways and Housework Time: Australia and the United Kingdom

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Abstract

It is well-known that pathways through the lifecourse have changed in recent years. People are marrying later, having fewer children, living together in cohabiting relationships, separating and divorcing more frequently. These changes have consequences for understanding the organisation of domestic work. Although much previous work on domestic labour has focused on married couples, it is becoming increasingly clear that we need to consider how housework patterns vary at different stages of the lifecourse and in different kinds of households. This is important not just because research has shown that previous relationship experiences will affect the ways in which individuals and couples organise domestic labour in their current households. Our earlier work has shown that lifecourse events have a much greater affect on women's housework time than men's. But this research has focused on Australia, a country that has relatively low levels of institutional and cultural support for gender equality at home. In this paper we examine data from the Households, Income and Labour Dynamics in Australia (HILDA) survey and the British Household Panel Study (BHPS) to investigate the impact of lifecourse pathways on domestic labour time. Our aim is to, first use HILDA to identify the joint influence of unobserved factors on the processes described above; second, to determine whether there is a selection effect from cohabitation into marriage, for women and men who are more prone to higher levels of domestic work; and third, to examine whether these patterns are more widespread by comparison with the UK, a country with broadly similar institutional and cultural features to Australia. We take a multilevel, multiprocess modelling approach. A simultaneous-equations model is used to jointly examine the relationships between time on domestic labour and the birth of a child, the transition from cohabitation to marriage and the dissolution of a union to allow for correlation between unobserved partner and person characteristics that impact on each process.

It is well-known that pathways through the lifecourse have changed in recent years. People are marrying later, having fewer children, living together in cohabiting relationships, separating and divorcing more frequently. These changes have consequences for understanding the organisation of domestic work. It is becoming increasingly clear that we need to consider how housework patterns vary across different kinds of households and in response to different life course pathways. This is important not just because we need to acknowledge household diversity, but because research has shown that prior relationship experiences and events will affect the ways in which individuals and couples organise domestic labour in their current households.

Our earlier work has shown that lifecourse events have a much greater affect on women's housework time than men's (Baxter, Hewitt and Haynes, 2008). Women's housework hours vary considerably in relation to marital, parental and employment status with women generally increasing their hours in response to the formation of partnerships and the arrival of children, typically in combination with a reduction in paid work hours outside the home. Men on the other hand perform much the same number of housework hours regardless of marital, parental or employment status. For this reason, in the current paper we focus on women, examining changes in women's housework hours in relation to marital and parental transitions.

Further, in this paper we go beyond the single process model to consider the selection of women into and out of partnerships, and into parenthood with regards to the amount of housework hours they do. We know that the processes influencing women's time on housework will be linked to decisions about union formation and dissolution and decisions about fertility. But to date there have been no attempts to jointly model these processes. In this paper we jointly model the processes of union formation and dissolution, fertility and housework hours using a

multiprocess, multilevel model. This allows us to examine the extent to which these processes are linked and jointly determined by observed and unobserved factors. For example, are women who do more housework prior to forming a union more likely to do more housework after the union? Or do women respond to union formation by increasing their housework hours regardless of their level of involvement in housework prior to the union? Similarly, are women who do less housework when married more likely to separate? We can ask similar questions about fertility and housework. We know that having a child leads to more time on housework for women, but we do not know if the decision to have a child is influenced by how much time women spend on housework prior to childbirth. The models in this paper allow us to address these kinds of questions.

We examine data from the Households, Income and Labour Dynamics in Australia (HILDA) survey and the British Household Panel Study (BHPS) to investigate these questions. Our aim is to first identify the joint influence of unobserved factors on the processes described above; second, to determine whether there is a selection effect from single into a union and into parenthood for women who are more prone to higher levels of domestic work; and third, to examine whether these patterns are similar across Australia and the UK, countries with broadly similar institutional and cultural features.

To analyse prospective data from each country we take a multilevel, multiprocess modelling approach. This method is now possible for examining pathways through the lifecourse in Australia with the availability of six waves of HILDA survey data in 2008. A simultaneous-equations model is used to jointly examine the relationships between time on domestic labour and the birth of a child, the transition into a union and the dissolution of a union to allow for correlation between unobserved partner and person characteristics that impact on each process.

Life Course Pathways and Housework Time

Understanding the amount of time men and women spend on housework has been an important research area for sociologists for at least the last two decades (for a review of over 200 articles and books on the topic see Coltrane 2000). Most of this research has focused on explaining the division of labour between husbands and wives with most showing that wives perform, on average, about two or three times as much housework compared to husbands (Coltrane 2000). Although there is evidence from cross-sectional studies over time that men have increased their time on domestic labour while women's time on domestic labour has decreased, there is still a significant gap in the time that men and women spend doing core household duties (Bianchi et. al. 2000; Sayer 2005). This gap has important consequences for women's ability to participate fully in paid market work and to pursue full-time careers and employment outside the home. We also know that women's greater responsibility for routine housework activities is a key factor increasing their overall workloads, and feelings of time pressure and strain (Hochschild, 1997).

Increasingly researchers are examining housework patterns in non-marital households. As patterns of family formation and dissolution become more varied and complex we need to understand how men and women organise housework in a range of different household types. Most of this research has been done on cross-sectional data comparing housework hours across different household types (South and Spitze 1994), but there is also some research beginning to appear that uses longitudinal data to examine how housework hours vary in relation to lifecourse transitions (Gupta 1999; Sanchez and Thomson 1997; Baxter, Hewitt and Haynes, 2008).

Gupta (1999) examined the impact of marital status transitions on changes in men's and women's time on housework using two waves of the National Survey of Families and

Households (1987-1988 and 1992-1993). This study was the first to use national longitudinal data to examine changes in housework hours in relation to marital status transitions. His main finding is that men substantially reduce their time on housework when they enter a coresidential union, while women increase theirs when they form a union (1999: 709). Moreover the form of the union is not important. Never married men decrease their time on housework when they enter a cohabiting or married relationship by about the same amount, while women increase their time on housework by the same amount regardless of whether they are cohabiting or marrying. Interestingly exit from a cohabiting relationship did not affect either men or women's housework hours, but exit from marriage did have a significant effect with separated or divorced men increasing their housework hours by about 5 hours per week and separated and divorced women decreasing their housework hours by about 3 hours per week. Gupta concludes that the formation of households with adult partners of the opposite sex is of significant advantage to men and disadvantage to women with respect to housework hours (1999: 711).

In our earlier work using data from the first two waves of the Negotiating the Lifecourse Project (1996/97 and 2000) we investigated the effect of marital and parenthood transitions on the time men and women spend on core housework tasks (Baxter, Hewitt and Haynes 2008). We found considerable gender differences with women reporting significantly more hours of domestic labour than men regardless of marital or parenthood status. Moreover we found that the birth of a first child or a higher order birth resulted in a significant increase in women's housework hours. The transition from cohabitation to marriage on the other hand resulted in only a slight increase in women's time on housework. For men the patterns were virtually the opposite. Men's time on housework showed considerable stability across both life course transitions, but we did find evidence that men's housework hours declined slightly as more

children were born. This finding in conjunction with the results for women showed that the gender gap in housework time widens just at the point in the lifecourse when the demand for time on domestic work increases.

The only transition that led to a significant increase in men's time on housework was the transition from married to separated. Like Gupta (1999) we found that separation from a marital union almost doubled men's time on routine housework from approximately 7 hours per week to approximately 13 hours per week on average. This implies that the absence of a female partner forces men to take on chores that they otherwise would not do. In contrast, the transition from married to separated resulted in less time on housework for women, although the result for women was not statistically significant.

In an additional paper using data from the first 3 waves of the HILDA project (2001, 2002 and 2003) we focused specifically on the transition from single to married, comparing those who married directly without a period of cohabitation and those who married indirectly via a period of cohabitation (Baxter, Haynes and Hewitt 2005). Our aim in this paper was to investigate how a period of time spent in cohabitation might impact on time on housework after marriage. Once again we found clear gender differences in the amount of time that men and women spend on housework, and also in the effect of lifecourse transitions on men's and women's housework time. For men spending time in a cohabiting relationship was irrelevant in terms of the amount of time they spent on housework after marriage. For some women on the other hand, spending time in a cohabiting relationship was associated with fewer hours of housework after marriage compared to women who married directly. We concluded that the gender division of labor is developed well before the formation of a union and that the pathway

to marriage has a relatively small effect on the patterning of housework arrangements after marriage for women, and no effect for men.

While these previous longitudinal studies offer some important insights into the association between transitions into and out of relationships and changes in time spent in housework, some questions about selection and causality remain. For example, the amount of housework that a single woman does may be influenced by her aspirations to domesticity, while the association between the amount of time spent on housework and household income may differ for a single woman compared to a married woman, if neither have children. If a single woman earns more income then she may spend less time at home and have less reason to spend much time on housework while a married woman may still need to spend more time on housework, particularly if the higher income is earned by her partner. Housework hours are also influenced by the birth and presence of children and may vary with the presence of a partner in the household and the type of relationship. The transition through marital states is also a process that is influenced by some of the factors that affect housework, such as birth and income, and other possibly unobserved factors.

We consider the time spent on housework as a process that is influenced by both observed and unobserved factors related to a woman's characteristics or circumstances, and in varying degrees by the same factors depending on current marital status and transition from a previous marital status. Partnership transitions and fertility have been analysed as two related multistate processes by Steele et al. (2005, 2006) and others (e.g. Upchurch et al. 2002) using event-history data. They jointly model these processes using a system of simultaneous equations with co-varying random effects. In this paper we consider time spent on housework and marital

transitions as two related processes and analyse six waves of comparative data from both the HILDA and BHPS surveys. We address two key questions:

1. What is the effect of a marital status transition on women's time on housework?
2. Is there a selection effect of women who are more prone to domestic labour into marriage compared to cohabiting relationships (or into stable relationships)?

Methods

Data and sample

Our Australian data come from the first 6 waves of The Households, Income and Labour Dynamics in Australia (HILDA) survey collected between 2001 and 2006. Wave 1 comprised 7,682 households and 13,969 individuals. Households were selected using a multi-stage sampling approach, and a 66% response rate was achieved (Watson and Wooden 2002). Within households, data were collected from each person aged over 15 years (where available) using face-to-face interviews and self-completed questionnaires, and achieved a 92% response rate of household members (Watson and Wooden 2002). By wave 6, 70% of the original sample had been retained. Our British data come from the British Household Panel Study (BHPS). Wave 1 was collected in 1991 with 5,505 households and 10,264 individuals. Similar to HILDA, households were selected using a multi-stage sampling approach with a 65% response rate for households and within households 95% of eligible respondents were interviewed (Lynn 2006; Taylor, Brice, Buck, and Prentice-Lane 2009). The BHPS is a much more mature panel than the Australian study, so for comparability we use waves 11 to 16, which coincide with the first 6 years 2001 – 2006 of the Australian panel. By wave 16, 48.8% of the original panel had been retained (Taylor, Brice, Buck, and Prentice-Lane 2009). In the current study our analysis is for women of all marital statuses, but we exclude women who were widowed either prior to entering

the sample or at any time prior to collection of the last wave in the sample. This exclusion was considered necessary as the circumstances and consequences of the death of a partner will be different to those of other forms of partnership dissolution. We further restrict the HILDA and BHPS samples to women who have completed all six waves of the survey during 2001-2006. We acknowledge that some proportion of women will have left the survey prior to and during this time period leading to possible bias in the results towards those women who do not leave or drop out. However, because we compare results from both Australia and Britain we have chosen to consider women who remain in the survey across at least six waves. In subsequent research we plan to more fully investigate the characteristics of women who drop-out of the survey over time and will analyse the longitudinal data for all women while accounting for drop-out and other forms of missing data. To control for housework hours in the previous wave, the model that we use includes a term for lagged housework hours. We therefore report summary statistics below for the five waves of data collected from 2002-2006.

In the HILDA sample there were 4,266 women who completed the survey for all five waves. Of these women, 14 had missing data on either housework hours or marital status at all waves and hence 4,252 women were included in the final sample. Many of these women also had missing data on the dependent variables for one to four waves leading to the final number of observations or person-years of 19,886. Following a similar process, 5,374 women with 26,267 observations were included in the final BHPS sample.

Measures

Both HILDA and BHPS collect a range of measures to do with time use and many of the measures are comparable across the studies.

Housework Hours

The outcome measure is hours spent doing housework each week. The questions in each survey are very comparable. In HILDA the question asked respondents how many hours they would spend in a typical week on housework (including preparing meals, washing dishes, cleaning house, washing clothes). In the BHPS the question asked "about how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry?" We also include a lagged measure for housework hours, this enables us to control for housework hours in the previous wave.

Relationship transitions

In both HILDA and BHPS respondents were asked their current marital status at each wave, including married, cohabiting (living together but not legally married), separated, divorced, widowed and never married (the BHPS also included common law unions). Excluding common law unions and the widowed we collapse marital status at each wave to three relationship states: Married, Cohabiting and Single (including never married, separated and divorced). We identify 8 transitions of interest between these relationship states: married – married; married – single; cohabiting – cohabiting; cohabiting – single; cohabiting – married; single – single; single – married; and single – cohabiting.

Children

We include 2 measures for children. The first is a categorical measure for the number of dependent children (defined as 18 and under), including 1 = no children, 2 = 1 child, 3 = 2 children, and 4 = 3 or more children. The second measure indicates whether the respondent had a birth between waves with 1 = no birth, 2 = first birth, and 3 = higher order birth. These measures were identical for HILDA and BHPS.

Controls

We include a range of controls that have been found to be associated with housework and relationship transitions. Measures indicating age of respondent and age squared are included. We also control for household income. Education is indicated by bachelor degree or higher (1 = yes). Our measure for employment status indicates 1 = not employed, 2 = employed full time, and 3 = employed part time. All of these measures are time varying and are identical for BHPS and HILDA. We also include measures of gender role attitudes, but these measures differ slightly between the surveys. The measure from the BHPS is based on responses to the statement "A husband's job is to earn money; a wife's job, is to look after the home and family." Responses range from 1 strongly agree to 5 strongly disagree. This is asked bi-annually. In HILDA respondents were asked to indicate their level of agreement with the statement "It is much better for everyone involved if the man earns the money and the woman takes care of the home and children", ranging from 1 strongly disagree to 7 strongly agree; this measure was asked in waves 1 and 5. The BHPS measure was reverse coded so that a higher score indicated a higher level of agreement. Descriptive statistics on the dependent and independent variables are shown in Table 1.

(TABLE 1 ABOUT HERE)

Models

In previous research, with availability of only two and three waves of HILDA data, we have modelled time spent on housework as a single process across the different marital states of single, cohabiting and married and have used linear mixed models with random intercepts to analyse the change in time on housework with transitions into and out of these partnerships for both men and women (Baxter et al. 2005, 2008). This is also a multilevel model with a two-level hierarchical structure where repeated observations are considered to be clustered within

individuals. The random intercept allows us to capture time-constant between-individual variation. With logged housework hours as the dependent variable we included both the current marital status and the marital status in the previous wave using a lagged variable and an indicator of birth as covariates in the model while controlling for important demographic and socio-economic characteristics.

This previous work is extended here by analysing time spent on housework as a process that is influenced by both observed and unobserved factors relating to individual characteristics and circumstance and allowing the process to vary according to marital status. The formation and dissolution of partnerships is also analysed as a multistate process that may be influenced by measured covariates and unobserved factors that measure a woman's propensity to spend time on housework, or in other words, her degree of domesticity. For each woman in the sample data, we observe measures for housework hours and marital status on up to five occasions and we also observe when a marital transition representing a partnership formation or dissolution occurs. Because we have repeated observations on each woman, and a transition can occur more than once for a woman, then housework hours and transitions are nested within individuals and an approach using a multilevel model specification is appropriate. In our sample data from HILDA, just over 1,000 marital transitions are observed and for the BHPS sample data just over 1,200 marital transitions are observed (see Table 2).

(TABLE 2 ABOUT HERE)

In an approach similar to that taken by Steele et al. (2005, 2006) among others, we use a multilevel multiprocess model where a system of regression equations with random coefficients is estimated simultaneously. Whereas Steele et al. specify a system of discrete-time hazards models, our multiprocess model includes a linear mixed model and several multinomial logit

models with random intercepts (Pettitt et al. 2006). The model for logged housework hours (Model 1) includes an indicator variable for each of the three marital states and the indicator variables are interacted with each covariate in the model. Random coefficients are specified for the indicator variables. Three additional models are specified separately for transitions into a partnership (Model 2: from the single state to cohabiting or married), for transitions out of a cohabiting partnership (Model 3: from the cohabiting state to married or single) and for transitions from the married state to single (Model 4). We analyse the likelihood of a transition occurring at any point in time and hence Models 2 and 3 are multinomial logit models with random intercepts and Model 4 is a binary logit model with a random intercept. For Models 2-4 the reference outcome is no transition. The model specification is similar for the analysis of both HILDA and BHPS data and is formulated below.

Model 1: A linear mixed model for housework hours with random coefficients on indicator variables for single, cohabiting and marriage states (statuses). All covariates are interacted with the state indicator variables.

$$\ln(Y)_t =$$

$$b_0^s + b_1^s Age_s + b_2^s Age_s{}^2 + b_3^s Income_s + b_4^s Attitude_s + b_5^s Degree_s + b_6^s One\_child_s + b_7^s Two\_children_s +$$
$$b_8^s More\_children_s + b_9^s First\_birth_s + b_{10}^s Higher\_birth_s + b_{11}^s FTemp_s + b_{12}^s PTemp_s + b_{13}^s Cohab\_trans_s$$
$$b_{14}^s Married\_trans_s + b_{15}^s \ln(Y)_{s,t-1} + \alpha[1,1] +$$

$$b_0^m + b_1^m Age_m + b_2^m Age_m{}^2 + b_3^m Income_m + b_4^m Attitude_m + b_5^m Degree_m + b_6^m One\_child_m + b_7^m Two\_children_m +$$
$$b_8^m More\_children_m + b_9^m First\_birth_m + b_{10}^m Higher\_birth_m + b_{11}^m FTemp_m + b_{12}^m PTemp_m + b_{13}^m Single\_trans_m +$$
$$b_{14}^m \ln(Y)_{m,t-1} + \alpha[1,2] +$$

$$b_0^c + b_1^c Age_c + b_2^c Age_c{}^2 + b_3^c Income_c + b_4^c Attitude_c + b_5^c Degree_c + b_6^c One\_child_c + b_7^c Two\_children_c +$$
$$b_8^c More\_children_c + b_9^c First\_birth_c + b_{10}^c Higher\_birth_c + b_{11}^c FTemp_c + b_{12}^c PTemp_c + b_{13}^c Single\_trans_c$$
$$b_{14}^c Married\_trans_c + b_{15}^c \ln(Y)_{c,t-1} + \alpha[1,3]$$

The variable Y is used to denote housework hours and $t = 1,\ldots,5$ indicates the current wave number. All covariates are interacted with the state indicator variables. The fixed regression constants and coefficients are denoted b_l^k where the superscript *k* denotes the marital status: s = single, c = cohabiting, m = married and $l = 0, 1,\ldots, 15$ is a variable specific number corresponding to each of the explanatory variables in the model. The explanatory variables included and interacted with the indicator variables are age, square of age, household income ($'0,000), attitude to males being the main bread-winner, dummy variable for having a bachelor degree, dummy variables for one child, two children and three or more children (no children is the reference), dummy variables for first birth and higher order birth since last wave (no birth is the reference), dummy variables for full-time and part-time employment (no employment is the reference) and whether a transition has occurred. The subscript *k* for each of the variable names indicates that the variable has been interacted with the indicator variable for the corresponding marital status. The term $\alpha[1, j]$ represents the individual-specific random intercept term associated with Model 1 and marital status j and is specified to have a normal distribution with mean zero and variance σ_{1j}^2.

Model 2: A multinomial logit model for transitions out of the single state with no transition as the reference category and a random intercept for each transition. The variable Z_1 denotes the marital status $p = 0, 1, 2$ into which a transition is being made, where 0 = no transition, 1 = cohabiting, 2 = married.

$$\ln\left(\frac{\Pr(Z_1 = p)}{\Pr(Z_1 = 0)}\right) =$$

$$g_0^p + g_1^p Age_p + g_2^p Age_p^2 + g_3^p Income_p + g_4^p Degree_p + g_5^p One\_child_p + g_6^p Two\_children_p +$$
$$g_7^p More\_children + g_8^p First\_birth_p + g_9^p Higher\_birth_p + \alpha[2, p]$$

The fixed regression constants and coefficients are denoted g_l^p where p = 1, 2 and *l =0, 1,…, 9* is a variable specific number corresponding to each of the explanatory variables in the model. The explanatory variables in Model 2 are a subset of those included in Model 1. The term $\alpha[2, p]$ represents the random intercept term associated with Model 2 and the transition to marital status p and is specified to have a normal distribution with mean zero and variance σ_{2p}^2.

Model 3: A multinomial logit model for transitions out of the cohabiting state with no transition as the reference category and a random intercept for each transition. The variable Z_2 denotes the marital status *q =0, 1, 2* into which a transition is being made, where 0 = no transition, 1 = single, 2 = married.

$$\ln\left(\frac{\Pr(Z_2 = q)}{\Pr(Z_2 = 0)}\right) =$$

$$g_0^q + g_1^q Age_q + g_2^q Age_q^2 + g_3^q Income_q + g_4^q Degree_q + g_5^q One\_child_q + g_6^q Two\_children_q +$$
$$g_7^q More\_children_q + g_8^q First\_birth_q + g_9^q Higher\_birth_q + \alpha[3, q]$$

The fixed regression constants and coefficients are denoted g_l^q where q = 1, 2 and *l =0, 1,…, 9*

The term $\alpha[3, q]$ represents the random intercept term associated with Model 3 and the transition to marital status q and is specified to have a normal distribution with mean zero and variance σ_{3q}^2.

Model 4: A binary logit model for transition out of marriage to separation with no transition as the reference category and a random intercept for the transition. The variable Z_3 denotes the marital status *r =0, 1* into which a transition is being made, where 0 = no transition, 1 =

single.

$$\ln\left(\frac{\Pr(Z_3 = r)}{\Pr(Z_3 = 0)}\right) =$$

$$g_0^r + g_1^r Age_r + g_2^r Age_r^2 + g_3^r Income_r + g_4^r Degree_r + g_5^r One\_child_r + g_6^r Two\_children_r +$$
$$g_7^r More\_children_r + g_8^r First\_birth_r + g_9^r Higher\_birth_r + \alpha[4,r]$$

The fixed regression constants and coefficients are denoted g_l^r where r = 1 and *l =0, 1,…, 9.* The term $\alpha[4,r]$ represents the random intercept term associated with Model 4 and the transition to single and is specified to have a normal distribution with mean zero and variance σ_{4r}^2.

Model Estimation

For the multinomial logit models defined as Models 2 and 3 it is unrealistic to assume that decisions to marry or cohabit from a single state, or to marry or separate from a cohabiting state are independent. Therefore we allow the random effects across the two transition states for each of these models to co-vary. Furthermore, non-zero correlations among random effects across the models may occur if the unobserved characteristics that influence a woman to do more housework in any of the marital states also influence the decision to form or dissolve a partnership. Also, if a woman experiences several transitions across the six waves it is possible that the propensity to undergo one type of transition may also influence the likelihood of her undergoing another transition. Therefore, all eight random effects from Models 1 to 4 are specified to arise from a multivariate normal distribution with mean zero and variance-covariance matrix Σ. The system of equations specified in Models 1-4 form the multilevel multiprocess model. The parameters in each of the equations are estimated simultaneously using Markov chain Monte Carlo (MCMC) simulation (Gelman et al. 2005) which is implemented using the freely available WinBUGS software (Spiegelhalter et al. 1998). Non-informative

normal prior distributions were specified for each of the regression parameters. A Wishart prior distribution with the minimum dimension of eight was specified for the inverse of Σ.Similar methods have been used to estimate multinomial logit models with random effects for estimating the probability of employment for immigrants to Australia with time since arrival using the Longitudinal survey of Immigrants to Australia (Pettitt et al. 2006) and the probability of employment for Australian women using four waves of HILDA (Haynes et al. 2008).

Results

The Australian Context

The initial results from the estimation of the multiprocess model defined by Models 1-4 using HILDA data are shown in Tables 3-6. All results are means of posterior distributions obtained from 10,000 MCMC simulations following a burn-in length of 10,000 simulations.

Table 3 shows the estimated regression coefficients for logged housework hours from Model 1.

(TABLES 3-6 ABOUT HERE)

Main results:

- Time on housework increases to begin with then tends to drop off after a certain age depending on the marital status of a woman.
- Single women do less housework as their income increases. This supports Gupta's findings. Household income is not significantly associated with housework hours for women who are cohabiting or married.

- A higher score on the attitude variable corresponds to a stronger agreement that the man in the household should be the main income earner. For waves 2 to 6 the value of this variable for each woman does not change therefore the effect observed is between-subjects. Time on housework is greater for those women who have a less liberal attitude.
- Single women with a bachelor's degree tend to do more housework. Education is not associated with housework hours for women who are cohabiting or married.
- Time on housework increases with the number of children in the household for all types of marital status.
- Time on housework decreases with both full-time and part-time work for all types of marital status. The magnitude of decrease is considerably less for part-time work as compared to full-time work. Also, for single women, the decrease in housework hours when taking up full-time work is almost half that for cohabiting and married women.
- Time on housework increases when single women form a partnership.
- Time on housework decreases when married women separate.
- There is no evidence of a significant fixed effect on housework hours when cohabiting women separate or marry.

Table 4 shows the estimated regression effects for the log odds of partnership formation. The main results are:

- The likelihood of a direct marriage does not change initially but decreases after a certain age. The likelihood of forming a cohabiting relationship diminishes more rapidly with age. The likelihood of marrying from a cohabiting relationship does not change with age.

- The likelihood of forming a partnership when single increases with income. However, the likelihood of indirect marriage from a cohabiting relationships decreases with increasing household income.
- The only partnership formation that is likely to increase significantly with the birth of a child is from single to cohabiting.

Table 5 shows the estimated regression effects for the log odds of partnership dissolution. The main results are:

- The likelihood of separation from either cohabiting or married partnerships decreases quadratically with age.
- The likelihood of separation from cohabiting increases with household income and the likelihood of separation from marriage decreases with an increase in household income.
- The likelihood of separation is not associated with number of children or birth.

Table 6 shows the estimated variance-covariance matrix for the eight random effects from Models 1-4.

- The significant positive correlations ($\rho > 0.60$) among the random effects for time spent on housework show that women who have a propensity to do more than average amounts of housework when single also have a propensity to do more than average housework hours when cohabiting or married. This supports an argument that some women are prone to higher levels of domestic behaviour regardless of marital status.
- The negative correlation ($\rho = -0.187$) between the propensity to a direct marriage and time spent on housework when married is related to our previous finding that time spent on housework immediately after marriage is much lower than time spent on housework

after several years of marriage. We have not yet dealt with partnership duration in this model. This may be better able to be addressed as more waves of data arise. We could perhaps now address this issue using all waves of the BHPS data. We have not included relationship duration in our models, it is possible that the correlations between the unobserved variation in these models is in part capturing differences in the duration of marital and cohabiting relationships rather than major differences in housework per se.

- Unobserved influences on the likelihood of an indirect marriage via cohabitation are negatively correlated ($\rho = -0.126$, borderline significant) with unobserved influences on time spent on housework when married. Similarly the correlation between the random effects for separation from marriage and time spent on housework when married is negative ($\rho = -0.179$).
- Significant positive correlations occur for unobserved characteristics influencing propensities to: cohabit and then marry indirectly ($\rho = 0.440$); cohabit and separate from marriage ($\rho = 0.560$); marry indirectly and separate from marriage ($\rho = 0.361$).

The British Context

The initial results from the estimation of the multiprocess model defined by Models 1-4 using BHPS data are shown in Tables 7-10. All results are means of posterior distributions obtained from 15,000 MCMC simulations following a burn-in length of 4,000 simulations.

(TABLES 7-10 ABOUT HERE)

Table 7 shows the estimated regression coefficients for logged housework hours from Model 1.

Main results:

Similarly to the Australian data

- Time on housework increases at lower ages but then tends to decrease from a certain age. This varies with marital status.
- Single women do less housework as household income increases.
- Time on housework is greater for those women who have a less liberal attitude to male's being the income earners.
- Time on housework increases with the number of children in the household for all types of marital status.
- Time on housework decreases with full-time work for all types of marital status and with part-time work for single and cohabiting women. Time spent on housework does not change for married women who take-up part-time work. The magnitude of decrease is considerably less for part-time work as compared to full-time work.
- Time on housework increases when single women form a partnership.

In contrast to the Australian data, the education level of British women is significantly associated with time spent on housework.

- Women with a tertiary Bachelor's degree or higher spend less time on housework than women without a degree. This result is significant across all types of marital status.
- Time on housework decreases when cohabiting women separate. The decrease for married women is not significant.

Table 8 shows the estimated regression effects for the log odds of a partnership formation.

- The likelihood of forming any relationship decreases with age although the likelihood of becoming married after a cohabiting relationship does not diminish as rapidly.

- The likelihood of forming a partnership when single increases with income. However, similarly to Australian women, the likelihood of indirect marriage from a cohabiting relationship decreases with increasing household income.
- In contrast to Australian women, formation of a direct marriage is more likely immediately following the birth of the first child and to a lesser extent with the birth of a subsequent child. For Australian women, this association was significant for the formation of cohabiting children.

Table 9 shows the estimated regression effects for the log odds of a partnership dissolution. The results that differ to that of the Australian context are:

- The likelihood of separation from cohabiting is not significantly associated with income.
- Women with a bachelor's degree are more likely to separate from a cohabiting partnership and are less likely to separate from marriage.

Table 10 shows the estimated variance-covariance matrix for the eight random effects from Models 1-4. Results are similar to the Australian context with one exception:

- Unobserved characteristics that influence separation from a cohabiting relationship are positively correlated with those that influence separation from marriage.

Concluding Points

- Time spent on housework and education is negatively associated for British women only.
- For Australian women, the likelihood of separation from cohabiting increases with household income and the likelihood of separation from marriage decreases with an

increase in household income. However, for British women, the likelihood of separation from cohabiting is not significantly associated with income.

- British women are more likely to marry following the birth of a child when single, Australian women are more likely to cohabit following a birth when single.
- In both countries, there is no evidence of a significant fixed effect on housework hours when cohabiting women marry although the direction of the effect is positive.
- The positive correlations among the random effects for time spent on housework in each marital status suggest that women with a propensity to high levels of housework or domesticity when single also have a propensity to spend more time on housework relative to other women, when in a partnership.
- Significant negative correlations are observed for the random effects associated with housework hours when married and each of the following transitions: single to married, cohabiting to married, and married to separation.
- The correlation of unobserved influences on housework hours when married and the transition from single to married suggests that those who do more housework when married are less likely to undergo this transition during the period of the survey. This may be a consequence of the limited number of waves in the data and implies that those who are married for the duration of the survey tend to do more housework than those who are recently married. This also implies that there is a "settling-in period" to doing housework when married which has also been identified in our previous research.
- The negative correlation of unobserved influences on housework hours when married and the transition from marriage to separation implies a selection effect such that women who

have the propensity to spend less time than average on housework when married are more likely to separate.

- The correlation of unobserved influences on housework hours when married and the transition from a cohabiting to married relationship also implies a selection effect such that women who marry indirectly following cohabitation are prone to spending less time than average on housework. It may be that women who marry indirectly are cohabiting for a short amount of time so that this effect is confounded with the increasing propensity to do more housework over time within a partnership. However, this is not clear and will need to be investigated further.
- All other significant correlations among the random effects associated with the formation and dissolution of partnerships are positive. It is not surprising that women who separate after cohabiting or marriage are more likely to marry again. However, it is interesting that women who have a higher propensity to separate from a cohabiting relationship also have a high propensity to separate from a marriage. This correlation is significant for British women.

Discussion

Overall our results suggest similar processes linking marital status transitions, fertility patterns and time spent on housework for women in both Australia and the United Kingdom. Generally, movement into a relationship and the birth of children increases women's time on domestic labour in both countries. This is consistent with findings from previous research (Baxter, Hewitt and Haynes, 2008; Gupta, 1999; Sanchez and Thomson, 1997). Our main contribution in this paper is to take these models one step further to examine whether this

increase in housework hours is due to the characteristics of the kinds of women who marry and have children or is the result of characteristics of marriage and parenthood.

Our results show that women who have higher levels of domesticity when single spend more time on housework after marriage, while women who spend less time on housework when married are more likely to separate. Taken together, these results imply a selection effect of certain kinds of women into and out of relationships. Spending time on housework when single may imply a level of domesticity, or an inclination for home-making activities, that encourages these women to form relationships. This in turn leads to a higher level of domesticity after the union, as measured by time spent on domestic labour.

In addition to our findings on housework, we also observe interesting differences between the countries in other patterns. In particular, we see variations in the processes associated with transitions into cohabitation and the effect of income and education on relationship transitions and domestic time. For Australian women, higher levels of household income are associated with greater likelihood of separation from cohabiting, while the reverse is the case for marriage. However, for women in the UK the likelihood of separation from cohabitation is not significantly associated with income. Additionally, we find that single UK women are more likely to marry following the birth of a child whereas single Australian women are more likely to cohabit following a birth. These results imply differences across countries in the role and meaning of cohabitation. The results suggest that UK women view cohabitation as a temporary arrangement prior to marriage which still plays a major role as the primary institution for bearing and raising children. In Australia on the other hand, cohabitation may have taken on a different role, not just as a precursor to marriage, but as an acceptable form of relationship union in its own right, and one suitable for raising children. Kiernan (2004) has shown that countries

vary in the prevalence, meaning and legality of cohabitation with some fully supporting cohabitation to the extent that it is virtually indistinguishable from marriage, while in others cohabitation is chosen by only a small minority of couples and is not considered a suitable alternative to marriage. Thus our results highlight possible variations between the countries in the patterning of relationship formation that may in turn have a bearing on the relationships between marital status transitions and domestic labour. Our task in future iterations of this paper is to scrutinise these results further and to identify key trends and differences across countries.

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Table 1: Means, Standard Deviations, Proportions of Housework Hours and Model Covariates for Pooled Samples HILDA Waves 1-6 and BHPS Waves 11-16.

	HILDA (1 – 6)		BHPS (11 – 16)	
	Mean	SD	Mean	SD
Housework hours	17.70	14.3	15.66	10.5
Housework hours (logged)	2.61	0.9	2.60	0.7
Age	44.05	15.2	45.92	15.1
Household Income (10,000)	$5.86	$4.4	£3.30	£2.5
Bachelor Degree or higher (1=yes)	23%		15%	
Number of children <18				
None	57%		59%	
1 child	13%		18%	
2 children	19%		16%	
3 + children	11%		6%	
Birth:				
None	97%		97%	
First birth	1%		1%	
Higher order birth	2%		2%	
Employment status:				
Not employed	30%		29%	
Employed Full time	31%		32%	
Employed Part time	39%		29%	
Woman-years	19,886		26,267	
Number of women	4,252		5,374	

Table 2: Numbers of person-year observations for relationship status and relationship transitions for HILDA and BHPS

	HILDA (Waves 2 – 6)	BHPS (Waves 12 – 16)
	N	N
Married	12,031	16,616
Single	5,279	6,855
Cohabiting	1,566	2,796
Single – Married	99	131
Single – Cohabit	353	419
Cohabit – Married	213	314
Cohabit – Single	168	214
Married – Single	177	188
Woman-years	19,886	26,267
Number of women	4,252	5,374

Note: N is person-years

Table 3: Estimated Coefficients and Standard Errors from Models of Change in Log Housework Hours for Single, Cohabiting and Married Women, HILDA Waves 1-6.[a b]

Variable	Single State Model for Log Housework Hours		Married State Model for Log Housework Hours		Cohabit State Model for Log Housework Hours	
	Coeff	SE	Coeff	SE	Coeff	SE
Age	0.012*	0.001	0.006*	0.001	0.008*	0.002
Age_squared	-0.0007*	0.00006	-0.0003*	0.00005	-0.0003*	0.00015
Household Income (log '0,000s)	-0.129*	0.023	-0.016	0.017	-0.022	0.045
Male breadwinner attitudes	0.014*	0.002	0.014*	0.001	0.014*	0.006
Bachelor degree (1=yes)	0.077*	0.035	-0.013	0.016	-0.015	0.050
Number of children <18						
None						
1 child	0.472*	0.055	0.206*	0.036	0.421*	0.066
2 children	0.509*	0.050	0.264*	0.026	0.573*	0.064
3+ children	0.512*	0.054	0.316*	0.028	0.495*	0.076
Birth of child						
No birth						
First birth	0.239	0.126	0.050	0.054	-0.117	0.098
Higher order birth	0.139	0.085	0.136*	0.034	0.220*	0.083
Employment						
Not employed						
Employed Full-time	-0.255*	0.031	-0.460*	0.023	-0.410*	0.050
Employed Part-time	-0.183*	0.028	-0.178*	0.019	-0.237*	0.047
Trans S-C	0.336*	0.041				
Trans S-M	0.321*	0.081				
Trans M-S			-0.141*	0.056		
Trans C-S					-0.121	0.065
Trans C-M					0.010	0.053

a. Estimated values are means of posterior distributions obtained from 20,000 MCMC simulations, burn-in of 10,000).
b. Lagged log of housework hours variable included in all models (coefficients not shown).
c. Constants were estimated, but results not shown.

Table 4: Estimated Coefficients and Standard Errors from Models of Log Odds of Partnership Formation, HILDA Waves 1-6.[a]

Variable	Model for Transition Single-Married		Model for Transition Cohabiting-Married		Model for Transition Single-Cohabiting	
	Coeff	SE	Coeff	SE	Coeff	SE
Age	-0.036	0.021	-0.037	0.023	-0.090*	0.013
Age_squared	-0.004*	0.001	-0.0001	0.001	-0.003*	0.0006
Household Income (log '0,000s)	2.395*	0.383	-3.706*	0.635	1.228*	0.166
Bachelor degree (1=yes)	0.267	0.411	0.768	0.466	-0.221	0.175
Number of children <18						
None						
1 child	-0.938	0.825	0.155	0.500	-0.534	0.303
2 children	0.196	0.611	-0.061	0.533	-0.396	0.252
3+ children	0.204	0.646	-0.545	0.641	-0.982*	0.325
Birth of child						
No birth						
First birth	2.764	1.831	-1.013	0.918	3.377*	0.573
Higher order birth	-0.621	1.527	-2.775	1.657	1.666*	0.429

a. Estimated values are means of posterior distributions obtained from 20,000 MCMC simulations, burn-in of 10,000.
b. Constants were estimated, but results not shown.

Table 5: Estimated coefficients and standard errors from models of log odds of partnership Dissolution, HILDA Waves 1-6.[a]

Variable	Model for Transition Cohabiting-Single		Model for Transition Married-Single	
	Coeff	SE	Coeff	SE
Age	-0.076*	0.018	-0.076*	0.015
Age_squared	-0.003*	0.001	-0.005*	0.001
Household Income (log '0,000s)	0.846*	0.267	-3.922*	0.335
Bachelor degree (1 = yes)	0.340	0.237	0.024	0.270
Number of children				
None				
1 child	0.106	0.347	-0.818	0.543
2 children	-0.959*	0.365	0.348	0.353
3+ children	-0.354	0.386	-0.031	0.378
Birth of child				
no birth				
First birth	-0.197	0.544	-0.973	1.548
Higher order birth	-0.690	0.650	-1.252	0.703

a. Estimated values are means of posterior distributions obtained from 20,000 MCMC simulations, burn-in of 10,000.
b. Constants were estimated, but not shown.

Table 6: Estimated random-effects covariance matrix from the multi-process model, HILDA Waves 1-6 (Includes estimates of correlation in [ ]).

	Housework hours for single state	Housework hours for married	Housework hours for cohabiting	Likelihood of S-M transition	Likelihood of S-C transition	Likelihood of C-M transition	Likelihood of C-S transition	Likelihood of M-S transition
Housework hours for single state	0.296*							
Housework hours for married	0.163* [0.618]	0.235*						
Housework hours for cohabiting	0.165* [0.677]	0.131* [0.606]	0.200*					
Likelihood of S-M transition	0.120 [0.066]	-0.304* [-0.187]	0.114 [0.076]	11.27*				
Likelihood of S-C transition	0.091 [0.133]	-0.056 [-0.092]	0.007 [0.001]	1.005 [0.240]	1.563*			
Likelihood of C-M transition	-0.037 [-0.045]	-0.126* [-0.169]	-0.003 [-0.004]	2.451 [0.475]	0.846* [0.440]	2.364*		
Likelihood of C-S transition	0.125 [0.080]	0.033 [0.024]	-0.077 [-0.060]	-3.562 [-0.371]	1.403* [0.392]	-1.272 [-0.289]	8.194*	
Likelihood of M-S transition	0.061 [0.040]	-0.246* [-0.179]	-0.068 [-0.054]	3.329* [0.351]	1.978* [0.560]	1.568* [0.361]	2.641 [0.326]	7.988*

Table 7: Estimated coefficients and standard errors from models of change in log housework hours for single, cohabiting and married women, BHPS Waves 11-16.[a b]

Variable	Single State Model for Log Housework Hours		Married State Model for Log Housework Hours		Cohabit State Model for Log Housework Hours	
	Coeff	SE	Coeff	SE	Coeff	SE
Age	0.011*	0.0009	0.008*	0.0008	0.006*	0.002
Age_squared	-0.0007*	0.00004	-0.0002*	0.00004	-0.0004*	0.0001
Household Income (log '0,000s)	-0.012*	0.004	-0.0006	0.002	-0.005	0.004
Attitudes to Male breadwinner	0.015*	0.001	0.015*	0.001	0.007	0.004
Bachelor degree (1=yes)	-0.066*	0.031	-0.190*	0.022	-0.133*	0.039
Number of children <18						
None	0.168*	0.023	0.178*	0.017	0.252*	0.032
1 child	0.282*	0.032	0.267*	0.018	0.349*	0.040
2 children	0.469*	0.047	0.384*	0.026	0.479*	0.056
3+ children						
Birth of child						
[No birth]	0.128*	0.070	0.025	0.034	-0.113*	0.055
First birth	0.121*	0.056	0.115*	0.024	0.033	0.048
Higher order birth						
Employment						
Not employed						
Employed Full-time	-0.173*	0.032	-0.012*	0.004	-0.250*	0.043
Employed Part-time	-0.096*	0.027	0.001	0.003	-0.095*	0.035
Trans S-C	0.290*	0.027				
Trans S-M	0.129*	0.048				
Trans M-S			-0.050	0.042		
Trans C-S					-0.300*	0.037
Trans C-M					0.055	0.034

a. Estimated values are means of posterior distributions obtained from 15,084 MCMC simulations, burn-in of 4,002.
b. Lagged log of housework hours variable included in all models (coefficients not shown).
c. Constants were estimated, but not shown.

Table 8: Estimated coefficients and standard errors from models of log odds of partnership formation, BHPS Waves 11-16.[a]

Variable	Model for Transition Single-Married		Model for Transition Cohabiting-Married		Model for Transition Single-Cohabiting	
	Coeff	SE	Coeff	SE	Coeff	SE
Age	-0.113*	0.013	-0.042*	0.014	-0.037*	0.010
Age_squared	-0.003*	0.0005	-0.00005	0.0007	-0.001*	0.0005
Household Income (log '0,000s)	0.061*	0.028	-2.562*	0.245	0.056	0.042
Bachelor degree (1=yes)	0.083	0.152	0.460	0.270	0.518*	0.257
Number of children <18						
None						
1 child	-0.614*	0.161	-0.237	0.233	-0.287	0.282
2 children	-0.957*	0.224	-0.175	0.268	-0.190	0.329
3+ children	-0.680*	0.284	0.151	0.384	0.512	0.388
Birth of child						
No birth						
First birth	2.359*	0.373	-1.374	0.746	0.394	1.357
Higher order birth	1.626*	0.356	-0.843	0.512	1.105	0.614

a. Estimated values are means of posterior distributions obtained from 15,084 MCMC simulations, burn-in of 4,002.
b. Constants were estimated, but not shown

Table 9: Estimated coefficients and standard errors from models of log odds of partnership dissolution, BHPS Waves 11-16.[a]

Variable	Model for Transition Cohabiting-Single		Model for Transition Married-Single	
	Coeff	SE	Coeff	SE
Age	-0.049*	0.013	-0.082*	0.012
Age_squared	-0.002*	0.0007	-0.0008	0.0007
Household Income (log '0,000s)	-0.002	0.029	-0.065*	0.017
Bach degree	0.489*	0.184	-0.641*	0.319
Number of children <18				
None				
1 child	-0.090	0.189	0.333	0.278
2 children	-0.426	0.244	0.429	0.284
3+ children	-0.201	0.326	0.565	0.393
Birth of child				
No birth				
First birth	-0.021	0.414	-25.94	17.80
Higher order birth	0.129	0.361	-0.756	0.498

a. Estimated values are means of posterior distributions obtained from 15,084 MCMC simulations, burn-in of 4,002.
b. Constants were estimated, but not shown

Table 10: Estimated random-effects covariance matrix from the multi-process model, BHPS Waves 11-16 (Includes estimates of correlation in [ ]).

	Housework hours for single state	Housework hours for married	Housework hours for cohabiting	Likelihood of S-M transition	Likelihood of S-C transition	Likelihood of C-M transition	Likelihood of C-S transition	Likelihood of M-S transition
Housework hours for single state	0.284*							
Housework hours for married	0.153* [0.618]	0.216*						
Housework hours for cohabiting	0.145* [0.650]	0.123* [0.633]	0.176*					
Likelihood of S-M transition	0.101 [0.129]	-0.111* [-0.163]	0.012 [0.020]	2.152*				
Likelihood of S-C transition	0.036 [0.072]	0.003 [0.007]	0.031 [0.079]	0.763* [0.554]	0.880*			
Likelihood of C-M transition	-0.082 [-0.139]	-0.143* [-0.278]	-0.063 [0.136]	0.545 [0.335]	0.079 [0.076]	1.224*		
Likelihood of C-S transition	-0.036 [-0.052]	-0.129* [-0.214]	-0.054 [-0.100]	1.341* [0.706]	0.811* [0.668]	0.530 [0.370]	1.675*	
Likelihood of M-S transition	0.120 [0.095]	-0.199* [-0.181]	-0.0005 [0.0005]	2.873* [0.826]	1.359* [0.611]	0.581 [0.222]	2.213* [0.722]	5.616*