The Impact of Work and Family Trajectories on Mortality: New Insights on Cumulative Stratification

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New Insights on Cumulative Stratification

ABSTRACT

Motivated by theoretical and empirical research on cumulative stratification and the life course, we examine relationships between long-term trajectories of work and family roles and the timing and cause of death. Using group-based trajectory modeling techniques and data from the Wisconsin Longitudinal Study (WLS), we identify discrete trajectories of work and family roles between adolescence and age 53. We then model mortality after age 53 as a function of (1) long-term trajectories of work and family roles and (2) measures of work, family, health, and other circumstances at age 53. We find that the work and family lives of WLS respondents have typically followed a small number of discrete trajectories and that these trajectories are shaped by gender as well as early life attributes and circumstances. Do respondents' trajectories of work and family roles independently influence mortality outcomes? Our findings will have important implications for theories of cumulative stratification.

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A central insight of the life course perspective is that the timing, duration, and sequencing of key social roles matters for outcomes later in life. From this perspective, we seek to test the following basic hypothesis: Among people who are equivalent with respect to their work, family, health, economic, and other circumstances at mid-life, we should observe that subsequent mortality is influenced by the life course pathways that people followed to get to those midlife circumstances. If the life course perspective has merit, then the long-term trajectories of people's work and family roles and experiences should matter for mortality, even among people who look similar with respect to mortality risk factors at midlife.

Our findings will speak to theories of cumulative stratification and the life course, but they will also speak to empirical research on the factors that stratify mortality outcomes among older Americans. Most research models the timing and cause of death beyond age X as a function of individuals' statuses and conditions at age X. A typical analysis might model mortality outcomes beyond, say, age 54 as a function of individuals' observed social, demographic, economic, health, and other conditions as ascertained at age 54. If life course ideas have merit, however, such research designs may be missing important dimensions of the processes that stratify mortality outcomes.

RESEARCH DESIGN

We will utilize uniquely rich data and novel techniques for generating statistically and substantively meaningful characterizations of trajectories of work and family roles across the full adult life course. Our analyses are based on data collected across the lives of participants in the Wisconsin Longitudinal Study (WLS). The WLS is the only existing large-scale longitudinal

survey that contains nearly complete information on respondents' work and family histories from early adulthood through the retirement years; extensive midlife measures of the major predictors of mortality outcomes (e.g., work, family, economic, health, and other circumstances); and mortality information as obtained from updated links to the National Death Index. As we describe in more detail below, the rich life history data in the WLS allow us to construct categorical representations of life trajectories that not only reflect men's and women's work and family circumstances at any given point in time, but also contain information about the timing, duration, and sequencing of these circumstances across the life course, all of which may, according to life course theories of cumulative stratification, be important for understanding individual variation in mortality outcomes.

The WLS is a long-term study of a random sample of 10,317 men and women who graduated from Wisconsin high schools in 1957. WLS "graduates" were interviewed in 1957, 1975, 1993, and 2004; their parents were interviewed in 1964, and a randomly selected sibling was interviewed in 1977, 1994, and 2005. The WLS graduate sample is broadly representative of white, non-Hispanic Americans who have completed at least a high school education—a group that included about two-thirds of all Americans of this generation. Response rates to WLS telephone and mail surveys have been consistently high. Responses were obtained from 88% of surviving graduates' parents in 1964 and from 90% of surviving graduates in 1975. In 1993, 87% of surviving graduates responded to the telephone survey and 71% responded to the mail survey.

The 1975 through 1993 WLS telephone surveys collected detailed information on marriage, childbearing, and most of the jobs that respondents ever held through age 54, thus allowing us to construct work and family histories in greater detail than in previous studies. In 1993, the WLS telephone surveys obtained essentially complete employment histories for

graduates covering the period 1975 through 1993 (or ages 36 through 54 for most graduates). The 1975 and 1993 telephone surveys obtained complete marital and fertility histories through 1993 (or age 54 for most graduates). Rich information on health, work, family, and financial circumstances at age 54 allows us to construct a comprehensive set of established temporally proximate correlates of subsequent mortality outcomes. We also have access to rich early-life background measures collected from graduates, their parents, and administrative records. The WLS includes parallel information for female and male respondents.

Our analysis will consist of two steps. First, we will develop classifications of trajectories of graduates' work and family histories through age 53. Second, among those who survive to age 54, we will model the impact of work and family trajectories on the timing and cause of death, both before and after accounting for measures of work, family, health, financial, and other statuses and attributes as measured at age 54. All analyses will be conducted separately by sex.

To identify and describe trajectories of work and family roles we make use of group-based trajectory modeling techniques introduced by Nagin and Land (1993) and developed by Nagin, Jones, and colleagues (Jones and Nagin 2006; Jones et al. 2001; Nagin 1999; Nagin 2005). Sometimes referred to as finite-mixture models, or latent growth curve models, these techniques can be used to identify groups of individuals who are following similar "developmental trajectories" or categorically similar patterns on some outcome over time. Whereas hierarchical models and latent curve analysis begin from the notion that there is a single developmental trajectory—from which individual lives may deviate—group-based trajectory models allow researchers to empirically define a finite set of developmental trajectories that best describe groups of individuals' lived experiences.

Group-based trajectory models are not only better suited to our research questions than traditional hierarchical or latent curve techniques, but they are also superior to more naïve approaches that researchers sometimes take to assigning individuals, *a priori*, to categories of work and family histories. For example, without resorting to any formal modeling we might simply suppose that female WLS respondents' employment histories fall into one of the following groups: 1) Consistently employed; 2) Consistently employed after delayed entry into the labor market; or 3) Usually not employed. We could then use some semi-formal algorithm to assign women to the group that most closely describes their lived experiences.

Nagin et al. (2003: 349) identify three major problems with such naïve approaches, all of which are overcome by group-based trajectory modeling. First, there is no way to empirically falsify the taxonomy of trajectories; they must be assumed *a priori*. Second, there is "the risk of simultaneously over- and under-fitting the data, thus creating trajectory groups that reflect only random variation and failing to identify unusual, but still real, developmental patterns." Third, such approaches provide no way to assess the precision with which individuals are assigned to the groups that comprise the taxonomy of trajectories. That is, such naïve approaches provide no empirically falsifiable way to determine the trajectory group to which any individual belongs.

CONCLUDING NOTE

The paper that we will present at PAA is the third in a series of papers that utilize WLS data and group-based modeling techniques to understand better the impact of trajectories of work and family roles on important outcomes among older adults. In a completed paper—**attached to provide you a better sense of our theoretical and methodological approach and preliminary results—**we model financial well-being in later adulthood. In an ongoing paper, we model physical and mental health outcomes. Because these analyses all rely on the same data and very

similar analytic strategies, we do not anticipate any difficulty in producing a well-developed paper by March of 2011.

The Impact of Work and Family Trajectories on Financial Well-Being at Older Ages

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ABSTRACT

Motivated by theory and research on cumulative (dis)advantage and the life course, we model relationships between trajectories of work and family roles between adolescence and age 64 and three measures of economic well-being in later adulthood. Using group-based trajectory modeling techniques and data from the Wisconsin Longitudinal Study (WLS), we identify discrete trajectories of work and family roles between adolescence and age 53 and between ages 54 and 64. We then model financial well-being (at age 54) and changes in financial well-being (between ages 54 and 65) as functions of (1) life course trajectories of work and family roles and (2) measures of work and family statuses as measured contemporaneously with financial well-being. WLS respondent's work and family lives have typically followed a small number of discrete trajectories; which trajectories people's lives have followed varies by sex and depends on early life attributes and circumstances. The trajectories of WLS respondents' work and family lives are associated with later-life economic well-being, even net of more proximate measures of work and family statuses.

The Impact of Work and Family Trajectories on Financial Well-Being at Older Ages

Many Americans are not financially prepared for life after retirement. By one estimate, 35% of the early baby boom cohort (born 1946-1954) may not be able to maintain their pre-retirement standard of living, even if they work full-time until age 65 (Munnell et al. 2007). Furthermore, there is evidence of increased variation in the financial well-being of older adults; inequalities in income and wealth among the population aged 65 and older in the United States have been increasing, and are among the highest of all industrialized countries (O'Rand 1996a; Smeeding 2006). The prevalence of inadequate financial preparation for retirement and the increasing economic inequality among older adults likely reflects the confluence of two broad trends in American social and economic life: 1) the shift toward greater individual responsibility for planning for and financing the retirement years and 2) growing heterogeneity in the structure of American's working careers and family lives.

In light of these two trends, we examine how the patterns of events that shape individuals' lives—i.e. their life trajectories of work and family roles—influence financial well-being in late adulthood. Specifically, we address the following three research questions: First, to what extent are income and net worth among older adults associated with long-term trajectories of work and family roles across the life course? For example, does job loss or divorce—as contrasted with stable career advancement or stable marriage throughout adulthood—impact financial well-being at older ages? Second, to what extent are these relationships mediated by work, family, and other circumstances observed contemporaneously with financial well-being? That is, do people's accumulated lifetime experiences in work and family roles influence financial well-being

later in life, above and beyond the effects of more proximate work, family, or other circumstances? Finally, how do these processes differ for women and men?

Explanations for Variation in Economic Well-Being at Older Ages

Over the past quarter century, a variety of public and private institutions (e.g., government agencies, the labor market, health care providers) have increasingly shifted the responsibility associated with managing the retirement years to individuals. This new reality has changed the meaning and nature of retirement in fundamental ways. For example, the proportion of the workforce covered by defined benefit retirement plans, which provide employees with a guaranteed lifetime income based on job tenure and pre-retirement income, dropped from just under 60% in 1981 to around 10% in 2004 (Buessing and Soto 2006). In their place, defined contribution plans have emerged as the primary work-related savings vehicle (Sorokina et al. 2008). In contrast to defined benefit plans, defined contribution plans require both that employees make the choice to contribute and that they make good decisions about where their money is invested. Not surprisingly, this change in policy regimes has contributed to increased heterogeneity in pension wealth and in the timing of retirement (Munnell and Quinby 2009).

Overall, there is reason to be concerned about the effects of increased individual responsibility for saving for retirement. Defined contribution plans are more sensitive than defined benefit plans to fluctuations in national and international financial markets. Reflecting the beginning of the recent economic downturn, the average household head aged 51-56 saw a decline in pension wealth of 11% between 1992 and 2004 (Sorokina et al. 2008). The stock market crash of 2008 further dampened workers' retirement prospects, with two-thirds of workers aged 45-59 reporting less

retirement savings than before the crash (Sass et al. 2010). The volatility of private pensions and personal assets has caused Americans to become even more reliant on Social Security as a source of retirement income. Although Social Security has been the primary source of income for retired individuals since the 1960s (U.S. Social Security Administration 2008), recently it has been compensating for a smaller share of workers' pre-retirement income due to the increasing proportion of dual-earner couples and the increasing minimum age at which workers can receive full benefits (Munnell et al. 2007). Furthermore, projected difficulties in maintaining current benefit levels suggest that individuals will likely shoulder an even greater share of the burden of saving for retirement in the future (U.S. Social Security Administration 2009).

At the same time that Americans are taking more responsibility for planning for retirement, the labor market and family contexts in which individuals live have undergone profound changes. Since the early 1970s, the labor market has been characterized by decreases in job security, wage security, and fringe benefits. Stable manufacturing jobs have been largely replaced by jobs in the service and technology sectors that emphasize intellectual ability and often require a post-secondary degree (Hughes and O'Rand 2004; Kalleberg et al. 2000). Displaced blue-collar workers have entered jobs characterized by limited security and lack of benefits, often in part-time work, day labor and on-call work, contracted work, temporary help agency employment, and self-employment (Kalleberg 2009; Kalleberg et al. 2000; Loveman and Tilly 1988). The prevalence of unionized jobs has also fallen dramatically, with the percentage of employees in a union decreasing from 28% in 1970 to 12% in 2007 (U.S. Bureau of the Census 1980; U.S. Bureau of the Census 2009).

However, not all groups of people have experienced these labor market changes equally. Exposure torelatively precarious working conditions and bad jobs varies by educational attainment, age, gender, race/ethnicity, and type of occupation and industry. For example, women's employment tenure and participation in full-time employment has increased substantially while men's has decreased. However, men are still more likely to hold a steady, full-time job throughout the adult life course, whereas women often depart from full-time employment in mid-adulthood in order to stay home with their children (Kalleberg 2009).

Family life has also become more differentiated over this period. Rates of marital dissolution have increased dramatically, with the sharpest increase in divorce rates over previous cohorts occurring among individuals born between 1936 and 1945 (Hughes and O'Rand 2004). Although divorce tends to reduce wealth in later life (Wilmoth and Koso 2002), the specific effects of divorce on financial well-being vary based on a number of factors, including an individual's age at divorce, gender, number of children, and work history (O'Rand and Henretta 1999). Recent decades have also witnessed heterogeneity in the age and marital status of parents upon childbearing and childrearing (Hughes and O'Rand 2004). For example, among households with minor children, the prevalence of two-parent families has decreased, while the prevalence of other types of families (e.g. single-parent families, stepfamilies) has increased (Bianchi and Milkie 2010). Such differences in family structure are associated with variation in the income and net worth of parents both as they are raising children and after their children are grown.

This increase in the variability of work and family experiences across the life course, coupled with growing individual responsibility for retirement planning and

saving, likely has implications for individuals' economic status in late adulthood. In this paper, we focus on several aspects of men's and women's trajectories of work and family roles across the entire adult life course. As we describe in more detail below, these trajectories not only reflect men's and women's work and family circumstances at any given point in time, but they also contain information about the timing, duration, and sequencing of these circumstances across the life course, all of which may be important for understanding individuals' subsequent income and net worth.

Cumulative Stratification and the Life Course

In this context of increasingly heterogeneous employment and family experiences, there is growing research interest in the ways in which experiences across the life course contribute to within-cohort variation in financial well-being at older ages (Crystal and Shea 1990; O'Rand 1996a; O'Rand 1996b). Theories of cumulative stratification posit that differences in well-being are compounded over time to generate larger differentials at later points in the life course (Dannefer 1987; O'Rand 1996a; O'Rand 1996b; O'Rand and Henretta 1999). In O'Rand's (1996a:188-189)words, "within cohorts, differentiation is an increasing function of age; insofar as age reflects the cumulative experiences of cohort members over time, placing them on different life pathways or trajectories." Initial individual differences—such as by race, gender, or socioeconomic status—give rise to unique opportunity structures and life pathways, which serve to further differentiate individuals over time. The linkage of individual lives to historical events (e.g. wars, depressions) and institutional arrangements (e.g. employment, family) produces individual biographies and intracohort heterogeneity (O'Rand 1996a).

The cumulative stratification hypothesis is embedded within the more general life course framework. Life course research recognizes that individuals' past experiences have enduring implications for later life outcomes. Throughout their lives, individuals occupy particular roles or statuses—e.g. as workers, spouses, or parents. Trajectories refer to the sequences of these roles within specific social pathways—such as employment or family life (Elder et al. 2004; Elder 1985). Trajectories vary depending on 1) the particular statuses of which they are composed, 2) the duration of time spent in each status, and 3) the timing and frequency of transitions between statuses (Elder et al. 2004). According to cumulative stratification theory, as individuals age they experience unique temporal orderings of roles and statuses, which produce life trajectories that are increasingly dissimilar from other members of their cohort. In turn, these differentiated life trajectories produce heterogeneity in well-being at older ages. Furthermore, there is evidence that trajectories represent a unique temporal dimension above and beyond the simple summation of statuses of which they are comprised (Elman and O'Rand 2004; Pavalko and Smith 1999; Pavalko and Woodbury 2000). That is, life course trajectories—representing the entirety of temporally organized sequences of statuses and transitions between them—are conceptually and empirically valuable for understanding heterogeneity in later life, beyond the sum of their constituent parts.

A well-documented example of the process of cumulative stratification is the promotion of employees within companies (Rosenbaum 1984). In most occupations, future success is predicated upon past success. When two individuals are hired as equals, the one who is initially more successful is more likely to be promoted and continue to accrue benefits, thus increasing the inequality between these two employees over time. A similar process governs the progression of students within schools, with

the outcome being increasing inequality of academic performance over time (Kerckhoff and Glennie 1999). At a more general level, some scholars argue that the age integration of the life course has contributed to increasing intra-cohort inequality (O'Rand 1996b; Riley 1987). In the past, life was separated into age-graded phases more so than in the present day. For example, whereas it used to be the norm for individuals to complete school before finding a job and having children, today the order is more variable. This loosening of clear life transitions by age has lead to the proliferation of "normative" life course trajectories and heightened heterogeneity within cohorts over time.

The process of cumulative stratification is likely responsible for the finding that inequality in various indicators of financial well-being—including income, asset accumulation, and net worth— increases with age (Crystal and Shea 1990; Crystal and Waehrer 1996; Zhan and Pandey 2002). Despite recognition of the importance of life-long trajectories of work and family roles in producing patterns of cumulative advantage and disadvantage, efforts to empirically describe them or the ways in which they contribute to increasing economic heterogeneity at older ages have been limited in two important ways. First, the scarcity of suitable data has forced most empirical studies to measure "life-long trajectories" of work or family roles as a series of point-in-time status measures (e.g. employment status or marital status at a few discrete ages) or fairly blunt summary measures (e.g. "ever divorced" or "total number of jobs held across the career"). Second, past research has not provided adequate empirical evidence that cumulative stratification actually contributes to inequality in well-being at older ages. If observed variation in financial well-being at older ages does indeed reflect processes of cumulative stratification over the life course, then trajectories of experience should be

associated with indicators of well-being net of temporally proximate correlates. As far as we can tell, this hypothesis has never been empirically tested.

Previous Studies

Economists, sociologists, and others have identified a variety of temporally proximate predictors of economic well-being at older ages. Work-related factors, such as current employment status (Farkas and O'Rand 1998), sources of post-retirement income (Crystal and Shea 1990; Hungerford et al. 2001), and type of pension plan coverage (Sorokina et al. 2008) all have direct implications for financial well-being in later life. Health is another well-established correlate of economic outcomes among older adults. Factors such as mental and physical health (Lum and Lightfoot 2003), comorbidity of diseases (Kim and Lee 2006), and health insurance coverage (Kim and Lee 2006; McGarry and Schoeni 2005) bear upon individuals' financial resources. Finally, in the family domain, financial well-being among older adults is associated with their current marital status (Yabiku 2000), widowhood (Angel et al. 2007; McGarry and Schoeni 2005), and living arrangements (Kim and Lee 2006). Nevertheless, despite the growing interest in economic well-being at older ages, past research has typically not specified how trajectories of experience across the life course stratify financial outcomes within cohorts in later adulthood, and whether these trajectories of life experience are associated with financial outcomes above and beyond their association with well-established temporally proximate correlates.

Studies that have attempted to evaluate the relevance of cumulative stratification for understanding variation in income or wealth at older ages have typically relied on crude summary measures of past characteristics. For example, a number of researchers have looked at the effects of education on financial well-being in later life by measuring

education as completed years of schooling (Crystal et al. 1992; Farkas and O'Rand 1998; Ozawa and Tseng 2000). Although evidence consistently indicates that individuals with higher educational attainment are better-off economically later in life, measuring education in this way does not allow researchers to determine how its effects differ by the timing or duration of schooling. Similar problems hamper analyses of financial well-being by employment or marital history, because these histories are typically summarized by measures such as "longest occupation" or "ever-divorced/widowed" (Farkas and O'Rand 1998; O'Rand and Henretta 1999; Ozawa and Tseng 2000; Zagorsky 2005). Unfortunately, crude summary measures such as these are often all that is available in survey data, and using these indicators as proxies for earlier-life covariates is frequently the only option available to researchers.

There are a few notable exceptions. Elman and O'Rand (2004) expanded upon the literature regarding the stratifying effects of education on financial well-being by examining how both the level and timing of educational attainment impacts adult wages at mid-life. They found that the timing of schooling is important, with individuals who received college and graduate degrees earlier in life earning significantly more than those who attained these degrees later. Also consistent with cumulative stratification theory, a simulation conducted by Mehdizadeh and Luzadis (1994) demonstrated that levels of wealth at retirement vary by workers' job mobility and the type of pension plan they participate in over the course of their careers. Similarly, Wilmoth and Koso (2002) found that the sequence of marital statuses over the life course accounted for inequality in later-life wealth significantly better than summary measures of current or past marital status. This body of research suggests that economic well-being in later life is

the cumulative result of a lifetime of experiences in the labor market, the family, and other social contexts.

Nevertheless, even research that attempts to describe the cumulative stratification of financial well-being in later adulthood using life course measures tends to be limited in important ways. This research is frequently based on small or non-representative samples, and/or on representative samples of individuals who are only followed for (at most) a few decades of the life course. It is also limited by a frequent reliance on information about experiences across the life course reported retrospectively at older ages. Finally, despite evidence that trajectories of life experience contribute to increasing intra-cohort variation at older ages (e.g., O'Rand and Henretta 1999), related research typically does not consider whether these life-course trajectories influence later-life financial well-being net of more temporally proximate characteristics, as the theory of cumulative stratification suggests.

Contributions of the Present Study

In this paper, we address these limitations by using rich data on financial well-being at two points in in later life and novel techniques for generating statistically and substantively meaningful characterizations of trajectories of work and family roles across the full adult life course, and by analyzing the effects of these trajectories net of both prior and current predictors of later-life wealth. Our analyses are based on data collected across the lives of participants in the Wisconsin Longitudinal Study (WLS). The WLS is the only existing large-scale longitudinal survey that contains nearly complete information on respondents' work and family histories from early adulthood through the retirement years, and detailed measures of financial well-being at multiple points in the second half of the life course. Furthermore, WLS respondents—mostly

born in 1939—have lived their lives in a period of unprecedented changes in the institutions of work and family. Theories of cumulative stratification suggest that the resulting heterogeneity in their trajectories of work and family experiences across the life course will translate into increased heterogeneity in financial well-being in later adulthood. Data from the WLS cohort can thus provide important insights into the factors that contribute to stratification in the financial well-being of subsequent cohorts of older adults (including those of the baby boom cohorts) who have experienced even more heterogeneous work and family trajectories (Hughes and O'Rand 2004). It will be another 20 years before the oldest birth cohorts in the NLSY-79 sample reach the current age of the WLS cohort, by which time the early baby boom cohorts will have already reached older ages.

The WLS data allow us to evaluate the predictions of theories of cumulative stratification by modeling measures of later life financial well-being as a function of respondents' lifetime trajectories of work and family experiences, background characteristics, and later-life characteristics. The background controls account for the possibility that observed associations between trajectories of work and family experiences and financial well-being are due to variables that simultaneously account for these trajectories and late-life wealth. The proximate correlates of financial well-being allow us to determine the extent to which the effects of work and family trajectories are direct—such that they operate net of proximate predictors of financial well-being—or indirect, operating through their effects on more proximate factors. As described above, cumulative stratification theory suggests that these trajectories should be associated with older adults' income and net worth above and beyond their associations with temporally proximate correlates of these indicators of financial well-

being. Our analytic approach thus provides a clear and effective means of evaluating the relevance cumulative stratification in influencing the financial outcomes of older adults.

RESEARCH DESIGN

The Wisconsin Longitudinal Study (WLS) is a long-term study of a random sample of 10,317 men and women who graduated from Wisconsin high schools in 1957. WLS "graduates" were interviewed in 1957, 1975, 1993, and 2004; their parents were interviewed in 1964, and a randomly selected sibling was interviewed in 1977, 1994, and 2005.[1] The WLS graduate sample is broadly representative of white, non-Hispanic Americans who have completed at least a high school education—a group that included about two-thirds of all Americans of this generation. Response rates to WLS telephone and mail surveys have been consistently high. Responses were obtained from 88% of surviving graduates' parents in 1964 and from 90% of surviving graduates in 1975. In 1993, 87% of surviving graduates responded to the telephone survey and 71% responded to the mail survey. In 2004, 78% of surviving graduates responded to the telephone survey and 76% responded to the mail survey.

The 1975 through 2004 WLS telephone surveys collected detailed information on marriage, childbearing, and most of the jobs that respondents ever held, thus allowing us to construct work and family histories in greater detail than in previous studies. In 1993 and 2004, the WLS telephone surveys obtained essentially complete employment histories for graduates covering the period 1975 through 2004 (or ages 36 through 65

[1] A new round of in-person interviews with WLS graduates, siblings, and spouses is currently being conducted. Data from this round of interviews will not be available for a few years.

for most graduates). The 1975, 1993, and 2004 telephone surveys obtained complete marital and fertility histories through 2004 (or age 65 for most graduates). Rich information on health, work, and family circumstances at multiple points in late mid-life allows us to construct a comprehensive set of established temporally proximate correlates of financial well-being at older ages. We also have access to rich early-life background measures collected from graduates, their parents, and administrative records. Finally, the WLS includes measures of financial well-being at multiple points in time, thus allowing us to advance our understanding of the ways in which life course trajectories of work and family roles contribute to change in financial well-being over time. The WLS includes parallel information for female and male respondents.

All of the analyses described below are restricted to the n=2,911 male and n=3,222 female graduates who responded to the 1993 and 2004 telephone surveys and for whom we can construct work and family histories. We have also excluded a trivial number of individuals who were not born between 1937 and 1940. Although we limit ourselves to individuals for who work and family trajectories can be constructed, we replace item-level missing data for all other measures using the ICE subroutine for multiple imputation in STATA (Royston 2004; Royston 2009). Our final analytic sample of 2,911+3,222=6,133 individuals includes about 70% of the graduates who survived to 2004, nearly a half century after they were first interviewed.

Our analysis consists of two major steps. First, we develop classifications of trajectories of graduates' work and family histories, separately through age 53 and for ages 54 through 64. Second, we model the impact of work and family trajectories on financial well-being, both before and after accounting for more proximate measures of work and family statuses and attributes. All analyses are conducted separately by sex.

CHARACTERIZING TRAJECTORIES OF WORK AND FAMILY ROLES

To identify and describe trajectories of work and family roles we make use of group-based trajectory modeling techniques introduced by Nagin and Land (1993) and developed by Nagin, Jones, and colleagues (Jones and Nagin 2006; Jones et al. 2001; Nagin 1999; Nagin 2005). Sometimes referred to as finite-mixture models, or latent growth curve models, these techniques can be used to identify groups of individuals who are following similar "developmental trajectories" or categorically similar patterns on some outcome over time. Whereas hierarchical models and latent curve analysis begin from the notion that there is a single developmental trajectory—from which individuals' own lives may deviate—group-based trajectory models allow researchers to define empirically a finite set of developmental trajectories that best describe groups of individuals' lived experiences.

Group-based trajectory models are better suited to our research questions than traditional hierarchical or latent curve techniques, but they are also superior to more naïve approaches that researchers sometimes take to assigning individuals, *a priori*, to categories of work and family histories. For example, without resorting to any formal modeling we might simply suppose that female WLS respondents' employment histories fall into one of the following groups: 1) Consistently employed; 2) Consistently employed after delayed entry into the labor market; or 3) Usually not employed. We could then use some semi-formal algorithm to assign women to the group that most closely describes their lived experiences.

Nagin et al. (2003: 349) identify three major problems with such naïve approaches, all of which are overcome by group-based trajectory modeling. First, there is no way to empirically falsify the taxonomy of trajectories; they must be assumed *a*

priori. Second, there is "the risk of simultaneously over- and under-fitting the data, thus creating trajectory groups that reflect only random variation and failing to identify unusual, but still real, developmental patterns." Third, such approaches provide no way to assess the precision with which individuals are assigned to the groups that comprise the taxonomy of trajectories. That is, such naïve approaches provide no empirically falsifiable way to determine the trajectory group to which any individual belongs.

The details of the estimation procedures for our group-based trajectory models appear in the appendix. There we describe 1) how we determined the number of developmental trajectories that best describe men's and women's histories of work and family roles up through age 53 and then from ages 54 through 65; 2) how we determine which individuals belong to which trajectory groups; and 3) what social and economic background factors predict trajectory group assignments.

In Figure 1, we depict men's and women's trajectories of employment status and number of job spells initiated between age 36 and 53. This and all subsequent figures are organized such that men's trajectory groups are shown on top, and such that the groups are in descending order of size from left to right. The most frequently observed pattern for both men and women involved consistent employment throughout these ages and on just one job. However, this modal pattern described fewer than half of all men and less than 40 percent of women. For men, the second and third most frequently observed trajectories involved consistent employment but more frequent job changes. A considerable number of women either entered the labor force at later ages (Group 3) or were never consistently employed (Groups 4 and 5). Figure 2 shows that more than 90 percent of men consistently worked full time between ages 36 and 53. On the other hand, only about 40 percent of women did so. About one in three women moved in and

out of part-time employment (Group 2), and about one in six transitioned from part-time to full-time employment (Group 3).

As shown in Figure 3, the majority of men and about one in four women consistently worked at jobs that offered them both health insurance and pension plans between ages 36 and 53.[2] About 11 percent of men and 31 percent of women were never offered these benefits. Other groups of individuals were only offered health insurance (Group 4 for both men and women), obtained benefits as they grew older (Group 5 for men, Groups 3 and 5 for women), or lost those benefits (Group 3 for men).

What has been gained by utilizing trajectory-based measures to describe employment experiences between ages 36 and 53? If we were to simply describe employment circumstances at age 54 in the 1993 WLS phone survey, we would note that almost all men were employed full-time, and that most had both health insurance and pension benefits. However, this would obscure the fact that employed men with benefits are heterogeneous with respect to number of job spells initiated and with respect to how long they have enjoyed those benefits. Likewise, the group of women who work full time at age 54 is diverse with respect to when they entered the labor force, how many jobs they have had, and their histories of full versus part time employment. All of this is to say that trajectory measures reveal that men and women differ with respect to the timing, duration, and sequencing of employment circumstances, even when they appear similar as observed age 54 in the 1993 survey.

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[2] The 1993 WLS telephone survey only collected information about whether health insurance and pension benefits were offered to them on each job; we do not know whether respondents actually participated in health insurance or pension plans.

Men's and women's trajectories of marital status (married vs. not married) and number of marriages between ages 16 and 53 are depicted in Figure 4. The modal experience for women and men involves marrying in their mid-20s and then remaining in that first marriage until age 53. However, other groups of men and women delayed first marriage or experienced marital dissolution and subsequent remarriage; about 5 percent never married at all. Figure 5 depicts trajectories of fertility in terms of the number of (own, biological) children (age 18 or under[3]) that respondents had at each point in time between ages 16 and 53. Trajectory groups differ with respect to total number of children respondent ever had, as well as the ages at which childbearing took place. About one in ten had no (biological) children.

Again, what might be gained from using trajectory measures of respondents' family circumstances? Most respondents were married at age 54, but they differ with respect to the timing of first marriage and with respect to experiences with marital disruption and remarriage. Likewise, respondents are diverse with respect to the number of children they had and the timing of their fertility. Summary measures of family circumstances at age 54—marital status, number of children, and so forth—would miss potentially important information about timing and duration of family statuses.

Figures 6 through 9 pertain to ages 54 through 64, and depict trajectories of employment status and number of job spells (Figure 6), full-time versus part-time work (Figure 7), health insurance and pension benefit availability (Figure 8), and marital

[3] These trajectories are based on how many children age 18 or under respondents had at each time point. Given low rates of child mortality, trajectories of the number of children age 6 or under are substantially the same.

status[4] (Figure 9) at these later ages. We do not describe these trajectories in detail. As with parallel trajectories for earlier ages, WLS men and women differ with respect to the timing and duration of their work and family statuses. Individuals who are similar with respect to work or family statuses at age 65 are heterogeneous with respect to the timing of their entry into those statuses and the amount of time they have been in them. Finally, as with trajectories that pertain to earlier ages, the trajectories pertaining to ages 54 to 64 reflect known gender differences in work and family roles. For example, women are less likely to have worked at all after age 53 (Figure 6), but they spent more time in part-time employment (Figure 7) and in jobs with no benefits (Figure 8). Gender differences in mortality are such that women were also more likely to have never been married between ages 54 and 64 (Figure 9).

OTHER MEASURES

In the second part of our analyses, we model the impact of work and family trajectories on financial well-being, both before and after accounting for more proximate measures of work and family statuses and attributes. In the next section we describe dependent measures of financial well-being at ages 54 and 65 and covariates that express respondents' work and family statuses at age 54. Descriptive statistics for all of these measures appear in Table 1 for men and Table 2 for women; those tables also include measures of respondents' background characteristics in adolescence which are used to in models predicting trajectory group memberships (shown in the appendix).

We employ three measures of financial well-being, both at ages 54 and 65; all

[4] Because so few WLS respondents initiate marriages after age 53, we do not jointly model trajectories of number of marriages initiated between ages 54 and 64.

were collected via self-reports in the 1993 and 2004 WLS phone surveys. First, net worth expresses the total market value of graduates' and their spouses' homes, other real estate, farms, vehicles, savings, and investments, minus any debt owed on those assets. The dollar values of some asset and debt amounts are top-coded in the WLS data. We express net worth in log dollars; for the small number of graduates with negative or zero net worth, we have assigned them a net worth of $1 before logging. Second, total per-capita household income expresses the total income—including wages, farm income, interest, social security benefits, pensions, public assistance, other government programs, child support, alimony, and other sources of income—for all members of respondents' households. We divide this total by the number of people living in the household, and express the result in log dollars. Third, graduates' own personal income expresses the total amount that they receive from the several sources listed above; this amount is expressed in log dollars. Tables 1 and 2 reveal several expected patterns: Women earn less than men earn and have lower net worth; net worth increases with age; both household and individual incomes decline with age; and variability in each measure grows with age.

We include several measures of respondents' labor force and family circumstances at age 54. Measures of labor force conditions at age 54 include employment status (employed full time vs. employed part time vs. not employed); retirement status[5] (partially retired vs. completely retired vs. not retired at all); whether

[5] The WLS instrument is designed to acknowledge retirement status and employment status do not go hand-in-hand among older Americans. Many retired people continue

respondents' current or most recent employer offered them pension benefits; and the prestige of respondents' current or last occupations. Measures of family circumstances at age 54 include total number of children; an indicator of whether respondents have any long-term limiting health condition; a measure of respondents' self-assessed overall health (excellent vs. good vs. otherwise); an indicator of marital status (married vs. not married); an indicator of spouses' employment status (employed vs. not employed vs. not married); and an indicator of spouses' overall health (excellent vs. very good vs. otherwise vs. not married).

Our models that predict trajectory group membership (shown in the appendix) include a series of measures of graduates' social, economic, and other childhood circumstances. Educational attainment is expressed as years of schooling completed. IQ was ascertained in graduates' freshman and/or junior years of high school using the Henmon-Nelson test. Class rank expresses graduates' course grades in terms of their percentile rank relative to others in their high school class. We also include an indicator of whether graduates served in the armed forces; many graduates enlisted after high school or college. Finally, we include a series of measures of the socioeconomic standing of graduates families, including indicators of both parents' educations (as ascertained in 1957, and expressed in years of schooling); fathers' occupational status in 1957 (expressed using Ducnan (1961) SEI); parental income in 1957 (as ascertained from state tax records and expressed in $100s); an indicator of whether or not graduates said in 1957 that they planned to attend college after graduation; and a measures of the

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to hold paid jobs. Many employed people still consider themselves to be retired, and many older people without jobs do not consider themselves to be retired.

occupational status (SEI) of the job that graduates aspired to hold after graduation.

RESULTS

To what extent is financial well-being among older adults associated with long-term trajectories of work and family roles across the courses of their lives? To what extent are these relationships mediated by work, family, and other circumstances as ascertained contemporaneously with financial well-being? To address these questions, we estimate a series of OLS regression models. First, we regress outcome on indicators of work, family, and other circumstances at age 54. This approximates what many prior researchers have done using other data. Second, we regress outcomes on indicators of membership in work and family trajectory groups through age 53. These models directly address the first question above. Third, we regress the outcome on indicators of both work, family, and other circumstances at age 54 and membership in work and family trajectory groups through age 54. These models directly address the second question above. Fourth, do "turning points," or unanticipated changes in people's work or family lives, matter for financial well-being, all else being equal? We estimate all models separately for men and women, and we estimate separate models for financial outcomes at age 54 and for changes in these outcomes between ages 54 and 65.

Table 3 includes fit statistics for a series of models of financial well-being at age 54 for WLS women and men. Table 4 does the same for a series of models of change in financial well-being between ages 54 and 65. In each table, the top panel describes results for net worth, the middle panel describes results for household income, and the bottom panel describes results for personal income; all results are presented separately for men and women. In each case, we present four sets of information for four models: Model 1 includes only proximately measured predictors, Model 2 includes only

indicators of trajectories of work and family roles, Model 3 includes both, and Model 4 add indicators of "turning points." Our focus in these two tables is on key model comparisons, and thus we rely on a series of *F* tests.[6]

Are trajectory measures of work and family roles prior to age 54 predictive of financial well-being at age 54? As shown in Table 3, Model 2 always fits between than the null model. That is, taken together, our trajectory measures are significantly associated with financial well-being at age 54. Are these measures predictive of financial well-being at age 54, even net of proximate predictors of that outcome? As shown in Table 3, Model 3 fits between than Model 1 at the α=0.05 level in all but one instance; it usually fits better at the α=0.01 level. Are turning points in respondents' lives prior to age 54 significantly related to financial well-being at age 54, net of proximate and trajectory measures of work and family roles? For men, Model 4 fits always fits better than Model 3; the same is never true for women. As we will show below, this result is driven by the considerable effects of unanticipated job loss on men's financial well-being.

Are trajectory measures of work and family roles between ages 54 and 64 predictive of changes in financial well-being between ages 54 and 65, net of proximate predictors of financial well-being? As shown in Table 4, the answer is "no" for net

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[6] As described above, we use Stata's multiple imputation routine ICE to handle missing data. A consequence of this is that we actually have five multiply imputed data sets, and thus five sets of results for every model. We use the MICOMBINE routine (Royston 2004) to generate single sets of coefficient estimates across the five data sets, and a technique described by Harel (2009) to generate single sets of fit statistics.

worth. For household income, Model 3 (both proximate and trajectory measures) fits better than Model 1 (proximate measures only) for men but not for women. For personal income, Model 3 fits better than Model 1 for both women and men. Our measures of turning points in respondents' lives are never independently associated with changes in financial well-being between ages 54 and 65.

Tables 3 and 4 directly address our first two research questions, but they do not give any sense of the strength or direction of the associations between financial well-being and respondents' trajectories of work and family roles. Consequently, Tables 5 through 8 report selected results for what was labeled Model 4 in Tables 3 and 4. In Tables 5 through 8, we present coefficients and significance tests for measures of work and family trajectories and turning points. Tables 5 and 6 pertain to financial outcomes at age 54; Tables 7 and 8 pertain to changes in financial well-being between ages 54 and 65. Tables 5 and 7 pertain to men, while Table 6 and 8 pertain to women. As described above, all models in these tables include proximate measures of work and family roles at age 54; results for these variables are available upon request.

Among men, household and personal income at age 54 (Table 5) are significantly related to trajectories of employment status and number of job spells, to trajectories of benefit availability, and to unexpected job loss. Men who never have access to health insurance or pension benefits have substantially lower incomes, even net of their benefits at age 54. All else constant, men who ever experienced involuntary job loss also have substantially reduced net worth, household income, and personal income; these findings are consistent with earlier evidence about the long-term consequences of involuntary job loss (Brand 2006; Brand and Burgard 2008).

Among women, net worth and personal income at age 54 (Table 6) are

significantly related to trajectories of employment status and number of job spells and to trajectories of full-time vs. part-time employment. Even net of employment circumstances at age 54, women who have spent more time in the labor force working full-time had higher net worth and higher personal incomes at age 54. Whereas men's trajectories of family roles prior to age 54 were unrelated to financial well-being at age 54, women's trajectories of family roles are closely related to net worth and personal income at age 54. Never married women and women with children do worse with respect to these outcomes at age 54, even net of their family circumstances as measured at age 54.

Among men, changes in financial well-being between ages 54 and 65 (Table 7) are closely related to trajectories of benefit availability. Men who always have health insurance and pension plans available to them between ages 54 and 64—which is to say, men who continue to work at relatively good jobs at these ages—experience positive changes in household and personal incomes. Changes in women's financial well-being between ages 54 and 65 (Table 8) are also significantly related to trajectories of benefit availability. Women who continue to work at jobs that make both health insurance and pensions plans available to them experience relatively improves net worth and personal income. Finally, women who are consistently married between ages 54 and 64 tend to experience reduced personal earnings between ages 54 and 65; we interpret this to mean that women who are not widowed during this period are less likely to continue in paid employment or to draw survivor's benefits.

DISCUSSION

Life course scholars have introduced a rich set of concepts to hypothesize about the ways in which lifelong contours of peoples' major social roles—in the labor force and

in their families—cumulate to shape important outcomes at older ages. According to this perspective and to theories of cumulative advantage, financial, health, and other outcomes in later life—as well as inequalities in these outcomes—are the product of a lifetime of exposure to work and family roles. How much time people spend in those roles, their sequencing and timing, how and when they transition between them, their qualitative attributes, and whether and when they experience unanticipated "turning points" all combine to shape later life well-being. A central empirical premise of this perspective is that life course-long trajectories of work and family roles should matter for later life well-being, even net of indicators of work and family statuses as measured contemporaneously with those outcomes. Unfortunately, because of a lack of suitable data it has generally not been possible to test this perspective in a way that does justice to its conceptual promise.

To this end, we addressed two related research questions using rich data from the Wisconsin Longitudinal Study (WLS). First, to what extent is financial well-being among older adults associated with long-term trajectories of work and family roles across the courses of their lives? Second, to what extent are these relationships mediated by work, family, and other circumstances as ascertained contemporaneously with financial well-being? Cognizant of the gendered nature of life course work and family roles and of financial outcomes in later life, we estimated all models separately for men and women.

Descriptively, we find that most WLS respondents work and family lives follow a relatively small of discrete pathways or trajectories. It is true that stereotypical pathways—continuous employment from the end of schooling through the retirement years, early and stable marriages, etc.—are the trajectories that we observe most

frequently. However, they are not experienced universally. Fewer than half of all men, for example, followed the stereotypical pathway of consistently working full time for the same employer. Sizable numbers of both men and women experienced marital disruptions. What is more, as we showed in the appendix, which pathways people's lives follow is contingent on things like educational attainment, military service, and gender. The trajectories of work and family roles that we depict in Figures 1 through 9 show that WLS respondents are heterogeneous with respect to whether, how often, and at what age(s) they experienced important changes in their work and family circumstances.

We find, in general, that long-term trajectories of work and family roles are associated with financial well-being (and changes in well-being) in later life, even net of contemporaneous measures of work, family, health, and other circumstances. That is, there is empirical support for life course notions about the importance of the timing, duration, and sequencing of social roles. Working at a job that offers benefits at age 54, for example, is associated with higher income at that time. Beyond that, however, having been consistently employed in jobs that offer benefits is independently associated with financial well-being at age 54. The salience of trajectories of work and family roles for financial well-being later in life differs for men and women, varies across outcomes, and varies across types of trajectories (work vs. marriage vs. parenting).

Although we provide no formal tests of gender difference in our key findings, it is clear that gender plays an important role in our story. First, the pathways that typify men's and women's work and family lives—what we measure in terms of trajectories of work and family circumstances—are notably different, and in ways that are not surprising. Men's work lives are characterized by earlier and more persistent full-time employment. Men are much more likely to have consistently had access to employer-

provided health insurance and pension plans. At older ages, women are less likely to be married and more likely to experience marital disruption (principally through widowhood). Second, the ways in which trajectories of work and family roles are related to financial well-being in later adulthood differ for men and women. Women's trajectories of family circumstances are independently associated with their subsequent financial well-being; the same is not true for men. All else equal, unanticipated job loss is associated with poorer financial outcomes for men at age 54; the same is not true for women. In the end, gender shapes both the trajectories of men's and women's work and family lives and the extent to which those trajectories mater for subsequent outcomes.

Financial well-being in the retirement years is increasingly dependent upon people's own planning and resources. In an era characterized by heterogeneous employment careers and family lives, financial well-being among older Americans might best be understood as the end product of a lifetime of accumulated experiences in the two most important social roles that most people occupy: their families and their jobs. Evidence from the WLS, a cohort that just precedes the baby boom cohort, provides support for these notions of cumulative stratification.

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APPENDIX

In this appendix, we briefly outline group-based modeling techniques as they are used to identify categories of work and family trajectories. Let $Y_i = (y_{i1}, y_{i2}, y_{i3}, \ldots, y_{iT})$ represent the longitudinal sequence of measurements of some attribute of individual *i* over *T* time periods (e.g., employment as measured between ages 36 and 54), and let $P(Y_i)$ represent the probability of observing Y_i. Group-based trajectory models assume that there are *J* underlying trajectory groups in the population such that

$$P(Y_i) = \sum_{j=1}^{J} \pi_j P^j(Y_i), \tag{1}$$

where $P^j(Y_i)$ is the probability of observing longitudinal sequence Y_i given membership in group *j* and π_j is the probability of group *j* (Jones and Nagin 2006; Nagin 1999). The model assumes that the random variables y_{it}, t=1,2,3,...,*T*, are independent conditional on membership in group *j*. Thus

$$P^j(Y^i) = \prod_{t=1}^{T} p^{jt}(y_{it}). \tag{2}$$

The values of π_j, j=1,2,3,...*J*, are estimated by a multinomial logit function:

$$\pi_j = e^{\theta_j} \Big/ \sum_{j=1}^{J} e^{\theta_j}, \tag{3}$$

where θ_1 is normalized to zero (Jones and Nagin 2006). The functional form of $p^{jt}(y_{it})$ in Equation 2 is determined by whether y_{it} is a continuous variable, binary, or count variable. When y_{it} is a count variable, $p^{jt}(y_{it})$ is assumed to follow a zero-inflated Poisson distribution (to allow for the possibility that there are more zeros in the data

than is allowable under the Poisson assumption). When y_{it} is a binary variable, $p^{jt}(y_{it})$ is assumed to follow the binary logit distribution (Jones et al. 2001; Kim and Lee 2006; Nagin 1999; Nagin 2005). The link between time (or age, in our case) and the variable in question is modeled as a polynomial relationship; the SAS routine PROC TRAJ that estimates these models allows for up to fourth order polynomials; however, we begin by estimating models with third order polynomials. For example, when y_{it} is a binary variable it is assumed, conditional on membership in group j, that $p^{jt}(y_{it})$ follows the binary logit distribution:

$$p^{jt}(y_{it}) = \frac{e^{\beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3}}{1 + e^{\beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3}}, \quad (4)$$

where Age_{it} is individual i's age at time t and coefficients β_0^j, β_1^j, β_2^j, and β_3^j determine the shape of the trajectory for group j. When y_{it} is a count, the linkage between time (or age) and the variable in question is

$$\ln(\lambda_{it}^j) = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3, \quad (5)$$

where λ_{it}^j is the expected number of occurrences of the event of interest (e.g., births) for subject i at time t, conditional on membership in group j.. Models are estimated through maximum likelihood, where the maximization is performed using a general quasi-Newton procedure (Dennis et al. 1981; Dennis and Mei 1979).

In some instances, we used an extended version of the procedures outlined above in order to jointly model two conceptually related outcomes that evolve contemporaneously (e.g., marital status and number of marriages or employment status

and number of employers). Generally speaking, these multi-trajectory models take on the following form:

$$P(Y_1,...Y_K) = \sum_j \pi_j \prod_k f_k^j(Y_k), \quad (6)$$

where *k* indexes the number of different outcome trajectories in each trajectory group *j*; π_j gives the probability of group membership; and $f(\cdot)$ defines the distribution of each outcome (Jones and Nagin 2007).

Which model best describes the number and shapes of trajectories? In many applications, researchers rely on the Bayesian Information Criterion (BIC) for model selection; see Jones, Nagin, and Roeder (2001) for more information about model selection. However, as shown in Table A1, we use BIC in conjunction with other criteria to select models. Separately for men and women and for each of several types of trajectories (e.g., marital status between ages 54 and 64), we estimate models that specify *J*=1, 2, 3, ... 7 trajectory groups. For each model, we then report 1) BIC; 2) change in BIC relative to the model with *J*-1 trajectory groups, and 3) the percentage of individuals who fall into the smallest trajectory group. Using BIC alone, we would select models with larger numbers of trajectory groups. However, we find that at some point the addition of more trajectory groups only modestly improves fit and substantively amounts to splitting small trajectory groups into smaller and smaller sub-groups (often with very few observations each). In the end, our model selection approach utilizes a blend of formal statistical criteria and less formal substantive criteria. Tables A1 and A2 highlight the best-fitting sex-specific model for each type of trajectories, separately for

age 16 through 53 and for ages 54 through 64.[7] The percentage of individuals who fall into each trajectory group are reported in Figures 1 through 9.

The modeling strategy described above allows us to accomplish two important objectives. First, the results describe the number and form of estimated trajectories. That is, the best-fitting model (determined as described above) specifies a discrete number of trajectories and its parameter estimates define the shapes of the trajectories. Second, the results of the model allow us to compute the probability that each graduate is a member of each trajectory group. Jones and Nagin (2006) and Nagin and Tremblay (2005) describe techniques for defining confidence intervals for such probabilities. In practice, we assign WLS graduates to the trajectory group for which their probability of assignment is highest. In the vast majority of instances these probabilities of assignment are either less than 0.10 or greater than 0.90; thus there is very little uncertainty in assignments.

Although not central to our analytic objectives, it is useful to understand the factors that predict trajectory group membership. What social, economic, and other background factors as measured in adolescence predict the trajectories of respondents' work and family lives over the ensuing decades? To examine this question, we have estimated multinomial logistic regression models to predict group membership as a function of educational attainment (expressed as years of schooling completed among this sample of high school graduates); IQ as measured in high school; high school class

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[7] Note that we always prefer models with third order polynomials. In general, this preference is based on inspection of the statistical significance of coefficients for the higher order polynomial terms.

rank (based on course grades); an indicator of military service; parents' educations; father's 1957 occupation; parents' 1957 income (from state tax records); and indicators of respondents' educational plans and occupational aspirations in high school. These measures are described in more detail above; descriptive statistics are provided in Tables 1 and 2.

In Tables A3 through A5, we report the results of multinomial logistic regression models predicting membership in trajectory groups of employment status and number of job spells (Table A3), health insurance and pension plan availability (Table A4), and marital status and number of marriages (Table A5), all through age 53. For the sake of space, we do not present similar results for trajectory groups of full-time vs. part time employment or for number of children age 18 or under, or for trajectory groups between ages 54 and 64. All of these models (including those not shown) indicate that educational attainment, military service, and (to a lesser extent) family socioeconomic origins are important predictors of the trajectories of respondents' subsequent work and family lives. Educational attainment and military service delay marriage, delay childbearing, delay labor market entry, and alter the pathways of respondents' careers.