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Domestic Outsourcing, Housework Time and Subjective Time Pressure: New Insights from Longitudinal Data

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Abstract:

Hiring household help could reduce housework time and alleviate subjective time pressure. Associations are assumed to be particularly apparent for women because they spend more time on housework than men. But empirical evidence on whether hiring help actually saves time or relieves time pressure is scant and inconclusive, chiefly due to data and methodological limitations. Our paper improves on earlier studies by examining panel data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey ($n = 5,124$ couples) that enable modelling techniques that take account of selection effects, possible reverse causality and unobserved heterogeneity. Contrary to some earlier studies, we show that outsourcing does in fact reduce housework time, narrow gender gaps, and lower women's subjective time pressure. We conclude that domestic outsourcing may save time and reduce subjective pressure for some women, but one consequence may be increased inequality between women who can and cannot afford domestic help.

Keywords: domestic outsourcing; housework; time pressure; gender; inequality; panel data; Australia

1 Introduction

It is widely assumed that hiring household help, often referred to as domestic outsourcing (Sullivan and Gershuny, 2013; Craig and Baxter, 2014), is a way of minimising time spent on housework, making gender shares of housework more equal and reducing time pressure. However, empirical testing of these expectations is sparse, and prior studies have not convincingly confirmed them. Most studies suggest counterintuitively that domestic outsourcing has little relationship to time on housework and is not associated with lower levels of time pressure. However, all the previous studies that we are aware of use cross-sectional analyses, so these results may be due to data and methodological limitations. We remedy this using data from an Australian panel study that contains information on domestic outsourcing, housework time and subjective time pressure. The longitudinal data allow us to use modelling techniques that take account of selection effects, possible reverse causality and unobserved heterogeneity.

2 Domestic Outsourcing, Housework and Time Pressure

Over the last half-century, as partnered women entered the workforce in greater numbers, it became harder for households to find time for domestic labor. Women's housework time has trended downwards, but men's housework time has not risen by the same amount (Bianchi et al., 2000; Sayer, 2005; Craig et al., 2010; Fisher et al., 2007). Many assume that these trends reflect greater use of paid services, since a potential means of coping with housework time demands is buying domestic assistance (Cohen, 1998; Bittman et al., 1999; de Ruijter et al., 2005; Gupta, 2006). Assuming domestic outsourcing will reduce housework time seems logical, particularly for women, who are still primarily responsible for domestic labor and household management (see Bianchi and Milkie, 2010; Lachance-Grzela and Bouchard, 2010). Outsourcing is also thought to be one of the possible reasons women with higher earnings do less housework than other women, on the assumption that they use their economic resources to replace their labor (Gupta, 2006; Gupta, 2007; Gupta and Ash, 2008; Sevilla-Sanz et al., 2010). But empirical research directly testing the relationship between outsourcing and housework time is surprisingly sparse, and has yielded mixed and equivocal results.

It is possible that mixed results reflect variation in social and economic context. Domestic labor patterns differ cross nationally, as do cultural norms and values about hiring household help and institutional structures such as workplace and economic policies (Hook, 2010; Gornick and Meyers, 2003; Lewis, 2009). Australia is a liberal welfare state with a relative lack of institutional supports for work-family reconciliation (Gornick and Meyers, 2003). There are wide average gender gaps in earnings, working hours and housework time (Pocock et al., 2012), and there has not been historically high use of domestic services (Meagher, 1997; Baxter, 2005a). Against this backdrop, research differentiating between male- and female-typed tasks found domestic outsourcing did not substitute for much housework time, reduced domestic time for men at least as much as for women, and did not minimize gender gaps (Craig and Baxter, 2014).

Research in other liberal welfare states also suggests buying domestic services engenders minimal or null time savings. US research has found outsourcing brought only small time reductions, and little evidence that it explained the association between women's economic resources and lower housework time (Killewald, 2011; Killewald and Gough, 2010). In the United Kingdom a study examining the association between domestic outsourcing and housework and childcare time (combined), concluded it brought no significant time savings for either men or women (Sullivan and Gershuny, 2013). In the Nordic social democracies, institutional supports for balancing work and family are more extensive (Gornick and Meyers, 2003), but although there is increasing use of domestic services (Kvista and Peterson, 2010; Platzer, 2006), studies are yet to examine whether it is time saving in that context. In continental Europe results are mixed, with French women who purchased domestic services saving

only minimal housework time (Windebank, 2007), while in the Netherlands, hiring help reduced women's cleaning time by about an hour and a half per week, with no effect on men's cleaning time (Van der Lippe et al., 2004).

It is also thought that hiring help could alleviate the widely reported contemporary feelings of being continually rushed, harried and overwhelmed by escalating time demands (Schulte, 2014; Mattingly and Sayer, 2006; Schor, 1991). That is, domestic outsourcing should logically mean people not only save time objectively, but also feel less subjective time pressure. While some studies infer an improvement in subjective time pressure from reduced time on household tasks (e.g., Sullivan and Gershuny, 2013), to our knowledge only one study has directly investigated the relationship between outsourcing and self-reported time stress. Craig and Baxter (2014) used Australian time use data to explore associations between hiring help and reporting always or often feeling rushed or pressed for time. Again, however, results were inconclusive, with no clear evidence that domestic outsourcing reduced feelings of time pressure, and some weak indications that the association was actually positive.

While the expectation that hiring help should reduce time pressure appears straightforward, it is theoretically possible that associations could run either way, such that domestic outsourcing and time pressure go hand in hand (Sullivan and Gershuny, 2013). Households may outsource because they are more time pressured, or outsourcing could bring time constraints that contribute to feeling rushed. Supporting this possibility are research findings that outsourcing childcare is associated with higher, not lower, subjective time pressure for mothers (Craig and Powell, 2013). These results could arise due to the deadlines for drop-off and pick up from child care centres, and because mothers who use such services may be doing more paid work than mothers who do not. Similarly, women who hire household help may transfer their time to other activities, and consequently gain no subjective relief from time pressure. For example, it may be that employing domestic help is another household management task, and that having a third party enter the home needs organisation, preparation (e.g., tidying up for the cleaner) and supervision that may itself be taxing and add to subjective time pressure (de Ruijter et al., 2003).

In summary, previous research on the relationship between hiring help, and time saving and time-stress alleviation is inconclusive, and results suggesting outsourcing adds to time pressure are somewhat counterintuitive. While there are possible substantive reasons why these results arise (for more detailed discussions, see Craig and Baxter, 2014; Sullivan and Gershuny, 2013), they may also be due to methodological issues. The previous studies described above of the effect of domestic outsourcing on housework time or time pressure largely relied on cross-sectional data and methods. This approach is restrictive for two key reasons.

First, cross-sectional estimates are likely to be affected by omitted-variable bias due to unobserved person-specific effects. That is, failure to include in the models person-specific traits that may affect both the propensity to outsource housework and the supply of housework will result in biased estimates of the domestic outsourcing effect in ordinary least square (OLS) regression. For example, traditional gender socialization might be correlated both with the propensity to outsource housework (negatively), and the propensity to do housework (positively amongst women, negatively amongst men) (Baxter, 2000; Bartley et al., 2005). The same logic applies to unobserved factors potentially affecting both domestic outsourcing and feelings of stress. For instance, individuals who place a lot of importance on having a tidy home, on spending time with children, or on leisure activities, may have a greater tendency to both outsource housework and feel rushed or pressed for time.

Second, cross-sectional models are poor at establishing the direction of causality between explanatory and outcome variables, which may lead to issues of reverse causation. In fact, reverse causation can be considered a form of omitted-variable bias in which those factors mediating the effect of Y on X

are unobserved. As noted above, previous research using cross-sectional data and methods that found domestic outsourcing to be neutral or associated with increased feelings of stress (Craig and Baxter, 2014) might just reflect a tendency for couples who feel more rushed or pressed for time to outsource housework. Similar arguments could be made concerning housework supply: couples who do more housework (because of their preferences for cleanliness, for example) may also be more likely to outsource housework, *ceteris paribus*.

In this paper, we contribute to the literature by examining the relationship between outsourcing and time on housework and subjective time pressure. We apply statistical methods that make use of panel data to provide more robust estimates than is possible with cross-sectional data and methods.

3 Data

To examine the longitudinal associations between domestic outsourcing, housework supply, and feelings of stress, we use data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey (Summerfield et al., 2014; Watson and Wooden, 2012) (Summerfield et al., 2014; Watson and Wooden, 2012) (Summerfield et al., 2014; Watson and Wooden, 2012). The HILDA Survey is a large, multipurpose panel survey that is largely representative of the Australian population. Since 2001, it has collected annual information on respondents aged 15 and older in the same households via face-to-face interviews and self-complete questionnaires. The HILDA Survey is particularly well-suited for our purposes because it (i) contains longitudinal information on domestic outsourcing in three of its 13 waves, (ii) includes a large enough subsample of individuals who outsource housework, an arrangement that remains relatively rare in Australia (Baxter and Hewitt, 2013); and (iii) collects the requisite information on housework supply and feelings of time pressure. Our sample includes heterosexual married or cohabiting respondents with non-missing information on analytical variables, who report non-zero earned income and whose partners also participated in the survey. We restrict the analyses to waves 5 (2005), 8 (2008) and 11 (2011) of the HILDA Survey, when questions on domestic outsourcing were included. Our initial analytical sample comprises 9,105 observations from 5,124 couples.

Our key explanatory variable is a binary measure of whether individuals outsource housework. The variable is derived from an item within a self-complete questionnaire asked in waves 5, 8 and 11 reading: “*Does your household regularly pay someone to do any of the housework (cleaning, washing, ironing, cooking, etc)?*” The variable takes the value *one* when respondents answer ‘yes’ and the value *zero* otherwise. Over the three waves of data, couples outsource housework in 12.3% of the observations. This proportion is consistent with previous reports for Australia using data from the ABS Time Use Survey 2006 (Craig and Baxter, 2014). Note however that in 10.8% of the observations there was disagreement between partners as to whether or not housework was outsourced. In 9.7% of cases the male but not the female partner reported outsourcing, with the reverse occurring in just 1.1% of cases. We consider housework to be outsourced as long as one of the partners reports so.

There are two outcome variables of interest. First, we examine partner-specific housework supply using a measure of weekly housework hours. This measure is derived from a survey question in the self-complete questionnaire asking: “*How many hours would you spend on each of the following activities in a typical week? [...] Housework, such as preparing meals, washing dishes, cleaning house, washing clothes, ironing and sewing*” Table 1 shows the gender-specific means in weekly housework hours. Female partners in this Australian sample (mean=18.7 hours) do three times as much housework as their male partners (mean=6.2 hours). Since the confidence intervals do not overlap, the difference is statistically significant ($p < 0.05$).

Second, we use partner-specific measures of stress derived from the following question in the self-complete questionnaire “*How often do you feel rushed or pressed for time?*” Possible responses are in an ordered scale: [1] ‘almost always’, [2] ‘often’, [3] ‘sometimes’, [4] ‘rarely’ and [5] ‘never’. For analytical ease and following previous research (see e.g., Craig and Powell, 2013; Craig and Mullan, 2009) we collapse this into a dichotomous variable. The original categories [1] and [2] are given the value 0 (‘regularly rushed or pressed for time’) and the original categories [3] to [5] are given the value one (‘not regularly rushed or pressed for time’). Table 1 shows the proportion of male and female partners who feel rushed or pressed for time in our data. More female (41.8%) than male (33.1%) partners feel regularly rushed or pressed for time, with the difference being statistically significant ($p < 0.05$), as denoted by non-overlapping confidence intervals.

In multivariate analyses, we control for a number of theoretically-relevant factors that might confound the relationships between domestic outsourcing, housework supply and feelings of time pressure. Following Craig and Baxter (2014), these include respondents’ earning decile (using weekly gross wages and salary from all jobs adjusted to 2014 prices), whether or not the respondent works in a professional occupation (defined as falling within category 2, “Professionals”, of the 1-digit Australian and New Zealand Standard Classification of Occupations 2006) and his/her usual hours of work per week (from all jobs). Income and professional occupation measures resources contributed to the household, with previous research showing that greater resources are associated with reduced housework time (Gupta and Ash, 2008). Women’s professional status, as a marker of class position, may be particularly relevant to between-household differences in the likelihood of outsourcing and women’s time in housework. Weekly hours worked capture time availability. Longer weekly work hours likely reduce time available for other activities including domestic labor (Bittman et al., 2003), and may prompt higher use of household services. We specified each of these variables separately for the male and female partners, so we are able to also capture cross-spousal effects. Additionally, we control for couple-level variables that are common to both partners: whether or not the couple cohabits (as opposed to being married), the number of dependent children under the age of 15 in the household, and whether or not the couple owns (or is in the process of purchasing) the family home. In Australia owner-occupied dwellings are more likely to be houses than apartments, so are on average larger and have grounds to maintain, and are associated with higher demand for domestic labor (Baxter and Hewitt, 2013). It is also likely that greater effort is expended by occupants on the upkeep, care and appearance of a dwelling and its yard, if it is owner-occupied rather than rented. Children require care, and also create more demand for housework (Craig and Bittman, 2008). This higher demand is likely to be positively associated with subjective time pressure, and the associations may differ by gender because women average more childcare and housework than men (Mattingly and Sayer, 2006). Research has shown that cohabiting couples spend less time on housework than married couples (Baxter, 2005b). Means and standard deviations for all model variables are presented in Table A1 in the Appendix.

Our analyses exclude 2,768 observations from respondents who did not answer the survey or had partners who did not answer the survey, and an additional 3,197 observations due to missing data on model variables. The latter seem to be ‘missing at random’ (MAR) given the covariates, as mean values are similar for the full and estimation samples. Hence, use of covariates minimizes missing information bias.

4 Methods

We will illustrate our methodological approaches using housework hours as the outcome variable of interest, but the same logic applies to feelings of stress (though this is dichotomous and modeled using logistic regression). Let the (pooled) cross-sectional model of interest be:

$$H_{it} = a + D_{it} * b_1 + X_{it} * b_2 + Z_i * b_3 + v_{it} \quad (1)$$

where

$$v_{it} = e_{it} + u_i \quad (2)$$

The i and t subscripts stand for individual and time, H refers to housework hours, D stands for domestic outsourcing, X is a vector of time-changing explanatory variables, Z is a vector of time-constant explanatory variables, a is an intercept, and b are coefficients or vectors of coefficients to be estimated. The error term v conflates the usual stochastic error term (e_{it}) and the person-specific unobserved heterogeneity (u_i) – as illustrated in equation (2). This is an OLS model that, as explained above, potentially suffers from bias due to selection effects, omitted unobserved variables (u) and reverse causality.

The first way to leverage the panel data to improve upon the OLS model is to estimate within-group fixed-effect models (Allison, 2009). These enable the researcher to account for person-specific unobserved effects by regressing deviations from person means of the outcome variable on deviations from person means of the explanatory variables. In other words, the housework hours of the same individuals are compared at times when these individuals are observed to outsource housework and at times when they are not observed to outsource housework. In statistical terms:

$$H_{it} - \bar{H}_i = (D_{it} - \bar{D}_i) * b_1 + (X_{it} - \bar{X}_i) * b_2 + (Z_{it} - \bar{Z}_i) * b_3 + (e_{it} - \bar{e}_i) + (u_i - \bar{u}_i) \quad (3)$$

When doing this, the time-constant terms u and Z – which are equal to their person means – drop out of the equation, permitting less biased estimation of the effect of domestic outsourcing (D) on housework supply:

$$H_{it} - \bar{H}_i = (D_{it} - \bar{D}_i) * b_1 + (X_{it} - \bar{X}_i) * b_2 + (e_{it} - \bar{e}_i) \quad (4)$$

However, this modeling strategy is still limiting in that it cannot account for reverse causality between domestic outsourcing and the outcome variables. To better account for reverse causality we turn to another family of models: simultaneous equation models for panel data (also known as ‘multiprocess multilevel models’). These models jointly estimate a main and a selection equation. The main equation is similar to equation (1) and is represented in equation (5). The selection equation models the determinants of a potentially ‘endogenous’ explanatory variable, in our case *domestic outsourcing*. This is represented in equation (6) and contains a person-specific unobserved heterogeneity term (v).

$$H_{it} = a + D_{it} * b_1 + X_{it} * b_2 + Z_i * b_3 + e_{it} + u_i \quad (5)$$

$$D_{it} = a + H_{it} * b_1 + X_{it} * b_2 + Z_i * b_3 + P_{it} * b_4 + w_i \quad (6)$$

The random error terms in both equations (u and w) come from the same joint bivariate normal distribution – see equation (6), and their correlation (ρ) can be estimated. A statistically significant, non-zero value for ρ indicates that common unobserved factors affect the outcomes in the main and secondary equations. In this scenario, only by controlling for ρ can the coefficient on domestic outsourcing in the main equation be estimated free of bias due to reverse causation.

$$\begin{pmatrix} u_i \\ w_i \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_u^2 & \rho_{uw} \\ \rho_{wu} & \sigma_w^2 \end{pmatrix} \right) \quad (6)$$

We estimate the models using full information maximum likelihood and aML 2.0 software. As the likelihood function has no closed-form solution, we integrate residuals using a numerical integration algorithm based on the Gauss-Hermite quadrature that approximates a multivariate normal distribution by seven integration points per dimension. We re-tested the final models with 20 integration points per dimension. Identification of this system of equations is facilitated by the inclusion of an instrument (P) (i.e. an instrumental variable) in the selection equation. Our instrument is a variable capturing the percentage of individuals in the respondent's state of residence who outsource housework, which ranges from 5% to 16.7%. Theoretically, this instrument should be correlated with the propensity for individuals to outsource housework (e.g., through information sharing and social norms), but not independently associated with housework supply or feelings of stress (other than through personal use of domestic outsourcing). Empirically, the instrument meets the eligibility criteria: it is not independently associated with the outcome variables in the main equations (housework time and time pressure), and it is moderately associated with the potentially endogenous explanatory variable capturing domestic outsourcing.

In the next section we provide new empirical evidence on the longitudinal associations between domestic outsourcing, housework hours and time pressure in Australia using these different specifications.

5 Empirical evidence

Table 2 shows the bivariate relationships between domestic outsourcing, housework time and time pressure amongst partnered men and women in Australia. Women in households that outsource housework spend an average of 16.2 hours on housework per week, compared to 19.01 hours by women in households that do not outsource housework. This difference is statistically significant ($p < 0.05$). Among men, the analogous figures are 6.2 and 6.2 hours for those in households that outsource and do not outsource housework, respectively. The difference is not statistically significant. This result suggests that housework outsourcing might reduce women's but not men's housework hours. It seemingly narrows the gender gap in housework hours from 12.8 hours ($19 - 6.2$) to 10 hours ($16.2 - 6.2$); that is by 2.8 hours or 28.9%. Women in households that outsource housework are substantially and significantly more likely to feel regularly rushed or pressed for time than those in households that do not outsource housework (51.4% vs. 40.4%). The same applies to men: 41.4% of those in households that outsource housework feel regularly rushed or pressed for time, compared to 32% for those in households that do not outsource. This pattern of results is inconsistent with the theoretical expectation that domestic outsourcing reduces stress and more consistent with the proposition that individuals who feel pressed for time resort to outsourcing as a coping mechanism.

Naturally, these bivariate associations might emerge due to compositional differences in the groups of individuals who outsource and do not outsource housework on traits such as age, income or family composition. More robust estimation of the associations between domestic outsourcing, housework supply and time pressure can be gathered through the use of multivariate regression models that adjust for these and other factors. Table 3 shows the results of models of housework hours. In columns (i) and (ii) the models are estimated using cross-sectional OLS regression models. This is the simplest way to account for potential observable confounders, and the only statistical approach deployed in the literature to date. The coefficient on domestic outsourcing is relatively small, negative and not statistically significant amongst men ($b = -0.180$, $p > 0.05$), and large, negative and highly statistically significant amongst women ($b = -2.696$, $p < 0.01$). This result suggests that outsourcing housework reduces women's housework hours by around 3 hours per week while it does not affect men's housework hours, consequently reducing the gender gap in housework time.

However, OLS models are limiting for the reasons outlined above. The first way to improve upon them is to estimate within-group fixed-effect models that leverage the panel data to reduce omitted variable-bias due to unobservables. Results from such models are presented in columns (iii) and (iv) in Table 3. In these models, the coefficient on domestic outsourcing amongst men is positive, but remains statistically insignificant ($b=0.171$, $p>0.05$). Amongst women, the coefficient on domestic outsourcing is again negative, but small and statistically insignificant ($b=-0.751$, $p>0.05$). Thus, the results from these fixed-effect models suggest that domestic outsourcing has no statistically significant effect on men's or women's housework hours. Since these models look at within individual change over time, the coefficients are showing that men and women allocate (roughly) the same number of hours to housework at those times when they are observed to outsource housework and at those times when they are not observed to outsource housework. They also suggest that the estimated negative and statistically significant effect of domestic outsourcing on housework hours among women observed in the OLS models was spurious and a product of unobserved variables correlated both with domestic outsourcing and women's housework supply.

However, while an improvement over the OLS models, the fixed-effect panel data models are not perfect either. First, the models are estimated using only within-individual over-time change: that is, only individuals who are ever observed over the life of the panel to both outsource housework *and* not outsource housework contribute to the estimation of the coefficient on domestic outsourcing. In our data, only 396 individuals (6.3%) are observed in these two states at different observation points. As a result, these models are inefficient and give imprecise parameters (i.e., large standard errors) with the risk of Type II errors (i.e., 'false negatives'). Second, the fixed-effect models, while powerful tools to account for bias due to unobserved factors, cannot deal with bias due to reverse causation. Hence, to complement the fixed-effect models we fit models that use simultaneous equation estimation for panel data. While these simultaneous equation models are arguably less powerful in accounting for unobservables than the fixed-effect models (they require distributional assumptions about the unobserved variables), they are both more efficient and more capable than fixed-effect models to deal with reverse causation.

The estimated correlations between the random error terms in the housework main equation and the domestic outsourcing secondary equation are 0.03 ($p<0.01$) amongst men and -0.02 ($p>0.05$) among women. This finding indicates that simultaneous equation models are preferable among men. Estimates from these models are presented in columns (v) and (vi) in Table 3. The results indicate that domestic outsourcing reduces both men's ($b=-0.790$, $p<0.05$) and particularly women's ($b=-2.835$, $p<0.01$) weekly housework hours. This finding is consistent with the most straightforward assumption about the effects of domestic outsourcing: that it relieves individuals' housework time burden, with effect sizes largest for women (who average more time doing housework than men) such that gender gaps are narrowed. It is not consistent with previous research findings that neither men nor women's time burden is reduced by outsourcing (Sullivan and Gershuny, 2013), or that men's time is reduced at least as much as women's (Craig and Baxter, 2014), and confirms our expectation that panel data and methods could significantly improve upon cross-sectional analyses.

Table 4 shows the results of models of feeling regularly rushed or pressed for time. Since this outcome variable is binary, we apply logistic regression and express the results as odds ratios. Results from cross-sectional logit models in columns (i) and (ii) in Table 4 provide a similar picture as the bivariate analyses in Table 2. Men (odds ratio=1.509, $p<0.01$) and women (odds ratio=1.370, $p<0.01$) who outsource housework are significantly and substantially more likely to feel rushed or pressed for time than those who do not outsource housework.

The statistical significance and magnitude of these estimates fades in fixed-effect logit models that do a better job in accounting for unobserved traits of individuals in columns (iii) and (iv). However, the

positive effect of domestic outsourcing on time pressure remains large and statistically significant among men (odds ratio=1.502, $p<0.05$) and relatively large though not statistically significant amongst women (odds ratio=1.240, $p>0.05$).

Results from simultaneous equation models for panel data that reduce the risk of bias due to reverse causation and improve efficiency in estimation are presented in columns in (v) and (vi). The estimated correlation between the random error terms in the main and secondary equations are large and statistically significant for both men ($\rho=0.13$; $p<0.05$) and women ($\rho=0.31$; $p<0.01$). This result indicates that simultaneous equation estimation is preferable. Results from these models are more consistent with theoretical expectations that domestic outsourcing should lower women's time pressure. They indicate that outsourcing housework has no statistically significant effect on the propensity for men to feel regularly rushed or pressed for time (odds ratio=1.235, $p>0.05$), but significantly and substantially reduce women's propensity to feel similarly (odds ratio=0.633, $p<0.05$).

6 Discussion and conclusion

In this paper we have reexamined the associations between domestic outsourcing, housework supply and feelings of time pressure, as well as gender differences in these, using Australian panel data from the Household, Income and Labor Dynamics in Australia (HILDA) Survey. We contribute to the literature by estimating these relationships using fixed-effect panel regression models that account for person-specific unobserved effects and simultaneous equation models for panel data (or multiprocess multilevel models) that enable us to better grapple with issues of reverse causation. These are more robust estimation techniques than those used in all prior studies. While we do not claim that our models are *causal*, we argue that the direction, magnitude and statistical significance of our estimates should be closer to the 'true' causal effects of outsourcing than those reported in previous studies.

Compared to many prior studies, the results in this paper are more consistent with theoretical expectations that domestic outsourcing is a possible solution to unequal gender divisions of housework and subjective time pressure. They support the widespread and intuitively appealing assumption that buying in services is a useful strategy for time-pressed households (Cohen, 1998; Bittman et al., 1999; de Ruijter et al., 2005; Bianchi and Milkie, 2010); it reduces housework time, particularly for women, and means they feel less rushed and harried. This study adds clarity to a literature that has produced inconsistent findings.

Overall, our models and data increase confidence that the findings are more reliable than those of the prior cross-sectional analyses, but our study is nevertheless not without shortcomings. First, the domestic outsourcing information available in the HILDA Survey is limiting. It gives no indication of the amount of service time that is purchased, or the specific services that are being supplied. There is likely to be a substantial difference in the impacts of outsourcing upon the domestic time of men and women according to whether it is female-typed tasks such as cleaning, or male-typed tasks such as outdoor work and maintenance that are being bought, but our measures cannot capture these distinctions. Also, there were a large number of couples whose reports of domestic outsourcing differed from each other. This mismatch points towards the presence of measurement error in this variable, which might dilute some of the reported effects. Second, we have argued that our estimation strategies enable us to provide a better representation of the relationships between domestic outsourcing, housework supply and feelings of time pressure than before. Yet these could be enhanced if certain data became available. For instance, the efficiency of our fixed-effect and simultaneous equation models would benefit from the collection of information on domestic outsourcing in more survey waves. Also, truly causal effects would best be gathered via natural experiments introducing truly exogenous variation in domestic outsourcing, for example the passing of laws affecting the legitimacy, price or availability of domestic outsourcing. Inclusion of missing covariates that change

over time, such as explicit measures of gender ideology, would also constitute an improvement over the current models. Third, our results may not be generalizable to other contexts, due to cross-national differences in housework patterns, cultural norms and values noted above (Hook, 2010; Gornick and Meyers, 2003; Lewis, 2009). It may be that the benefits of outsourcing for women are more pronounced in a liberal welfare state, such as Australia, with relatively few work-family reconciliation policies than in countries, such as the Nordic social democracies, where time allocation to paid and unpaid work are more gender-similar, and average full time working hours are lower (Hook, 2010).

In summary, arguments that outsourcing is a solution to domestic demand, and explains why women's housework time is negatively correlated with higher economic resources, have been enduring in the literature, but empirical investigation of the propositions has been surprisingly scant and inconclusive. We have undertaken analyses that significantly clarify the issue, and show that hiring help can promote greater gender equity between men and women and reduce time stress. One consequence, however, may be increased inequality amongst women who can and cannot afford paid domestic help. While domestic outsourcing may solve time constraints for middle class women, it is not a strategy available to all women and may exacerbate class inequalities. Alternative solutions to addressing continuing gender gaps in domestic labor are thus still required.

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Tables

Table 1

Percentage feeling rushed or pressed for time, by gender

	Women		Men	
	Mean/%	95% CI	Mean/%	95% CI
Weekly housework hours	18.67	18.39-18.94	6.20	6.07-6.34
Regularly rushed or pressed for time	41.80%	40.79-42.81	33.12%	32.16-34.09

Table 2

Percentage feeling rushed or pressed for time, by gender and domestic outsourcing

	Women		Men	
	Mean/%	95% CI	Mean/%	95% CI
Weekly housework hours				
Outsourcing	16.20	15.51-16.89	6.22	5.88-6.58
No outsourcing	19.01	18.72-19.31	6.20	6.05-6.35
Regularly rushed or pressed for time				
Outsourcing	51.43%	48.50-54.35	41.44%	38.56-44.33
No outsourcing	40.45%	39.37-41.53	31.96%	30.93-32.98

Table 3

Gender-specific linear regression models of weekly housework hours

	OLS ^a		FE ^b		SEE ^c	
	Men (i)	Women (ii)	Men (iii)	Women (iv)	Men (v)	Women (vi)
Domestic outsourcing	-0.180 (0.208)	-2.696** (0.393)	0.171 (0.328)	-0.751 (0.639)	-0.790* (0.345)	-2.835** (0.559)
Woman's earning decile	0.119** (0.039)	-0.399** (0.075)	-0.000 (0.059)	-0.370** (0.115)	0.114* (0.053)	-0.479** (0.106)
Woman's usual paid work hours	0.050** (0.006)	-0.166** (0.012)	0.047** (0.010)	-0.148** (0.020)	0.054** (0.008)	-0.169** (0.017)
Woman works in a professional occupation	0.329 (0.198)	-0.663 (0.376)	0.152 (0.349)	-0.211 (0.681)	0.473 (0.258)	-0.657 (0.620)
Woman's age	-0.017 (0.015)	0.117** (0.028)	0.004 (0.117)	-0.353 (0.227)	-0.020 (0.015)	0.119** (0.031)
Man's earning decile	0.023 (0.027)	-0.094 (0.051)	-0.069 (0.046)	-0.021 (0.089)	0.050 (0.036)	-0.099 (0.065)
Man's usual paid work hours	-0.083** (0.005)	0.085** (0.009)	-0.055** (0.008)	0.054** (0.016)	-0.095** (0.006)	0.088** (0.010)
Man works in a professional occupation	0.262 (0.187)	-0.355 (0.354)	-0.368 (0.335)	-0.464 (0.654)	0.407 (0.253)	-0.111 (0.481)
Man's age	0.022 (0.015)	0.055* (0.028)	0.086 (0.113)	0.393 (0.221)	0.030* (0.014)	0.061* (0.03)
Number of dependent children age 0-15	1.044** (0.076)	2.891** (0.143)	0.487** (0.157)	2.738** (0.307)	1.187** (0.078)	2.920** (0.155)
Couple owns home	-0.420* (0.180)	0.687* (0.341)	0.007 (0.351)	0.416 (0.684)	-0.689** (0.168)	0.658* (0.377)
Cohabiting couple	0.087 (0.193)	-1.675** (0.366)	0.055 (0.481)	-1.805 (0.939)	0.092 (0.225)	-1.517** (0.428)
N (observations)	9,105	9,105	7,276	7,276	9,105	9,105
N (couples)	5,124	5,124	3,295	3,295	5,124	5,124
R ²	0.071	0.199	0.033	0.087	n/a	n/a

Note: Model coefficients, standard errors in parentheses. Results for the selection equation in SEE models are available upon request.

^aOrdinary least squares.

^bFE: Fixed effects.

^cSEE: Simultaneous equation estimation.

* p<0.05, ** p<0.01.

Table 4

Gender-specific logistic regression models of feeling rushed or pressed for time

	OLS ^a		FE ^b		SEE ^c	
	Men (i)	Women (ii)	Men (iii)	Women (iv)	Men (v)	Women (vi)
Domestic outsourcing	1.509** (0.110)	1.370** (0.098)	1.502* (0.293)	1.240 (0.242)	1.235 (0.209)	0.633* (0.210)
Woman's earning decile	1.015 (0.014)	1.039** (0.014)	1.007 (0.038)	1.046 (0.040)	1.011 (0.026)	1.068** (0.025)
Woman's usual paid work hours	0.998 (0.002)	1.022** (0.002)	0.999 (0.006)	1.040** (0.007)	1.000 (0.004)	1.036** (0.004)
Woman works in a professional occupation	1.062 (0.071)	1.298** (0.085)	0.775 (0.167)	1.080 (0.231)	1.171 (0.126)	1.640** (0.121)
Woman's age	1.001 (0.006)	0.995 (0.005)	0.938 (0.063)	0.995 (0.086)	1.001 (0.010)	0.999 (0.009)
Man's earning decile	0.981* (0.009)	0.996 (0.009)	1.011 (0.029)	1.008 (0.028)	0.958* (0.018)	0.996 (0.017)
Man's usual paid work hours	1.026** (0.002)	1.003 (0.002)	1.033** (0.006)	0.997 (0.005)	1.047** (0.003)	1.007* (0.003)
Man works in a professional occupation	1.318** (0.081)	1.078 (0.067)	1.396 (0.318)	1.007 (0.205)	1.617** (0.119)	1.241 (0.116)
Man's age	0.979** (0.005)	0.997 (0.005)	1.009 (0.064)	0.976 (0.082)	0.967** (0.010)	0.999 (0.008)
Number of dependent children age 0-15	1.285** (0.032)	1.546** (0.041)	1.651** (0.162)	2.122** (0.216)	1.528** (0.046)	2.108** (0.048)
Couple owns home	1.093 (0.070)	1.068 (0.066)	1.200 (0.253)	0.981 (0.202)	1.155 (0.119)	1.091 (0.113)
Cohabiting couple	1.000 (0.066)	0.964 (0.062)	0.767 (0.210)	1.106 (0.321)	1.021 (0.119)	0.956 (0.113)
N (observations)	9,105	9,105	1,828	2,203	9,105	9,105
N (couples)	5,124	5,124	714	846	5,124	5,124
Log likelihood	-5,126	-5,537	-596	-721	-7,520	-7,963
p^d	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: Odds ratios, standard errors in parentheses. Results for the selection equation in SEE models are available upon request.

^aOrdinary least squares.^bFE: Fixed effects.^cSEE: Simultaneous equation estimation.^d p -value of a log-likelihood-ratio test.* $p < 0.05$, ** $p < 0.01$.

Appendix

Table A1

Means and standard deviations for model variables

	Mean	SD	Min.	Max.
<i>Outcome variables</i>				
Woman's weekly housework hours	18.67	13.42	0	128
Woman feels rushed or pressed for time	0.42		0	1
Man's weekly housework hours	6.21	6.57	0	100
Man feels rushed or pressed for time	0.33		0	1
<i>Key explanatory variable</i>				
Domestic outsourcing	0.12		0	1
<i>Control variables</i>				
Woman's earning decile	4.14	3.16	1	10
Woman's usual paid work hours	18.30	18.64	0	112
Woman works in a professional occupation	0.18		0	1
Woman's age	47.11	15.48	15	100
Man's earning decile	5.45	3.72	1	10
Man's usual paid work hours	31.59	22.41	0	130
Man works in a professional occupation	0.18		0	1
Man's age	49.67	15.88	16	95
Number of dependent children age 0-15	0.69	1.03	0	8
Couple owns home	0.78		0	1
Cohabiting couple	0.19		0	1
<i>Instrumental variable</i>				
% of people who outsource housework in respondent's state of residence	11.43	1.29	5.0	16.7