

Explaining the Decline in Married Women's Housework: 1965-2010

Patrick Ishizuka
Princeton University¹

Keywords: gender, housework, trends, bargaining, autonomy

¹ Department of Sociology and Office of Population Research.
email: ishizuka@princeton.edu

ABSTRACT

The average amount of time spent performing housework in the United States has declined dramatically since the 1960s, driven largely by a reduction in women's housework without a commensurate increase in that of men. At the same time, multiple indicators of married women's labor market participation rose substantially, including proportion working, hours worked, relative earnings, and absolute earnings. Each of these measures implies distinct theoretical mechanisms linking wives' labor market participation and housework hours. Using nationally representative repeated cross-sectional time diary data from 1965-2010, and longitudinal data containing housework reports from 1976-2007, I evaluate evidence for the time availability, relative resources, gender display, and autonomy perspectives in explaining the decline in married women's housework. In addition, I find that more recent cohorts of married women perform significantly less housework than older cohorts after accounting for various indicators of both spouses' labor market participation, educational attainment, and household composition.

INTRODUCTION

The amount of housework performed in the United States has declined substantially since the 1960s, driven largely by a reduction in women's housework without a commensurate increase in that of men (Bianchi et al. 2000; Gershuny and Robinson 1988; Sayer 2005). During this same period, various indicators of women's labor market participation changed dramatically (Blau 1998; Goldin 2006). Although there are a number of theories that examine the relationship between labor market participation and housework in the cross-section, the contribution of changes in various measures of women's labor market participation to the decline in their housework hours has not been examined.

Figure 1A shows the trend in married women's housework in time diary data from 1965-2010, and in the Panel Study of Income Dynamics (PSID) over the period 1976-2007. The time diary data shows married women's housework decreasing from approximately 30 hours a week in 1965 to only 15 hours a week in 2010. The PSID data show a similar decline, although over a condensed time horizon. In contrast, the trend for husbands' housework hours is relatively flat, showing only a marginal increase in both data sets. This change was small and clearly not sufficient to compensate for the drop in wives' housework hours. Although the dramatic decline in married women's housework since the 1960s is evident, the theoretical mechanisms underlying the trend are not well understood.

[Figure 1A about here]

Prior research has found evidence that changes in women's educational attainment, employment, and fertility are important in explaining trends in women's housework (Bianchi et al. 2000). Gershuny and Robinson (1988) attempt to separate changes in the prevalence of characteristics from changes in their effects on housework, arguing that both processes are implicated in the decline in women's housework in the U.S. Other research demonstrates a growing similarity between men and women in time spent in paid and unpaid labor in recent decades, implying that the convergence is related to increases in women's labor market participation (Sayer 2005). Because each of these studies relies on time diary data, which typically contains a limited set of explanatory variables on individuals only, the ability to test key theoretical perspectives is highly restricted.

Another relevant body of literature documents differences across cohorts in women's education, employment, cultural schemas, and housework. Artis and Pavalko (2003) provide an important analysis of change in women's household labor between 1974-1975 and 1987-1988, focusing on individual change and enduring differences between cohorts. Identifying cohort with gender socialization, they find that individual change and cohort differences are both important in explaining changes between survey waves in the percentage of housework items for which women have primary responsibility. Other studies have documented significant cohort differences in educational attainment (DiPrete and Buchman 2006; Goldin et al. 2006), labor market participation (Goldin 2006; Percheski 2007), fertility (Bongaarts and Feeney 1998), gender ideology (Brewster and Padavic 2000; Thonton and Young-DeMarco 2001), and cultural schemas for work and family life (Blair-Loy 2001), all of which may be associated with women's housework time.

A final strand of research focuses on the association between women's labor market participation and their housework hours, and is primarily concerned with evaluating competing theoretical perspectives in the cross-section, and often in subsamples such as dual full-time employed couples. Although some of this literature uses panel data to evaluate hypotheses (e.g. Killewald and Gough 2010), the analytical focus is on assessing evidence for various theoretical perspectives, and not on explaining trends over time. This literature highlights four perspectives on how women's market work may be expected to influence their household work: time availability, relative resources, gender display, and autonomy. The time availability perspective assumes a gender neutral model in which housework hours are rationally allocated based on time constraint factors and comparative advantage, including time spent in market work and the presence of children (Coverman 1985; Shelton 1992). The relative resources perspective treats economic resources as a source of intrahousehold power, typically focusing on the relationship between wives' financial contributions and their housework hours. This perspective predicts that as wives' earnings increase relative to those of their husbands, they can bargain down the amount of housework they perform (Brines 1994; Bittman et al. 2003; Lundberg and Pollak 1996). The gender display perspective suggests a modification to bargaining theory in that husbands who earn less than their

wives are hypothesized to neutralize gender deviance by engaging in less housework than what would be predicted under a gender neutral linear model of their relative earnings (Brines 1994; Schneider 2011). Finally, the autonomy perspective argues that it is not wives' relative earnings, but rather their absolute income, that ultimately matters in determining their housework hours. Absolute earnings are hypothesized to affect housework hours in part through outsourcing (Gupta 2007; Killewald 2011; Killewald and Gough 2010). Each of these perspectives implies very different theoretical mechanisms through which women's labor market participation affects their housework time. But a substantial gap remains between these studies and others that attempt to explain changes in housework over time.

The tremendous decline in married women's housework and the contemporaneous and rapid increase in their labor market participation represent fundamental changes in social organization. Figures 2A-D demonstrate the substantial rise in wives' relative earnings, absolute annual earnings, weekly hours worked, and proportion working by survey year in the PSID from 1976-2007. Husbands' labor market participation-related indicators, in contrast, did not change nearly as much over this period.² Wives' relative and absolute earnings increased dramatically, as did the proportion of wives currently working, and their average weekly market work hours. Both spouses' educational attainment also increased substantially across cohorts.³

[Figures 2A-D about here]

Understanding the decline in married women's housework during a time of profound change in women's employment and earnings has important potential implications for understanding the intersections between labor markets, families, and gender. Distinguishing between different aspects of labor market participation and their effects on housework is critical because these factors represent distinct underlying theoretical models of gender and intrahousehold dynamics. For example, change may reflect time constraints resulting from increasing market work hours or proportion working, shifts in power within the household as women's earnings change relative to husbands', or women's ability to

² See Appendix A, Figures 1A-C.

³ See Figures 4A and 4B.

outsource housework as their own incomes rise. Each of these factors implies different theoretical mechanisms at work, with different implications for our understanding the relationship between gender, market work, and housework.

Time trends in women's housework hours may reflect changes shared by women simultaneously regardless of when they were born (period effects), but may also be produced by enduring differences associated with the year in which women were born (cohort effects). Whereas Figure 1A plotted the trend in married women's housework by calendar year (period trend), Figure 1B plots housework hours by wives' birth cohort (birth cohort trend). Both figures show a decline of almost identical magnitude. These period and cohort patterns present an identification problem, because without formally separating period and cohort, the source of change in married women's housework is obscured. Do women of all ages simultaneously change their behavior in certain periods, or does change arise as older cohorts are replaced by younger, more egalitarian cohorts? Assessing whether the observed halving of married women's housework hours over the time series is produced by cohort-specific processes, or by processes shared broadly across cohorts in particular periods, is important for our understanding of gender-related social change more generally. Whereas persistent cohort differences suggest a stable pattern of behavior across the life course, period change implies significantly more malleability as women of all ages change their behavior at a given time. These two distinct components imply different processes of change and different expectations for future change.

[Figure 1B about here]

Using nationally representative repeated cross-sectional time diary data spanning the period 1965-2010, along with longitudinal data from the PSID from 1976 to 2007, I simultaneously test multiple theoretical perspectives (time availability, relative resources, gender display, and autonomy) to explain the dramatic decline in married women's housework during the past several decades. Given the rising female advantage in college completion in recent cohorts (Buchmann and DiPrete 2006; Goldin et al. 2006), along with the decline in fertility since the baby boom (Bongaarts and Feeney 1998), I also assess the role of changes in educational attainment and fertility in explaining the observed patterns. I

distinguish analytically between cohort and period changes in married women's housework, and assess the extent to which various aspects of married women's labor market participation explain these changes. Using data on employment, market work hours, absolute income, and relative income in random intercept models and couple-level fixed effects models, I assess the explanatory power of the time availability, relative resources, gender display, and autonomy perspectives in explaining the trends over time in married women's housework.

BACKGROUND

Prior studies have examined historical declines in women's housework (Bianchi 2011; Bianchi et al. 2000; Gershuny and Robinson 1988, Sayer 2005), providing evidence that changes in factors such as marital status, age at marriage, household composition, educational attainment, and time spent in paid work are important in explaining trends. Bianchi et al. (2000) perform a decomposition to distinguish between changes in characteristics and changes in their association with housework to explain the mean difference in housework performed in 1995 relative to 1965. Results suggested that changes in employment, educational attainment, and household composition contributed to the decline.

Decompositions of this nature are informative, but limited in that they make inefficient use of data by comparing only two time periods. In addition, they are unable to formally distinguish between changes in all women's behavior at a point in time (period effects), and change brought about by enduring differences between cohorts (cohort effects). Results from prior research suggest that cohort replacement represents an important source of observed change in gender ideology over time (Brewster and Padavic 2000). Gender ideology possesses a theoretical link to perceived fairness of the gender division of household labor and ultimately the amount of housework performed by husbands and wives (Davis and Greenstein 2009; Greenstein 1996).

Gershuny and Robinson (1988) argue that both compositional change and behavioral change are important in explaining the decline in women's housework in the U.S. Using detailed time use categories, Sayer (2005) documents a decline in the index of dissimilarity for proportion of time spent in different

activities in 1965, 1975, and 1998, part of which is attributable to increased similarity between men and women in time spent in paid and unpaid work. This analysis implies that women's increased labor market participation is related to the convergence in men and women's housework hours. Prior studies that have described changes in the way men and women allocate their time have relied on time diary data, which typically asks respondents to document all activities performed in a twenty-four hour period. While time diary data has advantages with respect to validity (Shelton and John 1996; Kan and Pudney 2008), the ability to test important theoretical mechanisms is restricted by the relatively limited set of explanatory variables consistently present in time diary surveys.

Previous housework studies have sometimes included age, typically as a control variable, as well as survey year in statistical models (Bianchi et al. 2000; Killewald and Gough 2010). But the possible role of birth cohort differences in explaining observed trends has generally not been theorized or estimated empirically. Artis and Pavalko (2003) make an important contribution by attempting to separate individual change from cohort differences in explaining changes between survey waves in the percentage of housework items for which women have primary responsibility. The analysis is limited, however, in its reliance on a measure of housework that is not comparable to measures used in most prior research, their restricted period and cohort coverage by examining only two time periods in the 1970s and 1980s, and the inability to analytically separate period and cohort change given their research design.

I argue that formally separating cohort and period components of change is important because of its potential to further our understanding of theoretical mechanisms. Bianchi et al. (2000), for example, suggest that increases in women's employment contributed to the decline in women's housework. However, these employment changes could have arisen as women of all ages moved into the labor force in a given period, or they could reflect fundamental differences between cohorts in their patterns of labor market participation. As a result, we are unable to determine whether the amount of housework a woman will do over her married lifetime is relatively stable, or instead whether the amount of housework performed is more responsive to changes in employment opportunities, the cost of domestic substitutes, or other transformations shared by women of all ages at a point in time. Analytically separating period

and cohort change can help us to understand not only how the decline in wives' housework happened in the past, but also how changes in women's housework may occur in the future.

COHORT, GENDER, AND HOUSEWORK

Age-period-cohort models are motivated by the theoretical importance of distinguishing between cohort and period change in married women's housework. There are several theoretical reasons from prior research to suggest that women from different cohorts may differ fundamentally in their housework patterns through both direct and indirect pathways.

Indirect Pathways

Cohorts provide a context in which decisions about family, education, and careers are made. Individuals from different birth cohorts reach the same age during different historical periods, which, in conjunction with cultural beliefs about gender, will shape career aspirations (Correll 2004) and the kinds of decisions men and women make regarding fertility, marriage, and investment in human capital (Goldin 2006).

Correll (2004) demonstrates that gender-related status beliefs can bias men and women's self-assessments of competence in career-relevant skills, controlling for actual ability. These biased self-assessments can then shape the kinds of aspirations men and women have for career-relevant activities. In prior work, Correll (2001) demonstrated that these biased self-assessments influenced men and women's differential rates of persistence in science, engineering, and mathematics fields. Additionally, cross-national research finds that the gender gap in boys' and girls' expressed affinity for mathematics, controlling for test scores, is associated with sex-segregation in field of study (Charles and Bradley 2009). But if gender-related status beliefs have become less pervasive in more recent cohorts, then both the vertical (level of schooling) and the horizontal (field of study) dimensions of educational stratification should have decreased, consistent with evidence from prior research (Buchmann and DiPrete 2006;

Goldin et al. 2006). This should serve as a mechanism through which cohort is associated with wives' housework.

Goldin argues that in different historical periods, cohorts of women reaching adulthood experience different “horizons,” which refer to expectations about their future labor market attachment. Goldin argues that these horizons are influenced by expectations about marriage, divorce, and fertility, which then shape women's human capital investment decisions in young adulthood. This is consistent with research suggesting that the gender-specific “insurance against poverty” benefit of a college education has increased substantially in recent cohorts (DiPrete and Buchmann 2006). Additionally, Percheski (2008) provides evidence that age-specific employment rates among professional women have increased across cohorts of women throughout the twentieth century. As women's educational attainment has continued to rise across cohorts (Buchmann and DiPrete 2006; Goldin et al. 2006), so too has women's earnings potential (Goldin 2006; Kessler-Harris 1990). The attractiveness on the marriage market of women with high earnings or earnings potential (Oppenheimer 1994; Schwartz 2010; Sweeney and Cancian 2004; though see Xie et al. (2003) for conflicting evidence) and women with high educational attainment (DiPrete and Buchman 2006; Goldstein and Kenney 2001; Schwartz and Mare 2005) may have increased in recent decades. As a result, I expect for married women's educational attainment to explain a portion of the association between cohort and housework.

Direct Pathways

Studies documenting differences by cohort in beliefs about gender equality and women's role in the workplace and the family provide further empirical evidence that gendered cultural beliefs are to a significant degree cohort-specific. Feminist self-identification and attitudes towards gender equality appear to be shaped by cohort experiences in early adulthood (Schnittker et al. 2003), and beliefs about gender have become more egalitarian in more recent cohorts (Thornton and Young-DeMarco 2001). Therefore, cohort patterns should be consistent with research suggesting that cohort replacement is an

important driver of aggregate changes in gender ideology over time as older cohorts are replaced by younger, more egalitarian ones (Brewster and Padavic 2000).

For Blair-Loy (2001), cultural schemas are socially constructed cognitive and normative expectations with strong emotional components. Schemas are based on shared cultural understandings and provide a cognitively ordered framework for both understanding and evaluating self and other, and therefore, how to act in specific contexts. Blair-Loy documents the powerful emotional grip of the family devotion schema, along with assumptions of what it means to be a good mother, on women of all birth cohorts in her study. Conflict arose through the coexistence of the family devotion schema with the work devotion schema, which prescribes intense devotion to one's career as a normative ideal. The ways in which women dealt with these conflicting schemas and approached decisions about housework, fertility, and childrearing differed in fundamental ways by cohort.

If gendered cultural beliefs within marriage are to an important degree cohort-specific, I expect this to be reflected in a strong relationship between wives' birth cohort and their housework hours, even after taking into account labor market participation, educational attainment, and the presence of children.

H1: Later birth cohorts of married women will perform less housework than earlier cohorts, net of period and all explanatory variables.

Since the effect of gendered cultural beliefs on housework operates indirectly through education, labor market participation, and fertility, I expect for these pathways to explain a significant portion of the cohort effect. Even after taking into account these factors and changes in housework shared by all women in specific periods, I expect for cohort differences to persist, which I argue represents the direct influence of cohort-specific gendered cultural beliefs on married women's housework.

GENDER, LABOR MARKET PARTICIPATION, AND HOUSEWORK

Theoretical perspectives related to labor market participation, housework, and gender that have received support in prior research include the relative resources, gender display, autonomy, and time availability perspectives. Research testing the relative resources and gender display (Bittman et al. 2003;

Brines 1994; Schneider 2011), autonomy (Gupta 2007), and time availability (Coverman 1985; Presser 1994) perspectives often rely on cross-sectional surveys from a single time period, or focus on a specific subpopulation such as couples in which both spouses are employed full-time (Killewald and Gough 2010). My analysis extends prior work by simultaneously testing each of these theoretical perspectives with panel data spanning several decades in order to assess their explanatory power in understanding the decline in wives' housework. Wives' relative earnings increased across the time series and may be associated with housework, for example, but may not play a significant part in explaining the overall decline. Therefore, I both assess evidence for each theoretical perspective in the data and evaluate each perspective's explanatory power in contributing to the decline.

The *time availability perspective* assumes that housework is rationally allocated based on time constraint factors, including time spent in market work and the presence of children (Coverman 1985; Shelton 1992). For example, wives who spend more time in market work have less time to engage in unpaid housework, all else being equal. In this framework, men and women's hours of market work are viewed as a time constraint limiting the amount of housework performed. Hours of market work themselves, however, may also be influenced by wage rates and relative earning potential (Devereaux 2004; Hersch and Stratton 1996; Lundberg and Pollak 1996; Pollak 2005). While the time availability perspective generally assumes that decisions about market work are gender neutral, decisions about family labor supply may be shaped by gender in important ways. Cha (2010), for example, finds that women are significantly more likely than men to quit their jobs if their spouse overworks, net of earnings and hours worked by each spouse, but the reverse does not hold true. Additionally, the relationship is stronger among couples with children. Nonetheless, the time availability perspective makes the gender-neutral prediction that wives' market work hours will be negatively associated with their housework hours, net of husbands' work hours, both spouses' absolute incomes, and wives' relative income. Because of the distributional change of increasing proportions of working wives and the rise in average hours worked, the time availability perspective is expected to explain a significant portion of decline in wives' housework hours.

Because various indicators of married women's labor force participation increased dramatically over the time series analyzed, I expect for the time trend to be explained largely by these factors, which both constrain their time and augment their economic resources in relative and absolute terms. With respect to the time availability perspective, I hypothesize a negative relationship between wives' weekly market work hours and housework hours:

H2: Increases in wives' weekly hours of market work will be associated with decreases in housework hours, net of absolute and relative earnings.

Since married women's hours of market work have increased substantially across the time series, I expect that adding hours of market work will explain a significant portion of the time trend.

The relative economic resources of each spouse are theorized to influence bargaining power within marriage (Bittman et al. 2003; Brines 1994; Lundberg and Pollak 1996; Pollak 2005). The *relative resources perspective* explicitly treats economic resources as a source of power within the household. This perspective typically focuses on the relationship between wives' direct financial contributions and their housework hours, predicting that as wives' earnings increase relative to those of their husbands, they are able to bargain down the amount of housework they perform (Bittman et al. 2003; Brines 1994; Lundberg and Pollak 1996). Since housework is assumed to be an undesirable activity, the relative resources perspective emphasizes the role of wives' potential (Pollak 2005) or current (Bittman et al. 2003; Brines 1994; Schneider 2011) earnings relative to their husbands' earnings in determining housework hours. As wives' relative earnings rise, their housework is predicted to decline, net of each spouse's absolute earnings and market work hours. Because married women's relative earnings increased significantly over the time series, the relative resources perspective may explain a substantial portion of the trend in wives' housework.

Gender-based perspectives on household labor focus on the persistence of asymmetry in men and women's housework hours. These perspectives treat gender as a routine accomplishment achieved in social interaction, and emphasize the symbolic cultural significance of housework as a means of enacting masculinity and femininity (West and Zimmerman 1987). In this framework, housework is not a gender

neutral domain, but rather serves as a means through which gender is performed. The *gender display perspective* suggests a modification to bargaining theory in that husbands who earn less than their wives are theorized to neutralize gender deviance by engaging in less housework than what would be predicted under a gender neutral linear model of their relative earnings (Bittman et al. 2003; Brines 1994; Schneider 2011).

Using data from the PSID, Killewald and Gough (2010) found that relative earnings and its square were unrelated to wives' housework hours once a flexible functional form (linear spline) was assumed for the absolute earnings-housework relationship. However, their sample restriction to couples in which both spouses were employed full-time leaves open the possibility that economic dependency may still matter, particularly because more than a quarter of the weighted sample of couple-year observations contain zero earnings for wives. Consistent with the relative resources and gender display perspectives, I expect for increases in wives' share of total family income to be associated with reductions in their housework hours (relative resources), and the squared term on relative earnings to be positive and statistically significant (gender display):

H3: Increases in wives' relative earnings will be associated with decreases in their weekly hours of household labor (relative resources), net of absolute earnings and hours/week worked, but the relationship will be curvilinear (gender display).

Although married women's relative earnings have increased substantially across the time series, the consequences for explaining the period and cohort trend depend in part on where in the distribution of relative earnings change occurred because of the hypothesized curvilinear relationship between relative earnings and housework.

The *autonomy perspective* differs from the relative resources perspective by suggesting that it is not wives' relative earnings, but rather their absolute earnings, that ultimately matters in determining their housework hours. Absolute earnings are hypothesized to affect housework hours in part through outsourcing (Gupta 2007; Killewald 2011; Killewald and Gough 2010). Evidence supporting the autonomy perspective demonstrates that wives' hours of housework decline more rapidly with increases in their own earnings than with increases in their husbands' earnings (Gupta 2007; Killewald and Gough

2010). Implicitly, this perspective suggests that the family devotion schema described by Blair Loy (2001) effectively codes housework as women's responsibility. As a result, increases in women's own absolute income allow them to purchase market substitutes to reduce their housework. The assumption of income pooling and monetary fungibility across income sources is also implicitly rejected in this framework (Kenney 2008; Lundberg et al. 1997; Thaler 1999). The autonomy perspective predicts that married women's housework declines as their absolute income rises, net of husbands' absolute income, wives' relative income, and both spouses' hours per week of market work. Like the relative resources perspective, given the considerable rise in married women's absolute earnings, inclusion of wives' absolute income should be expected to explain a considerable portion of the time trend in wives' housework hours.

If the autonomy perspective is correct, wives' housework will decline more with their own earnings than with those of their husbands. Consistent with the autonomy perspective, I expect for wives' own absolute income to be associated with the amount of household labor they perform:

H4: Increases in wives' absolute earnings will be associated with decreases in their weekly hours of household labor, net of relative earnings and hours/week worked.

The use of a linear spline for wives' absolute earnings allows the relationship between wives' income and their housework hours to vary across the earnings distribution. It is important to emphasize that these theoretical perspectives are not mutually exclusive. Indeed, it is possible for each to receive support in the data and to be important factors contributing to the observed decline in wives' housework.

Because an association between housework hours and market work hours may reflect wives' relative or absolute earnings, testing the relative resources, gender display, autonomy, and time availability perspectives requires simultaneously entering variables specific to each theory in the model. This allows each theory's distinct empirical predictions to be assessed, but also limits analysis of the extent to which these theories explain the decline to assessing their combined explanatory power. I expect that adding variables related to labor market participation to explain a significant portion of the time trends in wives' housework:

H5: Wives' labor market participation related variables will significantly attenuate the coefficients on period and cohort.

Married women's absolute earnings, relative earnings, hours per week of market work, and proportion working have increased substantially across the time series, suggesting that these factors may be important in explaining the decline in housework.

Table 1 organizes each of these theoretical perspectives according to their operationalization, empirical predictions, and hypothesized effects on the period and cohort coefficients when added to models. The proportion of wives' working, their average hours of market work, relative earnings, and absolute earnings all show significant increases in each of these indicators, which suggests that each labor market participation related component could be important in explaining the time trend.

DATA

I employ two different data sources spanning several decades, one being repeated cross-sectional, the other a panel. This allows me to establish the robustness of results across outcome measurement and data structure, and to take advantage of complementarities in data characteristics. I first rely on a series of nationally representative time diary studies in the American Heritage Time Use Study (AHTUS) database. Studies were administered in 1965, 1975, 1985, and 1995. The 1965 data was part of the Multinational Study of Time Use, which used a different sampling frame than the other studies. The sample was restricted to adults ages 19 through 65 in cities with populations greater than 30,000, and was limited to households in which at least one family member was employed full time. Because selection of a different sampling frame might alter the observed housework trend, I applied the same sampling restrictions to the 1975 and 1985 data to assess sensitivity of the pre-1975 trend to different sample eligibility criteria, since in these years information on urbanicity and whether each spouse is employed full-time is available. Trends presented in Appendix B are very similar to the observed trend in wives' housework hours when similar criteria are used. Beginning in 2003, a subset of those completing the final rotation of the Current Population Survey (CPS) was selected to participate in the American Time Use Study (ATUS),

administered by the Bureau of Labor Statistics. I append the ATUS from 2003-2010 to extend the time series.

In addition to the time diary data from 1965-2010, I use data from the Panel Study of Income Dynamics from 1976-2007. These correspond to the years for which data on housework and both spouses' labor market participation related variables are available, allowing me to formally and simultaneously test multiple theoretical perspectives. The PSID began in 1968 with a nationally representative probability sample of approximately 4,800 families. The full sample was comprised of two separate subsamples: an equal probability national sample of households, and a subsample of families with incomes less than two times the 1967 federal poverty line. Sample members forming new families were also followed across time, and their children become eligible sample members upon reaching adulthood. The PSID was administered annually from 1968-1997, and biennially thereafter, which greatly increases the period coverage relative to the time diary data, which is much sparser across periods. An immigrant refresher sample was added in 1997, and I include these observations in my analysis, but I exclude the Latino sample that was introduced in 1990 but subsequently dropped in 1995.

Because the PSID began with a nationally representative sample in 1968, the sample through 1996 is not representative of post-1968 immigrants and their children. A key question therefore is the degree to which the two data sets overlap in terms of key variables and sample characteristics. Appendix C presents descriptive statistics on variables for which data are available in both data sets: wives' age, number of children in the household, and years of education. Weighted descriptive statistics for these variables suggest some evidence of divergence in sample characteristics across survey period. The use of the PSID therefore to some extent represents a tradeoff between representativeness and the ability to test key explanatory mechanisms.

In both data sets, I handle missing data through listwise deletion. Although some research has found evidence of selective attrition in the PSID, the extent of bias introduced by selective attrition has been estimated to be mild (Lillard and Panis 1998). Additionally, while item non-response in the PSID for household income has increased since the early 1980s, non-response for housework and hours of market

work has remained consistently low (Killewald et al. 2011). The PSID contains 97,391 valid housework observations. Missing data on other non-labor market related variables reduces the sample size to 86,396 observations, and missing earnings and other labor market participation variables lead to a final analytic sample of 74,262 couple-year observations and an average of 8.3 observations per couple. The analytic sample for the time diary data contains 31,816 valid observations.

The repeated cross-sectional time diary data and the PSID possess a number of complementary characteristics. Some studies have suggested that time diary data may be less influenced by social desirability biases and other cognitive recall issues relative to stylized measures that ask respondents to report how much time they spend on a particular task on average (Shelton and John 1996; Kan and Pudney 2008). However, as noted earlier, the historical time trends are similar in the two data sets, consistent with earlier estimates from Juster et al (2003). In addition to demonstrating comparability in mean housework hours, establishing that time diary and stylized measures are comparable for the purposes of subsequent analyses requires examining the relationship between explanatory variables common to both data sets and the outcome variable. Although the small number of explanatory variables consistently used across years in the time diary data limits the potential comparisons between the two data sets, analyses discussed in the sensitivity analysis section suggest that period and cohort coefficients change similarly with the introduction of explanatory variables, and coefficients on variables available in both data sets (birth cohort, education, household composition, and employment status) are also similar in magnitude, direction, and statistical significance.

Relative to the time diary data, another key advantage of the PSID is the quality and extensiveness of data on background characteristics, earnings, and employment of both spouses, which is essential for testing key propositions of the time availability, relative resources, gender display, and autonomy perspectives. Another important feature of the PSID is its longitudinal design, which enables the ability to examine within-couple change over time, and the use of fixed effects models to remove the influence of time-invariant unobserved differences between couples. Repeated cross-sectional time diary

data and the PSID each contain unique strengths and limitations, with results from each serving to establish the robustness of the findings.

KEY CONCEPTS AND MEASURES

Table 2 presents key constructs and their empirical operationalization in the time diary data and the PSID. My primary interest is in explaining the dramatic decline in married women's housework hours since the 1960s. In the time diary data, I operationalize housework as the total combined time spent in the following detailed time use categories: cleaning, laundry, ironing, clothing repair, home repairs, vehicle maintenance, and other domestic work. The panel data, in contrast, contains a stylized report of time spent in household labor, and includes the question:

About how much time do you spend on housework in an average week – I mean time spent cooking, cleaning, and doing other work around the house?

There is some debate about the relative strengths and weaknesses of time diary and stylized reporting methods. Stylized reports are generally believed to produce overestimates of time spent in a given task, relative to time diary methods (Shelton and John 1996; Bianchi et al. 2000; Kan and Pudney 2008). While stylized reports are in principle more cognitively demanding to report accurately than time diaries and therefore potentially biased, an important exception documented by Juster et al. (2003) is the analysis of historical trends in time use.

[Table 2 about here]

I include continuous variables for survey year (period) and wife's year of birth (cohort). Alternative specifications of the relationship between housework and period and cohort were evaluated, but the functional form of the net period and cohort associations with housework were most parsimoniously and accurately represented by a linear term.⁴

To test the time availability perspective, I include separate measures of husbands' and wives' hours per week of market work, and a binary indicator for whether each spouse is currently working.

⁴ Appendix D presents lowess and linear fit graphs, as well as dummy variable specifications for survey year, wives' birth cohort, and housework hours.

Because the relationship between household labor and hours per week in the labor market may be non-linear, I evaluated this assumption by including dummy variables at 5 hour per week intervals, with zero hours per week worked serving as the reference category. Results presented in Appendix E suggest that the relationship between hours per week worked and wives' housework, net of absolute and relative income, is in fact linear, conditional on employment status.⁵

Consistent with prior studies evaluating the relative resources and gender display perspectives (Bittman et al. 2003; Brines 1994; Killewald and Gough 2010; Schneider 2011), relative earnings are defined as wives' direct monetary contribution to combined family income – that is, wives' income as a share of total family income. Testing the gender display perspective requires introducing a quadratic term for relative earnings to assess the hypothesized curvilinear relationship between housework hours and relative earnings.

Evaluating the autonomy perspective requires first converting the data on annual earnings into constant dollars using the Consumer Price Index (CPI). Since the autonomy perspective assumes that wives' absolute earnings are the most important determinant of their housework hours, I include separate measures of each spouse's annual income in thousands of dollars. Because recent work suggests a non-linear relationship between wives' absolute earnings and housework hours, following Killewald and Gough (2010), I model absolute earnings using a linear spline with knots at the 25th, 50th, and 75th percentiles of non-zero earnings. This piecewise linear function allows the slope of the relationship between earnings and housework to vary across the distribution of wives' earnings.⁶

While labor market participation-related variables for year t are assessed in year $t + 1$, average weekly housework hours represent current hours in year t . As a result, survey responses for each couple-year observation are drawn from two different survey years. Because of the potential for proxy respondent

⁵ Bayesian Information Criterion (BIC) statistics can be used to assess the relative goodness of fit of non-nested models (Raftery 1995). Analyses comparing specifications of market work hours and housework showed that the preferred model fit was achieved by including a linear term for hours per week worked and a dichotomous indicator for whether each spouse was working.

⁶ I performed an analysis of functional form in the relationship between wives' housework and absolute and relative earnings. BIC model fit statistics consistently suggested that the optimal functional form involves a linear spline with three knots for wives' absolute earnings, regardless of the relative earnings measure used.

bias, I include separate indicators for respondents' identity (proxy respondent vs. not) in year t and year $t + 1$. After 1997, the PSID switched to a biennial survey frequency. For years after 1997, I construct average labor market outcomes in year t from the average of these variables in year $t - 1$ and $t + 1$.⁷ To avoid unduly influential outliers, I recode the top one percent of both time use and earnings observations within each survey year to the 99th percentile.

Since prior work has found that black couples are more egalitarian in the gender division of household labor (Ross 1987), I include a dichotomous indicator for whether the husband is black.⁸ Additionally, because educational attainment is associated with gender ideology (Davis and Greenstein 2009) and wives' housework hours (Bianchi et al. 2000), I include husbands' and wives' educational attainment as categorical variables for high school graduate, some college, college graduate, and graduate/professional degree holders, with high school non-completers as the reference category.⁹

Since fertility and household composition vary across the life course, as well as across cohorts, I include categorical measures of household composition indicating the number of children (one, two, three, four or more) in the household younger than 18 years of age. The PSID also contains a variable indicating whether respondents have a "physical or nervous condition" that limits the amount of work they perform, which I dichotomize as a disability status variable.¹⁰

ANALYTIC STRATEGY

In Part I of the analysis, I document patterns of wives' weekly housework hours by survey year and cohort in both the repeated cross-sectional and panel data. I focus particular attention on assessing the robustness of the relationship between wives' birth cohort and their housework hours across outcome measurements and data structures. Because of limited explanatory variables available across the entire

⁷ Results are robust to the exclusion of observations from the post-1997 period (see Appendix F, Table 1).

⁸ Data on wives' race are not available across the entire time series, and therefore only husbands' race is used.

⁹ This specification of the education-housework relationship represented the optimal functional form relative to several others based on BIC statistics.

¹⁰ Wives' disability status is not available until 1985. Therefore, in supplemental analyses presented in Appendix H, Table 1, I reran analyses over the partial time series in models including wives' disability status. Results are substantively similar to the main models presented.

time series in the time diary data, direct comparisons between the data sets are possible only for survey year (period), wives' year of birth (cohort), wives' educational attainment, whether respondent is working,¹¹ and household composition. Because of the repeated cross-sectional structure of the time diary data, I use ordinary least squares (OLS) regression to examine the relationship between wives' birth cohort and their household labor. In parallel analyses using longitudinal data from the PSID, I estimate random intercept models with couple-year observations nested within couples.

Despite recent innovation attempts in age-period-cohort (APC) model methodology (Yang 2008; Yang and Land 2008), because of the perfect linear dependency of age, period, and cohort ($\text{age} = \text{period} - \text{cohort}$), and the strong assumptions required to derive all three parameters simultaneously, I focus on estimating period and cohort coefficients only. I apply the mechanism-based approach developed by Winship and Harding (2008) to estimate period and cohort effects while ensuring that changes in the age distribution over time do not result in biased coefficients. In this framework, the model is identified by specifying all of the theoretically relevant pathways through which at least one of the three components (in this case, age) is expected to be related to the outcome (housework).

Age represents variation in physiological processes and maturation across the life course, as well as change in the social roles that individuals occupy (Elder et al. 2003). With respect to the performance of household labor, this should be most clearly associated with labor market participation, health and disability, fertility, and parenting roles. The presence of children in the household is also strongly and positively associated with women's time spent in housework (Baxter et al. 2008; Bianchi et al. 2000). Since the timing of fertility by age, as well as the quantum of fertility, has changed across cohorts of women (Bongaarts and Feeney 1998; Goldstein 2009), it is particularly important to include factors related to household composition to achieve APC model identification. If labor market participation rates vary across the life course, employment participation variables should also be included in analyses of time trends in household labor. Finally, health may directly influence ability to participate in both market and

¹¹ Information on hours worked is not consistently available across survey years in the time diary data. While data on full- and part-time employment are available, definitions change across survey years. Therefore, only information on whether respondents are working (vs. not working) is used.

household work, and so health and disability status are potential mediators of the association between age and household labor. Therefore, within the mechanism-based framework applied here, these variables should also be included to effectively estimate period and cohort coefficients.

I include both survey year (period) and wives' year of birth (cohort), omitting age to identify the model. Using Winship and Harding's (2008) approach, I attempt to specify all possible pathways through which age might influence wives' housework. In the time diary data, this includes number of children in the household and whether the respondent is working, both of which are associated with age and housework. The PSID data contains an extensive set of variables related to both age and housework, including the number of children in the household and their age composition, both spouses' employment status, weekly hours of market work, self-rated health, disability status, and employment status. Because all of these variables are not available across the entire time series, however, I include all age-related variables covering the entire range of survey years in the main results, but assess the robustness of findings to the inclusion of variables available only in the partial time series in subsequent analyses discussed in the sensitivity analysis section.

Part II of the analysis evaluates the explanatory power of the time availability, relative resources, gender display, and autonomy perspectives using data from the PSID from 1976-2007. This involves 1) establishing whether each perspective is associated with wives' housework, and 2) assessing the extent to which these perspectives explain the decline in wives' housework. First, I run a series of random intercept models with couple-year observations nested within couples to take into account the correlation of observations within couples. This approach permits estimation of coefficients for substantively important time-invariant characteristics such as wives' birth cohort. At the couple-year observation level, I specify the random intercept model as follows:

$$housework_{ij} = \beta_0 + \beta_1(P) + \beta(C) + \beta X_{ij} + r_{ij}$$

In this model, i indexes couples and j indexes couple-year observations. Wives' weekly hours of housework in couple-year observation j are modeled as a function of an intercept, period (P), wives' birth cohort (C), a vector of explanatory variables (X) sequentially added to the model, and a couple-year-

observation-specific error term r_{ij} . These explanatory variables include educational attainment, household composition, labor market participation variables, and additional pathways through which age is expected to influence housework. At the couple level, I model a random intercept as a couple-specific disturbance assumed to be normally distributed with mean 0 and variance τ_0 . I then evaluate whether each of the labor market participation-related theories receives support in the data, and how the period and cohort coefficients change as variables hypothesized to explain the decline in wives' housework are added to the model.

Second, to establish that results for labor market participation related theories are robust to alternative model specifications, I estimate couple-level fixed effects models. Although the use of fixed effects precludes analysis of time invariant characteristics such as wives' birth cohort, the remaining theoretical perspectives (time availability, relative resources, gender display, and autonomy) can be evaluated empirically. A methodological advantage of fixed effects models is the ability to remove the influence of stable, unobserved differences between couples, such as preferences for household cleanliness or gender specialization. The fixed effects models are identified by variation within couples across couple-year observations, and are analogous to including a separate parameter for each couple:

$$housework_{ij} = \beta_0 + \beta_1(P) + \beta X_{ij} + \alpha_i + r_{ij}$$

This specification treats wives' housework in couple i in couple-year observation j as a function of an intercept, period (P), a vector of characteristics that are time-varying within couples, a couple-specific fixed effect, and a random disturbance r_{ij} specific to each couple-year observation. Fixed effects models establish whether each labor market participation-related theoretical perspective is supported after stable, unobserved characteristics of couples are taken into account, and the extent to which the period decline in wives' housework is explained by these perspectives.

RESULTS AND DISCUSSION

The first stage of the analysis focuses on evaluating the robustness of the relationship between wives' birth cohort and housework hours across data structures and outcome measurements using the time diary and PSID data. Tables 3 and 4 present results from OLS models using the repeated cross-sectional time diary data, and random intercept models with couple-year observations nested within couples. Both sets of models include the same variables in order to evaluate the comparability of the data sets. Hypothesis 1 posited a significant relationship between wives' birth cohort and their housework hours. In the full model in column (5), which includes period, wife's educational attainment, household composition, and wife's employment status, the cohort coefficient in model (2) is negative and statistically significant in the time diary and PSID data (-0.172 and -0.125, respectively). This corresponds to an estimate of approximately 1.7 fewer hours per week of housework performed by wives' from cohorts born 10 years later in the time diary data, and 1.25 fewer hours per week in the PSID. These estimates are net of education, household composition, employment status, and period declines shared by all married women.

[Tables 3 and 4 about here]

Comparing coefficients from models that are comparable across data sets allows us to assess whether results are robust across data structure (repeated cross-sectional versus longitudinal) and outcome measurement (time diary versus stylized report). Cohort coefficients from time diary and PSID estimates are almost identical (-0.081 and -0.080, respectively) when only period and cohort are introduced in column (2) of Tables 3 and 4. Although cohort coefficients remain somewhat larger in the time diary data in the final three models, in both data sets wives' birth cohort remains negative and strongly associated with housework hours (see Figure 4A). A key difference between the two data sets is the strength of the period coefficient across models, with PSID estimates consistently larger in magnitude than estimates from time diary data. In addition, the period coefficient appears to be fully explained in the time diary data by model (4), whereas a large period coefficient remains in the full model in the PSID. Nonetheless, both the period and cohort coefficient seem to respond similarly with the introduction of explanatory variables (see Figure 4B).

Because data are not available for variables required to test the remaining hypotheses in the time diary data across the range of survey years, we are limited to assessing the robustness of the cohort pattern across the two data sets with the inclusion of period, wives' educational attainment, household composition, and employment status only. Across different data structures and outcome measurements, wives' birth cohort is strongly and negatively related to their time spent in housework. This relationship persists, net of period, education, household composition, and employment status.

[Figures 4A and 4B about here]

Part II of the analysis uses several labor market participation related indicators and longitudinal data from the PSID to evaluate evidence for the time availability, relative resources and gender display, and autonomy perspectives. The time availability perspective predicted that wives' housework hours would be negatively associated with their market work hours, net of absolute and relative earnings (Hypothesis 2). The time availability perspective is strongly supported in the data. Husbands' market work hours positively related to wives' housework hours, and wives' market work hours are negatively and more strongly related to their housework hours. Husbands' employment is associated with an average increase of slightly more than one hour in wives' housework, with each additional 10 hours of husbands' market work adding slightly less than 15 additional weekly minutes to wives' housework load. In contrast, wives who are employed average approximately 7 hours per week less housework than wives who are not currently working, and each hour of wives' market work is associated with a marginal decline of slightly more than 15 minutes for every 10 hours of market work. Results from the fixed effects estimates in Table 6 are very similar in magnitude and are all highly statistically significant, together providing strong support for the time availability perspective.

[Tables 5 and 6 about here]

The relative resources perspective predicted that increases in wives' relative earnings would be associated with declines in their housework hours, net of both spouses' market work hours and absolute income (Hypothesis 3). Gender display is simultaneously tested through a quadratic term indicating a curvilinear relationship between wives' relative earnings and housework. The random intercept models

and the fixed effects models produced consistent estimates. Results from both models show that relative earnings and its square are both statistically significant and in the expected direction based on prior research and theory (Bittman et al. 2003; Brines 1994; Schneider 2011), net of hours/week worked and a linear spline for absolute earnings. These findings provide evidence in support of both the relative resources and gender display perspectives. Wives' housework hours decline as their relative earnings rise until reaching an earnings ratio of approximately 0.60 in the random intercept model (0.55 in the fixed effects model). Beyond this point, wives' begin to perform more housework than they would if they were to contribute a lesser share of household income. The results from both the random intercept models and fixed effects models provide evidence consistent with theory suggesting that economically gender atypical couples (as measured by wives' relative earnings greater than 0.60 and 0.55, respectively) enact gender through housework to neutralize gender deviance.

These results differ from analyses by Killewald and Gough (2010), who suggested that the introduction of a flexible functional form in the absolute earnings-housework relationship produces an insignificant association between relative earnings, its square, and housework. These findings may reflect differences in sample selection criterion. Specifically, Killewald and Gough restrict their sample to couples in which both spouses are employed full-time. This sample selection criterion may exclude the most economically dependent wives, as demonstrated in Figures 5 and 6, which compare kernel densities of relative and absolute earnings in the full sample of wives and the subsample of wives in dual full-time worker couples. Wives in full-time employed couples are much less economically dependent than wives in the full sample. When I perform similar sample restrictions (see Appendix H, Table 6), I find that relative earnings and its square are no longer statistically significant, consistent with results presented by Killewald and Gough. This finding appears to be an artifact of sample restriction to couples in which both spouses are employed full-time, which excludes the most economically dependent wives.

The autonomy perspective (Hypothesis 4) predicted that wives' absolute earnings would be negatively associated with less housework, net of relative earnings and market work hours. The autonomy perspective also received strong support in the data, and estimates from the fixed effects and random

intercept models are very similar. In both models, as predicted by the autonomy perspective, wives' housework declines as their absolute earnings rise, but the slope of the housework-earnings relationship becomes flatter as earnings rise. The final linear spline term is statistically insignificant in both sets of models, consistent with the argument that wives' ability to outsource domestic labor increases most rapidly at lower levels of absolute earnings (Killewald and Gough 2010). Although prior research has found that husbands' absolute earnings are not related to wives' housework (Gupta 2007), husbands' absolute earnings in both models are positively and significantly related to wives' housework hours, though the magnitude of this association is relatively small.

Testing the time availability, relative resources, and autonomy perspectives necessitated entering all explanatory variables specific to each theory simultaneously. Adding wives' labor market participation related variables was hypothesized to explain a significant portion of the trend by survey year and birth cohort (Hypotheses 5). When variables representing each of these perspectives are added in both the random intercept model and the fixed effects model, the coefficient on survey year declines and is statistically significantly different from its coefficient without these labor market participation variables. Inclusion of labor market participation related variables reduces the coefficient on survey year by 28.0 percent in the random effects model, and by 21.5 percent in the fixed effects model. Interestingly, although the period coefficient declines substantially with the introduction of labor market participation related variables, the cohort coefficient reduces in magnitude from (-0.085) to (-0.075), a much smaller absolute and proportionate change compared to the period coefficient.

As for the remaining period and cohort effects after taking labor market participation variables into account, educational attainment has no impact on the period coefficient, but does explain some of the cohort coefficient, moving from (-0.075) to (-0.055). Adding household composition affects both the period and cohort coefficients, but in different ways. Adding household composition explains some of the period decline, attenuating the coefficient from (-0.235) to (-0.181) in the random intercept model, and from (-0.266) to (-0.203) in the fixed effects model. But the cohort coefficient actually increases substantially when household composition is added to the model, increasing in magnitude from (-0.055)

to (-0.136). Supplemental analyses revealed that this change reflects a more rapid cohort decline among women without children compared to the cohort decline for women with children. Interestingly, however, identical analyses of time diary data provide some evidence that cohort declines are actually stronger for women with children. In both data sets, however, a substantial negative main effect of cohort exists, and women with and without children in the household experience a significant decline in housework across cohorts.¹²

A sizeable coefficient on survey year remains in the full model in both the fixed and random effects models in the PSID. In the full random intercept model, the coefficient on period declines substantially to (-0.168), but remains highly statistically significant, corresponding to a total weekly decline of 5.2 hours from 1976 to 2007, net of all explanatory variables. The fixed effects period estimate in the full model, presented in Table 3, was similar although somewhat larger at (-0.203), equivalent to a decline of 6.3 hours across the range of survey years. In the full model, 53.4 percent of the raw trend by survey year is explained in the random intercept model, and 40.1 percent of the decline is explained in the fixed effects model. PSID period coefficients on housework are of larger magnitude in both the fixed and random effects models relative to the time diary estimates. Although there are differences in period coefficients in the two data sets, a strong, negative, and statistically significant cohort coefficient persists in both the time diary and PSID data.

Overall, I find substantial variation across cohorts in married women's housework. Changes in various indicators of wives' labor market participation, including employment status, number of market work hours, and relative and absolute income, help to explain a large portion of the association between period – but not cohort – and married women's housework. Inclusion of these variables, together with

¹² Appendix H, Tables 6 and 7 present models that include interactions between cohort and household composition to examine whether the association between wives' birth cohort and housework depends on the number of children in the household. Results suggest that the cohort effect depends on the number of children, but the interactions are in opposite directions in the time diary and PSID data. Figures 2-5 in Appendix H graph the predicted housework hours by cohort separately by number of children. These figures show that the main effect of cohort is strong and results in a substantial decline in wives' housework, regardless of the number of children in the household.

education and household composition, explain more than half of the initial association between period and wives' housework in the PSID data.

SENSITIVITY ANALYSES

I perform a number of supplemental analyses to establish that results are not sensitive to model specification. First, because of the relatively wide age range (18-65) in the analytic sample, I assess the sensitivity of results to changes in the age distribution across time in Appendix G. I run separate regressions within 5-, 10-, and 20-year age intervals to estimate period and cohort coefficients while effectively attempting to control for age to varying degrees. Point estimates for period and cohort coefficients within delimited age ranges are generally of similar magnitude and in the same direction within these age categories, though standard errors are relatively large within 5- and 10-year age intervals. These results hold for both the PSID¹³ and the time diary¹⁴ estimates.

Because time diary data from the 2003-2010 period involves a sample that is significantly larger than the sample in earlier time diary surveys,¹⁵ it is possible that data from the more recent period is driving the results by disproportionately weighting the cohort observations in the most recent period. To address this possibility, I ran identical analyses that exclude the most recent survey years (see Appendix F, Table 2). In the full model in column (5), point estimates for wives' birth cohort that exclude the 2003-2010 period are very similar to results that include these years (-0.190 and -0.172, respectively). In addition, I ran weighted regressions in identical models over the full period (see Appendix F, Table 3), with the coefficient on wives' birth cohort almost identical to the coefficient in the unweighted regressions (-0.171). These analyses suggest that the substantially larger sample size in the ATUS data from 2003-2010 is not driving the results in the time diary data.

As discussed earlier, the mechanism-based approach to APC model identification requires specifying all pathways through which at least one of the components relates to the outcome. Certain

¹³ See Appendix G, Figure 3

¹⁴ See Appendix G, Figure 4

¹⁵ See Appendix F, Figure 1 for a histogram of sample size by survey year.

variables theoretically related to age and housework are available over only part of the time series in the PSID, and I present supplemental analyses in Appendix H to assess the robustness of results to the inclusion of these variables. For example, wives' disability status and both spouses' self-rated health are not available over the entire time series. Since health and disability are potential pathways through which age might affect housework, I include a measure of self-rated health for both husbands and wives.¹⁶ Since questions on self-rated health are available only from 1984 to 2007, I can run models only on the partial time series, which I present in Table 1 of Appendix H. The cohort coefficient in the full model is of similar magnitude (-0.131) to main results and remains highly statistically significant with the inclusion of these additional variables. Since wives' labor force participation may vary based on children's ages (Goldin 2006), I also include a measure of number of children in the household at different ages (0-2, 3-5, 6-10, and 11-17 years old), which also is available over only part of the time series. Results presented in Appendix H (Table 2) are substantively similar (-0.182) to the main results and remain highly statistically significant, demonstrating a strong and persistent negative association between wives' birth cohort and housework.

Appendix H also presents results for subsamples restricted to couple-year observations in which no children are present in the household (Table 3), couple-year observations in which children are present (Table 4), and couple-year observations in which both spouses are employed full time (Table 5). The full model represented in column (5) in each subsample analysis in Tables 3-5 shows a statistically significant, negative coefficient on wives' birth cohort. Among couples with children (Table 4), however, this effect appears only in the full model net of labor market participation-related variables, and the cohort coefficient is twice as large in couple-year observations in which no children are present.

CONCLUSION

¹⁶ Since self-rated health is measured in ordinal categories, I generate dummy variables for excellent, very good, good, and fair, with poor health as the reference category.

I first document trends across period and cohort in wives' household labor, validating measures of time trends using two data sets with complementary characteristics and data structures. Wives' housework declined significantly in recent decades across both period and birth cohort. A strong negative relationship between wives' birth cohort and their housework hours persists in both data sets, which I argue reflects changes across cohorts in how married women perceive their roles in marriage and obligations for housework. These results are robust to multiple sensitivity analyses, including alternative model specifications with random and fixed effects, regressions within delimited age intervals, across data sets that use repeated cross-sectional and longitudinal designs, and with different outcome measures based on time diary and stylized reports. The results also hold across subsamples defined by household composition and employment, and with the inclusion of health- and disability-related variables associated with age.

The relationship between period and wives weekly hours of household labor remains in the full random intercept model and fixed effects model, net of these explanatory variables, presumably due to factors that are more difficult to measure, such as changes in standards of house cleanliness or the cost of domestic substitutes. Semi-exogenous changes such as the diffusion of birth control technologies (Bailey 2010; Goldin and Katz 2002) or no-fault divorce statutes (Wolfers 2003) may alter patterns of selection into or out of marriage (Akerlof, Yellen, and Katz 1996) in certain periods. It is also possible that changes in household technology and labor saving devices are implicated in residual period variation in wives' household labor. Specifically, the introduction of labor saving technologies may have facilitated wives' entry into the labor market or their increased participation over time (Heisig 2011). But the development of these technologies is also potentially endogenous to increases in wives' labor force participation – a response to demand induced by changes in wives' employment patterns. If the cost of efficiency-increasing domestic technologies or substitutes drops in particular periods and women of all ages simultaneously adopt these technologies without changing their preferences for household cleanliness, this also would represent a period change that is unmeasurable in the data analyzed here. Alternatively, some have argued that household technologies paradoxically had no impact, or even increased wives'

housework (Cowan 1983; Vanek 1974). Specifically, standards of cleanliness may have increased with the diffusion of household technologies, with consequences primarily for output rather than time spent in housework. Changes in the structure of the economy, and in patterns of inequality, may also affect wives' ability to outsource certain forms of household labor across time (Killewald 2011). If couple-level preferences for cleanliness did not change, both domestic labor-saving technological change and the outsourcing of wives' household labor remain plausible explanations given that husbands' housework did not increase nearly enough to compensate for the dramatic decline in wives' housework hours.

Though a significant coefficient on period persists in the full model, a substantial portion is explained by changes related to wives' labor force participation, including employment, hours per week worked, absolute earnings, and relative earnings. Results of age-period-cohort models in both the repeated cross-sectional time diary data and the longitudinal analyses from the PSID provide robust evidence of a persistent association between wives' housework and birth cohort, net of period changes in housework shared across cohorts. This result holds even after household composition, both spouses' educational attainment, and both spouses' labor market participation related characteristics are included in the model.

I tested four theoretical perspectives on the relationship between labor market participation and housework: time availability, relative resources, gender display, and autonomy. Evidence for time availability in wives' hours of market work was unequivocal: increases in wives' employment hours were strongly associated with declines in their weekly hours of household labor, net of absolute and relative earnings, and this negative relationship is stronger for wives' employment than the positive association for husbands' employment. In both the random intercept models and the fixed effects models, I find that relative resources and its square are strongly related to wives' housework in a manner consistent with prior work on bargaining and gender display (Bittman et al. 2003; Brines 1994; Schneider 2011). Finally, the autonomy perspective received strong support in the data. Increases in wives' absolute earnings matters most at the low end of the earnings distribution, presumably because there are upper bounds to the extent of outsourcing of domestic labor (Killewald and Gough 2010). Inclusion of variables related to these theoretical perspectives combined explained a substantial portion of the relationship between period

and housework, but relatively little of the association between cohort and housework. Taken together, these findings suggest the relevance of carefully examining the distinct sources of temporal variation in housework and the mechanisms underlying observed patterns, which has important implications for theory development and testing of explanatory mechanisms.

Table 1: Empirical Predictions Derived from Theoretical Perspectives

THEORY	OPERATIONALIZATION	EMPIRICAL PREDICTION	HYPOTHESIZED EFFECT ON PERIOD COEFFICIENT
Time Availability	Both spouses' employment status (working vs. not), both spouses' hours/week worked	(-) wives' employment and (-) wives' hours/week worked	(-)
Relative Resources	Wives' income as proportion of total family income	(-) wives' relative income	(-)
Gender Display	Wives' relative income squared	(+) quadratic term suggesting curvilinearity	(+) or (-), depending on where change occurred in the distribution of relative income
Autonomy	Linear splines with knots between quartiles of wives' non-zero earnings	(-) linear spline terms, with coefficients more negative at low earnings than at high earnings	(-), with strength of effect depending on where change occurred in distribution of wives' absolute income

Table 2: Explanatory and Outcome Variables

Variable	Measure
Time Diary Data (AHTUS & ATUS)	
Household Labor	Minutes spent in cleaning, laundry, ironing, clothing repair, home repairs, maintaining vehicle, and other domestic work, converted to hours per week
Period	Survey year
Cohort	Year of birth
Education	Categorical: less than high school, high school, some college, college graduate, graduate/professional degree
Number of Children	Dummies for one child, two children, three children, four or more children (under 18 years of age)
Panel Study of Income Dynamics (PSID)	
Household Labor	About how much time do you spend on housework in an average week--I mean time spent cooking, cleaning, and doing other work around the house?
Period	Survey year
Cohort	Year of birth
Education	Categorical: less than high school, high school, some college, college graduate, graduate/professional degree
Number of Children	Dummies for one child, two children, three children, four or more children (under 18 years of age)
Employment Status	Currently working (versus not working)
Hours/Week Worked	Average number of hours/week worked in current year
Husband is Black	Dummy variable (0/1)
Absolute Income	Wage and labor income from current year, adjusted to 2009 dollars using the Consumer Price Index (CPI)
Wife's Relative Income	Wife's Income as Proportion of Total Household Income
Disability Status	Respondent has "a physical or nervous condition that limits the type of work or amount of work" respondent can do

Figure 1A: Husbands' and Wives' Weekly Housework Hours by Period (PSID & Time Diary Data)

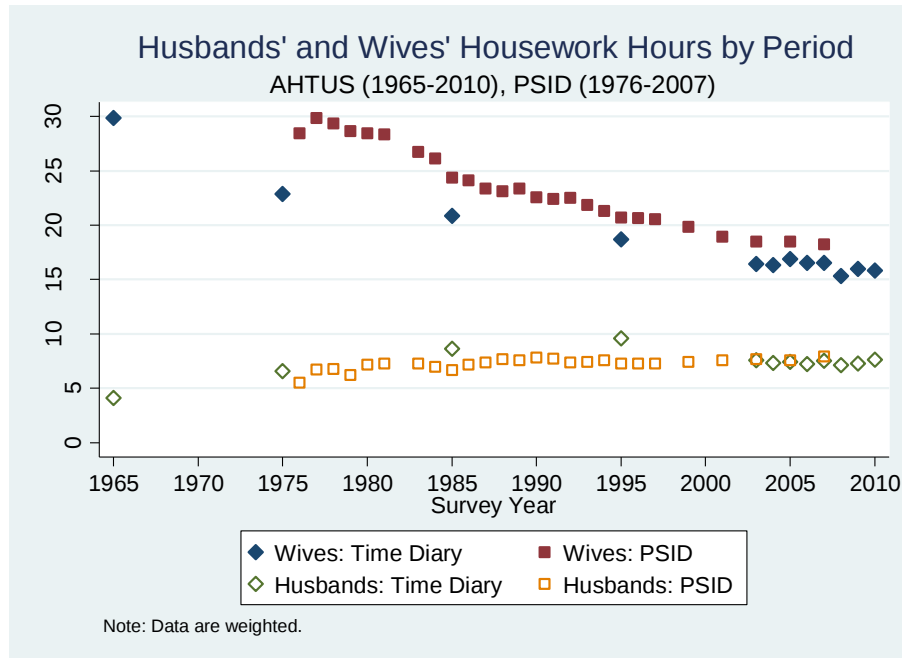


Figure 1B: Husbands' and Wives' Weekly Hours of Household Labor by Birth Cohort (PSID & Time Diary Data)

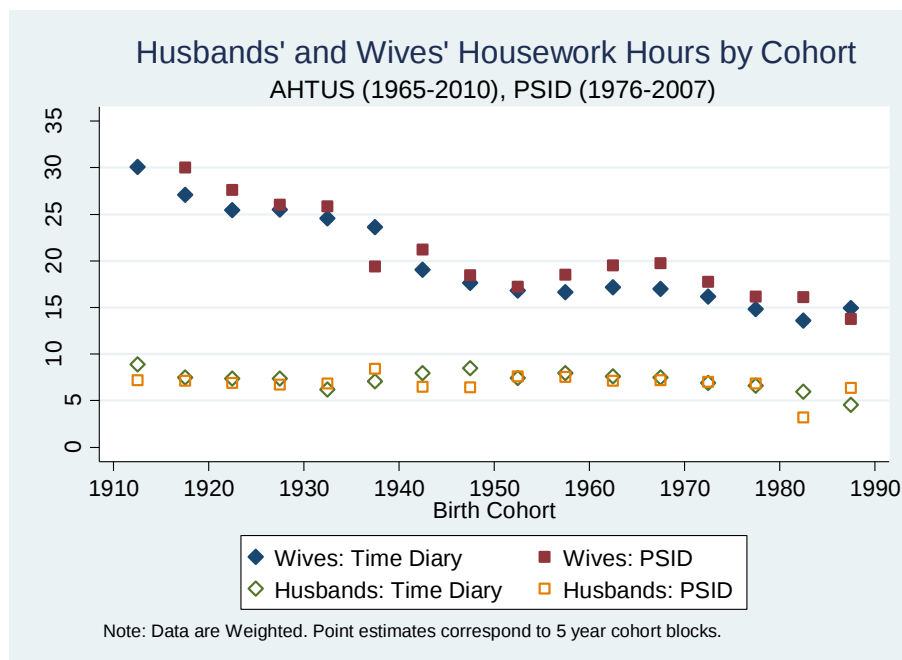


Figure 2A: Wives' Relative Earnings by Period (PSID)

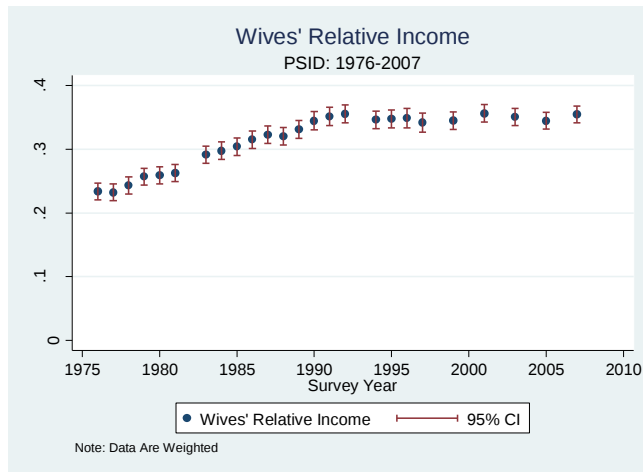


Figure 2C: Wives' Average Hours/Week Worked by Period

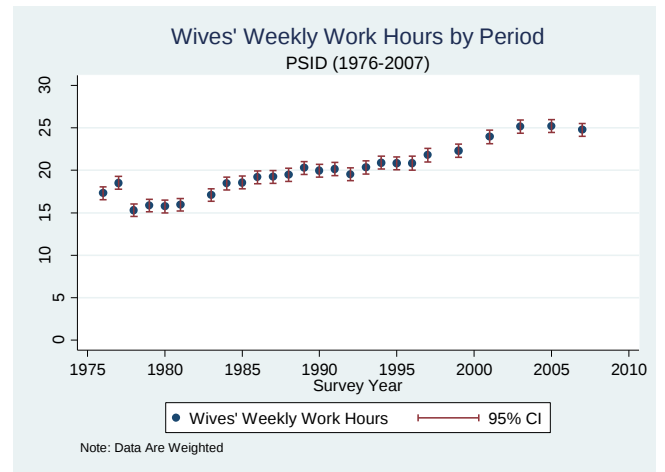


Figure 2B: Wives' Absolute Earnings by Period (PSID)

Note: Income Converted to 2009 Dollars Using Consumer Price Index (CPI)

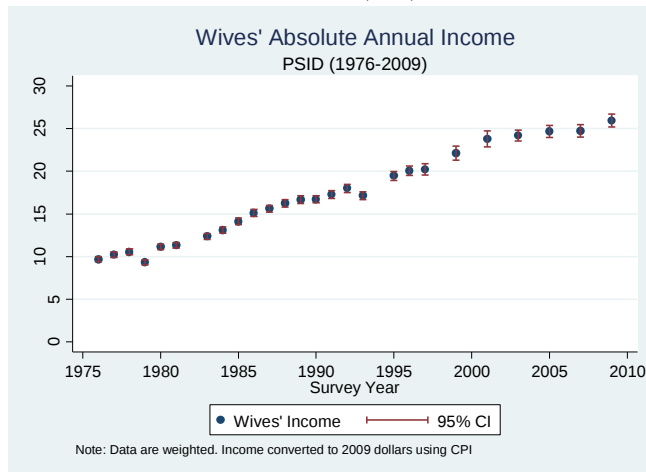


Figure 2D: Proportion of Wives Working by Period

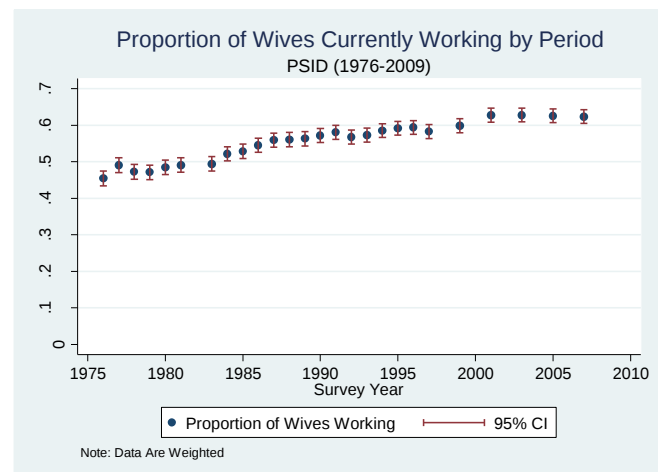


Figure 3A: Wives' Years of Education by Birth Cohort
(PSID & Time Diary Data)

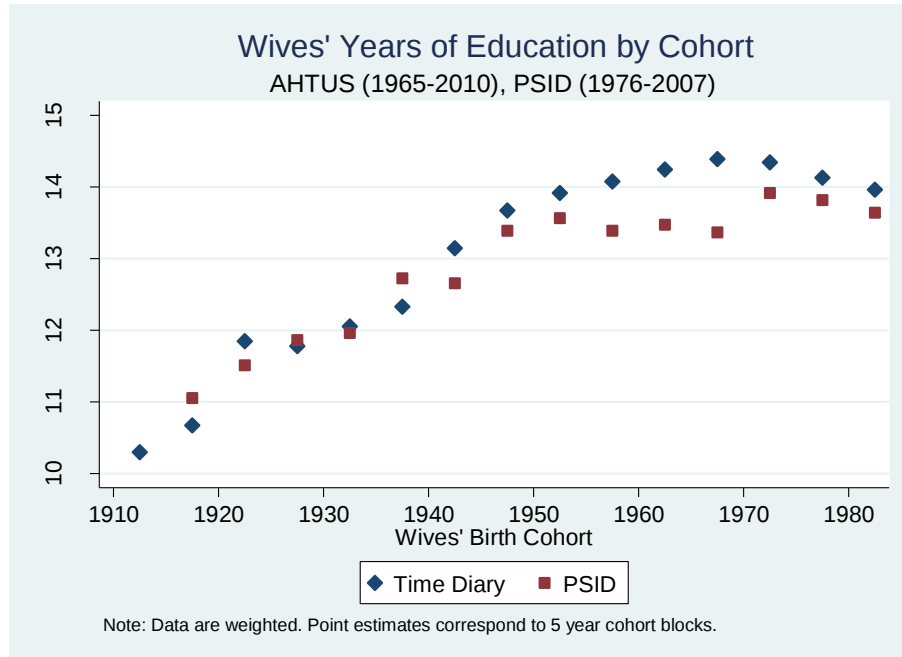


Figure 3B: Husbands' Years of Education by Birth Cohort
(PSID & Time Diary Data)

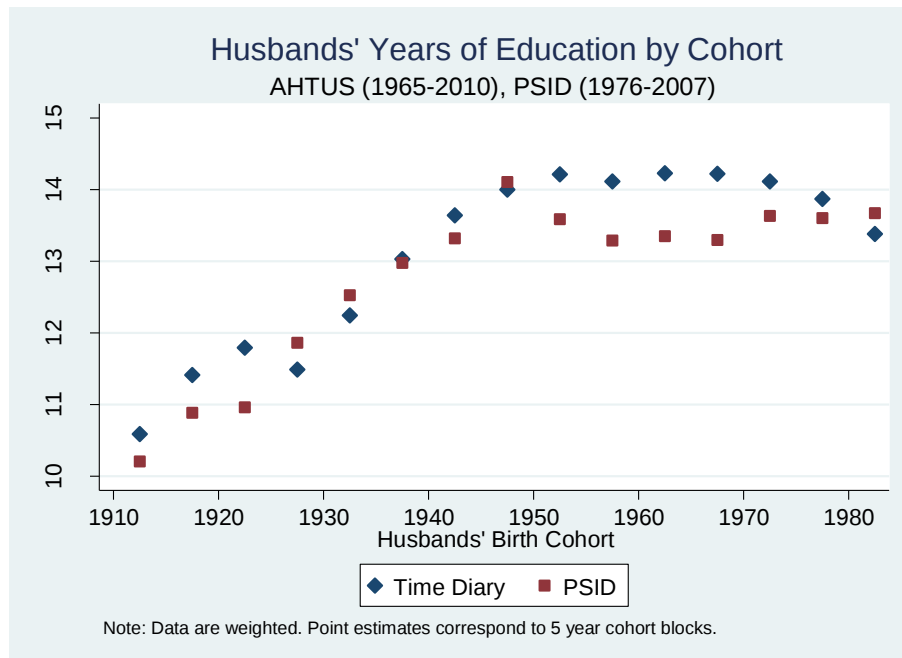


Table 3: OLS Regression
Time Diary Data (1965-2010)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Period	-0.221 (0.010)***	-0.148 (0.013)***	-0.112 (0.013)***	-0.011 (0.013)	-0.006 (0.013)
Wife's Birth Cohort		-0.081 (0.008)***	-0.078 (0.008)***	-0.191 (0.009)***	-0.172 (0.009)***
<i>Wife's Education</i>					
High School			-4.312 (0.338)***	-3.897 (0.335)***	-2.833 (0.332)***
Some College			-5.226 (0.364)***	-4.800 (0.360)***	-3.568 (0.358)***
College Graduate			-5.885 (0.335)***	-5.666 (0.332)***	-4.048 (0.332)***
Grad/Prof. Degree			-7.267 (0.397)***	-6.951 (0.394)***	-4.963 (0.395)***
<i>Household Composition</i>					
One Child				2.932 (0.256)***	2.853 (0.252)***
Two Children				5.030 (0.257)***	4.618 (0.254)***
Three Children				6.828 (0.334)***	5.922 (0.331)***
Four + Children				8.347 (0.473)***	7.169 (0.468)***
<i>Employment Status</i>					
Wife Working					-5.698 (0.192)***
Constant	26.033 (0.404)***	24.141 (0.445)***	27.655 (0.504)***	21.653 (0.557)***	24.043 (0.556)***
Observations	31816	31816	31816	31816	31816
R-squared	0.015	0.018	0.030	0.050	0.076

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses.

Table 4: Random Intercept Model
PSID (1976-2007)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Period	-0.361 (0.007)***	-0.339 (0.007)***	-0.320 (0.007)***	-0.233 (0.007)***	-0.186 (0.007)***
Wife's Birth Cohort		-0.080 (0.008)***	-0.051 (0.008)***	-0.131 (0.008)***	-0.125 (0.007)***
<i>Wife's Education</i>					
High School			-2.084 (0.254)***	-1.576 (0.244)***	-0.441 (0.223)*
Some College			-4.549 (0.292)***	-3.644 (0.281)***	-1.966 (0.256)***
College Graduate			-6.029 (0.346)***	-4.970 (0.332)***	-2.813 (0.302)***
Grad/Prof. Degree			-5.805 (0.422)***	-5.316 (0.406)***	-3.059 (0.371)***
<i>Household Composition</i>					
One Child				3.803 (0.133)***	3.188 (0.126)***
Two Children				6.434 (0.137)***	5.675 (0.130)***
Three Children				8.636 (0.182)***	7.734 (0.172)***
Four + Children				10.296 (0.262)***	9.041 (0.248)***
<i>Employment Status</i>					
Wife Working					-9.579 (0.105)***
Constant	26.385 (0.177)***	26.419 (0.177)***	28.932 (0.253)***	23.455 (0.263)***	28.406 (0.247)***
<i>Random Effects Parameters</i>					
ln(SD of Constant)	2.220 (0.010)***	2.214 (0.010)***	2.182 (0.010)***	2.123 (0.010)***	1.979 (0.011)***
ln(SD of Residual)	2.398 (0.003)***	2.398 (0.003)***	2.398 (0.003)***	2.378 (0.003)***	2.332 (0.003)***
Observations	72745	72745	72745	72745	72745
Number of groups	8719	8719	8719	8719	8719

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent.

Figure 4A: Period Coefficients on Wives' Housework across Comparable Models
(Time Diary and PSID Data)

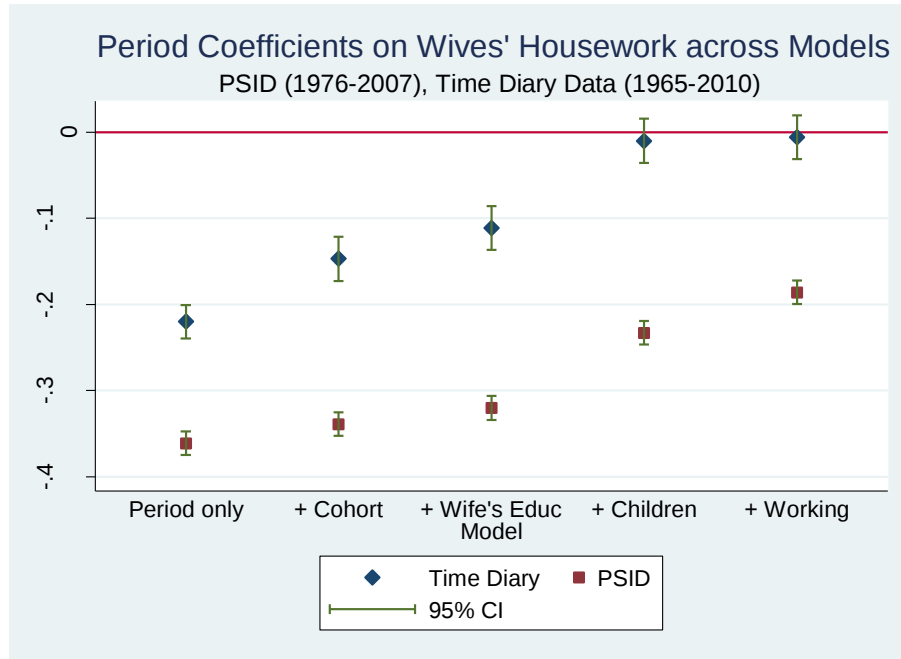


Figure 4B: Cohort Coefficients on Wives' Housework across Comparable Models
Time Diary and PSID Data

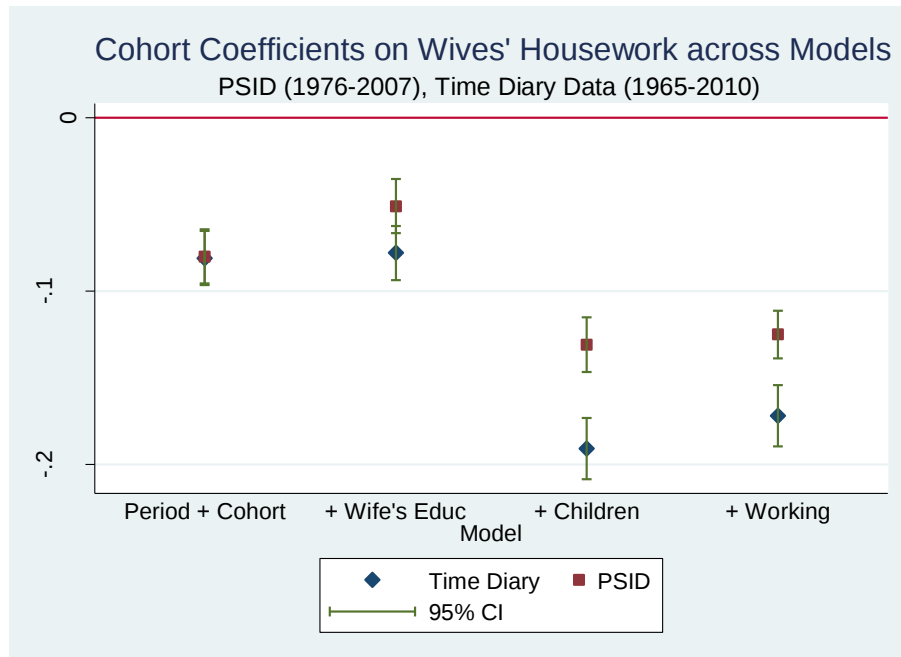


Table 5: Random Intercept Model
PSID (1976-2007)

VARIABLES	Wives' Weekly Housework Hours				
	(1)	(2)	(3)	(4)	(5)
Period	-0.361 (0.007)***	-0.340 (0.007)***	-0.244 (0.007)***	-0.235 (0.007)***	-0.168 (0.007)***
Wife's Birth Cohort		-0.085 (0.008)***	-0.075 (0.007)***	-0.055 (0.007)***	-0.122 (0.007)***
<i>Time Availability</i>					
Husband Is Working			1.256 (0.177)***	1.286 (0.177)***	1.034 (0.174)***
Husb. Hrs/Wk Worked			0.024 (0.004)***	0.025 (0.004)***	0.018 (0.003)***
Wife Is Working			-7.089 (0.133)***	-7.054 (0.133)***	-6.953 (0.130)***
Wife's Hrs/Wk Worked			-0.027 (0.004)***	-0.028 (0.004)***	-0.026 (0.004)***
<i>Relative Resources</i>					
Wife's Rel. Earnings			-3.658 (1.122)**	-4.089 (1.121)***	-2.496 (1.102)*
<i>Gender Display</i>					
Wife's Rel. Earnings ²			3.280 (0.919)***	3.926 (0.919)***	1.987 (0.903)*
<i>Autonomy</i>					
Husband's Earnings			0.016 (0.002)***	0.021 (0.002)***	0.010 (0.002)***
Wife's Abs. Earnings					
Quartile 1			-0.173 (0.024)***	-0.166 (0.024)***	-0.170 (0.024)***
Quartile 2			-0.156 (0.015)***	-0.147 (0.015)***	-0.126 (0.014)***
Quartile 3			-0.068 (0.013)***	-0.054 (0.013)***	-0.038 (0.012)**
Quartile 4			-0.009 (0.007)	-0.005 (0.007)	-0.010 (0.007)
<i>Wife's Education</i>					
High School				-0.525 (0.234)*	-0.144 (0.226)
Some College				-1.743 (0.275)***	-1.095 (0.266)***
College Graduate				-2.259 (0.344)***	-1.499 (0.332)***
Grad/Prof. Degree				-1.994 (0.420)***	-1.562 (0.406)***
<i>Husband's Education</i>					
High School				-0.673 (0.221)**	-0.583 (0.213)**
Some College				-1.797 (0.259)***	-1.589 (0.250)***
College Graduate				-2.294 (0.312)***	-2.056 (0.302)***
Grad/Prof. Degree				-2.018 (0.374)***	-2.011 (0.362)***
<i>Household Composition</i>					
One Child					2.889 (0.126)***
Two Children					5.210 (0.130)***
Three Children					7.248 (0.172)***
Four + Children					8.552 (0.246)***
Constant	26.385 (0.177)***	27.110 (0.193)***	31.261 (0.278)***	32.753 (0.329)***	29.165 (0.330)***
<i>Random Effects Parameters</i>					
ln(SD of Constant)	2.220 (0.010)***	2.210 (0.010)***	1.995 (0.011)***	1.980 (0.011)***	1.923 (0.011)***
ln(SD of Residual)	2.398 (0.003)***	2.398 (0.003)***	2.340 (0.003)***	2.340 (0.003)***	2.325 (0.003)***
Observations	72745	72745	72745	72745	72745
Number of groups	8719	8719	8719	8719	8719

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent. Models (2)-(5) control for whether husband is black and husband's disability status.

Table 6: Fixed Effects Models
PSID (1976-2007)

VARIABLES	Wives' Weekly Housework Hours		
	(1)	(2)	(3)
Period	-0.339 (0.007)***	-0.266 (0.007)***	-0.203 (0.007)***
<i>Time Availability</i>			
Husband Working		1.176 (0.185)***	0.961 (0.183)***
Husb. Hrs/Wk Worked		0.017 (0.004)***	0.011 (0.004)**
Wife Working		-6.831 (0.138)***	-6.782 (0.136)***
Wife's Hrs/Wk Worked		-0.026 (0.004)***	-0.024 (0.004)***
<i>Relative Resources</i>			
Wife's Rel. Earnings		-4.467 (1.194)***	-3.120 (1.177)**
<i>Gender Display</i>			
Wife's Rel. Earnings ²		4.486 (0.978)***	2.655 (0.965)**
<i>Autonomy</i>			
Husb. Abs. Earnings		0.027 (0.002)***	0.014 (0.002)***
Wife's Abs. Earnings			
Quartile 1		-0.161 (0.025)***	-0.158 (0.025)***
Quartile 2		-0.122 (0.016)***	-0.105 (0.015)***
Quartile 3		-0.039 (0.014)**	-0.023 (0.013)
Quartile 4		0.010 (0.008)	0.004 (0.008)
<i>Household Composition</i>			
One Child			2.644 (0.136)***
Two Children			4.923 (0.142)***
Three Children			6.746 (0.189)***
Four + Children			7.892 (0.276)***
Constant	26.346 (0.157)***	30.412 (0.288)***	27.226 (0.297)***
Observations	72745	72745	72745
R-squared	0.038	0.146	0.170
Number of PID	8719	8719	8719

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent. Models (2)-(3) control for husband's disability status.

Figure 5: Kernel Density of Wives' Relative Earnings by Sample Criteria
PSID (1976-2007)

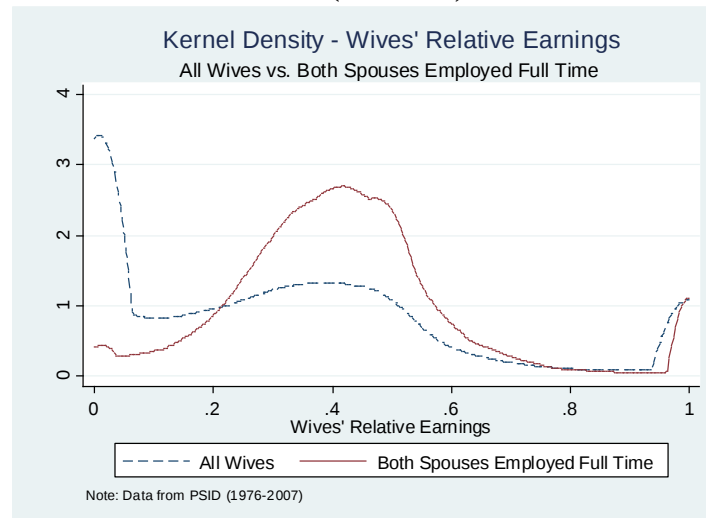


Figure 6: Kernel Density of Wives' Absolute Earnings by Sample Criteria
PSID (1976-2007)

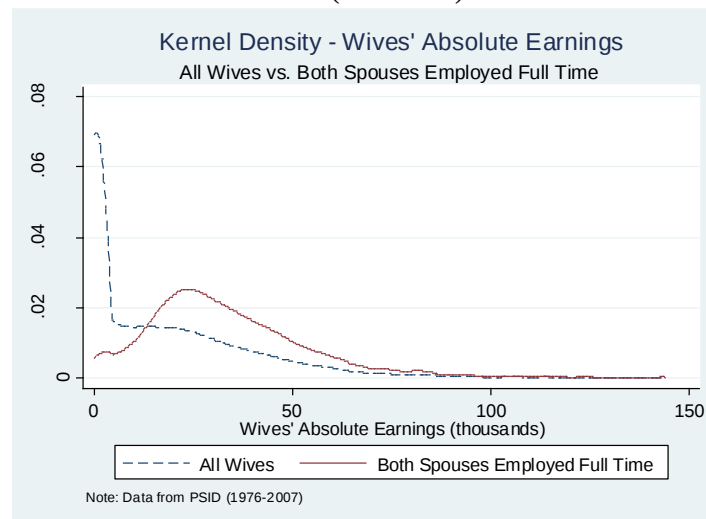
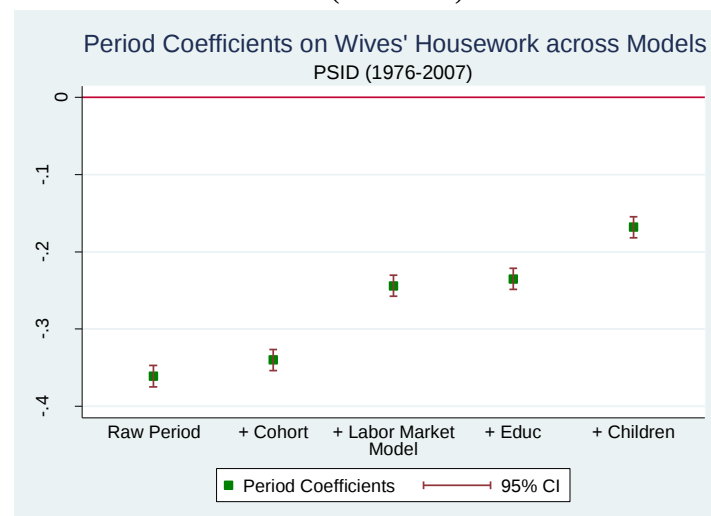


Figure 7: Period Coefficients and Wives' Housework across Models (Random Effects)
PSID (1976-2007)



APPENDIX A: HUSBAND'S CHARACTERISTICS ACROSS PERIOD AND COHORT PSID (1976-2007)

Figure 1: Husbands' Absolute Earnings by Period

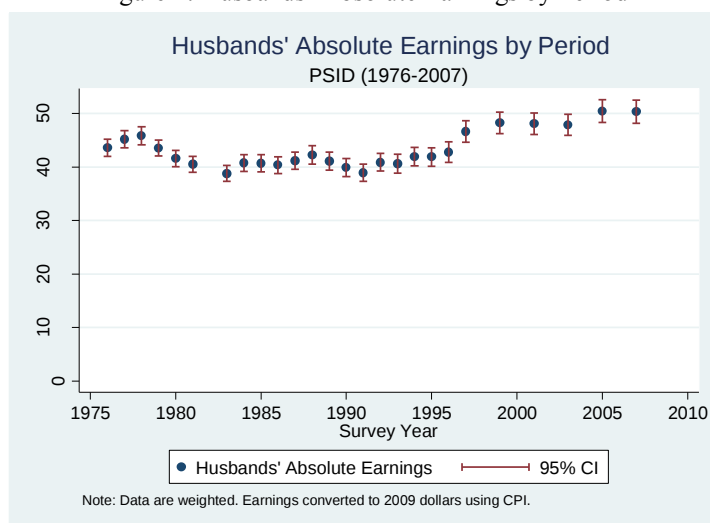


Figure 2: Husbands' Weekly Work Hours by Period

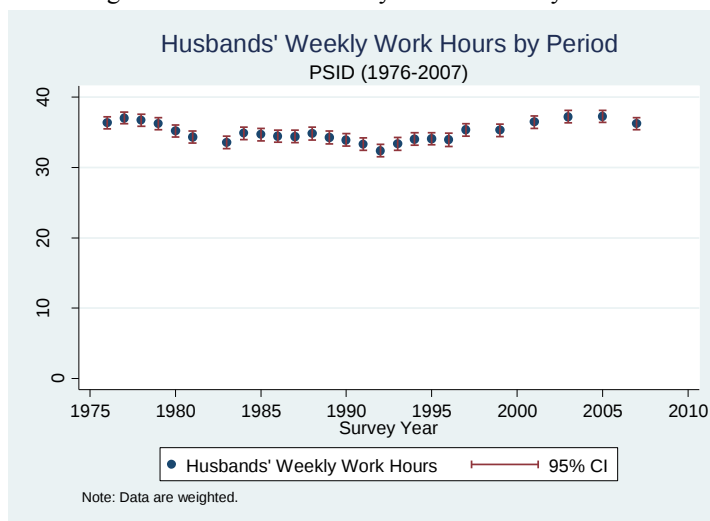
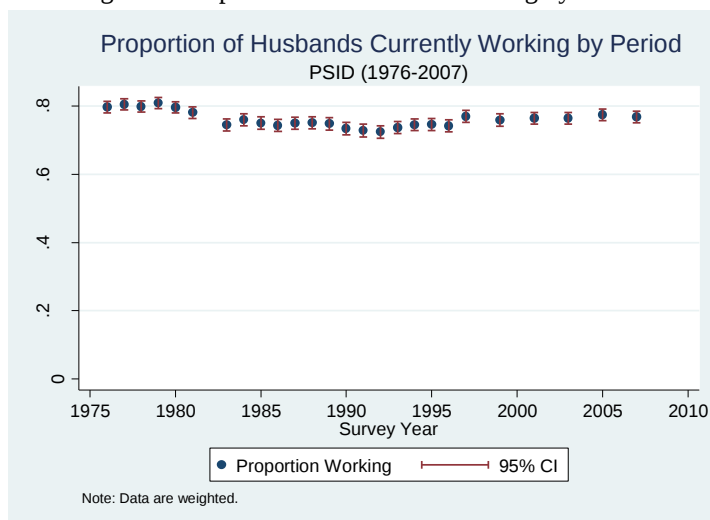
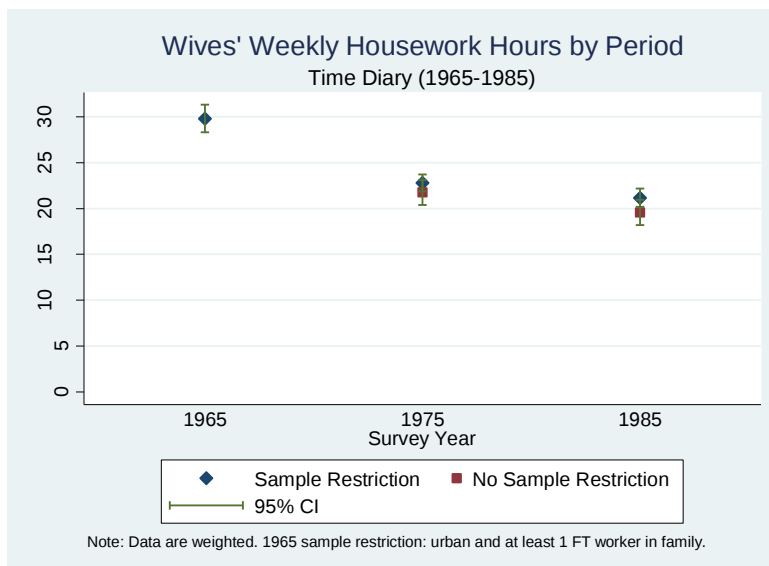


Figure 3: Proportion of Husbands Working by Period

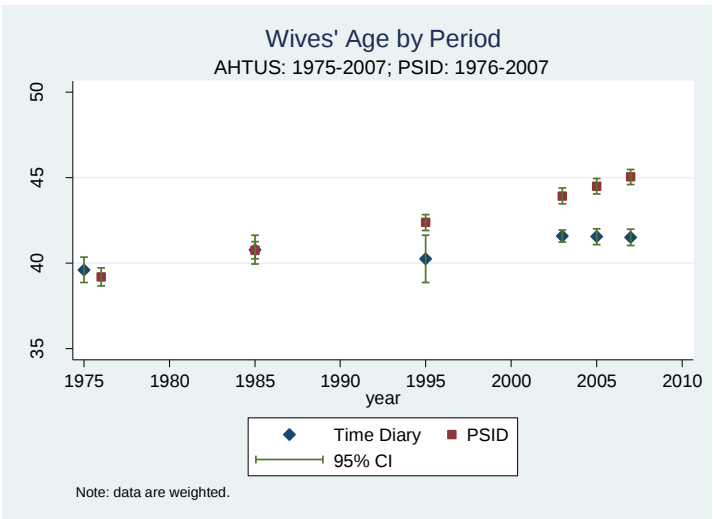
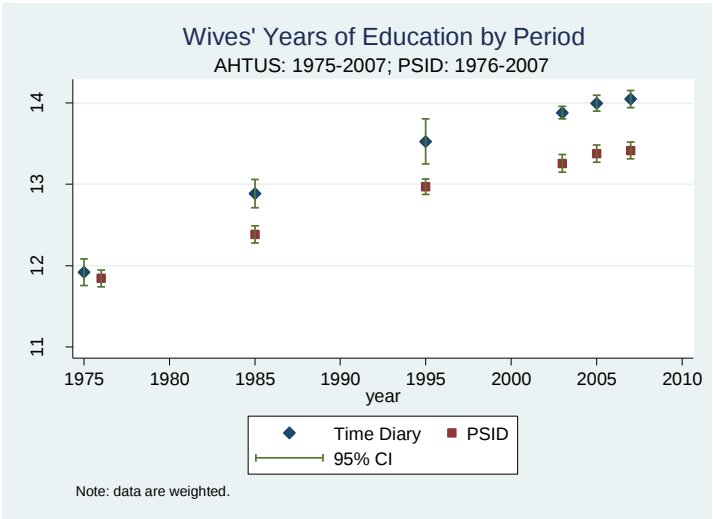
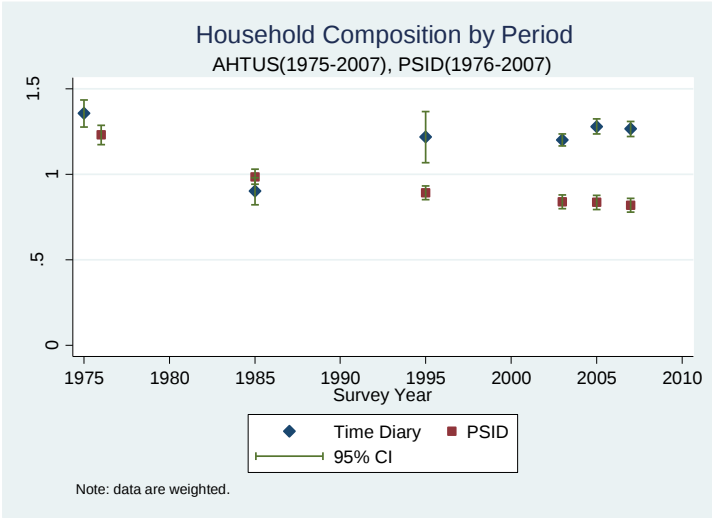


APPENDIX B: ASSESSING SENSITIVITY OF HOUSEWORK TREND TO SAMPLE RESTRICTION

Figure 1: Applying Sample Restriction from 1965 to 1975 and 1985 Surveys
(Time Diary Data)



APPENDIX C: DESCRIPTIVE STATISTICS ON VARIABLES AVAILABLE IN TIME DIARY AND PSID DATA
AHTUS (1965-2010); PSID (1976-2007)



APPENDIX D: FUNCTIONAL FORM OF PERIOD, COHORT, AND HOUSEWORK RELATIONSHIP

Appendix C (Analysis of Functional Form)

Figure 1: Wives' Birth Cohort and Household Labor (PSID)

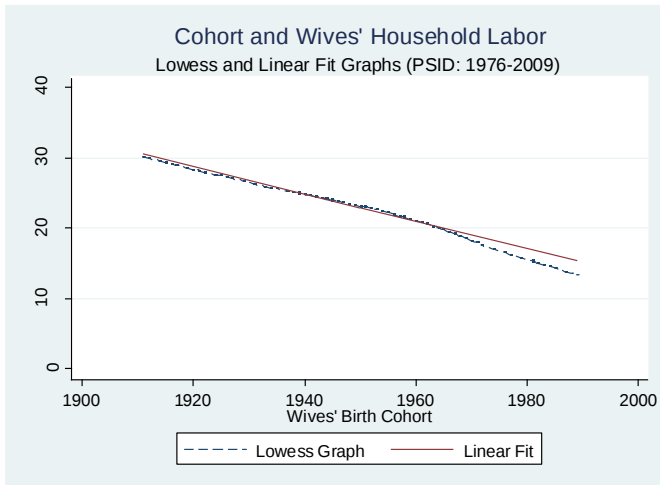


Figure 3: Period and Wives' Household Labor (PSID)

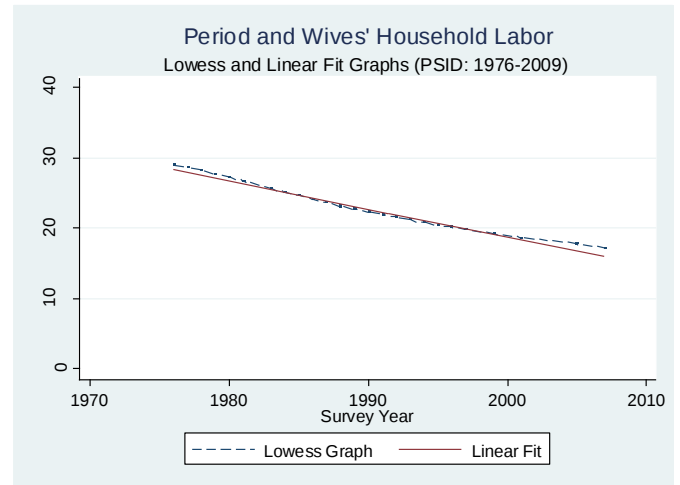


Figure 2: Cohort Coefficients, Net of Period – Wives' Housework (PSID)

Note: Model includes controls for husbands' race, husbands' disability status, husbands' and wives' education, and fertility

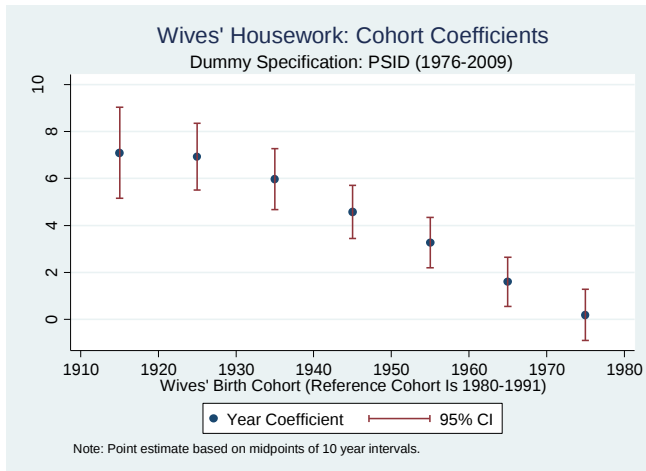
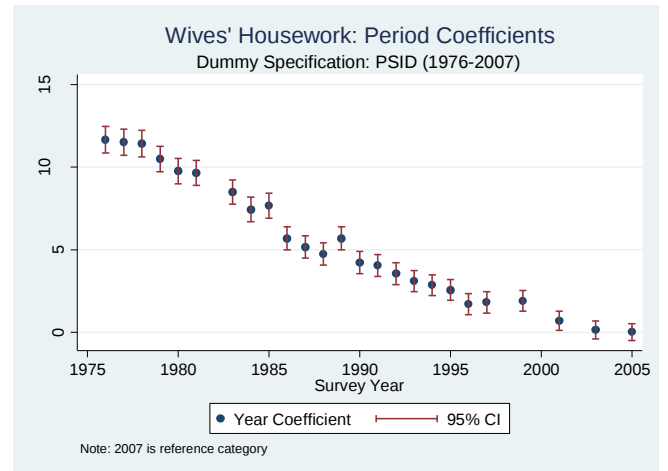


Figure 4: Period Coefficients – Wives' Housework (PSID)



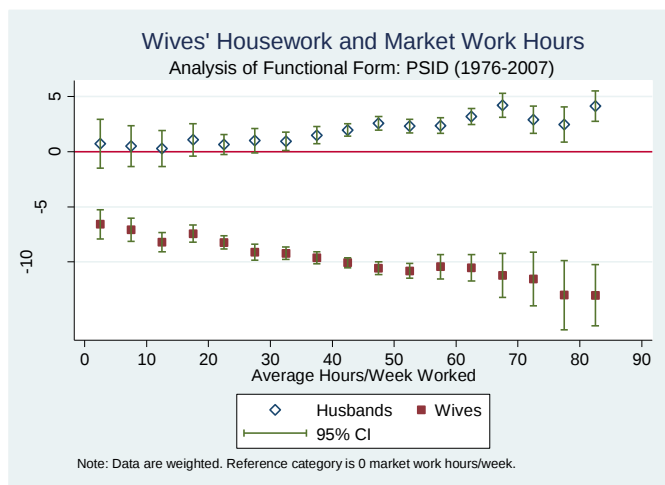
APPENDIX E: HOUSEWORK AND FUNCTIONAL FORM

RELATIVE EARNINGS, ABSOLUTE EARNINGS, AND HOURS/WEEK OF MARKET WORK: PSID (1976-2007)

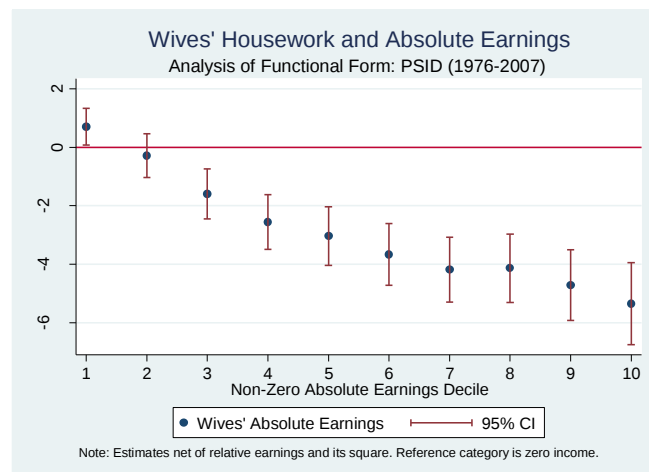
Notes: Coefficients based on models including proxy respondent, whether husband is black, husbands' disability status, husbands' and wives' educational attainment, fertility, period, cohort, absolute income, and wives' relative income.

A: Wives' Housework and Market Work Hours

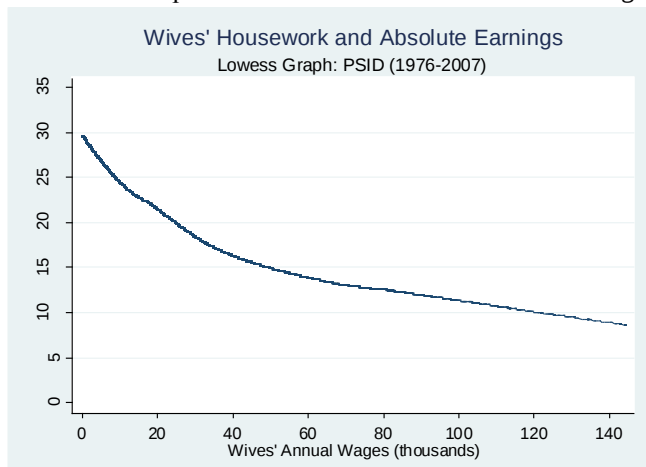
Note: Reference category is zero hours/week of market work. Work hours in 5 hour intervals.



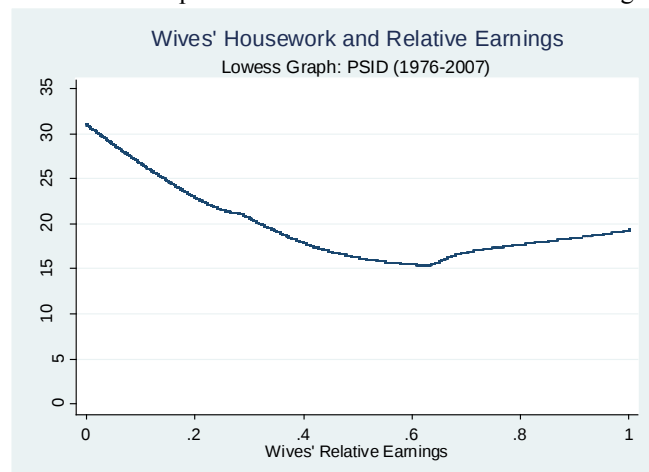
D: Wives' Housework and Absolute Earnings (Deciles)



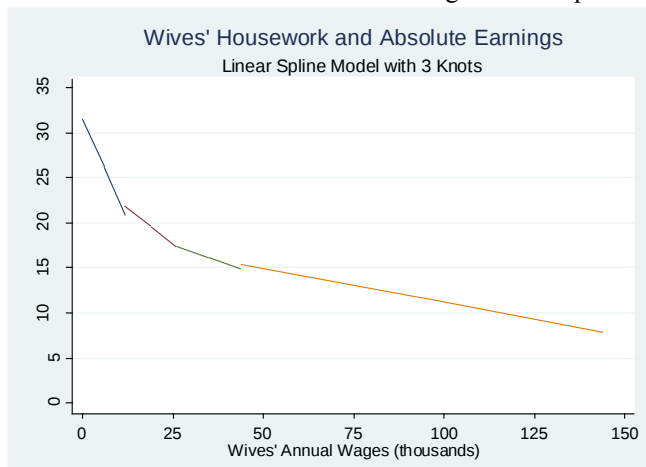
B: Lowess Graph of Wives' Housework and Abs. Earnings



E: Lowess Graph of Wives' Housework and Rel. Earnings

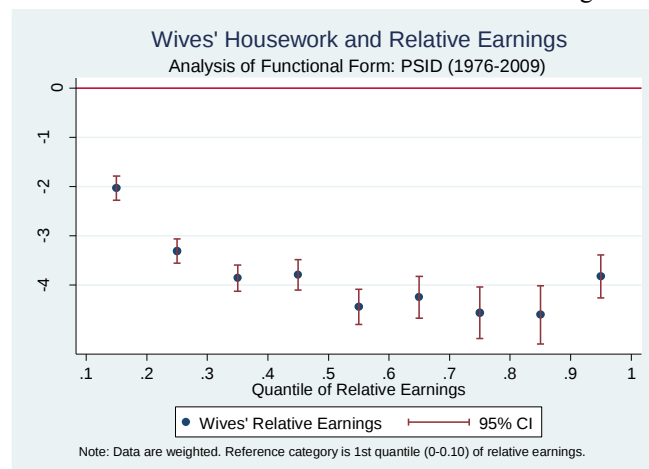


C: Wives' Housework and Abs. Earnings: Linear Spline



F: Wives' Housework and Relative Earnings

Note: Reference is first decile of wives' relative earnings.



APPENDIX F (SENSITIVITY ANALYSES)

Table 1: Random Intercept Model
Exclusion of Post-1997 Observations
PSID (1976-1997)

VARIABLES	Wives' Weekly Housework Hours				
	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.429 (0.010)***	-0.403 (0.010)***	-0.377 (0.010)***	-0.321 (0.010)***	-0.233 (0.010)***
Wife's Birth Cohort		-0.099 (0.010)***	-0.066 (0.010)***	-0.139 (0.010)***	-0.133 (0.009)***
<i>Wife's Education</i>					
High School			-1.532 (0.289)***	-1.135 (0.276)***	0.195 (0.247)
Some College			-3.846 (0.345)***	-2.871 (0.331)***	-0.712 (0.298)*
College Graduate			-5.446 (0.440)***	-4.355 (0.420)***	-1.148 (0.379)**
Grad/Prof. Degree			-5.243 (0.545)***	-4.727 (0.523)***	-1.178 (0.477)*
<i>Husband's Education</i>					
High School			-0.410 (0.274)	-0.446 (0.262)	-0.424 (0.235)
Some College			-2.003 (0.326)***	-1.935 (0.312)***	-1.520 (0.281)***
College Graduate			-1.453 (0.398)***	-1.752 (0.380)***	-2.015 (0.343)***
Grad/Prof. Degree			-0.304 (0.476)	-1.225 (0.457)**	-1.844 (0.417)***
<i>Fertility</i>					
One Child				4.194 (0.156)***	3.132 (0.148)***
Two Children				7.100 (0.164)***	5.765 (0.155)***
Three Children				9.165 (0.213)***	7.714 (0.202)***
Four + Children				10.525 (0.298)***	8.683 (0.280)***
<i>Time Availability</i>					
Husband Is Working					1.144 (0.198)***
Husb. Hrs/Wk Worked					0.013 (0.004)***
Wife Is Working					-7.270 (0.148)***
Wife's Hrs/Wk Worked					-0.025 (0.004)***
<i>Relative Resources</i>					
Wife's Rel. Earnings					-2.700 (1.261)*
Wife's Rel. Earnings ²					2.289 (1.036)*
<i>Autonomy</i>					
Husb. Abs. Earnings					0.010 (0.003)***
Wife's Abs. Earnings					
Quartile 1					-0.153 (0.027)***
Quartile 2					-0.121 (0.017)***
Quartile 3					-0.047 (0.015)**
Quartile 4					-0.018 (0.011)
Constant	874.955***	1,018.028***	905.530***	930.454***	748.000***
	(19.255)	(24.157)	(24.702)	(23.677)	(21.482)
Random Effects					
ln(SD of Constant)	2.253 (0.011)***	2.247 (0.011)***	2.216 (0.011)***	2.141 (0.011)***	1.955 (0.012)***
ln(SD of Residual)	2.419 (0.003)***	2.419 (0.003)***	2.418 (0.003)***	2.400 (0.003)***	2.351 (0.003)***
Observations	58657	58657	58657	58657	58657
Number of groups	7105	7105	7105	7105	7105

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent and whether husband is black. Models (2) - (5) control for husband's disability status.

Figure 1: Histogram of Sample Size by Period
Time Diary Data (1965-2010)

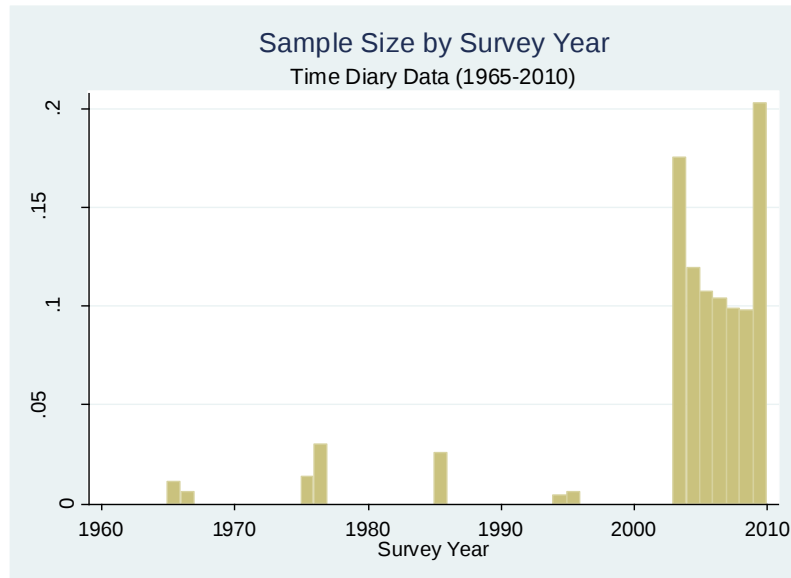


Table 2: OLS Regression
Exclusion of Post-1995 Observations
Time Diary Data (1965-1995)

VARIABLES	Wives' Weekly Housework Hours				
	(1)	(2)	(3)	(4)	(5)
Period	-0.368 (0.035)***	-0.251 (0.042)***	-0.234 (0.042)***	-0.090 (0.044)*	-0.016 (0.043)
Wife's Birth Cohort		-0.130 (0.025)***	-0.109 (0.025)***	-0.213 (0.027)***	-0.190 (0.027)***
<i>Wife's Education</i>					
High School			-2.843 (0.833)***	-2.942 (0.820)***	-2.626 (0.797)***
Some College			-3.725 (1.012)***	-3.487 (0.996)***	-3.677 (0.968)***
College Graduate			-3.349 (1.127)**	-3.294 (1.108)**	-2.417 (1.080)*
Grad/Prof. Degree			-6.454 (1.671)***	-6.193 (1.645)***	-3.794 (1.610)*
<i>Household Composition</i>					
One Child				3.178 (0.826)***	3.089 (0.804)***
Two Children				6.052 (0.839)***	5.048 (0.819)***
Three Children				8.068 (1.037)***	6.676 (1.020)***
Four + Children				9.069 (1.240)***	7.575 (1.212)***
<i>Employment Status</i>					
Wife Working					-8.489 (0.597)***
Constant	27.775 (0.559)***	24.776 (0.803)***	27.451 (1.049)***	20.840 (1.251)***	24.783 (1.246)***
Observations	3049	3049	3049	3049	3025
R-squared	0.034	0.043	0.050	0.082	0.140

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses

Table 3: OLS Regression
Weighted Regressions
Time Diary Data (1965-1995)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Period	-0.252 (0.011)***	-0.176 (0.014)***	-0.126 (0.014)***	-0.030 (0.014)*	-0.018 (0.013)
Wife's Birth Cohort		-0.082 (0.009)***	-0.084 (0.009)***	-0.189 (0.010)***	-0.171 (0.009)***
<i>Wife's Education</i>					
High School			-4.788 (0.412)***	-4.308 (0.408)***	-2.882 (0.394)***
Some College			-6.135 (0.433)***	-5.632 (0.428)***	-3.954 (0.414)***
College Graduate			-6.904 (0.400)***	-6.674 (0.395)***	-4.393 (0.384)***
Grad/Prof. Degree			-8.668 (0.442)***	-8.352 (0.437)***	-5.544 (0.426)***
<i>Household Composition</i>					
One Child				2.873 (0.272)***	2.727 (0.262)***
Two Children				5.210 (0.269)***	4.666 (0.260)***
Three Children				7.263 (0.355)***	6.057 (0.341)***
Four + Children				9.260 (0.543)***	7.661 (0.521)***
<i>Employment Status</i>					
Wife Working					-7.924 (0.217)***
Constant	26.614 (0.452)***	24.649 (0.489)***	28.468 (0.580)***	22.494 (0.621)***	25.703 (0.600)***
Observations	31816	31816	31816	31816	31816
R-squared	0.020	0.024	0.042	0.067	0.118
Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses					

APPENDIX G (SENSITIVITY ANALYSIS OF CHANGE IN THE AGE DISTRIBUTION ACROSS PERIODS)

Figure 1: Kernel Density of Wives' Age across Survey Years (Time Diary Data)

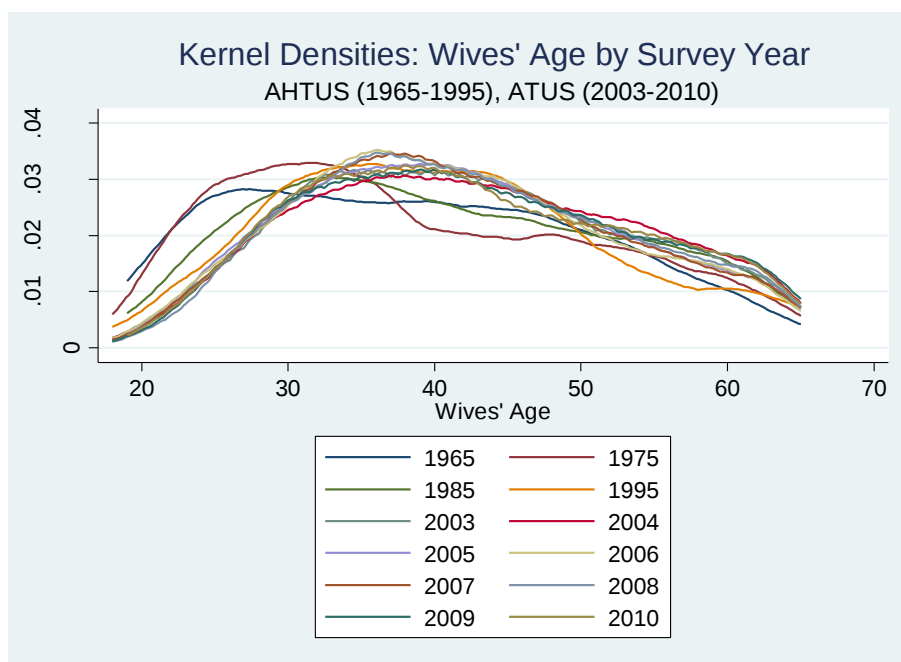


Figure 2: Kernel Density of Wives' Age across Survey Years (PSID)

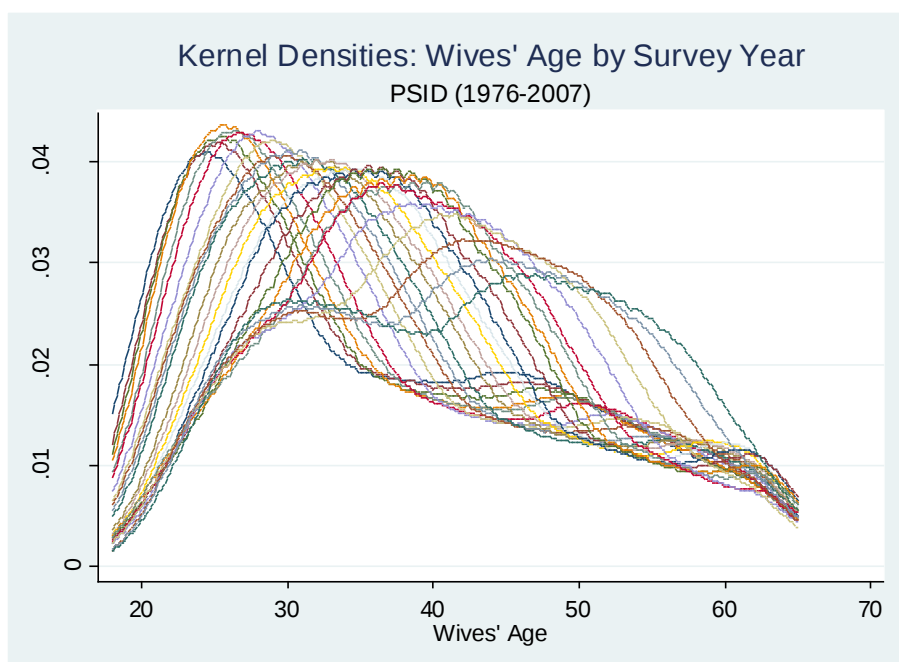
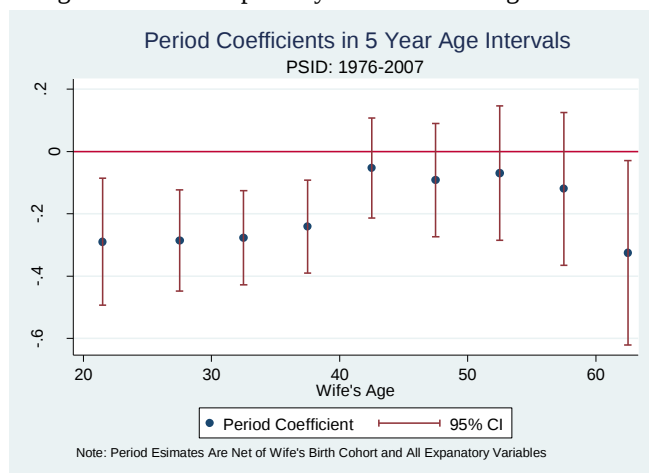


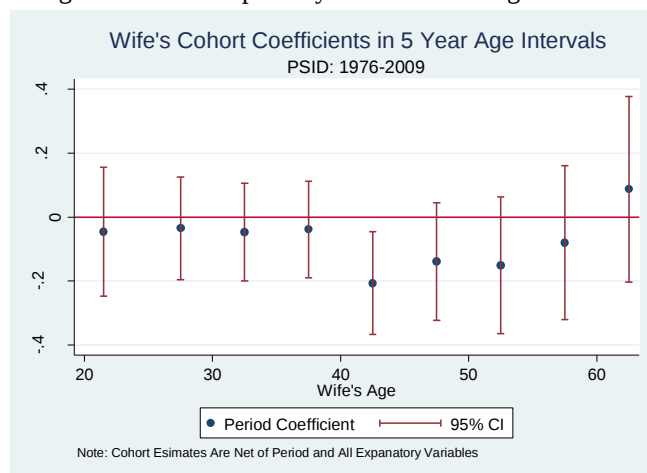
FIGURE 3: PERIOD AND COHORT COEFFICIENTS IN DELIMITED AGE INTERVALS (PSID: 1976-2007)

Note: All models include additional controls for employment status, wife's hours/week worked, husband's wife's hours/week worked, husbands' race, wife's wages, husband's wages, wives' proportion of household income, husband's education, wife's education, and number of children.

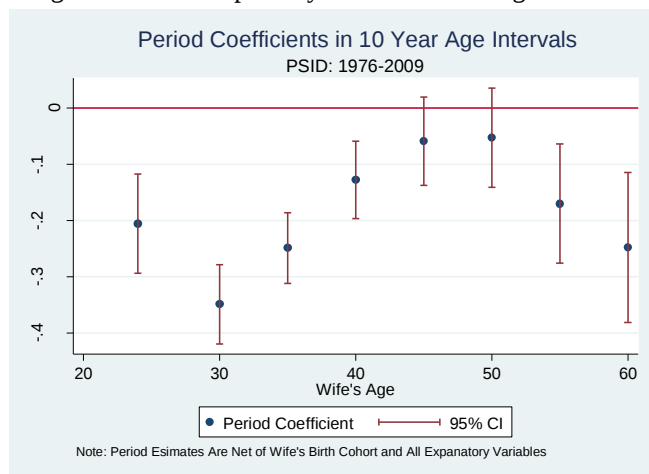
**Panel A: Period Coefficients, Net of Cohort and Age (PSID)
Regressions Run Separately within 5 Year Age Intervals**



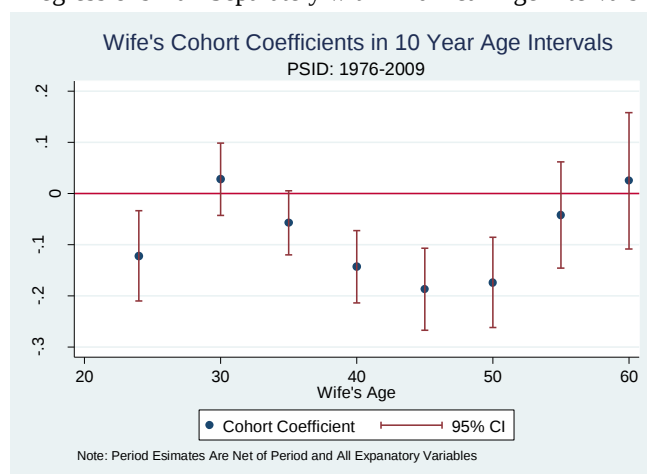
**Panel B: Cohort Coefficients, Net of Period and Age (PSID)
Regressions Run Separately within 5 Year Age Intervals**



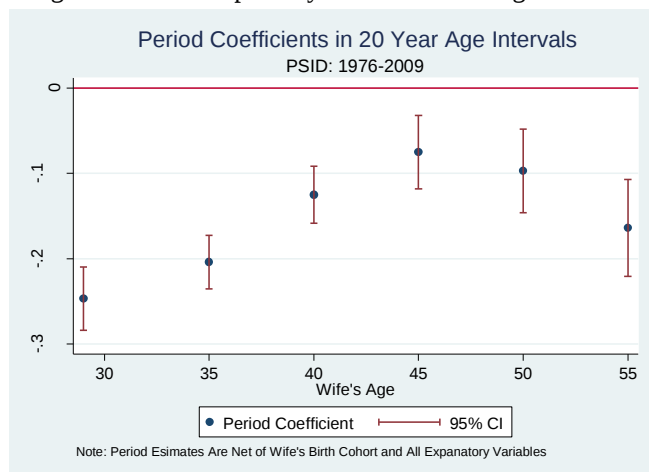
**Panel C: Period Coefficients, Net of Cohort and Age (PSID)
Regressions Run Separately within 10 Year Age Intervals**



**Panel D: Cohort Coefficients, Net of Period and Age (PSID)
Regressions Run Separately within 10 Year Age Intervals**



**Panel E: Period Coefficients, Net of Cohort and Age (PSID)
Regressions Run Separately within 20 Year Age Intervals**



**Panel F: Cohort Coefficients, Net of Period and Age (PSID)
Regressions Run Separately within 20 Year Age Intervals**

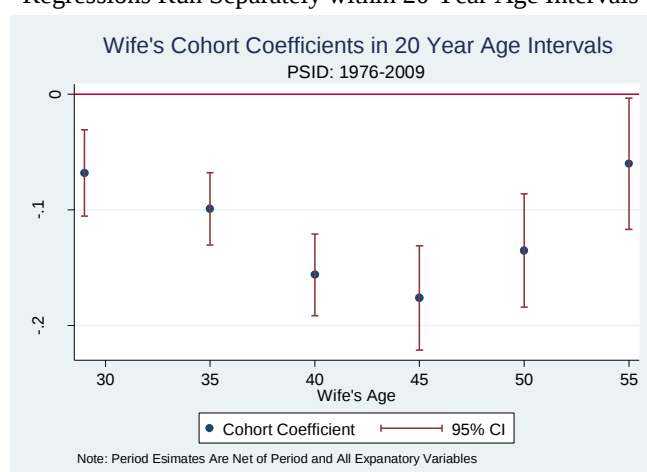
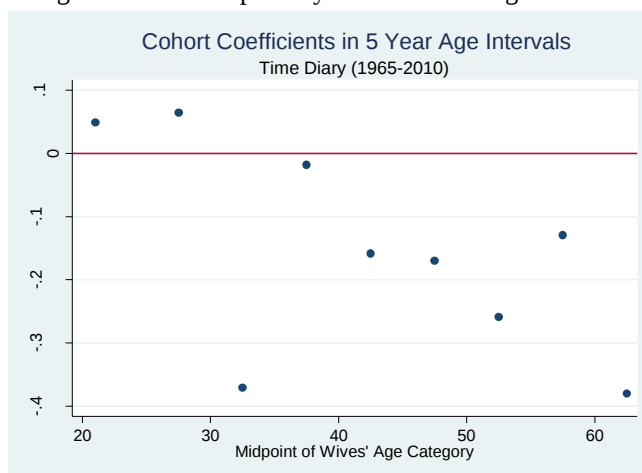


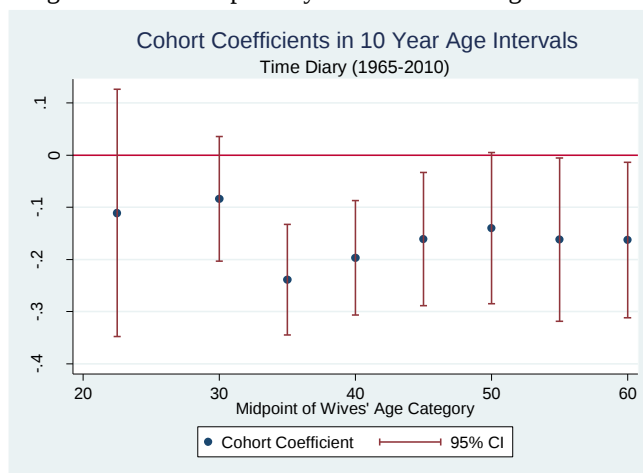
FIGURE 4: PERIOD AND COHORT COEFFICIENTS IN DELIMITED AGE INTERVALS
TIME DIARY DATA (1965-2010)

Note: Models include only period and cohort

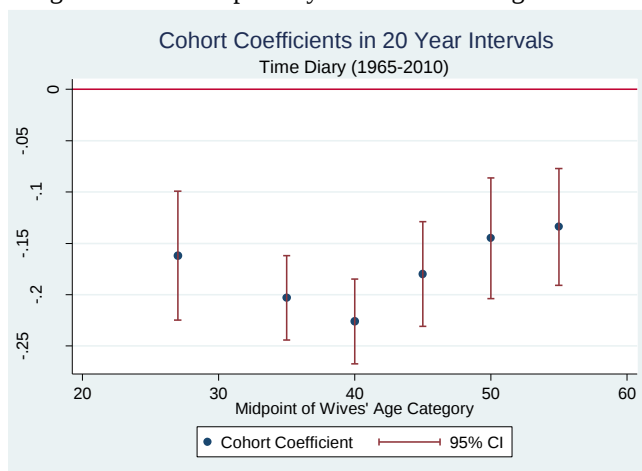
Panel A: Cohort Coefficients, Net of Period and Age (Time Diary Data)
Regressions Run Separately within 5 Year Age Intervals



Panel B: Cohort Coefficients, Net of Period and Age (Time Diary Data)
Regressions Run Separately within 10 Year Age Intervals



Panel C: Cohort Coefficients, Net of Period and Age (Time Diary Data)
Regressions Run Separately within 20 Year Age Intervals



APPENDIX H: SENSITIVITY ANALYSES BASED ON DATA SUBSAMPLES

Table 1: Wives' Housework Hours and Health- and Disability-Related Variables
PSID (1984-2007)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.284 (0.009)***	-0.267 (0.009)***	-0.245 (0.009)***	-0.164 (0.009)***	-0.124 (0.009)***
Wife's Birth Cohort		-0.085 (0.010)***	-0.058 (0.010)***	-0.136 (0.010)***	-0.131 (0.009)***

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black. Models (2) - (5) include variables for wife's disability status and both spouses' self-rated health. N = 52,753 observations in 7254 couples.

Table 2: Wives' Housework Hours and Children's Ages
PSID (1976-1992)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.448 (0.013)***	-0.421 (0.013)***	-0.391 (0.014)***	-0.246 (0.013)***	-0.174 (0.013)***
Wife's Birth Cohort		-0.097 (0.011)***	-0.065 (0.011)***	-0.223 (0.011)***	-0.182 (0.010)***

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black. N = 47,067 in 6,293 couples.

Table 3: Wives' Housework Hours and Subsample with No Children
PSID (1976-2007)

	Wives' Weekly Housework Hours			
VARIABLES	(1)	(2)	(3)	(4)
Survey Year	-0.166 (0.009)***	-0.078 (0.009)***	-0.057 (0.010)***	-0.064 (0.009)***
Wife's Birth Cohort		-0.271 (0.008)***	-0.221 (0.009)***	-0.183 (0.008)***

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black. N = 24,797 in 5,408 couples.

Table 4: Wives' Housework Hours and Subsample of Respondents with Children
PSID (1976-2007)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.493 (0.010)***	-0.493 (0.011)***	-0.466 (0.011)***	-0.462 (0.011)***	-0.254 (0.011)***
Wife's Birth Cohort		0.003 (0.012)	0.021 (0.012)	0.017 (0.012)	-0.091 (0.011)***

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black. N = 47,948 in 6,796 couples.

Table 5: Wives' Housework Hours and Subsample of Respondents in Dual Earners Employed Full-Time
PSID (1976-2007)

	Wives' Weekly Housework Hours				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.286 (0.008)***	-0.257 (0.009)***	-0.229 (0.009)***	-0.193 (0.009)***	-0.121 (0.009)***
Wife's Birth Cohort		-0.083 (0.010)***	-0.055 (0.010)***	-0.084 (0.010)***	-0.122 (0.009)***

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black. N = 47,948 in 6,796 couples.

Figure 1: Plotted Cohort Coefficients by Data Subsample
PSID

Note: Cohort coefficients are from full model with all explanatory variables. Models including health and disability cover the period 1984-2007. Models including number of children in household at various ages cover the period 1976-1992. Subsetting models by presence of children, and analysis of dual full time earner couples, enables inclusion of entire time series 1976-2007.

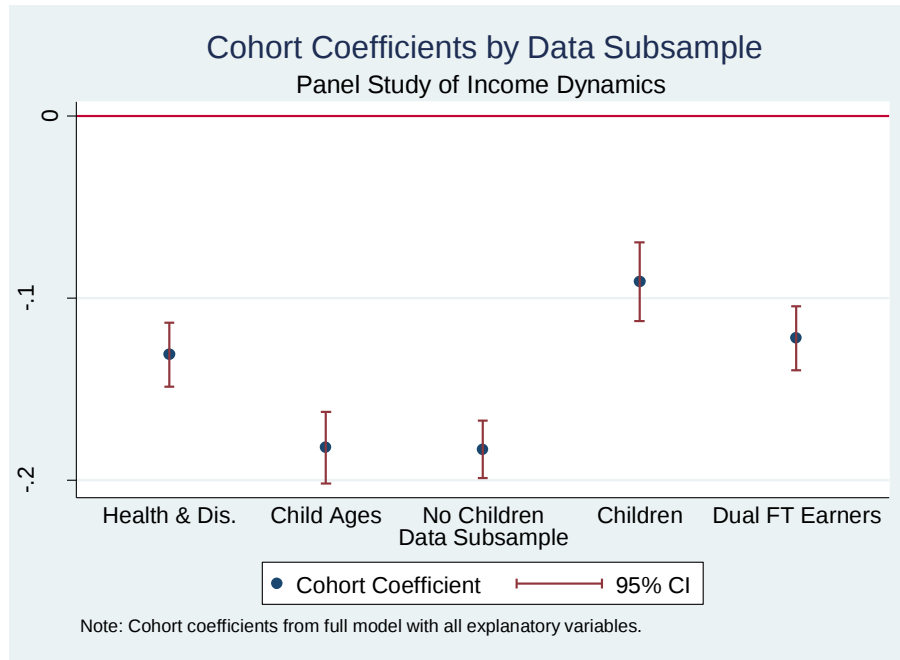


Table 6: Wives' Housework Hours and Subsample of Respondents in Dual Earners Employed Full-Time
PSID (1976-2007)

VARIABLES	Wives' Weekly Housework Hours				
	(1)	(2)	(3)	(4)	(5)
Survey Year	-0.286 (0.008)***	-0.257 (0.009)***	-0.229 (0.009)***	-0.193 (0.009)***	-0.121 (0.009)***
Wife's Birth Cohort		-0.083 (0.010)***	-0.055 (0.010)***	-0.084 (0.010)***	-0.122 (0.009)***
<i>Wife's Education</i>					
High School			-1.744 (0.322)***	-1.256 (0.312)***	-0.399 (0.297)
Some College			-3.593 (0.361)***	-2.869 (0.350)***	-1.650 (0.335)***
College Graduate			-4.344 (0.422)***	-3.422 (0.409)***	-1.593 (0.395)***
Grad/Prof. Degree			-4.441 (0.502)***	-3.818 (0.487)***	-1.886 (0.473)***
<i>Husband's Education</i>					
High School			-0.917 (0.288)**	-0.861 (0.279)**	-0.638 (0.265)*
Some College			-2.152 (0.324)***	-1.985 (0.314)***	-1.596 (0.300)***
College Graduate			-2.905 (0.379)***	-2.635 (0.367)***	-2.293 (0.353)***
Grad/Prof. Degree			-2.767 (0.467)***	-2.674 (0.452)***	-2.331 (0.438)***
<i>Fertility</i>					
One Child				2.397 (0.156)***	2.144 (0.151)***
Two Children				3.690 (0.164)***	3.437 (0.158)***
Three Children				5.140 (0.233)***	4.759 (0.225)***
Four + Children				5.787 (0.379)***	5.223 (0.365)***
<i>Time Availability</i>					
Husband Is Working					1.076 (0.294)***
Husb. Hours Worked					0.027 (0.007)***
Wife Is Working					-7.092 (0.217)***
Wife's Hours Worked					-0.037 (0.011)***
<i>Relative Resources</i>					
Wife's Rel. Earnings					-1.782 (2.054)
<i>Gender Display</i>					
Wife's Rel. Earnings ²					0.488 (1.478)
<i>Autonomy</i>					
Husband's Earnings					-0.001 (0.004)
Wife's Earnings					
Quartile 1					-0.108 (0.044)*
Quartile 2					-0.135 (0.020)***
Quartile 3					-0.031 (0.013)*
Quartile 4					-0.012 (0.008)
Constant	585.768***	691.009***	584.256***	567.400***	507.459***
	(16.261)	(20.434)	(20.655)	(20.009)	(19.238)
<i>Random Effects</i>					
ln(SD of Constant)	1.930 (0.015)***	1.923 (0.015)***	1.870 (0.015)***	1.812 (0.015)***	1.732 (0.016)***
ln(SD of Residual)	2.074 (0.005)***	2.074 (0.005)***	2.074 (0.005)***	2.067 (0.005)***	2.036 (0.005)***
Observations	27700	27700	27700	27700	27700
Number of groups	5443	5443	5443	5443	5443

Notes: *** p<0.001, ** p<0.01, * p<0.05. Standard errors in parentheses. All models control for proxy respondent, husband's disability status, and whether husband is black.

REFERENCES

- Akerlof, George A., Janet L. Yellen, and Michael L. Katz. 1996. "An Analysis of Out-of-Wedlock Childbearing in the United States." *Quarterly Journal of Economics* 111(2): 277-317.
- Artis, Julie E. and Eliza K. Pavalko. 2003. "Explaining the Decline in Women's Household Labor: Individual Change and Cohort Differences." *Journal of Marriage and the Family* 65:746-761.
- Bailey, Martha J. 2010. "Momma's Got the Pill: How Anthony Comstock and *Griswold v. Connecticut* Shaped US Childbearing," *American Economic Review* 100(1): 98-129
- Baxter, Janeen, Belinda Hewitt, and Michele Haynes. 2008. "Life Course Transitions and Housework: Marriage, Parenthood, and Time on Housework." *Journal of Marriage and Family* 70: 259-272.
- Bittman, Michael, Paula England, Liana Sayer, Nancy Folbre, and George Matheson. 2003. "When Does Gender Trump Money? Bargaining and Time in Household Work." *American Journal of Sociology* 109(1): 186-214.
- Bianchi, Suzanne. 2011. "Family Change and Time Allocation in American Families." *The Annals of the American Academy of Political and Social Science* 638: 21-44.
- Bianchi, Suzanne M., Melissa Milkie, Liana Sayer, and John Robinson. 2000. "Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor." *Social Forces* 79: 191-228.
- Blair-Loy, Mary. 2001. "Cultural Constructions of Family Schemas: The Case of Women Finance Executives." *Gender & Society* 15: 687-709.
- Blau, Francine. 1998. "Trends in the Well-Being of American Women, 1970-1995." *Journal of Economic Literatures* 36: 112-165.
- Bongaarts, John and Griffith Feeney. 1998. "On the Quantum and Tempo of Fertility." *Population and Development Review* 24(2): 271-291.
- Brewster, Karin L. and Irene Padavic. 2000. "Changes in Gender Ideology, 1977-1996: The Contributions of Intracohort Change and Population Turnover." *Journal of Marriage and the Family* 62(2): 477-87.
- Brines, Julie. 1994. "Economic Dependency, Gender, and the Division of Labor at Home." *American Journal of Sociology* 100(3): 652-88.
- Buchmann, Claudia and Thomas DiPrete. 2006. "The Growing Female Advantage in College Completion: The Role of Parental Education, Family Structure, and Academic Achievement." *American Sociological Review* 71(4): 515-541.
- Cha, Youngjoo. 2010. "Reinforcing Separate Spheres: The Effect of Spousal Overwork on Men's and Women's Employment in Dual-Earner Households." *American Sociological Review* 75(2): 303-329.
- Charles, Maria and Karen Bradley. 2009. "Indulging our Gendered Selves? Sex Segregation by Field of Study in 44 Countries." *American Journal of Sociology* 114(4): 924-976.
- Correll, Shelley J. 2004. "Constraints into Preferences: Gender, Status and Emerging Career Aspirations." *American Sociological Review* 69(1): 93-113.
- Correll, Shelley J. 2001. "Gender and the Career Choice Process: the Role of Biased Self-Assessments." *American Journal of Sociology* 106(6): 1691-1730.
- Cowan, Ruth S. 1983. *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*. New York: Basic Books.
- Coverman, Shelly. 1985. "Explaining Husbands' Participation in Domestic Labor." *The Sociological Quarterly* 26(1): 81-97.
- Davis, Shannon N. and Theodore N. Greenstein. 2009. "Gender Ideology: Components, Predictors, and Consequences." *Annual Review of Sociology* 35:88-105.
- Devereux, Paul J. 2004. "Changes in Relative Wages and Family Labor Supply." *The Journal of Human Resources* 39(3): 697-720.
- DiPrete, Thomas A. and Claudia Buchmann. 2006. "Gender Specific Trends in the Value of Education and the Emerging Gender Gap in College Completion." *Demography* 43(1): 1-24.

- Elder, Glen H., Jr., Monica Kirkpatrick Johnson, and Robert Crosnoe. 2003. "The Emergence and Development of Life Course Theory." Pp. 3-16 in *Handbook of the Life Course*, edited by Jeylan T. Mortimer and Michael J. Shanahan. Hingham, MA: Kluwer Academic Publishers.
- Gershuny, Jonathan and John P. Robinson. 1988. "Historical Changes in the Household Division of Labor." *Demography* 25(4): 537-552.
- Goldin, Claudia. 2006 "The Quiet Revolution That Transformed Women's Employment, Education, and Family." *American Economic Review* 96: 1-21.
- Goldin, Claudia and Lawrence F. Katz. 2002. "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions." *Journal of Political Economy* 110(4): 730-770.
- Goldin, Claudia, Lawrence F. Katz, and Ilyana Kuziemko. 2006. "The Homecoming of American College Women: The Reversal of the College Gender Gap." *Journal of Economic Perspectives* 20(4): 133-156.
- Goldstein, Joshua R. 2009. "The End of 'Lowest-Low' Fertility?" *Population and Development Review* 35(4): 663-699.
- Goldstein, Joshua R. and Catherine T. Kenney. 2001. "Marriage Delayed or Marriage Forgone? New Cohort Forecasts of First Marriage for U.S. Women." *American Sociological Review* 66(4): 506-519.
- Greenstein, Theodore N. 1996. "Gender Ideology and Perceptions of the Fairness of the Division of Household Labor: Effects on Marital Quality." *Social Forces* 74(3):1029-1042.
- Gupta, Sanjiv. 2007. "Autonomy, Dependence, or Display? The Relationship between Married Women's Earnings and Housework." *Journal of Marriage and the Family* 69: 399-417.
- Gupta, Sanjiv. 1999. "The Effects of Transitions in Marital Status Transitions on Men's Performance of Housework." *Journal of Marriage and the Family* 61: 700-711.
- Heisig, Jan Paul. 2011. "Who Does More Housework: Rich or Poor? A Comparison of 33 Countries." *American Sociological Review* 76(1): 74-99.
- Hersch, Joni and Leslie S. Stratton. 1996. "Housework, Wages, and the Division of Housework Time for Employed Spouses." *American Economic Review* 84(2): 120-125.
- Juster, F. Thomas, Hiromi Ono, and Frank P. Stafford. 2003. "An Assessment of Alternative Measures of Time Use." *Sociological Methodology* 33(1): 19-54.
- Kan, Man-Yee and Stephen Pudney. 2008. "Measurement Error in Stylized and Diary Data on Time Use." *Sociological Methodology* 38(1): 101-132.
- Kenney, Catherine T. 2008. "Father Doesn't Know Best? Parents' Control of Money and Children's Food Insecurity." *Journal of Marriage and Family* 70(3): 654-669.
- Kessler-Harris, Alice. 1990. *A Woman's Wage*. Louisville: University of Kentucky Press.
- Killewald, Alexandra. 2011. "Opting Out and Buying Out: Wives' Earnings and Housework Time." *Journal of Marriage and Family* 73(2): 459-471.
- Killewald, Alexandra, Patricia Andreski, and Robert Schoeni. 2011. "Trends in Item Non-Response in the PSID, 1968-2009." *Panel Study of Income Dynamics Technical Series Paper No. 11-02* (http://www.psidonline.isr.umich.edu/Publications/Papers/tsp/2011-02_Killewald_Andreski_Schoeni.pdf).
- Killewald, Alexandra and Margaret Gough. 2010. "Money Isn't Everything: Wives' Earnings and Housework Time." *Social Science Research* 39(6): 987-1003.
- Lillard, Lee A. and Constantijn W. A. Panis. 1998. "Panel Attrition from the Panel Study of Income Dynamics: Household Income, Marital Status, and Mortality." *Journal of Human Resources* 33(2): 437-457.
- Lundberg, Shelley J., Robert A. Pollak, and Terence J. Wales. 1997. "Do Husbands and Wives Pool Resources? Evidence from the UK Child Benefit." *Journal of Human Resources* 32(3): 463-480.
- Lundberg, Shelley and Robert A. Pollak. 1996. "Bargaining and Distribution in Marriage" *Journal of Economic Perspectives* 10(4): 139-158.
- Oppenheimer, Valerie K. 1994. "Women's Rising Employment and the Future of the Family in Industrial Societies." *Population and Development Review* 20: 293-342.

- Percheski, Christine. 2008. "Opting Out? Cohort Differences in Professional Women's Employment Rates from 1960 to 2005." *American Sociological Review* 73(3): 497-517.
- Pollak, Robert A. 2005. "Bargaining Power in Marriage: Earnings, Wage Rates, and Household Production" *NBER Working Paper Series* No. 11239
- Presser, Harriet B. 1994. "Employment Schedules among Dual-Earner Spouses and the Division of Household Labor by Gender" *American Sociological Review* 59: 348-364.
- Raftery, Adrian. 1995. "Bayesian Model Selection in Social Research." *Sociological Methodology* 25: 111-163.
- Ridgeway, Cecilia L. 2011. *Framed by Gender: How Gender Inequality Persists in the Modern World*. NY/Oxford: Oxford University Press.
- Ross, Catherine E. 1987. "The Division of Labor at Home." *Social Forces* 65(3): 816-833.
- Sayer, Liana. 2005. "Gender, Time and Inequality: Trends in Women's and Men's Paid Work, Unpaid Work and Free Time." *Social Forces* 84(1): 285-303.
- Schneider, Daniel. 2011. "Market Earnings and Household Work: New Tests of Gender Performance Theory." *Journal of Marriage and Family* 73(4): 845-860.
- Schnittker, Jason, Jeremy Freese, and Brian Powell. 2003. "Who are Feminists and What Do They Believe? The Role of Generations." *American Sociological Review* 68:607-622.
- Schwartz, Christine R. 2010. "Earnings Inequality and the Changing Association between Spouses' Earnings." *American Journal of Sociology* 115: 1524-57.
- Schwartz, Christine R. and Robert D. Mare. 2005. "Trends in Educational Assortative Marriage from 1940 to 2003." *Demography* 42(4): 621-646.
- Shelton, Beth Anne and Daphne John. 1996. "The Division of Household Labor." *Annual Review of Sociology* 22: 299-322.
- Shelton, Beth Anne. 1992. *Women, Men, and Time: Gender Differences in Paid Work, Housework, and Leisure*. New York: Greenwood Press.
- South, Scott J. and Glenna Spitze. 1994. "Housework in Marital and Nonmarital Households." *American Sociological Review* 59(3): 327-347.
- Sweeney, Megan M. and Maria Cancian. 2004. "The Changing Importance of White Women's Economic Prospects for Assortative Mating." *Journal of Marriage and Family* 66(4): 1015-1028.
- Thaler, Richard H. 1999. "Mental Accounting Matters." *Journal of Behavioral Decision Making* 12(3): 183-206.
- Thornton, Arland and Linda Young-DeMarco. 2001. "Four Decades of Trends in Attitudes toward Family Issues in the United States: The 1960s through the 1990s." *Journal of Marriage and the Family* 63(4): 1009-1037.
- Vanek, Joann. 1974. "Time Spent in Housework." *Scientific American* 231:116-20.
- West, Candace and Don H. Zimmerman. 1987. "Doing Gender." *Gender & Society* 1(2): 125-151.
- Winship, Christopher and David J. Harding. 2008. "A General Strategy for the Identification of Age, Period, Cohort Models: A Mechanism Based Approach." *Sociological Methods and Research* 36(3): 362-401.
- Wolfers, Justin. 2003. "Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results." *NBER Working Paper* No. 10014.
- Xie, Yu, James Raymo, Kimberly Goyette, and Arland Thornton. 2003. "Economic Potential and Entry into Marriage and Cohabitation." *Demography* 40:351-367.
- Yang, Yang. 2008. "Social Inequalities in Happiness in the U.S. 1972-2004: An Age-Period-Cohort Analysis." *American Sociological Review* 73(2): 204-226.
- Yang, Yang and Kenneth C. Land. 2008. "Age-Period-Cohort Analysis of Repeated Cross-Section Surveys: Fixed or Random Effects?" *Sociological Methods and Research* 36: 297-326.