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ABSTRACT

Studies examining the association of housework with earnings have not tested for causal directionality despite competing theories about causal ordering. Autonomy theory, and the relative resources, gender display, and gender deviance neutralization hypotheses suggest personal and relative earnings affect time in housework while human capital theory implies the opposite. Using data from $N = 3,719$ continuously married couples in Waves 1 and 2 of the National Survey of Families and Households and structural equation models, we find that wives' personal earnings and housework are reciprocally related. Her earnings have a stronger effect on housework than vice versa. For husbands, time in routine housework affects earnings only. We find little evidence that relative earnings affect husbands' or wives' housework time, rather we identify a significant effect of housework on one's share of couple's earnings. The results provide support for autonomy theory for wives and a human capital perspective for both spouses.

Key words: Housework, Division of labor, Income/Wages, National Survey of Families and Households, Structural equation modeling

The surge of women into the labor force (especially married women with children) since 1960 has dramatically altered the household division of labor in American families. Women now constitute nearly half of the adult labor force and have emerged as significant contributors to family coffers (Wang, Parker, & Taylor, 2013). This shift in family life has spawned a body of research devoted to understanding not only the determinants of the household division of labor but also its consequences for families and individuals (Becker 1981; Budig & England, 2001; England, 2005; Jacobs & Gerson, 2004; Hochschild, 1989), with a specific focus on the relationship between spouses' time in housework and earnings derived from paid labor. Yet, despite decades of research demonstrating that personal and relative earnings are associated with housework participation (Bittman, England, Sayer, Folbre, & Matheson, 2003; Brines, 1994; Coverman, 1983; Greenstein, 2000; Gupta, 2006; 2007; Gupta, Sayer, & Cohen, 2009; Hersch, 1991; 2009; Hersch & Stratton, 1997; Shirley & Wallace, 2004; Stratton, 2001) it remains, nevertheless, unclear *how* earnings and housework are causally related for the married.

Explanations for the relationship between earnings and housework fall into one of two camps. On one hand, *autonomy theory*, along with the *relative resources, gender display,* and *gender neutralization hypotheses*, suggests that housework arrangements depend on spouses' absolute and relative earnings (Blood & Wolfe, 1960; Brines, 1994; Greenstein, 2000; Gupta, 2006; 2007). On the other hand, *human capital theory* suggests that time spent in housework affects one's earnings (Becker, 1985). Despite the plausibility of a mutually reinforcing relationship, only one study to date has investigated this possibility (Hersch, 1991) but with significant limitations. Rather, the vast majority of research has focused on the examination of one causal direction or the other; and many have done so using single-direction, single-equation

models (e.g., OLS regression) and cross-sectional data which, although often recognized by researchers as a limitation, do not provide information on causal directionality.

This study examines the relationship between housework and earnings by relaxing assumptions of relational unidirectionality and employing structural equation models that can estimate a possible reciprocal relationship. For comparability with past research on housework and earnings we employ data from the National Survey of Families and Households (NSFH), an older survey with high quality measures. Results indicate a reciprocal relationship between housework and absolute personal earnings for wives but only a unidirectional effect of housework on absolute personal earnings for husbands. For both husbands and wives we find little evidence of an effect of relative earnings on housework performance. Rather, it is housework performance that affects their relative earnings.

BACKGROUND

The Effect of Spouses' Personal and Relative Earnings on Housework Performance

Although numerous factors including spouses' gender ideologies, time availability, parental status, race/ethnicity, and socioeconomic status affect their performance in, and sharing of, household labor (Coltrane, 2000), spouses' relative and absolute earnings have received particular attention for their effect on housework arrangements. The *relative resources hypothesis* (also called the economic dependence or bargaining hypothesis), argues that couples determine who is responsible for housework by bargaining with one another – a process in which the spouse with the most resources (i.e., income; occupational prestige; education) is able to negotiate out of housework and pass this responsibility onto his/her partner. Proponents of this hypothesis use this reasoning to explain wives' historically greater hours and larger share of housework compared to their husbands' (Blood & Wolfe, 1960; Brines, 1994; Ross, 1987). In

support of the hypothesis, research finds that in couples with relatively equal earnings, husbands do more housework and wives less, resulting in a more equitable sharing of housework (Bittman, et al. 2003; Brayfield, 1992; Brines, 1994; Greenstein, 2000).

Although the relative resources hypothesis portrays housework bargaining as an exchange process unbiased by gender, some evidence suggests that wives' hours of housework increase and husbands' hours decrease when wives out earn their husbands (Bittman et al., 2003; Brines, 1994; Greenstein, 2000). Scholars explain these observations using a *gender display* or *gender deviance neutralization* perspective, arguing that in order to offset the stigma of female providership, wives perform more housework as a demonstration of femininity and/or husbands assert their masculine dominance by refusing housework. These hypotheses are part of a broader gender perspective that emphasizes paid and unpaid labor as central to the construction and reproduction of gender and power inequality between men and women (Risman, 1999). While the gender neutralization hypothesis suggests that both men and women adjust housework performance to offset female breadwinning, the gender display perspective argues that it is only men who do so. Evidence for these perspectives, nonetheless, is mixed. Some studies find larger income shares among wives to be associated with an increase in their hours of housework (Evertsson & Nermo, 2004; Schneider, 2011), while other do not (Brines, 1994; Greenstein, 2000; Parkman, 2004) and some find larger shares to decrease husbands' hours (Brines, 1994; Evertsson & Nermo, 2004; Greenstein, 2000), while others do not (Parkman, 2004; Schneider, 2011). Evidence suggests that gender display, for men especially, may depend on cultural attitudes about gender since evidence for it varies across countries (Bittman et al., 2003; Thébaud, 2010). Moreover, this curvilinear pattern, when observed, is limited to the few cases where wives earn more than two-thirds of family income (Bittman et al., 2003; Greenstein, 2000;

Sullivan, 2011), suggesting that, for the vast majority of married couples, more equitable resources are associated with fewer hours of housework for wives, more for husbands, and more equitable sharing of household tasks in total.

Developed by Sanjiv Gupta (2006; 2007) in response to inconclusive support for the relative resources and gender display/deviance neutralization hypotheses, *autonomy theory* argues that absolute rather than relative earnings determine one's, especially women's, participation in housework. According to Gupta, this is because rather than "bargain" out of housework one can decrease housework time by purchasing market substitutes. Gupta further argues that the curvilinear association of relative earnings with housework is an artifact of wives' out earning their husbands' almost exclusively in low income couples – a situation in which wives would have fewer earnings to outsource housework. This perspective acknowledges that housework time is neither fixed nor finite and helps explain why married couples do significantly less housework today (28.1 hours per week in 2010) than they did four decades ago (38.6 hours in 1960) – a pattern driven largely by decreases in wives' housework time (33.9 hours $\rightarrow$ 17.8 hours) in light of small increases in husbands' (4.7 hours $\rightarrow$ 10.3 hours) (Bianchi et al., 2012).

Initial tests of autonomy theory were limited to women's own housework time and demonstrated that only women's personal earnings matter for their housework performance (male partners' earnings have no effect). Most importantly, when adjusted for personal, absolute earnings Gupta found no significant effect of relative earnings on women's hours of housework (Gupta, 2007). Evidence to support the spuriousness of relative earnings, nevertheless, is mixed, as recent work suggests that both relative and absolute earnings are associated with women's hours of housework (Baxter & Hewitt, 2009; Schneider, 2011; Usdansky & Parker, 2011).

Although the relative resources hypothesis aims to explain both husbands' and wives' housework time, autonomy theory pertains to wives' housework performance only. As explained by Gupta (2006; 2007), the most likely reason absolute earnings matter is that they can be used to purchase housework services. Since women remain conventionally responsible for housework, it is they who direct their earnings toward purchasing market substitutes for housework and childcare (Cohen, 1998). Husbands' absolute earnings, then, should have no theoretical effect their own housework performance, although this has not been empirically tested to our knowledge.

All of these perspectives help explain variation in spouses' housework performance, but are limited by the use of cross-sectional data and single-direction, single-equation models (e.g., OLS regression) to examine the earnings-housework relationship. This is problematic given that an entirely separate body of research suggests reverse causality – that time spent in housework has a negative effect on both men's and women's earnings.

The Effect of Housework Allocation on Spouses' Earnings

According to *human capital theory*, earnings are the product of one's time spent in paid labor and one's human capital investment in labor (experience, skills, training, etc.) -- which itself is a function of the time doing paid work (Becker, 1985). As such, responsibilities for unpaid labor (i.e., housework and childcare) directly inhibit one's ability to accumulate earnings and human capital in paid labor. Specifically, the time and energy one directs toward unpaid labor inhibits: a) availability to work outside the home, b) productive capacities in paid work, and c) ability to accumulate human capital that lead to higher wages and earnings (Becker, 1985). According to Becker (1985), wives' historically lower earnings compared to husbands' are in large part a function of their housework responsibilities which in turn reduce their

financial return on paid labor. Male breadwinning is perpetuated not only through actual gendered labor practices but also through cultural assumptions and expectations for gendered labor responsibilities and capacities. For example, employment discrimination based on such perceptions result in wage premiums for married fathers compared to single, childless men and wage penalties among mothers compared to childless women (Antonovics & Town, 2004; Budig & England, 2001; Dougherty, 2006; Glauber, 2008; Killewald & Gough, 2013). Although a human capital framework would suggest a marriage penalty for women, evidence is mixed. Some studies find that wives' earnings decline following marriage (Light, 2004), and that unmarried women incur fewer penalties than married women (Budig & England, 2001). Others, nonetheless, find that married women garner a marriage premium although it is smaller than men's (Dougherty, 2006; Killewald & Gough, 2013).

Consistent with the human capital perspective, a considerable number of studies have found that housework is negatively associated with men's and women's wages (Hersch, 1991; 2009; Hersch & Stratton, 1997; McAllister, 1990; Noonan, 2001; Powers, 2003; Shelton & Firestone, 1988; Stratton, 2001). Research suggests that the association of housework with wages is generally stronger for women than men (Hersch, 1991; 2009) and among the married specifically, stronger for wives than husbands (Hersch & Stratton, 1997). Yet, Noonan (2001) found that among married couples wages are only associated with routine housework like cooking, cleaning, and washing dishes and not with infrequent housework – activities such as lawn maintenance, car maintenance, bill paying. When analysis is limited to routine housework items, the effect on wages is statistically no different for husbands and wives.

Like analyses assessing the effect of earnings on housework, studies testing human capital theory suffer from limitations of cross-sectional data and unidirectional models.

However, human capital studies have on occasion employed methods that attempt to control for the possibility of joint endogeneity (i.e., reciprocal relation), namely instrumental variable (IV) approaches (Hersch & Stratton, 1997) or two-stage least squares (2SLS) regression (Hersch, 1991). One study using data from the Panel Study of Income Dynamics (PSID) found a strong negative effect of housework on wages in OLS regression analyses for both husbands and wives, but an effect of housework on wages for wives only when using instrumental variables (Hersch & Stratton, 1997). Most importantly, post-estimation Hausman tests indicated that hourly wage was exogenous to housework for husbands, but not wives – implying a mutually reinforcing relationship for wives but not husbands. This finding is consistent with Hersch's (1991) 2SLS regression analysis of the association between housework and wages where she found a reciprocal relationship between housework and wages for women, also using PSID data.

The studies that explicitly examine the possibility of endogeneity using the PSID are limited in many respects. First, Hersch and Stratton (1997) limited their analyses to a subgroup of white respondents. Second, both studies ignore many important sociological factors that affect housework hours and earnings such as gender ideology. Third, measures of housework were nondescript, combining both routine and infrequent housework and were not exhaustive. Finally, these studies contained information from the heads of households only, meaning that married women did not report their own wages or hours of housework, introducing possible bias.

An additional difference across studies assessing the relationship between housework and earnings is the measurement of earnings. In studies testing human capital theory, earnings are almost universally operationalized as hourly wage while assessments of autonomy theory, the relative resources hypothesis, gender display, and gender deviance neutralization operationalize earnings as yearly income. Although Gupta (2007) found in supplemental analyses that women's

routine housework was associated with both their yearly income and hourly wage, it is not entirely clear if yearly income is reciprocally related to housework despite the fact that some research finds this for wages. Reciprocality between housework and both wages and yearly income, therefore, need to be investigated.

Although tests of the human capital perspective have been limited to individuals' personal earnings, the implications for spouses' relative earnings are clear; because relative earnings are the product of both spouses' personal earnings, housework time should also negatively affect one's relative contribution to a couple's total earnings. This introduces the possibility of a reciprocal relationship between relative earnings and housework, especially for wives, and suggests the possibility that previous findings of an effect of relative earnings on housework for husbands may be an artifact of the effect of housework on his relative earnings.

Findings from tests of human capital theory combined with those from tests of the relative resources, gender display, gender deviance neutralization, and autonomy perspectives, suggest two heretofore unexplored possibilities. First, the relationship between housework and earnings, in both relative and absolute sense, is reciprocal for wives; and second, for husbands, it is possible that housework affects his absolute earnings but that only relative earnings may affect his housework. A rigorous test, nonetheless, is required to establish relational directionality and to accurately estimate the strength of these potential associations. Indeed, if housework and earnings are reciprocally related, results from models that fail to account for this are likely to be biased and inconsistent, resulting in a misrepresentation in the magnitude of directional effects (Finkel, 1995; Paxton, Hip, & Marquart-Pyatt, 2011).

METHOD

Data

Data for this study come from Waves 1 (1987-88) and 2 (1992-94) of the National Survey of Families and Households (NSFH). Of the 13,017 households interviewed in the first wave, 10,005 were re-interviewed in 1992-1994. We restrict the sample to continuously married couples in Waves 1 and 2 where both spouses were of working age (under age 60 at Wave 1) and both completed interviews and self-administered questionnaires in both waves. Of the 13,017 Wave 1 primary respondents, 6,877 were married (52.8%), 81% (n = 5,463) of which had both spouses under age 60. Of the original married couples where both respondents were under age 60 at Wave 1, 967 were lost to attrition, 757 couples dissolved either through divorce, separation, or widowhood, 4 reported being married to someone else, and another 16 exhibited inconsistencies between their Wave 1 and Wave 2 marital status. These restrictions resulted in an analytic sample of N = 3,719 married couples.

Some may question the use of "older" data, but we believe the NFSH is useful for two reasons. First, a significant number of previous studies on housework and earnings over the last twenty plus years use the NSFH. Therefore, using the NSFH ensures that our findings are not the product of idiosyncratic data. Second, the NSFH includes a rich array of housework questions and couple-level measures unmatched in modern surveys.

Analytic Strategy

Model specification.

If the directional relationship between housework and earnings is misspecified, estimates from single-direction regression models will be biased and inconsistent, even if estimates come from panel data with lagged dependent variables (Bollen, 2012; Finkel, 1995; Paxton, Hipp, & Marquart-Pyatt, 2011) or if fixed-effects are employed to control for unobserved variable bias. Moreover, OLS regression depresses standard errors, resulting in increased probability that

researchers will make a Type I error (Kmenta, 1997). Testing for directionality, therefore, requires a technique that can estimate multiple equations with multiple dependent variables while also accounting for prediction error – a primary source of estimate bias (Finkel, 1995).

FIGURE 1 ABOUT HERE

Model components.

This study employs structural equation models (SEM) using AMOS 19 to test for and measure possible reciprocal causality between earnings and housework. As seen in Figure 1 we estimate a nonrecursive (i.e., reciprocal) SEM with dual paths between housework and absolute personal earnings at Time 2 while also accounting for prediction error, or equation disturbance, for both housework and earnings (ε_1 and ε_2) and covariance between the error terms. We estimate covariance between the error terms since it is reasonable to assume correlated measurement errors between endogenous outcomes among married persons due to unobserved factors that vary across households (Sanchez, 1994). The model also specifies several observed exogenous variables as predictors of absolute personal earnings and housework. Two of these predictors are measures of personal earnings and housework at Time 1. These variables serve as instrumental variables (IVs) of their respective measures at Time 2. Inclusion of time lagged measures, known as auxiliary instrumental variables (AIVs), is common when using survey data (Bollen, 2012) since IVs are essential for model identification when estimating nonrecursive paths (Bollen, 1989; Paxton, Hipp, & Marquart-Pyatt, 2011). Lagged measures satisfy the first requirement of IVs in that they are related to the endogenous predictors (Bollen, 2012), but it is uncertain that they satisfy the second requirement of IVs -- that they are uncorrelated with the disturbance term of the equation (Bollen, 2012). It is fortunate, therefore, that theory and past research indicate

other variables that may serve as IVs of both earnings and housework. These variables, shown in Figure 1, are labeled model implied instrumental variables or MIIVs, and are discussed below.

To assess the strength of the IVs (both AIVs and MIIVs), whether they are correlated with the disturbance term of any given equation, and to verify results from the nonrecursive SEMs, the reciprocal relationship between housework and earnings is also assessed using two-stage least squares (2SLS) regression. Two tests are conducted to assess the validity of the IVs in the models. One, the Anderson canonical correlations likelihood ratio test (Hall, Rudebusch, & Wilcox, 1996), assesses the relevance of the instruments. The other, the Hansen-Sargan test (Sargan, 1958), determines if at least one of the IVs is correlated with the disturbance term.

In addition to the AIVs, the MIIVs and the common covariates in the model (i.e., observed exogenous variables that predict both endogenous variables) are all assessed at Time 1, ensuring temporal ordering. Indeed, some time-varying predictors of housework and earnings, such as labor force participation and gender ideology, are also affected by housework and earnings (Carlson & Lynch, 2013; Cunningham, 2008). An optimal model would estimate contemporaneous paths amongst all of these variables at Time 2. Unfortunately, such a model cannot be mathematically identified.

Procedure.

Using a nonrecursive model, we first estimate the reciprocal relationship between housework and husbands' absolute yearly income. Then, we estimate the reciprocal relationship between housework and wives' absolute yearly income. Following the same procedures outlined above, we next assess the association of housework with husbands' and wives' absolute hourly wages. Finally, we examine the possibility of a reciprocal relationship between husbands' and wives' housework time and their relative yearly income.

Although we use nonrecursive SEM to test for and measure possible reciprocal causality between personal earnings and housework, we use a cross-lagged structural equation model, as shown in Figure 2, to assess the relationship between relative earnings and housework. Ideally, a nonrecursive framework would be preferable due to the significant 5 to 7 year time lag between waves of the NSFH. Indeed, to the degree that housework and earnings are related, their effects are likely proximal rather than distal. That is one's current earnings are likely a better predictor of one's current housework performance that one's earnings from 5 years ago. Therefore, findings from a cross-lagged SEM are likely to be conservative. Nevertheless, our ability to assess reciprocality using a nonrecursive modeling strategy is complicated by inclusion of the quadratic endogenous variable for relative earnings needed to assess the gender display and gender deviance neutralization hypotheses. Although both SEM and 2SLS models were specified reliable estimates were not attainable when we included an endogenous quadratic term for relative earnings in our models.

FIGURE 2 ABOUT HERE

Measures

Descriptive characteristics for all variables used in the analysis are displayed in Table 1.

Endogenous and auxiliary instrumental variables.

In keeping with the majority of tests on the effect of earnings on housework and findings that only routine housework affects earnings, we focus the analysis on routine housework. *Hours of routine housework T1/T2* is measured as the number of hours spent on four routine housework items per week: a) meal preparation, b) washing dishes and cleaning up after meals, c) cleaning house, and d) washing, ironing, and mending. Although respondents were asked to report their time in nine different household activities, factor analyses on these items yielded 2 dimensions of

household work (Eigenvalues > 1.0) - "routine housework", consisting of the items above and "infrequent housework" which consisted of items like bill paying and home maintenance.

A benefit of the NSFH is that respondents also report on their partners' participation in household tasks which reduces issues related to response bias or inaccuracy in recall (Kamo, 2000). Husbands, especially, overestimate their own time spent in housework in surveys (Bianchi, Milkie, Sayer, & Robinson, 2000; Kamo, 2000). To partially correct for this bias, we follow Kamo (2000) and use the average of husbands' and wives' reports on these tasks. A small number of cases reported more hours of housework than waking hours in a week; following Lennon and Rosenfield (1994) housework hours were truncated at 120. Specifications where housework hours were truncated at the 95th percentile produced similar to identical results.

Absolute earnings are assessed in two ways -- as one's *yearly income T1/T2* and as *hourly wage T1/T2*. Yearly income is calculated as the sum of respondents' reports of income earned in the past year from wages, salary, commissions, tips, and self-employment. Hourly wage is calculated by dividing the respondents' average weekly earnings in the past year (yearly income ÷ 52) by their average weekly hours worked. Alternative specifications where earnings were logged produced identical results (i.e., statistically significant directional effects) as those presented below. For interpretation, we present results where earnings are measured in dollars. Supplemental analyses were also conducted excluding respondents who reported no earnings at Time 2. Results of these analyses did not differ from those we report. Couples' relative earnings are measured as *husband's share of couple's total yearly income T2* which is the husbands' yearly income at Time 2 divided by the couples' total yearly income at Time 2.

Model implied instrumental variables (MIIVs).

In addition to the AIVs several variables are included as potential instruments of earnings and one's hours of housework. Each of the following measures has been theorized and/or demonstrated in past research to be directly associated with one or the other variable but not both. The MIIVs of earnings include self-employment at Time 1 for husbands (Hamilton, 2000; Hundley, 2000) and for wives their husbands' personal earnings at Time 1 (Gupta, 2007; Sweeney, 2002). *Self-employed* is a dichotomous dummy variable (1 = *yes*).

The MIIVs of routine housework in the model include a quadratic term for couples' relative earnings at Time 1 (Evertsson & Nermo, 2004) and whether the couple owns a home (South & Spitze, 1994). Last, for husbands' analyses only, the husbands' own egalitarian gender ideology (Corrigall & Konrad, 2007) is employed as an instrument of his participation in routine housework. *Owns home* is a dummy variable indicating whether the couple owns their home (1 = *yes*). *Egalitarian gender ideology T1* is measured as the summed scale of five items which appear in Wave 1 of the NSFH and which has been used extensively in various combinations in past research (Bianchi et al., 2000; Carlson & Knoester, 2011; Kroska & Elman, 2009): (a) "It is much better for everyone if the man earns the main living and the woman takes care of the home and family", (b) "It is all right for mothers to work full-time when their youngest child is under 5", (c) "Preschool children are likely to suffer if their mother is employed", (d) "It is all right for children under age 3 to be cared for all day in a daycare center", and (e) "If a husband and a wife both work full-time, they should share household tasks equally." Items (b) and (d) are both are measured on a 7-point scale rather than the 5-point scale for items (a), (c), and (e). Therefore, we recalibrated these measures on a 5-point scale (1= 0; 2 = .67; 3 = 1.33; 4 = 2; 5 = 2.67; 6 = 3.33; 7 =4). Responses for every item were recoded from 0 - 4 and oriented so that higher scores indicate more egalitarian gender ideologies (wives α = .71, husbands α = .72).

Common covariates.

A series of covariates are included as controls in this analysis that are predictors of both ones' hours of routine housework and absolute earnings at Time 2 (Coltrane, 2000; Hersh & Stratton, 1997; Noonan, 2001; Gupta, 2007). These include the one's age, wife's gender ideology, wife's occupational prestige, both spouses' hours of paid work, race/ethnicity, one's own and one's mothers' level of education, couple's relative earnings at Time 1, whether the couple had children younger than age 5 in the home at Time 1, and whether they had a child between waves. For wives only, her husbands' gender ideology and her self-employment are predictors of both endogenous variables. For husbands only, his wife's personal earnings are employed as predictors of both endogenous variables.

Age is measured in years, *Wife's occupational prestige* is assessed at Time 1 using the total labor force socioeconomic index developed by (Stevens & Cho, 1985). Values on this scale range from 14 to 90 with higher scores indicating higher occupational prestige. Homemaking/unemployed wives are assigned a value of 15.71 on this scale. *Paid work hours* is measured as the average number of hours per week participants reported they worked in the paid labor force at Time 1. Unemployed respondents are given a value of 0 on this measure. *Race/ethnicity* is a series of dummy variables with categories for black and Hispanic with non-black, non-Hispanic as the reference category. One's *education* and one's *mother's education* are measured in years of schooling completed. The presence of young children in the home is measured by the *number of children under age 5* at Time 1 and whether the couple experienced the *addition of a child* from Time 1 to Time 2 (1 = *yes*).

Multiple imputation is used to account for nontrivial missing information related to both spouse's information in the NSFH. Accordingly, missing values are imputed using the Bayesian

multiple imputation routine available in AMOS 19. In contrast, a list-wise deletion approach

would result in a loss of 1,593 (42.8%) cases for husbands and 1,401 cases (37.7%) for wives.

55.2% and 86.3% of this missing information is attributable to missing data on housework and

income for husbands and wives respectively. Results from supplemental analyses (not shown;

available upon request) with unimputed values for housework and income were not substantively

different than the results we present here.

TABLE 1 ABOUT HERE

RESULTS

Table 2 presents estimates from 2SLS regression and nonrecursive SEM of the

association between housework and yearly income. For presentation purposes, the table shows

estimates of the relationship between the endogenous variables only (Appendix A -- Tables A

and B for full results). First, results from 2SLS regression indicate that the IVs in each equation

are relevant and that there are no serious issues regarding the association of the IVs with the

equation disturbances. The Anderson canonical correlation likelihood ratio test demonstrates that

all of the IVs in each model serve to identify it. The results from the Hansen-Sargan test shows

that the disturbances for husbands' and wives' housework hours are not associated with the IVs

in those equations. There is evidence of problematic IVs in the equations for husbands and wives

yearly income, where at least one of the IVs in the equation is associated with the equation

disturbance term. In supplemental analyses (see table note) the problematic IV in each equation

was identified. Removal of this variable from the equation resulted in nonsignificant Hansen-

Sargan coefficients while the Anderson canonical correlation likelihood ratio coefficients

retained significance – indicating that the other IVs in the model served to identify it.

TABLE 2 ABOUT HERE

Second, fit indices from the nonrecursive SEM indicate excellent model fit. Although the omnibus chi-square test statistic – which is affected by sample size (Bollen, 1989) – only allows us to reject the null hypothesis of a perfectly fitting model for wives, three other fit indices – the incremental fit index (IFI), the normed fit index (NFI), and the Root Mean Square Error of Approximation (RMSEA) – all suggest that the model fits the data very well for both groups. Values of the IFI, NFI, and RMSEA range from 0 to 1. IFI and NFI values greater than .95 and a RMSEA of less than .05 represent excellent model fit. For wives, the IFI and NFI have values of 1.000 and 1.000 and the Root Mean Square Error of Approximation (RMSEA) is .017. For husbands, these values are .998, .997, and .048 respectively.

Estimates from the 2SLS and nonrecursive SEM analyses produce consistent estimates for both husbands and wives and indicate that the association between personal yearly income and housework for wives is reciprocal, while for husbands routine housework has a unidirectional effect on earnings. For example, these results indicate that for every one thousand dollar increase in yearly earnings in 1992 wives performed approximately .4 less hours of housework per week. Yet, changes in their time spent in housework also had an effect on their earnings as a one-hour increase in time spent in routine housework per week resulted in approximately 300 fewer dollars of annual income ($481 in 2014 dollars). The standardized coefficients (see Appendix A – Table B) show that the effect of earnings on housework (β = -.416) was one and a half times as strong as the effect of housework on earnings (β = -.287), indicating that autonomy theory is a more appropriate explanation for this relationship than human capital theory. Wives' earnings portend their household labor. According to supplemental t-tests (t = -3.096; p < .001, two-tailed), the effect of housework on earnings is three-and-one half times larger for husbands than for wives as the model predicts a one hour increase in

average time spent on routine housework to result in a reduction of approximately $1,000 in

yearly income in 1992, the equivalent of $1,605 today. These results support a human capital

perspective for husbands as their responsibilities for household labor foreshadow their earnings.

To compare findings with past studies testing human capital theory, and to ensure that the

manner in which earnings are measured do not affect findings, analyses of possible reciprocality

between housework and earnings were also conducted using spouses' hourly wages. The results

of these tests are presented in Tables C, D, and E of Appendix A. Estimations of directional

effects between routine housework and hourly wages mirror those found for yearly income – the

relationship between housework and wages is reciprocal for wives, while for husbands only

housework hours affects wages, although the effect is only marginally significant. Nonetheless,

this suggests that the specification of earnings has little impact on our estimates.

Table 3 presents results from cross-lagged SEM analyses of the relationship between

spouses' hours of housework and relative earnings. Full results are available in Appendix A -

Tables F and G. For both spouses, increases in time spent in routine housework at Time 1

negatively affect their own share of couple's yearly income at Time 2. Although this makes this

the first study to identify such an effect it is entirely consistent with ours and others' findings that

housework time negatively affects spouses' personal earnings. Consistent with a gender display

perspective, initial results reveal a curvilinear effect of relative earnings on husbands' hours of

housework such that housework at Time 2 for husbands is highest, when couples contribute

equally to the household finances at Time 1. We find no significant effect of relative earnings on

wives' hours of housework (we find no significant linear effect ($p > .10$) when we remove the

quadratic term from the model) and therefore no support for gender deviance neutralization.

Supplemental analyses indicate significantly better model fit to the data when the curvilinear

term for both husbands and wives is excluded from the model: for husbands -- χ^2 (3) = 19.1 $\rightarrow$ χ^2

(2) = 7.1; $\Delta \chi^2$ (1) = 12.0; p < .001; for wives -- χ^2 (3) = 17.9 $\rightarrow$ χ^2 (2) = 8.3; $\Delta \chi^2$ (1) = 9.6; p <

.01. Without the quadratic term, we find no significant effect of relative earnings on either's

hours of housework. Our results therefore provide little evidence for a relative resources, gender

display, or gender neutralization perspective. It is important to note that the coefficients for

relative earnings in Table 3 are roughly 20% (wives) to 35% (husbands) smaller than those

reported in Tables A and B in Appendix A, which were significant at the p < .01 level. Indeed,

supplemental analyses reveal that this is entirely attributable to omission of a path estimate for

the effect of housework time on relative earnings in these models. Moreover, the inclusion or

omission of a path estimate from relative earnings to housework time has no effect on estimates

of the effect of housework time on relative earnings, indicating that it is very likely that prior

investigations of the effect of relative earnings on housework time substantially overestimated

this effect by ignoring reverse causality in this relationship.

TABLE 3 ABOUT HERE

DISCUSSION

Despite decades of research demonstrating strong associations between earnings and

one's time spent in housework the causal relationship between these variables is unclear. This

lack of clarity matters since competing theoretical arguments about them exist. Autonomy

theory, gender display, gender deviance neutralization, and the relative resources hypothesis

suggest that earnings affect housework time while human capital theory implies the opposite.

The aim of this study, therefore, was to clarify this relationship by using data and methods that

relaxed assumptions of unidirectionality and explored the possibility of a reciprocal, mutually

reinforcing relationship between routine housework and earnings. This study is the first to test a

reciprocal relationship between relative earnings and housework performance and although it is

not the first to examine the possibility of reciprocality between absolute earnings and housework,

it clarified this relationship and improved upon past work in this area in numerous ways.

Results from both two-stage least squares regression and nonrecursive structural equation

models demonstrated that the relationship between absolute earnings and routine housework (at

least in 1994) was reciprocal for wives and unidirectional for husbands. For wives, earnings

negatively affected time spent in housework and time spent in routine housework also negatively

affected personal earnings. For husbands, only the latter was observed. This pattern held whether

earnings were measured as yearly income or hourly wage. Using cross-lagged structural equation

models we found evidence of a unidirectional effect of housework on relative earnings for both

husbands and wives.

These findings reinforce that single-direction, single-equation models provide little to no

information on causality and are unable test explanatory hypotheses. In using the NSFH, we have

shown that determining directionality was not a data limitation but instead a methodological

choice. However, that is not to say that the NSFH is without limitations. Indeed, we must be

careful in generalizing these patterns to couples today since the data is now 20 years old. It is,

therefore, vital that family scholars use analytic strategies and contemporary data that provide

more rigorous tests of their theoretical premises about family processes. In the case of

housework, recent research has demonstrated that despite nearly all studies treating gender

ideology as causally prior to housework, these variables are actually reciprocally related (Carlson

& Lynch, 2013). Both theory and research indicate that paid work hours (Cunningham, 2008;

Kalleberg & Rosenfeld, 1990; Silver & Goldscheider, 1994) and childcare (Sullivan, 2013) are

also likely reciprocally related to routine housework. Assessing the strength and direction of

these relationships is an important next step in family research. Scholars should also consider how earnings may be reciprocally related to other aspects of the gendered division of labor.

Although two-stage least squares regression and structural equation models make it possible to assess relational directionality, it is important to stress that these modeling procedures are based on assumptions that if violated, may bias results (see Bollen, 1989). For example, bias may be introduced via sampling procedures, unobserved variables, misspecification of time lags, and inaccurate modeling of the functional form of variables. Although fit statistics help assess and falsify models (i.e., demonstrate that models are inaccurate representations of the data or that instruments appropriately identify models) there are no procedures that can prove whether a model accurately represents reality (Bollen, 1989). Given these limitations, the relationships implied by these models should be interpreted with a certain degree of caution until they are replicated. Indeed, although we find no effect of relative earnings on housework this may be due to the lag between waves in the NSFH. Moreover, our study was limited to couples who were continuously married. If the relationship between earnings and housework varies for those whose marriages dissolve this may bias results.

Methodology aside, an important substantive finding to emerge from this analysis is the observation of gender difference in the relationship between absolute earnings and housework. In short, we find support for autonomy theory, but for wives only. This is consistent with the argument that wives' conventional responsibilities for housework mean that their personal earnings must be used to buy her, and thus the couple, out of housework (Cohen 1998). Our results additionally support an autonomy perspective over either a relative resources or gender deviance neutralization perspective for wives as we find no evidence that relative earnings affect

their housework time. This finding also sheds light on women's marriage wage premium and the fact that despite increases in their housework following marriage, their earnings do not suffer.

In contrast, for husbands, human capital theory best explains the relationship between his personal earnings and housework. That is, his time in housework inhibits his efforts and accumulation of skills and abilities in paid work leading to depressed earnings. Support for human capital theory, however, does not preclude a gender perspective to assist in understanding this relationship as the identification of an effect of housework on earnings does not explain how housework time is determined. Nevertheless, it does add nuance to this argument. Indeed, hegemonic ideals about appropriate gendered responsibilities for unpaid labor within marriage play a large role in freeing men from housework responsibilities (Komter, 1989). Yet, for decades scholars have argued that husbands' earnings lead to power and privilege in marriage and afford them, amongst other things, freedom from domestic responsibilities (Ross, 1987; Ferree, 1990). Other feminist theorists have augmented this argument by noting that husbands' exhibit marital power above and beyond their earnings due to a gender structure that privileges men over women (Komter, 1989; Connell, 1987; Risman, 1999; Tichenor, 2005). Given that housework time affects husbands' earnings, our findings revise this argument further by suggesting that husband's greater absolute and relative earnings compared to wives' are, if anything, the *product* of a patriarchal gender structure that frees them from housework and, therefore, the likely product of their marital power and privilege, not its source. Indeed, once the effect of housework on earnings is accounted for there is little evidence that relative earnings affect husbands' or wives' housework time. Rather, we find the opposite. This of course does not mean that husbands' absolute and relative levels of income are otherwise inconsequential for marital power. Indeed, the perception that husbands' earnings matter legitimizes wives' earnings

as supplementary to family coffers and their occupations as optional. Moreover, his greater earnings may provide power other than arranging housework, like childcare or leisure.

Not only are husbands' earnings the product of their time in housework or lack thereof, but the effect is stronger for husbands than wives. This study is the first to identify this gender disparity. That we observe this is likely due to the fact that we are the first to appropriately model this relationship for women and men. There are a few potential explanations for this finding. One is that this difference is the product of wives selecting – either by choice or due to hiring discrimination –into jobs that are more amenable to housework responsibilities or selecting out of the labor market altogether (England, 2005). A second possible explanation is that husbands may select into jobs that are especially inflexible, incurring especially high costs for time in housework. This, however, is not consistent with research on the job characteristics of married men (Sharpe, Hermsen, & Billings, 2002a; Sharpe, Hermsen, & Billings, 2002b). Last, husbands may be especially inefficient at routine housework compared to wives – requiring greater exertions of energy to complete the same amount of work. As Gager (1998) notes, such inefficiency – whether real, feigned, or assumed – is sometimes used by couples to justify wives' greater responsibilities for housework. Investigating the mechanisms that produce gender differences in the effect of routine housework on earnings should be an aim of future research.

No matter the mechanisms, our findings highlight some of the roots of gender inequality in marriage. Indeed, taking the totality of our findings into account, husbands' freedom from housework appears to be a primary driver of marital earnings inequality not vice versa. Therefore, this study helps answer important theoretical questions regarding the relationship between housework and earnings, and thus provides a firmer foundation on which to address gender inequality inside and outside the home.

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Table 1: Descriptive Statistics

	M	SD	α
Time 2 Variables			
Husband's hours of routine housework	6.80	7.25	
Husband's yearly income (in thousands)	37.31	37.39	
Husband's hourly wage	17.11	38.59	
Wife's hours of routine housework	26.45	16.19	
Wife's yearly income (in thousands)	14.95	16.35	
Wife's hourly wage	8.48	10.30	
Husband's share of couple's income	.70	.26	
Time 1 Variables			
Husband's hours of routine housework	5.52	6.34	
Husband's yearly income	23.74	30.12	
Husband's hourly wage	9.76	13.55	
Wife's hours of routine housework	25.14	16.19	
Wife's yearly income	13.70	26.72	
Wife's hourly wage	5.36	14.65	
Husband's share of couple's income	.60	.32	
Husband's work hours	40.89	15.33	
Husband self-employed	.12	.32	
Wife's paid work hours	22.92	18.69	
Wife self-employed	.09	.28	
Wife's occupational prestige	28.51	23.99	
# of children less than age 5	0.44	0.70	
Addition of child since T1 (1 = *yes*)	.35	.68	
Wife's education	13.16	2.58	
Wife's mother's education	10.91	3.16	
Husband's education	13.43	2.75	
Husband's mother's education	10.92	3.11	
Black	.10	.30	
Hispanic	.07	.25	
Own home	.75	.43	
Wife's age	35.78	9.22	
Husband's age	38.06	9.62	
Wife's egalitarian gender ideology	10.12	3.72	.71
Husband's egalitarian gender ideology	9.29	3.49	.72

Table 2. Unstandardized Estimates from Two-Stage Least Squares (2SLS) Regression and Non-Recursive Structural Equation Models for Hours of Routine Housework and Yearly Income (in thousands) NSFH (N = 3,719).

	→ Husband's hours of routine housework (t2)		→ Husband's yearly income (in thousands) (t2)		→ Wife's hours of routine housework (t2)		→ Wife's yearly income (in thousands) (t2)	
	2SLS	Non-Recursive SEM	2SLS	Non-Recursive SEM	2SLS	Non-Recursive SEM	2SLS	Non-Recursive SEM
Endogenous Predictors								
Husband's hours of routine housework (t2) →			-1.007*** (0.233)	-0.960*** (0.244)				
Husband's yearly income (in thousands) (t2) →	0.005 (0.011)	0.002 (0.011)						
Wife's hours of routine housework (t2) →							-0.248*** (0.055)	-0.295*** (0.055)
Wife's yearly income (in thousands) (t2) →					-0.504* (0.217)	-0.406* (0.193)		
Post-Estimation Statistics of Instrument Relevance								
Hansen-Sargan	$\chi^2(1) =$ 1.955		$\chi^2(3) =$ 32.022***a		$\chi^2(1) =$ 0.067		$\chi^2(2) =$ 9.175*b	
Anderson CCLR	$\chi^2(2) =$ 339.484***		$\chi^2(4) =$ 419.785***		$\chi^2(2) =$ 26.190***		$\chi^2(3) =$ 276.856***	
Fit Statistics for Nonrecursive SEM								
Chi-Square			$\chi^2(4) = 38.400$***				$\chi^2(3) = 6.067$	
NFI			.998				1.000	
IFI			.998				1.000	
RMSEA			.048				.017	

*** $p < .001$; ** $p < .01$; * $p < .05$ (two-tailed test)

Note: standard errors in parentheses; [a] Anderson CCLR statistically significant ($\chi^2(2) = 409.629$; $p < .001$) and Hansen-Sargan test non-significant ($\chi^2(1) = 0.149$; $p > .10$) when *Home ownership and Husbands' proportion of total couple income squared* removed from model. [b] Anderson CCLR statistically significant ($\chi^2(2) = 272.696$; $p < .001$) and Hansen-Sargan test non-significant ($\chi^2(1) = 0.682$; $p > .10$) when *Husbands' proportion of total couple income squared* removed from model.

Table 3. Unstandardized Estimates from Cross-lagged Structural Equation Models for Hours of Routine Housework and Relative Earnings (N = 3,719).

	→ Husband's Share of Couples' Income (t2)	→ Husband's hours of routine housework (t2)	→ Wife's hours of routine housework (t2)
	B	B	B
	(SE)	(SE)	(SE)
Husband's Share of Couples' Income (t1) →		2.051†	-4.494†
		(1.191)	(2.584)
Husband's Share of Couples' Income Squared (t1) →		-2.348*	3.824
		(1.164)	(2.519)
Husband's hours of routine housework (t1) →	-0.002*		
	(0.001)		
Wife's hours of routine housework (t1) →	0.001*		
	(0.000)		
Fit Statistics for Cross-lagged SEM			
Chi-Square		χ^2 (4) = 19.065***	χ^2 (3) = 17.927***
NFI		.999	.999
IFI		.999	.999
RMSEA		.032	.037

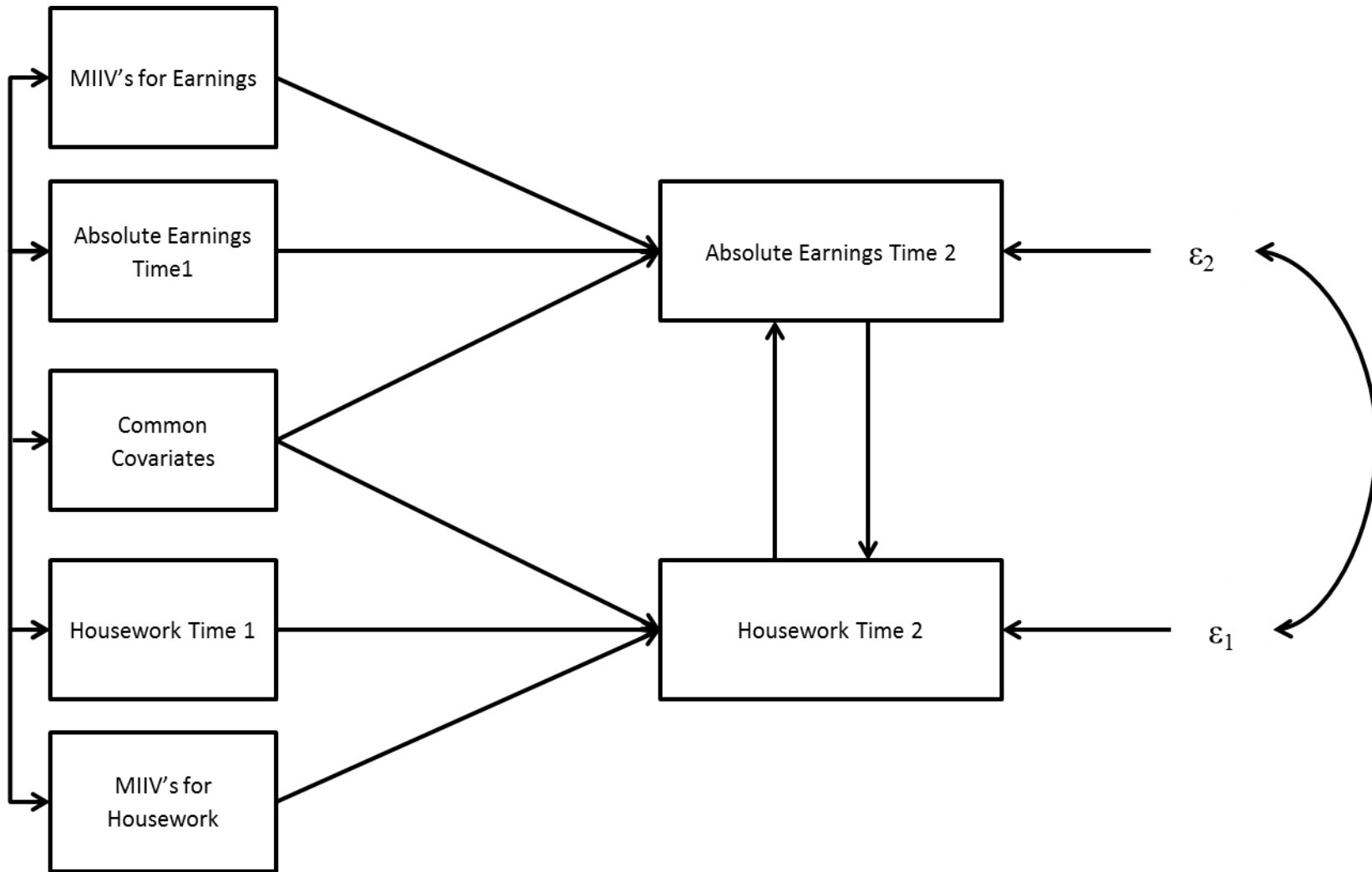*** $p < .001$; ** $p < .01$; * $p < .05$ (two-tailed test)

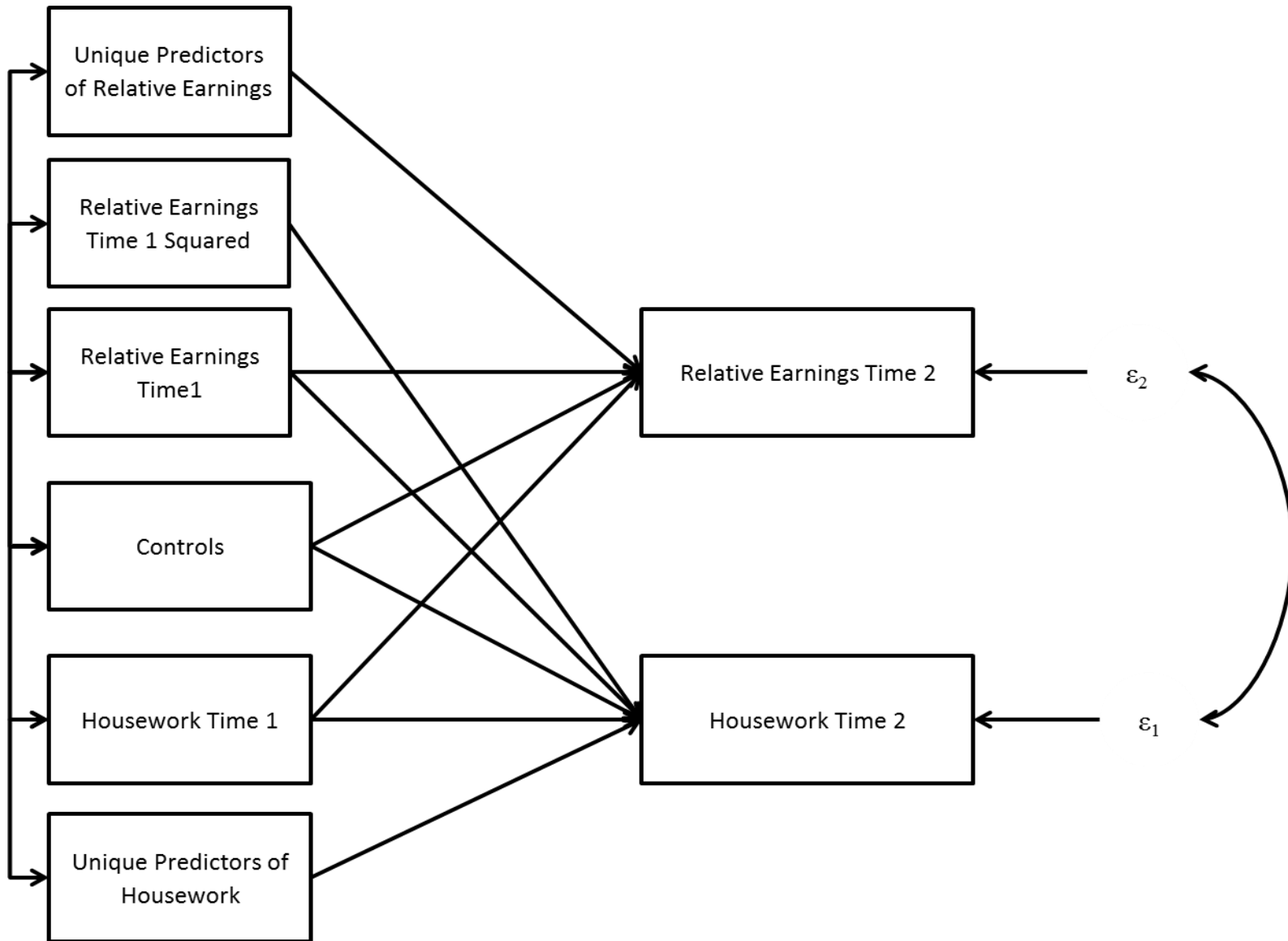Figure 1: Nonrecursive Structural Equation Model of Housework and Absolute Earnings

Figure 2: Cross-lagged Structural Equation Model of Housework and Relative Earnings