Life Course Trajectories of Inter-Spouse Income Inequality

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Research question and justification

Marriages are complex and dynamic and their character at any point in time is dependent on past decisions, arrangements, and characteristics. Although the complexity and path dependency of marital relationships is commonly acknowledged, it is rarely formally incorporated into empirical analyses. Income inequality is a prime example of a dynamic marital characteristic that has been inadequately operationalized as an indicator variable and studied as an outcome. For example, investigations of the association between spouses' relative contributions to family income and the division of household labor routinely rely on static measures of the inter-spouse income gap. Static operationalizations ignore the processes that generate the state and therefore the possibility that any estimated effect of the static measure may be capturing the influence of those developmental processes. Furthermore, the commonly used measures of relative income, e.g. the husband-wife income ratio, are continuous and therefore imply consistency in the practical importance or meaning of a given level of spousal income inequality. In fact, any specific magnitude of inequality may reflect different etiologies, e.g., a temporary deviation from an otherwise stable pattern of inequality or an intermediate point on an increasing or decreasing trajectory, whose distinctiveness is not recoverable from static continuous measures.

In this paper I present an analysis of the dynamics of inter-spouse income inequality. The three main aims of the paper are (1) to describe the life course pattern of spousal income inequality, (2) to test if there are distinct developmental trajectories of inter-spousal income inequality that may reflect distinctive types of marriages, and (3) to describe the character and prevalence of the identifiable patterns of inter-spousal income inequality. I use finite mixture models to analyze 20-year longitudinal sequences of earnings inequality between the partners in married couples. The analysis is based on nationally representative data from the *Panel Study of Income Dynamics* (PSID). This analysis is primarily descriptive in that it focuses on identifying and describing the multiple paths of the evolution of income inequality within the family. In doing so, it is a first step toward the development of a typology that may allow this dynamic characteristic of marriages, inter-spousal income inequality, to be parsimoniously incorporated in empirical analyses of a variety of family decision making processes and outcomes.

Theoretical perspectives on the dynamics of inter-spousal income inequality

Theories of union formation and the household division of labor predict the existence of distinct developmental trajectories of spousal income inequality, yet the literature lacks an empirical analysis of this aspect of family life. The dominant theoretical perspectives include exchange theory as it is formalized by Becker (1991) and sociological perspectives such as the work-family balance theory and a structural perspective which emphasizes the influence that occupational segregation exerts on the dynamics within families.

The neoclassical economic theory of union formation and household division of labor (Becker 1991) predicts that all marriages will tend toward market specialization, a traditional division of

household labor, and therefore significant husband-wife income inequality that is stable over the life of the marriage. The theory explains the division of labor within the family as the outcome of sex differences in the distribution of the human capital necessary for market and household production. In short, the theory predicts that sex differences in the physiology of reproduction and in the socialization of girls and boys will drive sex-specific specialization in human capital investments such that men will tend to have the comparative advantage in the market human capital and women will have the comparative advantage in the human capital necessary for efficient home production. This imbalance in stocks of specialized human capital will lead married women to specialize in household labor and married men to specialize in market labor.

Work-family balance theory, which incorporates insights from gender-role theory (DiPrete 2005), predicts more variation in the patterns of income inequality within marriages. According to this theory, the influence of gender-role ideology and the extent to which women value their labor force participation will cause population variation in the labor force participation of women and therefore in the observed patterns of inter-spouse income inequality. Recent changes in cultural norms and in the earnings power of women is therefore seen as causing increased diversity in family forms and arrangements. For example, in her study of marriage in the U.S. Pepper Schwartz (Schwartz 1994) identified "peer marriages" as an new type of marriage whose emergence has been driven by the cultural changes of the past 40 years. According to Schwartz, peer marriages are based on equality, equity, and intimacy. They share four characteristics: an equal (no more than a 60/40) split of household duties and child raising, both partners have equal influence over important decisions and of the family economy and each partners work is given equal eight in the couple's life plans (Schwartz 1994).

Finally, a structural perspective on the experience of income inequality between married partners recognizes that family dynamics are responsive to the characteristics of the labor market context, and that this context may reinforce the likelihood of traditional specialization of the type predicted by Becker (1991). The gender gap in pay remains very significant – the female-to-male ratio of earnings was 0.778 in 2002 (Statistics 2003) – and it is widely acknowledged that a significant proportion of this sex gap is attributable to occupational sex segregation and the concentration of women in relatively low-paying occupations (Treiman and Hartmann 1981). Indeed, it is estimated that employment in predominantly female occupations reduces wages by 11 to 21 percent net of the influence of industry distribution and the age and education of incumbent workers (Boraas and Rogers 2003). Given the persistence of occupational segregation, the inter-spousal income gap is likely to favor men at the start of a marriage. This gap may set a couple on a path of specialization that is perpetuated throughout the duration of their marriage, and in the aggregate the gap may sustain the predominance of marriages characterized by traditional specialization and earnings inequality. In addition, if the potential for upward mobility and earnings growth is greater in male-dominated occupations than it is in the occupations in which women are disproportionately employed, the persistence of occupational sex segregation will help to generate growth in the inter-spouse income gap over the life of a marriage even when both partners have uninterrupted labor force participation and a commitment to equality that characterizes "peer marriages."

Based on these theoretical perspectives on the division of household labor as well as the demographic research that documents the increasing diversification of in marriage types (Farley

1996) and the trends in the cultural, social, and economic factors that are hypothesized to influence the division of labor between spouses, I expect significant variation in the patterns of income inequality experienced by couples in the U.S. More specifically, I expect specialization and the income inequality it engenders to be a prevalent experience of married couples, but I also expect joint production and the more equitable sharing of household and market labor to be experienced by a significant proportion of the population of married couples.

Data and Methods

To identify and describe the distinct developmental trajectories of marital income inequality I use finite mixture models estimated on longitudinal earnings data for married couples from the 1968-2003 waves of the PSID. The PSID is a multiwave longitudinal study of a representative sample of U.S. individuals and the family units in which they reside. This data source provides accurate information on the timing of union formation and dissolution as well as income sources and amounts across the duration of a marriage.

Marriage trajectories
Although the PSID includes many individuals who were married prior to the base year interview in 1968, income information was not collected retrospectively to the start-date of those marriages so I restrict the analytical sample to those married couples for which a marriage is observed beginning after 1968. This selection criterion ensures accurate assessment of the duration of the marriage as well as reliable concurrent information on the earnings income of both partners in the couple. I further restrict the sample to first marriages only, i.e., I exclude the trajectories of remarriages. The observation of inter-spousal income inequality in each marital trajectory begins with the first year of the marriage and extends until either the marriage ends (through separation, divorce or death) or one of the marital partners retires. To ensure that the analysis is not biased by a preponderance of very short or very long marriages, I excluded marriages that persisted for fewer than 5 years or for more than 25 years. Imposing this set of selection criteria yields 2,833 marital trajectories. The average length of the marriages in the weighted sample is 13.18 years and 366 of the total sample of marriage trajectories lasted 20-25 years.

The focal dependent variable of this analysis is the disparity between the labor incomes of husbands and wives in each married couple. I operationalize inter-spousal income inequality using the economic dependency measure proposed by Sorensen and McLanahan (1987): DEP = $(INC_H – INC_W)/(INC_H + INC_W)$, where INC_H and INC_W represent the husband's and wife's income from salary or wages. Prior to calculating the ratio I first standardize the individual-level earnings to constant 1982-1984 dollars using the Consumer Price Index for all urban consumers of all products (CUUR0000SA0 series).[1] DEP ranges from -1 to 1 where a value of -1 indicates that all family income comes from the husband, a value of 1 indicates that all income is earned by the wife, and zero indicates that the income of the spouses is equal.

Finite mixture model
I use a finite mixture model to test for groupings of distinctive developmental trajectories of inter-spousal income inequality. This method enables identification of the number of discrete types of trajectories, characterization of the shape of each distinct trajectory and estimation of the prevalence of each trajectory in the population. Mixture models have recently been used to make

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[1] Zero earnings are recoded to 1 dollar before calculating the ratio.

significant contributions to research on life course patterns of criminal behavior (Ezell and Cohen 2005; Land 2001) and psychological traits such as aggression (Brame, Nagin, and Tremblay 2001). This approach is well suited for analyzing individual-level developmental trends in which development does not vary regularly and smoothly across population members, but rather when the population is viewed as being comprised of distinct clusters of developmental trajectories (Nagin 2005). For this analysis, I model DEP as a polynomial function of the "age" of the marriage.

To address the first research question, identifying the distinct trajectories of inter-spouse income inequality, I focus on specifying the most empirically appropriate number of groups to include in the model. The second research objective, describing the shape and prevalence of the distinct patterns of inequality, entails correctly specifying the polynomial function of each trajectory and the use of posterior probability estimation to assess the proportionate representation of each in the population. The comparison of alternative specifications of both the number and shapes of trajectories is guided by theoretical predictions and the comparison of the goodness-of-fit of alternative models using the Baysian Information Criterion (BIC) (Nagin 2005; Raftery 1995). All models are estimated using SAS 9.1 and the custom procedure TRAJ developed by Jones et al. (2001). All analyses are weighted to account for the complex sampling design of the PSID and non-random nonresponse.[2]

Preliminary Results

Preliminary results indicate that a 6-group model with one zero-order, two linear, two quadratic, and one cubic trajectory is the best fit to the data. The estimated shapes of the seven developmental patterns of inter-spousal income inequality are plotted in Figure 1. This figure presents both the trajectories predicted by the 6-group model as well as the observed age-specific means of DEP for the sample couples assigned to each group. The proportion of the sample assigned to each group is noted in parentheses.

The trajectories that lie above the zero-value axis all characterize patterns of traditional (i.e., the husband earning significantly more than the wife) division of labor during some or all of the years of the marriage. Together they are estimated to account for 76.75 percent of the population. The most prevalent trajectory of income inequality identified by this analysis is the third group which is estimated to include 29.2 percent of the population. This trajectory is characterized by a horizontal line with an intercept of 0.344 and describes the experience of couples for whom husbands consistently earn about 70 percent more than their wives throughout the marriage. The other trajectories on the upper half of the Figure 1 describe patterns of what could be labeled "persistent and intense income inequality" (group 6) "early inequality that declines over the life course" (group 4), "developed and sustained inequality " (group 5). Respectively, these trajectories account for 14.3, 16.4 and 17.7 percent of the population of married couples.

The two trajectories that fall below the zero-axis of the graph reflect distinct patterns of non-traditional specialization, i.e., developmental patterns of income inequality for couples in which the labor income of the wife exceeds that of the husband. The trajectory for group 2 describes a

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[2] Each marital trajectory is weighted by the year-specific family weight for the end-year of the marital trajectory.

pattern by which a small husband advantage in earnings gives way to a female advantage after the fifth year of the marriage. This trajectory accounts for 20 percent of the population. The final trajectory is identified as distinct by the model but it is estimated to be rare in the population, accounting for the experience of only 2.6 percent of the population of married couples. This trajectory identifies a pattern of significant and steady female advantage in earnings that persists throughout the duration of the marriage.

These preliminary results support two general observations about the development of inter-spousal earnings inequality. First, the fluctuations in the estimated trajectories are notable. The model results indicate that that the level of inter-spousal income inequality tends to change over the life of a marriage. I find that inter-spousal income inequality does not tend to be something that is established and then maintained, nor is it a characteristic that tends grows in a linear way as a marriage ages. Rather, many of the developmental patterns identified by the analysis include both periods of growth and decline in inequality. Second, the results underscore the variability of the marital experience. The analysis estimates that six distinct trajectories are necessary to adequately describe this dynamic characteristic of married couples. Even among those couples where a traditional division of labor is a defining characteristic, the experience of such specialization takes many forms that are distinguished by the timing and intensity of the resulting earnings advantage enjoyed by husbands.

Direction of further research

Having identified distinctive trajectories of marital income inequality prompts many interesting questions. Prominent among them are two types of questions focusing on (1) the component or contributing individual-level patterns of income inequality and (2) the determinants of selection into one or the other of the distinct trajectories.

Although the development of the earnings gap between husbands and wives is interesting in itself and may be a significant influence on family decision making, examining trends in income differences begs the question: what individual-level patterns of earnings growth give rise to these patterns? Each of the trajectories identified by this analysis is the product of the combination of the longitudinal earnings trajectories of husbands and wives. In further research, I will analyze the roots of the trajectories of inequality identified here more completely by examining the number, character, and prevalence of the distinct component trajectories that are obscured in the current analysis of the income gap. That analysis will utilize a group-based trajectory framework for dual trajectories (Nagin 2005) to model simultaneously the developmental course of spousal income trajectories.

Given that there are distinct trajectories of inter-spousal earnings inequality, one of the most important questions that arises is whether these trajectories identify distinct types of marriages. That is, do the member couples of each trajectory group and the individual men and women they comprise have characteristics that distinguish them from their counterparts in other trajectory groups? A complete analysis of the covariates of the trajectories of inter-spousal income inequality would investigate both the determinants of selection into a marriage trajectory as well as the influence of events that occur during the course of the marriage that may influence either the shape of a trajectory or the group membership of a particular couple. Such analyses can be

accomplished using finite mixture models (Nagin 2005) and will be the subject of future research.

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Figure 1: Observed and predicted trajectories of inter-spousal income inequality across 20 years of marriage