MAPPING TRENDS:
PATTERNS OF EMPLOYMENT TRAJECTORIES
IN THE UNITED STATES, 1967-2005

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA
BY

Reiping Huang

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

John Rob Warren, Phyllis Moen
Co-advisors

December, 2011

ACKNOWLEDGEMENTS

This dissertation is about trajectories. Looking back, my own course of graduate study has been long, full of detours, and was in no way orderly. This journey comes to an end because of the support from many people. First I would like to thank my mentors for their intellectual guidance, encouragement, and patience. I will remember Rob Warren's dedication to mentoring students and the opportunities I received working with him. Phyllis Moen has been a role model for superior scholarship that any student would look up to as well as a mother figure. I have always believed it was a privilege, not just good luck, to be their students. I thank Ross Macmillan for his thoughtful comments on my draft and his lecture that has led me to an interest in statistics for social sciences.

This journey would have felt longer without the company of many friends. I appreciate the friendship with Dong Dong, Xi Zhu, Song Chen, Erika Busse, Lara Cleveland, Yu-ju Chien, and Chika Shinohara, among others. And I missed the daily group lunch with Julie Trupke-Bastidas, Uttam Sharma, Shingya Takamatsu, and Phatta Kirdruang.

I'm indebted to my family for their enormous patience and support. Thanks to my grandparents, Ruihua Ma and Chaowei Huang, who shaped my personalities profoundly and taught me how to be a good person. I thank my parents, Yuerong Pan and Weiwen Huang, who always have had faith in me, encouraged me to pursue my interests, and treated me like a friend since I was little. Finally, special thanks to Xiangmin Zhou whom I met in graduate school and whose trajectory has intertwined with mine since then as well as Ethan Zhou for being a happy preschooler even though his mother was too busy to spend much time with him.

To Yuerong Pan, Weiwen Huang,
Xiangmin Zhou
and sociology students who follow their hearts regardless

ABSTRACT

This thesis systematically examines the overall patterns of employment histories in the United States based on data from the Panel Study of Income Dynamics (1967-2005). Over 15,000 individual employment trajectories, including those from previously under-studied social groups such as workers in the secondary labor market, blue-collar occupations, and those outside big firms, were compared by optimal matching analysis and cluster analysis.

Accounting for gender, age period, and birth cohort, the distance of Americans' career paths from the stable, full-time trajectories was found to be decreasing over time when careers were examined holistically; meanwhile, career paths have become more homogeneous to one another. Gender gap in employment trajectories has considerably declined. These trends have been driven primarily by women's increasing engagement in full-time employment while men's trajectories have changed only slightly. Three primary patterns of employment trajectories were found—an unstable, part-time pattern, a stable, inactive pattern, and a stable, full-time pattern that accounted for about three-quarter of the cases. Those in the stable, full-time pattern, particularly men, were highly likely to continue this type of employment trajectories into older ages. A modest occupation effect was found in which white-collar workers and those in occupations dominated by men, such as managers and administrators and machine operatives, were more positively associated with the stable, full-time pattern than those from other occupations, even after gender was taken into account.

Overall, this study draws an optimistic picture of employment trajectories that contradicts current perceptions about the disappearance of long-term, full-time employment. Its conclusions, however, need to be interpreted with caution given a possible under-estimation of job changes, part-time work, and underemployment as well as an under-representation of women, economically less active people, and those in big family units due to data quality issues.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

As this chapter was being written, the United States was undergoing a major recession. Starting at the end of 2007, this recession was one of the longest and most severe the United States has experienced since the Great Depression of the 1930's (National Bureau of Economic Research 2009). According to Bureau of Labor Statistics (2009), in 2008 more than 2.5 million jobs were eliminated across the country, the most since 1945. By September 2011, the nation's unemployment rate had soared to 9.1%, the highest level since 1993, and the number of workers out of a job for more than 27 weeks accounted for 42.9% of the unemployed. The length of the work week, on the contrary, slipped to 34.2 hours, one of the shortest since records began in 1964 (U. S. Department of Labor 2011).

Scholars who study the post-industrial labor market have argued that employers have increased the proportion of temporary, part-time, contract, and on-call workers on their payrolls in order to maximize profits and save costs (Aronowitz and DiFazio 1994; Benach, Amable, Muntaner, and Benavides 2002). However, the 2007-2009 recession seemed to be eroding economic sectors in which jobs were often well-paid and stable. Unlike in most other recessions, this time job loss had spread to almost all major industries and sectors including business, insurance, real estate, pharmaceuticals, and information technology (IT). According to the Federal Deposit Insurance Corporation (2009), for example, the number of bank failures in 2008 climbed to 44. These closed banks included well-established investment banks, such as Lehman Brothers and Merrill Lynch, as well as large commercial banks like IndyMac and Washington Mutual. In early 2009, the peak of the job cuts seemed to shift from the financial and business sectors to the IT industry. After passing a $700 billion bill bailing out many of these banks and Wall Street firms, Congress faced heated discussions about a bailout of the three leading U.S. auto makers--General Motors, Chrysler, and Ford. Also, in January 2009 alone, Motorola, Microsoft, Oracle, Ericsson, and other companies announced plans to shed thousands of jobs (CNET News 2009).

For ordinary Americans, perhaps a more personal experience of this recession was not about the scale of job losses but about the occupations that were at risk. During the waves of IT job cuts, computer programmers, engineers, research and development personnel, sales representatives, human resource managers, recruiters, and other professionals had been as likely to lose their jobs as contract workers or low-level technicians. As of February 18, 2009, about 4,500 attorney and legal staff positions were eliminated within a six-week period in 67 major law firms such as Allen & Overy, Latham & Watkins, and Linklaters (Lawshucks 2009). Even the once-secure academic sector was not untouched. Due to financial difficulties, the University of Texas Medical Branch in Galveston laid off more than 3,000 employees in November 2008. Among them, 83 were tenured and tenure-track faculty and 44 were non-tenure track researchers; some were close to retirement, having served at the university for more than 30 years (The Scientist.com 2008).

In the United States, a stable, full-time career has underpinned the middle-class lifestyle and been considered as a key element of the American Dream (Moen and Roelling 2005). For decades, obtaining a college degree has meant a white-collar job, which brings job security and a decent wage. This perception of "careers" has never been shattered so vividly until the recent economic recession. It seems to be the first time in history that job security has become a risk that everyone has to face, regardless of industry, occupation, tenure, or education. When did stable, secured careers become a privilege? How common are they? And who are the people that stay on such career paths?

This dissertation is a study that re-examines the notion of the stable, full-time career and its presence in American society. Using a socio-demographic approach, this project empirically maps the primary patterns of employment trajectories in the United States during the past forty years. The goal is not only to compare the careers of men and women in different occupations, but also to reveal how gender- and occupational-variations in career patterns have changed *over time*. The focus is on changes in career paths over a long period of time and within an individual's life span.

Why is it important to study changes in careers? Sociologists have looked beyond business cycles to study job loss and employment history. Decades of research has underscored the central roles of family origin, gender, industry, and occupation in allocating individuals to different jobs, career paths, and essentially, social statuses. For instance, the status attainment model suggests that family background, measured by the father's occupation and education, significantly predicts the son's schooling and occupational status (Blau and Duncan 1967). Scholars of the dual labor market have stated that workers in the periphery sector or those in the secondary labor market have jobs with lower pay and benefits and that are less secure than those in the center sector or the primary labor market (Doeringer and Piore 1971; Edwards, Reich, and Gordon 1975). Given their concentration in the disadvantaged segments of the labor market, women and minorities have less chance of securing a stable career or career advancement than men and White Americans. Moreover, their disadvantages tend to be carried over into later stages of their employment histories. Life course sociologists seek an alternative perspective to explain women's career disadvantages by their social roles as caregivers and homemakers (Pavalko and Artis 1997; Pavalko and Woodbury 2000). More specifically, among dual-earner couples, women are found to be more likely to opt out of their careers than men (Becker and Moen 1999; Moen and Yu 2000; Moen and Roelling 2005).

Sociological research has shown that some people tend to follow stable, full-time careers given their gender, family background, or position in the segmented labor market. However, major social institutions such as the demographic structure of the labor force, economy, the labor market, and social norms about family and marriage have all been profoundly transformed over the years (Aronowitz and DiFazio 1994; Benach et al. 2002; Stone 2004; Goldin 2006). Despite this, few studies have investigated career patterns in different historical and social contexts. A study of careers has to take into account these transformations that are reflected by the changing patterns of employment histories over time. Furthermore, almost all empirical studies in sociology that focus on employment trajectories have been either cross-sectional or restricted to a small sample of select social

groups. To understand who is likely to experience what careers and under what circumstances, a comparative study that examines career patterns across different cohorts and traces the employment within an individual's life span is necessary. This is the focus of the present dissertation.

In the social sciences, careers have been loosely defined in various ways. In this dissertation, career refers to a sequence of employment statuses or jobs that a person has held during his or her working age. It is used interchangeably with "career trajectories", "career paths", and "employment histories" throughout this study. In the next chapter (Chapter 2), sociological theories and studies about employment histories as well as research about institutional changes are elaborated. Data and methods are introduced in Chapter 3.

Table 1. Chapter Outline

Chapter 1	Introduction
Chapter 2	Employment Histories in Sociological Research and Hypotheses
Chapter 3	Data, Method, and Measurement
Chapter 4	Departure from the Norm of the Stable, Full-Time Careers: Analysis on Optimal Matching Distance Scores and Trajectory Characteristics
Chapter 5	Patterns and Path Dependence of Employment Trajectories in the Life Course
Chapter 6	Occupations and Primary Patterns of Employment Trajectories
Chapter 7	Summary, Discussion, and Conclusions

Analysis and discussion of findings that reflect different perspectives of investigating career trajectories are spread over three chapters. In Chapter 4, careers are studied from a holistic perspective via optimal matching distances through which career trajectories as wholes can be compared to one another. Gender and birth cohort differences in career trajectories are summarized. Five cohorts are studied: Pre-war (born

1907-1927), Post-war (born 1928-1945), Leading boomers (born 1946-1954), Trailing boomers (born 1955-1964), and Generation X (born 1965-1979). A more detailed analysis of the characteristics of episodes, transitions, and states in a trajectory help explain where men and women as well as different birth cohorts have differed in overall employment trajectories. The purpose of Chapter 5 is to identify several primary patterns of careers among the large number of employment trajectories and track how these patterns have changed over different age periods in the life course. Chapter 6 examines the association between occupation and an employment trajectory pattern, accounting for gender, birth cohort and age period. The final chapter (Chapter 7) summarizes the key findings and discusses the limitations as well as contributions of the study. The outline of the seven chapters is summarized in Table 1.

CHAPTER 2
EMPLOYMENT HISTORIES IN SOCIOLOGICAL RESEARCH AND HYPOTHESES

Job changes or job losses closely reflect the fluctuations of business cycles. However, under similar circumstances, individuals have unequal access to well-paid, secure jobs and different odds of losing their jobs. Sociologists' primary interests have lied in the demand side of the labor market with a focus on the constraints of social factors, such as gender, education, and status in the labor market, on employment and career paths. Sociological research about careers has primarily drawn on theories from two areas -- research about labor market segmentation and the life course perspective (e.g. Wilensky 1961; Doeringer and Piore 1971; Spilerman 1977; Kalleberg and Sorensen 1979; Baron and Bielby 1980; Hodson and Kaufman 1982; Althauser and Kalleberg 1981; Jacobs 1983; Allmendinger 1989; Abbott and Hrycak 1990; Moen et al. 1992; Stovel, Savage, Beraman 1996; Quick 1998; Blair-Loy 1999; Han and Moen 1999; Scherer 2001; Pollock, Antcliff, and Ralphs 2002; Blair-Loy and DeHart 2003).

2.1 SOCIAL MOBILITY IN SEGMENTED LABOR MARKET

In 1970s a wave of "structuralism" surged among labor economists and sociologists (Doeringer and Piore 1971; Beck, Horan, and Tolbert 1978; Kalleberg and Sorensen 1979; Baron and Bielby 1980; Hodson and Kaufman 1982). Resting on critiques to neoclassical assumptions about the competitive market and fluid labor force, the structural approach considers segments within the labor market and barriers for mobility. Social mobility has basically been studied from three perspectives--occupational careers in a dual labor market, organizational careers in the internal labor market, and career lines.

Occupational Careers in Dual Labor Market

From the first theoretical perspective, scholars have claimed that both the economy and the labor market are segmented so that individuals' changes in industry and occupation

were primarily restricted within, rather than between, sectors. For example, the economy is composed of two qualitatively distinct *sectors* characterized by dominant types of firms with regards to size, market power, influence, the manner of labor force control, and the production process (Averitt 1968). The center sector consists of large corporate and bureaucratic firms whose activities permeate multiple industries, regions, and nations. These core firms are monopolists or oligopolists in product markets and are able to influence or manipulate their economic and non-economic environment (Hodson and Kaufman 1982). By contrast, the periphery sector is dominated by small firms that have to face competition and encounter control from core firms. That the core firms impose and subordinate periphery firms in the production process is a product of the centralization of capital (O'Connor 1973; Reich, Gordon, and Edwards 1973; Edwards 1979).

Another form of labor market segmentation is the dual labor market, which is considered to have two distinct segments based on the characteristics of workers' employment. Jobs in the primary market are "good" jobs with high rewards, good working conditions, and more importantly, job security and the opportunity for career advancement. On the contrary, jobs in the secondary market are "bad" jobs with low rewards, impaired working conditions, low job security, and little promise for upward mobility (Doeringer and Piore 1971; O'Connor 1973; Edwards, Reich, Gordon 1975; Piore 1975; Bibb and Form 1977). Furthermore, the primary and secondary markets differ in the administration of work rules. Unlike the primary market operated by equity and due process, the secondary market is maintained by a highly personalized relationship between workers and supervisors, wide latitude for favoritism, and harsh and capricious work discipline (Piore 1975: 126).

Research about the dual economy or the dual labor market underscores that individuals have markedly different benefits and job opportunities primarily because of their positions in the labor market instead of their personal characteristics. Theories suggest that people in different sectors follow distinct career patterns. In a classic piece about the dual labor market, Piore (1975) considered the relative stability of jobs and

workers as the *critical* explanatory variable in drawing the border between the primary and the secondary sectors; other job characteristics are merely *derivatives* of employment stability. He defined labor market structure based on "mobility chains", a sequence of jobs that follow a regular order (1975: 128). According to him, *mobility chains* in the primary sector constitute career ladders along with a progression in pay and status; jobs in the secondary sector, by contrast, are held in a random fashion without a necessary relationship in terms of the job description and required skills. Moreover, Piore further divided the primary sector into upper- and lower-tiers. Compared with the lower tier, the upper tier offers better rewards and allows for greater individual creativity and initiative but requires formal education for entry. Nevertheless, it resembles the secondary market for frequent employment mobility and turnover; only that the mobility in the upper tier is more often associated with career advancement than with job loss (Piore 1975).

Empirical studies have been carried out to detect career mobility and delineate labor market barriers among economic sectors, industries, occupational sex types, occupations, or combination of these levels (Bluestone 1970; Gordon 1972; O'Connor 1973; Beck et al. 1978; Hodson 1978; Kalleberg et al 1981; Wallace and Kalleberg 1981; Jacobs 1983, 1989; DiPrete 1990; DiPrete and Krecker 1991; Stier and Grusky 1990; Rosenfeld and Spenner 1992; Chan 1999). However, the prediction that social mobility occurs more frequently within- than across-sectors has not often been well supported (Leigh 1976; Bridges 1980; Kaufman and Daymont 1981; Jacobs 1983, 1989). Some studies found that the partitions of the labor market could not be well explained along the boundaries defined by the center and the periphery sectors (Hodson 1978; Wallace and Kalleberg 1981).

Organizational Careers in the Internal Labor Market

Alternatively, some sociologists recognized that career mobility was often bounded by a firm or profession within the same industry or sector (Rosenbaum 1979). They partitioned the labor market into within- and outside- the "internal labor market" and monitored a person's job shifts along career tracks in big organizations (i.e. organizational careers). The internal labor market refers to "the complex of rules which

determines the movement of workers among job classifications within administrative units, such as enterprises, companies, or hiring halls" (Dunlop 1966:32). It is often found in larger establishments, like firms, the government, unions, and occupational organizations (Doeringer and Piore 1971; Mahoney and Milkovich 1971; Dalton and Snelling 1983; Osterman 1984; White and Althauser 1984). It is either a strategy of rational employers to reduce turnover and save labor costs (Doeringer and Piore 1971; Williamson, Wachter, and Harris 1975) or a historical product of the conflicts or compromise between employers and unionized workers (Kerr 1954; O'Connor 1973; Reich, et al. 1973; Edwards et al. 1975; Osterman 1984).

As in the primary sector, workers within the internal labor market are protected from competition with outsiders. Entry to such structure is nevertheless controlled, and different entry portals lead to distinct career paths. Each career path is a multi-stepped job ladder. Upward mobility on a "ladder" is accompanied by growth of skill and knowledge and succession of tasks and assignments (Althauser 1989a). Empirical studies of the internal labor market have often become investigations about the odds and rates of job changes and waiting time, given the experience immediately prior to job shifts. Much research has been done at the *organizational* level, based on personnel records from specific firms or professions about employees' promotions on predetermined job ladders (e.g. Doeringer and Piore 1971; Kalleberg and Sorensen 1979; Althauser and Kalleberg 1981; Althauser 1989b).

Research has suggested that when and how fast a person makes a move can be governed by their age, education, occupation, and their location on a career track or grade level, as well as the characteristics of the internal labor market. For instance, people with longer *firm-specific seniority* are less likely to make job exits for career reasons (Halaby 1982; Petersen and Spilerman 1990) or across-ladder job shifts (DiPrete and Soule 1988). As seniority rises, the odds of promotion decreases or follows a nonlinear trend (Donohue 1988; Petersen and Spilerman 1990). *Education* is a key mechanism in the internal labor market since career advancement is usually driven by increment in skill and knowledge (White and Althauser 1984; Althauser 1989a). Formal education in particular increases

the capacity for moving across distinct job ladders (DiPrete and Soule 1988; DiPrete and Krecker 1991). A distinct yet complementary mechanism to merit or seniority is a *job vacancy* that opens at a higher level (White 1970; Abbott 1990; Smith and Abbott 1983; Stewman and Konda 1983).

In addition, the rates of promotion slow down with an increase in *grade level*; job exits are less frequent for positions at higher grades or with larger promotion prospects (Peterson, Spilerman, and Dahl 1989; Peterson and Spilerman 1990). Near the ceiling of a job ladder, a shift to another job ladder is more likely than promotion (Peterson and Spilerman 1990). Beyond organization, the rates of job shifts were found to reflect organizational expansion (Pfeffer 1983; Baron 1984; Rosenbaum 1979), heterogeneity of the workforce (e.g. Blumen, Kogan, and McCarthy 1955; Felmlee 1982; Heckman and Singer 1982), and the age structure of occupations (Kaufman and Spilerman 1982).

Career Lines

The third approach regarding people's locations in the labor market and employment is through "career lines" (Spilerman 1977; Spenner, Otto, and Call 1982; Althauser 1989b; Althauser and Veen 1995). A career line is "a sequence of jobs common to a portion of individuals in the labor force" with "a high probability of movement from one position to another" (Spilerman 1977: 560). Career lines are constructed by linking jobs with high frequencies of job transitions; therefore, they represent the career paths that a large number of people pass through given their locations in the labor market. Similar to job ladders in a big firm, career lines is a social structure for career mobility. The concept implies that the occupation of one's current job, instead of the job holder's personal characteristics, is relevant to the direction of next job. Unlike job ladders or organizational careers, however, career lines transcend the boundaries of firm, occupation, or industry. More importantly, they are empirically linked without the assumption that jobs are functionally related and later jobs are on a higher grade than earlier ones (Spilerman 1977).

Empirical studies that outline the career lines in the labor market have been scattered. In an ambitious study, Spenner, Otto, and Call (1982) identified 384 career

lines among 6,729 men and women in Washington State. Their findings indicated that career lines reflected the skill levels inherent in jobs but were formed and maintained in sectors of the economy. In another study, Althauser examined "career line segment", a set of possible job shifts on a career line within a firm (Althauser 1989b). He identified 59 career line segments in a large Midwestern bank and found a concentration of job shifts in typically male dominated middle-management positions.

In summary, occupational careers across sectors, organizational careers in the internal labor market, and career lines represent three different perspectives among sociologists in understanding the key role that the inner structure of the labor market plays on job changes and career paths. Scholars assume that some persons enjoy higher job rewards, better working conditions, and more opportunities for career advancement because of their locations in the advantaged segments. In this group of research, careers are usually assumed to be linear, upward job ladders.

2.2 CAREERS IN THE LIFE COURSE

The second theoretical tradition in which the studies about career patterns are situated is the life course perspective. Life course refers to "an age-graded pattern of events and social roles that is embedded in social life and structures" (Elder, George, and Shanahan 1996: 249). From a life course perspective, career is a role history in which individuals traverse sequential sets of social roles at different life stages. The life course perspective underscores the gendered nature of careers through women's and men's social roles and how women's career paths are intertwined with the lives of family members, especially those of their husbands (Moen 2001; Moen and Spencer 2006).

Role Constellations and Linked Lives

Given that people enact multiple roles simultaneously, the notion of social roles allows life course researchers to investigate paid and unpaid work that people are engaged in during the life course. The life course research about careers provides a powerful perspective in studying men's and women's distinct careers. Women are much more likely than men to be engaged in all kinds of unpaid work, such as volunteering and

caregiving, and their career trajectories are considerably constrained by the roles they perform outside occupational domains (Pavalko and Artis 1997; Han and Moen 1999).

Moreover, recognition of the life course as a biography of role constellations invokes the principle of linked lives (Elder 1987; Elder et al. 2003) that distinguishes a life course perspective from the models of occupational careers that focus on a single role sequence (e.g. Hill 1970; Hareven 1978). Linked lives refer to "the interdependence of individuals in various networks, including, but not limited to, family and work" (George 1999: 566). It implies that primary groups and social networks can serve as a middle-level mechanism between social structure and individual development. For instance, as they are often affected by macro-level social and economic changes, the changes in family structure and other primary groups often alter the timing and consequences of individual life transitions (George 1993). The idea of linked lives also suggests that occupational careers should be understood in relation to family obligations, social support, social integration, and experience in other life domains rather than studied in isolation.

Life course scholars have investigated the associations among employment, unpaid work, and well-being, especially for women. Commonly studied forms of unpaid work include, but are unlimited to, volunteering (e.g. Luoh and Herzog 2002; Marrow-Howell et al. 2003; Moen et al. 1992; Musick and Wilson 2003) and caregiving (Marks 1998; Pavalko and Woodbury 2000). Using families or couples as the unit of analysis, researchers have also examined work-family conflicts among dual-earner couples and revealed the gendered and age-graded nature of work and family (e.g. Barnett et al 1995; Becker and Moen 1999; Moen and Yu 2000).

Two general hypotheses have been tested to examine whether employment benefits women's well-being, conditional on other social roles that they play in life. The Role Accumulation Hypothesis contends that multiple social roles provide a variety of resources and therefore the combined effects can be additive or complementary (Sieber 1974; Thoits 1983; Waldron and Jacobs 1989; Moen et al. 1992; Barnett 1993). In contrast, the Role Strain Hypothesis underscores the negative consequences of holding

multiple roles and states that overload and role conflict can lead to stress and excessive demands on time, energy, and psychological resources (Verbrugge 1986; Waldron and Jacobs 1989; Barnett 1993). Empirical evidence supports both hypotheses, suggesting that the direction and magnitude of associations depend on age (McLanahan and Adams 1987; Hoffman, Foster, and Furstenberg 1993; Irvine et al. 1997; Maynard 1997), quantity of demands (Verbrugge 1986; McLanahan and Adams 1987; Repetti et al. 1989), and the specific constellation of social roles (Waldron et al. 1998).

Time and Timing in Careers

In life course theories, the interplays between human agency and social structure is often studied with the time and timing of significant life or historical events. The impacts of such events depend on an individual's age and life stage as well as historical contexts. Each generation receives a distinctive imprint from the social and political events of its youth (Mannheim [1928] 1952). Age, cohort, and historical time are social structures for constraining and explaining individual as well as institutional changes (Riley 1987).

From this perspective, the life courses of individuals are embedded and shaped by the historical times and places that they experience over their lifetime (Elder et al. 2003). People from the same cohort, period, or generation tend to be affected by similar social contexts and thus share some behavioral or psychological characteristics. Therefore, individual life courses are normatively governed, and the genesis and timing of life transitions are reasonably predictable (George 1993). However, human agency interplays with age grading and results in heterogeneity of behaviors so that individual development has a certain degree of "loose coupling" instead of being totally determined by social structure (Elder and O'Rand 1995). Furthermore, differential opportunities allocated by structural arrangements in the early life stage can be further amplified by the temporal characteristics of individual behaviors and attainments so that (dis)advantages tend to be cumulative over time (O'Rand 1996).

Given the centrality of time and timing in research, life course scholars have developed a time-related vocabulary that greatly facilitates the articulation of temporal dimensions of careers. The concepts of life stage, life cycle, life span, life history, cohort,

period, and generation have been routinely used to differentiate temporal variations in human behaviors and experience. For example, *transitions* refer to "changes in status that are discrete and relatively bounded in duration, although their consequences may be observed over long periods of time" (George 1999: 566). The time between transitions is *duration,* while *turning point* describes a substantial change in the direction of one's life (Elder et al. 2003). *Trajectory* indicates a "long-term pattern of stability and change, often including multiple transitions, that can be reliably differentiated from alternate patterns" (George 1999: 566). Transitions and trajectories are the key temporal dimensions in a life course study and are inherently related in that "[t]ransitions are always embedded in trajectories that give them distinctive form and meaning" (Elder 1985: 31).

In a life course study, the concept of *careers* typically involves life stages, alternative pathways, and a predictable endpoint. For instance, a career of mental illness can refer to "any sphere of activity in which people move through a series of related and definable stages in a progressive fashion, moving in a definite direction or toward a recognizable end point of goal" (Aneshensel 1999: 586). However, trajectories are considered different and should be distinguished from careers. For example, George argues that trajectories are not assumed to involve specific stages or a defined outcome; on the contrary careers often indicate a single life domain, mostly likely, occupational careers whereas trajectories include the intersections of multiple life domains (1999: 566).

2.3 EMPIRICAL STUDIES ABOUT CAREERS

Rooted in both the theoretical traditions of the structuralist accounts of labor market segmentation and of the life course, there has been a small group of sociological studies that empirically examines the *sequences* of jobs or employment statuses over a long term. These studies explicitly expressed careers as trajectories and empirically mapped them based on life histories data.

Research on career trajectories before the 1970s were often case studies about work histories (Davidson and Anderson 1937; Form and Miller 1949; Lipset and Bendix 1952a,b; Jaffe and Carleton 1954; Palmer 1954; Reiss 1955; Warner and Abegglen 1955; Slocum 1966). Lipset and Bendix (1952a, b) for example studied the complete job histories of 935 working heads of families in Oakland, California in terms of the rates of job shifts at three levels (job, occupation, and community) and the percentage of time spent in the current occupation. They showed that most respondents, particularly the unskilled, upper-white-collar, and self-employed people, had experienced unstable careers. In their study, remarkable social mobility occurred between the manual and non-manual workers, and most of the people who moved upward from non-manual to manual occupations became self-employed.

Wilensky's classic study (1961) introduced an important concept about careers--the degree of *orderliness* of careers. An orderly career is one in which "skills and experience gained on one job are directly functional to performance in subsequent jobs and jobs are arranged in a hierarchy of prestige" (1961: 525). Given the relationship among jobs in a function, direction of movement, and time spent in orderly jobs, he constructed 6 career patterns--orderly horizontal, orderly vertical, borderline orderly vertical, disorderly horizontal, disorderly vertical movement, and paths without job changes. Among the 678 white men in the sample who were from upper-working and lower-middle class, merely 30% exhibited "orderly careers". Another surprising finding was that men experienced a similar degree of orderliness in employment histories, regardless of differences in father's occupation, self-employment history, religion, age, occupational stratum, income, and education.

Compared with their predecessors, contemporary studies of career trajectories since the 1990s have been more explicit in examining complete work histories as a whole, which was made possible by increasing availability of high-quality longitudinal data and the development of statistical methods and computer programs.

Trajectories of Occupations

Most contemporary research about career trajectories has been about changes in occupations. Scholars in the United States are often interested in careers with regards to occupational status (on either a continuous prestige scale or discrete categories), organization (type or size), and geographical location (e.g. rural or urban) (Abbott and Hrycak 1990; Stovel, Savage, Beraman 1996; Blair-Loy 1999; Blair-Loy and DeHart 2003).

In a study about the careers of 18th century German musicians, Abbott and Hrycak (1990) found 20 career tracks among 279 sequences with states coded based on position (similar to job title, such as vocalist, instrumentalist, composer) and sphere (whether one played primarily in court, church, theater/opera, etc.). Stovel et al. (1996) studied the modernization of career systems in a large British bank from 1890 to 1970 through changes in career patterns among its three cohorts of employees. Their coding of careers took into account the size of a branch and its location (small rural, large rural, small urban, or London) and occupational position of a job (specialist head office, head office, clerk, senior clerk, manager, or specialist manager). By comparing the 27 ideal types of career patterns across cohorts, they concluded that the national bank had transformed from an ascriptive, status-based system to a more dynamic, achievement-based one.

Trajectories of Employment Statuses

Compared with American researchers, European scholars are more interested in careers in other socioeconomic dimensions like employment status and social class. Their analyses of career trajectories are often instrumental, as a mean of studying how individual life courses are constrained by social institutions. Cross-national comparisons have revealed how national-level institutions, such as education and training systems; the labor market structure; and labor regulations shape career mobility (Konig and Muller 1986; Allmendinger 1989; Scherer 2001; Pollock, Antcliff, and Ralphs 2002).

A study by Scherer (2001) compared life history data from Germany and Great Britain to investigate the patterns in young adults' job histories for the first five years after leaving full-time education. She examined eight work statuses, including self-

employment, family care/maternity leave, and (return to) full-time education. Her study showed that British youth encountered more problems entering the labor market smoothly than the German cases and had more deviations from continuous full-time work (a sign of a higher degree of career flexibility). She suggested that the German labor market, as a result of its education and training system, is more highly structured and regulated than the British labor market. Moreover, she found that in Germany, gender differences in career patterns were more pronounced and more consistent with the male-breadwinner and female caretaker division of labor. Part-time work, unemployment, withdrawals from labor market are a female-dominated phenomena in German but are much less so in Great Britain.

Allmendinger (1989) studied the impacts of educational systems on employment histories in West Germany, the United States, and Norway. She found that West Germany scored high in both the degrees of standardization and stratification of the educational system, the United States scored low in both dimensions, while the Norwegian system was high standardization with low stratification. Her analysis on life histories in those three countries showed that people educated in a standardized system were more likely to change jobs and that the degree of coupling between educational attainment and occupational status was higher in stratified systems.

Gendered Careers and the Life Course

The life course research on employment histories have basically confirmed the findings from cross-sectional studies that women's careers look more diversified and deviated from the stable full-time ideal type of careers (Quick 1998; Han and Moen 1999; Moen and Roellings 2005). Analyzing the life history data from the Cornell Retirement and Well-Being Study, Quick (1998) not only found that wives' careers were significantly less orderly than husbands' but also that couple's careers compete with each other. In terms of parenthood, women with children tended to experience disorderly careers; in contrast, husbands' careers appeared to benefit from having children and the presence of homemaker wives.

Studies about early careers have focused on the timing of entry to regular, full-time employment in relation to those of education completion, family formation, first parenthood, and other life events that usually signal the "transition to adulthood" (Macmillan and Scott 2003; Mortimer, Oesterle, and Kruger 2005). Some studies have suggested that the timing of retirement is associated with career trajectories (O'Rand and Henretta 1992; Han and Moen 1999). Han and Moen (1999) hypothesized retirement as a process timed by three clocks--historical context, social heterogeneity, and biographical pacing. They found five career patterns in their data--delayed entry, orderly, high-geared, steady part-time, and intermittent career. Their findings suggested that historical, social, and biographical clocks all significantly predicted the age variations in the timing of when people began to plan for, expect to, and make the actual move to retirement. Moreover, men over-represented the orderly career pathway type and women tended to retire earlier than men.

2.4 EMPLOYMENT AND CAREERS IN THE TIME OF CHANGE

Sociological research about career trajectories have uncovered the significant roles of gender, occupation, and the structure of the labor market in allocating individuals to different jobs, employment statuses, and career patterns. However, some important aspects about career paths and social structure have remained unknown. The primary task of this dissertation is to provide a bigger picture and to enrich sociological knowledge about how career patterns in the United States vary for different cohorts in light of the historical times in which they play out.

Towards A Big Picture of Employment Histories

The evidence about employment histories that sociologists have provided has been restricted to careers of select social groups under some specific historical contexts. For instance, scholars have summarized the career patterns of 18th Century German musicians (Abbott and Hrycak 1990), executive women in finance (Blair-Loy 1999; Blair-Loy and DeHart 2003), African American female attorneys (Blair-Loy and DeHart 2003), employees at Lloyds Bank (Stovel, Savage, Bearman 1996), and retired employees from

six big firms in upstate New York (Han and Moen 1999). Almost all tof hese studies are based on small samples of individuals in particular occupations, especially white-collar workers or professionals. The sample sizes are small, usually around 200 cases, probably due to some methodological difficulties in analyzing and interpreting a large number of trajectories with numerous repeated measures.

This limitation of existing studies about careers is more than a methodological concern. It is theoretically important to look at all segments of the labor market if we aim to understand how employment histories in different occupations unfold. So far, sociologists have primarily focused on employment histories in the primary labor market or within the internal labor market, where "careers" are likely to exist. Empirical research about the linkage among a person's jobs in other segments is rare. For example, dual labor market theorists have not kept track of job shifts or job losses in the secondary labor market, except assuming that jobs are held in a "random fashion", without being functionally related or beneficial for career development (Piore 1975). Similarly, researchers who study the internal labor market have given much attention to what happens within big firms or unionized professions while leaving employment histories outside that kind of structure unexplained. Research about career lines has described career progressions in a more comprehensive way in that career lines are linkages of jobs located in *any* sector, industry, or occupation (Spilerman 1977; Spenner, Otto, and Call 1982). From that perspective, we know how employment histories proceed within the whole labor market. Nevertheless, as they defined, career lines are the lines of highly related *jobs*, not a longitudinal account of the employment of *individuals*. Given a same position, however, a person may transit into a different job from the one that most people do. Such variation or agency of job holders needs to be examined at the individual level.

What would the employment histories look like outside the primary labor market or the internal labor market? Findings about the dual economy provided some evidence. Some studies showed that women and minorities were not over-represented in the secondary sector (Bridges 1980; Kaufman and Daymont 1981); nor were they less likely to move across the core-periphery boundaries than white men (Leigh 1976; Jacobs 1983,

1989). The mobility between the center- and the periphery-sectors was found to be as common as within-sector mobility (Jacobs 1983). For example, in a study about job changes across male-dominated, sex-neutral, and female-dominated occupations, Jacobs (1989) found surprisingly higher rates of mobility in later careers to occupations of other sex types among women than men. Of those who changed occupations between 1967 and 1977, about one-third of women moved into and out of male-dominated occupations, a pattern that he called “revolving doors” (Jacobs 1989).

However, this evidence is primarily indirect. It remains an empirical question about what the primary patterns of employment histories are in the United States, if we look at long-term employment within individuals' life histories. Therefore, to complete our knowledge about employment histories, this dissertation seeks to directly delineate the individual career paths in the United States of men and women in all sectors or occupations throughout working ages.

Employment Status Trajectories

Unlike most of the previous studies about careers and employment histories, this dissertation takes a socio-demographic approach in examining the changing profile of career patterns in the US. First, the emphasis lies on historical changes in careers by comparing people in five birth cohorts (born 1907-1979). Second, the employment histories studied are not restricted to any specific occupation, industry, or sector, allowing a systematic investigation of careers. Third, the unit of analysis is the individual. Career paths will be constructed based on individual life histories rather than from a perspective of cross-sectional studies. By doing so, this dissertation seeks to contribute to the research on careers by drawing a comprehensive picture of employment histories. The research questions to be answered in this dissertation are: 1) What are the major patterns of career trajectories in America and how have these patterns changed over time? 2) How has the gender difference in career patterns changed? 3) To what extent is a person’s employment history predicted by his or her employment in earlier ages? and 4) What are the primary differences in career patterns among occupational groups and how have them changed over time?

This dissertation will answer these questions by investigating the trajectory of employment status through a person's working ages. The states of an employment status trajectory include four mutually exclusive categories: (1) employed full-time, (2) employed part-time, (3) unemployed or absent from work (e.g. temporarily on leave or being laid off), and (4) economically inactive, which includes retirees, housewives, full-time students, the permanently disabled, or any other people outside the labor force. Linking employment statuses across different time points within a person forms the employment (status) trajectory.

Why Trajectories? An important feature of this dissertation is, it is a longitudinal study about career trajectories within individual life spans. Several concepts have suggested the needs of accounting for a person's previous jobs to study current employment. For instance, the existence or absence of "mobility chains", sequences of jobs that follow a regular order, is the pivotal criterion in defining the boundary in a dual labor market (Piore 1975). Similarly, "vacancy chains" are also a trajectory of positions that a person holds in an organization driven by job vacancy (White 1970). The concept of career lines especially underscores the *path dependence* of employment (Spilerman 1977). More importantly, the notion of trajectory resonates with the sociological theory about *accumulated disadvantages*. The long-term employment trajectory is an important means of understanding how differential opportunities allocated by structural arrangements in an early life stage are amplified over time.

Some empirical studies have shown that trajectory has a meaning by itself, above and beyond transition, duration, and cross-sectional snapshots of employment or social roles (Moen et al.1992; Pavalko and Smith 1999; Pavalko and Woodbury 2000). Trajectories of employment have significant consequences for individual social integration (Wilensky 1961), timing of retirement (O'Rand and Henreta 1992; Han and Moen 1999), and health and well-being in later life stages (Moen, Dempster-McClain, and Williams 1992; Pavalko and Smith 1999), after controlling for job shifts and job duration. For example, in a study of a sample of 313 married women, Moen and colleagues (Moen et al. 1992) investigated the timing (i.e. role incidence, duration, and

sequence), process (role trajectories), and context (cohort membership) of women's social roles throughout adulthood. They uncovered that it was the *pattern* of role history rather than its duration that predicted health consequences. Another study also showed women's physical limitations were highly dependent on the trajectory of their employment (Pavalko and Smith 1999).

These studies suggested an independent effect of trajectories which assumes that the sequences of employment histories cannot be empirically reduced to several linearly-related variables (Abbott 1990; Abbott and Hrycak 1990). Several sociologists have discussed a few concepts that represent what trajectories are about, such as orderliness (Wilensky 1961), pace (Aminzade 1992), reversibility (Pavalko 1997), and stability (George 1999). The notion of trajectory provides researchers a useful tool to theorize features of a long-term process or non-linear impacts of the social structure, given its ability to entail complicated temporal dimensions such as overall trends, presence of threshold, pacing, and order of events. However, little empirical research has been done to formally measure those concepts.

Two characteristics of trajectories will be examined: (A) the overall trajectory patterns and (B) the degree of diversity or heterogeneity among trajectories. (A) Pattern indicates the shape and stability of a trajectory. In this dissertation, a stable, full-time career in which a person has continuous, full-time employment throughout his or her career serves as the reference for comparison. Therefore, trajectories in this study will be classified into a few primary groups based on the number of episodes, average duration of episodes, the proportion of time holding full-time jobs, and other measures that capture their degree of departure from the nominal stable, full-time careers. (B) Diversity indicates the degree of variation among people at the level of employment trajectory. Measurement and methods will be elaborated in the next chapter.

Hypotheses about Career Changes

Previous research in sociology about employment histories has been based on special cases of careers in specific labor market segments. More importantly, findings generally reflect trends in careers *within a single cohort* in a *specific historical context*. Due to the

profound transformations in some major social institutions, previous hypotheses about careers from the sociological literature need to be re-tested in a longitudinal study that compares multiple cohorts over a long historical period. This is the primary mission of this dissertation. It is designed to reflect the trends of changing career patterns in the U.S. over the past four decades by taking into account the impacts of significant social transformations. Hypotheses about employment trajectories are elaborated in four groups, which correspond to each of the four research questions. Table 2 summarizes these different hypotheses.

I. Birth Cohorts:

Changes in career patterns can be examined by comparing employment trajectories of people born in different cohorts. People from different generations or cohorts can vary significantly from each other given distinctive socio-demographic characteristics, cultural identity, and collected memory about significant historical events (Mannheim [1928] 1952; Schuman and Scott 1989; Strauss and Howe 1991). Cohort variations in career paths reflect transformations in major social institutions. Through post World War II to recent years, the labor market in the U.S. has basically spanned over three periods:

1940s to Early 1970s. Transformations in the labor market have been a product of business cycles, a globalizing economy, employers' strategy of cutting labor cost, a changing labor pool, and changes in industrial structure. After World War II, the American economy has basically undergone three distinct periods. From the 1940s to the early 1970s, America encountered few competitors in the world market when many countries were still busy recovering from the Second World War. The domination of manufacturing in world markets, a favorable balance of trade, and great needs for modern infrastructure such as interstate highways all boosted the dramatic expansion of manufacturing, construction, and transportation industries in the United States (Farley 1996). Consequently, a large number of well-paid jobs were created without requiring high skills and credentials. Men with little education were able to earn a family wage and enjoy long job tenure. The unemployment rate stayed at a 3 to 4% low throughout the 1950s and 1960s, and real earnings increased by 2% per year or more (Farley 1996).

1973-1989. This "golden-age" of the American economy nevertheless ended in the early 1970s. Due to 1973 oil crisis, the country was sliding into a severe recession with declined labor productivity and high inflation. As global competitors were beating U.S. manufacturers in quality and price, the balance of trade in manufactured goods shifted toward a huge deficit on the American side. The unemployment rate in 1982 climbed to 10% and about 26.5 million workers in the U.S. lost their jobs (Wetzel 1995). To increase productivity and maximize profits, American employers resorted to hiring more technically trained workers, seeking foreign suppliers, subcontractors, and partners, and outsourcing production. A seven-year period of economic expansion occurred from 1982 to 1989 after the Reagan administration took action to stimulate the economy by cutting federal income taxes and increasing government expenditures. However, the benefits of economic expansion were not equally distributed across the social classes. Unemployment persisted at a relatively high rate and the proportion of people in poverty remained about the same (Farley 1996). On one hand high-wage manufacturing jobs that required low technical training were widely displaced in the late 1970s and early 1980s; On the other hand, newly created jobs during the 1982-1989 expansion were primarily of a lower quality than the jobs being displaced.

The 1990s. In the past two decades, the structure of the labor market has dramatically changed as the economy shifted from manufacturing toward service and retail industries. The diffusion of information technology, economic globalization, and the growth of service and retail industries have profoundly changed the production process as well as employment relations (Stone 2004).

One significant feature of the current labor market is the proliferation of "contingent jobs" and alternative work arrangements, such as temporary work, part-time, contract, unregulated work, freelance, and home-based work. Some workers, primarily professionals, have opted out from regular scheduled, full-time work to customize work time, workload, and the work place to accommodate personal and family demands (Meiksins and Whalley 2002; Platman 2003). Nonetheless, firms and employers are also using those jobs as a mean of cutting labor cost despite high productivity. Most of the

newly created contingent jobs are characterized by reduced job security, low compensation, and impaired working conditions (Benach et al. 2002). Moreover, an increasing proportion of the contingent jobs are "secondary part-time jobs" that are taken involuntarily rather than the "retention part-time jobs" taken by choice (Tilly 1991). Based on the changes in the labor market over these three periods, the following hypothesis can be derived about career changes:

Hypothesis 1.1 (cohort): Later cohorts have employment trajectories further diverging from the norm of stable, full-time careers.

However, social demographers have offered insights on an alternative hypothesis. One significant change that has taken place in the past several decades is the steady increase of women in American labor force. Compared to 1970, women's labor force participation rate has risen from 43.3% to 58.6% in 2010 while the rate for men has dropped from 79.7% to 71.2% (Bureau of Labor Statistics 2011). The higher education system in the country has expanded considerably as well. The proportion of the American population 25 years and older with a bachelor's degree or higher has increased from 4.6% in 1940 to 24.2% in 2000 (U.S. Census Bureau 2011, Table 2). In particular, the gender composition of the educated population has shifted. Since 1980, women have surpassed men in secondary education (Goldin, Katz, and Kuziemko 2006). In 2008, female students accounted for 55.9% of undergraduate and 58.4% of graduate enrollment (U.S. Census Bureau 2011). Data from the National Longitudinal Survey of Youth 1997 indicated that 23% of women had earned a bachelor's degree by age 23, compared with 14% of men (Bureau of Labor Statistics 2011). As time goes by, there have been more women and better educated workers in the American labor force. If stable, full-time careers are associated with active participation in the labor force, high education and skills, then these trends may lead to the following hypothesis about career changes at the population level:

Hypothesis 1.2 (cohort): Later cohorts have employment trajectories converging towards the norm of stable, full-time careers.

Arguments about transformations in the labor market and the changing demographics of the labor force have both suggested that American's careers have become more diverse in terms of overall patterns. Emergence of various 'contingent jobs' or alternative work arrangements that deviate from the traditional, full-time jobs may imply a higher degree of heterogeneity among workers with regard to employment. From a life course perspective, the US population has displayed some new patterns in their life courses during the past several decades (Scherer 2001; Heinz 2003; Moen and Roehling 2005). Historically, the norm has been a lock-stepped path in which a person finishes education, leaves his or her parents' home, enters the labor market, gets married, has children, and retires around ages of early 60s (Moen 1998). Social norms about age-appropriate behaviors were highly predictable.

In recent years, however, the order and age that people have made these life transitions have become less predictable. For example, 52.8% of first births between 1990 and 1994 to women 15 to 29 years old were either premarital births (40.3%) or premaritally conceived births (12.5%), much higher than 60 years ago (8.2% were premarital births and 9.5% were premaritally conceived births, 1930-1934) (U.S. Census Bureau 1998, Table 1). Like childbirth prior to marriage, employment before age 18 or high school graduation is common. In 2010, 74.1% of American civilian labor force between age 16 and 19 years were employed (Bureau of Labor Statistics, 2011, Table 3). At age 17 to 18 years, in the cohort from the National Longitudinal Survey of Youths 1997, the employed accounted for 49.1% of students enrolled in high school and 48.3% of high school dropouts (Bureau of Labor Statistics 2006).

The processes of life transitions, such as transitions to adulthood or retirement, have been prolonged and increasingly reversible. In 2000 Census, only 16.3% of young adults between age 18 and 24 had finished all five milestones of transitions into adulthood (Rumbaut 2011). Moreover, the proportion of young adults who follow the

traditional sequence of these milestones--finishing education, leaving home, entering full-time employment, getting married, and having children-- has declined from 37-40% in the 1960s to 25-29% in the 1990s (Mouw 2004). Returning home and living with parents and returning to school have both become common.

Meanwhile, the transition into retirement has become less regular (Han and Moen 1999). The process between career employment and complete retirement has stretched longer, often involving forms of partial employment or "bridge jobs" like a switch to part-time work, self-employment, or reverse retirement (when a retired individual reenters the labor market) (Quinn and Kozy 1996). Transition from education to work has become a process instead of a single event because of its instability and duration (Scherer 2001). As a result of all these trends, career paths are increasingly diversified (Moen and Roehling 2005). The fact that careers have become more de-standardized and individualized reflects the de-centralization of social institutions (Heinz 2003). In other words, it can be hypothesized that

Hypothesis 1.3 (cohort): The employment trajectories among later cohorts have become more diverse and heterogeneous than among earlier cohorts.

II. Gender Gap in Careers

Gender is one of the fundamental social structures that have shaped the inequalities in employment and other aspects of social life (Moen and Spencer 2006). At the institutional level, women are disadvantaged in reaching jobs with stable employment and career promise (Bluestone 1970; Gordon 1972; Thurow 1975; Beck et al. 1978; O'Rand 1996; Moen 1998; Quick 1998; Han and Moen 1999). Labor policies, family policies, and the childcare system in the US have discouraged women from pursuing full-time employment and career development (Liebowitz and Klerman 1995; Blair-Loy 1999; Kelly 2003). At the family level, gender norms demand women have more responsibility in caring for children, the elderly, and sick family members as well as

maintaining social ties (Pavalko and Artis 1997; Marks 1998; Pavalko and Woodbury 2000). When there is a conflict in work schedule or career planning, women often "choose" to scale back from their careers in order to support those of their husbands (Barnett et al. 1995; Becker and Moen 1999; Moen and Yu 2000; Moen and Roellings 2005).

However, how has the gender gap in labor and employment changed over time? Has gender inequality with regards to career trajectories declined? Drawing social theories, two alternative hypotheses can be raised. First, theory of dual labor market indicates that women and minorities face disadvantages from the beginning of their careers because they are usually assumed to be more costly for training and more likely to be ordered by employer at the lower end of a "queue" that governs the entry into the primary labor market (Doeringer and Piore 1971; Thurow 1975). After entering the labor market, their disadvantages tend to be further exacerbated by their concentration in the secondary market that provides slim chance for upward mobility. Over time, social division of labor is formed by a "vicious circle" through which social inequalities are perpetuated (e.g. Bluestone 1970; Gordon 1972; Beck et al. 1978). Then a hypothesis following this 'vicious circle' reasoning is:

Hypothesis 2.1 (gender gap): Gender gap in employment histories is expanding as women's employment trajectories have increasingly deviated from the norm of stable, full-time careers relative to men's.

Alternatively, research on post-industrial societies may support a converging trend over time. This theory suggests that in a new economy, although all workers face the issue of declined job security, middle-class, professional men have become more vulnerable to job loss and career interruptions than before as compared with women and other previously disadvantaged groups (Farber 1993; Aronowitz and DiFazio 1994; Levy 1995; Stone 2004). In other words, the traditional careers of men now have become "feminized" with more diversified paths and more interruptions (Fondas 1996). From another perspective, some scholars predict a larger heterogeneity among career pathways

but smaller between-gender difference (Moen and Spencer 2006). As a result, a convergence of the trajectories of employment histories between men and women should be anticipated even when both tend to depart further from the norm of stable, full-time careers:

Hypothesis 2.2 (gender gap): The gender gap in employment histories is decreasing as men's employment trajectories have increasingly diverged from the norm of stable, full-time careers to a larger degree than women's.

III. Path Dependence within Employment History

Path dependence is a term that has been utilized in economics, political science, sociology, and other social sciences to study the historical reasons for existing and persistent social institutions, such as the processes of technology adoption (David 1985; Liebowitz and Margolis 1990; Arthur 1994), industry evolution and geographic concentration (Wallerstein 1974; Krugman 1991; Roy 1997; Goldstone 1998), and development and persistence of institutions (North 1990; Orren 1991; Isaac, Street, and Knapp 1994; Pierson 2000; Alexander 2001). In historical sociology, path dependence often refers to the temporal connection of events and how events or decisions from an early time limit the choice or situation of the later (e.g. Abbott 1983; Tilly 1988; Aminzade 1992; Griffin 1992, 1993; Sewell 1996; Isaac 1997; Goldstone 1998).

There are basically two types of sequences with the character of path dependence: *Self-reinforcing sequences* are characterized by the formation and long-term reproduction of a given institutional pattern due to rational choice built on the perception of "increasing returns"; *reactive sequences* are the "chains of temporally ordered and causally connected events that follow a stochastic process" (Mahoney 2000: 508-509). In either type, a path-dependent sequence must fulfill three conditions: (1) The sequence is a causal process that is highly sensitive to events that take place in the early stages; (2) early historical events that trigger the path-dependent sequence are contingent and cannot be fully predicted in advance; and (3) once such sequence is set to motion, it is marked by

a relatively deterministic causal pattern or can be thought of as "inertia" (Mahoney 2000: 510-511).

In this dissertation, path dependence in employment history will be theorized as an example of reactive sequences. The term path dependence will be used loosely to indicate the association in the patterns of employment trajectory from the same person in consecutive age periods. The underlying assumption is that a person's chance of having a certain employment trajectory is constrained by his or her past employment experience. A chain that consists of employment trajectories at different ages or life stages is path dependent because the trajectory pattern from the earlier ages is contingent but limits a person's chance of going to a given pattern later in the life course. The idea is similar to that of 'career lines' where the probabilities of being engaged in different occupations vary, depending on the occupation held earlier (Spilerman 1977; Spenner, Otto, and Call 1982; Althauser and Van Veen 1995). But the unit of analysis in this dissertation is the employment trajectory over an extended age period (about 10 years), not the occupational status at one point in time.

The proceeding pattern of employment trajectory can be the same as the prior pattern or a different but predicable one. For example, holding a regular, full-time job in young ages may increase the chance of staying in full-time employment for the next 10 years (i.e., no change of trajectory pattern). Additionally, people who started with sporadic employment with frequent withdrawal or re-entry into the labor force can be at a higher risk of having an unstable trajectory or part-time job. In this case, there is a change in the employment trajectory pattern, but the freedom of change is constrained.

Another assumption that this dissertation makes about employment history as a type of reactive, path-dependent sequence is that timing matters. That is, the effect of a pattern of employment trajectory on older ages may lead to different consequences depending on ages or life stages. For instance, most men and women are making a transition to retirement after age 55 years regardless of employment trajectories in middle age.

The 'vicious circle' argument from the theory about dual labor market (Bluestone 1970; Gordon 1972; Beck et al. 1978) as well as the emphasis of 'cumulative dis/advantages' from a life course perspective (O'Rand 1996) both indicate strong path dependence within a person's employment trajectory at different life stages or ages. That is to say,

Hypothesis 3.1 (path dependence): An individual's employment trajectory is highly predicted by his or her trajectory in younger ages.

Moreover, the assumptions of employment trajectories as reactive, path-dependent sequences made by this dissertation can be translated into the following statements:

Hypothesis 3.2 (path dependence): Employment trajectories similar to the norm of stable, full-time careers likely leads to the same pattern in older ages.

Hypothesis 3.3 (path dependence): Having prior employment trajectories different from the norm of stable, full-time careers decreases one's likelihood of having such pattern in older ages.

IV. Occupations and Employment Trajectories

Dual labor market theorists have assumed that jobs in the secondary labor market are held in a 'random fashion', without being functionally related or beneficial for career development; the presence or missing of 'mobility chains' helps to draw the boundary between the two labor markets (Piore 1975). However, scholars of post-industrial societies have suggested that the border between the primary and the secondary markets, if there was any, have been twisted and shifted. An important, new characteristic of the labor market since the 1990s is that highly skilled, white-collar workers have become increasingly vulnerable to job loss, reductions in earnings, and prolonged unemployment (Aronowitz and DiFazio 1994). During the early 1990s recession, middle management positions, rather

than manufacturing jobs, suffered substantial job losses; older, more-educated workers were relatively more likely to be laid off than in the previous 1982-1983 recession (Farber 1993). Historically, the blue collar unemployment rate was about 3 times the white collar rate during recessions. In the 1990s, the rate declined to twice the white collar rate (Levy 1995). The argument of 'downgrading work' among previous advantaged workers can lead to the following hypotheses about career trajectories relative to different occupations:

Hypothesis 4.1 (occupation): Stable, full-time careers are more prevalent among professionals than among other occupations. However, this relative advantage of professionals has diminished in later cohorts.

Hypothesis 4.2 (occupation): Stable, full-time careers are more prevalent among white-collar workers than among other workers. However, this relative advantage of white-collar workers has diminished in later cohorts.

To summarize, sociological research about careers has been focused on the different career patterns as constrained by social institutions such as gender, occupation, and industry. In general, researchers have shown that men, the well-educated, and people employed in the primary labor market or central economy tend to experience stable, full-time employment or more regulated career paths (Bluestone 1970; Doeringer and Piore 1971; Gordon 1972; Spilerman 1977; Baron and Bielby 1980; Hodson and Kaufman 1982; Han and Moen 1999).

This dissertation is an investigation about how career patterns in the US have changed over time, taking into account gender, ages, and occupations. It is one of the most systematic analyses of employment history patterns in the US by including all segments of the labor market and investigating different birth cohorts over a long historical period. This comparative study will enrich sociological research about social mobility and the life course by showing how careers and work have transformed in the United States. Data and methodology will be elaborated on in the next chapter.

Table 2 Summary of Hypotheses and Supporting Social Theories

	Statement	Theories and representative works
I. Cohort		
H1.1	Later cohorts have employment trajectories further diverging from the norm of stable, full-time careers.	Transformations in the labor market (Wetzel 1995, Farley 1996); emergence of 'contigent work' (Tilly 1991, Benach et al. 2002, Stone 2004)
H1.2	Later cohorts have employment trajectories converging towards the norm of stable, full-time careers.	More women, highly-educated, and workers aged 60+ years in the labor force (Goldin, Katz, and Kuziemko 2006)
H1.3	The employment trajectories among later cohorts have become more diverse and heterogeneous than among earlier cohorts.	Diversified jobs due to increase in 'contigent work' (Tilly 1991, Stone 2004); careers have become individualized and destandardized (Heinz 2003)
II. Gender gap in careers		
H2.1	Gender gap in employment histories is expanding as women's employment trajectories have increasingly diverged from the norm of stable, full-time careers relative to men's.	“Vicious circle” of women and minorities in dual economy (Doeringer and Piore 1971; Bluestone 1970; Gordon 1972; Beck et al. 1978)
H2.2	Gender gap in employment histories is decreasing as men's employment trajectories have increasingly diverged from the norm of stable, full-time careers to a larger degree than women's.	"Feminization" of men's employment (Aronowitz and DiFazio 1994; Fondas 1996); 'converging divergence' (Moen and Spencer 2006)
III. Path dependence within employment history		
H3.1	Individual's employment trajectory is highly predicted by his or her trajectory in younger ages.	“Vicious circle” of women and minorities in dual economy (Doeringer and Piore 1971; Bluestone 1970; Gordon 1972); 2) "cumulative dis/advantages" (O’Rand 1996)
H3.2	Employment trajectories similar to the norm of stable, full-time careers likely leads to the same pattern in older ages.	
H3.3	Having prior employment trajectories different from the norm of stable, full-time careers decreases one's likelihood of such normative pattern in later age periods.	
IV. Occupations and Employment trajectories		
H4.1	Stable, full-time careers are more prevalent among professionals than among other occupations. However, this relative advantage of professionals has deminished in later cohorts.	Downgrading of white-collar, professional jobs (Aronowitz and DiFazio 1994)
H4.2	Stable, full-time careers are more prevalent among white-collar workers than among other workers. However, this relative advantage of white-collar workers has deminished in later cohorts.	

CHAPTER 3
DATA, METHOD, AND MEASUREMENT

3.1 DATA

3.1.1 The Panel Study of Income Dynamics

Given that the goals of this dissertation are to provide a comprehensive account of the trends of career patterns in the United States, the data for this analysis should satisfy the following three conditions: 1) The sample is nationally representative of the whole population, not just social groups limited to a specific economic sector or occupation; 2) It follows a person's economic activities over a long period and has detailed information about employment status, occupations, and jobs; and 3) The sample contains multiple cohorts, allowing for comparisons of careers across cohorts.

This dissertation draws data from the Panel Study of Income Dynamics (PSID 2006), which fulfills all of those three conditions. The PSID is an ongoing, longitudinal study of a representative sample of U.S. individuals and the family units in which they reside. The original sample in 1968 contained 4,800 families randomly selected from throughout the nation. In each survey (annual 1968-1996 or biannual 1997-present), the head of a sampled family was interviewed to report household characteristics such as housing, household expenditures, and family composition, as well as important individual characteristics of the head (himself or herself) and those of other family members.

Several features of the PSID offer a unique opportunity for investigating the changing profiles of careers in the United States. First, the PSID sample is nationally representative so it allows researchers to map trajectories of careers across all occupations, industries, and economic sectors. While a majority of sociological findings about employment histories have been based on small samples or select social groups, the PSID offers the ability to analyze employment histories to address critical questions about what careers look like in previously under-studied areas. For example, the hypothesis about whether mobility chains are absent in the secondary labor market (Piore 1975) can now be empirically tested. Important insights can also be gained about under-

studied workers in disadvantageous market positions, such as blue-collar workers, minorities, or immigrants. Among the 4,800 family units sampled in 1968, nearly 2,000 were over-sampled low-income households. In 1990, 2,000 Latino households (with origins from Mexico, Puerto Rico, and Cuba) were also included in the PSID. Correspondingly, the career paths of those populations may be examined in this dissertation.

Second, another incredible feature of the PSID is that it comprehensively surveys respondents' employment status and jobs, as it was originally designed to capture all aspects of household income and expenditures. Employed respondents are asked to report their main job(s), extra jobs, employer episodes, and position spells within each employer episode at the time of interview as well as in the prior year. For each job, data are collected about a respondent's occupation, industry, class of worker, work hours, rates of pay, and whether the job was covered by union contract. Information is available for the amount of work that a person missed due to his or her own or other's illness, a vacation or time off, a strike, unemployment or a layoff, and economical inactivity. Unemployed respondents and those out of the labor force at the time of survey are also probed to report their last or most recent jobs. However, information on those jobs is collected with less detail than that of the main jobs of the currently employed.

In the PSID, job changes are dated so that trajectories of employment status or occupation can be constructed based on the life history calendar. An advantage of the PSID compared with other similar longitudinal studies is the degree of fineness in its recording of the dates of employment histories. If respondents are employed, the beginning- or ending-year and month are recorded for the present employer episode, the present position (primary or secondary jobs), and the previous employer episode. If respondents are unemployed or out of the labor force, the year and month worked with the most recent employer, the last position, and the next-to-last position are recorded. Precise dating of job or employer episodes is important for studying job transitions, particularly in the recent labor market, since short-term employment and frequent moves in and out of the labor force or between jobs are otherwise likely to be overlooked.

Moreover, each household in the PSID sample has been surveyed each year or every other year since 1997. Therefore, changes in employment status or occupations are recorded more accurately and thus, are less subject to recall errors compared with social surveys that ask respondents to recall job changes over long periods of time.

Third, the PSID collects information about respondents and their family members at a wide range of ages, unlike many other longitudinal social studies that are restricted to certain age groups or birth cohorts, such as the Wisconsin Longitudinal Study, the National Longitudinal Survey of Youth, and the National Longitudinal Survey of Young Women and Mature Women. By 2005, the respondents and family members in the original PSID sample have been followed for up to 39 years[1]. An important implication is that career paths can be mapped and compared among multiple cohorts of the American population. Comparisons across different cohorts of people who passed through the 39-year period at different ages and life stages enables this dissertation to take a life course perspective in studying the patterns of employment histories in the U.S., a classic topic in sociology of social stratification and mobility.

For the purposes of this study, the PSID respondents and their family members are divided into five birth cohorts. The first cohort (born 1924 or earlier) belongs to *the Greatest Generation* (Brokaw 1998), which includes people who grew up during the Great Depression and experienced World War II (WWII) in adulthood. The second cohort is *the Silent Generation*, which consists of people who were born between the two World Wars (1925-1945) and spent their childhoods during WWII (Time 1951; Strauss and Howe 1991). This cohort is followed by two cohorts of boomers (U.S. Census Bureau 2006). *The Leading Boomers* were born after WWII (1946-1954) and *the Trailing Boomers* were born between 1955 and 1964. Finally, the youngest cohort in this study is *Generation X* (Cheung 1995; Holtz 1995), whose members were born in 1965 or after. This dissertation assumes different career patterns exist among people from various cohorts as a reflection of changes in the labor market, the labor force, and the life course during changing historical contexts.

Finally, it is noteworthy that the PSID contains a great deal of information about the employment of the spouse of the family head so that the career paths of women as early as in the early 1980s can be examined. Investigation of women's career paths has been made possible given two features in the PSID design. First, since 1983 a similar number of questions about the employment of spouses of family heads have been asked as that of the heads themselves in each PSID survey. Prior to the 1983 survey, wife's employment was also recorded but with less detail. In 1976, the PSID conducted a parallel interview of the wives who reported their own employment, housework, and childcare; this was reported by their husbands in other years.

Furthermore, long-term female cohabiters have been treated as "wives" in the PSID as long as they lived in the family for one year or longer. For households whose heads are female, the male cohabiters of the family heads are treated as the new heads after living there for more than one year. In such case, the previous female heads are then considered the spouses or wives of the new heads (Hill 1992). Therefore, since the late 1970s, information typically gathered about wives has been collected from cohabiters as well. In short, the PSID is undoubtedly an invaluable source for research on career trajectories that traverse labor market boundaries and are intertwined with family life.

3.1.2 Data Limitations

Despite the incredible opportunity that the PSID provides to study career trajectories over individuals' working age and across multiple cohorts, it has two primary limitations given the purposes of this dissertation. These limitations may bias sample selection and undermine the validity of findings.

First, detailed information about employment has been collected in the PSID only for family heads, to a less degree for their spouses (normally wives), and basically unavailable for other family members. Most of the survey questions were asked of family heads or their spouses. Only a handful were asked about other members in the family. Even for family heads, their job-related information was almost unknown for the years when they were 'other family members even though they might work at that time. Moreover, respondents are asked different questions depending on their employment

status. As a result, some information, such as employment of the *prior* year, was not collected from those who did not have a job at the time of survey but who had actually worked in the prior year.

The implications of this data quality issue for data preparation and analysis is that missing employment or occupation statuses may be systematic in the PSID, depending on gender, role in a family unit (breadwinner, spouse, or others), and employment status at the time of survey. It also has impact on sample selection in this dissertation. Husbands and employed people are more likely to be selected for analysis because their employment trajectories are more easily captured than others by the PSID. Consequently, employment of other family members, wives as well as people not employed are likely under-represented.

This problem can be partially remedied by imputing missing values with valid answers to the same question in adjacent years from the same person. For instance, one's missing employment status in the 1976 survey can be obtained from her answer in 1977 about status in the prior year. However, this imputation is possible only when a person was employed in 1977 and was either the family head or the spouse of the head.

The second limitation of the PSID data is that variables from different years are sometimes incomparable given that the changes over years in the wording of survey questions, the codeframe of answers, even the universe of respondents who answered questions. Some questions have been asked in some years but not in others, which makes construction of a trajectory through all years impossible.

A case in point is regarding the questions about housework and childcare. For each family unit, the hours that the head and the spouse spend on housework and childcare or the money they pay for outside help are important components of the PSID surveys. Nevertheless, those questions were asked of different persons (the head, the spouse, the head and spouse combined, or anyone who was the primary caretaker) for different sets of activities. Moreover, such questions are available only in some, but not all, years, which make it infeasible to use them for this *longitudinal* study. Consequently, important questions about how the careers of paid work interact with unpaid work cannot

be investigated as had been planned due to data quality and compatibility. Other valuable information that is available in certain years cannot be retrieved for the same reason.

For some information collected in all years, the available options in the answer to the survey question are inconsistent from year to year so that identification of the same category through years is infeasible. For example, in the case of the question about employment status, the status of 'not working due to disability' was not included in 1968 but was combined with retirement as one category in 1969, and has been a separate category on its own ('5') since 1976. From 1994 to 2005, each respondent was allowed to report up to three employment statuses whereas only one was reported in prior years. Furthermore, since the 2003 survey, a unified section of questions has been answered by all family heads, regardless of their employment status, as well as by their wives who were employed or unemployed. Such inconsistency in question design has imposed a great challenge for constructing good-quality, comparable time-varying variables over time.

In summary, the PSID offers a unique opportunity for examining the trends in career paths across five cohorts in the U.S. However, the scope of this dissertation and its sample selection are confined by some limitations in the questionnaire design and data structure of the PSID. Furthermore, the findings of this dissertation apply only to the men and women who have had the responsibility for the finance and economic activities in American families rather than the population as a whole. Findings will also be based on available information collected by the PSID, depending on a respondent's roles in the family unit and employment status. Therefore, extra caution should be taken in interpreting results.

3.1.3 Sample Selection

Data preparation for this dissertation has to take these characteristics of the PSID into account. There are two steps in setting the analytical samples for this study. First, this study is restricted to people who have been family heads or their spouses (or cohabiters) *at any time* between 1968 and 2005. In other words, people who were other family members throughout the 39-year period were excluded because most information about

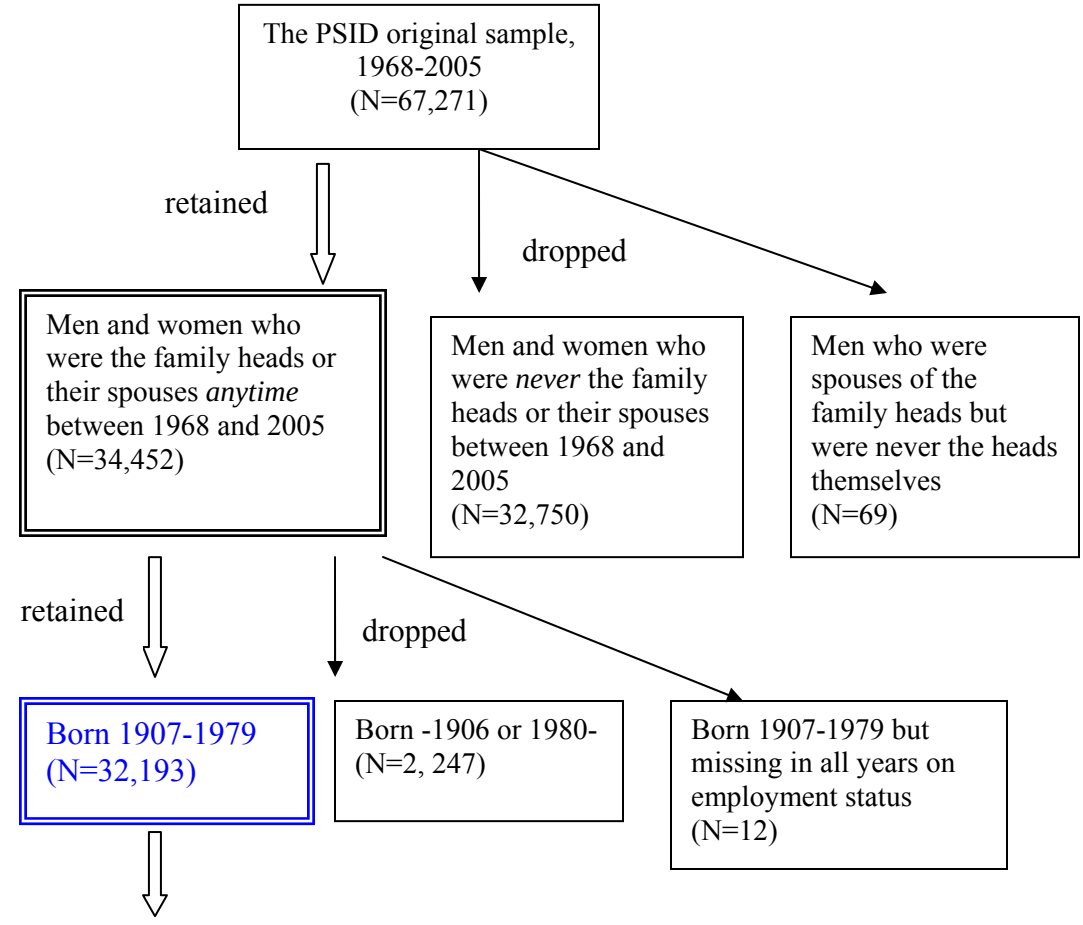
them is unavailable in the PSID. Although the employment status since 1979 of each family member is reported by their family heads, other information about jobs or employment is unknown. Using this criterion, the whole PSID sample was reduced from 67,721 people to 34,452 people (see Figure 3.1).

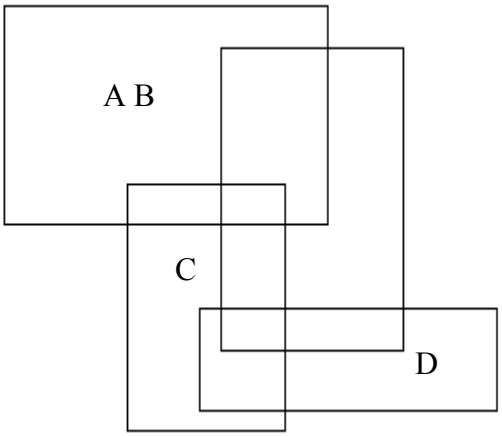
During this step, men who had been spouses of the heads of their family units but were never the heads themselves (N=69) were also excluded. In the PSID the head of a family was defined as the person aged 16 years or older with the most financial responsibility for the family (Hill 1992). In most occasions, the primary, male bread-winner is treated as the family head. Female heads usually are the single mothers or widows. It is only under rare occasions that a female head has a husband present in the families; this usually happens when the husband is disabled or unable to fulfill the function of a head. After excluding the 69 husbands whose wives are female heads, there are three types of people in this study--male heads, their wives, and female heads.

Next, the sample was further reduced by age. To make sure that the people in this study spent at least 10 years of their working age within the 39-year period (1967-2005), those who are too old or too young were excluded. A person is included in the sample if he or she was 60 years old or younger in 1967 (born 1907 or later) or if 26 years or older in 2005 (born 1979 or earlier). Using this criterion, another 2,247 cases were dropped. Also omitted were 12 people who had a missing value on employment status during the whole period from 1967 to 2005. As a result, the analytic sample for this dissertation includes 32,193 men and women born between 1907 and 1979 who had been family heads or their spouses anytime between 1968 and 2005. Given the definition of a family head in the PSID, these men and women thus represent the most economically active adults in the American labor force from the late 1960s to the present. Among them, there are 15,423 male heads, 2,971 female heads, 8,812 wives of male family heads throughout the whole period from 1968 to 2005 as well as 4,987 women who have played both roles at different times.

The last step in sample selection involved drawing age-specific subsamples from the 32,193 men and women from the PSID. Since this dissertation is a comprehensive

Figure 3.1 Data Selection and Sample Size





A. **Young adulthood** (Age 25-34 years old): born 1942-1971, N=15,949

B. **Young middle age** (Age 35-44 years old): born 1932-1961, N=12,149

C. **Late middle age** (Age 45-54 years old): born 1922-1951, N=7,664

D. **Later adulthood** (Age 55-65 years): born 1912-1940, N=4,968

investigation of people from different ages and its subject--employment trajectory--is a longitudinal concept that runs across many years in the life course, it is crucial to ensure that comparisons of the employment trajectories do not simply reflect age differences. A solution is to truncate the primary working age (age 25 to 65 years old) into several age periods and examine people's employment by age periods individually. Thus this dissertation examines four sequential age periods, each of which covers 10 or 11 years in the life course—Young Adulthood (age 25 to 34 years), Young Middle Age (age 35 to 44 years), Late Middle Age (age 45 to 54 years), and Later Adulthood (age 55 to 65 years). Therefore, comparisons can be translated into discovering gender- or cohort- variations in employment histories by studying people at similar ages or life course stages.

For this purpose, four subsamples were drawn from the pool of cases solely based on their ages. To ensure cases contribute sufficient information to a particular age period, a person was selected if his or her age period fully overlapped with the PSID (1967-2005). For example, people selected to the analytical sample for Young Adulthood must have spent the 10 years of their whole Young Adulthood (from age 25 to 34 years) within the PSID (between 1967 and 2005). In other words, they should have been born between 1942 and 1971. People born prior to 1942 or after 1971 would have been either too old or too young to have had sufficient employment data during this age period in the PSID. Note that people were selected purely based on their ages. Theoretically, a person's age makes it possible that his or her employment trajectory could overlap with the PSID for 10 years (or 11 years in the case of Later Adulthood, age 55 to 65). However, it does not guarantee that information about that person's employment status is available for each year throughout the whole period. As long as he or she has had a valid employment status anytime in these 10 years, this person would be included in the analytical sample.

By this selection criterion, four analytical samples were formed for the four age periods of interest. The bottom of Figure 3.1 describes the corresponding ages, years of birth of selected cases, as well as the sample size for each age period. This figure also suggests the overlaps existing among two or more samples since the same person can be selected to multiple samples based on age. No overlap was found between the samples

for the youngest and the oldest age periods (A. Young Adulthood and D. Later Adulthood). The gender- and birth-cohort compositions of the four analytical samples in this dissertation are presented in Table 3.1. All samples are mostly balanced between men and women (with slightly more women than men). Distribution of birth cohorts is not even because of the age limits for each age period and case selection criterion applied in this dissertation.

3.2 MAPPING EMPLOYMENT HISTORIES

3.2.1 Employment Status Trajectories

The key task prior to data analysis is constructing the employment status trajectory for each person in the sample. For such trajectory, a state has four exclusive categories--employed full-time (f), part-time (p), unemployed or absent from work temporarily (u),[2] and economically inactive (i). Employment status provides a simple way to describe a person's work experience without referring to the characteristics attached to employment, such as job rewards (e.g., income and benefits) and job conditions (e.g., time pressure, physical demand, flexibility, etc.). Therefore, this most fundamental form of work experience will be useful to understand the *temporal* dimensions of a trajectory by revealing the effects of purely being in a *status*.

A person's employment status during a year was obtained from four groups of PSID variables. The first group includes variables based on a series of questions about the primary employment status of the family heads ("heads") or their wives ("wives"). One question was "[a]re you working now, unemployed, unemployed, retired, or what." People that were economically inactive were probed by questions including "[d]o you have a job now," "[a]re you still working," and "[d]uring the last year, did you do any work for money." Appendix A lists the series of questions used in mapping the employment status trajectories in this study. For each serial, only the first variable is shown. Therefore, each row in the table can be multiplied by up to 35 time points. Coding or wording of the questions can vary across years.

Table 3.1 Gender and Birth Cohort Compositions of Analytical Samples by Age Period: The Panel Study of Income Dynamics, 1967-2005

	Young Adulthood (Age 25-34 Years)		Young Middle Age (Age 35-44 Years)		Late Middle Age (Age 45-54 Years)		Later Adulthood (Age 55-65 Years)	
	Mean	**Std.D.**	**Mean**	**Std.D.**	**Mean**	**Std.D.**	**Mean**	**Std.D.**
Pooled								
N (% in sample)	15,949	(100.00%)	12,149	(100.00%)	7,664	(100.00%)	4,968	(100.00%)
Gender								
Men	7,616	(47.75%)	5,757	(47.39%)	3,616	(47.18%)	2,267	(45.63%)
Women	8333	(52.25%)	6392	(52.61%)	4048	(52.82%)	2701	(54.37%)
Birth Cohort								
The Greatest Generation (born 1907-1924)*	---	---	---	---	544	(7.10%)	1,845	(37.14%)
Years of birth among selected cases (from, to)					(1922, 1924)		(1912, 1924)	
The Silent Generation (born 1925-1945)	1,051	(6.59%)	2,912	(23.97%)	4,510	(58.85%)	3,123	(62.86%)
Years of birth among selected cases (from, to)	(1942, 1945)		(1932, 1945)		(1925, 1945)		(1925, 1940)	
Leading baby boomers (born 1946-1954)	4,435	(27.81%)	4,863	(40.03%)	2,610	(34.06%)	---	---
Years of birth among selected cases (from, to)	(1946, 1954)		(1946, 1954)		(1946, 1951)			
Trailing baby boomers (born 1955-1964)	6,903	(43.28%)	4,374	(36.00%)	---	---	---	---
Years of birth among selected cases (from, to)	(1955, 1964)		(1955, 1961)					
Generation X (born 1965-1979)	3,560	(22.32%)	---	---	---	---	---	---
Years of birth among selected cases (from, to)	(1965, 1971)							

Note: * Years presented in row labels are the years of birth for a cohort as defined in the literature in general; the actual years of birth for this dissertation are displayed in the body of the table.

The second group includes variables about work hours that distinguish people who are employed full-time from those employed part-time. In this dissertation, a person was considered 'employed full-time' if he or she worked for more than 35 hours a week or 1,820 hours a year (assuming 52 weeks in a year).

From 1968 to 1993, the number of *annual work hours* was collected for all heads and wives. The PSID calculated the annual work hours as the product of the number of weeks that a person was employed in a year multiplied by the average number of hours that he or she worked in one of those weeks (Rows 16 and 18). It represents the number of weeks that people actually worked in all of their jobs, not counting the time for vacation, unemployment, a strike, or sick time. This numeric state ranges from 0 to 9,998 hours. From 1994 to 2005, the number of *weekly work hours* was recorded through questions that differed for employed heads, unemployed heads, employed wives, and unemployed wives. For instance, for employed heads, the questions were "[h]ow many weeks did you actually work on your main job last year" and "[o]n the average, how many hours a week did you work on your main job last year" (Row 20-29). Then they were also asked to report the weeks and hours that they worked in their extra or secondary jobs (up to five) in addition to their main jobs. Similar questions were probed for unemployed heads (Row 30-42), employed wives (at the time of interview) with any employment experience in the prior year (Row 43-53), and unemployed wives (Row 54-66). The 2003 and 2005 surveys no longer distinguished employed people from those unemployed (Rows 17 and 19).

The third and fourth groups of variables that were used to code the employment status trajectories are about unemployment (Row 67-97) and those out of the labor force (Row 98-112). These variables were used only when a person's employment status remained missing after combining all the information from the above two groups. A missing value for employment status was replaced if the status was known based on questions about whether a person was unemployed or economically inactive.

To illustrate, the next two figures describe the employment status trajectories of two cases from a random PSID family unit. In Figure 3.2A, Person 1 who was born in

1938 was the head of that family unit. His employment status became available in the PSID in 1967 when he was 29 years old. He worked full-time for 31 years from 1967 until 1998 when he left the labor force at the age of 60. Despite some employment in 1999 and 2000, he had basically phased out of the labor force. In 2005 his trajectory was censored at the age of 67. Given that he was born in 1938, his employment trajectory fully covered his Young Middle Age (age 35 to 34 years between 1973 and 1982), Late Middle Age (age 45 to 54 years between 1983 and 1992), and Later Adulthood (age 55 to 65 years between 1993 and 2003). His employment statuses during Young Adulthood (age 25 to 34 years) were ignored in the analysis since those data were partial—only available for 6 of the 10 years in that age period. Moreover, since this dissertation does not focus on employment after age 65, his information after 2003 was excluded as well. Therefore, he was included in the analysis in three age periods from age 35 to age 65 years. Overall this trajectory is dominated by full-time employment.

	1967	1968	1969	1970	1971	1972	1973	1974	1975
Person 1	full	full	full	full	full	full	full	full	full
←	Age 29	Young adulthood				→ Age 34	Age 35		
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
	full	full	full	full	full	full	full	full	full	full
	←	Young middle age				→ Age 44	Age 45			
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	full	full	full	full	full	full	full	full	full	full
			Late middle age			→	Age 54	Age 55		
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	full	full	out	full	part	out	out	out	out	out
	←		Later adulthood			→	Age 64	Age 65		Age 67

Employment Status:

full = employed full-time, part = employed part-time, unemp = unemployed or temporarily absent from work, out = economically inactive.

Figure 3.2A Example of Employment Status Trajectory: Husband

Figure 3.2B illustrates the employment trajectory of the wife from the same family which looks quite different. She was born in 1950 and had a known employment status from age 21 to age 55 years. This trajectory primarily consists of years spent outside of the labor force. For instance, of the 35 years in which her employment status was known, 23 years were not in the labor force. This was followed by 9 years of part-time work. Only three years were spent in full-time employment. Since she was 38 years old (in 1988), she had not been actively involved in employment. Given her age, she has contributed to the analysis of employment trajectories in three age periods—Young Adulthood (age 25 to 34 years), Young Middle Age (age 35 to 44 years), and Late Middle Age (age 45 to 54 years). Her employment status before or after these periods was partial and thus not counted.

	1967	1968	1969	1970	1971	1972	1973	1974	1975
Person 2					part	full	part	out	out
					Age 21				Age 25
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
out	out	out	out	part	full	part	part	part	part
	←		Young adulthood				→		Age 35
1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
part	full	out	out	out	out	out	out	out	out
←		(Age 38)		Young middle age			→		Age 45
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
out	out	out	out	out	out	out	out	out	out
	←		Late middle age				→		Age 55

Employment Status:

full = employed full-time, part = employed part-time, unemp = unemployed or temporarily absent from work, out = economically inactive.

Figure 3.2B Example of Employment Status Trajectory: Wife

As these figures show, people from the same family can follow distinctive career paths in terms of the proportion of full-time employment, instance of occupational changes, and other aspects. The goals of this dissertation are to study the overall employment trajectories in the U.S., uncover how the primary patterns of these trajectories have changed over four decades, and investigate the relationships among the pattern of a person's employment trajectory and occupations as well as that person's earlier employment history in the life course.

3.3 METHODS

Analyzing trajectories is a demanding task. Because of the longitudinal nature of a trajectory, it is challenging to capture its characteristics with a small number of measures. The underlying methodological issue is essentially a data reduction problem involving how to grasp the key characteristics of a trajectory efficiently through simple measures and how to compare across trajectories without losing important information. In the social sciences, scholars have adopted several models for latent variable analysis in achieving this goal. For example, commonly used methods from this group include hierarchical linear modeling (Bryk and Raudenbush 1987, 1992), group-based discrete mixture model ("PROC TRAJ" procedure in SAS) (Nagin 1999; Nagin and Tremblay 2001), and latent growth curves (Meredith and Tisak 1990; Duncan and Duncan 1996). However, these methods are primarily designed for trajectories with continuous states, such as numeric scales of psychological constructs, count data, or bivariate data. For trajectories with nominal or categorical states such as employment status or occupation, the assumptions of those models do not hold. The latent class model (Lazarsfeld and Henry 1968; Goodman 1974; McCutcheon 1987) is suitable for analyzing trajectories with nominal states. Nevertheless, its main application is to classify trajectories into several groups, but this is done without providing a measure for the variation among trajectories. Assessing heterogeneity or variation is nevertheless one of the goals of this dissertation. Therefore, given the purposes of this study and the characteristics of the

trajectories of interest, optimal matching analysis and cluster analysis will be performed to achieve these goals.

3.3.1 Optimal Matching Analysis: Estimating Dissimilarity between Sequences

Optimal matching analysis (OMA) is a method of sequence analysis. Sequence broadly refers to an ordered list of successive, discrete elements with inherent connections (Abbott 1995: 94-95). Examples of sequence analysis include research on DNA arrays in computational biology, site dating based on characteristics of artifacts in archaeology, cognition, interaction; developmental sequences in psychology; sequential games in economics; grammatical, word, and text structure in linguistics; among others. Widely used in sequence analysis, OMA was introduced to sociologists by Abbott (Abbott and Forrest 1986; Abbott and Hrycak 1990; Abbott 1995) as a method of studying repeated measures of a person's social status observed at different times during a life span, such as individual mobility in occupation, employment status, organization, and social class, or to examine timing and transitions of key life events in the life course.

OMA estimates the dissimilarity between two sequences by counting the steps of transforming one sequence into the other. The more steps it takes to reach two identical sequences, the larger the difference between the sequences under comparison. Transformation in OMA can take three forms: substitution, insertion, and deletion. OMA sets numeric values for the three types of transformations as the "costs" of transforming one sequence into another. The total cost of transforming two sequences, for example, Sequence A into Sequence B, is the sum of the costs associated with all steps in the transformation with insertions, deletions, and substitutions combined. Because there can be more than one way to transform A into B, the distance score, which represents the degree of dissimilarity between them, is based on the transformation that costs least (see Formula 3.1).

$$d_{A,B} = Min[\sum_{k=1}^{K}(C_i, C_d, C_s)] \qquad \text{Formula 3.1}$$

where $d_{i,j}$= distance score between Sequence A and Sequence B,

Ci= sum of costs for all insertions, Cd= sum of costs for all deletions, Cs= sum of costs for all substitutions, K= total number of insertions, deletions, and substitutions during transformation.

The logic of how OMA calculates distance scores can be illustrated by the following examples of employment status trajectories. Suppose there are three sequences A, B, and C, which at various lengths over a period from T_1 to T_6 contain full-time states (F), part-time states (P) or unemployment (U) (Figure 3.3.1). Transforming Sequence A into Sequence B can involve two steps: (1) substituting the "F" at T_5 with P and (2) inserting an "F" at the end. However, an easier way to achieve the same goal is to insert a "P" between the last two "F"s in Sequence A, which involves only one step. If we assume all transformation steps cost the same (cost=1), regardless of insertion, deletion, or substitution (Figure 3.3.2), then the distance score between A and B is 1:

$d_{A,B} = 1$ (insertion "P" between "F"s).

	T_1	T_2	T_3	T_4	T_5	T_6
Sequence A:	F F F F				F	
Sequence B:	F F F F				P F	
Sequence C:		F F P			U	P

Figure 3.3.1

F=Full-time employment, P=Part-time employment, U=Unemployment, I=Economically inactive status or out of the labor force.

Indel cost matrix	F	P	U		I
(F) Full-time	0				
(P) Part-time	1	0			
(U) Unemployed or temporarily absent from work	1	1	0		
(I) Inactive economically	1	1	1	0	
Substitution cost matrix	F	P	U		I
(F) Full-time	0				
(P) Part-time	1	0			
(U) Unemployed or temporarily absent from work	1	1	0		
(I) Inactive economically	1	1	1	0	

Figure 3.3.2

Distance Matrix	A B		C
A	0 1 3		
B	1 0 4		
C	3 4 0		

Figure 3.3.3

Similarly, transforming A into C requires at least three steps to substitute the last three “F”s with a "P", "U", and "P". Assuming the same insertion/deletion or substitution costs, the distance between A and C, $d_{A,C}$, is 3:

$d_{A,C}$ = 1 (subst. "F" @ T_4 with "P") + 1 (subst. "F"@ T_5 with "U") + 1 (subst. "F" @ T_6 with "P")=3.

By the same token, the distance between B and C, $d_{A,C}$, using the most efficient transformation is 4--deleting an "F" at T_1 of Sequence B and substituting the states from T_4 to T_6 with "P", "U", and "P":

$d_{B,C}$ = 1 (delet. "F" @ T_1) +1 (subst. "F" @ T_4 with "P") + 1 (subst. 'P' @ T_5 with "U")
+ 1 (subst. "F" @ T_6 with "P") = 4.

All pair-wise distance scores can be cross-tabulated in a square distance matrix whose rows and columns contain all the possible states. The distance matrix is symmetric along the diagonal. Transformations in reverse direction (from A to B versus from B to A) lead to same distance score as long as the insertion/deletion cost matrix or substitution cost matrix are symmetric (such as the ones as defined in Figure 3.3.2). In the three pair-wise distance scores in this example (Figure 3.3.3), Sequence B is more similar to Sequence A than to Sequence C given its smaller distance score with A ($d_{A,B} < d_{A,C}$). With

reference to Sequence C, A and C are closer than B and C ($d_{A,C} < d_{B,C}$). The scores on the diagonal of this distance matrix are set to 0 as no transformation is needed for comparing a sequence with itself.

The values of the costs for insertions, deletions, and substitutions are usually decided by researchers prior to data analysis based on their assumptions about the relationships among states. If we assume that it is harder to transfer from being unemployed (or temporarily absent from work) or economically inactive to a full-time job than from a part-time job. The substitution costs from those states to full-time or part-time employment could be set twice as much as those between part-time and full-time states (Figure 3.3.4). Given these new assumptions, the three pair-wise distance scores are recalculated by OMA as follows:

Indel cost matrix	F	P	U		I
(F) Full-time	0				
(P) Part-time	1	0			
(U) Unemployed or temporarily absent from work	1	1	0		
(I) Inactive economically	1	1	1	0	
Substitution cost matrix	F	P	U		I
(F) Full-time	0				
(P) Part-time	1	0			
(U) Unemployed or temporarily absent from work	**2**	**2**		0	
(I) Inactive economically	**2**	**2**	**2**		0

Figure 3.3.4

$d_{A,B}$ = 1 (insertion "P" between "F"s).

$d_{A,C}$ = 1 (subst. "F" @ T_4 with "P") + **2** (subst. "F" @ T_5 with "U")
+ 1 (subst. "F" @ T_6 with "P")= **4**.

$d_{B,C}$ = 1 (delet. "F" @ T_1) +1 (subst. "F" @ T_4 with "P") + **2** (subst. "P" @ T_5 with "U")
+ 1 (subst. "F" @ T_6 with "P") = **5**.

The corresponding distance matrix then becomes Figure 3.3.5. Likewise, the insertion/deletion costs can be set to more than one based on a researcher's theories about the relationships among states in sequences. When a step during transformation can be achieved by either insertion/deletion or substitution, OMA will compare the costs and choose the "cheapest" way of transformation (for introductions about OMA refer to Abbott and Tsay 2000; Stovel and Bolan 2004).

Distance Matrix	A B		C
A 0		1	**4**
B 1		0	**5**
C	**4 5**		0

Figure 3.3.5

In summary, OMA fulfills an important task in analyzing trajectories in this dissertation. It is through calculating the costs associated with insertions, deletions, and substitutions in transforming one sequence into another that OMA takes into account the differences among sequences in terms of not only the duration and frequency of events but their location and order as well. In that sense, it enables researchers to condense the multiple dimensions of a sequence, such as the repeated measures of a person's employment status during his or her career, into one single dimension--the distance score--so that the trajectories *as wholes* can be easily compared to one another. Due to its holistic perspective, OMA is distinguished from other methods for analyzing longitudinal data as it considers a sequence as a whole and uses its integrity as the unit of analysis (Abbott 1995). From a data reduction point of view, the way distance scores are calculated helps to retain the main characteristics of trajectories without losing substantial information. OMA is, therefore, a powerful tool for analyzing sequence data because it not only takes into account multiple dimensions of a career trajectory simultaneously (e.g., length, pattern, and types of transitions), but also allows for the “direct” measurement of career resemblance (Abbott and Hrycak 1990:144).

3.3.2 Cluster Analysis

Once a person's employment statuses throughout his or her career are translated into OMA distance scores, the next step is to seek out the distinct groups to which a large number of employment trajectories belong, solely based on the OMA distance scores. These groups of trajectories thus represent the underlying patterns of careers in the United States. OMA by itself does not provide any classification for sequences, so researchers usually resort to cluster analysis that follows OMA to classify sequences into several groups based on the distance scores that OMA yields. The function of OMA in this study is to condense repeated measures in a trajectory into one single dimension (distance score) while the utility of a cluster analysis after OMA is to further reduce the large number of trajectories into several distinctive groups to indicate the primary patterns of employment histories in the U.S.

Cluster analysis can be performed by numerous methods or algorithms. However, the requirements and assumptions of some of these methods prevent them from being used for the analysis in this dissertation. For instance, discriminant analysis, K-means analysis, or two-step cluster analysis require prior knowledge about the number of clusters before analysis is carried out. Hierarchical cluster analyses such as nearest-neighbor, complete-linkage, single-linkage, or the Ward method are only practical for small samples that contain less than 200 cases. Moreover, clusters yielded by these hierarchical clustering methods are nested within each other as a tree structure rather than as mutually exclusive.

This dissertation assumes that the employment histories in the U.S. can be captured by several patterns, the changes of which reflect the changes in the labor market and social mobility at a macro level. It is also assumed that these patterns are distinctive to one another so that an individual belongs to one and only one pattern. This assumption implies that people's employment is shaped by earlier experience in or out of the labor market. Given these assumptions, clustering methods selected for this study must satisfy three conditions: produce mutually exclusive or disjoint clusters, are suitable for large

datasets (>200 cases), and do not require any assumption about the number of clusters in advance.

Based on these requirements, a nonparametric, density-based method performed in a SAS procedure "PROC MODECLUS" (SAS Institute 2008) was selected for this purpose. This method has the following advantages. First, it can sort out clusters among a large number of cases. This feature is a prerequisite for studies like this dissertation as the sizes of its analytic samples range from nearly 5,000 to 16,000 cases. Second, this method not only requires no prior knowledge about the number of clusters but also provides significance tests against excessive numbers of resulting clusters. It is a benefit if researchers have no theoretical guidance on how many clusters there actually are prior to data analysis but hope to identify a manageable number of clusters. Third and most importantly, as a nonparametric method, its solution is less biased towards finding clusters with certain characteristics than other methods. For instance, most clustering methods tend to yield clusters with a similar number of observations (or equal variance) or are likely affected by the different scales of the variables used to classify observations (SAS Institute 2008). The methods with the least bias are those based on nonparametric density estimation (Wong and Schaack 1982; Wong and Lane 1983) like those implemented in PROC MODECLUS.

3.4 DATA ANALYSIS OUTLINE AND MEASUREMENT

The present dissertation seeks to compare the career paths of five birth cohorts in the PSID during a 39-year period from 1967 to 2005. The four analytic samples together contain 32,193 men and women, which is probably the largest among those in the current sociological research about employment histories in the U.S. Therefore, the analysis needs to be carefully planned to accommodate these characteristics of the data as well as to avoid some limitations of OMA and cluster analysis. There are several methodological challenges that this dissertation has to address in order to perform a successful analysis. The following section shows how every step of this dissertation has been carefully

planned to address the four methodological challenges discussed below and to cushion some of the limitations of those methods.

3.4.1 Step 1: Optimal Matching Analysis

(1) Comparison with Stable, Full-Time Careers

The first step in data analysis is to generate distance scores in OMA for each person in an analytical sample. There are two methodological challenges related to OMA. First, despite being a powerful tool for analyzing sequences, OMA demands intensive computing so that the size of analytic sample is usually constrained. The pair-wise distance scores are calculated in such a way that OMA needs to compare *all* possibilities of change given *any* state at *any* point in time. Consequently, as the number of states and the number of time points increase, the volume of required computation rises exponentially. The burden for computing can be further deteriorated when the number of sequences is large, which is precisely the case in this study. This constraint is probably the reason it has been rare for sociological studies utilizing OMA to analyze employment histories of more than a thousand cases that involve a large number of states and time points (see Table 3.4.1).

One solution for this constraint is to analyze a small random sample and extend the findings to the whole sample (Stovel, Savage, Beraman 1996; Stovel and Bolan 2004). However, this solution is not ideal when a cluster analysis follows OMA since the results of cluster analysis (i.e., the number of clusters and cluster membership for each case) can be highly contingent on which cases are included, when the heterogeneity among those cases is high.

This dissertation has taken an alternative approach which is made possible by a special computer program, Transition Data Analysis (TDA) (Rohwer and Pötter 1999; Schmidheiny 2001). Instead of calculating the distance scores among all the possible pairs of sequences in the data, this dissertation compares each trajectory with a predefined reference sequence (Rohwer and Pötter 1999: §6.7.2.6). The merit of this approach is it significantly decreases the amount of computation. For example, in the

case of Young Adulthood, the number of comparisons or pairs of sequences in OMA is now 15,949 rather than [15,949 x (15,949-1)]/2 = 127,145,428.

Table 3.4.1 Examples of Empirical Studies in Sociology about Trajectories Using Optimal Matching Analysis

	Subjects Sample	**size (persons)**	**States in trajectory**	**Number of time points**
Abbott and Hrycak 1990	Careers of German musicians from the 18th century	279	35 job positions	Up to 51(years)
Stovel, Savage, Bearman 1996	Careers of employees from a bank in Great Britain	80 per cohort	24 job positions x branch types	Up to 50 (years)
Blair-Loy 1999	Executive women in finance	57 36	combinations of job and organization size	Up to 38 (years)
Han and Moen 1999	Retirees from 6 companies in upstate NY	401 64	occupations, 5 work statuses, or 11 organizations	Up to 30 (years)
Scherer 2001	Early careers of adults from British Household Panel Survey (BHPS) and German Socio-Economic Panel (SOEP)	1,114 UK; 1,111 Germany	8 employment statuses	5 (years)
Pollock, Antcliff, and Ralphs 2002	Careers of adults from British Household Panel Survey (BHPS)	2,302 4	employment statuses	6 (months)

For all employment trajectories in this study, the reference sequence is that of a stable, full-time career in which a person remains employed full-time throughout his or her career. Comparison with the stable, full-time trajectory is theoretically meaningful in that it is the normative career path that the public, the media, policy makers, and even some scholars refer to as careers (Moen and Roehling 2005). As trajectories vary in

length and start in different years, each trajectory was compared with a stable, full-time trajectory of the same length and starting and ending points.

	1967	1968	1969	1970	...	2002	2003	2004	2005
1A		p	p	u	...	f	f		
1B		f	f	f	...	f	f		
2A	o o o o ...					o o o o			
2B	f f f f ...					f f f f			
3A		p	.	p	...	f	f	t	
3B		f	.	f	...	f	f	f	

f=Employed full-time, p=Employed part-time, u=Unemployed or temporarily absent from work, i= Economically inactive.

Figure 3.4 Comparison with the Reference Sequence: Employment Status Trajectories

For example, as illustrated in Figure 3.4, Person 1A began with a part-time job in 1968 but was unemployed after two years. Her trajectory ended in 2003 when she was employed full-time. Her reference trajectory was 1B, a person who started in the same year but stayed in full-time employment until 2003. Similarly, Person 2A was compared with Person 2B. In cases with missing employment spells, such as the missing employment status in 1969 in Person 3A's trajectory, the reference was a stable, full-time trajectory with a missing value in the same year (Person 3B). In other words, although every person was compared with his or her own counterpart, the references for all people in the analysis were the same–trajectories of the stable, full-time careers. The relative distances to the same reference further became the basis for comparison among all employment status trajectories.

(2) Data-based Costs

The biggest criticism for OMA is its arbitrariness in setting the costs for insertion/deletion and substitution (Levine 2000; Wu 2000; Elzinga 2003). The costs for

sequences with numeric states can be assumed to be equal to the difference between the two states involved. For example, the cost of substituting an income of $1,000 with another income of $1,500 is $500. The decision about the costs for sequences with nominal states, however, can be fairly subjective: how much does it cost if a person is unemployed versus working a full-time job? In that case, researchers may have no clear theoretical reason for setting the costs in OMA. The distance score assessed by OMA is nevertheless a function of the types of transformation and their costs.

To address this issue, this dissertation uses data-based substitution costs (Abbott and Hrycak 1990; Rohwer and Pötter 1999). Through such parameterization, OMA will analyze all the transitions within sequences in the data, calculate the frequency of each type of transitions between states, and use the *inverse* of the frequency of transitions as the costs for substitution (Rohwer and Pötter 1999). The intuition is that "two states are less different from each other when there are, in the given data set, less transitions from one state into the other" (Rohwer and Pötter 1999: §6.7.2.5, P.497). In the OMA terminology, less frequent transitions are treated as "more costly." Suppose there are 100 transitions among all the sequences in total, among which 10 transitions occur between State A and State B, 20 between State A and State C, and 70 between State B and State C. The corresponding substitution costs will be the following:

$C_{A,B} = 1/[10/100] = 10,$
$C_{A,C} = 1/[20/100] = 5,$
$C_{B,C} = 1/[70/100] = 1.43.$

As it is more common for someone to change from State B to State C (frequency=70/100=0.7) than from A to C (frequency=10/100=0.1), the former transition is considered by OMA as "cheaper."

(3) Substitution versus Insertion/Deletion

Furthermore, the costs of insertion/deletion are set to a large number, 100, to encourage OMA to choose substitution over insertion or deletion when possible. Operations of

insertion/deletion and substitution have different theoretical meanings in OMA depending on the states represented in a study. For example, inserting or deleting an event preserves the event but distorts time as if two episodes are identical as long as they have the same state, regardless of the difference in duration; on the contrary, substituting one event with another preserves timing but treats two events as equivalent (Lesnard 2006). When comparing sequences of equal length or when timing is inherently meaningful in research, frequent use of insertion or deletion will invoke the problem of "time warping" (Abbott 1995; Lesnard 2006). Consequently, one should choose substitution rather than insertion or deletion to preserve the timing of transitions and duration of episodes in sequences, which is appropriate in this dissertation as timing is one of the concepts that makes "trajectory" important and meaningful.

3.4.2 Step 2: Cluster Analysis: Patterns of Employment Status Trajectories

The third methodological challenge has to do with cluster analysis in general. One problem is that cluster analysis can always provide a solution even when there are no meaningful clusters, for example, in an extremely homogeneous sample without distinctive subgroups. Another problem is that different rules of cluster formation can affect solutions even within the same dataset (Scherer 2001). This dissertation will take three sequential steps in the analysis to address this limitation.

(1) Smoothing Parameter Array

First, an array of smoothing parameters, instead of one or two, will be used in cluster analysis to avoid the arbitrariness in selecting a smoothing parameter. In the algorithm of PROC MODECLUS, a smoothing parameter is a quantity that the computer uses as a radius to draw the boundary of a cluster. Any observations that fall into the sphere surrounded by this boundary are combined into one cluster. In this bottom-up process, as the radius increases, the sphere keeps expanding and consequently more cases are joined to form fewer clusters. When a series of radii continually suggest the same number of clusters, that number becomes the optimal solution. In this dissertation, a series of radii will be applied, on each of which PROC MODECLUS will conduct a separate cluster analysis. The initial radius is set to 1, the smallest possible value for a smoothing

parameter, and increases by 1 in ascending order until an optimal number of clusters is found. The resulting several solutions which all suggest the optimal number of clusters will be compared by Analysis of Variance (ANOVA) on the OMA distance scores by cluster membership. The final model will be the one that best maximizes the variations in distance scores among clusters, or in other words, the one with the largest F test statistics.

(2) Supplementary Cluster Analysis: K-Means Clustering Method

Second, an alternative clustering method will be implemented to validate the results from MODECLUS. This alternative method is a K-means method that can also be conducted in SAS as PROC FASTCLUS. Like MODECLUS, it has several merits for the characteristics of the data being analyzed in this study. It finds disjoint clusters among a large sample of cases and provides three statistics that serve as criteria in selecting models (SAS Institute 2008). However, in this study, FASTCLUS will supplement, not replace, the role of MODECLUS in cluster analysis due to two of FASTCLUS's limitations: Like other clustering methods based on the least-squares criterion, the K-means method can be biased towards finding clusters of equal size (Sarle 1982). Moreover, it assumes the numeric variables used for grouping observations are normally distributed. It is less robust than MODECLUS when such an assumption is violated. However, it has been suggested that the K-means method be used in combination with other clustering methods to quickly identify the number of clusters in large data (SAS Institute 2008).

In this dissertation, cluster analysis through FASTCLUS will be carried out separately from analysis through MODECLUS but in the same process. First, an array of smoothing parameters which start from 1 will be inputted sequentially in FASTCLUS until the optimal number of clusters is suggested by multiple models based on different parameters. After that, the final model will be selected among models related to the optimal number of clusters based on three statistics available in the FASTCLUS output--pseudo-F test (Calinski and Harabasz 1974), pseudo-t test (Duda and Hart 1973), and the cubic clustering criterion (CCC) (Sarle 1983). Calculated slightly differently from regular F tests in ANOVA, all three test statistics can be interpreted as the ratios of the average

variation within a cluster to the average variation across clusters. Results of cluster analysis are considered sufficient and valid if the ratios are significantly small. Lastly, the final model from MODECLUS and that from FASTCLUS are to be examined side-by-side. When necessary, ANOVA F tests are performed to select the model in which clusters better explain the variation in OMA distance scores.

(3) Validity Checking After Cluster Analysis

The next step is checking the validity of the results from cluster analysis by a *post hoc* diagnosis to see if identified clusters truly differ in several characteristics that potentially explain the clustering (Stovel, Savage, Beraman 1996; Blair-Loy 1999; Scherer 2001; Pollock, Antcliff, and Ralphs 2002). In this study, cluster differences will be tested on 10 measures which are constructed to represent the fundamental characteristics that underlie a trajectory. These measures can be classified into three groups (see Appendix B for definitions).

(i) Proportions of Time on Each State in Trajectory. The first four variables relate to the distribution of 'states' in a trajectory and capture the proportion of time a person spent on each of the four employment statuses being examined—(V1) work full-time, (V2) work part-time, (V3) unemployed (or temporarily absent from work), and (V4) economically inactive or out of the labor force. Together, these four measures reveal how a person's time is distributed in terms of employment statuses over time. Since the PSID employment trajectories are of unequal lengths within a certain age period, values of the four variables have been expressed as *proportions* in relation to trajectory length. As a result, the values of these measures always sum to 100 for each person. For example, a value of 75 on V1 indicates that a person has spent three-quarters of time during an age period on full-time employment continuously or intermittently, regardless of whether this person's employment trajectory was 10-years long (the maximum in an age period)[3] or only 4 years. In the case of Person 2 in Figure 3.2B, her time spent during Young Middle Age (1985-1994) is 10 (percent) on full-time work, 20 (percent) on part-time work, 0 (percent) on unemployment, and 70 (percent) out of the labor force.

(ii) Duration and Pacing of Episodes. Next, the group consists of four measures about episodes--the number of episodes in sequence (V5), the average duration (V6) and maximum duration (V7) of those episodes, and the difference in duration between a person's longest and shortest episodes (V8). The last episode-related measure (V8) indicates whether the pacing of episodes was even or not. Together with the other three measures, it captures the degree of stability of an employment trajectory from another angle. Again using Person 2's trajectory between 1985 and 1994 as an example: She had three episodes, which on average lasted for 3.33 years (10 years/3). Her longest episode was in an "economically inactive" status (V7). Her episodes were not evenly paced due to a big difference between the duration of the longest and the shortest episodes (V8=7-1=6 years).

(iii) Modal Transitions. The last two measures are related to the scope of modal transition in a person's employment trajectory (V9) as well as its direction (V10). Both are restricted to people who had more than one employment status during an age period (about 10 years long). Modal transition refers to the change in employment status that occurs most frequently during a trajectory. A dummy variable (V9) was to distinguish people whose modal transitions were "far transitions" between (full-time or part-time) employment and non-employment (unemployment, temporary absence from work, or being outside of the labor force) from those whose modal transitions were "near transitions" between full-time and part-time employment. Likewise, another dummy variable (V10) helped to divide people whose modal transitions were "downward transitions" from a reduction in work hours or withdrawal from employment (that is, from full-time to part-time work, or from employment to non-employment) and those who had modal transitions in opposite directions—in other words, "upward" transitions.

To illustrate, Person 2 in Figure 3.2B made two transitions during her Young Middle Age (Year 1985 to 1994): first from part-time work to full-time work (1986 to 1987), and then from full-time work to an economically inactive status (1987 to 1988). Her modal transition in this period was the second one which was followed by a longer episode than the other transition. This modal transition was a "far transition" that went

"downward" (V9="far" and V10="downward") from employment to non-employment. She had missing values for these two measures in the next age period because she did not make any transitions during those 10 years (1995 to 2004).

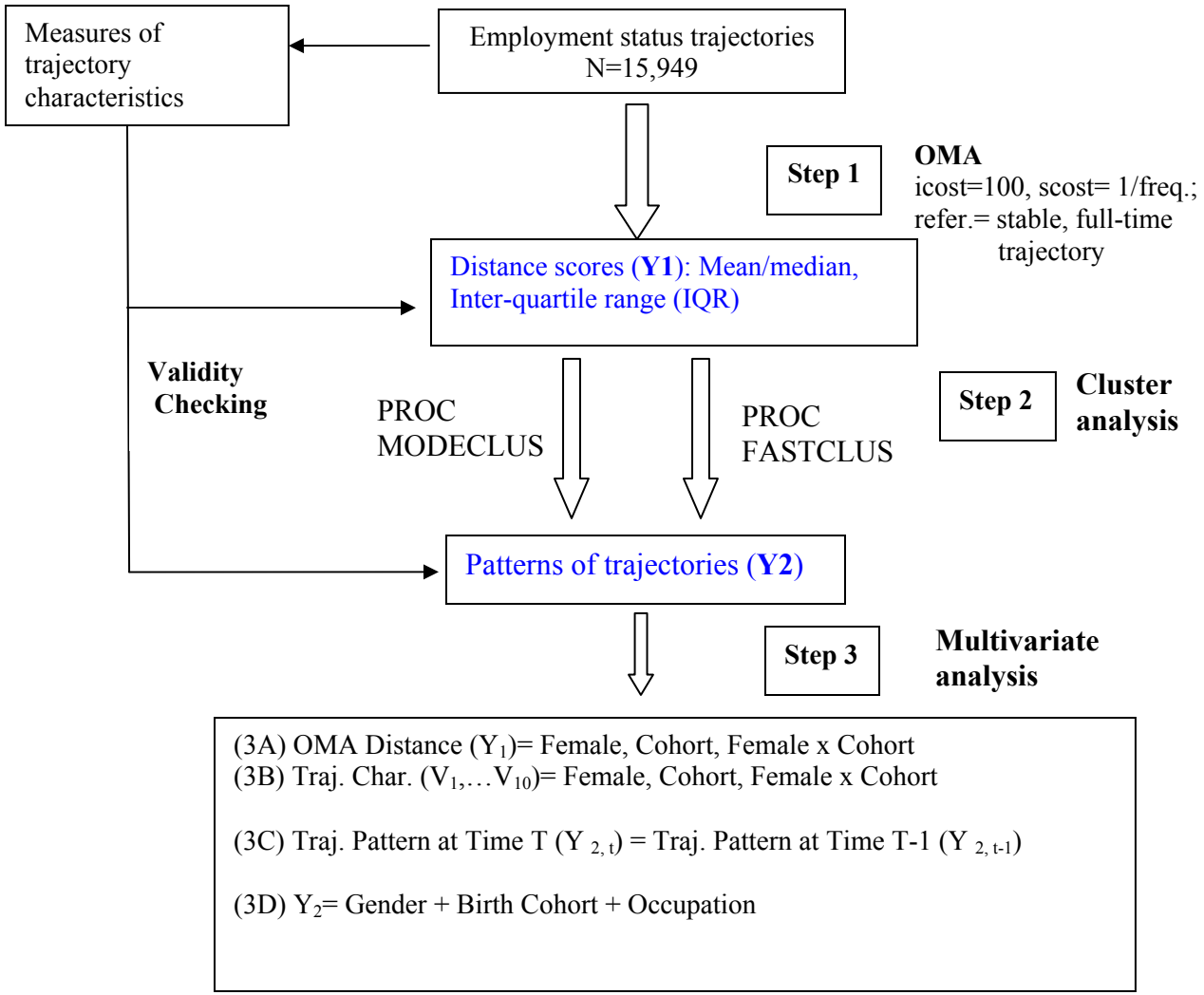
In the case of both transition characteristics, there were few people (under 3%) whose modal transitions belonged to "other types" that happened among non-employment statuses such as unemployment, absence from work, and not in the labor force. Given their small share, these transitions of other types were later combined with near transitions or upward transitions--the respective reference category for V9 and V10—in the multivariate analysis.

Cluster differences on these 10 trajectory characteristics will be examined through ANOVA F tests (for numeric characteristics) or Chi-square tests (for categorical characteristics). If true clusters in the data are identified appropriately and if these 10 trajectory characteristics are sufficient to capture the underlying temporary dimensions embedded in a trajectory, we should see significant differences on those trajectory characteristics among clusters. Moreover, validity checking will further play a role in testing the ability of OMA to condense a multi-dimensional trajectory into a single measure without losing important information, as employment status trajectories are partitioned into distinct clusters solely based on the OMA distance score, not trajectory characteristics. Significant differences on those trajectory characteristics among clusters that are identified by OMA distance scores will justify the assumption that the OMA distance score accounts for all or most underlying characteristics of a trajectory.

3.4.3 Step 3: Multivariate Analysis

Multivariate analysis needs to be conducted individually for four age periods. The flowchart in Figure 3.5 provides an example of the steps that have been carried out in multivariate analysis for Young Adulthood (age 25 to 34 years). Once OMA distance scores for employment trajectories (Y_1) as well as trajectory clusters or patterns (Y_2) are generated in Step 1 and Step 2, multivariate analysis is carried out in several sub-steps to test the hypotheses outlined in Chapter 2 (Step 3).

Figure 3.5. Flowchart for Data Analysis: Young Adulthood (Age 25 to 34 Years)



(3A) Gender and Cohort Association with OMA Distance Scores (Chapter 4.1)

The first part of the analysis is to examine to what extent a person's employment trajectory within an age period, as measured by OMA distance score, is related to the gender and birth cohort. The results will be presented in Chapter 4, Section 1. Since the dependent variable, Y_1 OMA distance score, is numeric while the gender and birth cohort variables are bivariate, ANOVA will be carried out.

Three models will be used to test the gender main effect, cohort main effect, and gender-by-cohort interactions, respectively. One dummy variable is created for FEMALE (=1 if female; =2 if male) and N-1 dummy variables is generated for N birth cohorts. Regardless of age period, the reference group is the oldest cohort in sample. In the case of Young Adulthood, there are four birth cohorts of PSID men and women included in its analytical sample—the Silent Generation, two boomer cohorts, and Generation X. The formula specific to that age period are as follows:

To test the gender main effect:

$$Y_1 = \alpha + \beta_1 \times Female, \qquad \text{(Formula 3.4.1)}$$

where Y1=OMA distance score; FEMALE=1 if women, 2=men.

To test cohort main effects:

$$Y_1 = \alpha + \beta_s \times LeadingBoomers + \beta_2 \times TrailingBoomers + \beta_3 \times GenerationX \qquad \text{(Formula 3.4.2)}$$

where Leading Boomers=1 if cohort=Leading Boomers; =0, otherwise;
Trailing Boomers=1 if cohort=Trailing Boomers; =0, otherwise;
Generation X=1 if cohort=Generation X; =0, otherwise;
omitted group (reference)= the Silent Generation (the oldest cohort among the four).

To test gender-by-cohort interactions:

$$Y_1 = \alpha + \beta_1 \times Female + \beta_2 \times LeadingBabyBoomers + \beta_3 \times TrailingBabyBoomers + \beta_4 \times Generation\ X + \beta_5 \times Female \times LeadingBabyBoomers + \beta_6 \times Female \times TrailingBabyBoomers + \beta_7 \times Female \times Generation\ X$$

(Formula 3.4.3)

(3B)Associations of Trajectory Characteristics with OMA Distance Scores (Chapter 4.2)

Results of validity checking following cluster analysis as discussed earlier in Step 2 will be summarized in Chapter 4.2. Statistical models of ANOVA are similar to those in Chapter 4.1, except that the dependent variable becomes each of the ten measures for trajectory characteristics. For categorical measures such as V9 and V10, Chi-square tests will be conducted. In statistical tests of V9 (scope of modal transition in trajectory), the reference group is people whose most frequent transition is a near transition. In models of V10 (direction of modal transition), the reference group is upward transitions or 'other types of transitions.' For example, the interaction model for V10 will be:

$$V_{10} = \alpha + \beta_1 \times Female + \beta_2 \times LeadingBoo\ mers + \beta_3 \times TrailingBo\ omers + \beta_4 \times Generation\ X + \beta_5 \times Female \times LeadingBoo\ mers + \beta_6 \times Female \times TrailingBo\ omers + \beta_7 \times Female \times Generation\ X$$

(Formula 3.4.4)

where V10=1 if modal transitions in the trajectory was downward; =0 otherwise (including upward or other types of transitions)

(3C) Path Dependence in Employment Trajectory Patterns (Chapter 5)

Results of cluster analysis as well as comparisons of trajectory characteristics and demographic characteristics across clusters will be summarized in Chapter 5, Section 5.1 and Section 5.2. After distinctive patterns among a large number of employment trajectories are sorted out in the cluster analysis, flowcharts will be employed in Section 5.3 to examine the path dependence in employment history. The purpose of this part of the analysis is to estimate the direction and degree of association between employment trajectory patterns in two different age periods.

(3D) Trajectory Patterns and Occupation (Chapter 6)

The second set of multivariate analysis after cluster analysis is to examine the associations between employment trajectory and a person's *primary occupation* in a career. Primary occupation refers to the occupation in which a person spends most of his

or her time during an age period, continuously or intermittently. In this dissertation, occupational status has seven mutually exclusive categories: (1) professional and technical workers; (2) managers, administrators, and self-employed businessmen or businesswomen; (3) clerical and sales workers; (4) craftsmen and foremen; (5) operatives and kindred workers; (6) laborers, service workers, farmers, farm managers, armed services, protective workers, and miscellaneous;[3] and (7) not applicable, not in the labor force, unascertained, and don't know. This last category mostly consists of people who are not actively involved in the labor market, such as retirees, housekeepers, students, and people who are permanently disabled. Alternatively, employment history can be analyzed by combination of white-collar (occupation categories 1 to 3) and blue-collar occupations (occupation categories 4 to 6).

Person 1	1967	1968	1969	1970	1971	1972	1973	1974	1975
		full sales	full opert.	full sales	full sales	full sales	full sales	full mang	full mang
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
full mang	full mang	full sales	full mang	full mang	full craft	full mang	full prof	full mang	full mang
1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
full mang	full mang	full mang	full mang	full mang	full mang	full mang	full mang	full mang	full mang
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
full mang	full mang	out mang	full mang	part mang	out NA	out NA	out NA	out	out

Primary Occupation:
Prof=professionals; mang= managers, administrators; sales = clerks and salespersons; craft=craftsmen, foremen; opert= machine operatives; serv = laborers, service workers, farmers, farm managers, armed services, protective workers, and miscellaneous; NA=not applicable, not in the labor force, unascertained, and don't know.

Figure 3.6 Example of Primary Occupation: Husband

Figure 3.6 shows the employment trajectory of the husband presented earlier with occupations added to each year under employment status. By definition, Person 1's primary occupation during Young Middle Age (age 35 to 44 years, 1973 to 1982) was a managerial occupation which he held during three episodes for a total of 7 years. from another perspective, he was in a white-collar occupation although he held blue-collar job(s) in 1981.

As the analysis for employment trajectory patterns, multinomial logistic regressions will be conducted. Since there are seven categories of a primary occupation, six dummy variables will be created:

O_1=1 if managers or administrators, or 0 otherwise;
O_2=1 if sales or clerical workers, or 0 otherwise;
O_3=1 if craftsmen, or 0 otherwise;
O_4=1 if operatives, or 0 otherwise;
O_5=1 if service workers, laborers, farm workers, or in armed forces, or 0 otherwise;
O_6=1 if not applicable, not in the labor force, unascertained, and don't know,
or 0 otherwise.

The omitted occupational category is professionals. Therefore, the regression coefficient of each of the above variables will indicate the relative likelihood of a person having an employment trajectory in one pattern versus another, if he or she has engaged in occupations in a category other than professionals. Associations between occupation and employment trajectory patterns will be studied with gender and birth cohort taken into account. For example, the multinomial logistic regression model for the contrast between trajectory Pattern 1 and the reference pattern during Young Adulthood (age 25 to 34 years) will be:

$$\log\left(\frac{P_{p-1}}{1-P_{p-1}}\right) = \alpha + \beta_1 \times Female + \beta_2 \times LeadingBabyBoomers + \beta_3 \times TrailingBabyBoomers$$
$$+ \beta_5 \times Generation\,X + \beta_4 \times O_1 + \beta_5 \times O_2 + \ldots + \beta_9 \times O_6$$

(Formula 3.4.5)

Similar logistic regression analysis can be performed by replacing primary occupations with class of worker (white- or blue-collar occupations).

3.4.4. Statistical Tests for Large Samples

The last methodological challenge is related to the validity of performing statistical tests for a large sample. When a sample size is large, the risk of Type I errors can be high. It becomes easy to declare significant associations among variables which are not strongly related. Or the degree of associations may be too small to be considered meaningful given the context of the research subjects. Consequently, extra considerations should be taken in justifying the results of statistical tests in this dissertation. Two measures will be taken to address this issue—effect size and tests on small random samples.

Effect Size. Effect size is a family of indices that measures the magnitude of a treatment effect. In this dissertation, a commonly used index developed from Cohen's d (Cohen 1988; Rosnow and Rosenthal 1996) is adopted to define effect size as:

$$EffectSize = \frac{M_1 - M_2}{\sqrt{\frac{s_1^2 + s_2^2}{2}}} \qquad \text{(Formula 3.4.6)}$$

where M_1 and s_1^2 are the mean and standard deviation of Group 1 and M_2 and s_2^2 are the mean and standard deviation of Group 2.

When there are more than two groups under comparison, Group 1 will be the group that has the largest mean and Group 2 will be the group with the smallest mean. In other words, effect size will be measured based on the largest group difference among the groups. In addition, the magnitude of effect size will be judged by a rule of thumb—an effect size of 0.5 or larger signals large effect size. Being independent of sample size makes the effect size a useful way to evaluate equality among groups with large and unequal sample sizes.

Small random samples. Another action that will be taken to protect against large Type I errors in statistical testing is to use small random samples. A random sample of 200 cases will be drawn from the full sample and statistical tests will be performed twice

using both the full sample as well as the random sample. The size of the random sample, 200 cases, is arbitrary but helps to examine whether statistical tests remain strong if only a subset of cases are used.

In summary, analyzing sequences via OMA followed by a cluster analysis is appropriate for comparing trajectories in this dissertation. OMA helps condense the repeated measures in a sequence into one dimension that enables easy comparisons of sequences as wholes. Cluster analysis can further reduce a large number of sequences into several clusters which helps the researchers focus on the primary differences among sequences and conveniently interpret the results. However, given that the data for this dissertation contains a large sample of trajectories with a large number of nominal states over numerous time points, the analysis of using OMA and cluster analysis must be tailored to accommodate the data characteristics.

Notes:

1. Although the first PSID survey was conducted in 1968, employment in 1967 was available since respondents were asked about their employment in prior year and the year at the time of the survey.

2. Unemployment and temporary absence from work were previously treated as separate statuses. However, these two categories were later combined as a single employment status due to small sample sizes.

3. Three groups of PSID occupational statuses were combined in this dissertation due to small sample sizes—laborers and service workers; farmers, farm managers, and farm laborers; and armed forces and protective service workers.

4. The exception is Later Adulthood (age 55 to 65 years) during which the maximum length of employment trajectory is 11 years.

CHAPTER 4
DEPATURE FROM THE NORM OF THE STABLE, FULL-TIME CAREERS: ANALYSIS ON OPTIMAL MATCHING DISTANCE SCORES AND TRAJECTORY CHARACTERISTICS

What have the overall trends of employment histories in the U.S. have changed in the past four decades? How has the gender difference in careers changed over time? This chapter presents the results from the analyses about the Optimal Matching Analysis (OMA) distance scores which indicate the degree of departure of American employment trajectories from the stable, full-time career norm between 1967 and 2005.

Findings are organized in two sections. In Section 4.1, summary statistics of OMA distance scores are presented separately for each of the four age periods—Young Adulthood (age 25 to 34), Young Middle Age (age 35 to 44), Late Middle Age (age 45 to 54), and Later Adulthood (age 55 to 65). Comparisons on the distance scores across genders, cohorts, and age periods show how the overall trends of employment histories have changed over the past four decades in the United States. In Section 4.2, the analyses seek to find out in what ways employment trajectories differ by gender and cohort. To achieve this goal, an anatomical approach was taken to examine various components of employment trajectories under the level of OMA distance score which only provides information about the whole sequences of employment trajectories. With this approach, a series of trajectory characteristics were investigated and associations with gender and/or birth cohort were statistically tested.

4.1 OPTIMAL MATCHING DISTANCE SCORES FOR EMPLOYMENT TRAJECTORIES IN THE UNITED STATES: 1967-2005

4.1.1 Distance from the Stable, Full-time Careers

Across Age Periods

In OMA, each person's employment trajectory was summarized as a single measure--the distance score. This continuous measure represents the degree of departure from the

normative trajectory of the stable, full-time careers which serves as the reference for comparison. Consequently, a distance score of 0 indicates no departure from the reference trajectory, which in turn means that a person has stayed employed full-time throughout the whole period. In this study, the distance scores of the family heads and their spouses in the PSID range from 0 to 21.24 (Table 4.1.1).

The top section of Table 4.1.1 describes the overall distribution of OMA distance scores by showing the count, mean, standard deviation (Std. D.), median, half inter-quartile range (half IQR), minimum, and maximum of distance scores for the pooled samples, and by birth cohort and gender. Separate statistics were presented based on different analytical samples specific to the four age periods (from left to right).

A first look at the statistics of the pooled samples across the four age periods reveals that distance scores generally range from 0 to 20 or so, with means around 5 to 6 and standard deviations around 6 in the first three periods. Later Adulthood (age 55 to 65 years) is quite different due to much larger distance scores (mean=9.74) with larger variation (St.D.=7.50). It suggests that the employment trajectories after Age 55 years look less similar to those of the stable, full-time careers and are more diverse than the trajectories from younger ages in the life course. Among the first three age periods, the smallest distance scores are associated with Young Middle Age (age 35 to 44, mean=4.81 and St.D.=5.91). It implies that without considering gender, birth cohort, or any other socio-demographic characteristics, people's employment trajectories between Age 35 and 44 years most resemble the reference trajectory.

Another noticeable difference is that regardless of age periods, the median and half IQR are smaller than the mean and standard deviation. This suggests that distance scores are skewed and more cases are clustered on the left side of the mean than on the right side. Consequently, transformations may be needed in statistical analyses. The histograms in Figure 4.1.1 reflect the skewness of distance scores and the difference in the overall forms of employment trajectories between Later Adulthood (age 55 to 65, lower right) and other ages. In moving towards older age periods, especially after Age 55, the bars in histograms gradually shift to the right, indicating a larger degree of deviation

Table 4.1.1 Summary Statistics of Optimal Matching Distance Scores of Employment Trajectories by Age Period, Birth Cohort, and Gender: The Panel Study of Income Dynamics, 1967-2005

	Young Adulthood (Age 25-34 Years)		Young Middle Age (Age 35-44 Years)		Late Middle Age (Age 45-54 Years)		Later Adulthood (Age 55-65 Years)	
All								
N (% in sample)	15,949	(100.00%)	12,149	(100.00%)	7,664	(100.00%)	4,968	(100.00%)
Mean (Std.D.)	5.15	(5.86)	4.81	(5.91)	5.65	(6.53)	9.74	(7.50)
Median (half IQR[¶])	2.99	(4.17)	1.93	(3.86)	3.04	(4.88)	8.65	(6.95)
Mininum, maximum	0.00,	19.25	0.00,	19.34	0.00,	19.50	0.00,	21.24
By Birth Cohort								
The Greatest Generation (born 1907-1924)								
N (% in sample)	---	---	---	---	544	(7.10%)	1,845	(37.14%)
Mean (Std.D.)					8.49	(7.58)	11.83	(7.50)
Median (half IQR)					7.37	(7.43)	12.35	(7.14)
Mininum, maximum					0.00,	19.50	0.00,	21.24
The Silent Generation (born 1925-1945)								
N (% in sample)	1,051	(6.59%)	2,912	(23.97%)	4,510	(58.85%)	3,123	(62.86%)
Mean (Std.D.)	7.36	(7.06)	7.33	(7.19)	6.80	(6.85)	8.50	(7.23)
Median (half IQR)	4.48	(6.14)	4.49	(7.30)	4.56	(6.30)	6.86	(6.22)
Mininum, maximum	0.00,	19.25	0.00,	19.34	0.00,	19.50	0.00,	21.24
Leading boomers (born 1946-1954)								
N (% in sample)	4,435	(27.81%)	4,863	(40.03%)	2,610	(34.06%)	---	---
Mean (Std.D.)	6.57	(6.39)	4.80	(5.66)	3.08	(4.65)		
Median (half IQR)	4.48	(5.00)	2.99	(3.87)	1.52	(2.28)		
Mininum, maximum	0.00,	19.25	0.00,	19.34	0.00,	19.50		
Trailing boomers (born 1955-1964)								
N (% in sample)	6,903	(43.28%)	4,374	(36.00%)	---	---	---	---
Mean (Std.D.)	5.05	(5.63)	3.16	(4.48)				
Median (half IQR)	2.99	(4.07)	1.50	(2.25)				
Mininum, maximum	0.00,	19.25	0.00,	19.34				
Generation X (born 1965-1979)								
N (% in sample)	3,560	(22.32%)	---	---	---	---	---	---
Mean (Std.D.)	2.93	(4.21)						
Median (half IQR)	1.49	(1.93)						
Mininum, maximum	0.00,	19.25						
By Gender								
Men								
N (% in sample)	7,616	(47.75%)	5,757	(47.39%)	3,616	(47.18%)	2,267	(45.63%)
Mean (Std.D.)	2.42	(3.69)	2.23	(3.82)	2.88	(4.55)	6.92	(6.44)
Median (half IQR)	1.49	(1.62)	0.00	(1.50)	0.00	(1.95)	5.40	(4.83)
Mininum, maximum	0.00,	19.25	0.00,	19.34	0.00,	19.50	0.00,	21.24
Women								
N (% in sample)	8333	(52.25%)	6392	(52.61%)	4048	(52.82%)	2701	(54.37%)
Mean (Std.D.)	7.65	(6.34)	7.14	(6.46)	8.13	(7.02)	12.10	(7.51)
Median (half IQR)	5.98	(5.67)	5.37	(5.46)	6.08	(6.78)	13	(7.34)
Mininum, maximum	0.00,	19.25	0.00,	19.34	0.00,	19.5	0.00,	21.24

Note: Half interquartile-range (IQR)= (75 percentile - 25 percentile)/2.

from the stable, full-time careers at older ages. In the next section, OMA distance scores are examined more closely within each specific age period with a focus on gender- and cohort-variations.

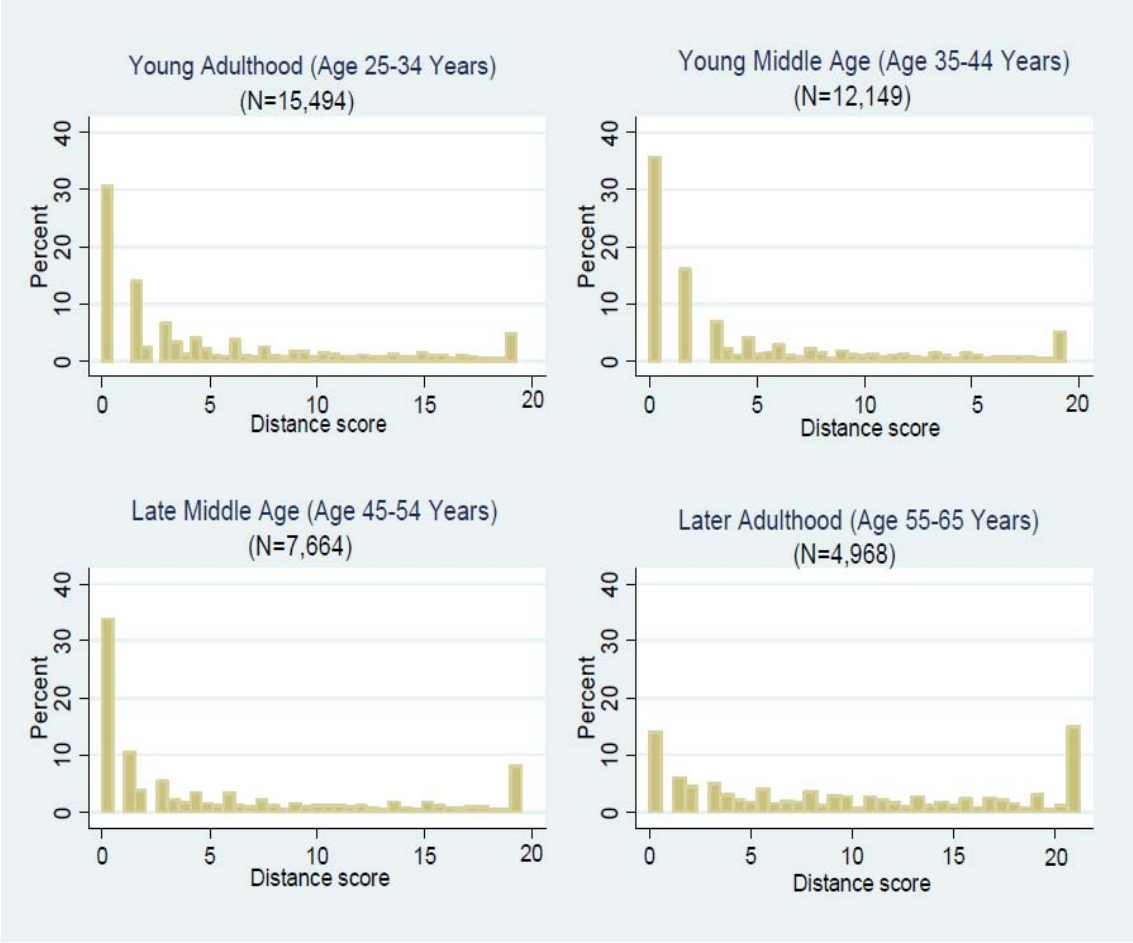


Figure 4.1.1. Histograms of Optimal Matching Distance Scores by Age Period

Cohort Variations

Figure 4.1.2 consists of four box plots for distance scores across birth cohorts, separately by four age periods. Summary statistics of distance scores are tabulated by cohort in the middle section of Table 4.1.1. People from different birth cohorts were selected to an age period-specific analytical sample as long as their age period of interest ran across the PSID for 10 years or longer. As a result, different numbers of birth cohorts and different people in them were included in each analytical sample. For example, there are four

cohorts selected for analysis for Young Adulthood (age 25 to 34) whereas only people from the two oldest cohorts were qualified to be studied for Later Adulthood (age 55 to 65).

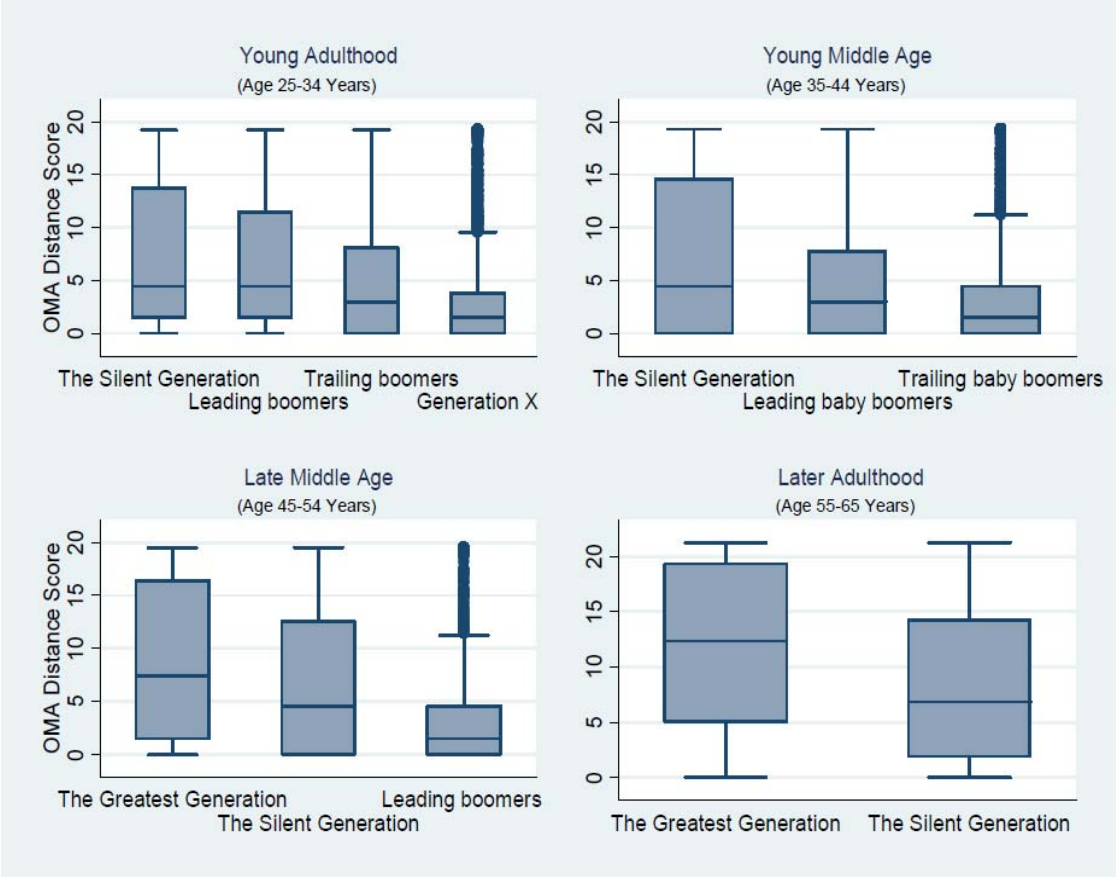


Figure 4.1.2. Box Plots of Optimal Matching Distance Scores by Birth Cohort

Despite different cohort composition in age-specific samples, the overall trend is consistent across age periods. Later cohorts tend to have shorter boxes dragged closer to the bottom. This suggests smaller distance from the stable, full-time career norm and less variation among the employment trajectories than those from earlier cohorts in terms of the overall sequence. The Greatest Generation had the largest median distance score (median=12.35, in Later Adulthood, age 55 to 65) and their trajectories were the most heterogeneous (half IQR=7.43, in Late Middle Age, age 45 to 54). On the contrary, the

latest cohort, Generation X, had the smallest median distance from the stable, full-time careers (median=1.49) as well as the most homogeneous trajectories within groups (half IQR=1.93) in Young Adulthood (age 25 to 34).

Gender Variations

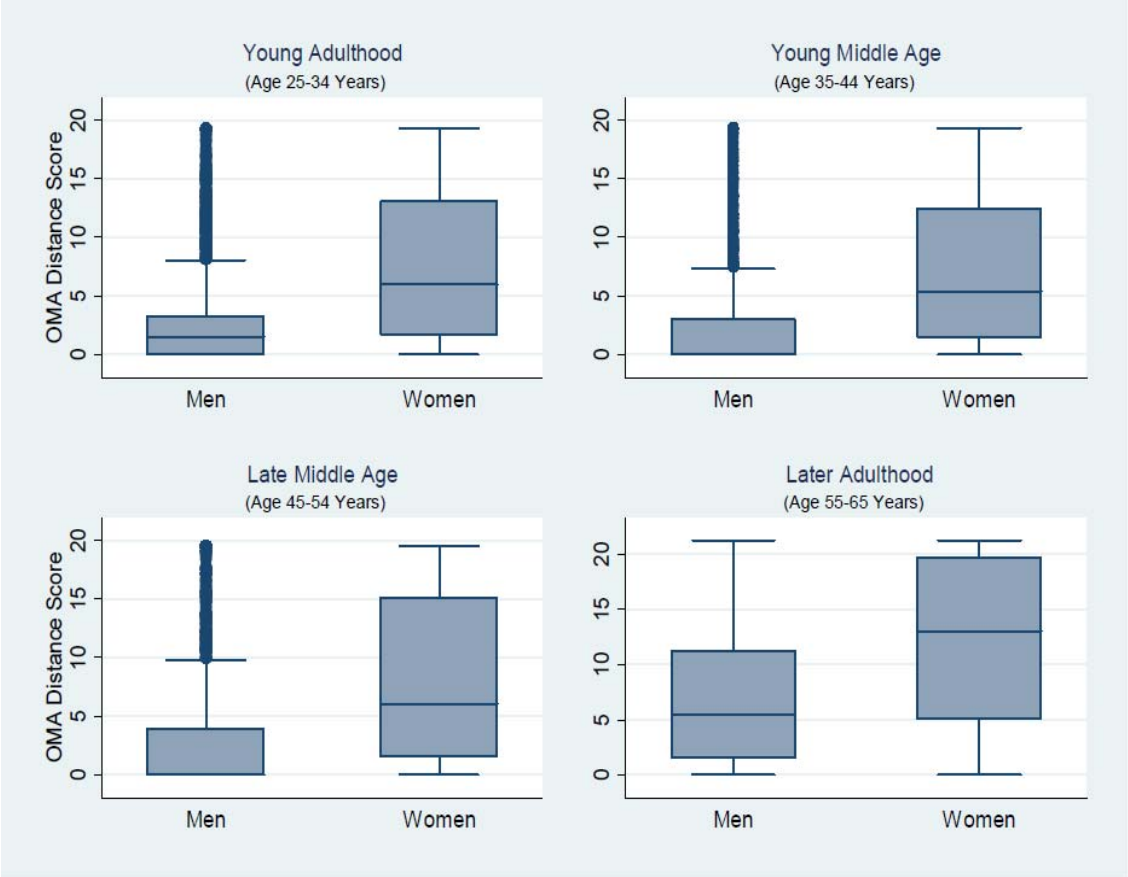


Figure 4.1.3. Box Plots of Optimal Matching Distance Scores by Gender

Figure 4.1.3 shows the box plots of distance scores for men and women, separately by age periods (see Table 4.1.1 for statistics). In each plot, women's boxes are larger and located higher than men's, which suggests a larger degree of deviation from the norm of the stable, full-time careers than men. During Later Adulthood (age 55 to 65), the gender difference declines as the men's box stretches upward greatly, even though the women's box moves up as well. In other words, after Age 55, both men and women deviated from the stable, full-time trajectory to a larger extent than in younger

ages; but this change in employment trajectories is more salient among men than among women. In the following section, further analysis will be discussed as to how the gender gap in the overall sequence of employment trajectories has changed in the U.S. during the past several decades.

4.1.2 Changing Gender Gap in the Overall Employment Trajectories Over Time

As Section 4.1.1 shows, women's employment trajectories have been more diverse and deviated further from the stable, full-time careers than men's in general. How has this gender difference in careers changed over time? To answer this question, the association between OMA distance scores and gender-by-cohort interactions were statistically tested.

Figure 4.1.4 consists of four line plots for the four age periods of interest. In each plot, men's and women's medians of OMA distance scores are connected by straight (men) or dashed lines (women) across birth cohorts to show the trend over time. No assumption was made about whether the trend would continue exactly along the line between two discrete cohorts.

The vertical bars on the top of a line represent the IQRs of men or women in a specific cohort. The lower end of a bar corresponds to the 25^{th} percentile and its upper end corresponds to the 75^{th} percentile of the distance scores among people in a subgroup. The longer the bar, the more diverse the employment trajectories are within a group. Therefore, this figure provides a picture of how the gender difference in the overall sequences of employment trajectories in the U.S. has changed over time as represented by cohort variations.

The first thing to be noticed in Figure 4.1.4 is that all lines decline to the right and the dashed lines always flow above the straight lines. This reflects the gender- or cohort-differences in OMA distance scores that we found earlier: regardless of ages, women's employment trajectories are further apart from the stable, full-time careers than men's; so are the trajectories of earlier cohorts as compared with those from the later cohorts.

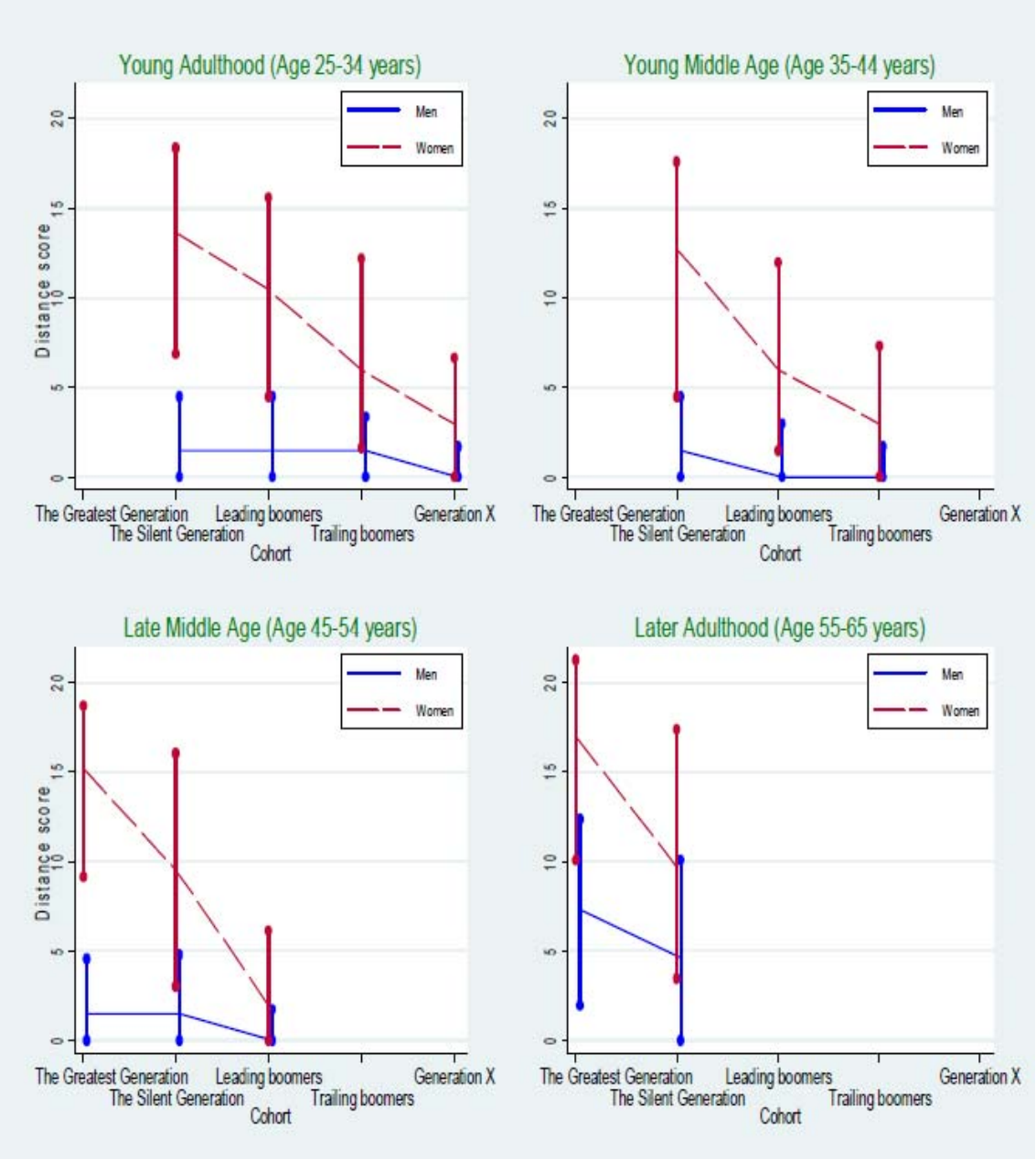


Figure 4.1.4. Distance from the Stable, Full-Time Career by Age Period: Median and Inter-quartile Range

Degree of Departure from the Stable, Full-time Trajectories

Although both are declining, women's median distance scores nevertheless decrease faster than men's which results in a shrinking gap in the overall sequence of

employment trajectories between genders. The largest decline in median distance scores among men occurs in Later Adulthood (age 55 to 65) between the Greatest Generation (median=7.33) and the Silent Generation (median=4.63). Other than that, men's median distance scores stay flat or go down only slightly between adjacent birth cohorts. Men from the two boomer cohorts are found to have the same median distance scores, which indicates no substantive difference before Age 54 in the overall trajectories among people born between 1946 and 1954 or those born between 1955 and 1964.

By contrast, women's median distance scores have declined more remarkably than men's, which reveals that women's employment trajectories became closer to the reference trajectories as well as those of men. For example, the largest gender gap can be found in Late Middle Age (age 45 to 54) among people from the Greatest Generation (Figure 4.1.4, lower left). As reflected by Table 4.1.2, this gender difference in medians is considerably large (13.68) given that the distance scores of the Greatest Generation of that age period range from 0 to 19.05. For the same age period (same plot), however, the gender difference sharply decreased to 7.80 among the Silent Generation and then 1.95 among Leading Boomers.

Diversity of Employment Trajectories

In the meantime, similar trends can be noticed in terms of *trajectory diversity*, which is represented by the length of bars in Figure 4.1.4. In general, the trajectories are more heterogeneous for women or people from earlier cohorts given their longer bars (larger half IQRs) than men or later cohorts. The gender differences in trajectory diversity, as expressed in half IQRs in Table 4.1.2, have basically decreased across cohorts. It suggests that more women are beginning to share similar paths of employment trajectories with each other than before. Men's changes in IQR bars are much less obvious. An exception is Later Adulthood (age 55 to 65) in which gender difference in half IQR has increased from 0.35 to 2.71. It results from the increase of women's half IQR between the Greatest Generation and the Silent Generation (from 5.80 to 6.95) accompanied by a slight decline in men's (from 5.45 to 4.25).

4.1.3 Statistical Tests for Gender and Cohort Associations with OMA Distance Scores

The findings about the associations between OMA distance scores and gender, cohort, and their interactions need to be statistically tested. Two statistical tests were performed—ANOVA and the Kruskal-Wallis test. The Kruskal-Wallis test (Kruskal and Wallis 1952) is a non-parametric method that evaluates the equality of groups by rank. Instead of using means as in ANOVA, it is based on medians. The Kruskal-Wallis test is an extension of the Mann-Whitney test which is restricted to two-group comparison. When the numeric, dependent variable in the statistical test is not normally distributed, the Kruskal-Wallis test is more appropriate than ANOVA.

To avoid big Type I error associated with the big sample size, a 20% random sample instead of the full data file was drawn and used in both ANOVA and the Kruskal-Wallis test. Moreover, as they are highly skewed (shown in Table 4.1.1 and Table 4.1.2), OMA distance scores were logged prior to statistical testing. For distance scores of 0, a small amount, 0.0001, was added before log transformation so that all cases had a valid value on the logged scale.

Finally, effect size was calculated to ensure that the gender- or cohort-variations found in ANOVA or the Kruskal-Wallis tests were not only statistically significant but also big in magnitude. Given these three criteria, an association with OMA distance scores is considered significant if the P values of both the ANOVA F test and the Kruskal-Wallis test are under 0.05 and its effect size is above 0.5.

Table 4.1.3 presents the results of statistical tests by four age periods. Within the panel for each age period, test statistics are tabulated in three columns for gender main effect, birth cohort main effect, and the interaction effects of gender and birth cohort. Test statistics suggest that no matter what forms of measures we examine--mean or median--distance scores are indeed significantly different by gender and birth cohort. The only association that fails to meet the strict additional testing criteria of having an effect size above 0.5 occurs to Later Adulthood (age 55 to 65) where the Greatest Generation and the Silent Generation did not remarkably differ in the overall sequences of their employment trajectories (effect size=0.45). In other words, the differences in employment trajectories after Age 45 primarily reflect the gender-, not cohort-,

Table 4.1.2 Gender Differences in Optimal Matching Distance Scores by Birth Cohort and Age Period

	The Greatest Generation (born 1907-1924)		The Silent Generation (born 1925-1945)		Leading boomers (born 1946-1954)		Trailing boomers (born 1955-1964)		Generation X (born 1965-1979)	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Young Adulthood (Age 25 to Age 34 Years)										
N			519	532	2,160	2,275	3,230	3,673	1,707	1,853
Median			1.49	12.50	1.49	9.87	1.49	5.98	0.00	2.99
half IQR			(2.24)	(6.10)	(2.24)	(5.47)	(1.62)	(5.35)	(0.87)	(3.33)
Gender gap†:										
in medians:			11.01		8.38		4.49		2.99	
in half IQRs:			(3.86)		(3.23)		(3.73)		(2.46)	
Young Middle Age (Age 35 to Age 44 Years)										
N			1,334	1,578	2,352	2,511	2,071	2,303		
Median			1.50	12.02	0.00	5.80	0.00	2.99		
half IQR			(2.25)	(6.55)	(1.50)	(5.24)	(0.87)	(3.66)		
Gender gap†:										
in medians:			10.52		5.80		2.99			
in half IQRs:			(4.31)		(3.75)		(2.80)			
Late Middle Age (Age 45 to Age 54 Years)										
N	252	292	2,090	2,420	1,274	1,336				
Median	1.52	15.2	1.52	9.32	0.00	1.95				
half IQR	(2.28)	(5.69)	(2.39)	(6.51)	(0.87)	(3.04)				
Gender gap†:										
in medians:	13.68		7.80		1.95					
in half IQRs:	(3.41)		(4.12)		(2.18)					
Later Adulthood (Age 55 to Age 65 Years)										
N	832	1,013	1,435	1,688						
Median	7.33	17.36	4.63	9.65						
half IQR	(5.45)	(5.80)	(4.25)	(6.95)						
Gender gap†:										
in medians:	10.03		5.02							
in half IQRs:	(0.35)		(2.71)							

Note:

† Gender gap is women's summary statistics minus men's

Table 4.1.3 Statistical Tests for Associations Between Optimal Matching Distance Scores and Gender, Birth Cohort, and the Interaction of Gender and Cohort *

	Young Adulthood (Age 25-34 Years) N=3,190			Young Middle Age (Age 35-44 Years) N=2,430		
	Gender	**Cohort**	**Gender x Cohort**	**Gender**	**Cohort**	**Gender x Cohort**
ANOVA[§] on Mean Distance Score (using a 20% random sample)						
F test statistics	556.45	50.82	108.43	408.39	22.86	99.81
Degree of freedom	(1)	(3)	(7)	(1)	(2)	(5)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Effect size [Δ]	**1.01**	**0.53**	**0.95**	**0.93**	**0.58**	**0.95**
Kruskal-Wallis tests on Median Distance Score (using a 20% random sample)						
Test statistics	718.08	166.69	863.98	433.33	129.18	639.74
Degree of freedom	(1)	(3)	(7)	(1)	(2)	(5)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

	Late Middle Age (Age 45-54 Years) N=1,533			Later Adulthood (Age 55-65 Years) N=994		
	Gender	**Cohort**	**Gender x Cohort**	**Gender**	**Cohort**	**Gender x Cohort**
ANOVA[§] on Mean Distance Score (using a 20% random sample)						
F test statistics	239.68	37.71	67.15	47.23	14.22	20.81
Degree of freedom	(1)	(2)	(5)	(1)	(1)	(3)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Effect size [Δ]	**0.89**	**0.68**	**1.02**	**0.74**	0.45	**0.59**
Kruskal-Wallis tests on Median Distance Score (using a 20% random sample)						
Test statistics	262.95	110.61	391.39	121.56	34.94	158.76
Degree of freedom	(1)	(2)	(5)	(1)	(1)	(3)
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Notes:

[*] All statistical tests were performed using a 20% random sample.

[§] For ANOVA F tests, OMA distance scores were logged in advance due to their skewness.

[Δ] Effect size (Cohen's d) = (M1-M2)/S, where M1 and M2 are the largest difference among group means, and S indicates standard deviation of pooled sample. Cohen's d is bolded if larger than 0.5, the conventional value for a modest effect.

differences in the PSID. The gender-by-cohort interactions, however, meet the three testing criteria during all four age periods throughout all tests in Table 4.1.3.

4.1.4 Section Summary

In Section 4.1, the employment trajectories from the PSID were analyzed through the OMA distance score, a numeric measure that represents the degree of departure of these trajectories from stable, full-time careers. Table 4.1.4 lays out the five hypotheses related to this section as well as the findings corresponding to each hypothesis.

Scholars who study the post-industrial labor market have suggested a pessimistic trend in which later cohorts have employment trajectories further diverging from the norm of the stable, full-time careers (Hypothesis 1.1, Tilly 1991, Wetzel 1995, Farley 1996, Benach et al 2002, Stone 2004). In addition, some life course scholars suggested increasing diversity in people's employment trajectories as careers have become individualized and destandardized (Hypothesis 1.3, Heinz 2003). However, findings from Section 4.1 nevertheless support alternative trends—people's employment trajectories in the U.S. are not only more homogeneous among themselves than before, but also becoming more similar to the stable, full-time trajectories.

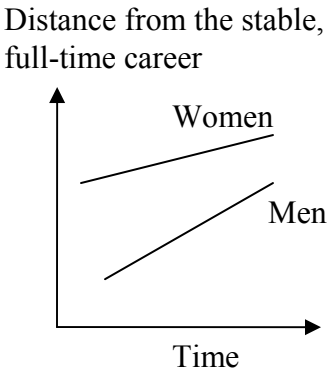


Figure 4.1.5a
(Hypothesis 2.2)

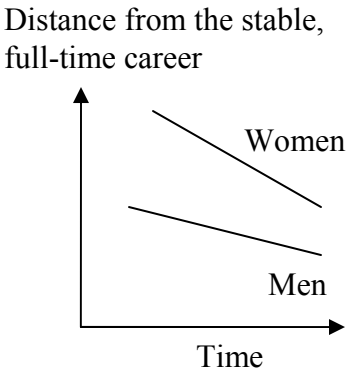


Figure 4.1.5b
(Finding)

Table 4.1.4 Summary of Hypotheses and Findings in Chapter Four

	Statement	Findings	Explanations
I. Cohort			
H1.1	Later cohorts have employment trajectories further diverging from the norm of stable, full-time careers.	Support Hypothesis 1.2: Later cohorts have employment trajectories converging towards the norm of the stable, full-time careers.	Although employment trajectories have become less stable, later cohorts have trajectories that increasingly resemble the normative careers due to a larger proportion of full-time employment and upward transitions.
H1.2	Later cohorts have employment trajectories converging towards the norm of stable, full-time careers.		
H1.3	The employment trajectories among later cohorts have become more diverse and heterogeneous than among earlier cohorts.	No. The employment trajectories among later cohorts have become more homogeneous than among earlier cohorts.	
II. Gender gap in careers			
H2.1	Gender gap in employment histories is expanding as women's employment trajectories have increasingly diverged from the norm of stable, full-time careers relative to men's.	Gender gap in employment histories is decreasing as women's employment trajectories have become increasingly closer to the norm of stable, full-time careers to a larger degree than men's.	Gender difference in career paths is best explained by lower proportion of full-time employment among women's trajectories than men's.
H2.2	Gender gap in employment histories is decreasing as men's employment trajectories have increasingly diverged from the norm of stable, full-time careers to a larger degree than women's.		Women have become more active in the labor force, especially full-time employment; far transitions have become less common for women than for men. Therefore, gender gap has declined over time.

Moreover, analyses from this section confirm that the gender disparity in careers has changed over time. Strong and significant gender-by-cohort interactions were found in OMA distance scores, after considering birth cohort and ages. Dual labor market theory about a "vicious circle" that emphasizes the cumulative disadvantages of women and minorities (Hypothesis 2.1) is not well supported by findings from this section. On the contrary, a converging trend was discovered (Hypothesis 2.1)--the gender difference in the overall employment trajectories has declined in later cohorts, which partially supports the 'converging divergence' prediction (Moen and Spencer 2006).

The hypothesis of a shrinking gender gap due to "feminization" of men's employment (Aronowitz and DiFazio 1994; Fondas 1996) is partially supported as well. Despite the narrowing gender gap, the mechanisms behind are surprising. Comparing across birth cohorts, the decline between genders in distance scores is found to result from the fact that women's careers have shifted *towards* the normative career stereotype and changed at a faster pace than men, rather than the opposite--men's careers have deviated away from that type of trajectories and faster than women's. In other words, more changes have taken place in women's employment trajectories overall, not men's. Furthermore, instead of rising, both men's and women's distances from the stable, full-time careers have decreased among later cohorts. Hypothesis 2.2 and the finding about declining gender gap in careers can be illustrated by Figure 4.1.5a and Figure 4.1.5b, respectively.

4.2 GENDER, BIRTH COHORT, AND CHARACTERISTICS OF EMPLOYMENT TRAJECTORIES

Findings from Section 4.1 seem counter-intuitive to what are suggested by some sociologists or common sense about the labor market in the U.S. However, it should be noticed that above analyses were all based on OMA distance scores alone. Despite being a powerful tool that enables comparison of a large number of trajectories convenient by condensing a *whole sequence* into a single quantity, the OMA distance score by definition is highly rough and abstract. Although its estimation takes into account

important characteristics embedded in a trajectory and avoids the loss of such information, it cannot tell *how* trajectories *differ from each other in a straightforward manner*. To answer this question, we need an anatomical approach that examines the various characteristics or components of a trajectory in terms of its episodes, transitions, and states.

The following section presents the primary findings from the series of statistical tests conducted to test the associations of each of the 10 basic trajectory characteristics with gender, birth cohort, or their interactions. Beyond what were found at the level of the OMA distance scores in Section 4.1, this anatomical approach helps to understand *in what ways* the employment trajectories of men and women have changed over time in the U.S. It also provides explanations for the seemly counter-intuitive trends found in the prior section.

Analyses were carried out separately for four age periods, as summarized in Table 4.2.1 to Table 4.2.4, respectively. Each table consists of three sections for statistical tests about (I) gender-, (II) cohort-, and (III) gender-by-cohort variations on the 10 trajectory characteristics. In each section, variables are organized under two big categories. The first group includes four numeric variables (V1-V4) that represent the characteristics of states or employment statuses in trajectories. The second group includes six variables related to episodes or transitions (V5-V10), the last two of which are categorical (V9-V10). Age-specific summary statistics on these 10 trajectory characteristics can be found in Appendix C.

Because of the large sample size, strict criteria were again applied in statistical testing to counteract the potential risk of a large Type I error. For numeric variables, three criteria were used—an F test in ANOVA on the full sample, a Kruskal-Wallis test on a 20% random sample, and effect size. The hypothesis of a lack of association between a trajectory characteristic and gender or cohort was considered rejected only when both the ANOVA F test and Kruskal-Wallis test were significant and the effect size was above 0.5. For categorical variables (V9 and V10), Chi-square tests were carried out on a full sample as well as a 20% random sample. Test statistics and degrees of freedom for these

tests are shown in boxes in the tables. Significant subgroup differences were declared when both sets of Chi-square tests were found significant at the alpha 0.05 level.

Young Adulthood: Age 25 to Age 34 Years

(I) Gender

Proportions of Time on Each State in a Trajectory. Findings about the associations between characteristics of employment trajectories and gender, birth cohort, as well as the gender-by-cohort interactions in Young Adulthood (age 25 to 34) are shown in Table 4.2.1. The first four variables related to the 'states' in a trajectory capture the proportion of time a person spent on each of the four employment statuses. Together, these four measures reveal how a person's time is distributed in terms of employment statuses over a ten-year period.

Given the three testing criteria, significant and sizable gender variations are found on V1 and V4. This suggests that the gender differences that were found earlier on the overall sequences of employment trajectories (as expressed by OMA distance scores) primarily lie in the different distribution of time on full-time employment (V1) and the time being economically inactive (V4) between men and women. Regardless of birth cohort, men spent 77.57% of their Young Adulthood (age 25 to 34) on full-time employment and less than 5% (4.44%) outside of the labor force. Women, on the contrary, had a bigger component of economically inactive status (27.13%) and a much lower proportion of full-time employment (42.53%).

Duration and Pacing of Episodes. The next four measures are related to episodes in trajectories--the number of episodes in a sequence (V5), the average and maximum duration (V6, V7) of those episodes, and the difference in duration between a person's longest and shortest episodes (V8). Women's trajectories between Age 25 and Age 34 are found to be less stable than men's because they had more episodes (3.19 episodes on average) than men (2.27 episodes) (ANOVA F test p value<0.001, Kruskal-Wallis test p value < 0.001, and effect size=0.51).

Modal Transitions. The bottom of Section I, Table 4.2.1 reveals the gender differences in the scope of modal transition in a person's employment trajectory (V9) as

well as its direction (V10). Both measures are restricted to people who had more than one employment status during Young Adulthood (age 25 to 34). Of those who made any transitions or changes to their employment status, men and women are found significantly different in the scope of their most often transitions. For only less than one-third of men (29.19%) the modal transition was a 'far transition' crossing the boundary of the labor market—between employment (full-time or part-time) and unemployment or an economically inactive status. Among women, the chance of having such modal transitions was much higher (52.26%). In other words, young women are more likely than young men to experience employment transitions of a larger scope which may relate to the low stability of their trajectories. With regard to the direction of movement, both men and women tended to make downward transitions than upward modal transitions (from full-time to part-time, or from employment to non-employment). But the gender difference is not significant in the Chi-square test on a 20% random sample (F statistics=0.02, d.f.=1, P>0.5).

Above analyses based on Section I in Table 4.2.1 tell why or in which ways the gender difference exists in Young Adulthood (age 25 to 34). They suggest that young women spent more time outside of the labor force and less time working full-time than young men as well as had a larger number of episodes; their transitions tended to run across the boundary of the labor market. All of these contributed to the larger distance between women's employment trajectories and the stable, full-time careers when compared with men's.

(II) Birth Cohort

The middle section of Table 4.2.1 presents the results of the statistical tests about cohort variations on trajectory characteristics in Young Adulthood (age 25 to 34). The PSID cases included in the analytical sample for this age period came from four birth cohorts—the Silent Generation, Leading Boomers, Trailing Boomers, and Generation X. Because of the requirement of full overlap between the PSID and this ten-year age period, only people born between 1942 and 1971 from those birth cohorts were selected. In other

words, some people from the Silent Generation and Generation X were ignored for being too young or too old.

Overall, cohort variations seem to be less salient than gender differences in this age period. Significant variations among the four birth cohorts are found only on two trajectory characteristics—the scope (V9) and direction (V10) of modal transitions, both of which indirectly relate to the degree of stability of a trajectory. Far modal transitions have become increasingly common among later cohorts, especially the Trailing Boomers and Generation X (44.27% and 50.40% from below 40%). As for the direction of transitions, comparisons across cohorts reveals that cohort variations are generally driven by Generation X. Compared with the earlier cohorts, people from Generation X were less likely to experience downward modal transitions (61.58%) (from full-time to part-time employment, or from employment to unemployment or to being out of the labor force). Statistics on episode characteristics (V5-V8) suggest shorter episodes among later cohorts. But the sizes of the effects are all below 0.5.

The above findings help to explain the smaller distance scores in later cohorts between Age 25 to 34 years. Their employment trajectories look more similar to those of the stable, full-time careers than earlier cohorts because of the kinds of transitions they experienced in Young Adulthood (age 25 to 34), not because of how much time they spent across the four employment statuses or the characteristics of their employment episodes.

(III) Gender-and-Cohort Interactions

The bottom section of Table 4.2.1 summarizes the statistical tests carried out to investigate whether gender differences in trajectory characteristics vary by birth cohorts. Because of the width limit of the tables, only column percentages, not count, are presented. The analysis provides a more detailed explanation as to why women's and men's employment trajectories have become more similar to one another in the later birth cohorts. It suggests that the change in the scope of modal transitions plays a key role in the shrinking gender gap in the overall employment trajectories during Young Adulthood (age 25 to 34). "Far transitions" have become more common among men (from 12.23%

to 46.09%) but slightly less common among women (from 60.17% to 52.60%). At the time when Generation X reached Young Adulthood (age 25 to 34), the gender difference almost disappeared. The men-driven converging pattern can be observed from Figure 4.2.1.

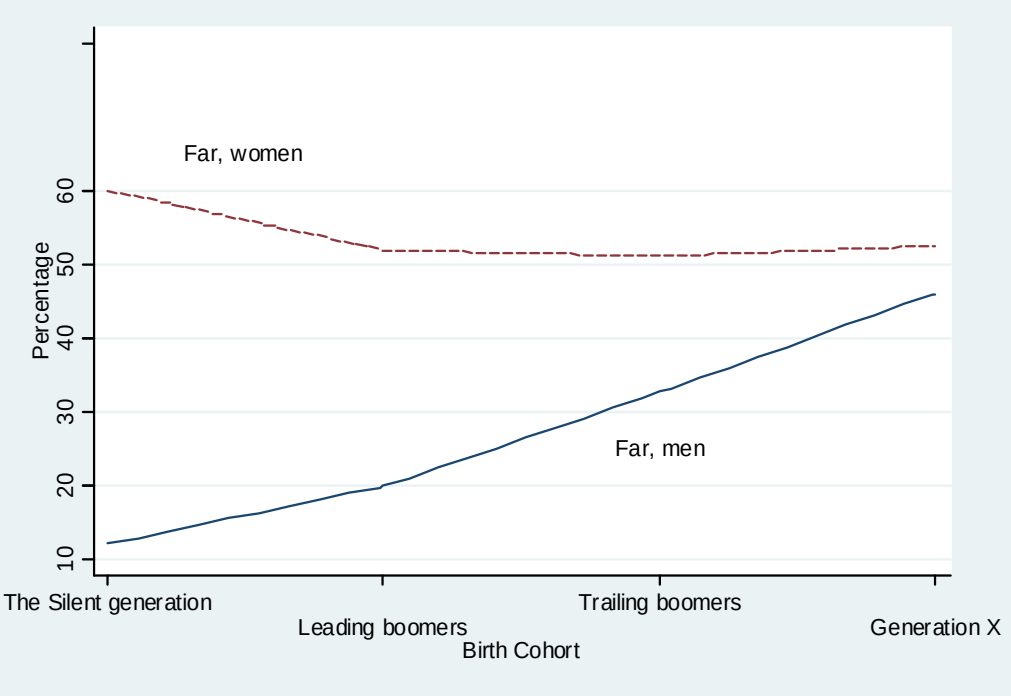


Figure 4.2.1. Scope of Modal Transitions: Young Adulthood (Age 25 to 34 Years)

Figure 4.2.2 presents the bar plots for the proportion of time spent on each employment status for men and women by birth cohort. Towards later cohorts, women are catching up with an increase in full-time employment and decrease in the time outside of the labor force. However, when evening out marginal cohort variations with men's distributions, the gender-by-cohort interactions on time distribution in employment trajectories are not remarkable (effect sizes <0.5).

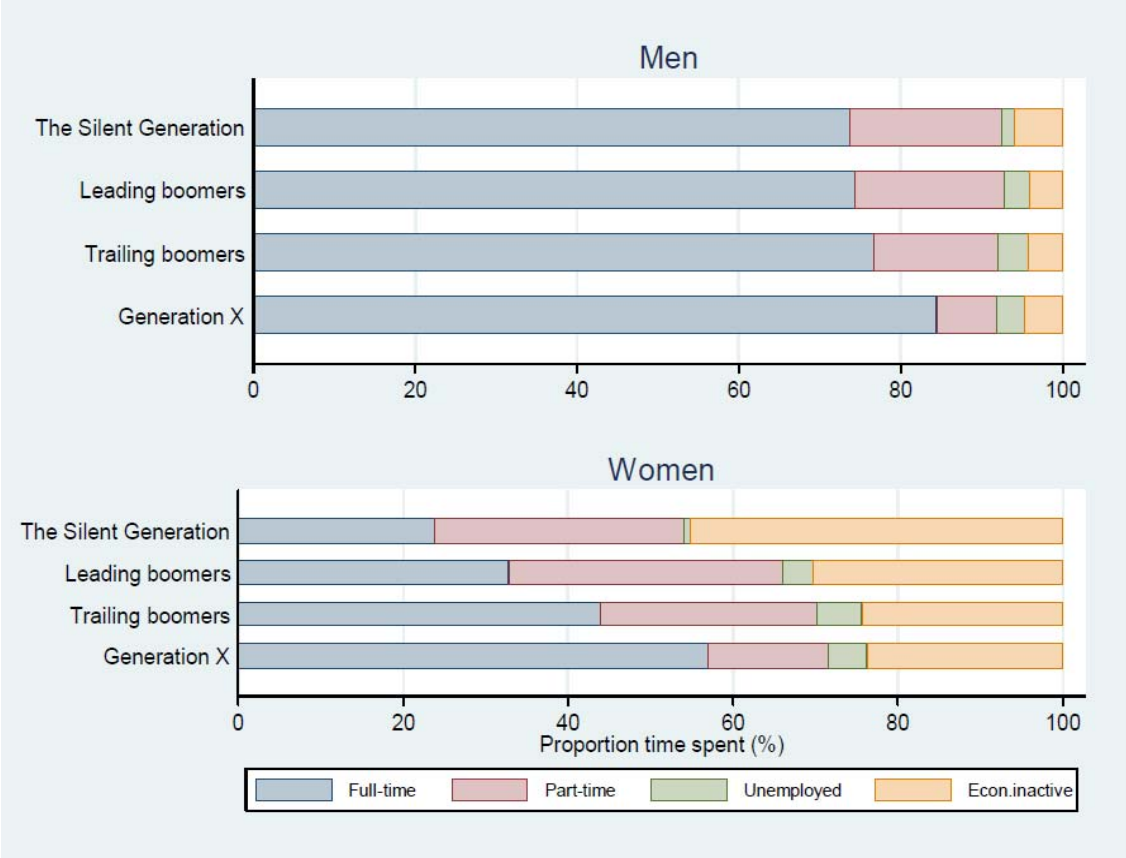


Figure 4.2.2. Proportion Time Spent on Each Employment Status: Young Adulthood (Age 25 to 34 Years)

Young Middle Age (Age 35 to 44 Years)

Similar analyses were conducted for three other age periods as well and results were summarized in Tables 4.2.2 to 4.2.4 with the same layout. The analytical sample for Young Middle Age (age 35 to 44) consists of 12,149 men and women from three birth cohorts: Trailing Boomers, Leading Boomers, and people from the Silent Generation (together born in 1932 to 1961).

Gender. Between men and women, significant differences were found primarily in characteristics of the states of trajectories as well as modal transitions (see Table 4.2.2). First, being a woman is negatively associated with full-time employment but positively associated with part-time work and an economically inactive status in Young Middle Age (age 35 to 44). Regardless of the length of employment trajectories, men on

average spent 79.42% of their Young Middle Age (age 35 to 44) on full-time work (V1), 11.34% on part-time work (V2), and 6.18% outside of the labor force (V4). In contrast women spent much less time on full-time employment (46.64%) but more time on part-time work (23.86%) and especially more time, being economically inactive (25.90%).

In Young Adulthood (age 25 to 34), women's employment trajectories consisted of a larger number of episodes than men's. During Young Middle Age (age 35 to 44 years), not only did both men and women have fewer episodes (2.93 for women and 2.13 for men), but their difference also decreased. The size of this gender effect dropped below 0.5, even though both ANOVA and the Kruskal-Wallis test were significant. Besides fewer episodes, compared with those from Young Adulthood (age 25 to 34), the employment trajectories between Age 35 and Age 44 years were associated with longer episodes (V6 and V7) that were more compatible in length (V8). No remarkable gender difference was found in any of the trajectory characteristics related to episodes. This can be interpreted as that Young Middle Age (age 35 to 44) is a period when both men's and women's careers are more stable than in younger ages and their differences are not as large as before.

Men and women continued to differ in the characteristics of their most frequent transitions (V9 and V10). The gender contrasts in modal transitions were the same as those in Young Adulthood (age 25 to 34): men's trajectories remained more positively related to near (69.00%) and downward (70.78%) transitions; women were more likely to experience "far" transitions across the boundary of employment and non-employment statuses (45.44%) and upward transitions (41.31%). In spite of these associations between modal transitions and gender, the differences between men's and women's trajectories are smaller in Young Middle Age (age 35 to 44) as compared to Young Adulthood (age 25 to 34).

Birth Cohort. Cohorts are different in terms of episode duration and modal transitions. Trajectories from the later cohorts look less stable. The longest episode of a typical person from the Silent Generation lasted 6.09 years, longer than half of this ten-year age period as a whole. It was shorter among Leading Boomers (5.12 years) and the

shortest among Trailing Boomers (4.11 years). In terms of modal transitions, later cohorts had more far transitions (V9) across the boundary of the labor market than earlier cohorts but were negatively related to downward transitions (V10).

Gender and Cohort Interactions. The trends of the changes in gender gaps regarding trajectory characteristics in Young Middle Age (age 35 to 44) are similar with what we have found in Young Adulthood (age 25 to 34). On one hand, neither the characteristics about the states in trajectories (V1-V4) nor those about episodes (V5-V8) have sufficiently large interaction effects (> 0.5). Despite the gender differences in the distribution of time in employment statuses, these gender variations have not considerably changed by birth cohort. In other words, these variations mostly exist between men or women, not by cohort.

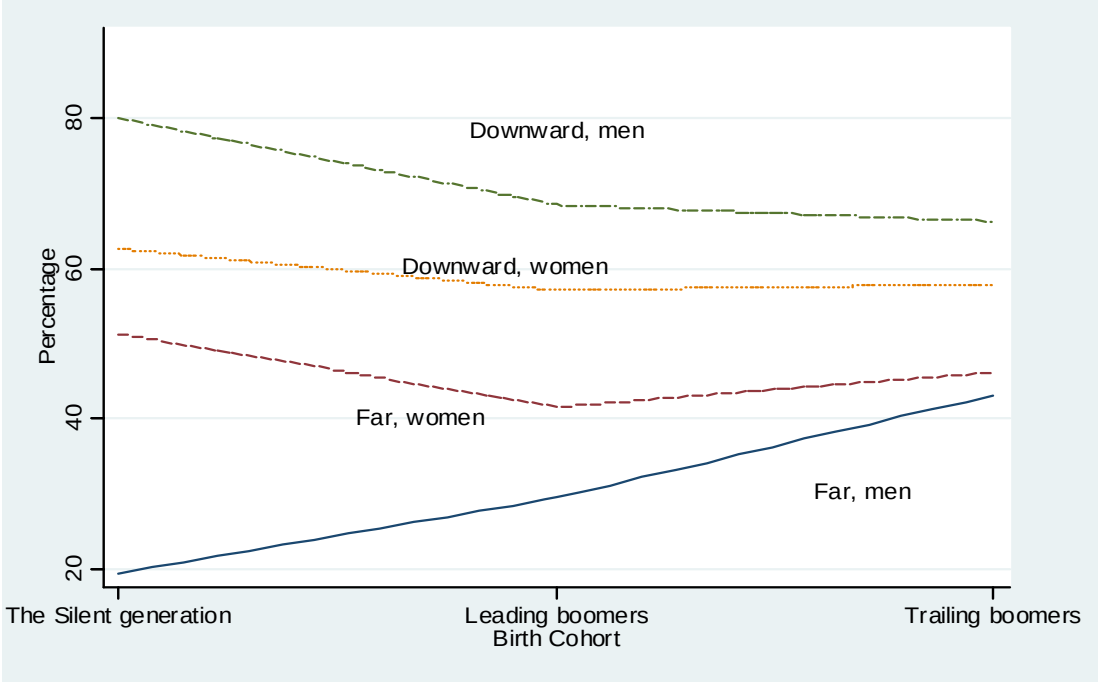


Figure 4.2.3. Scope and Direction of Modal Transitions: Young Middle Age (Age 35 to 44 Years)

On the other hand, the differences between men and women in the characteristics of modal transitions are smaller over time. As more men have switched from moving

within the boundary of the labor market ("near transitions") to transitions across this boundary ("far transitions"), women have followed a flat, U-shaped trend (Figure 4.2.3). Due to the different paths that men and women have experienced, the gender difference in the scope of modal transition was quite slim when Trailing Boomers entered their Young Middle Age (age 35 to 44).

Late Middle Age (Age 45 to Age 54 Years)

When trajectory characteristics are examined, the ways that employment trajectories are related to the gender and birth cohort are similar between the two middle age periods with only minor variations. The analytical sample for Late Middle Age (age 45 to 54) shifts to people born between 1922 and 1951 from the Greatest Generation, the Silent Generation, and Leading Boomers. In total, this analytical sample contains 7,644 employment trajectories from the PSID family heads and their spouses between Age 45 and 54 Years.

Gender. The gender differences on trajectory characteristics in Late Middle Age (age 45 to 54) are displayed in Table 4.2.3, Section I. Women's employment trajectories in this age period are significantly associated with less full-time employment (V1), more time outside of the labor force (V4), and more far transitions between work and non-work statuses (V9). However, women's trajectories demonstrate fewer downward modal transitions (V10) than men's. Also, when compared with Young Middle Age (age 35 to 44), the strength of these gender associations has loosened given the decrease in effect sizes or test statistics. The positive association between women and part-time employment (V2), which used to be significant in the younger age period, no longer stand out.

Cohort. As in Young Middle Age (age 35 to 44), a significant cohort difference can be noticed in the duration of the longest episode in Late Middle Age (age 45 to 54). The later a cohort, the shorter the longest episode (P value < 0.001 in both ANOVA and the Kruskal-Wallis test, effect size=0.60). However, there are two changes in Late Middle Age (age 45 to 54). First, the three cohorts spent different proportions of time in full-time employment (V1) in Late Middle Age (age 45 to 54) (P value < 0.001 in both ANOVA

and Kruskal-Wallis test, effect size=0.53). Full-time employment consumed about 45.57% of the 10-year period among people from the Greatest Generation. It increased to 52.22% among the Silent Generation and then leaped to 71.50% for Leading Boomers. Alternatively speaking, the full-time component has become increasingly dominant in employment trajectories among later cohorts. However, previously significant cohort variations in the both the scope (V9) and the direction (V10) of the modal transitions disappeared once men and women enter Late Middle Age (age 45 to 54).

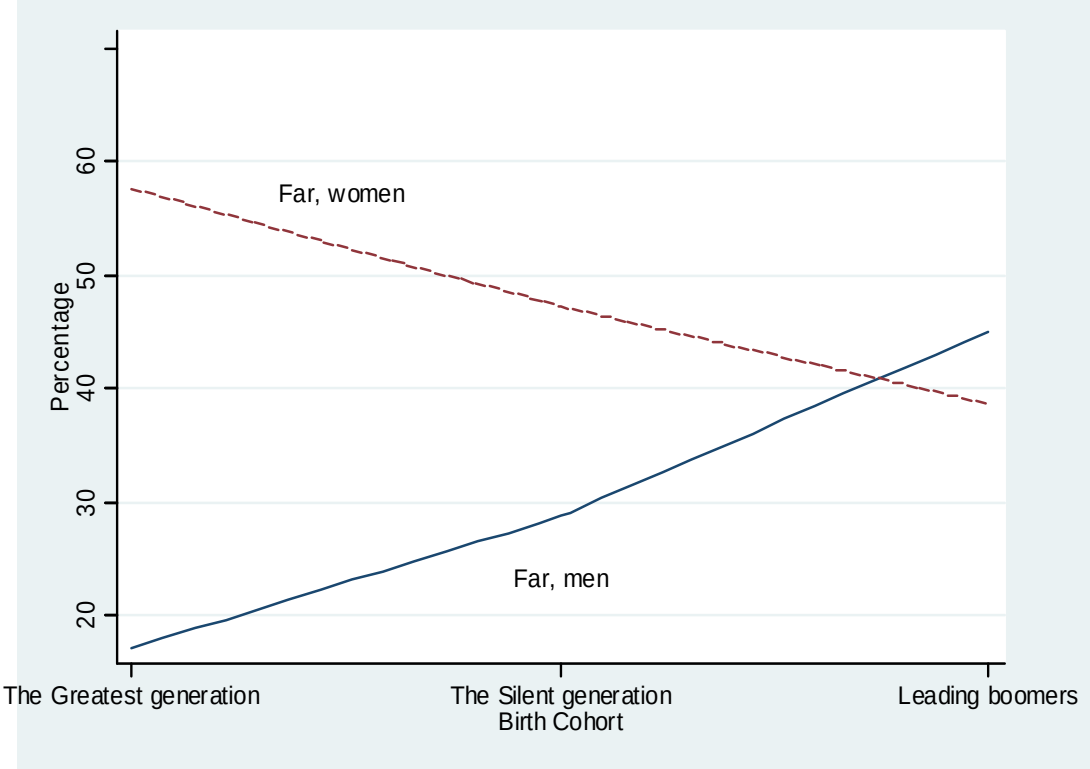


Figure 4.2.4 Scope of Modal Transitions:
Late Middle Age (Age 45 to 54 Years)

Gender-and-Cohort Interactions. The only significant gender-by-cohort interaction is about the scope of modal transitions (V9) where a converging trend is found between men and women by cohort. For example, far modal transitions across the boundary of the labor market became more prevalent for men as they became less common for women (see Figure 4.2.4). For the Greatest Generation, 17.09% men had far

modal transitions while the percentage for women was 57.65%. For Leading Boomers, however, the order of contrast was reversed as men become more likely to have far transitions (45.05%) than women (38.67%). In the meantime, despite the gender differences regarding the direction of modal transitions (V10) and the proportion of time spent on full-time (V1) or in an economically inactive status (V4), the magnitude and direction of these differences did not change dramatically in later cohorts.

Later Adulthood (Age 55 to Age 65 Years)

Finally, in examining the last age period, only two birth cohorts were included in the analytical sample which consisted of 4,968 men and women from either the Greatest Generation or the Silent Generation born between 1912 and 1940. Results from the statistical testing are displayed in Table 4.2.5.

Gender. Analysis of OMA distance scores from Section 4.1 suggested that when people entered Later Adulthood (age 55 to 65), the overall differences in their employment trajectories existed mainly by gender, not so much by cohort. Table 4.2.4 shows that women's negative association with full-time employment and positive association with time spent outside of the labor force persists into Later Adulthood (age 55 to 65). Nevertheless, these two gender differences did not change by birth cohort as no significant gender-by-cohort interactions were found (III, Table 4.2.5).

Birth Cohort. Although the type of modal transitions does not differ significantly between men and women overall, it does vary slightly between the two birth cohorts in terms of direction of transition (V10). Downward modal transitions are found to be less common for the Silent Generation (78.61%) than for the Greatest Generation (89.09%) (II, Table 4.2.4). Furthermore, the degree of the decline in the prevalence of downward modal transitions depends on gender. As it decreased for both men and women, this declining trend is more salient among women (Figure 4.2.5). The gender-by-cohort interaction on the direction of modal transitions is significant (V10, III in Table 4.2.4). The findings from Section 4.2 are briefly summarized in Appendix D.

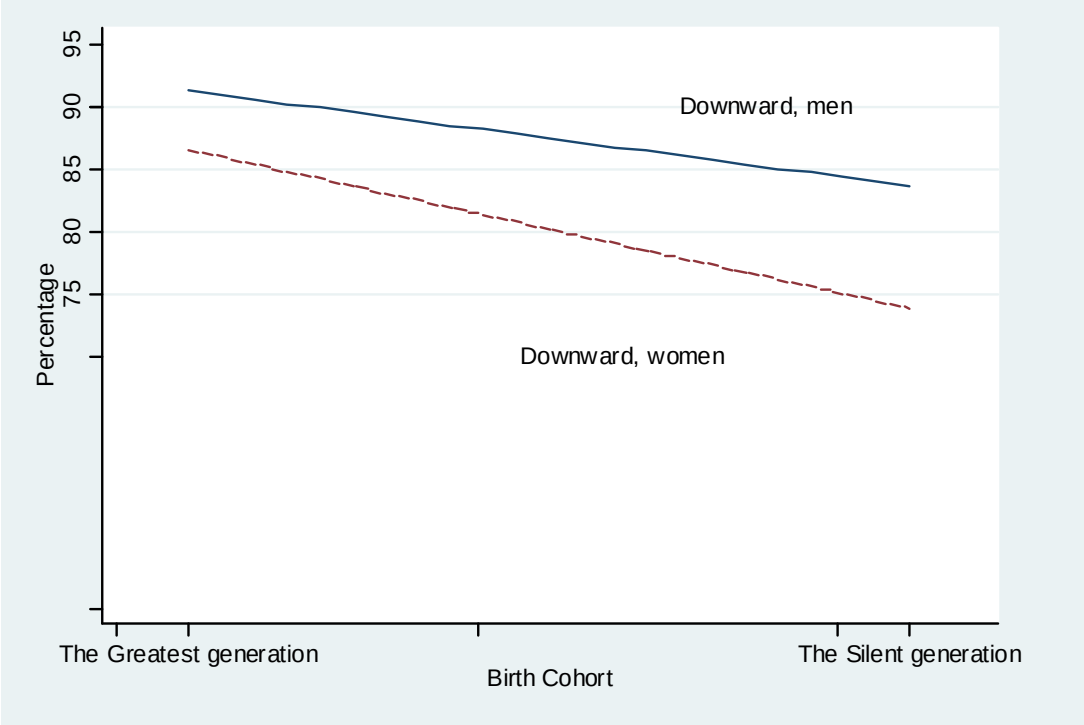


Figure 4.2.5. Direction of Modal Transitions:
Later adulthood (Age 55 to 65 Years)

4.3 CHAPTER SUMMARY

In this chapter, OMA distance scores of a large sample of PSID employment trajectories were thoroughly investigated at two levels. At the first level, the focus was purely the OMA distance score that represents the degree of departure for a person's employment trajectory from the stable, full-time careers.

Analyses from Section 4.1 reveal that employment trajectories in the U.S. have become more homogeneous and more similar to the paths of the career norm. Although women have deviated from the norm of stable, full-time careers to a larger degree than men, the gender difference in employment trajectories nevertheless became smaller among the later cohorts and older ages. Variation in employment trajectories in Later Adulthood (age 55 to 65) was better explained by gender, not by birth cohorts.

In Section 4.2, an anatomical approach was taken to examine employment trajectories at a finer level through a series of characteristics related to the states,

episodes, and transitions embedded in trajectories. Analyses at this finer level help explain *why* the employment trajectories of the PSID cases are different as well as make sense of the prior findings at the level of OMA distance scores.

These analyses reveal that employment trajectories looked less stable among later cohorts than those from earlier cohorts due to a larger number of shorter episodes and employment transitions across the boundary of the labor market. However, the distance from the norm of stable, full-time careers has become actually smaller *when trajectories were studied as wholes*. Two reasons have contributed to this trend. First, the proportion of full-time employment was larger among later cohorts. Second, the kinds of transitions they made were likely to be upward—moving into employment or from part-time to full-time jobs. Therefore, as far as the *overall trend* of trajectories is concerned, later cohorts have smaller OMA distance scores.

Analyses in Section 4.2 also suggest that women's further departure from the stable, full-time careers than men can be explained by their time allocation on the four employment statuses and the scope of their modal transitions. Women have spent much less time on full-time employment but more time outside of the labor force. This gender difference was robust and persistent through all age periods and birth cohorts. In the mean time, time on part-time employment is not an important explanatory factor for the gender gap, except in Young Middle Age (age 35 to 44). It suggests that full-time employment, not employment in general, matters for how close a person's career path is to the norm. Moreover, women have also been positively associated with far modal transitions which run across the boundary of the labor market rather than switching between full-time and part-time work, which is one of the indicators of low stability of their trajectories.

Finally, the shrinking gender gap in the overall employment trajectories (as represented by OMA distance scores) can be further interpreted based on analyses of trajectory characteristics. Results suggest that one of the driving forces of decreasing gender differences in employment trajectories is that men and women have changed in opposite directions in terms of the scope of modal transitions. From Young Adulthood

(age 25 to 34) to Late Middle Age (age 45 to 54), far transitions (between employment and unemployment or being out of the labor force) became less common for women and more common for men. As a result, the gap between them has declined dramatically. Accompanied by women's increasing participation in full-time employment, the distance between women and men or between women's career paths and the stable, full-time paths has decreased. In the next chapter, the primary patterns among PSID employment trajectories are discussed and the path dependence in employment histories across age periods are examined.

Table 4.2.1 Characteristics of Employment Trajectories During Young Adulthood (Age 25 to 34 Years)*: The Panel Study of Income Dynamics, 1967-2005 (N=15,949)

	Variable[§]	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	ANOVA F test statistics (d.f.=1)	Kruskal-Wallis tests[‡] (d.f.=1)	Effect size[Δ]
I. Gender		**Men**	**Women**									
	States:											
	Proportion of time spent on each state (100=whole sequence)											
V1	Employed full-time (%)	77.57	42.53							2358.22 ***	713.24 ***	**1.05**
		(29.83)	(36.83)									
V2	Employed part-time (%)	14.66	25.77							145.66 ***	159.27 ***	0.46
		(21.69)	(26.82)									
V3	Unemployed or absent from work (%)	3.34	4.57							47.94 ***	19.15 ***	0.10
		(11.56)	(12.23)									
V4	Economically inactive (%)	4.44	27.13							115.06 ***	646.59 ***	**0.81**
		(16.79)	(35.72)									
	Episodes and transitions:											
V5	Number of episodes in sequence	2.27	3.19							1036.55 ***	163.35 ***	**0.51**
		(1.58)	(1.99)									
V6	Average duration of episodes	4.00	3.15							356.88 ***	49.25 ***	0.30
		(3.06)	(2.61)									
V7	Duration of the longest episode	4.93	4.41							62.36 ***	14.61 ***	0.18
		(3.01)	(2.70)									
V8	Maximum difference in duration among episodes	1.57	2.05							12.65 ***	70.87 ***	0.22
		(2.17)	(2.12)									
	Among people with two or more employment statuses (N=9,628):											
V9	Scope of modal transition:											
	Far (between work and non-work)	29.19%	52.26%									
	Other transitions	70.81%	47.74%									
	Total	100%	100%									
V10	Direction of modal transition:											
	Downward	68.22%	65.60%									
	Other transitions	31.78%	34.40%									
	Total	100%	100%									

Chi-square test statistics (d.f.)	
Full sample:	20% random sample:
494 *** (1)	101.36 *** (1)
7.06 ** (1)	0.02 (1)

Table 4.2.1 Characteristics of Employment Trajectories During Young Adulthood (Cont.)

	II. Birth Cohort	**The Silent Gen.**	**Leading boomers**	**Tailing boomers**	**Gen. X**			**ANOVA F test statistics (d.f.=3)**	**Kruskal-Wallis tests‡ (d.f.=3)**	**Effect size$^{\Delta}$**
	States:									
	Proportion of time spent on each state (100=whole sequence)									
V1	Employed full-time (%)	48.49	53.01	59.28	70.21			112.89 ***	92.85 ***	0.41
		(40.31)	(38.44)	(37.23)	(35.21)					
V2	Employed part-time (%)	24.53	26.05	21.10	11.07			58.26 ***	157.07 ***	0.43
		(27.54)	(27.70)	(24.96)	(17.54)					
V3	Unemployed or absent from work (%)	1.20	3.45	4.68	4.12			4.74 **	34.19 ***	0.22
		(7.18)	(11.42)	(12.23)	(12.88)					
V4	Economically inactive (%)	25.79	17.49	14.94	14.61			26.68 ***	23.00 ***	0.25
		(37.89)	(31.63)	(28.79)	(29.21)					
	Episodes and transitions:									
V5	Number of episodes in sequence	2.58	2.90	2.81	2.50			35.88 ***	29.27 ***	0.15
		(1.75)	(1.90)	(1.89)	(1.80)					
V6	Average duration of episodes	4.42	4.02	3.48	2.88			140.53 ***	72.25 ***	0.38
		(3.32)	(3.14)	(2.82)	(2.23)					
V7	Duration of the longest episode	5.63	5.28	4.59	3.74			225.81 ***	148.94 ***	0.47
		(3.14)	(2.96)	(2.83)	(2.42)					
V8	Maximum difference in duration among episodes	2.07	2.09	1.82	1.42			47.72 ***	57.21 ***	0.22
		(2.40)	(2.26)	(2.15)	(1.90)					
	Among people with two or more employment statuses (N=9,628):									
V9	Scope of modal transition:					**Chi-square test statistics (d.f.)**				
	Far (between work and non-work)	39.08%	38.70%	44.27%	50.40%		20% random			
	Other transitions	60.92%	61.30%	55.73%	49.60%	Full sample:	sample:			
	Total	100%	100%	100%	100%	66.98 ***	23.53 ***			
						(3)	(3)			
V10	Direction of modal transition:									
	Downward	65.66%	68.61%	67.42%	61.58%					
	Other transitions	34.34%	31.39%	32.58%	38.42%	26.58 ***	8.15 *			
	Total	100%	100%	100%	100%	(3)	(3)			

Table 4.2.1 Characteristics of Employment Trajectories During Young Adulthood (Cont.)

III. Gender-Birth Cohort Interactions	The Silent Generation		Leading boomers		Trailing boomers		Generation X		ANOVA F test statistics (d.f.=7)	Kruskal-Wallis tests‡ (d.f.=7)	Effect size$^{\Delta}$
States:	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**			
Proportion of time spent on each state (100=whole sequence)											
V1 Employed full-time (%)	73.74	23.84	74.28	32.81	76.71	43.94	84.50	57.03	51.79 ***	815.76 ***	0.42
	(31.78)	(31.54)	(30.71)	(33.88)	(29.98)	(36.22)	(26.50)	(37.06)			
V2 Employed part-time (%)	18.79	30.12	18.51	33.21	15.26	26.24	7.39	14.46	13.35 ***	337.72 ***	0.38
	(24.28)	(29.35)	(23.35)	(29.55)	(22.05)	(26.22)	(15.32)	(18.74)			
V3 Unemployed or absent from work (%)	1.54	0.88	3.14	3.75	3.75	5.49	3.36	4.82	0.61	74.27 ***	0.12
	(8.40)	(5.74)	(11.87)	(10.97)	(11.55)	(12.75)	(11.94)	(13.65)			
V4 Economically inactive (%)	5.92	45.16	4.07	30.23	4.27	24.33	4.75	23.69	1.43	600.62 ***	0.36
	(21.53)	(40.30)	(16.73)	(36.77)	(15.69)	(33.96)	(17.22)	(34.56)			
Episodes and transitions:											
V5 Number of episodes in sequence	2.26	2.89	2.46	3.31	2.29	3.27	1.99	2.97	4.38 **	219.51 ***	0.38
	(1.53)	(1.88)	(1.70)	(1.99)	(1.61)	(1.99)	(1.33)	(2.03)			
V6 Average duration of episodes	4.65	4.20	4.43	3.62	4.00	3.02	3.26	2.53	3.93 **	140.98 ***	0.37
	(3.39)	(3.23)	(3.29)	(2.93)	(3.07)	(2.48)	(2.44)	(1.96)			
V7 Duration of the longest episode	5.71	5.55	5.53	5.03	4.91	4.30	3.95	3.54	1.68	140.79 ***	0.38
	(3.21)	(3.07)	(3.09)	(2.81)	(3.01)	(2.62)	(2.55)	(2.28)			
V8 Maximum difference in duration among episodes	1.82	2.31	1.87	2.30	1.53	2.08	1.20	1.61	2.45	130.27 ***	0.26
	(2.39)	(2.39)	(2.32)	(2.17)	(2.15)	(2.11)	(1.84)	(1.93)			
Among people with two or more employment statuses (N=9,628):											
V9 Scope of modal transition:									**Chi-square test statistics**		
Far (between work and non-work)	12.23%	60.17%	20.03%	52.04%	32.76%	51.22%	46.09%	52.60%		20% random	
Other transitions	87.77%	39.83%	79.97%	47.96%	67.24%	48.78%	53.91%	47.40%	Full sample:	sample:	
Total	100%	100%	100%	100%	100%	100%	100%	100%	655.00 ***	150.17 ***	
V10 Direction of modal transition:									(7)	(7)	
Downward	66.91%	64.69%	70.78%	67.06%	69.13%	66.40%	61.05%	61.85%			
Other transitions	33.09%	35.31%	29.22%	32.94%	30.87%	33.60%	38.95%	38.15%	34.84 ***	13.07	
Total	100%	100%	100%	100%	100%	100%	100%	100%	(7)	(7)	

Table 4.2.1 Characteristics of Employment Trajectories During Young Adulthood (Cont.)

Notes:

* Analyses for this age period were restricted to the PSID household heads and spouses who were born in 1942 or after but no later than 1971 to ensure that their age period from 25 to 34 years had a 10-year overlap with the PSID period from 1967 to 2005. Therefore, only subsets of the Silent Generation and Generation X were included to this analysis.

[§] Numeric variables were logged prior to statistical testing due to skewness.

[‡] Kruskal-Wallis tests (with correction for ties) on a 20% random sample (N=3,190).

[Δ] Effect size (Cohen's d) = (M1-M2)/S, where M1 and M2 are the largest difference among group means, and S indicates standard deviation of pooled sample. Cohen's d is bolded if larger than 0.5, the conventional value for a modest effect.

Table 4.2.2 Characteristics of Employment Trajectories During Young Adulthood (Age 35 to 44 Years)*: The Panel Study of Income Dynamics, 1967-2005 (N=12,149)

	Variable[§]	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	ANOVA F test statistics (d.f.=1)	Kruskal-Wallis tests[‡] (d.f.=1)	Effect size[Δ]
I. Gender		**Men**	**Women**							
	States:									
	Proportion of time spent on each state (100=whole sequence)									
V1	Employed full-time (%)	79.42	46.64					1546.78 ***	412.28 ***	**0.95**
		(30.50)	(38.35)							
V2	Employed part-time (%)	11.34	23.86					209.39 ***	149.68 ***	**0.52**
		(19.54)	(27.67)							
V3	Unemployed or absent from work (%)	3.05	3.61					23.90 ***	7.27 **	0.05
		(11.61)	(11.34)							
V4	Economically inactive (%)	6.18	25.90					25.74 ***	276.27 ***	**0.66**
		(20.51)	(36.85)							
	Episodes and transitions:									
V5	Number of episodes in sequence	2.13	2.93					639.75 ***	103.93 ***	0.45
		(1.54)	(1.97)							
V6	Average duration of episodes	4.40	3.52					236.75 ***	33.61 ***	0.29
		(3.25)	(2.84)							
V7	Duration of the longest episode	5.26	4.74					42.34 ***	7.30 **	0.17
		(3.13)	(2.85)							
V8	Maximum difference in duration among episodes	1.48	2.01					7.01 **	58.29 ***	0.24
		(2.17)	(2.20)							
	Among people with two or more employment statuses (N=6,533):									
V9	Scope of modal transition:							**Chi-square test statistics (d.f.)**		
	Far (between work and non-work)	31.00%	45.44%							
	Other transitions	69.00%	54.56%					Full sample:	20% random sample:	
	Total	100%	100%					132.06 ***	37.57 ***	
								(1)	(1)	
V10	Direction of modal transition:									
	Downward	70.78%	58.69%							
	Other transitions	29.22%	41.31%					95.65 ***	20.03 ***	
	Total	100%	100%					(1)	(1)	

Table 4.2.2 Characteristics of Employment Trajectories During Young Middle Age (Cont.)

	II. Birth Cohort	**The Silent Gen.**	**Leading boomers**	**Tailing boomers**	**ANOVA F test statistics (d.f.=2)**	**Kruskal-Wallis tests‡ (d.f.=2)**	**Effect size$^{\Delta}$**
	States:						
	Proportion of time spent on each state (100=whole sequence)						
V1	Employed full-time (%)	51.31	61.57	70.08	95.21 ***	78.53 ***	0.40
		(41.19)	(37.82)	(35.45)			
V2	Employed part-time (%)	22.92	20.83	11.39	88.01 ***	87.57 ***	0.38
		(28.58)	(26.84)	(17.79)			
V3	Unemployed or absent from work (%)	1.75	3.55	4.16	17.41 ***	22.99 ***	0.18
		(7.54)	(11.44)	(13.40)			
V4	Economically inactive (%)	24.02	14.05	14.37	31.44 ***	32.97 ***	0.25
		(37.75)	(29.14)	(29.41)			
	Episodes and transitions:						
V5	Number of episodes in sequence	2.53	2.52	2.60	1.41	0.67	0.40
		(1.77)	(1.75)	(1.93)			
V6	Average duration of episodes	4.90	4.05	3.17	282.51 ***	111.58 ***	0.46
		(3.50)	(3.08)	(2.52)			
V7	Duration of the longest episode	6.09	5.12	4.11	357.25 ***	160.02 ***	**0.56**
		(3.13)	(2.97)	(2.65)			
V8	Maximum difference in duration among episodes	2.01	1.79	1.55	99.48 ***	8.04 *	0.17
		(2.37)	(2.24)	(2.01)			
	Among people with two or more employment statuses (N=6,533):						
V9	Scope of modal transition:				**Chi-square test statistics (d.f.)**		
	Far (between work and non-work)	39.04%	36.91%	45.08%		20% random	
	Other transitions	60.96%	63.09%	54.92%	Full sample:	sample:	
	Total	100%	100%	100%	34.58 ***	8.29 *	
V10	Direction of modal transition:				(2)	(2)	
	Downward	69.30%	61.44%	60.78%			
	Other transitions	30.70%	38.56%	39.22%	34.80 ***	15.43 ***	
	Total	100%	100%	100%	(2)	(2)	

Table 4.2.2 Characteristics of Employment Trajectories During Young Middle Age (Cont.)

III. Gender-Birth Cohort Interactions	The Silent Generation		Leading boomers		Trailing boomers		ANOVA F test statistics	Kruskal-Wallis tests‡	Effect size$^{\Delta}$
States:	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**(d.f.=5)**	**(d.f.=5)**	
Proportion of time spent on each state (100=whole sequence)									
V1 Employed full-time (%)	76.75	29.79	77.87	46.30	82.91	58.55	64.96 ***	579.571 ***	0.36
	(31.92)	(35.48)	(30.93)	(37.31)	(28.72)	(36.95)			
V2 Employed part-time (%)	14.87	29.73	12.90	28.26	7.31	15.05	15.20 ***	276.578 ***	0.35
	(22.75)	(31.12)	(20.80)	(29.60)	(14.50)	(19.59)			
V3 Unemployed or absent from work (%)	1.78	1.73	3.18	3.90	3.71	4.57	1.75	26.302 **	0.08
	(8.18)	(6.96)	(11.77)	(11.11)	(13.14)	(13.63)			
V4 Economically inactive (%)	6.60	38.75	6.05	21.55	6.07	21.83	0.81	350.125 ***	0.28
	(22.38)	(41.63)	(19.83)	(34.06)	(20.00)	(34.15)			
Episodes and transitions:									
V5 Number of episodes in sequence	2.19	2.81	2.11	2.90	2.11	3.05	4.16 *	131.452 ***	0.31
	(1.58)	(1.88)	(1.52)	(1.86)	(1.53)	(2.14)			
V6 Average duration of episodes	5.22	4.62	4.57	3.56	3.67	2.73	8.69 ***	129.719 ***	0.47
	(3.58)	(3.40)	(3.32)	(2.75)	(2.76)	(2.19)			
V7 Duration of the longest episode	6.24	5.97	5.40	4.85	4.47	3.78	8.08 ***	134.2 ***	0.47
	(3.24)	(3.03)	(3.15)	(2.77)	(2.83)	(2.42)			
V8 Maximum difference in duration among episodes	1.71	2.26	1.42	2.14	1.41	1.68	1.70	75.57 ***	0.23
	(2.37)	(2.35)	(2.13)	(2.28)	(2.06)	(1.95)			
Among people with two or more employment statuses (N=6,533):									
V9 Scope of modal transition:							**Chi-square test statistics (d.f.)**		
Far (between work and non-work)	19.32%	51.31%	29.42%	41.53%	43.11%	46.11%		20% random	
Other transitions	80.68%	48.69%	70.58%	58.46%	56.89%	53.89%	Full sample:	sample:	
Total	100%	100%	100%	100%	100%	100%	238.42 ***	58.02 ***	
V10 Direction of modal transition:							(5)	(5)	
Downward	80.03%	62.63%	68.52%	57.09%	66.30%	57.89%			
Other transitions	19.97%	37.37%	31.48%	42.91%	33.70%	42.11%	135.87 ***	37.31 ***	
Total	100%	100%	100%	100%	100%	100%	(5)	(5)	

Notes:

* Analyses for this age period were restricted to the PSID household heads and spouses who were born in 1942 or after but no later than 1971 to ensure that their age period from 25 to 34 years had a 10-year overlap with the PSID period from 1967 to 2005.

§ Numeric variables were logged prior to statistical testing due to skewness. ‡ Kruskal-Wallis tests (with correction for ties) on a 20% random sample (N=1,430).

$^{\Delta}$ Effect size (Cohen's d) = (M1-M2)/S, where M1 and M2 are the largest difference among groups in means, and S indicates standard deviation of pooled sample. Cohen's d is bolded if larger than 0.5, the conventional value for a modest effect.

Table 4.2.3 Characteristics of Employment Trajectories During Late Middle Age (Age 45 to 54 Years)*: The Panel Study of Income Dynamics, 1967-2005 (N=7,664)

	Variable[§]	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	ANOVA F test statistics (d.f.=1)	Kruskal-Wallis tests[‡] (d.f.=1)	Effect size[Δ]
I. Gender		**Men**	**Women**							
	States:									
	Proportion of time spent on each state (100=whole sequence)									
V1	Employed full-time (%)	75.69	42.78					667.67 ***	266.50 ***	**0.90**
		(33.55)	(39.50)							
V2	Employed part-time (%)	12.10	22.81					117.38 ***	84.88 ***	0.43
		(20.62)	(28.32)							
V3	Unemployed or absent from work (%)	2.45	2.38					52.98 ***	2.61	0.01
		(10.19)	(8.37)							
V4	Economically inactive (%)	9.77	32.03					41.70 ***	158.29 ***	**0.65**
		(25.97)	(40.77)							
	Episodes and transitions:									
V5	Number of episodes in sequence	2.18	2.76					196.06 ***	41.63 ***	0.33
		(1.57)	(1.91)							
V6	Average duration of episodes	4.32	3.97					33.59 ***	17.33 ***	0.11
		(3.16)	(3.13)							
V7	Duration of the longest episode	5.27	5.14					1.35	5.53 *	0.04
		(3.05)	(3.00)							
V8	Maximum difference in duration among episodes	1.62	1.92					8.49 *	22.29 ***	0.14
		(2.24)	(2.23)							
	Among people with two or more employment statuses (N=3,931):									
V9	Scope of modal transition:							**Chi-square test statistics (d.f.)**		
	Far (between work and non-work)	32.25%	45.44%							
	Other transitions	67.75%	54.56%					Full sample:	20% random sample:	
	Total	100.00%	100%					68.18 *** (1)	14.20 *** (1)	
V10	Direction of modal transition:									
	Downward	75.43%	66.30%							
	Other transitions	24.57%	33.70%					37.33 *** (1)	3.95 * (1)	
	Total	100.00%	100%							

Table 4.2.3 Characteristics of Employment Trajectories During Late Middle Age (Cont.)

	II. Birth Cohort	**The Greatest Gen.**	**The Silent Gen.**	**Leading boomers**	**ANOVA F test statistics (d.f.=2)**	**Kruskal-Wallis tests‡ (d.f.=2)**	**Effect size$^{\Delta}$**
	States:						
	Proportion of time spent on each state (100=whole sequence)						
V1	Employed full-time (%)	45.57	52.22	71.50	127.1 ***	80.55 ***	**0.53**
		(42.41)	(40.51)	(35.92)			
V2	Employed part-time (%)	22.46	21.68	9.99	57.87 ***	60.17 ***	0.40
		(29.07)	(28.14)	(16.77)			
V3	Unemployed or absent from work (%)	0.87	2.32	2.90	6.34 **	8.20 *	0.19
		(5.91)	(8.44)	(11.02)			
V4	Economically inactive (%)	31.20	23.78	15.62	4.60 *	30.47 ***	0.34
		(41.29)	(37.59)	(31.86)			
	Episodes and transitions:						
V5	Number of episodes in sequence	2.42	2.50	2.48	1.75	2.87	0.04
		(1.73)	(1.73)	(1.89)			
V6	Average duration of episodes	5.05	4.55	3.23	191.02 ***	76.38 ***	0.48
		(3.44)	(3.30)	(2.56)			
V7	Duration of the longest episode	6.28	5.69	4.12	265.74 ***	95.62 ***	**0.60**
		(3.06)	(3.04)	(2.65)			
V8	Maximum difference in duration among episodes	2.06	1.92	1.47	66.39 ***	5.88	0.21
		(2.49)	(2.34)	(1.95)			
	Among people with two or more employment statuses (N=3,931):						
V9	Scope of modal transition:				**Chi-square test statistics (d.f.)**		
	Far (between work and non-work)	41.11%	39.70%	41.06%		20% random	
	Other transitions	58.89%	60.30%	58.94%	Full sample:	sample:	
	Total	100%	100%	100%	0.71 (2)	3.34 (2)	
V10	Direction of modal transition:						
	Downward	78.75%	72.32%	62.39%			
	Other transitions	21.25%	27.68%	37.61%	47.96 ***	2.67	
	Total	100%	100%	100%	(2)	(2)	

Table 4.2.3 Characteristics of Employment Trajectories During Late Middle Age (Cont.)

III. Gender-Birth Cohort Interactions	The Greatest Generation		The Silent Generation		Leading boomers		ANOVA F test statistics (d.f.=5)	Kruskal-Wallis tests‡ (d.f.=5)	Effect size$^{\Delta}$
States:	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**			
Proportion of time spent on each state (100=whole sequence)									
V1 Employed full-time (%)	74.14	20.73	72.02	35.11	82.01	61.48	62.69 ***	336.88 ***	0.39
	(34.49)	(31.70)	(34.61)	(37.31)	(30.57)	(37.74)			
V2 Employed part-time (%)	16.08	27.97	15.08	27.38	6.41	13.41	3.17 *	126.95 ***	0.34
	(24.55)	(31.48)	(22.76)	(30.96)	(13.72)	(18.61)			
V3 Unemployed or absent from work (%)	1.20	0.58	2.29	2.34	2.96	2.84	4.46 *	24.10	0.09
	(8.06)	(2.99)	(9.51)	(7.39)	(11.53)	(10.51)			
V4 Economically inactive (%)	8.59	50.71	10.60	35.17	8.63	22.28	0.84	194.20 ***	0.31
	(24.71)	(42.78)	(26.92)	(41.58)	(24.55)	(36.30)			
Episodes and transitions:									
V5 Number of episodes in sequence	2.23	2.58	2.22	2.73	2.11	2.84	1.96	42.15 ***	0.24
	(1.64)	(1.78)	(1.56)	(1.82)	(1.58)	(2.08)			
V6 Average duration of episodes	5.08	5.02	4.68	4.43	3.56	2.91	9.32 ***	106.89 ***	0.39
	(3.47)	(3.42)	(3.30)	(3.30)	(2.68)	(2.40)			
V7 Duration of the longest episode	6.14	6.39	5.70	5.69	4.39	3.86	11.18 ***	147.04 ***	0.48
	(3.15)	(2.98)	(3.09)	(3.00)	(2.74)	(2.53)			
V8 Maximum difference in duration among episodes	1.81	2.28	1.72	2.10	1.42	1.52	3.25 *	31.11 ***	0.22
	(2.43)	(2.53)	(2.34)	(2.33)	(2.01)	(1.89)			
Among people with two or more employment statuses (N=3,931):									
V9 Scope of modal transition:							**Chi-square test statistics (d.f.)**		
Far (between work and non-work)	17.09%	57.65%	28.67%	47.25%	45.05%	38.67%		20% random	
Other transitions	82.91%	42.35%	71.33%	52.75%	54.95%	61.33%	Full sample:	sample:	
Total	100%	100%	100%	100%	100%	100%	139.74 ***	25.35 ***	
							(5)	(5)	
V10 Direction of modal transition:									
Downward	84.62%	74.71%	76.71%	69.30%	69.81%	57.93%			
Other transitions	15.38%	25.29%	23.29%	30.70%	30.19%	42.07%	84.82 ***	10.94	
Total	100%	100%	100%	100%	100%	100%	(5)	(5)	

Notes:

* Analyses for this age period were restricted to the PSID household heads and spouses who were born in 1942 or after but no later than 1971 to ensure that their age period from 25 to 34 years had a 10-year overlap with the PSID period from 1967 to 2005. Therefore, only subsets of the Silent Generation and Generation X were included to this analysis.

§ Numeric variables were logged prior to statistical testing due to skewness. ‡ Kruskal-Wallis tests (with correction for ties) on a 20% random sample (N=1,533).

$^{\Delta}$ Effect size (Cohen's d) = (M1-M2)/S, where M1 and M2 are the largest difference among groups in means, and S indicates standard deviation of pooled sample. Cohen's d is bolded if larger than 0.5, the conventional value for a modest effect.

Table 4.2.4 Characteristics of Employment Trajectories During Late Adulthood (Age 55 to 65)*: The Panel Study of Income Dynamics, 1967-2005 (N=4,968)

	Variable[§]	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	Mean (St.D.)	ANOVA F test statistics (d.f.=1)	Kruskal-Wallis tests[‡] (d.f.=1)	Effect size[Δ]
I. Gender		**Men**	**Women**					
States:								
Proportion of time spent on each state (100=whole sequence)								
V1	Employed full-time (%)	51.33	24.73			204.72 ***	119.20 ***	**0.75**
		(37.81)	(33.38)					
V2	Employed part-time (%)	16.91	19.90			92.07 ***	0.21	0.12
		(22.15)	(27.15)					
V3	Unemployed or absent from work (%)	2.24	1.69			11.05 **	0.31	0.06
		(10.30)	(7.96)					
V4	Economically inactive (%)	29.52	53.67			192.09 ***	79.48 ***	**0.61**
		(36.84)	(42.56)					
Episodes and transitions:								
V5	Number of episodes in sequence	2.67	2.58			16.87 ***	7.75 **	0.05
		(1.74)	(1.94)					
V6	Average duration of episodes	3.81	4.89			82.56	22.53 ***	0.33
		(2.85)	(3.67)					
V7	Duration of the longest episode	5.30	6.19			61.47 ***	25.08 ***	0.27
		(3.05)	(3.40)					
V8	Maximum difference in duration among episodes	2.52	2.15			0.13	7.08 **	0.14
		(2.74)	(2.60)					
Among people with two or more employment statuses (N=2,908):								
V9	Scope of modal transition:					**Chi-square test statistics (d.f.)**		
	Far (between work and non-work)	55.74%	59.96%			Full sample:	20% random sample:	
	Other transitions	44.26%	40.04%					
	Total	100%	100%			5.3049 *	1.60	
V10	Direction of modal transition:					(1)	(1)	
	Downward	86.85%	78.59%					
	Other transitions	13.15%	21.41%			34.63 ***	1.60	
	Total	100%	100%			(1)	(1)	
II. Birth Cohort		**The Greatest Gen.**	**The Silent Gen.**			**ANOVA F test statistics (d.f.=1)**	**Kruskal-Wallis tests[‡] (d.f.=1)**	**Effect size[Δ]**
States:								
Proportion of time spent on each state (100=whole sequence)								
V1	Employed full-time (%)	30.76	40.48			41.51 ***	5.51 *	0.26
		(35.25)	(38.88)					
V2	Employed part-time (%)	21.93	16.53			4.84 *	7.52 **	0.21
		(27.21)	(23.43)					
V3	Unemployed or absent from work (%)	1.05	2.47			11.05 **	2.04	0.16
		(6.75)	(10.21)					
V4	Economically inactive (%)	46.27	40.52			0.77	1.92	0.14
		(41.58)	(41.81)					
Episodes and transitions:								
V5	Number of episodes in sequence	2.70	2.58			6.89 **	2.419	0.07
		(1.84)	(1.86)					

Table 4.2.4 Characteristics of Employment Trajectories During Late Adulthood (Cont.)

V6	Average duration of episodes	5.06 (3.66)	4.00 (3.11)	114.1 ***	24.33 ***	0.31
V7	Duration of the longest episode	6.639 3.306	5.279 3.146	178.96 ***	48.76	0.42
V8	Maximum difference in duration among episodes	2.66 (2.81)	2.11 (2.56)	48.08 ***	10.67 ***	0.20

Among people with two or more employment statuses (N=2,908):

				Chi-square test statistics (d.f.)	
V9	Scope of modal transition:				20% random
	Far (between work and non-work)	58.21%	57.66%	Full sample:	sample:
	Other transitions	41.79%	42.34%		
	Total	100%	100%	0.08	1.13
V10	Direction of modal transition:			(1)	(1)
	Downward	89.09%	78.61%		
	Other transitions	10.91%	21.39%	52.90 ***	12.59 ***
	Total	100%	100%	(1)	(1)

III. Gender-Birth Cohort Interactions		**The Greatest Generation**		**The Silent Generation**		**ANOVA**		
	States:	**Men**	**Women**	**Men**	**Women**	**F test statistics (d.f.=3)**	**Kruskal-Wallis tests‡ (d.f.=3)**	**Effect size△**
	Proportion of time spent on each state (100=whole sequence)							
V1	Employed full-time (%)	48.41 (36.10)	16.26 (26.98)	53.03 (38.68)	29.82 (35.74)	12.23 ***	154.37 ***	0.23
V2	Employed part-time (%)	21.51 (24.33)	22.28 (29.36)	14.24 (20.31)	18.48 (25.63)	0.35	9.95	0.09
V3	Unemployed or absent from work (%)	1.30 (8.03)	0.85 (5.47)	2.78 (2.20)	2.20 (9.10)	0.01	17.89	0.16
V4	Economically inactive (%)	28.79 (35.27)	60.62 (40.89)	29.95 (37.72)	49.51 (43.01)	16.11 ***	112.86 ***	0.17
	Episodes and transitions:							
V5	Number of episodes in sequence	2.88 (1.75)	2.55 (1.89)	2.55 (1.73)	2.60 (1.96)	16.94 ***	10.10	0.13
V6	Average duration of episodes	4.05 (3.03)	5.89 (3.92)	3.67 (2.73)	4.28 (3.37)	35.00 ***	46.55 ***	0.42
V7	Duration of the longest episode	5.81 (3.12)	7.32 (3.30)	5.01 (2.97)	5.51 (3.27)	21.28 ***	66.83 ***	0.45
V8	Maximum difference in duration among episodes	2.99 (2.82)	2.38 (2.77)	2.24 (2.65)	2.01 (2.48)	2.59	15.86 **	0.25

Among people with two or more employment statuses (N=2,908):

						Chi-square test statistics	
V9	Scope of modal transition:						20% random
	Far (between work and non-work)	52.03%	64.99%	58.32%	57.07%	Full sample:	sample:
	Other transitions	47.97%	35.01%	41.68%	42.93%		
	Total	100%	100%	100%	100%	19.73 ***	5.35
V10	Direction of modal transition:					(3)	(3)
	Downward	91.36%	86.59%	83.71%	73.98%		
	Other transitions	8.64%	13.41%	16.29%	26.02%	86.66 ***	15.55 **
	Total	100%	100%	100%	100%	(3)	(3)

Notes:

* Analyses for this age period were restricted to the PSID household heads and spouses who were born in 1942 or after but no later than 1971 to ensure that their age period from 25 to 34 years had a 10-year overlap with the PSID period from 1967 to 2005. Therefore, only subsets of the Silent Generation and Generation X were included to this analysis. § Numeric variables were logged prior to statistical testing due to skewness.

‡ Kruskal-Wallis tests (with correction for ties) on a 20% random sample (N=994).

△ Effect size (Cohen's d) = (M1-M2)/S, where M1 and M2 are the largest difference among groups in means, and S indicates standard deviation of pooled sample. Cohen's d is bolded if larger than 0.5, the conventional value for a modest effect.

CHAPTER 5
PATTERNS AND PATH DEPENDENCE OF EMPLOYMENT TRAJECTORIES IN THE LIFE COURSE

In this chapter, several mutually exclusive clusters in the PSID were identified to represent the primary patterns of employment histories in the United States. Changes in such patterns among the PSID men and women would reflect the transformations undergoing in the labor market, the labor force, and the demographic structure in American society since late 1960s. To this end, cluster analysis was implemented solely based on distance scores estimated from Optimal Matching Analysis (OMA) given the assumption that the OMA distance score can sufficiently summarize the key characteristics of a trajectory at a high level.

Section 5.1 describes how cluster analyses were performed and decisions were made to classify the patterns of employment trajectories. Section 5.2 compares identified clusters of employment trajectories through an Analysis of Variance (ANOVA) of cluster membership with regards to trajectory characteristics as well as demographics. Statistically significant cluster differences indirectly reinforce the validity of cluster solutions. The last section of this chapter, Section 5.3, tests hypotheses about path dependence in employment histories over the life course—whether a person's pattern in one age period constrains or increases the likelihood of having another pattern in another age period.

5.1 CLUSTER ANALYSIS

In each age-specific analytical sample, clusters were detected by two independent SAS procedures–PROC FASTCLUS and PROC MODECLUS. The optimal solution was the one suggested jointly by both procedures. The process of cluster analysis is described as follows.

5.1.1 Cluster Analysis by K-Means Method

A cluster analysis by a K-means method has been recommended as an efficient way to quickly discover the number of clusters in large data when applied in combination with another method (SAS Institute 2008). In this analysis, the cluster analysis was conducted through the SAS Procedure called FASTCLUS. The first step was to try a series of arbitrary radii starting from one. Increasing the radius yields a smaller number of clusters in general as the criteria for aggregating cases loosens. The process was carried out with different radii until a sole-cluster solution was given. For example, with an initial radius of one, the 15,949 employment trajectories at Young Adulthood (age 25 to 34) were classified into 15 clusters (Section I, Appendix E). With the radius parameter increasing, the number of clusters declined until the radius was 16, when all trajectories were aggregated into one big cluster.

The second step was to examine all radius-based solutions and identify the optimal number of clusters among the trajectories. Such an optimal solution is the number of resulting clusters that occurs most often among all tried solutions (SAS Institute 2008). For instance, for Young Adulthood (age 25 to 34), which had a radius increasing from 1 to 15, the procedure formed a two-cluster solution six times, a three-cluster solution five times, and other solutions at lower frequencies. This result suggested that a two-cluster solution should be considered.

Once the number of clusters that best represented the data was selected, the next step was to compare the models that yielded a solution with an optimal number of clusters. In PROC FASTCLUS, SAS provided three statistics that indicated the overall goodness-of-fit of a model: Pseudo-F statistics, R-squared, and cubic clustering criterion (CCC). Larger values on each criterion suggest a better fit. Therefore, the best model is the one that is associated with the largest goodness-of-fit statistics. In the case of Young Adulthood (age 25 to 34), all six models that suggested a two-cluster solution happened to yield the same values on the three goodness-of-fit statistics (Pseudo-F statistics=57063.4, R-squared=0.750, and CCC=16.99). The boundary between two

clusters was also consistent across these models--partitioned 12,021 cases in one cluster and 3,928 cases in the other.

By the same token, the K-means method of cluster analysis via PROC FASTCLUS was conducted for three other analytical samples that represented employment trajectories in Young Middle Age (age 35 to 44), Late Middle Age (age 45 to 54), and Later Adulthood (age 55 to 65). Throughout the same procedure as described above, an optimal number of clusters were identified and the best model was selected. For each of these analytical samples, two clusters were suggested. For example, among the 12,149 employment trajectories at Young Middle Age (age 35 to 44), the bigger cluster contained 9,552 cases while the smaller one had 2,597 cases (Pseudo-F statistics=43,582.9, R-squared=0.75, and CCC=15.1). Similarly, two clusters were identified among the 7,664 trajectories during Late Middle Age (age 45 to 54, 5,531 cases and 2,133 cases; Pseudo-F statistics=33,119.7, R-squared=0.75, and CCC=24.9) as well as among the 4,968 trajectories during Later Adulthood (age 55 to 65, 5,531 cases and 2,133 cases; 2,643 cases and 2,325 cases; Pseudo-F statistics=17,963.3, R-squared=0.75, and CCC =10.06).

5.1.2 Cluster Analysis by Nonparametric, Density-Based Method

At the same time, cluster analyses were performed independently by a nonparametric, density-based method via a SAS procedure called MODECLUS. The process of cluster analysis was similar to the K-means method: The first step was to apply a series of arbitrary radii starting from one until a single cluster was formed. The second step was to find out the optimal number of clusters that was suggested most frequently among all tried solutions. The third step was to select the best model among solutions associated with the optimal number of clusters. PROC MODECLUS provided a “saddle test”--a significant test against excessive numbers of resulting clusters. The best model was the one with a large P value on the saddle test, which indicates the number of clusters was sufficient to capture the clustering in data (SAS Institute 2008).

This alternative approach through PROC MODECLUS also suggested that two clusters be formed out of the employment trajectories in each of the four analytical

samples (see Appendix E, the final model is marked with an asterisk). For instance, among the 15,949 employment trajectories during Young Adulthood (age 25 to 34), both the models with radius parameters 2 and 3 units yielded two clusters with different partitions. To choose between these two models, an Analysis of Variance (ANOVA) of cluster membership on OMA distance scores was conducted. Larger F-test statistics indicated higher homogeneity among trajectories within clusters than between clusters—in other words, a better way to partition cases. In this case, the model associated with a radius of 3 had larger ANOVA F-test statistics and thus was chosen as the final model. Once the final model was selected, cluster membership was generated by re-fitting the final model for further analysis. The same procedure, including saddle tests and ANOVA, was carried out for employment trajectories in the other three age periods as well.

Although both indicated the same number of clusters, the K-means method and the density-based method split the samples along different boundaries. Table 5.1.1 shows how clusters uncovered by one method overlapped with those identified from the other method. In the case of Young Adulthood (age 25 to 34), both methods indicated that 12,021 trajectories and 1,433 trajectories belong to two distinctive clusters. However, a discrepancy lies in the 2,495 cases that were joined with the 1,433 trajectories by the K-Means method but were assigned to join the other 12,021 cases by the density-based method. In other words, those 2,495 could be assigned to either cluster, depending on the agglomerating method in cluster analysis. The same pattern is apparent in comparing cluster analysis results between the two methods from the other age periods.

5.1.3 Cluster Model Selection and Analysis of Variance on Cluster Membership

The next step was to determine whether to adopt the two-cluster solution from the density-based method or to further split the larger cluster into two groups as implied by the K-means method. To answer this question, a series of ANOVA's were carried out to investigate which solution—the two-cluster or the three-cluster one—better explained the variation among employment trajectories based on numeric OMA distance scores. The results from ANOVA are summarized in Table 5.1.2.

Table 5.1.1 Crosstabulations of Results from Cluster Analysis by K-Means Method and Density-based Method

Young adulthood

K-Means Method	Density-based Method		
	Cluster 1	Cluster 2	**Total**
Cluster 1	12,021	0	12,021
Cluster 2	2,495	1,433	3,928
Total	14,516	1,433	15,949

Young middle age

K-Means Method	Method		
	Cluster 1	Cluster 2	**Total**
Cluster 1	9,552	0	9,552
Cluster 2	1,534	1,063	2,597
Total	11,086	1,063	12,149

Late middle age

K-Means Method	Density-based Method		
	Cluster 1	Cluster 2	**Total**
Cluster 1	5,531	0	5,531
Cluster 2	960	1,173	2,133
Total	6,491	1,173	7,664

Later adulthood

K-Means Method	Method		
	Cluster 1	Cluster 2	**Total**
Cluster 1	2,643	0	2,643
Cluster 2	700	1,625	2,325
Total	3,343	1,625	4,968

Table 5.1.2 Analysis of Variance of Cluster Membership on Optimal Matching Analysis Distance Scores

	Young adulthood (age 25 to 34 years)			**Young middle age** (age 35 to 44 years)		
	F-statistics	degree of freedom	P-value	F-statistics	degrees of freedom	P-value
Two-cluster solution from density-based method	15186.49	1	<0.0001	12382.16	1	<0.0001
Three-cluster solution	43893.13	2	<0.0001	30752.88	2	<0.0001
	Late middle age (age 45 to 54 years)			**later adulthood** (age 55 to 65 years)		
	F-statistics	degree of freedom	P-value	F-statistics	degrees of freedom	P-value
Two-cluster solution from density-based method	14461.92	1	<0.0001	14341.9	1	<0.0001
Three-cluster solution	28415.82	2	<0.0001	17594.23	2	<0.0001

The table contains four sections, each of which presents ANOVA F-test statistics as well as the degrees of freedom and P value for employment trajectories in an age period. In all four sections, the F-test statistics are larger in the three-cluster model than in the two-cluster solution. This suggests that the three-cluster model better explains the clustering of employment trajectories based on their overall patterns represented by OMA distance scores. Therefore, cluster analysis on analytical samples of all four age periods led to three clusters of employment trajectories.

5.2 CLUSTER DIFFERENCES AND VALIDITY CHECKING

In this section, trajectory clusters were compared in terms of trajectory characteristics (Table 5.2.1) and demographic compositions (Table 5.2.2). Analyses were conducted separately by age period.

Cluster comparisons in this section serve several purposes. First, they test the validity of prior cluster analysis and show whether the discovered clusters are indeed different from each other. Second, the process of comparing clusters helps to summarize the patterns embedded in each cluster, which provides information to use in cluster labeling. Finally, cluster comparisons also test the validity of relying on OMA in condensing the overall structure of a trajectory into one single dimension—distance score. In the prior cluster analysis, trajectories of employment status were partitioned based solely on OMA distance scores given the assumption that OMA was sufficient for capturing the characteristics of a trajectory, such as the diversity and combination of states (employment statuses) and duration or pacing of episodes. This assumption needs to be verified.

As the following section shows, the three trajectory clusters identified within an age period were indeed distinctive from each other on all analyzed trajectory characteristics. This supports the utility of OMA distance scores in summarizing the trajectory structure as well as the validity of cluster analysis that led to the resulting clusters. It suggests that the three clusters among employment trajectories should not be

combined. This section also revealed that gender- and cohort-composition of different trajectory patterns vary significantly.

5.2.1 Cluster Variations of Characteristics of Employment Trajectories

The findings of age period-specific cluster comparisons are presented in Table 5.2.1. The upper portion of the table shows the summary statistics of OMA distance scores. In the section below, clusters were compared on ten characteristics that represented the primary elements of a trajectory. These trajectory characteristics were the same as those analyzed in Chapter 4. For numeric variables (marked by asterisks in the table), ANOVA was carried out with cluster membership as the explanatory variable. Since most of these numeric variables were skewed, Kruskal-Wallis tests on medians were conducted. Results from both types of tests were consistent with each other. The last two trajectory characteristics about the scope and direction of modal transitions in a trajectory were categorical and therefore tested using Chi-square tests. It turned out that the identified clusters significantly differed in all ten trajectory characteristics as well as OMA distance scores and sequence length. Testing statistics are not shown in Table 5.2.1.

Young Adulthood

The first set of cluster differences presented in the table was among the three clusters of employment trajectories between Age 25 and 34 years. Optimal matching distance scores were summarized by cluster median, inter-quartile range, and a 6-category grouped score. At first glance, the 12,021 employment trajectories in Cluster 1 distinguish themselves from other trajectories by having a very low distance from the reference--stable, full-time careers. Their median score is 1.49 with over 80% cases with scores under 5 (the range of all OMA distance scores is between 0 and 21.24 unit). Nearly half of the members in Cluster 1 (40.65%) have a score of 0, which indicates a stable, full-time trajectory. By contrast, the distance to the reference trajectory is the largest in Cluster 3 in which the trajectories gather around the higher end of above 15 (Median=18.82). The median distance in Cluster 2 was in the middle: the majority of trajectories lie between 10 and 15 with a median score of 11.75. The inter-quartile range (IQR = 75% percentile – 25% percentile) is an indicator of the variation among trajectories in a cluster. The cluster IQR

Table 5.2.1 Cluster Variations of Characteristics of Employment Trajectories

	Young adulthood (age 25 to 34 years)			Young middle age (age 35 to 44 years)			Late middle age (age 45 to 54 years)			Later adulthood (age 55 to 65 years)		
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
Sample size (persons)	12,021	2,495	1,433	9,552	1,534	1,063	5,531	960	1,173	2,643	700	1,625
% in total	75.37%	15.64%	8.98%	78.62%	12.63%	8.75%	72.17%	12.53%	15.31%	**53.20%**	14.09%	**32.71%**
Distance score--degree of dissimilarity from the stable, full-time trajectory (0-21.24) *												
Median	**1.49**	11.75	18.82	1.50	12.23	19.13	1.52	11.48	19.07	3.09	11.58	19.69
Inter-quartile range (IQR)	3.66	3.62	**2.15**	3.43	3.66	2.05	3.25	3.47	3.01	5.79	2.21	4.26
Grouped distance score (Col. %)												
0	40.65	0.00	0.00	45.41	0.00	0.00	46.79	0.00	0.00	26.41	0.00	0.00
(0, 5]	44.27	0.00	0.00	39.45	0.00	0.00	39.03	0.00	0.00	39.05	0.00	0.00
(5, 10]	15.07	24.61	0.00	15.14	15.58	0.00	14.17	28.85	0.00	34.54	13.57	0.00
(10, 15]	0.00	66.73	0.00	0.00	73.53	0.00	0.00	71.15	1.11	0.00	86.43	6.52
(15, Maximum)	0.00	8.66	58.27	0.00	10.89	51.46	0.00	0.00	54.22	0.00	0.00	54.46
Maximum	0.00	0.00	41.73	0.00	0.00	48.54	0.00	0.00	44.67	0.00	0.00	39.02
States in trajectory												
V1 % time on full-time work*	**74.23**	20.37	1.45	76.04	17.97	1.41	76.78	21.05	1.66	**60.28**	23.01	4.77
V2 % time on part-time work*	15.72	**46.53**	14.88	14.01	46.34	12.12	13.03	41.57	20.54	15.22	**29.26**	19.31
V3 % time unemployed or temparorily absent from work*	3.27	6.61	5.40	3.01	5.06	3.84	2.22	3.93	2.08	2.41	1.64	1.30
V4 % time economically inactive*	6.79	**26.49**	**78.26**	6.94	30.64	82.63	7.96	33.45	75.72	**22.09**	**46.09**	74.62
Episodes and transitions												
V5 Number of episodes*	2.39	**4.50**	2.73	2.33	4.09	2.31	2.29	4.10	2.09	2.44	**3.78**	**2.42**
V6 Average duration of episodes in sequence* (year)	3.44	2.74	**5.95**	3.75	3.23	6.62	3.75	2.81	7.00	3.12	3.31	**6.93**
V7 Duration of the longest episode in sequence* (year)	4.37	4.46	**7.44**	4.65	5.02	7.92	4.67	4.60	8.20	4.34	**4.80**	**8.56**
V8 Difference in duration between the longest and the shortest episodes in sequence* (year)	**1.57**	**2.71**	2.42	1.53	2.87	2.17	1.54	2.84	2.02	2.04	2.44	2.71

Table 5.2.1 Cluster Variations of Characteristics of Employment Trajectories (Cont.)

Modal Transitions Among People who Changed Employment Statuses												
Trajectories with any transitions:	6,543	2,270	815	4,705	1,306	522	2,586	840	505	1,522	544	842
Percent of sample (%)	54.43	**90.98**	56.87	49.26	85.14	49.11	46.75	87.50	43.05	57.59	**77.71**	51.82
V9 Scope of modal transition‡ (%):												
Far (between work and non-work)	**31.35**	61.72	**88.71**	29.69	58.58	87.74	28.11	47.74	89.50	**45.60**	52.02	83.85
Other transitions	68.65	38.28	11.29	70.31	41.42	12.26	71.89	52.26	10.50	54.40	47.98	16.15
V10 Direction of modal transition‡ (%):												
Downward	66.44	72.73	73.74	64.80	65.85	71.26	69.33	74.88	83.37	**80.81**	**84.56**	**92.28**
Other transitions	33.56	27.27	26.26	35.20	34.15	28.74	30.67	25.12	16.63	19.19	15.44	7.72

Notes:

* P<0.05, F tests and Kruskal-Wallis tests.

‡ P<0.05, Chi-squared tests.

among people in the last cluster (2.15) is slightly smaller than those of other clusters. This suggests that people in Cluster 3 are more homogeneous in terms of their employment trajectories than people in the other two clusters.

States in Trajectories. The lower section of Table 5.2.1 suggests that the three clusters that significantly differ from each other based on distance scores do indeed differ in terms of states, episodes, transitions or other characteristics of their employment trajectories. With regards to the proportion of time spent on each of the four employment statuses in a trajectory, Cluster 1 trajectories are heavily full-time (74.23% of whole trajectory) whereas Cluster 3 cases are very economically inactive (78.26%). People in Cluster 2 spent half of their time during Young Adulthood (age 25 to 34) working part-time (46.53%) and about a quarter of their time outside of the labor force (26.49%).

Episodes. The four characteristics presented in the middle of the table indicate stability and pacing of employment status episodes. Trajectories in Cluster 2 seem to be the least stable with the largest number of episodes (4.5 over 10-year period) that tend to be short (average 2.74 years). Among trajectories in this cluster, the longest episode lasted for 4.46 years on average, much shorter than those of Cluster 3 (7.44). Meanwhile, the large difference in episode duration (2.71-year difference) reflects the low evenness in episode pacing in Cluster 3. By these standards, Cluster 1 trajectories consist of fewer (2.39), slightly longer (3.44-year), and more evenly spaced episodes (duration differences of 1.57 years). The trajectories in Cluster 3 also look stable because their episodes are long (average duration of 5.95 years, average maximum of 7.44 years).

Modal Transitions. Finally, discovered clusters were compared based on the scope and direction of the modal transition (the most frequent transition) in an employment trajectory. Percentages shown at the bottom of the table are restricted to people who had any changes in employment status during Young Adulthood (age 25 to 34). A striking difference is that 90.98% of cases in Cluster 2 made at least one transition in employment statuses while nearly half of the people in the other two clusters did not. This reinforces the earlier finding of episode characteristics across the clusters—Cluster 2 trajectories are the least stable of all trajectories in the three clusters.

Of those who had any transitions, the modal transitions among 88.71% of the trajectories in Cluster 3 occurred between work (like full-time or part-time employment) and non-work statuses (unemployment, temporary absence from work, or out of the labor force). The proportion of such "far transitions" is lower in Cluster 2 (61.72%) and much lower in Cluster 1 (31.35%). In that sense, employment trajectories in Cluster 3 were less stable than those in Cluster 1. In terms of the direction of modal transitions, downward transitions that happened from full-time to part-time work or from employment to being out of the labor market were more common in Clusters 2 and 3 than in Cluster 1.

Cluster Labeling. The above analysis of cluster differences in trajectory characteristics during Young Adulthood (age 25 to 34) clearly explains the low distance of Cluster 1 trajectories from the normative career paths. Employment trajectories from this cluster are not only tightly related to full-time employment but also to overall stability or lack of changes given the characteristics of employment status episodes and the scope of modal transitions. Based on all these characteristics, Cluster 1 is therefore labeled as "*stable, full-time cluster*."

Given the large number of transitions and short and unevenly paced episodes, trajectories from Cluster 2 distinguished themselves from those in other clusters by their low stability. Furthermore, because part-time work plays a big role in employment histories during this age period, Cluster 2 is labeled as "*unstable, part-time cluster*." Finally, although also having stability, people in Cluster 3 had a large proportion of trajectories spent outside of the labor force. Therefore, this cluster is labeled as "*stable, inactive cluster*."

Young Middle Age, Late Middle Age, and Later Adulthood

The patterns of employment trajectory clusters in older age periods as well as their contrasts and similarities resemble those of the clusters discovered in Young Adulthood (age 25 to 34). The trajectories during each of those age periods can be also partitioned into three groups--a stable, full-time cluster; an unstable, part-time cluster; and a stable, inactive cluster.

Regardless of age periods, the largest cluster of employment trajectories has been the stable, full-time pattern: about three-quarters of people were associated with this pattern until during Later Adulthood (age 55 to 65) where their proportion declined to 53.2%. During Young Adulthood (age 25 to 34) and Young Middle Age (age 35 to 44), the unstable, part-time cluster (Cluster 2) was found to be slightly larger than the stable, inactive cluster (Cluster 3). However, in the last two age periods, more people were found related to the latter.

The main change in the pattern of employment trajectories with age is that more people shifted from the stable, full-time cluster to the stable, inactive cluster in Later Adulthood (age 55 to 65) as compared with those in three younger age periods. Between age 55 and age 65 years, the proportion of people in the first cluster decreased from three-quarters to 53.20%. At the same time, the proportion in the last cluster was up to nearly one-third (32.71%), which was triple or double the proportions in younger ages.

In addition to this shift towards a stable, inactive cluster, there are some changes in trajectory characteristics for the same trajectory pattern across age periods, primarily between the first three age periods and Later Adulthood (age 55 to 65). For example, the time spent in an economically inactive status (V4) increased in Later Adulthood (age 55 to 65) even among people in the stable, full-time cluster (Cluster 1) and unstable, part-time cluster (Cluster 2). Throughout Young Adulthood (age 25 to 34) and the two middle age periods (age 35 to 44, age 45 to 54), Cluster 1 was associated with 75% of the time on full-time employment (V1) and under 10% of the time outside of the labor market (V4) during a ten-year period. In Later Adulthood (age 55 to 65), the proportion of full-time employment decreased to 60.28% and that of being economically inactive increased to 22.09%. Similarly, those in Cluster 2 were found to spend less time on part-time employment (29.26%) and more time outside of the labor market (46.09%).

Moreover, employment trajectories in the unstable, part-time cluster (Cluster 2) and the stable, inactive cluster (Cluster 3) seemed to be more stable in Later Adulthood (age 55 to 65) with respect to the episode characteristics. Cluster 2 trajectories which were the least stable among all employment trajectories had fewer episodes (on average

3.78 episodes) that lasted longer (4.80 years in duration). At the same time, fewer people in Cluster 2 had transitions in Later Adulthood (age 55 to 65, 77.71%) than in Young Adulthood (age 25 to 34, 90.98%) or Middle Ages (age 35 to 54, around 85%). Cluster 3 trajectories also looked slightly more stable between age 55 and 65 years with fewer episodes (2.42 episodes as compared to 2.73 episodes in Young Adulthood, age 25 to 34) and episodes that lasted longer (mean=6.93 years as compared to that in the first age periods). The duration of the longest episode in the trajectory, another indicator of stability, was also longer within Cluster 3 in Later Adulthood (age 55 to 65, 8.56 years) than in other age periods.

Finally, in terms of modal transitions in a trajectory, "downward transitions" (from full-time work to part-time work or from employment to unemployment or being economically inactive) became more common in Later Adulthood (age 55 to 65) than in younger ages. Regardless of trajectory clusters, over 80% of the most frequent transitions between age 55 and 65 years were downward transitions (80.91% in Cluster 1, 84.56% in Cluster 2, and 92.28% in Cluster 3). Furthermore, for people in the stable, full-time cluster (Cluster 1), "far transitions" that occurred across the boundary of the labor market became more common, increasing to 45.6%. All these findings reinforce the common sense that people are scaling back in Later Adulthood (age 55 to 65) either by reducing work hours or withdrawing from the labor market.

Despite the changes of a trajectory pattern across age periods (especially in Later Adulthood, age 55 to 65), the same three types of employment trajectories were found in each age period. These three patterns—stable, full-time cluster; unstable, part-time cluster; and stable, inactive cluster have persisted over the past four decades among the PSID men and women. The above analysis suggested that these three trajectory patterns were indeed distinctive from each other by various characteristics of trajectories, which supports the validity of cluster analysis.

5.2.2 Socio-demographic Distributions by Patterns of Employment Trajectories

Although the primary patterns of employment trajectories remain basically the same, the composition of those patterns has nevertheless changed. It is the changes in socio-

demographic characteristics of those patterns that reflect the changes in the employment histories in the U.S. over the last several decades. The following section discusses these changes.

Table 5.2.2 presents the differences in three patterns of employment trajectories by the distributions of gender, birth cohort, birth year, and the median age when a person had his or her first regular job. For gender and cohort distributions, both row and column percentages are shown.

Gender. Regardless of the age period, the stable, full-time pattern is disproportionally male while the other two patterns are associated with females. For instance, 81.76% and 91.97% of those in the unstable, part-time cluster and stable, inactive cluster during Young Adulthood (age 25 to 34) were women while less than half in the stable, full-time pattern were women. From another perspective, 92.52% of men in the analytic sample of this age period were associated with the stable, full-time pattern (row percentage), much higher than the marginal percentage, 75.37%. Women were more strongly related to the unstable, part-time pattern or the stable, inactive pattern.

The association of gender and trajectory patterns remained but weakened in older age periods as more people shifted out of the stable, full-time pattern. From Late Middle Age (age 45 to 54), more men began to spread out into the unstable, part-time cluster or the stable, inactive cluster. This "migration" continued into Later Adulthood (age 55 to 65) when men in the first cluster decreased from over 90% to 69.7%. By the time of age 55 and older, the unstable, part-time cluster became almost gender-balanced (43.43% men and 56.57% women); about one-quarter of people in the stable, inactive cluster were men (23.57%), which doubled in proportion from younger age periods.

Although more women also shifted from the stable, full-time pattern, their destinations differed from those of men. Whereas men moved to both Clusters 2 and 3 at Later Adulthood (age 55 to 65), women primarily moved to the stable, inactive cluster. Women's proportion in the stable, inactive cluster tripled from around 15% in the first two age periods to 45.98% in Later Adulthood (age 55 to 65), a change of a much larger degree than that in the unstable, part-time cluster (Cluster 2).

Table 5.2.2 Cluster Variations of Demographic Characteristics

	Young adulthood (age 25 to 34 years)			Young middle age (age 35 to 44 years)			Late middle age (age 45 to 54 years)			Later adulthood (age 55 to 65 years)		
	Stable, Full-time Cluster	**Unstable, Part-time Cluster**	**Stable, Inactive Cluster**	**Stable, Full-time Cluster**	**Unstable, Part-time Cluster**	**Stable, Inactive Cluster**	**Stable, Full-time Cluster**	**Unstable, Part-time Cluster**	**Stable, Inactive Cluster**	**Stable, Full-time Cluster**	**Unstable, Part-time Cluster**	**Stable, Inactive Cluster**
Sample size (persons)	12,021	2,495	1,433	9,552	1,534	1,063	5,531	960	1,173	2,643	700	1,625
% in total	75.37%	15.64%	8.98%	78.62%	12.63%	8.75%	72.17%	12.53%	15.31%	53.20%	14.09%	32.71%
Gender ‡												
(column %)												
men	58.61	18.24	8.03	56.47	15.51	11.76	57.73	28.44	12.79	59.78	**43.43**	**23.57**
women	**41.39**	**81.76**	**91.97**	43.53	84.49	88.24	42.27	71.56	87.21	40.22	**56.57**	76.43
(row %)												
men	**92.52**	5.97	1.51	93.69	4.13	2.17	88.30	7.55	4.15	**69.70**	13.41	16.89
women	59.70	24.48	15.82	65.05	20.28	14.67	57.76	16.97	25.27	39.36	14.66	45.98
Birth Cohort ‡												
(column %)												
The Greatet Generation	---	---	---	---	---	---	5.30	9.06	13.98	29.25	35.71	**50.58**
The Silent Generation	5.46	7.01	15.35	19.34	31.03	**55.41**	**53.12**	**71.46**	**75.53**	**70.75**	**64.29**	49.42
Leading Boomers	24.38	36.47	**41.45**	40.03	**45.89**	31.51	41.58	19.48	10.49	---	---	---
Trailing Boomers	**43.67**	**45.33**	36.50	**40.63**	23.08	13.08	---	---	---	---	---	---
Generation X	26.50	11.18	6.70	---	---	---	---	---	---	---	---	---
(row %)												
The Greatet Generation	---	---	---	---	---	---	**53.86**	15.99	30.15	41.90	13.55	**44.55**
The Silent Generation	**62.42**	16.65	20.93	**63.43**	16.35	20.23	**65.14**	15.21	19.65	**59.88**	14.41	25.71
Leading Boomers	**66.09**	20.52	13.39	**78.63**	14.48	6.89	**88.12**	7.16	4.71	---	---	---
Trailing Boomers	**76.04**	16.38	7.58	**88.73**	8.09	3.18	---	---	---	---	---	---
Generation X	**89.47**	7.84	2.70	---	---	---	---	---	---	---	---	---
Median year of birth (year) ‡	1959	1956	**1953**	1953	1950	**1944**	1944	1938	**1932**	1930	1929	**1924**
Median age started the first regular job (year)¶	18.97	18.95	18.99	18.84	19.31	19.63	19.41	19.50	19.45	19.64	20.36	19.10

Notes:

* P<0.05, F tests and Kruskal-Wallis tests.

‡ P<0.05, Chi-squared tests.

¶ Significant cluster difference was found in Young middle Age only (P<0.05, F tests and Kruskal-Wallis tests). Other age periods did not indicate signficant differences by cluster and thus shaded.

Age. In terms of age, people in the stable, inactive cluster were much older than other people. Their median birth year was about five or six years older than those in other clusters. Members in the stable, full-time cluster were the youngest given their low median years of birth during each age period.

However, the pattern of employment trajectories was not strongly related to when employment formally started. The ANOVA and Kruskal-Wallis tests were statistically significant ($P<0.05$) only for Young Middle Age: Between age 35 and 45 years, people whose employment trajectories were found in the stable, full-time cluster started their first regular jobs around age 18.84 years, slightly earlier than others (19.31 years and 19.63 years in the other clusters). Overall, people seemed to start their formal employment around the same ages.

5.3 PATH DEPENDENCE OF EMPLOYMENT TRAJECTORIES IN THE LIFE COURSE

This section empirically examines the degree of path dependence within a person's employment trajectory across different age periods. Path dependence is a term used in this dissertation to refer to the association in the employment trajectories from the same person in adjacent age periods. It is hypothesized that an individual's employment trajectory is constrained by with past employment experience and that the degree of association depends on the specific patterns of employment trajectories from younger age periods.

To that end, trajectory patterns were analyzed through three pairs of adjacent age periods within a person—(I) Young Adulthood (age 25 to 34) and Young Middle Age (age 35 to 44), (II) Young Middle Age (age 35 to 44) to Late Middle Age (age 45 to 54), and (III) Late Middle Age (Age 45 to 54) to Later Adulthood (age 55 to 65). During each age period, a person may have an employment trajectory in one of the three patterns: 1) the stable, full-time; 2) the unstable, part-time; and 3) the stable, inactive. Path dependence in the patterns of employment trajectories were examined through flow

diagrams, restricted to people who had valid records of employment trajectories in both age periods of interest.

Flow diagrams cross-tabulate the counts and proportions of people whose employment trajectories are associated with an origin pattern (row) to a destination pattern (column) between two adjacent age periods (Figure 5.3.1). The proportions of cases on- and off-diagonals are examined. If there is no change in the pattern of people's employment trajectories, all cases would perfectly fall on the diagonal in a flow diagram. On the contrary, the fewer people on the diagonal, the larger the mobility in employment trajectories within the same persons.

5.3.1 Path Dependence in Two Adjacent Age Periods

Table 5.3.1 presents the flow of women, men, and their combined total between two adjacent age periods in terms of three primary patterns of employment trajectories. Together, these diagrams help to understand how many people remain or change their employment trajectories while moving to the next stage of the life course.

The upper section (I) cross-tabulates the count and cell percentages of people in each of the nine origin-destination combinations between Young Adulthood (age 25 to 34) and Young Middle Age (age 35 to 44). Of the 7,939 men and women who had identified employment trajectory patterns in both periods, 71.71% remained in the same pattern. Among these who did not change, the majority (60.27% of 71.71%=84.05%) continued with the stable, full-time pattern. Among those who changed, the biggest group consisted of people whose employment trajectories used to be unstable, part-time dominant but became more stable and full-time (13.38% of total).

The gender-specific diagrams on the right show the move towards stable, full-time trajectory pattern was primarily driven by women (19.27%), not men (6.55%). Moreover, some women who had stable, inactive trajectories early in their working ages became more involved in the labor market during Young Middle Age (age 35 to 44)—7.53% of total women moved to the stable, full-time cluster and 8.64% moved to the unstable, part-time cluster. However, low proportions of men in such directions of changes were actually due to high stability in their employment trajectories overall—

Table 5.3.1 Flow Diagrams of Employment Trajectory Patterns in Adjacent Age Periods by Gender

I. Young middle age (age 35 to 44 years)

Young adulthood (age 25 to 34 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**4,785**	**274**	**63**	5,122	Stable, full-time	**1,641**	**171**	**44**	1,856	Stable, full-time	**3,144**	**103**	**19**	3,266
(cell %)	(60.27)	(3.45)	(0.79)	(64.52)		(38.51)	(4.01)	(1.03)	(43.56)		(85.48)	(2.80)	(0.52)	(88.80)
Unstable, part-time	**1,062**	**448**	**115**	1,625	Unstable, part-time	**821**	**391**	**96**	1,308	Unstable, part-time	**241**	**57**	**19**	317
(cell %)	(13.38)	(5.64)	(1.45)	(20.47)		(19.27)	(9.18)	(2.25)	(30.70)		(6.55)	(1.55)	(0.52)	(8.62)
Stable, inactive	**345**	**387**	**460**	1,192	Stable, inactive	**321**	**368**	**408**	1,097	Stable, inactive	**24**	**19**	**52**	95
(cell %)	(4.35)	(4.87)	(5.79)	(15.01)		(7.53)	(8.64)	(9.58)	(25.75)		(0.65)	(0.52)	(1.41)	(2.58)
Total	6,192	1,109	638	**7,939**	Total	2,783	930	548	**4,261**	Total	3,409	179	90	**3,678**
				(71.71)					(57.26)					(88.44)

II. Late middle age (age 45 to 54 years)

Young middle age (age 35 to 44 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**2,719**	**201**	**69**	2,989	Stable, full-time	**955**	**104**	**33**	1,092	Stable, full-time	**1,764**	**97**	**36**	1,897
(cell %)	(59.02)	(4.36)	(1.50)	(64.88)		(38.15)	(4.16)	(1.32)	(43.63)		(83.84)	(4.61)	(1.71)	(90.16)
Unstable, part-time	**505**	**185**	**128**	818	Unstable, part-time	**427**	**154**	**114**	695	Unstable, part-time	**78**	**31**	**14**	123
(cell %)	(10.96)	(4.02)	(2.78)	(17.76)		(17.06)	(6.15)	(4.55)	(27.77)		(3.71)	(1.47)	(0.67)	(5.85)
Stable, inactive	**202**	**178**	**420**	800	Stable, inactive	**183**	**159**	**374**	716	Stable, inactive	**19**	**19**	**46**	84
(cell %)	(4.38)	(3.86)	(9.12)	(17.36)		(7.31)	(6.35)	(14.94)	(28.61)		(0.90)	(0.90)	(2.19)	(3.99)
Total	3,426	564	617	**4,607**	Total	1,565	417	521	**2,503**	Total	1,861	147	96	**2,104**
				(72.15)					(59.25)					(87.50)

Table 5.3.1 Flow Diagrams of Employment Trajectory Patterns in Adjacent Age Periods by Gender (Cont.)

III. later adulthood (age 55 to 65 years)

Late middle age (age 45 to 54 years)	**All**					**Women**					**Men**			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**1,185**	**220**	**226**	1,631	Stable, full-time	**402**	**83**	**92**	577	Stable, full-time	**783**	**137**	**134**	1,054
(cell %)	(39.85)	(7.40)	(7.60)	(54.84)		(23.83)	(4.92)	(5.45)	(34.20)		(60.84)	(10.64)	(10.41)	(81.90)
Unstable, part-time	**182**	**82**	**198**	462	Unstable, part-time	**132**	**58**	**139**	329	Unstable, part-time	**50**	**24**	**59**	133
(cell %)	(6.12)	(2.76)	(6.66)	(15.53)		(7.82)	(3.44)	(8.24)	(19.50)		(3.89)	(1.86)	(4.58)	(10.33)
Stable, inactive	**186**	**123**	**572**	881	Stable, inactive	**153**	**108**	**520**	781	Stable, inactive	**33**	**15**	**52**	100
(cell %)	(6.25)	(4.14)	(19.23)	(29.62)		(9.07)	(6.40)	(30.82)	(46.30)		(2.56)	(1.17)	(4.04)	(7.77)
Total	1,553	425	996	**2,974**	Total	687	249	751	**1,687**	Total	866	176	245	**1,287**
				(61.84)					(58.09)					(66.74)

88.44% of men remained in the same pattern as they were in 10 years earlier. Almost all of these men remained in the stable, full-time pattern after ten years. Flow diagrams between the first pair of age periods suggest high stability in employment patterns, especially for men who were actively employed full-time, and the strong impact of a career pattern from Young Adulthood (age 25 to 34) on Young Middle Age (age 35 to 44).

The middle section of Table 5.3.1 (II) describes the flow between two periods of middle ages. The findings are similar to those for Young Adulthood (age 25 to 34) and Young Middle Age (age 35 to 44). First, stability is the theme. Over 72% people, mainly men, belonged to the same patterns of employment trajectories in their late 40's and early 50's. The strongest path dependence was still found among men who carried over stable, full-time patterns of employment trajectories to Late Middle Age (age 45 to 54) (83.84% of all men). Women were more mobile with only 59.25% changed. When they did change, they were more likely to change from unstable, part-time trajectories to the stable, full-time pattern (17.06%).

The bottom section of the table (III) relates to the comparisons of career patterns between the last two age periods. After Age 55 years, patterns of employment trajectories became less predictable. Among men, only 66.74% continued with the same patterns in Later Adulthood (age 55 to 65), which pushed the grand average percentage of those who changed downward by nearly 10 percentage points to 61.84%. Women nevertheless displayed the same trend as in younger ages. In fact, they remained more mobile than men regardless of age periods. Because of women's lower degree of participation in the labor force than men in general, employment changes at late working ages primarily reflect the changes of men.

5.3.2 Lasting Path Dependence in Employment Trajectory Patterns

After examining the association between two adjacent age periods in people's patterns of employment trajectories, this section extends this analysis to two periods that are far apart. Strong associations indicate the lasting impacts from prior employment experience over a longer period of time in the life course.

The upper part of Table 5.3.2 shows the associations of the primary trajectory patterns during Young Adulthood (age 25 to 34) and Late Middle Age (age 45 to 54). To make comparisons easier, the lower section of the table mirrors the first section (I) in Table 5.3.1 which contains the flow diagrams between the same origin age period and its subsequent period (Young Middle Age, age 35 to 44 years) for women, men, and both combined. The same structure can be seen in Table 5.3.3 which was to show the flows between two older non-adjacent age periods, Young Middle Age (age 35 to 44 years) and Later Adulthood (age 55 to 65) as well as two adjacent middle age periods (age 35-44, 45-54), as appeared in Section II, Table 5.3.1.

Path Dependence of Employment from Young Adulthood

Comparing the two sections in Table 5.3.2 suggests that the degree of path dependence of a person's employment trajectory pattern at early working ages could last beyond ten years, yet its impact became weaker. For example, more than half (60.56%) of PSID cases remained in the same trajectory pattern during Late Middle Age (age 45 to 54) as during Young Adulthood (age 25 to 34). However, this proportion is lower in comparison with the proportion between Young Middle Age (age 35 to 44) and Late Middle Age (age 45 to 54, 71.71%).

Looking into gender-specific flow diagrams in these two sections reveals an interesting finding. The weakening path dependence from Young Adulthood (age 25 to 34) is best explained by women, not men. The proportion of men who did not change their patterns of employment trajectories in Late Middle Age (age 45 to 54) from their twenties remained remarkably high at 84.66%, which was almost no change from that of ten years ago (88.44%). Having an employment trajectory in the stable, full-time cluster is still strongly related to having such pattern in older ages, even beyond ten years of a period. For women, however, this percentage declined by 17 percentage points from 57.26% to 39.35%. In other words, women's employment trajectories were less predicable in Late Middle Age (age 45 to 54) than in the ten years prior even if their patterns in the late twenties or late thirties were known.

Table 5.3.2 Flow Diagrams of Employment Trajectory Patterns in Two Non-Adjacent Age Periods by Gender
Between Young Adulthood and Late Middle Age
Late middle age (age 45 to 54 years)

Young adulthood (age 25 to 34 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**1,268**	**89**	**31**	1,388	Stable, full-time	**342**	**38**	**17**	397	Stable, full-time	**926**	**51**	**14**	991
(cell %)	(51.82)	(3.64)	(1.27)	(56.72)		(25.93)	(2.88)	(1.29)	(30.10)		(82.09)	(4.52)	(1.24)	(87.85)
Unstable, part-time	**433**	**85**	**34**	552	Unstable, part-time	**360**	**70**	**27**	457	Unstable, part-time	**73**	**15**	**7**	95
(cell %)	(17.70)	(3.47)	(1.39)	(22.56)		(27.29)	(5.31)	(2.05)	(34.65)		(6.47)	(1.33)	(0.62)	(8.42)
Stable, inactive	**258**	**120**	**129**	507	Stable, inactive	**241**	**109**	**115**	465	Stable, inactive	**17**	**11**	**14**	42
(cell %)	(10.54)	(4.90)	(5.27)	(20.72)		(18.27)	(8.26)	(8.72)	(35.25)		(1.51)	(0.98)	(1.24)	(3.72)
Total	1,959	294	194	**2,447**	Total	943	217	159	**1,319**	Total	1,016	77	35	**1,128**
				(60.56)					(39.95)					(84.66)

I. Young middle age (age 35 to 44 years), Table 5.3.1

Young adulthood (age 25 to 34 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**4,785**	**274**	**63**	5,122	Stable, full-time	**1,641**	**171**	**44**	1,856	Stable, full-time	**3,144**	**103**	**19**	3,266
(cell %)	(60.27)	(3.45)	(0.79)	(64.52)		(38.51)	(4.01)	(1.03)	(43.56)		(85.48)	(2.80)	(0.52)	(88.80)
Unstable, part-time	**1,062**	**448**	**115**	1,625	Unstable, part-time	**821**	**391**	**96**	1,308	Unstable, part-time	**241**	**57**	**19**	317
(cell %)	(13.38)	(5.64)	(1.45)	(20.47)		(19.27)	(9.18)	(2.25)	(30.70)		(6.55)	(1.55)	(0.52)	(8.62)
Stable, inactive	**345**	**387**	**460**	1,192	Stable, inactive	**321**	**368**	**408**	1,097	Stable, inactive	**24**	**19**	**52**	95
(cell %)	(4.35)	(4.87)	(5.79)	(15.01)		(7.53)	(8.64)	(9.58)	(25.75)		(0.65)	(0.52)	(1.41)	(2.58)
Total	6,192	1,109	638	**7,939**	Total	2,783	930	548	**4,261**	Total	3,409	179	90	**3,678**
				(71.71)					(57.26)					(88.44)

Moreover, examining the off-diagonal percentages in the middle panels of Table 5.3.2 helps explain the declining path dependence in women's employment patterns between the two non-adjacent age periods. High percentages of women were able to hold stable, full-time like employment trajectories in their late forties and early fifties even though they had either heavily part-time (27.29%) or inactive employment experience (18.27%). Together, these women made up nearly two-thirds of the women in the stable, full-time pattern during Late Middle Age (age 45 to 54). The remaining one-third of them (342 among 943) were those who had already worked full-time stably during Young Adulthood (age 25 to 34).

Path Dependence of Employment from Young Middle Age

Table 5.3.3 compares the associations in the patterns of employment trajectories across two age periods that are far apart or adjacent but shifts to later stages in the life course. This table suggests that the impact of employment trajectories at Young Middle Age (age 35 to 44) is even smaller on trajectory patterns beyond ten years when compared with the impact of Young Adulthood (age 25 to 34). The overall percentage of people who stayed in the same patterns after age 55 years dropped to 49.18% from 72.15% as after age 45 years (lower section of the table). The drop (72.15% - 49.18%=22.97%) almost doubled the decline between two adjacent age periods from Young Adulthood (age 25 to 34, 71.71% to 60.56%, Table 5.3.2). This suggests a lower degree of path dependence in people's employment trajectories in older ages.

Furthermore, unlike what was found in Table 5.3.2 related to younger age periods, patterns of employment trajectories of both women and men have become harder to predict. The percentage of women who had the same trajectory pattern in Later Adulthood (age 55 to 65) as in Young Middle Age (age 35 to 44) is 38.42%, about 20.83% lower than between the two middle ages (age 35 to 44 and age 45 to 54, 59.25%). Men's percentage has dropped at a similar degree—from 87.50% to 65.43%.

Among those women who changed trajectory patterns between these two age periods, the largest groups were still those who held stable, inactive trajectories or unstable, part-time trajectories in Young Middle Age (age 35 to 44) but were found to

Table 5.3.3 Flow Diagrams of Employment Trajectory Patterns in Two Non-Adjacent Age Periods by Gender Between Young Middle Age and Later Adulthood

later adulthood (age 55 to 65 years)

Young middle age (age 35 to 44 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**404**	**98**	**104**	606	Stable, full-time	**118**	**35**	**43**	196	Stable, full-time	**286**	**63**	**61**	410
(cell %)	(34.98)	(8.48)	(9.00)	(52.47)		(16.98)	(5.04)	(6.19)	(28.20)		(62.17)	(13.70)	(13.26)	(89.13)
unstable, part-time	**104**	**48**	**67**	219	unstable, part-time	**97**	**42**	**60**	199	unstable, part-time	**7**	**6**	**7**	20
(cell %)	(9.00)	(4.16)	(5.80)	(18.96)		(13.96)	(6.04)	(8.63)	(28.63)		(1.52)	(1.30)	(1.52)	(4.35)
Stable, inactive	**151**	**63**	**116**	330	Stable, inactive	**135**	**58**	**107**	300	Stable, inactive	**16**	**5**	**9**	30
(cell %)	(13.07)	(5.45)	(10.04)	(28.57)		(19.42)	(8.35)	(15.40)	(43.17)		(3.48)	(1.09)	(1.96)	(6.52)
Total	659	209	287	**1,155**	Total	350	135	210	**695**	Total	309	74	77	**460**
				(49.18)					(38.42)					(65.43)

II. Late middle age (age 45 to 54 years), Table 5.3.1

Young middle age (age 35 to 44 years)	All					Women					Men			
	Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**		Stable, full-time	Unstable, part-time	Stable, inactive	**Total**
Stable, full-time	**2,719**	**201**	**69**	2,989	Stable, full-time	**955**	**104**	**33**	1,092	Stable, full-time	**1,764**	**97**	**36**	1,897
(cell %)	(59.02)	(4.36)	(1.50)	(64.88)		(38.15)	(4.16)	(1.32)	(43.63)		(83.84)	(4.61)	(1.71)	(90.16)
Unstable, part-time	**505**	**185**	**128**	818	Unstable, part-time	**427**	**154**	**114**	695	Unstable, part-time	**78**	**31**	**14**	123
(cell %)	(10.96)	(4.02)	(2.78)	(17.76)		(17.06)	(6.15)	(4.55)	(27.77)		(3.71)	(1.47)	(0.67)	(5.85)
Stable, inactive	**202**	**178**	**420**	800	Stable, inactive	**183**	**159**	**374**	716	Stable, inactive	**19**	**19**	**46**	84
(cell %)	(4.38)	(3.86)	(9.12)	(17.36)		(7.31)	(6.35)	(14.94)	(28.61)		(0.90)	(0.90)	(2.19)	(3.99)
Total	3,426	564	617	**4,607**	Total	1,565	417	521	**2,503**	Total	1,861	147	96	**2,104**
				(72.15)					(59.25)					(87.50)

have the stable, full-time pattern after age 55 (19.42% and 13.96% of all women). A similar finding is evident in diagrams between other adjacent or non-adjacent age periods, all of which suggest women's relatively higher mobility of moving into stable, full-time trajectory patterns in the Middle Ages (age 35 to 54) or Later Adulthood (age 55 to 65) as compared to men. Although this dissertation focuses on trajectories of employment status rather than occupations, this finding resembles the "revolving-door effect" in women's high likelihood of participation in male-dominated occupations in their mid- or late-careers (Jacob 1989). Overall, however, the degree of path dependence in terms of the employment trajectories across different age periods has declined for both men and women during Middle Ages (age 35 to 54) and Later Adulthood (age 55 to 65).

5.4 CHAPTER SUMMARY

This chapter focuses on the overall patterns of employment trajectories classified based on OMA distance scores that indicate the degree of dissimilarity from the normative, stable, full-time career paths. For trajectories related to each of the four age periods, three clusters were identified through two cluster methods—the K-means method and a nonparametric, density-based method.

By examining the differences among three clusters in terms of the characteristics of states in a trajectory, episodes, and modal transitions, it was summarized that one cluster consisted of people who were heavily full-time employed, had few transitions, and therefore had very small distances from stable, full-time trajectories. Another cluster consisted of trajectories with numerous, short episodes and had a large proportion of part-time employment. The last cluster included people who were economically inactive and made a lot of transitions across the labor market boundary. Analysis of cluster differences in trajectory characteristics of employment indicated that the three discovered patterns were indeed distinctive to each other in their trajectories, which validated the utility of OMA in summarizing a trajectory into a single measure.

Cluster comparisons of demographic compositions further revealed that the stable, full-time pattern was disproportionally male; women were concentrated in the other two

clusters. People found in the economically inactive cluster were older than others. Towards Late Middle Age (age 45 to 54) and Later Adulthood (age 55 to 65), more men were found in the unstable, part-time cluster and economically, inactive cluster than in younger ages.

The next section of the chapter tracked people's trajectory patterns across two age periods. Social theories about the "vicious circle" or "cumulative disadvantage" (Doeringer and Piore 1971, Bluestone 1970, Gordon 1972, O'Rand 1996) have suggested strong path dependence across the life course in employment. Indeed, a strong effect of path dependence was found throughout all ages and even lasted beyond ten years (Hypothesis 3.1). Findings were summarized in Table 5.3.4. The pattern of employment trajectories in younger ages was significantly related to patterns later in the life course. A person, especially a man, is highly likely to carry over the stable, full-time pattern to the next ten years (Hypothesis 3.2). At older ages, the effect of path dependence became weaker for women and men. Of those who changed career patterns, men were increasingly associated with unstable, part-time trajectories or economically, inactive patterns while women changed in the opposite direction—towards the stable, full-time pattern. This chapter extends Chapter Four's study of employment histories as a single construct that summarizes the trajectories at a high level through several primary patterns of such trajectories.

Table 5.3.4 Summary of Hypotheses and Findings in Chapter Five

	Statement	Findings
Path dependence within employment history		
3.1	Individual's employment trajectory is highly predicted by his or her trajectory in younger ages.	Yes. The effect of path dependence is strong, especially in younger ages, two adjacent age periods, and among men.
3.2	Employment trajectories similar to the norm of stable, full-time careers likely leads to the same pattern in older ages.	Yes overall. Men with stable, full-time trajectory pattern are very likely to carry it over to older ages.
3.3	Having prior employment trajectories different from the norm of stable, full-time careers decreases one's likelihood of such normative pattern in later age periods.	Yes, as compared with those with stable, full-time pattern in younger ages. But women are found more mobile and many of them were able to move into the stable, full-time pattern in middle ages.

CHAPTER 6:
OCCUPATIONS AND PRIMARY PATTERNS OF EMPLOYMENT TRAJECTORIES

How has the association between employment histories and occupations changed over time? If white-collar workers or professionals have concentrated in the pattern of stable, full-time careers are they losing their advantage? The primary goal of this chapter is to systematically examine the longitudinal association between occupations and patterns of employment trajectories. Its focus lies on people in professional or white-collar occupations and those who spent most of their careers in white-collar jobs. Multinomial logistic regression analysis was carried out on patterns of employment trajectories with gender, birth cohort, and occupation as explanatory variables.

6.1 PRIMARY OCCUPATIONS AND CLASS OF WORKER DURING WORKING AGES

In this dissertation, occupational status in a career is constructed as 'primary occupation'. *Primary occupation* refers to the occupation that a person has held for the longest time through a period, either continuously or cumulatively over several job episodes. In other words, it is defined based on the modal occupational episode within a person's employment history. A person's primary occupation can fall into one of the seven categories—(1) professional and technical workers; (2) managers, administrators, and self-employed businessmen or businesswomen; (3) clerical and sales workers; (4) craftsmen and foremen; (5) operatives; (6) laborers, service workers, farmers, farm managers, armed services, protective workers, and miscellaneous;[1] and (7) economically inactive individuals. The last category mostly consists of people whose modal occupational episodes were either "not applicable," "not in the labor force," "unascertained," or "don't know". In the PSID codeframe for occupations, "not in the labor force" includes unemployed people who were looking for jobs. Although varying

slightly by ages, about 13% of this group consisted of people who remained outside of the labor force through the whole age period of interest.

Table 6.1 presents the frequencies of these seven primary occupations in the four age-specific PSID analytical samples. Overall, the PSID observations were nearly evenly distributed across the seven categories, with the largest being the economically inactive group—consisting of around 28% of the sample. Most people phased out of the labor market in Later Adulthood (age 55 to 65) in which this group made up nearly half of the sample (42.81%). Primary occupations over a long age period were highly gendered. Not surprisingly, men were over-represented in traditionally male-dominated occupations, such as craftsmen and foremen (nearly all were men), machine operatives (about 10% higher than women), and managers and administrators (5 to 10% higher than women). Women were clustered in sales/clerical occupations and were particularly over-represented in the economically inactive category (about 30% higher than men). The overall proportions of men and women in the seven occupation categories remained fairly constant across age periods.

Alternatively, occupations in a career can be studied through the class of worker, which was derived from aggregated occupations. White-collar workers included men and women whose primary occupations fell into the categories of professionals, managers and administrators, and clerical and sales workers. Those whose primary occupations were among the categories of craftsmen and foreman, operatives, laborers, service workers, farmers, and armed forces (i.e. the last three groups of occupations) were considered blue-collar workers. Finally, the 'economically inactive' category consisted of the same people who spent most or all of their time in an age period outside of the labor market.

The distribution of the PSID cases by class of worker us presented in Table 6.2. Across the four age periods, white-collar and blue-collar workers had similar proportions with slightly more blue-collar workers in Later Adulthood (age 55 to 65, 24.56% white-collar and 32.63% blue-collar). Men have dominated the blue-collar occupations. Women have had slightly higher proportions in white-collar occupations until Late Middle Age

Table 6.1 Distribution of Primary Occupations in Career by Age Period:
The Panel Study of Income Dynamics, 1967-2005

	I. Young adulthood (Age 25 to 34 years)						III. Late middle age (Age 45 to 54 years)					
	All		Women		Men		All		Women		Men	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Professionals	2,062	12.93%	1,025	12.30%	1,037	13.62%	990	12.92%	464	11.46%	526	14.55%
Managers and administrators[1]	1,063	6.66%	376	4.51%	687	9.02%	727	9.49%	181	4.47%	546	15.10%
Sales/clerical workers	2,565	16.08%	1,845	22.14%	720	9.45%	1,012	13.20%	748	18.48%	264	7.30%
Craftsmen	1,502	9.42%	64	0.77%	1,438	18.88%	753	9.83%	26	0.64%	727	20.11%
Operatives	1,926	12.08%	528	6.34%	1,398	18.36%	846	11.04%	272	6.72%	574	15.87%
Service workers, laborers, farmers, armed forces[2]	2,323	14.57%	958	11.50%	1,365	17.92%	1,184	15.45%	640	15.81%	544	15.04%
Economically inactive[3]	4,508	28.27%	3,537	42.45%	971	12.75%	2,152	28.08%	1,717	42.42%	435	12.03%
Total	**15,949**	**100.00%**	**8,333**	**100.00%**	**7,616**	**100.00%**	**7,664**	**100.00%**	**4,048**	**100.00%**	**3,616**	**100.00%**

	II. Young middle age (Age 35 to 44 years)						IV. Later adulthood (Age 55 to 65 years)					
	All		Women		Men		All		Women		Men	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Professionals	1,663	13.69%	829	12.97%	834	14.49%	366	7.37%	143	5.29%	223	9.84%
Managers and administrators[1]	1,034	8.51%	311	4.87%	723	12.56%	369	7.43%	77	2.85%	292	12.88%
Sales/clerical workers	1,837	15.12%	1,376	21.53%	461	8.01%	485	9.76%	339	12.55%	146	6.44%
Craftsmen	1,221	10.05%	49	0.77%	1,172	20.36%	381	7.67%	14	0.52%	367	16.19%
Operatives	1,480	12.18%	458	7.17%	1,022	17.75%	455	9.16%	147	5.44%	308	13.59%
Service workers, laborers, farmers, armed forces[2]	1,784	14.68%	882	13.80%	902	15.67%	785	15.80%	417	15.44%	368	16.23%
Economically inactive[3]	3,130	25.76%	2,487	38.91%	643	11.17%	2,127	42.81%	1,564	57.90%	563	24.83%
Total	**12,149**	**100.00%**	**6,392**	**100.00%**	**5,757**	**100.00%**	**4,968**	**100.00%**	**2,701**	**100.00%**	**2,267**	**100.00%**

Note:

1. Includes the self-employed.

2. Includes the unemployed.

3. Includes cases in which all or most of the time during an age period was spent outside the labor force, such as retired people, permanently disabled, housekeepers, students, or those whose occupational status was don't know or not ascertained.

Table 6.2 Frequencies of Class of Worker in Career by Age Period:
The Panel Study of Income Dynamics, 1967-2005

	I. Young adulthood (Age 25 to 34 years)						III. Late middle age (Age 45 to 54 years)					
	All		Women		Men		All		Women		Men	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
White-collar[1]	5,690	35.68%	3,246	38.95%	2,444	32.09%	2,729	35.61%	1,393	34.41%	1,336	36.95%
Blue-collar[2]	5,751	36.06%	1,550	18.60%	4,201	55.16%	2,783	36.31%	938	23.17%	1,845	51.02%
Economically inactive[3]	4,508	28.27%	3,537	42.45%	971	12.75%	2,152	28.08%	1,717	42.42%	435	12.03%
Total	**15,949**	**100.00%**	**8,333**	**100.00%**	**7,616**	**100.00%**	**7,664**	**100.00%**	**4,048**	**100.00%**	**3,616**	**100.00%**
	II. Young middle age (Age 35 to 44 years)						**IV. Later adulthood (Age 55 to 65 years)**					
	All		Women		Men		All		Women		Men	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
White-collar[1]	4,534	37.32%	2,516	39.36%	2,018	35.05%	1,220	24.56%	559	20.70%	661	29.16%
Blue-collar[2]	4,485	36.92%	1,389	21.73%	3,096	53.78%	1,621	32.63%	578	21.40%	1,043	46.01%
Economically inactive[3]	3,130	25.76%	2,487	38.91%	643	11.17%	2,127	42.81%	1,564	57.90%	563	24.83%
Total	**12,149**	**100.00%**	**6,392**	**100.00%**	**5,757**	**100.00%**	**4,968**	**100.00%**	**2,701**	**100.00%**	**2,267**	**100.00%**

Note:

1. Includes the self-employed.

2. Includes the unemployed.

3. Includes cases in which all or most of the time during an age period was spent outside the labor force, such as retired people, permanently disabled, housekeepers, students, or those whose occupational status was don't know or not ascertained.

(age 45 to 54). In Later Adulthood (age 55 to 65), more than half of women and nearly one-quarter of men became economically inactive.

In order to examine the association between occupations and the patterns of employment trajectories as well as how this association has changed over time, a series of multinomial logistic regression models were fitted for four age periods with explanatory variables for gender, birth cohort, and primary occupation or class of worker. The reference pattern of the employment trajectory is the stable, full-time pattern. Therefore, each regression model yielded two sets of coefficients that quantified the relative risk of having either (I) the unstable, part-time pattern or (II) the stable, inactive pattern, instead of belonging to the reference pattern. Given that stable, full-time careers are the reference, an odds ratio significantly below one suggests a positive association between an occupation and this reference; on the contrary, an odds ratio significantly larger than one indicates a negative relationship. The more the estimated odds ratio departs from one in terms of magnitude, the stronger the effect.

Primary Occupation and Pattern of Employment Trajectory

Table 6.3 presents the results of multivariate analyses with primary occupations as the key explanatory variables. The reference primary occupation for comparison is professional and technical workers (*professionals*). Five indicators were included in regression models to compare each of the five other occupational groups with the professionals. In addition, gender was taken into account through a dummy variable, "female," which indicated the effect of being a woman on the odds of having a certain pattern of employment trajectory other than the stable, full-time career. For birth cohorts, the oldest cohort in an analytical sample was treated as the reference group. In the analysis of Young Adulthood (age 25 to 34) and Young Middle Age (age 35 to 44), the cohort compared was the Silent Generation. The reference cohort for analysis of Late Middle Age (age 45 to 54) and Later Adulthood (age 55 to 65) was the Greatest Generation.

Formula 6.1 describes the model for Young Middle Age (age 35 to 44) that assesses the odds ratios of having an unstable, part-time pattern (Y_B) instead of the stable,

Table 6.3 Multinomial Logistic Regression of Patterns of Employment Trajectories on Gender, Cohort, and Occupation

	(I) Unstable, part-time cluster vs. Stable, full-time cluster											
	(A) Young adulthood (Age 25-34 years)			**(B) Young middle age** (Age 35-44 years)			**(C) Late middle age** (Age 45-54 years)			**(D) Later adulthood** (Age 55-65 years)		
		Robust			Robust			Robust			Robust	
Variable	OR	SE	P value	OR	SE	P value	OR	SE	P value	OR	SE	P value
Gender (reference=male)												
Female	8.26	0.65	<.0001 ***	7.47	0.78	<.0001 ***	3.64	0.37	<.0001 ***	1.76	0.19	<.0001 ***
Birth cohort												
Leading boomers	0.78	0.09	0.035 *	0.49	0.04	<.0001 ***	0.65	0.11	0.009 **	0.64	0.07	<.0001 ***
Trailing boomers	0.36	0.04	<.0001 ***	0.14	0.02	<.0001 ***	0.16	0.03	<.0001 ***	NA	NA	NA
Generation X	0.08	0.01	<.0001 ***	NA	NA	NA	NA	NA	NA	NA	NA	NA
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Primary occupation in career (reference=professional)												
Managers and administrators	0.35	0.06	<.0001 ***	0.34	0.06	<.0001 ***	0.40	0.08	<.0001 ***	---	---	---
Sales/clerical workers	0.74	0.06	0.001 **	0.52	0.05	<.0001 ***	0.58	0.07	<.0001 ***	---	---	---
Craftsmen	---	---	---	0.53	0.10	0.001 **	---	---	---	---	---	---
Operatives	0.80	0.08	0.030 *	0.48	0.06	<.0001 ***	0.64	0.10	0.003 **	0.69	0.11	0.018 *
	(II) Stable, inactive cluster vs. Stable, full-time cluster											
Gender (reference=male)												
Female	35.68	15.76	<.0001 ***	10.24	3.38	<.0001 ***	11.84	2.66	<.0001 ***	2.89	0.33	<.0001 ***
Birth cohort												
Leading boomers	0.23	0.06	<.0001 ***	0.23	0.05	<.0001 ***	0.47	0.11	0.001 **	0.60	0.07	<.0001 ***
Trailing boomers	0.07	0.02	<.0001 ***	0.04	0.02	<.0001 ***	0.05	0.02	<.0001 ***	NA	NA	NA
Generation X	0.01	0.01	<.0001 ***	NA	NA	NA	NA	NA	NA	NA	NA	NA
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Primary occupation in career (reference=professional)												
Managers and administrators	0.30	0.18	0.049 *	0.77	0.31	0.515	0.50	0.15	0.024 *	---	---	---
Sales/clerical workers	0.54	0.14	0.014 *	0.86	0.21	0.539	0.93	0.16	0.680	---	---	---
Craftsmen	---	---	---	0.20	0.20	0.111	---	---	---	---	---	---
Operatives	0.43	0.19	0.050	0.43	0.18	0.049 *	0.59	0.15	0.041 *	0.61	0.10	0.003 **
Number of observations	11,441			9,019			5,512			2,841		
Log pseudolikelihood	-3611.29			-2588.00			-2250.02			-2234.45		
Pseudo R2	0.183			0.179			0.128			0.031		

Notes:

'NA' denotes 'not applicable' while '---' indicates coefficients are not statistically significant.

* P<0.05, ** P<0.01, *** P<.001.

Factor of service workers, laborers, farmers, and armed forces was dropped from the final model due to large P values.

full-time pattern (Y_A). On its right side, there is one factor for female, two for the leading and trailing boomers, and five factors for occupations. Omitted categories are the reference groups—men, the Silent Generation, and the professional occupation. Formula 6.2 is similar but it estimates the odds ratios of having the stable, inactive pattern (Y_c) instead of the stable, full-time pattern (Y_A).

$$\log\left(\frac{\frac{Y_B}{1-Y_B}}{\frac{Y_A}{1-Y_A}}\right) = \alpha + \beta_1 \times FEMALE + \beta_2 \times LEADINGBOOMERS + \beta_3 \times TRAILINGBOOMERS$$
$$+ \beta_4 xMANAGERS + \beta_5 xSALES + \beta_6 xCRAFTSMEN + \beta_7 xOPERATIVES$$
$$+ \beta_8 xSERVICES / LABORERS$$

(Formula 6.1)

$$\log\left(\frac{\frac{Y_C}{1-Y_C}}{\frac{Y_A}{1-Y_A}}\right) = \alpha + \beta_1 \times FEMALE + \beta_2 \times LEADINGBOOMERS + \beta_3 \times TRAILINGBOOMERS$$
$$+ \beta_4 xMANAGERS + \beta_5 xSALES + \beta_6 xCRAFTSMEN + \beta_7 xOPERATIVES$$
$$+ \beta_8 xSERVICES / LABORERS$$

(Formula 6.2)

In an analysis a full model with all the possible main effects served as the starting point. After not-significant explanatory variables (P value < 0.05) were gradually dropped, the model was simplified step by step. Log likelihood ratio tests were conducted to compare nested models for goodness of fit. P values larger than 0.05 in such tests suggested that the simpler model was sufficient and should be favored.

Findings of the final models are summarized in Table 6.3 which presents the coefficients for odds ratios, robust standard errors, P values as well as goodness-of-fit statistics for models. The panels arrayed horizontally show results of the final models in

each age period. The two sets of estimates from a model are presented in upper (I) and lower (II) sections within each panel.

Gender. Regardless of age, strong, positive gender effects were found. Being a woman significantly increased the odds of having both of the alternative trajectory patterns rather than the reference pattern. Such a gender effect nevertheless was diluted when people were aging. Women's odds ratio of having the stable, inactive trajectories decreased from 35.68 from Young Adulthood (age 25 to 34) to 2.89 in Later Adulthood (age 55 to 65). The change was less dramatic in the upper panel of Table 6.3 (from 8.26 to 1.76) which relates to the relative odds of having unstable, part-time trajectories.

Birth Cohort. Furthermore, the results from the multinomial logistic regressions suggest a positive relationship between later cohorts and stable, full-time career paths. This effect was increasing in magnitude when moving towards later cohorts. For instance, among people in Young Adulthood (age 25 to 34) with same occupations, the odds ratio of having an unstable, part-time trajectory rather than a stable, full-time trajectory increases from the Leading boomers (OR=0.78) and Trailing boomers (OR=0.36) to Generation X (OR=0.08, when compared with the Silent Generation (the reference). This cohort effect is consistent across age periods. As in the case of gender, cohort effects are smaller in the upper section (I) than in the lower section (II), when the unstable, part-time pattern is compared with the reference pattern.

Primary Occupation. Strong differential associations with patterns of employment trajectories exist among occupations. Overall, the professionals actually appeared more likely to be in alternative trajectory patterns than the stable, full-time pattern than people in other occupations, after accounting for gender and birth cohort. For example, the odds for managers, administrators, and the self-employed of having an unstable, part-time trajectory rather than a stable, full-time pattern (upper section I) is about two-thirds lower than the odds for professionals during Young Adulthood (age 25 to 34) (OR=0.35, Robust SE=0.06, P<.001). This suggests that professionals' careers may be less stable than managers' careers or may contain more part-time work. This effect remained throughout Young Middle Age (age 35 to 44) (OR=0.34, Robust SE=0.06,

P<.001), slightly decreases in Late Middle Age (age 45 to 54) (OR=0.40, Robust SE=0.08, P<.001), but is no longer significant in Later Adulthood (age 55 to 65). The difference between managers and professionals is milder with respect to the odds of having a stable, inactive pattern (lower section II). The difference is significant only during Young Adulthood (age 25 to 34) and Late Middle Age (age 45 to 54).

Interestingly, this finding applies not only to managers but also to machine operators and clerks although the magnitude of the effect was smaller than that of managers and administrators. Craftsmen only differed from professionals in Young Middle Age (age 35 to 44) with a slightly lower likelihood of being in the unstable, part-time trajectory pattern than the reference pattern (OR=0.53, Robust SE=0.10, P<.001). No differences were found between professionals and service workers, laborers, farmers, or armed forces (not shown in Table 6.3) who were dropped from the final models due to large P values. The distributions in the three employment trajectory patterns within men and women from each occupation are summarized in Table 6.4.

Class of Worker and Pattern of Employment Trajectory

A parallel analysis was carried out with class of worker as key explanatory variable (Table 6.5). An indicator was included in models representing blue-collar status. The reference class of worker was white-collar status. As in Table 6.3 where occupations were examined, women and earlier cohorts were found to be negatively associated with the normative pattern of stable, full-time trajectories than men and later cohorts.

At the level of class of worker, people who spent most of their time in blue-collar occupations (such as craftsmen, machine operatives, and service workers, laborers, farmers, or armed forces) did seem to positively relate to unstable, part-time employment trajectories, compared with white-collar workers. During Young Adulthood (age 25 to 34), blue-collar occupations increased the odds of having such a pattern than the stable, full-time pattern by 21% (OR=1.21, Robust SE=0.08, P=0.004). This effect disappeared in Young Middle Age (age 35 to 44) but became significant and stronger in Late Middle Age (age 45 to 54, OR=1.47).

Table 6.4 Proportions of Men and Women in Three Employment Trajectory Patterns by Birth Cohort and Occupation

	Young Adulthood (Age 25 to 34 Years)						Young Middle Age (Age 35 to 44 Years)					
	Men			Women			Men			Women		
	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern
The Silent Generation (born 1928-1945)												
Professionals	92.1	7.9	0.0	42.2	44.4	13.3	93.9	6.1	0.0	52.6	42.9	4.5
Managers and administrators[1]	100.0	0.0	0.0	53.9	46.2	0.0	98.3	1.7	0.0	70.7	19.0	10.3
Sales/clerical workers	100.0	0.0	0.0	46.0	44.8	9.2	97.3	2.7	0.0	65.5	25.0	9.5
Craftsmen	92.5	7.6	0.0	0.0	0.0	0.0	96.2	3.8	0.0	90.0	10.0	0.0
Operatives	92.6	7.4	0.0	60.0	30.0	10.0	94.7	4.9	0.4	75.6	24.4	0.0
Service workers, laborers, farmers, armed forces[2]	90.4	8.2	1.4	52.6	33.3	14.0	91.7	7.3	1.0	51.6	43.4	5.0
Leading Boomers (born 1946-1954)												
Professionals	92.6	7.4	0.0	52.2	43.5	4.3	96.5	3.2	0.3	69.7	28.2	2.1
Managers and administrators[1]	97.3	2.2	0.5	76.1	22.4	1.5	98.7	1.3	0.0	88.3	10.2	1.6
Sales/clerical workers	95.6	3.9	0.5	70.4	27.5	2.0	98.4	1.6	0.0	83.7	15.7	0.5
Craftsmen	93.5	6.5	0.0	72.2	27.8	0.0	96.5	3.3	0.2	89.5	10.5	0.0
Operatives	91.6	8.1	0.2	65.9	33.3	0.8	95.8	3.2	1.0	87.6	11.9	0.5
Service workers, laborers, farmers, armed forces[2]	92.8	7.3	0.0	56.6	39.4	4.0	94.4	5.4	0.3	76.2	21.5	2.3
Trailing Boomers (born 1955-1964)												
Professionals	98.2	1.8	0.0	77.4	21.0	1.6	98.3	1.7	0.0	88.4	11.3	0.3
Managers and administrators[1]	99.0	1.0	0.0	91.7	8.3	0.0	98.4	1.6	0.0	96.8	3.2	0.0
Sales/clerical workers	95.2	4.8	0.0	80.3	19.0	0.7	98.8	1.2	0.0	94.8	5.0	0.2
Craftsmen	96.1	3.9	0.0	83.9	16.1	0.0	99.3	0.7	0.0	90.0	10.0	0.0
Operatives	96.1	3.9	0.0	84.3	14.9	0.8	98.4	1.6	0.0	97.9	2.2	0.0
Service workers, laborers, farmers, armed forces[2]	95.2	4.7	0.2	74.0	24.6	1.4	98.6	1.1	0.3	94.1	5.3	0.6

Table 6.4 Proportions of Men and Women in Three Employment Trajectory Patterns by Birth Cohort and Occupation (Continued)

Generation X (born 1965-1979)												
Professionals	100.0	0.0	0.0	92.7	7.3	0.0	---	---	---	---	---	---
Managers and administrators[1]	99.3	0.0	0.7	97.8	2.2	0.0	---	---	---	---	---	---
Sales/clerical workers	99.0	1.0	0.0	93.8	6.0	0.2	---	---	---	---	---	---
Craftsmen	99.7	0.4	0.0	100.0	0.0	0.0	---	---	---	---	---	---
Operatives	99.3	0.7	0.0	95.2	4.8	0.0	---	---	---	---	---	---
Service workers, laborers, farmers, armed forces[2]	100.0	0.0	0.0	94.3	5.3	0.5	---	---	---	---	---	---

	Late Middle Age (Age 45 to 54 Years)						Later Adulthood (Age 55 to 65 Years)					
	Men			Women			Men			Women		
The Greatest Generation (born 1907-1927)												
Professionals	100.0	0.0	0.0	50.0	0.0	50.0	71.4	12.5	16.1	33.3	33.3	33.3
Managers and administrators[1]	97.4	2.6	0.0	60.0	0.0	40.0	82.4	13.0	4.6	63.2	5.3	31.6
Sales/clerical workers	100.0	0.0	0.0	58.6	31.0	10.4	67.4	23.9	8.7	58.0	21.6	20.5
Craftsmen	86.3	11.8	2.0	NA	NA	NA	69.1	19.5	11.4	83.3	0.0	16.7
Operatives	96.0	2.0	2.0	33.3	50.0	16.7	75.8	19.4	4.8	57.9	15.8	26.3
Service workers, laborers, farmers, armed forces[2]	81.3	18.8	0.0	35.9	39.6	24.5	77.4	12.9	9.7	33.3	19.4	47.2
The Silent Generation (born 1928-1945)												
Professionals	91.1	8.2	0.7	62.7	23.4	13.9	76.1	15.0	9.0	60.5	19.3	20.2
Managers and administrators[1]	93.5	5.9	0.6	86.1	6.5	7.4	77.7	13.0	9.2	70.7	13.8	15.5
Sales/clerical workers	96.5	1.4	2.1	70.6	17.5	11.9	82.0	6.0	12.0	61.4	17.9	20.7
Craftsmen	90.2	9.0	0.7	100.0	0.0	0.0	73.0	12.7	14.4	100.0	0.0	0.0
Operatives	90.2	8.6	1.2	81.0	12.6	6.3	83.7	7.1	9.2	78.9	9.2	11.9
Service workers, laborers, farmers, armed forces[2]	88.1	10.6	1.3	62.2	26.1	11.7	79.8	10.3	9.9	66.7	18.3	15.0
Leading Boomers (born 1946-1954)												
Professionals	97.2	2.8	0.0	91.8	7.8	0.4	---	---	---	---	---	---
Managers and administrators[1]	98.9	1.1	0.0	94.1	5.9	0.0	---	---	---	---	---	---
Sales/clerical workers	97.1	1.0	1.9	93.5	4.6	2.0	---	---	---	---	---	---
Craftsmen	97.0	2.3	0.8	100.0	0.0	0.0	---	---	---	---	---	---
Operatives	97.0	2.0	1.0	91.3	8.7	0.0	---	---	---	---	---	---
Service workers, laborers, farmers, armed forces[2]	97.4	2.1	0.5	90.7	7.8	1.6	---	---	---	---	---	---

Table 6.5 Multinomial Logistic Regression of Patterns of Employment Trajectories on Gender, Cohort, and Class of Worker

	(I) Unstable, part-time cluster vs. Stable, full-time cluster											
	(A) Young adulthood (Age 25-34 years)			**(B) Young middle age** (Age 35-44 years)			**(C) Late middle age** (Age 45-54 years)			**(D) Later adulthood** (Age 55-65 years)		
Variable	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value
Gender (reference=male)												
Female	8.37	0.65	<.0001 ***	8.20	0.81	<.0001 ***	3.74	0.37	<.0001 ***	1.76	0.19	<.0001 ***
Birth cohort												
Leading boomers	0.79	0.09	0.042 *	0.50	0.04	<.0001 ***	0.66	0.11	0.011 *	0.64	0.07	<.0001 ***
Trailing boomers	0.36	0.04	<.0001 ***	0.14	0.02	<.0001 ***	0.17	0.03	<.0001 ***	---	---	---
Generation X	0.08	0.01	<.0001 ***	---	---	---	---	---	---	---	---	---
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Class of Worker (reference=White-collar)												
Blue-collar	1.21	0.08	0.004 **	1.08	0.09	0.360	1.47	0.14	<.0001 ***	0.90	0.10	0.325
	(II) Stable, inactive cluster vs. Stable, full-time cluster											
Gender (reference=male)												
Female	35.13	15.67	<.0001 ***	13.01	4.20	<.0001 ***	12.69	2.75	<.0001 ***	2.97	0.34	<.0001 ***
Birth cohort												
Leading boomers	0.24	0.06	<.0001 ***	0.22	0.06	<.0001 ***	0.46	0.11	0.001 **	0.60	0.07	<.0001 ***
Trailing boomers	0.06	0.02	<.0001 ***	0.04	0.02	<.0001 ***	0.05	0.02	<.0001 ***	---	---	---
Generation X	0.01	0.01	<.0001 ***	---	---	---	---	---	---	---	---	---
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Class of Worker (reference=White-collar)												
Blue-collar	1.20	0.28	0.422	0.89	0.20	0.602	1.02	0.15	0.898	1.06	0.12	0.581
Number of observations	11,441			9,019			5,512			2,841		
Log pseudolikelihood	-3640.64			-2635.00			-2266.50			-2240.27		
Pseudo R2	0.176			0.165			0.122			0.028		

Note:

'NA' denotes 'not applicable' while '---' indicates coefficients are not statistically significant.

* P<0.05, ** P<0.01, *** P<.001.

Factor of service workers, laborers, farmers, and armed forces was dropped from the final model due to large P values.

Excludes cases whose primary occupational episode was economically inactive, such as retired people, permanently disabled, housekeepers, students, or those whose occupational status was don't know or not ascertained.

Overall, multivariate analyses on occupations (primary occupation or class of worker) and patterns of employment trajectories suggest a moderate occupation effect. White-collar occupations are indeed positively associated with stable, full-time careers, even among people in the same gender or from the same birth cohort. But this effect due to class of worker was restricted to specific age periods (age 25 to 34, age 45 to 54) and did not lead to higher odds of being in the stable, inactive cluster than the reference pattern.

When looking at the finer level of primary occupation, the occupation that had the strongest, positive association with the reference trajectory pattern turned out to be managers and administrators. The employment trajectories of professionals, which are fairly gender-balanced, were found to be further apart from the normative careers than managers and administrators and to a less degree than machine operatives, sales/clerical workers, and craftsmen and foremen. This may be related to the gendered structure of occupations as three of these categories, except for sales/clerical workers, have been dominated by men. These findings are interesting because estimated differences presented here are those after gender was taken into account. Blue-collar and white-collar workers' distributions in the three employment trajectory patterns are summarized in Table 6.6 by gender, birth cohort, and age period.

However, the above multivariate analyses might be gender-biased, as people in the last category of primary occupation, 'economically inactive individuals' who were mostly likely to be women, were excluded. By definition, they tended to have stable, inactive employment trajectories. Appendix F and Appendix G show the alternative version of previous analysis with these people included. The overall conclusions found in Table 6.3 and Table 6.5 did not change remarkably despite better model goodness-of-fit statistics.

Table 6.6 Proportions of Men and Women in Three Employment Trajectory Patterns by Birth Cohort and Class of Worker

	Young Adulthood (Age 25 to 34 Years)						Young Middle Age (Age 35 to 44 Years)					
	Men			Women			Men			Women		
	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern	Stable, Full-Time Pattern	Unstable, Part-Time Pattern	Stable Inactive Pattern
The Silent Generation (born 1928-1945)												
White collar	96.32	3.68	0.00	45.52	44.83	9.66	96.30	3.70	0.00	62.42	29.45	8.13
Blue collar	91.99	7.67	0.35	54.55	32.47	12.99	94.46	5.11	0.43	58.90	37.54	3.56
Leading Boomers (born 1946-1954)												
White collar	94.70	5.02	0.28	64.78	32.45	2.76	97.71	2.17	0.12	79.19	19.59	1.22
Blue collar	92.63	7.29	0.08	60.26	36.92	2.82	95.65	3.87	0.48	80.65	17.72	1.63
Trailing Boomers (born 1955-1964)												
White collar	97.59	2.41	0.00	80.70	18.38	0.92	98.44	1.56	0.00	93.06	6.74	0.20
Blue collar	95.78	4.17	0.06	78.10	20.82	1.09	98.78	1.13	0.09	95.26	4.36	0.38
Generation X (born 1965-1979)												
White collar	99.49	0.34	0.17	94.07	5.81	0.12	---	---	---	---	---	---
Blue collar	99.68	0.32	0.00	94.83	4.89	0.29	---	---	---	---	---	---
	Late Middle Age (Age 45 to 54 Years)						**Later Adulthood (Age 55 to 65 Years)**					
	Men			**Women**			**Men**			**Women**		
The Greatest Generation (born 1907-1927)												
White collar	98.68	1.32	0.00	57.50	22.50	20.00	76.19	15.24	8.57	54.20	21.37	24.43
Blue collar	87.92	10.74	1.34	35.59	40.68	23.73	74.38	16.92	8.71	39.89	18.09	42.02
The Silent Generation (born 1928-1945)												
White collar	93.15	5.93	0.92	70.74	17.48	11.79	78.05	12.20	9.76	62.38	17.76	19.86
Blue collar	89.62	9.33	1.06	68.67	21.51	9.81	78.32	10.30	11.39	70.77	15.38	13.85
Leading Boomers (born 1946-1954)												
White collar	97.80	1.80	0.40	92.88	6.01	1.11	---	---	---	---	---	---
Blue collar	97.10	2.13	0.76	91.28	7.72	1.01	---	---	---	---	---	---

6.2 THE ASSOCIATION OF OCCUPATIONS AND EMPLOYMENT TRAJECTORY PATTERNS OVER TIME

In light of the discovered associations between the three patterns of employment trajectories and the primary occupation or class of worker, this section focuses on how these associations have changed over time, as examined through birth cohorts. Bar plots in Figure 6.1a illustrate the distributions of the three employment trajectory clusters in Young Adulthood (age 25 to 34). Bars are aligned from left to right for earlier to later birth cohorts side by side, separately for white-collar and blue-collar workers, and then arranged by gender (men's on the left and women's on the right). The three colors in each bar present the proportions of three trajectory patterns among people within a specific birth cohort. The blue portion at the bottom of a bar indicates the percentage of people in the stable, full-time pattern. The main purpose of these bar plots is to help understand how the distributions of employment trajectory patterns have changed across birth cohorts. Figure 6.1b to Figure 6.1d contains similar bar plots for the three older age periods. If the hypothesis that white-collar workers are losing their advantage of having the trajectories in the stable, full-time pattern is true, then we should see from these figures that the speed of change among cohorts is faster among blue-collar workers (towards later birth cohorts).

The left side of each of the four figures lays out men's distributions of trajectory patterns across four age periods. Overall the proportion of those having the stable, full-time pattern was slightly larger among white-collar workers and later cohorts, but the differences are very small. Women had more variation, with larger proportions in stable, full-time pattern among later cohorts. In Late Middle Age (age 45 to 54) and Later Adulthood (age 55 to 65), an increase in this career pattern was faster among blue-collar women than white-collar women.

Figure 6.2a to 6.2d depict similar trends, but for six primary occupation groups and women only; little changes have taken place in distribution of three trajectory patterns among men over time, as the majority of them were in the normative, stable, full-time pattern (not shown). These four figures generally suggest that among women of

similar ages, women managers and administrators were the most likely to be in the stable, full-time pattern, compared to those in other occupations. They were followed by women machine operatives, except in Late Middle Age (age 45 to 54) when the largest pattern was an unstable, part-time cluster. Although the craftsmen occupation appeared to have the highest percentage of women in the stable, full-time pattern, only a handful of women were actually in that group based on the occupations in which they spent most of the time.

In terms of the change over time, the group that has changed to the largest degree is women in the service/labor/farm occupations, followed by professionals, sales/clerks and machine operatives. Overall, the above bar plots suggest a 'ceiling effect' that some occupations with previously lower proportions in the normative career pattern have been catching up with managerial workers. Professionals did not have a significantly stronger association with the stable, full-time trajectory pattern than managers, administrators and people in some other occupations. But across birth cohorts the association of professionals and the stable, full-time pattern has become stronger.

However, results shown in all these bar plots excluded those who spent all or most of the time outside the labor force or those whose occupational status was 'don't know' or 'not ascertained' throughout an age period. As suggested by Tables 6.1 and 6.2, these two groups might account for from a quarter to 42.81% of all people in the analytical samples. Since majority of them were women, the above results were biased towards men and women who actively participated in the labor force.

6.3 CHAPTER CONCLUSION

The key findings from this chapter and the related hypotheses are summarized in Table 6.7. The results suggest that having a professional occupation does not necessarily guarantee a higher likelihood of having stable, full-time careers than other occupations. On the contrary, professionals are less likely to experience that pattern of employment trajectories than those in male-dominated occupations such as managers, machine operatives, and craftsmen and foremen. This association remains even after gender and

birth cohort are taken into account. White-collar workers are indeed more likely (but only modestly) to experience such normative career pattern than blue-collar workers, but no difference was found among the two groups in their tendency to have unstable, inactive trajectories.

Looking at the different birth cohorts, the increase in the proportion of having employment trajectories in the stable, full-time pattern was more significant among women in service/labor/farm, professional, and machine operative occupations than other women, or among blue-collar women than white-collar women. This reflects a 'ceiling effect' that occupations which normally had a lower degree of concentration in the stable, full-time trajectory pattern tend to have larger room for a change than others.

Note:
Armed forces and protective workers were unable to be separated from service workers, laborers and farm workers in some years of the PSID surveys.

Table 6.7 Summary of Hypotheses and Findings in Chapter Six

	Statement	Findings
Occupations and Employment trajectories		
H4.1	Stable, full-time careers are more prevalent among professionals than among other occupations. However, this relative advantage of professionals has deminished in later cohorts.	1) Professionals had a lower chance of being associated with the stable, full-time career norm, especially when compared with managers and administrators.
		2) The increase in the proportion of the stable, full-time trajectory pattern has been more significant among women in service/labor/farm occupations than professional women.
H4.2	Stable, full-time careers are more prevalent among white-collar workers than among other workers. However, this relative advantage of white-collar workers has deminished in later cohorts.	3) White-collar had higher likelihood of being associated with the stable, full-time career norm than blue-collar workers, only when unstable, part-time employment trajectories were examined. No difference was found between White-collar and blue-collar workers in having stable, inactive trajectories.
		4) The increase in the proportion of being in the stable, full-time trajectory pattern has been more significant among blue-collar women than women in white-collar occpuations.

Figure 6.1a Distribution of Patterns of Employment Trajectories Among White- or Blue-Collar Workers in Young Adutlhood (Age 25-34 Years)

by Birth Cohort and Gender

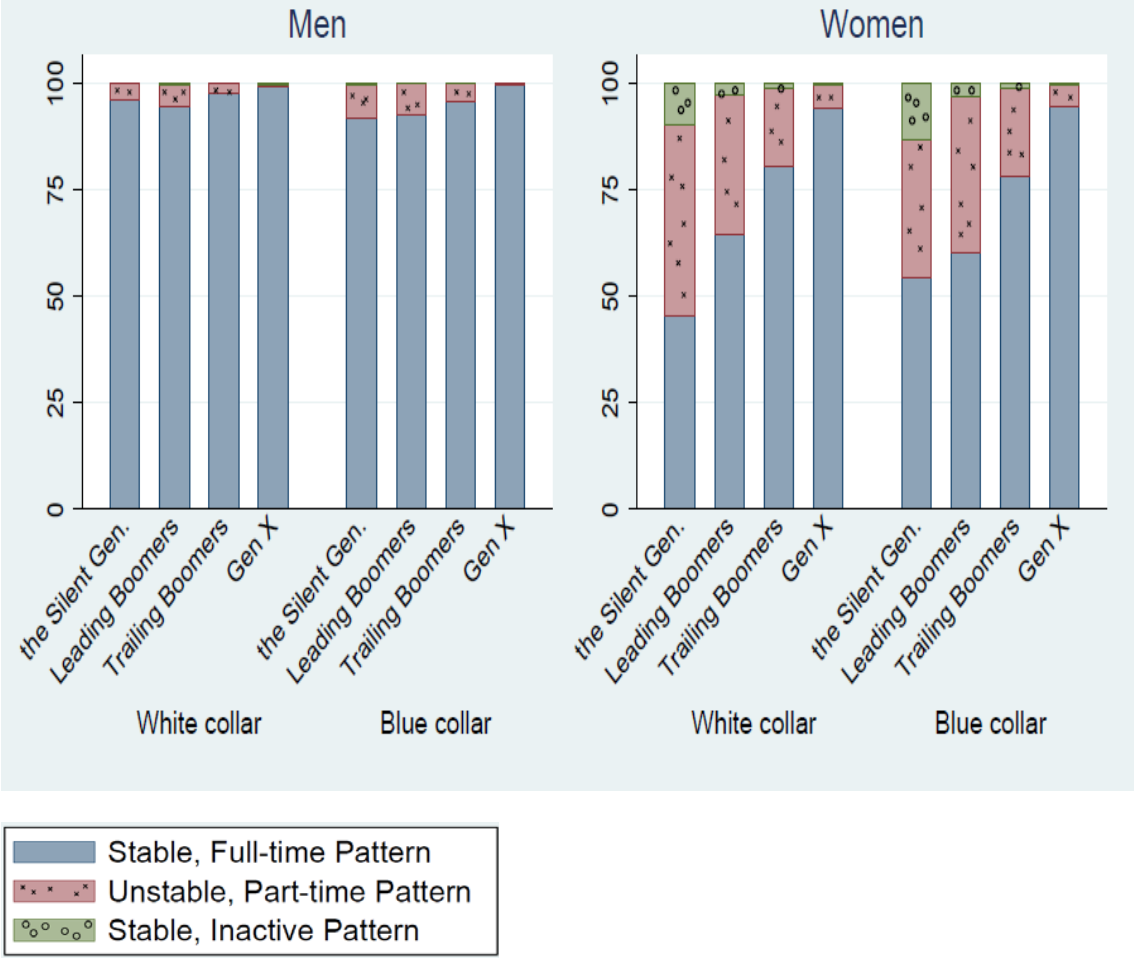
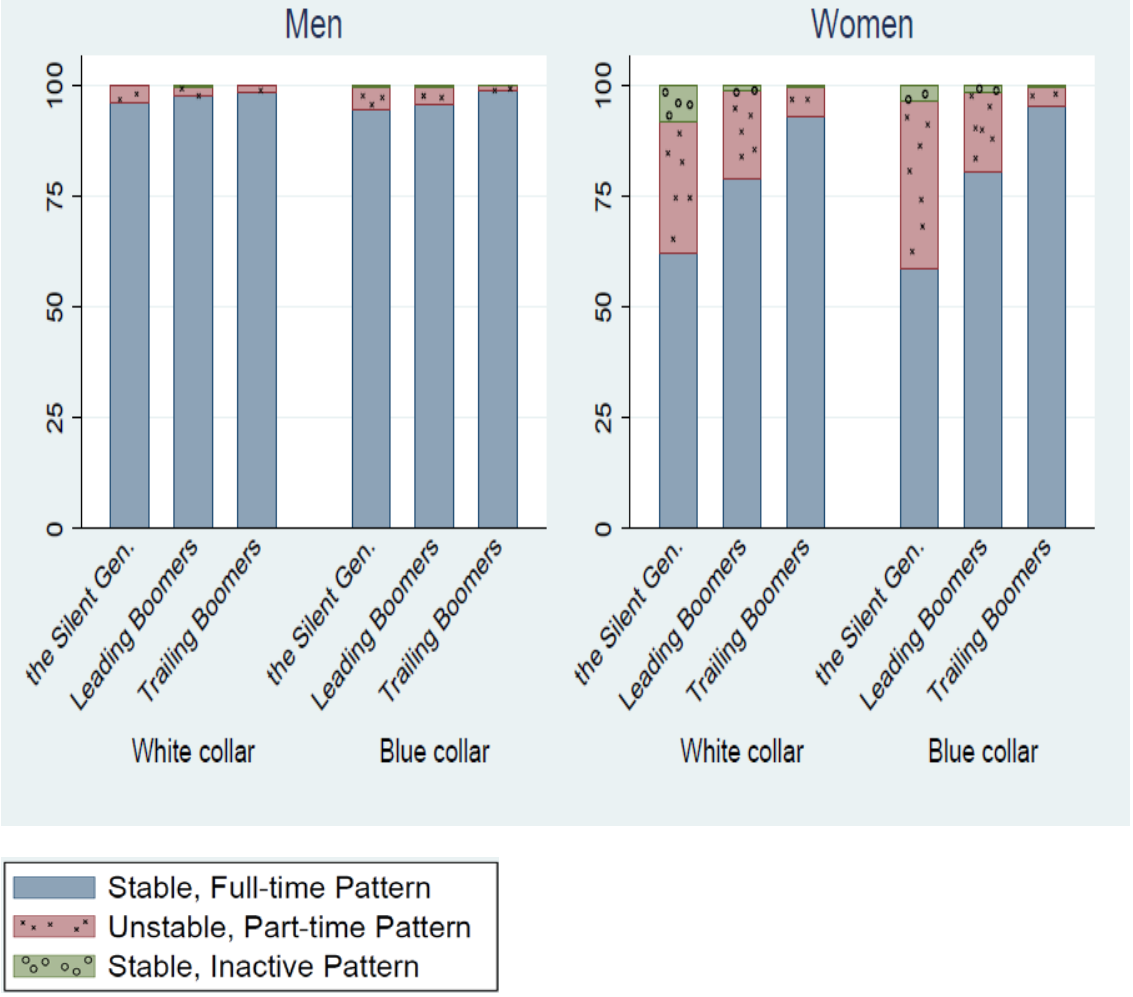


Figure 6.1b Distribution of Patterns of Employment Trajectories Among White- or Blue-Collar Workers in Young Middle Age(Age 35-44 Years)

by Birth Cohort and Gender



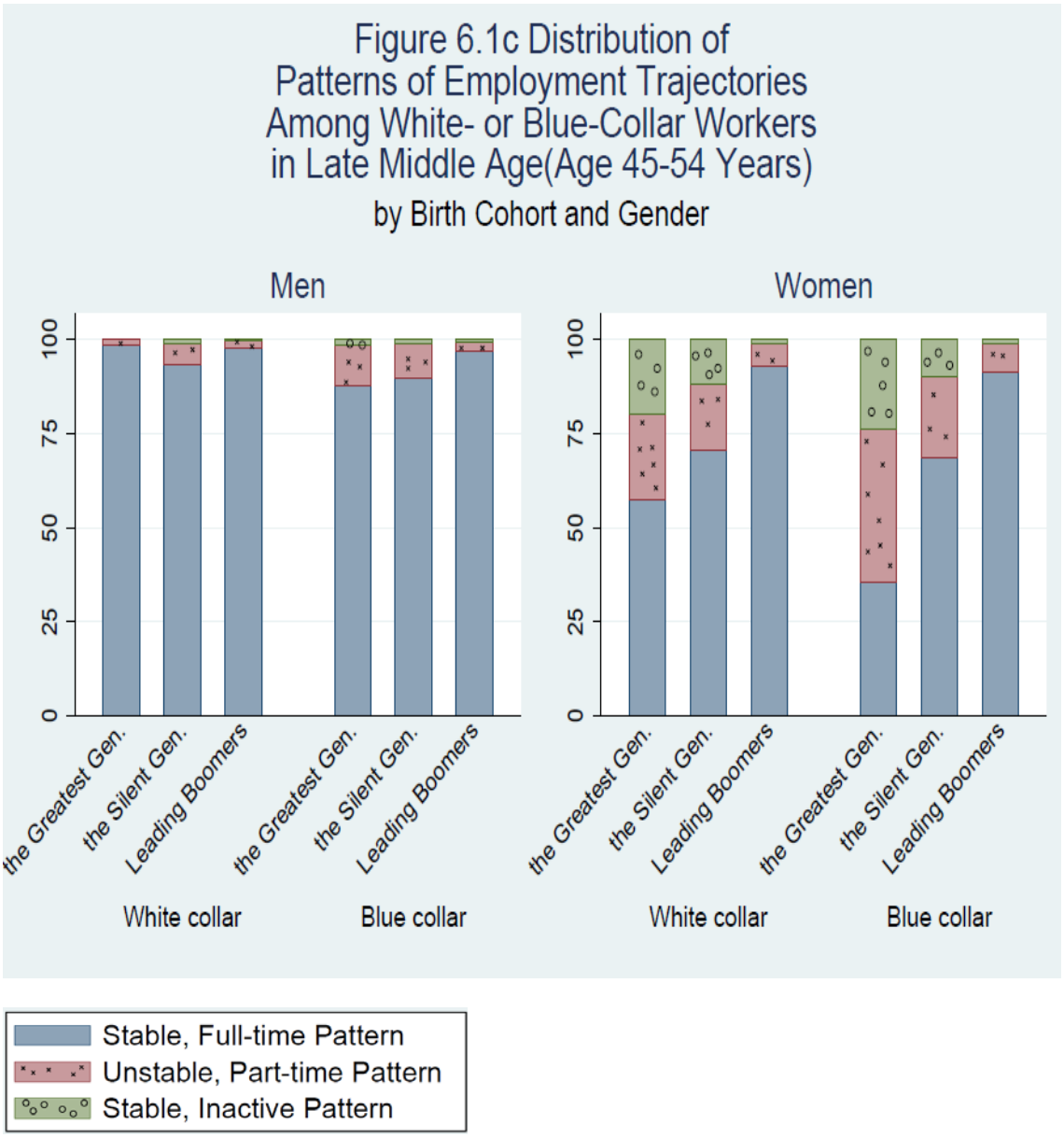
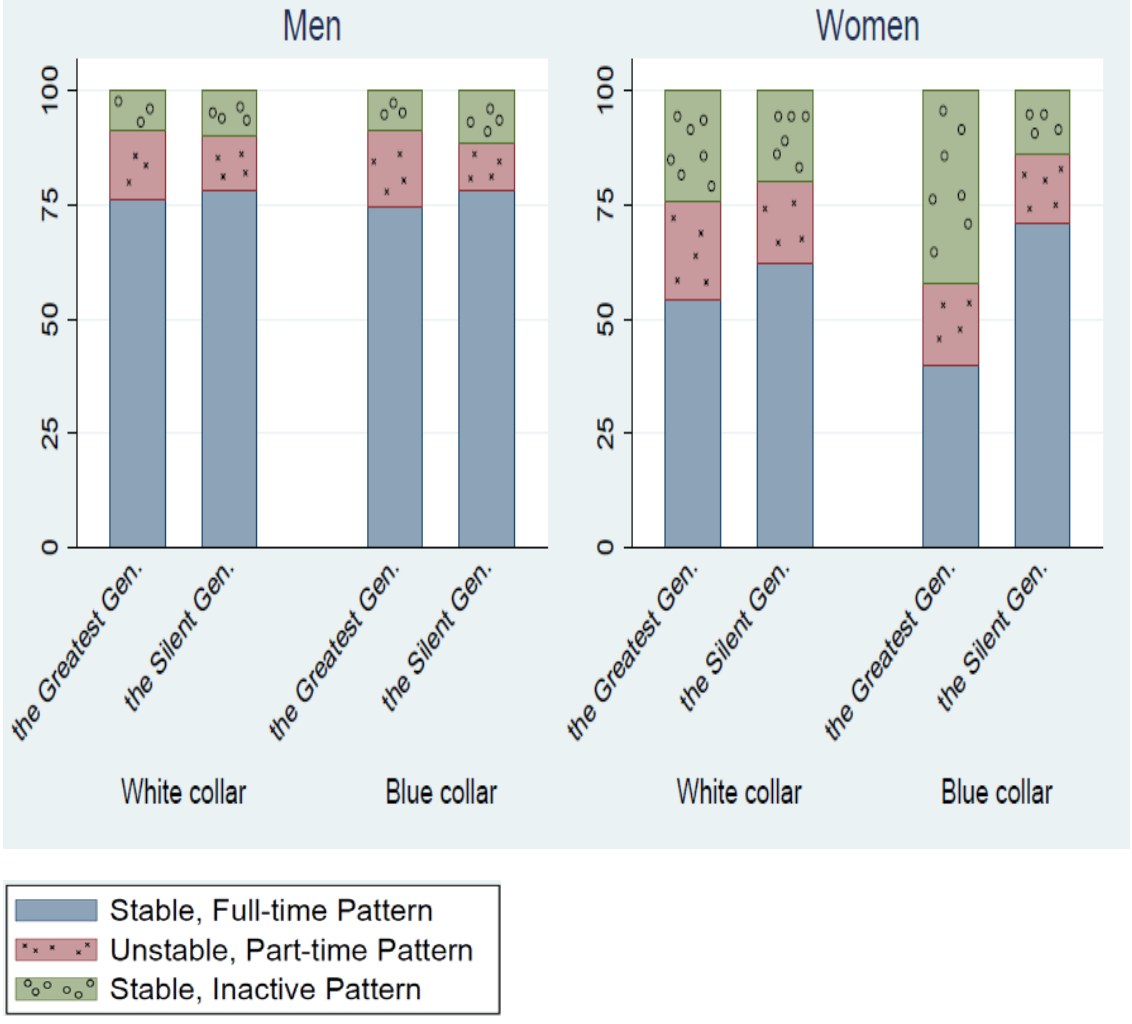


Figure 6.1c Distribution of
Patterns of Employment Trajectories
Among White- or Blue-Collar Workers
in Late Middle Age(Age 45-54 Years)
by Birth Cohort and Gender
Men
Women
0
25
50
75
100
the Greatest Gen.
the Silent Gen.
Leading Boomers
White collar
Blue collar
Stable, Full-time Pattern
Unstable, Part-time Pattern
Stable, Inactive Pattern

Figure 6.1d Distribution of Patterns of Employment Trajectories Among White- or Blue-Collar Workers in Later Adulthood (Age 55-65 Years)

by Birth Cohort and Gender



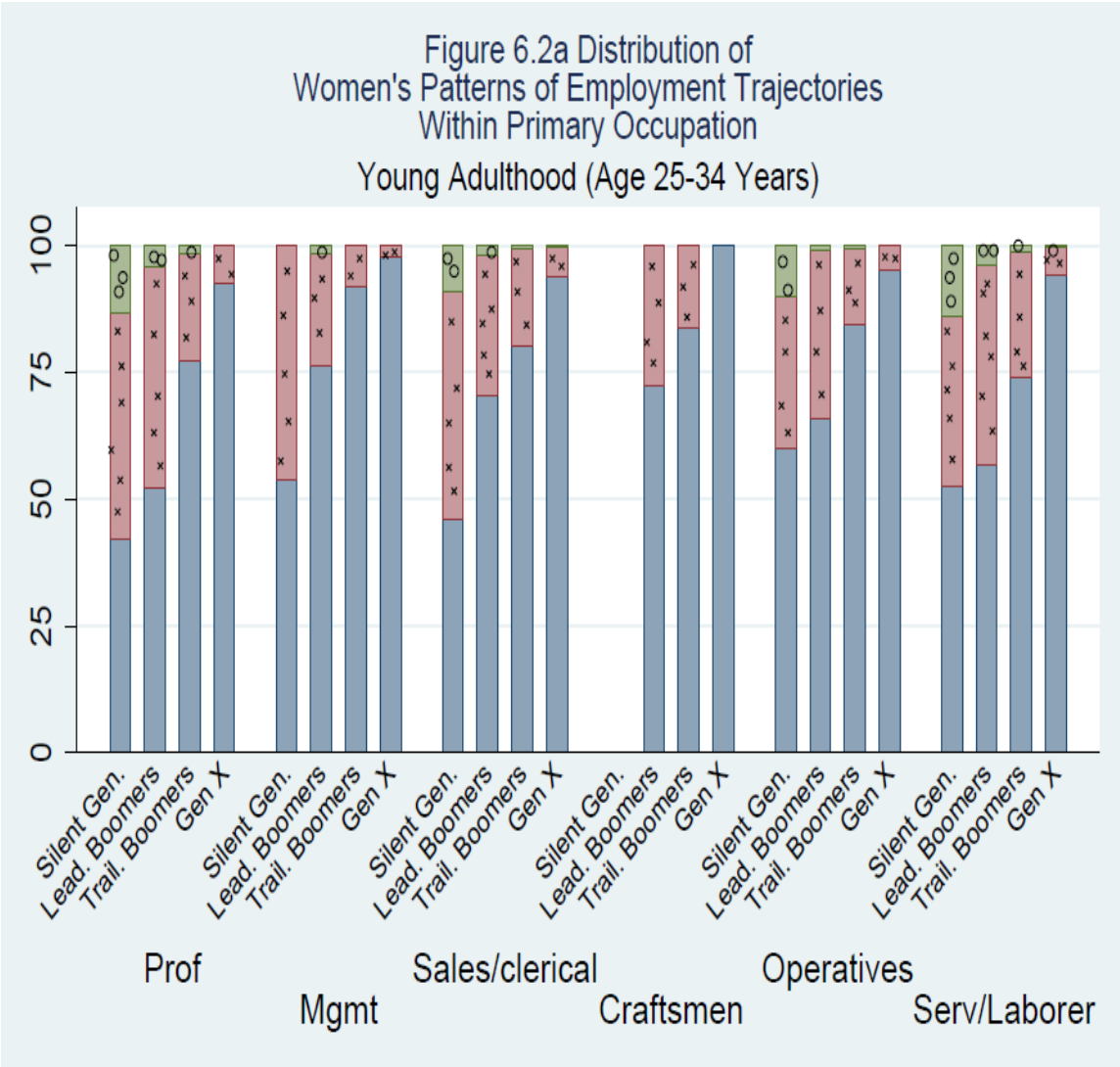
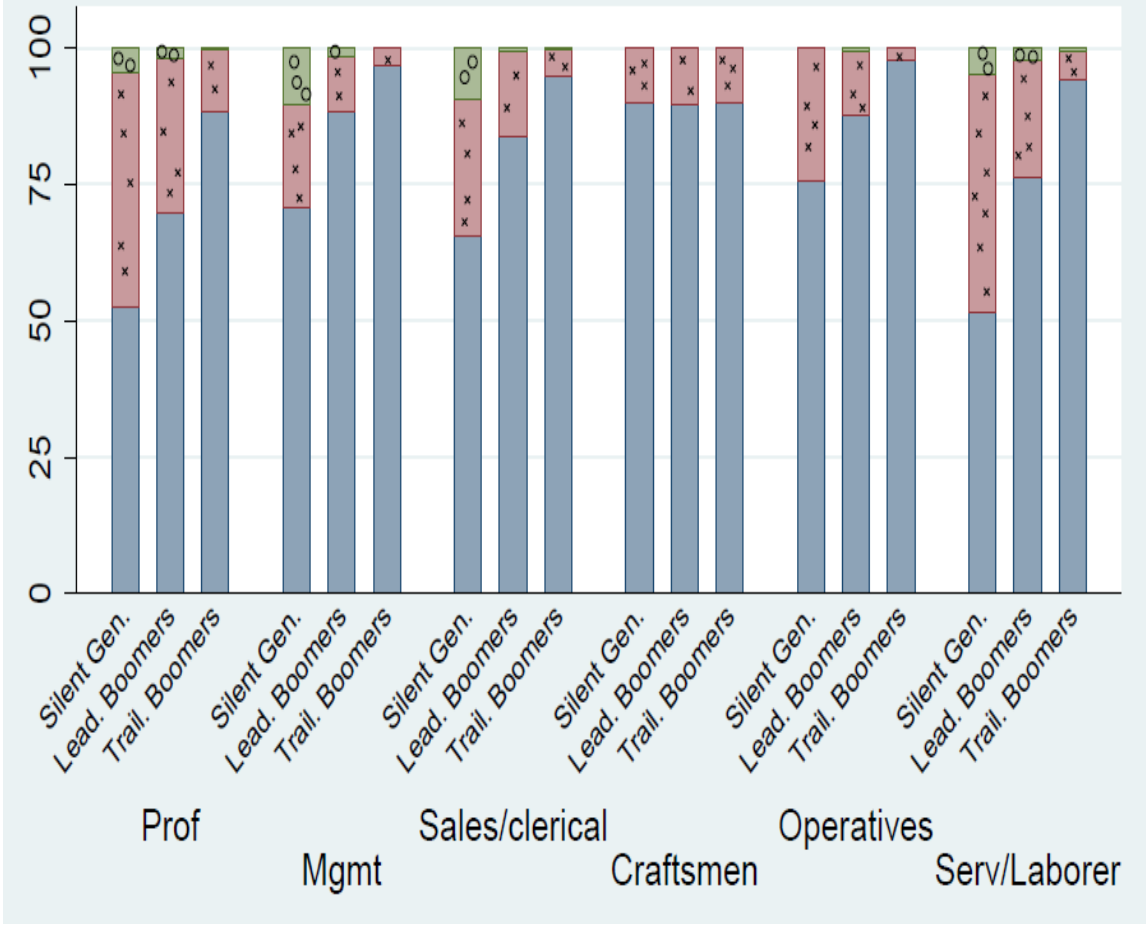
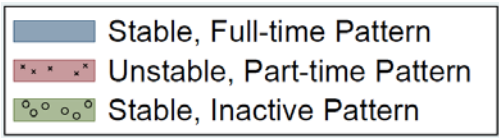


Figure 6.2a Distribution of
Women's Patterns of Employment Trajectories
Within Primary Occupation
Young Adulthood (Age 25-34 Years)
0
25
50
75
100
Silent Gen.
Lead. Boomers
Trail. Boomers
Gen X
Prof
Mgmt
Sales/clerical
Craftsmen
Operatives
Serv/Laborer
Stable, Full-time Pattern
Unstable, Part-time Pattern
Stable, Inactive Pattern

Figure 6.2b Distribution of
Women's Patterns of Employment Trajectories
Within Primary Occupation

Young Middle Age (Age 35-44 Years)





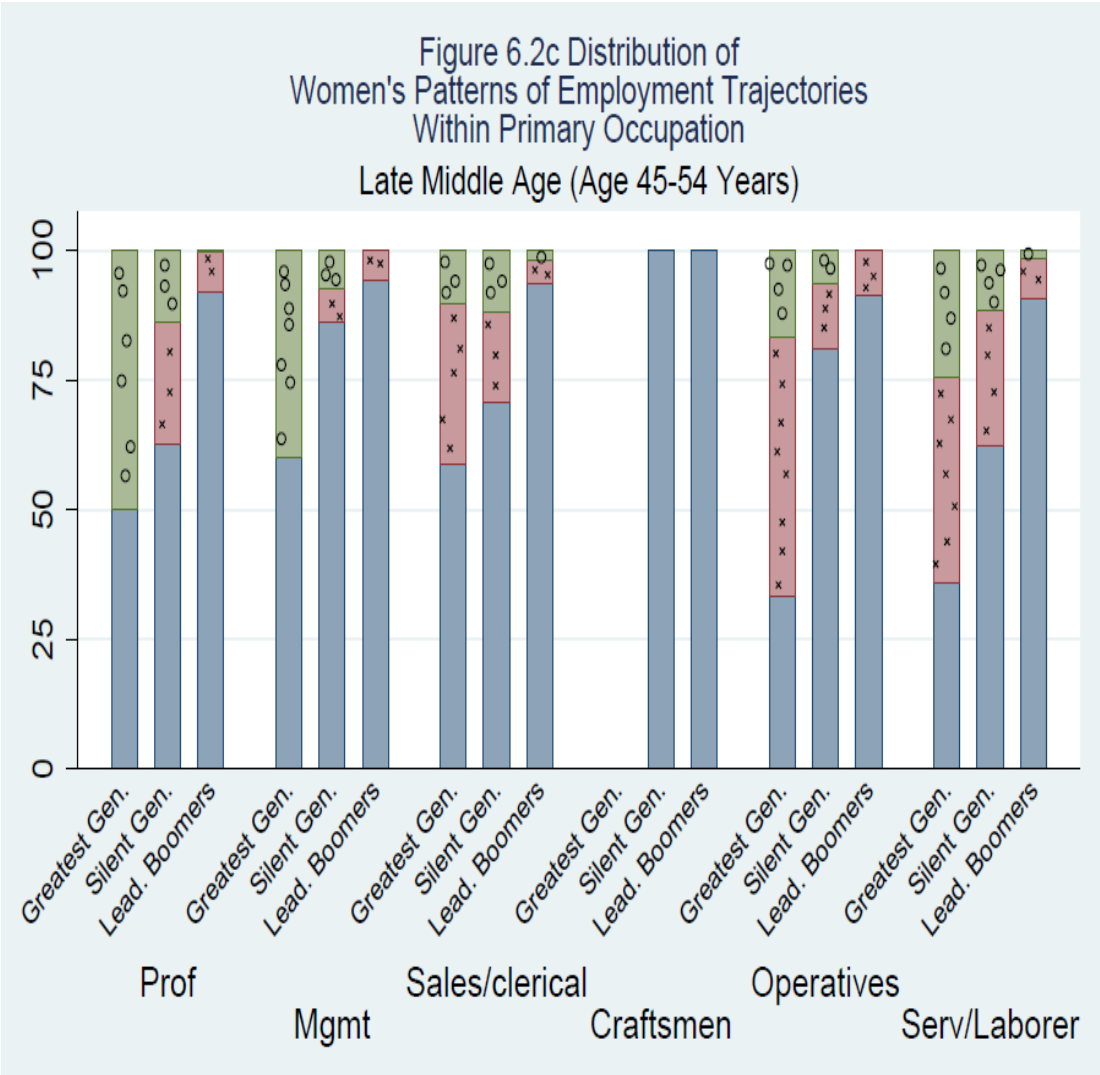


Figure 6.2c Distribution of
Women's Patterns of Employment Trajectories
Within Primary Occupation
Late Middle Age (Age 45-54 Years)
0
25
50
75
100
Greatest Gen.
Silent Gen.
Lead. Boomers
Prof
Mgmt
Sales/clerical
Craftsmen
Operatives
Serv/Laborer
Stable, Full-time Pattern
Unstable, Part-time Pattern
Stable, Inactive Pattern

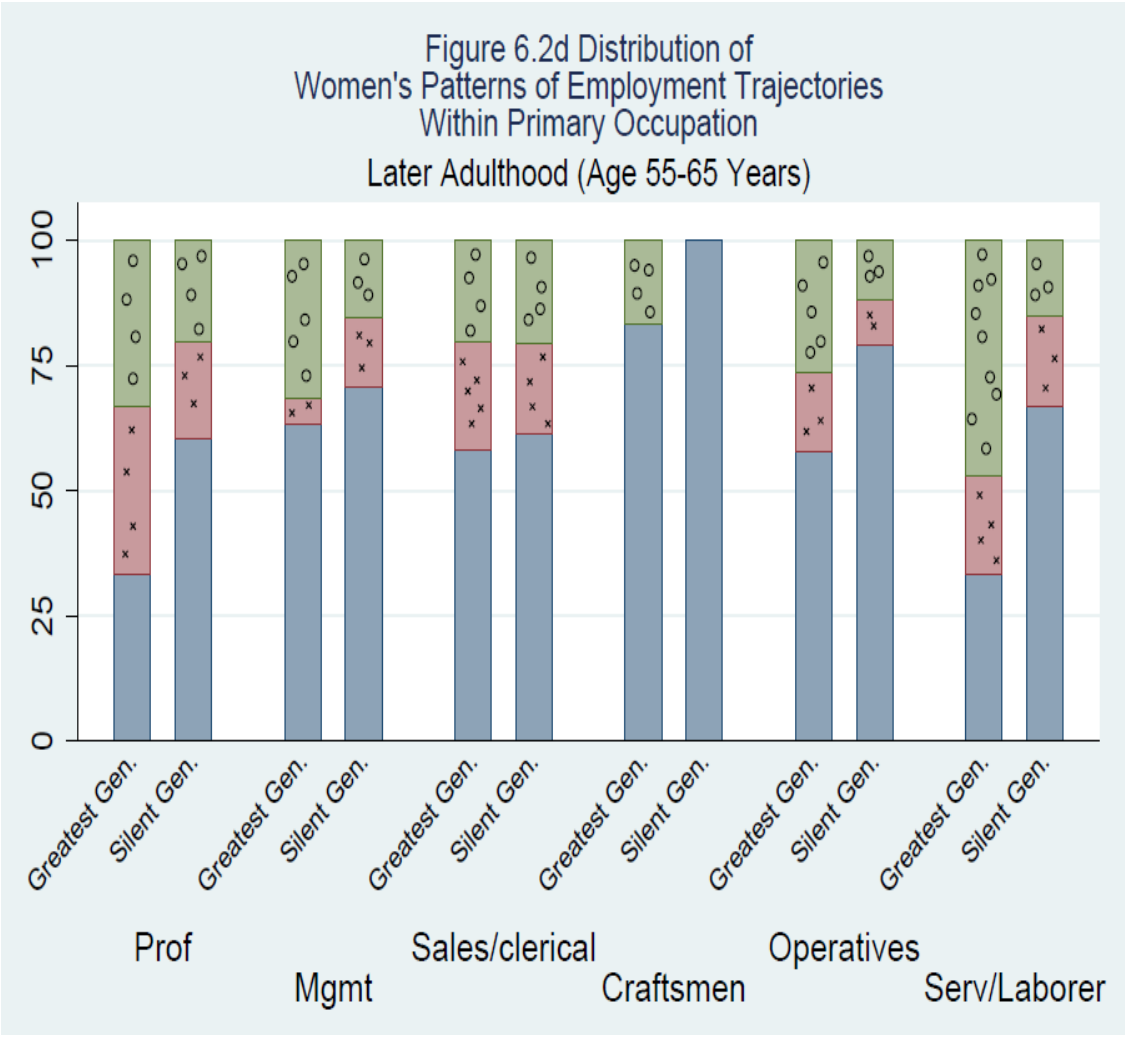


Figure 6.2d Distribution of
Women's Patterns of Employment Trajectories
Within Primary Occupation
Later Adulthood (Age 55-65 Years)
0
25
50
75
100
Greatest Gen.
Silent Gen.
Prof
Mgmt
Sales/clerical
Craftsmen
Operatives
Serv/Laborer
Stable, Full-time Pattern
Unstable, Part-time Pattern
Stable, Inactive Pattern

CHAPTER 7
SUMMARY, DISCUSSION, AND CONCLUSIONS

SUMMARY OF FINDINGS

This dissertation is a systematic, empirical study of employment histories in the U.S. since the late 1960s. It is comprehensive because it is not limited to any specific social groups such as white-collar workers, professionals, or those employed in big firms, as most of the previous sociological research has been done. In order to map the overall patterns of employment histories in the U.S. and examine how these patterns have changed over time, this dissertation thoroughly examines the employment status trajectories of 32,193 men and women from the PSID from several perspectives. First, optimal matching distance summarized the whole trajectory of a person's employment status over a long period and indicated the degree of departure of an individual's employment history from the normative, stable, full-time career. Second, derived from optimal matching distances, clusters of employment trajectories were discovered to represent the primary patterns of American's employment histories over the past four decades and to help identify the overall trends in career changes. Third, path dependence within a person's trajectory pattern was examined over two adjacent or non-adjacent age periods. Finally, the longitudinal relationship between occupations and patterns of employment status trajectories was investigated. The following findings stood out through these different perspectives and levels (also see Table 7):

First (cohort variations in employment), the employment histories in the U.S. have become more similar to the stable, full-time careers with smaller distance to this career norm, after gender, age, and occupation were taken into account. Cumulative engagement in full-time employment plays a key role in explaining this observation: Later cohorts, despite their less stable trajectories, were found to be closer to the stable, full-time career paths *overall* than older cohorts because they spent more time in full-time employment. In addition, later cohorts were also found to have more similar employment

trajectories than among earlier cohorts as the degree of heterogeneity of trajectories was lower.

Second (Gender gap in employment) and more interestingly, this study revealed that the gender gap in employment has declined in the U.S. over the forty years, which was driven primarily by *women*, not men. Although being disadvantaged in terms of employment, women have become increasingly active in the labor force, particularly full-time employment, over the years. This has become the single, most important driving force of the converging gender gap in career paths. Despite this optimistic trend, a strong, persistent disadvantage of women in employment and career paths was found throughout this dissertation at various levels of analysis. Women's employment trajectories looked more heterogeneous and still had a larger distance from the stable, full-time career norm than men's.

Third (patterns of employment histories), three primary patterns of employment trajectories were identified in the U.S. throughout the past four decades based on data from the PSID: 1) the stable, full-time pattern; 2) the unstable, part-time pattern; and 3) the stable, economically inactive pattern. The stable, full-time pattern disproportionally related to men and later cohorts while women and people at older ages or from earlier cohorts tended to be concentrated in the two alternative patterns.

Fourth (path dependence in employment histories), patterns of employment trajectories from younger ages were very likely to be carried over to the next stages of the life course. The effect of path dependence is particularly strong among men and/or those who had trajectories in the stable, full-time pattern. This underscores the significance of having a "good start" early in one's career. Disadvantages in employment histories tend to be perpetuated and cumulated although the strength of path dependence weakens in older ages and over longer time intervals. Among those who did change career patterns, women were more likely than men to transition into the stable, full-time trajectory pattern. This may provide additional evidence for the shrinking gender gap over time.

Finally (occupations and employment trajectory patterns), relative advantage was found among white-collar workers in their stronger association with the stable, full-time

pattern than with the unstable, part-time pattern as compared with the associations for blue-collar workers. Professionals had no advantage of continuous, full-time employment relative to managers and administrators or machine operatives--the occupations dominated by men. In terms of change over time, the increase in the proportion of having the stable, full-time pattern has been larger in later cohorts among blue-collar workers and women in service/labor/farm occupations than among white-collar workers, managers/administrators, and professionals. However, this trend has basically been limited to women, and few changes were found by cohort among men.

CONSTRAINTS OF STUDY

Optimal Matching

The findings of this dissertation, however, need to be interpreted with caution given some constraints related to data quality in the PSID and the methods being used. The first limitation has to do with Optimal matching analysis (OMA). To accommodate several features of the data being examined--a large number of long employment trajectories with nominal states (employment status)--OMA was favored over other methods in analyzing trajectories in this dissertation. Since there was no theoretical reason to determine the costs of transitions among these nominal employment statuses, substitution costs were set as the inverse of the frequency of a transition such that transitions that rarely occur in reality (as suggested by frequencies in data) required larger costs than common transitions. However, this decision about substitution costs was still arbitrary. Moreover, neither substitution costs nor insertion/deletion costs in OMA took into account the *direction* of transitions—transitions in opposite directions were treated equally and assigned the same costs since few OMA computer programs allow for asymmetric costs. Nevertheless, values of distance scores can be sensitive to the costs set for substitutions, insertions, and deletions in OMA.

However, alternative methods of analyzing employment trajectories may not affect the conclusions from this study dramatically as suggested by the cross-sectional data shown in the following figures. Figure 7.1 gives an example of the 15,949 PSID men

and women whose trajectories during Young Adulthood were studied in regard to their cross-sectional proportions in each of the four employment statuses between 1967 and 2005. As the figure illustrates, more people were engaged in full-time employment (up from 40% to 80%) while fewer were part-time employed or outside of the labor force (down to 10% from 30% or 40%, respectively) despite a slight increase in unemployment.

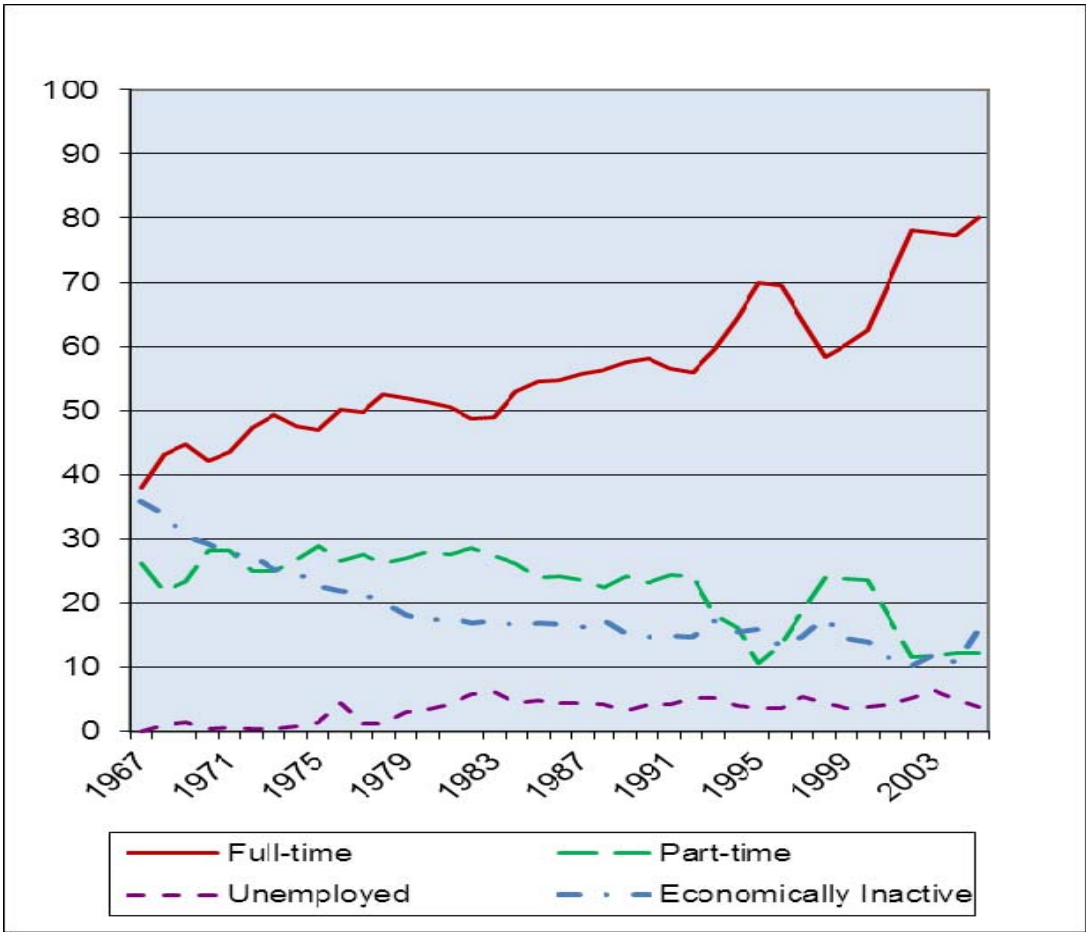
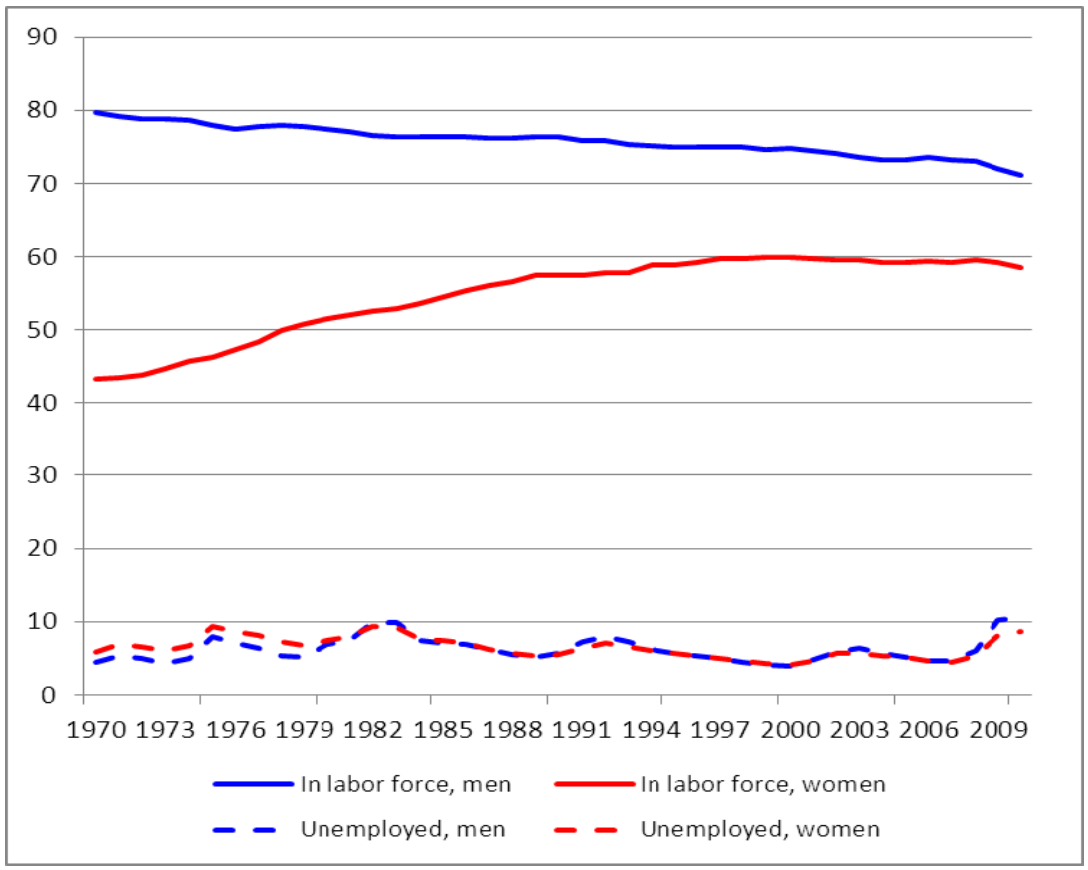


Figure 7.1 Cross-Sectional Percentages of Employment Statuses During Young Adulthood (Age 25 to 34 Years): The Panel Study of Income Dynamics, 1967-2005

The official labor statistics also provide evidence for the trends found in the PSID data. Figure 7.2 shows the labor force participation rates of men and women (among non-

institutionalized civilian population) from 1970 to 2010 as well as their unemployment rates (among those in the labor force). While unemployment rates have increased to 10% in the recent two years and men's labor force participation has decreased from 80% to 70% during these 30 years, the biggest change is still women's signficant increase in the labor force (from 43.3% in 1970 to 60% or so). Both figures suggest that similar conclusions are likely to be reached if employment histories are investigated *overall and across a long period of time*, regardless of the methods being used.



Source: US Department of Labor, Bureau of Labor Statistics 2011

Figure 7.2 Labor Force Participation Rate and Unemployment Rate: Current Population Survey, 1970-2010

Therefore, the above observations bring another critique to OMA or any methods based on an overall perspective. As far as this dissertation is concerned, another limitation of OMA happens to be its most attractive feature--its holistic perspective, which is a paradox, given its utility in studying social science sequences like employment trajectories. On the one hand, the benefit of OMA is that it treats sequences as *the* unit of analysis, which implies that a sequence as a whole has key characteristics that cannot be studied through its components separately. Coming from this basic assumption, OMA allows comparing whole sequences directly and efficiently. On the other hand, knowing "how much" sequences differ at a high level may be insufficient for addressing why they are different. In other words, the overall differences that OMA identifies among sequences may overshadow or over-simplify important variations among them. For instance, in this dissertation, the stable, full-time career pattern was found to be increasingly common among later cohorts, which seems counter-intuitive to what some scholars have argued (Tilly 1991; Aronowitz and DiFazio 1994; Benach et al. 2002). A closer look, however, reveals that the conclusion resulted from the fact that later cohorts have had a bigger full-time employment component than earlier cohorts, despite the larger number of transitions and shorter episodes on average that they have had. From another perspective, if the focus is to seek the *overall* trend of the whole sequence, any critical transitions or patterns of changes that occur in a small segment within a long sequence can be overlooked.

For some scholars, for instance, a more interesting research question may be "*in what aspects* or *how* do those sequences differ," which cannot be answered by OMA distances directly. However, OMA can be used instrumentally, together with further analysis, to help answer the "how" question. For example, cluster analysis and analysis of episode, state, and transition characteristics as carried out in Chapter 5 of this dissertation, helped to explain how those career paths were different from one another in their overall trends as expressed by OMA distance scores.

An alternative approach that identifies patterns of trajectories without examining the trajectories as a whole is to find key latent components that distinguish different

trajectories. In this author's own unpublished work, a series of 36 measures were developed that captured the temporary characteristics of 32,193 employment status trajectories from the PSID, including the ten measures analyzed in Chapter 5 (Huang 2008). Then nonlinear principal component analysis was carried out that reduced these 36 characteristics into four latent components—employment stability, sustained economical inactivity, insecure part-time employment, and difficulty in returning to employment. These four components were found to be the underlying dimensions that jointly defined the temporal structure of trajectories and sufficiently distinguished one trajectory from another.

As a popular method in sequence analysis, OMA is a well-established approach to study all sorts of sequences in biology, archeology, linguistics, economics, and other disciplines. As discussed in Chapter 3, thus far its application in sociology has been fairly limited. One of the reasons may relate to the challenge of translating its logic for application in the social science context. On the surface, the difficulty relates to the justification of the choices of appropriate values for substitution, insertion, and deletion costs. For instance, how different is it between reducing work hours to part-time employment and withdrawal from employment all together? How hard is it to reenter the labor force as opposed to leave? For which types of social trajectories, does time warping matter? These apparently methodological questions in fact all demand thoughtful theoretical consideration. In other words, every step in OMA for analyzing trajectories must make sense given the social meaning behind the study subjects. The author believes bridging the gap between social theory and OMA algorithm remains the biggest challenge for sociologists who are interested in this method. Furthermore, there have been numerous computer programs available in the sciences that implemented OMA logic. How to adopt these programs and make use of them in social research is another area that needs to be explored in future.

Data Constraints in the PSID

Compared with the methodological limitations, data quality and the scope of this dissertation have a bigger impact on the conclusions. As a longitudinal study designed to

trace family development as well as incomes and expenditures in each family unit, the PSID provides invaluable information to address the research questions of this dissertation. Nevertheless, two characteristics of the PSID have considerably constrained the quality of analysis of this study, which may, in turn, have an impact on its findings.

One limitation of the PSID is that it focuses on the family head (who is usually the breadwinner) in the survey such that employment information regarding other family members are either not collected or are collected with much less detail. In addition, compared with the employed people at the time of survey, substantially fewer questions were asked about the unemployed or people not in the labor force. As a result, women, people in big family units, those economically inactive or combinations of these groups are very likely under-reported in the PSID.

This systematic bias in coverage is further deteriorated in longitudinal studies like this dissertation that require valid data from *multiple* time points. Having systematic missing values in any of those points might filter some social groups from being selected into analytic samples. For instance, to ensure analyses are based on sufficient data, cases who had never been family heads or their spouses in any of the years between 1957 and 2005 or those whose employment statuses were all missing during a ten-year age period being studied had to be excluded from the analysis. In addition, data about women's employment can be inaccurate or out-of-date in the PSID since the husband, who is considered family head by default, is usually the respondent during the interview. Between the 1968 and the 2005 PSID surveys, on average 77.9% of the interviews were carried out with family heads as the respondents and only 20.7% of the interviews were conducted with wives (or female cohabiters of male family heads). Naturally the accuracy of a husband's account about his wife's employment and unpaid work can be undermined.

A second limitation of the PSID is that the changes in the survey questions made it infeasible to develop variables compatible over years for this longitudinal study. Trajectory mapping requires consistency in applicable respondents and in the response options. Although the PSID offers detailed and comprehensive information about jobs,

occupations, family expenditures and hours of childcare, the inconsistency in those kinds of information made it hard to construct trajectories of those critical factors closely related to employment status. Therefore, the intention of this dissertation of studying employment at different levels—job, occupation, industry and in relation to unpaid work was compromised.

Scope of This Dissertation

As discussed above, several important employment-related factors were unable to be accounted for in this dissertation. The scope of this study was significantly constrained because longitudinal records of employment could only be captured at the high level of employment status. Parallel trajectories of jobs and occupations were not constructed due to data limitations and the design of the PSID. Job changes and underemployment thus were not captured in this analysis. This may be one of the reasons why the picture of career paths drawn by this study looked overly optimistic.

Time spent on unpaid work such as housekeeping, childcare, and care for sick or disabled family member were not considered, either. Given the systematic bias towards women's employment in the data, the employment trajectory of significant others could not be investigated simultaneously. Moreover, this dissertation was not able to distinguish between a single job and multiple jobs held at the same time since full-time employment and part-time employment were separated solely based on weekly work hours. Nor did this study distinguish voluntary job withdrawal and forced job determinations due to downsizing. Therefore, the key questions that life course sociologists have about the multiple layers of life and intertwined nature of employment with unpaid work, individual careers within the family context or the questions of whether employment has become more diverse given the proliferation of all sorts of employment other than regular, full-time jobs cannot be directly answered.

Finally, the estimates in this study were not weighted. Although the PSID provides weights for users to weight estimates in a given year, appropriate weights for longitudinal measures like employment trajectories were unavailable at the time this study began. Because sample selection criteria in this study were limited to cases with

sufficient valid information of employment status and family roles (family heads and spouses) as well as from certain age groups, the resulting analytic samples were no longer nationally representative. Therefore, the findings from this study should be interpreted as tests for associations among correlated social factors rather than as precise estimates. Furthermore, men and women selected for this study represented the most active portions, not the general population, of the American labor force since the late 1950's.

The above discussions about data quality and the limited scope of this study imply that the picture drawn here can be overly optimistic. Full-time employment and overall career stability discovered from the analyses can be over-estimated while time spent on part-time jobs and outside of the labor force, particularly of women's, as well as underemployment and job transitions within same employment status are under-reported. That said, given that the purpose of this dissertation is to examine employment trajectories in general, beyond any select occupations, social classes, racial or ethnic groups, or birth cohorts, the PSID perhaps is still the best choice as data for analysis as compared with other data. In the future, availability of high-quality longitudinal data on work and family at individual level must provide better opportunities to address the research questions raised in this study than the PSID.

CONTRIBUTIONS AND DIRECTIONS FOR FUTURE RESEARCH

Despite the limitations related to data quality and methodology, this dissertation is likely the first sociological study to systematically examine the overall patterns of employment histories in the U.S. based on a major longitudinal study. This study is systematic in that it is not limited to any specific gender, birth cohort, age group, occupation, industry, economic sector, or geographic area, as most sociological research about employment histories in the U.S. has done. The comprehensive nature of this study allows a formal investigation of employment histories in previously understudied social groups, such as blue-collar workers, those in the secondary labor market or employed outside big organizations. Its findings apply to the U.S. populations that are active in the labor force in general. Moreover, careful analyses by age periods have helped reveal the long-term

Table 7. Summary of Hypotheses and Findings

	Statement	Findings
I. Cohort		
1.1	Later cohorts have employment trajectories further diverging from the norm of stable, full-time careers.	Support Hypothesis 1.2: Later cohorts have employment trajectories converging towards the norm of the stable, full-time careers.
1.2	Later cohorts have employment trajectories converging towards the norm of stable, full-time careers.	
1.3	The employment trajectories among later cohorts have become more diverse and heterogeneous than among earlier cohorts.	No. The employment trajectories among later cohorts have become more homogeneous than among earlier cohorts.
II. Gender gap in careers		
2.1	Gender gap in employment histories is expanding as women's employment trajectories have increasingly diverged from the norm of stable, full-time careers relative to men's.	Gender gap in employment histories is decreasing as women's employment trajectories have become increasingly closer to the norm of stable, full-time careers to a larger degree than men's.
2.2	Gender gap in employment histories is decreasing as men's employment trajectories have increasingly diverged from the norm of stable, full-time careers to a larger degree than women's.	
III. Path dependence within employment history		
3.1	Individual's employment trajectory is highly predicted by his or her trajectory in younger ages.	Yes. The effect of path dependence is strong, especially in younger ages, two adjacent age periods, and among men.
3.2	Employment trajectories similar to the norm of stable, full-time careers likely leads to the same pattern in older ages.	Yes overall. Men with stable, full-time trajectory pattern are very likely to carry it over to older ages.
3.3	Having prior employment trajectories different from the norm of stable, full-time careers decreases one's likelihood of such normative pattern in later age periods.	Yes, as compared with those with stable, full-time pattern in younger ages. But women are found more mobile and many of them were able to move into the stable, full-time pattern in middle ages.

Table 7 Summary of Hypotheses and Findings (Cont.)

IV. Occupations and Employment trajectories

4.1	Stable, full-time careers are more prevalent among professionals than among other occupations. However, this relative advantage of professionals has deminished in later cohorts.	1) Professionals had a lower chance of being associated with the stable, full-time career norm, especially when compared with managers and administrators.
		2) The increase in the proportion of being in the stable, full-time trajectory pattern has been more significant among women in service/labor/farm, machine operative occupations than women in professional occpuations.
4.2	Stable, full-time careers are more prevalent among white-collar workers than among other workers. However, this relative advantage of white-collar workers has deminished in later cohorts.	3) White-collar had higher likelihood of being associated with the stable, full-time career norm than blue-collar workers, only when unstable, part-time employment trajectories were examined. No difference was found between White-collar and blue-collar workers in having stable, inactive trajectories.
		4) The increase in the proportion of being in the stable, full-time trajectory pattern has been more significant among blue-collar women than women in white-collar occpuations.

associations between gender, birth cohort, occupation, and the overall patterns of employment trajectories through the different stages of the life course.

In the future, availability of good-quality longitudinal employment data at the individual level will certainly enable more sophisticated and detailed investigations of employment histories than was possible in this dissertation. Employment of women and people who were not family heads but with employment experience will be better captured and findings from such studies will more accurately represent the actual American population. The inherent association of unpaid work and employment can also be studied longitudinally. Career trends are to be scrutinized at finer levels by tracking industrial sector, occupational, and job episodes, the dis-concurrence of which from each other and from employment status will be another angle to study the "orderliness" of careers. Finally, social scientists should advance established methods of sequence analysis in studying important yet still under-studied social sequences like employment trajectories by adopting methods from other disciplines and tailoring them to social science inquiry and the characteristics of social science subjects.

REFERENCES

Abbott, Andrew. 1983. “Sequences of Social Events: Concepts and Methods for the Analysis of Order in Social Processes,” *Historical Methods* 16: 129-147.

Abbott, Andrew. 1990. Vacancy Models for Historical Data. P. 80-102 in *Social Mobility and Social Structure*. Ed. R.L. Breiger. Cambridge: Cambridge Univ. Press.

----.1995. “Sequence Analysis: New Methods for Old Ideas”. *Annual Review of Sociology*. 21:93-113.

Abbott, Andrew and Stanley DeViney. 1992. “The Welfare State as Transnational Event: Evidence from Sequences of Policy Adoption”. *Social Science History* 16(2):245-73.

Alexander, Gerard. 2001. “Institutions, Path Dependence, and Democratic Consolidation,” *Journal of Theoretical Politics* 13(3):249-270.

Allmendinger, Jutta. 1989. “Educational Systems and Labor Market Outcomes.” *European Sociological Review* 5(3): 231-50.

Althauser, Robert P. 1989a. "Internal Labor Markets." *Annual Review of Sociology* 15:143-61.

----. 1989b. “Job Histories, Career Lines and Firm Internal Labor Markets: An Analysis of Job Shifts.” *Research in Social Stratification and Mobility* 8: 177-200.

Althauser, R. P. and A. L. Kalleberg. 1981. “Firms, Occupations and the Structure of Labor Markets: A Conceptual Analysis.” P. 119-49 in *Sociological Perspectives on Labor Markets*. Ed. I. Berg. NY: Academic Press.

Althauser, R. P. and Kees Van Veen. 1995. “An Algorithm for Identifying Career Lines from Job History Data.” *Journal of Mathematical Sociology* 20 (2-3): 89-107.

Aminzade, Ronald. 1992. “Historical Sociology and Time.” *Sociological Methods and Research* 20(4): 456-80.

Aneshensel, Carol S. 1999. "Mental Illness as a Career: Sociological Perspectives." Pp. 585-603 in *Handbook of the Sociological of Mental Health,* edited by Carol S. Aneshensel and J. C. Phelan. New York: Kluwer Academic/Plenum Publishers.

Aronowitz, Stanley and William DiFazio. 1994. *The Jobless Future: Sci-Tech and the Dogma of Work.* Minneapolis: University of Minnesota Press.

Arthur, W. Brian. 1994. *Increasing Returns and Path Dependence in the Economy*. Ann Arbor, MI: University of Michigan Press.

Averitt, Robert T. 1968. *The Dual Economy*. New York: W. W. Norton.

Barnett, Rosalind C. 1993. “Multiple roles, Gender, and Psychological Distress.” Pp.427-445 in *Handbook of Stress: Theoretical and Clinical Aspects*, 2nd ed., edited by Leo Goldberger and Schlomo Breznitz. New York: The Free Press.

Barnett, Rosalind, C., Stephen W. Raudenbush, Robert T. Brennan, et al. 1995. "Change in Job and Marital Experiences and Change in Psychological Distress: A Longitudinal Study of Dual-Earner Couples." *Journal of Personality and Social Psychology* 69:839-50.

Baron, James N. and William T. Bielby. 1980. "Bringing the Firms Back in: Stratification, Segmentation, and the Organization of Work." *American Sociological Review* 45:737-65.

----. 1984. “The Organization of Work in A Segmented Economy.” *American Sociological Review* 49: 454-73.

Beck, E. M., P. M. Horan, and C. M. Tolbert. 1978. “Stratification in a Dual Economy: A Sectoral Model of Earnings Determination.” *American Sociological Review* 43: 704-20.

Becker, Penny E. and Phyllis Moen. 1999. "Scaling Back: Dual-Earner Couples' Work-Family Strategies." *Journal of Marriage and the Family* 61:995-1007.

Benach, J., M. Amable, C. Muntaner and F. G. Benavides. 2002. "The Consequences of Flexible Work for Health: Are we Looking at the Right Place?" *Journal of Epidemiology & Community Health* 56:405-7.

Bibb, Robert and William Form. 1977. “The Effects of Industrial, Occupational, and Sex Stratification on Wages in Blue-collar Markets.” *Social Forces* 55: 974-96.

Blair-Loy, Mary. 1999. "Career Patterns of Executive Women in Finance: An Optimal Matching Analysis." *American Journal of Sociology* 104:1346-97.

Blair-Loy, Mary and Gretchen DeHart. 2003. "Family and Career Trajectories among African American Female Attorneys." *Journal of Family Issues* 24:908-33.

Blau, Peter M. and Otis D. Duncan. 1967. *The American Occupational Structure*. New York: Wiley.

Bluestone, B. 1970. “The Tripartite Economy: Labor Markets and the working Poor.” *Poverty and Human Resources Abstract* 5: 15-35.

Blumen, I. M., M. Kogan, and P.J. McCarthy. 1955. *The Industrial Mobility of Labor as a Probability Process*. Ithaca, NY: Cornell University Press.

Bridges, William P. 1980. “Industry Marginality and Female Employment: A new Appraisal.” *American Sociological Review* 45: 58-75.

Brokaw, Tom. 1998. *The Greatest Generation*. New York : Random House.

Bryk, Anthony S. and Stephen W. Raudenbush. 1987. "Application of Hierarchical Linear Models to Assessing Change," *Psychological Bulletin* 101(1):147-58.

----. 1992. *Hierarchical Linear Models: Applications and Data Analysis Methods*, Newbury Park, CA: Sage.

Bureau of Labor Statistics. 2006. "America's Young Adults at 18: School Enrollment and Employment Transitions Between Ages 17 and 18." Issued February 24, 2006 (http://bls.gov/nls/nlsy97r7.pdf).

Bureau of Labor Statistics, 2009. "The Employment Situation: December 2008." Washington, D.C.: Bureau of Labor Statistics, United States Department of Labor. Retrieved Janurary 26, 2009 (http://www.bls.gov/news.release/pdf/empsit.pdf). In-text citation: (Bureau of Labor Statistics 2009).

Bureau of Labor Statistics, 2011. "Employment Situation Summary." Washington, D.C.: Bureau of Labor Statistics, United States Department of Labor. Retrieved October 2, 2011 (http://www.bls.gov/news.release/empsit.nr0.htm). In-text citation: (Bureau of Labor Statistics 2011).

Bureau of Labor Statistics. 2011. "Employment Status of the Civilian Noninstitutional Population 16 Years and Over by Sex, 1973 to date." Retrieved September 3, 2011 (http://www.bls.gov/cps/cpsaat2.pdf).

Bureau of Labor Statistics. 2011. "Employment Status of the Civilian Noninstitutional Population by Age, Sex, and Race." Retrieved September 3, 2011 (http://bls.gov/cps/cpsaat3.pdf).

Bureau of Labor Statistics. 2011. "America's Young Adults at 23: School Enrollment, Training, and Employment Transitions Between Ages 22 and 23." Issued February 9, 2011 (http://www.bls.gov/news.release/pdf/nlsyth.pdf).

Calinski, T. and Harabasz, J .1974. "A Dendrite Method for Cluster Analysis," *Communications in Statistics*, 3, 1-27.

Cheung, Edward. 1995. *Baby Boomers, Generation X and Social Cycles*. Toronto, Canada: Longwave Press.

CNET News.com, 2009. "Tech Layoffs: The Scorecard." Retrieved January 26, 2009 (http://news.cnet.com /tech-layoffs/). In-text citation: (CNet News.com 2009).

Cohen, Jacob. 1988. *Statistical Power Analysis for the Behavioral Sciences.* 2nd Edition. Hillsdale, NJ: Lawrence Earlbaum Associates.

Dalton, A. H. and E. C. Snelling. 1983. "A Note on Salary Variations in An Academic Internal Labor Market." *Atlantic Economic Journal* 11: 70-78.

David, Paul A. 1985. “Clio and the Economics of QWERTY,” *American Economic Review* 75: 332-337.

Davidson, P. E. and H. D. Anderson. 1937. *Occupational Mobility in an American Community*. Stanford, CA: Stanford Univ. Press.

Diprete, Thomas A. and David B. Grusky. 1990. “Structure and Trend in the Process Of Stratification for American Men and Women.” *American Journal of Sociology.* 96(1): 107-143.

Diprete, Thomas A. and M. L. Krecker. 1991. “Occupational Linkages and Job Mobility Within and Across organizations.” *Research of Social Stratification and Mobility*. 10: 91-131.

Doeringer, P. B. and M. J. Piore. 1971. *Internal Labor Markets and Manpower Analysis.* Lexington, MA: D.C. Heath.

Donohue, J.J. III. 1988. “Determinants of Job turnover of Young Men and Women in the United States: A Hazard Rate Analysis. ” *Research in Political Economy* 6: 257-301.

Duda, R.O. and Hart, P.E. .1973. *Pattern Classification and Scene Analysis*, New York: John Wiley & Sons, Inc.

Duncan, Susan C. and Terry E. Duncan. 1996. "A Multivariate Latent Growth Curve Analysis of Adolescent Substance Use," *Structural Equation Modeling*, 3(4): 323-47.

Edwards, Richard, M. Reich, and D. M. Gordon. Eds. 1975. *Labor Market Segmentation*. Lexington, MA: Heath.

Elder, Glen H.Jr. 1985. “Perspectives on the Life Course.” P. 23-49 in *Life Course Dynamics*, ed. By G. H. Elder, Jr. Ithaca, NY: Cornell Univ. Press.

----.1987. “War Mobilization and the Life Course: A cohort of World War II Veterans.” *Sociological Forum* 2(3): 449-72.

Elder, Glen H.,Jr, Linda K. George and Michael J. Shanahan. 1996. "Psychosocial Stress Over the Life Course." Pp. 247-91 in *Psychosocial Stress: Perspectives on Structure, Theory, Life Course and Methods,* edited by H. B. Kaplan. Orlando, FL: Academic Press.

Elder, Glen H.Jr. and A. M. O’Rand. 1995. “Adult Lives in a changing Society.” P. 452-75 in *Sociological Perspectives on Social Psychology*. Eds. By K. S. Cook, G. A Fine and J.S. House. Needham Heights, MA: Allyn and Bacon.

Farber, Henry S. 1993. "The Incidence and Costs of Job Loss: 1982-91." *Brookings Papers on Economic Activity. Microeconomic* 1: 71-119.

Farley, Reynolds. 1996. *The New American Reality: Who We Are, How We Got Here, Where We Are Going*. New York, NY: Russell Sage Foundation.

Federal Deposit Insurance Corporation, 2009. "Failed Bank List." Washington, D.C.: Federal Deposit Insurance Corporation. Retrieved January 26, 2009 (http://www.fdic.gov /bank/individual/failed/banklist.htm l). In-text citation: (Federal Deposit Insurance Corporation 2009).

Felmlee, D.H. 1982. "Women's Job Mobility Processes Within and Between Employers." *American Sociological Review* 47: 142-51.

Fondas, Nanette. 1996. "Feminization at Work: Career Implications" Pp. 282-294 in *The Boundaryless Career: A New Employment Principle for a New Organizational Era*. Eds by Michael B. Arthur and Denise M. Rousseau. New York: Oxford University Press.

Form, W. H. and D. G. Miller. 1949. "Occupational Career Patterns as a Sociological Instrument." *American Journal of Sociology* 54: 317-29.

George, Linda K. 1993. "Sociological Perspectives on Life Transitions." *Annual Review of Sociology* 19: 353-73.

----. 1999. "Life-Course Perspectives on Mental Health." P. 565-83 in *Handbook of the Sociology of Mental Health*, eds. By Carol S. Aneshensel and Jo C. Phelan. New York: Kluwer Academic/Plenum Publishers.

Goldin, Claudia. 2006. "The 'Quiet Revolution' That Transformed Women's Employment, Education, and Family," American Economic Review, Papers and Proceedings, 96 (May): P. 1-21.

Goldin, Claudia, L. Katz, and I. Kuziemko. 2006. "The Homecoming of American College Women: The Reversal of the Gender Gap in College". Journal of Economic Perspectives 20 (Fall): 133-56.

Goldstone, Jack A. 1998. "Initial Conditions, General laws, Path Dependence, and Explanation in Historical Sociology," *American Journal of Sociology* 104:829-845.

Goodman, Leo A. 1974. "Exploratory Latent Structure Analysis Using Both Identifiable and Unidentifiable Models," *Biometrika* 61: 215-31.

Gordon, David M. 1972. *Theory of Poverty and Underemployment*. Lexington, MA: Heath.

Griffin, Larry J. 1992. "Temporality, Events, and Explanation in Historical Sociology: An Introduction," *Sociological Methods and Research* 20:403-427.

Griffin, Larry J. 1993. "Narrative, Event-Structure, and Causal Interpretation in Historical Sociology," *American Journal of Sociology* 98: 1094-1113.

Halaby, C. N. 1982. “Job-shift Differences Between Men and Women in the Workplace.” *Social Science Research* 11: 1-29.

Han, Shin-Kap and Phyllis Moen. 1999. "Clocking Out: Temporal Patterning of Retirement." *American Journal of Sociology* 105:191-236.

Hareven, Tamara K. 1978. “Cycles, Courses and Cohorts: Reflections on Theoretical and Methodological Approaches to the Historical Study of Family Development.” *Journal of Social History* 12(1): 97-109.

Heckman, J. and B. Singer. 1982. “The Identification Problem in Econometric Models for Duration Data.” P. 39-77 in *Advance in Econometrics*, ed. W. Hidonbrard, Cambridge: Cambridge Univ. Press.

Heinz, Walter R. 2003. “From Work Trajectories to Negotiated Careers: the Contingent Work Life Course.” P. 185-204 in *Handbook of the Life Course*. Eds. By Jeylan T. Mortimer and Michael J. Shanahan. New York : Kluwer Academic/Plenum Publishers.

Hill, David. 1970. “The Attitudes of West Indian and English Adolescents in Britain.” *Race* 11(3): 313-322.

Hodson, Randy. 1978. “Labor in the Monopoly, competitive, and State Sectors of Production.” *Politics and Society* 8: 429-80.

Hodson, Randy and Robert L. Kaufman. 1982. "Economic Dualism: A Critical Review." *American Sociological Review* 47:727-39.

Hoffman, Saul D., Michael E. Foster, and Frank F. Furstenburg, Jr. 1993. “Reevaluating the Costs of Teenage Childbearing: Response to Geronimus and Korenman.” D*emography* 2: 291-296.

Holtz, Geoffrey T. 1995. *Welcome to the Jungle: The Why Behind 'Generation X'.* New York: St. Martins' Griffin.

Huang, Reiping. 2008. “Decoding Temporality: A Sociological Study to Discover the Underlying Dimensions of Individual Life Trajectories”, A Paper Presented in the Annual Meeting of Social Science History Association, Miami, FL Oct 23-26, 2008.

Irvine, H., T. Bradley, M. Cupples, and M. Boohan. 1997. “The Implications of Teenage Pregnancy and Motherhood for Primary health Care.” *British Journal of General Practice* 47: 323-26.

Isaac, Larry W. 1997. “Transformint Localities: Reflections on Time, Cuasality, and Narrative in Contemporary Historical Sociology,” *Historical Methods* 30: 4-12.

Isaac, Larry W., Debra A. Street, and Stan J. Knapp. 1994. "Analyzing Historical Contingency with formal Methods: The Case of the 'Relief Explosion' and 1968," *Sociological Methods and Research* 23: 114-141.

Jacobs, Jerry A. 1983. "Industrial Sector and Career Mobility Reconsidered." *American Sociological Review* 48:415-21.

----. 1989. *Revolving Doors: Sex Segregation and Women's Careers.* Stanford, CA: Stanford University Press.

Jaffe, A. J. and R. O. Carleton. 1954. *Occupational Mobility in the United States, 1930-1960*. NY: King's Crown Press.

Kalleberg, Arne L. and Aage B. Sorensen. 1979. "The Sociology of Labor Markets." *Annual Review of Sociology* 5:351-79.

Kaufman, Robert L. and Thomas N. Daymont. 1981. "Racial Discrimination and the Social Organization of Industries." *Social Science Research* 10: 225-55.

Kaufman, Robert L. and Seymour Spilerman. 1982. "The Age Structures of Occupations and Jobs." *American Journal of Sociology* 87:827-51.

Kerr, Clark. 1954. "The Balkanization of Labor Markets." P.92-110 in Labor Mobility and Economic Opportunity, eds. E. W. Bakke, P. M. Hauser, G. L. Palmer, et al. Cambridge, Mass: MIT Press.

Konig, Wolfgang and Walter Muller. 1986. "Educational Systems and Labour Markets as Determinants of Worklife Mobility in France and West Germany: A Comparison of Men's Career Mobility, 1965-1970." *European Sociological Review* 2:73-96.

Krugman, Paul. 1991. "History and Industry Location: The Case of the Manufacturing Belt," *American Economic Review* 81(2): 80-83. Papers and Proceedings of the Hundred and Third Annual Meeting of the American Economic Association.

Kruskal, William H. and W. Allen Wallis. 1952. "Use of Ranks in One-Criterion Variance Analysis" *Journal of the American Statistical Association* 47 (260): 583–621.

Lawshucks.com. 2009. "Layoff Tracker." Retrieved March 2, 2009 (http://lawshucks.com/layoff-tracker/). In-text citation: (Lawshucks.com 2009).

Lazarsfeld, Paul F. and Neil W. Henry. 1968. *Latent Structure Analysis.* Boston, MA: Houghton Mill.

Leigh, D. E. 1976. "The Occupational Mobility of Young Men, 1965-70." *Industrial labor Relation Review* 30: 68-78.

Levy, Frank.1995. "Incomes and Income Inequality." in State of the Union: America in the 1990s, edited by R. Farley. New York, NY: Russell Sage Foundation.

Liebowitz, S. J. and Stephen E. Margolis. 1995. "Path-Dependence, Lock-In, and History," *Journal of Law, Economics, and Organization* 11: 205-226.

Lipset, Seymour M and R. Bendix. 1952a. "Social Mobility and Occupational Career Patterns. I. Stability of Job Holding." *American Journal of Sociology* 57 (Jan.): 366-74.

----. 1952b. "Social Mobility and Occupational Career Patterns. II. Social Mobility." *American Journal of Sociology* 57(March): 494-504.

Luoh, Ming-Ching and A. R. Herzog. 2002. "Individual Consequences of Volunteer and Paid Work in Old Age: Health and Mortality." *Journal of Health and Social Behavior* 43:490-509.

Mahoney, James. 2000. "Path Dependence in Historical Sociology," *Theory and Soci*ety 29: 507-548.

Mahoney, T. A. and G. T. Milkovich. 1971. "The Internal Labor Market as a Stochastic Process." P. 446-69 in *Manpower and Management Science*. Ed. D. J. Bartholonew. Lexington, MA: Heath.

Mannheim, Karl. [1928] 1952. "The Problem of Generations." P. 276-322 in *Essays on the Sociology of Knowledge*, by Karl Mannheim. London: Routledge and Kegal Paul.

Marks, Nadine F. 1998. "Does it Hurt to Care? Caregiving, Work-Family Conflict, and Midlife Well-being." *Journal of Marriage and the Family* 60:951-66.

Marrow-Howell, Nancy, et al. 2003. "Effects of Volunteering on the Well-Being of Older Adults". *Journal of Gerontology: Social Sciences*. 58B(3):S137-S145.

McCutcheon, A. L. 1987. *Latent Class Analysis*. Quantitative Applications in the Social Sciences Series No.64. Thousand Oaks, CA: Sage.

McLanahan, Sara and Julia Adams. 1987. "Parenthood and Psychological Well-Being." *Annual Review of Sociology* 13: 237-257.

Meiksins, Peter and Peter Whalley. 2002. *Putting Work in Its Place: A Quiet Revolution*. Ithaca: Cornell Univ. Press.

Meredith, William and John Tisak. 1990. "Latent Curve Analysis," *Psychometrika*, 55(March):10 7-22.

Moen, Phyllis. 1998. "Recasting Careers: Changing Reference Groups, Risks, and Realities." *Generations* 22:40-5.

Moen, Phyllis, Donna Dempster-McClain and Robin M. Williams Jr. 1992. "Successful Aging: A Life-Course Perspective on Women's Multiple Roles and Health." *American Journal of Sociology* 97:1612-38.

Moen, Phyllis and Patricia Roehling. 2005. *The Career Mystique: Cracks in the American Dream.* Lanham, Maryland: Rowman and Littlefield Publishers, Inc.

Moen, Phyllis, Donna Dempster-McClain and Robin M. Williams Jr. 1992. "Successful Aging: A Life-Course Perspective on Women's Multiple Roles and Health." *American Journal of Sociology* 97:1612-38.

Moen, Phyllis and Yan Yu. 2000. "Effective Work/Life Strategies: Working Couples, Work Conditions, Gender, and Life Quality." *Social Problems* 47:291-326.

Mouw, Ted. 2004. "Sequences of Early Adult Transitions: How Variable are They, and Does it Matter?" P. 256-291 in *On the Frontier of Adulthood: Theory, Research, and Public Policy*, edited by Richard A Settersten, Jr., Frank F. Furstenberg, Jr., and Ruben G. Rumbaut. Chicago: University of Chicago Press.

Musick, Marc A. and John Wilson. 2003. "Volunteering and Depression: The Role of Psyschological and Social Resources in Different Age Groups." *Social Science & Medicine* 56:259-69.

Nagin, Daniel S. 1999. "Analyzing Developmental Trajectories: A Semiparametric, Group-Based Approach," *Psychological Methods* 4(2):139-57.

Nagin , Daniel S. and Richard E.Tremblay. 2001. "Analyzing Developmental Trajectories of Distinct but Related Behaviors: A Group-Based Method," *Psychological Methods* 6(1):18-34.

The National Bureau of Economic Research, 2008. "Determination of the December 2007 Peak in Economic Activity." New York, NY: The National Bureau of Economic Research. Retrieved December 20, 2008 (http://www.nber.org/cycles/dec2008.html). In-text citation: (National Bureau of Economic Research 2008).

North, Douglas C. 1990. *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press.

O'Connor, James. 1973. *The Fiscal Crisis of the States*. New York: St. Martin's Press.

O'Rand, Angela M. 1996. "The Precious and the Precocious: Understanding Cumulative Disadvantage and Cumulative Advantage Over the Life Course." *The Gerontologist* 36:230-8.

O'Rand, Angela M. and John C. Henretta. 1982. "Delayed Career Entry, Industrial Pension Structure, and Early Retirement in a Cohort of Unmarried Women." *American Sociological Review* 47:365-73.

Orren, Karen. 1991. *Labor, the Law, and Liberal Development in the United States*. Cambridge: Cambridge University Press.

Osterman, P. 1984. *Internal Labor Markets*. Cambridge, MA: MIT Press.

Palmer, Gladys. 1954. *Labor Mobility in Six Cities*. New York: Columbia Univ. Press.

Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Institute for Social Research, Survey Research Center, University of Michigan, Ann Arbor, MI (2006).

Pavalko, Eliza K.1997. "Beyond Trajectory: Multiple Concepts for Analyzing Long-Term Process." Pp. 129-147 in *Conceptual and Methodological Issues in the Study of Aging and Social Change*. Edited by Melissa A. Hardy. Newbury Park, CA: Sage.

Pavalko, Eliza K. and Julie E. Artis. 1997. "Women's Caregiving and Paid Work: Causal Relationships in Late Mid-Life." *Journal of Gerontology: Social Sciences* 52B:S1-S10.

Pavalko, Eliza K. and Shari Woodbury. 2000. "Social Roles as Process: Caregiving Careers and Women's Health." *Journal of Health and Social Behavior* 41:91-105.

Peterson, T., S. Spilerman, and S-A Dahl. 1989. "The Structure of Employment Terminations among Clerical Employees in a large Bureaucracy." *Acta Sociol.*32-319-38.

Peterson, T. and S. Spilerman. 1990. "Job Quits from an Internal Labor Market. Pp.69-95 from *Event History Analysis in Life Course Research*. Edited by K. U. Mayer and N. B. Tuma. Madison, WI: University of Wisconsin Press.

Pierson, Paul. 2000. "Increasing Returns, Path Dependence, and the Study of Politics," *American Political Science Review* 94: 251-267.

Piore, M. J. 1975. "Notes for a Theory of Labor Market Segmentation." P. 125-171 in *Labor Market Segmentation*. eds. By R. C. Edwards, M. Reich, and D. M. Gordon, Lexington: D. C. Heath.

Pfeffer, J. 1983. "Organizational Demography." *Research of Organizational Behavior* 5: 299-357.

Platman, Kerry. 2003. "The Self-designed Career in Later Life: A Study of Older Portfolio Workers in the United Kingdom." *Ageing and Society* 23: 281-302.

Pollock, Gary, Valerie Antcliff and Rob Ralphs. 2002. "Work Orders: Analysing Employment Histories using Sequence Data." *International Journal of Social Research Methodology* 5:91-105.

Quick, Heather E. 1998. "Shaping Men's and Women's Career Trajectories: The Intersections of Personality, Family, and Opportunity Structures." Dissertation Abstracts International, A: The Humanities and Social Science.

Quinn, Joseph F. and Michael Kozy. 1996. "The Role of Bridge Jobs in the Retirement Transition: Gender, Race, and Ethnicity," *The Gerontologist*, 36(3): 363-372.

Reich, Michael, David Gordon and Richard Edwards. 1973. "A theory of Labor Market Segmentation." *American Economic Review* 63: 359-65.

Reiss, A. J. Jr. 1955. "Occupational Mobility of Professional Workers." *American Sociological Review* 20: 693-700.

Repetti, Rena L., Karen A. Matthews, and Ingrid Waldron. 1989. "Employment and Women's Health." *American Psychologist* 44: 1394-1401.

Riley, Matilda W. 1987. "On the Significance of Age in Sociology. American Sociological Association, 1986 Presidential Address." *American Sociological Review* 52(1): 1-14.

Rosenbaum, James E. 1979. "Tournament Mobility: Career Patterns in a Corporation." *Administrative Science Quarterly* 24:220-41.

Rosnow, R. L., & Rosenthal, R. (1996). Computing Contrasts, Effect Sizes, and Counternulls on Other People's Published Data: General Procedures for Research Consumers. *Psychological Methods, 1,* 331-340.

Roy, William G. 1997. Socializing Capital: *The Rise of the Large Industrial Corporation in America*. Princeton, NJ: Princeton University Press.

Rumbaut, Ruben G.. 2011. "Young Adults in the United States: A Profile." The Network on Transitions to Adulthood Working Paper No.4. Retrieved September 3, 2011 (http://www.transad.pop.upenn.edu/downloads/Young%20Adults%20in%20the%20United%20States%20-%20A%20Profile.pdf).

Sarle, W.S. 1983. "Cubic Clustering Criterion", *SAS Technical Report* A-108, Cary, NC: SAS Institute Inc.

SAS Institute Inc, 2008. SAS/STAT 9.2 User's Guide, Cary, NC: SAS Institute Inc.

Scherer, Stefani. 2001. "Early Career Patterns: A Comparison of Great Britain and West Germany." *European Sociological Review* 17:119-44.

The Scientist, 2008. "Fired Faculty Speak Out." Philadelphia, PA: The Scientist.com. Retrieved December 5, 2008 (http://www.the-scientist.com/blog/display/55258/). In-text citation: (The Scientist.com 2008).

Sewell, William H, Jr. 1996. "Three Temporalities: Toward an Eventful Sociology," in The *Historic Turn in the Human Sciences*. Edited by Terrence J. McDonald. Ann Arbor: University of Michigan Press.

Sieber, Sam D. 1974. "Toward a Theory of Role Accumulation." *American Sociological Review* 39: 567-78.

Slocum, W. 1966. *Occupational Careers*. Chicago: Aldine.

Smith, D. R. and A. Abbott. 1983. "A Labor Market Perspective on the Mobility of College Football Coaches." *Social Forces* 61:1147-67.

Spenner, K. I., L. B. Otto, and V.R.A. Call. 1982. *Career Lines and Careers*. Lexington, MA: Lexington Books.

Spilerman, Seymour. 1977. "Careers, Labor Market Structure, and Socioeconomic Achievement." *American Journal of Sociology* 83:551-93.

Stewman, S. and S. L. Konda. 1983. "Careers and Organizational labor Markets: Demographic Models of Organizational Behavior." *American Sociological Review* 1988: 637-85.

Stone, Katherine. 2004. *From Widgets to Digits: Employment Regulation for the Changing Workplace*. Cambridge, U.K.: Cambridge University Press

Stovel, Katherine, Michael Savage and Peter Bearman. 1996. "Ascription into Achievement: Models of Career Systems at Lloyds Bank, 1890-1970." *American Journal of Sociology* 102:358-99.

Strauss, William and Neil Howe. 1991. *Generations: The History of America's Future, 1584 to 2069*. New York : Morrow.

Thurow, L.C. 1972. "Education and Economic Inequality." *Public Interest* 28: 66-81.

Time. 1951. *The Younger Generation*. Nov. 05.

Thoits, P. A. 1983. "Multiple Identifies and Psychological Well-being: A Reformulation and Test of the Social Isolation Hypothesis." *American Sociological Review* 47(2): 174-87.

Tilly, Charles. 1988. "Future History," *Theory and Society* 17(6): 703-712.

Tilly, Chris.1996. *Half a Job: Bad and Good Part-time Jobs in a Changing labor Market*. Philadelphia, PA: Temple University Press.

U.S. Census Bureau. 1998. “Trends in Marital Status of U.S. Women at First Birth: 1930 to 1994.” Population Division Working Paper No.20 (http://www.census.gov/population/www/documentation/twps0020/table1.html).

U. S. Census Bureau, 2006. "Oldest Baby Boomers Turn 60!" in *Facts for Features and Special Editions*, CB06-FFSE.01-2. Washington, D.C.: U. S. Census Bureau, Public Information Office. (http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/006105.html).

U.S. Census Bureau. 2011. “Percent of the Population 25 Years and Over with a Bachelor’s Degree or Higher by Sex and Age, for the United States: 1940 to 2000.” Retrieved September 3, 2011 (http://www.census.gov/hhes/socdemo/education/data/census/half-century/tables.html).

U. S. Department of Labor, 2008. "News Release: Unemployment Insurance Weekly Claims Report." Washington, D.C.: United States Department of Labor. Retrieved January 26, 2009 (http://workforcesecurity.doleta.gov/press/2008/122408.asp). In-text citation: (U. S. Department of Labor 2008).

Verbrugge, Lois M. 1986. “Role Burdens and Physical Health of Women and Men.” *Women and Health* 11: 47-77.

Waldron, Ingrid and Jerry A. Jacobs. 1989. “Effects of Multiple Roles on Women’s Health-Evidence from a National Longitudinal Study.” *Women and Health* 15:3-19.

Waldron, Ingrid, Christopher C. Weiss and Mary Elizabeth Hughes. 1998. “Interacting Effects of Multiple Roles on Women's Health.” *Journal of Health and Social Behavior* 39: 216-236.

Wallace, Michael and Arne L. Kalleberg. 1981. “Economic Organization, Occupations, and labor force consequences: Toward a Specification of dual Economy theory.” P. 77-117 in *Sociological Perspectives on Labor Markets*. Ed. By Ivar Berg. New York: Academic.

Wallerstein, Immanuel. 1974. *The Modern World System I: Capitalist Argiculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.

Warner, W. L. and J. C. Abegglem. 1955. *Occupational Mobility in American Business and Industry*. Minneapolis, MN: Univ. of Minnesota Press.

Wetzel, James R.1995. "Labor Force, Unemployment and Earnings." in *State of the Union: America in the 1990s*, edited by R. Farley. New York, NY: Russell Sage Foundation.

White, Harrison. 1970. *Chains of Opportunity: System Models of Mobility in Organizations.* Cambridge: Harvard University Press.

White, R. W. and R. P. Althauser. 1984. “Internal Labor Markets, Promotions, and Worker Skill: An Indirect Test of Skill ILMs.” *Soc. Sci. Res*. 13: 373-92.

Wilensky, Harold L. 1961. “Orderly Careers and Social Participation: The Impact of Work History on Social Integration in the Middle Mass.” *American Sociological Review* 26: 521-39.

Williamson, Oliver E., Michael L. Wachter, and Jeffrey E. Harris. 1975. “Understanding the Employment Relation: The Analysis of Idiosyncratic Exchange.” *The Bell Journal of Economics* 6(1):250-78.

Wong, M.A. and C. Schaack. 1982. “Using the kth Nearest Neighbor Clustering Procedure to Determine the Number of Subpopulations,” American Statistical Association 1982 Proceedings of the Statistical Computing Section, 40-48.

Wong, M. A. and T. Lane. 1983. “A Kth Nearest Neighbor Clustering Procedure,” *Journal of the Royal Statistical Society*, Series B, 45, 362-368.

Appendix A. Variables Used for Deriving Employment Status Trajectories

	Name of the first variable in series	Years available /used	Relevant person	Question wording	Year(s) applied	Codeframe
HD=Head, WF=Wife, E=Employed, U=Unemployed, R=Retired or not in the labor force; year: 68=1968, 69=1969…105=2005 NIU=not in universe, DK=don't know, NA=not ascertained						
Employment Status						
1	V196	68/75 76/78	HD	Are you working now, unemployed, retired, or what?	This year	1=working now or laid off only temporarily; 2=unemployed, 3=retired, permanently disabled, 4=housewife, 5=student, 6=other
2	V4841	76	WF	Same as above	This year	0=NIU/No wife's interview, 1=working Now, 2=only temporarily laid off, 3=looking for work, unemployed, 4=retired, 5=permanently disabled, 6=housewife, 7=student, 8=other
3	ER30293	79/93	Individual	Are you working now, looking for work, retired, a student, a housewife, or what?	This year	1=working Now, 2=only emporarily laid off, 3=looking for work, unemployed, 4=retired, 5=permanently disabled, housewife, keeping house; 7=student, 8=other; mover-out Nonresponse only if deceased; NA; DK; 0=NIU
4	ER2069	94/97 99 101 103 105	HD	Are you working now, looking for work, retired, a student, a housewife, or what?--First mention	This year	1=working Now, only temporarily oaid off, sick leave or maternity leave, 3=looking for work, unemployed, 4=retired, 5=permannetly/temporarily disabled, 6= keeping house, 7=student, 8=other, "workfaire", in prison or jail, 98=DK, 99=NA, 0=NIU
5	ER2070	94/97 99 101 103 105	HD	Same as above, --Second mention	This year	Same as above
6	ER2071	Same as above	HD	Same as above, --Third mention	This year	Same as above
7	ER2563	Same as above	WF	Are you working now, looking for work, retired, a student, a housewife, or what?--First mention	This year	Same as above
8	ER2564	Same as above	WF	Same as above, --Second mention	This year	Same as above
9	ER2565	Same as above	WF	Same as above, --Third mention	This year	Same as above
10	V5486	77/97 99 101 105	HD R	Do you have a job now?	This year	1=Yes, 5=No.
11	V4776	76/97 99 101 105	WF R	Do you have a job now?	This year	1=Yes, 5=No.
12	V10663	84	HD R	Are you still working?	This year	1=Yes, 5=No, 9=NA, DK, 0=NIU
13	V10860	84	WF R	Is she still working	This year	Same as above
14	V1350	70/84	HD R	During the last year, did you do any work for money?	Last year	Same as above
15	V608	69/84	WF R	Did your wife do any work for money in 1968?	Last year	1=Yes, 5=No, 9=NA, DK, 0=NIU, No wife present

Appendix A. Variables Used for Deriving Employment Status Trajectories (Cont.)

Work Hours						
16	V47	68/93 103 105	HD	Head's annual hours working for money	Last year	0=None, 9999=9999+
17	ER24078	103 105	HD	Head's total weekly hours last year	Last year	1-112, 998=DK, 999=NA, 0=NIU
18	V53	68/93 103 105	WF	Wife's annual hours working for money	Last year	0=None, 9999=9999+
19	ER24089	103 105	WF	Wife's total weekly work hours on all jobs	Last year	1-112, 0=NIU
	Head E:					
20	V225	94/97 99 101	HD E	How many hours a week is that? On the average, how many hours a week did you work on your main job last year?	Last year	1=1-19hr, 2=20-34, 3=35-39,…8=60+, 9=NA, 0=NIU
21	V223	Same as above	HD E	How many weeks did you actually work on your main job last year?	Last year	0=None, NIU, 1=1-13, 2=14-26, 3=27-39, 4=40-47, 5=48-49, 6=50-51, 7=52, 9=NA
22	V665	Same as above	HD E	On the average, how many hours a week did you work on your extra job(s)?	Last year	1=1-19,2=20-34,3=35-39,4=40,5=41-47,6=48,7=49-59,8=60+,9=NA,0=NIU
23	V664	Same as above	HD E	And how many weeks did you work on this extra job in 1968?[second job]	Last year	1=1-13,2=14-26,3=27-39,4=40-47,5=48-49,6=50-51,7=52,9=NA,0=NIU
24	V10573	Same as above	HD E	On the average, how many hours a week did you work on this job?-All extra jobs except first	Last year	1-98, 99=NA,0=NIU
25	V10572	Same as above	HD E	And how many weeks did you work on this job last year? - all extra jobs except first	Last year	1-98, 99=NA,0=NIU
26	ER2277	Same as above	HD E	One the average, how many hours a week did you work on this job? --Third extra job/Job 4	Last year	1-112, 998=DK, 999=NA, 0=NIU
27	ER2276	Same as above	HD E	And how many weeks did you work on this job last year? - Third extra job/Job 4	Last year	1-52, 98=DK, 99=NA, 0=NIU
28	ER2299	Same as above	HD E	On the average, how many hours a week did you work on this job?--Fourth extra job/Job 5	Last year	1-112, 998=DK, 999=NA, 0=NIU
29	ER2298	Same as above	HD E	And how many weeks did you work on this job last year? - Fourth extra job/Job 5	Last year	1-52, 98=DK, 99=NA, 0=NIU
	Head U:					
30	V1334	94/96	HD U	About how many hours a week did you work when you worked?	Last year	0=None, NIU, 1=one hour or less, 2-97, 98=98+, 99=NA
31	V1333	94/96	HD U	How many weeks did you work in 1969?	Last year	0=None, NIU, 1=one week or less, 2-52, 99=NA
32	ER2469	97 99 101	HD U	Head's weeks worked on main job(s), CAI computed	Last year	1-97, 98=98+, 99=NA, DK, 0=NIU

Appendix A. Variables Used for Deriving Employment Status Trajectories (Cont.)

33	V9126	97 99 101	HD U	On the average, how many hours a week did you work on your extra job(s)? Note: The values for this variable represent the actual number of hours per week head worked on his/her extra job or jobs. If Head had more than one extra job, the value here represents a weighted average of hours spent on all extra jobs.	Last year	1-97, 98=98+, 99=NA, DK, 0=NIU
34	V9125	94/97 99 101	HD U	And how many weeks did you work on your extra job(s) last year?	Last year	1-97, 98=98+, 99=NA, DK, 0=NIU
35	V10640	94/97 99 101	HD U	On the average, how many hours a week did you work on this job? --All extra jobs except first	Last year	1-98, 99=NA,0=NIU
36	V10639	94/97 99 101	HD U	And how many weeks did you work on this job last year?--All extra jobs except first	Last year	1-52, 99=NA,0=NIU
37	ER2522	94/97 99 101	HD U	And how many weeks did you work on this job last year?--Third extra job/Job 4	Last year	1-112, 998=DK, 999=NA, 0=NIU
38	ER2521	94/97 99 101	HD U	And how many weeks did you work on this job last year?--Third extra job/Job 4	Last year	1-52, 98=DK, 99=NA,0=NIU
39	ER2544	94/97 99 101	HD U	And how many weeks did you work on this job last year?--Fourth extra job/Job 5	Last year	1-112, 998=DK, 999=NA, 0=NIU
40	ER2543	94/97 99 101	HD U	And how many weeks did you work on this job last year?--Fourth extra job/Job 5	Last year	1-52, 98=DK, 99=NA,0=NIU
41	ER21127	94/97 99 101	HD U	Have you done any work for money since January 1, 2001? Please include any type of work, no matter how small.	Last 2 years	1=Yes, 5=No, 8=DK, 9=NA, 0=NIU
42	V4552	76/97 99 101 103 105	HD U	Have you ever had a job?	All prior years	1=Yes, 5=No, 9=DK,NA, 0=NIU
	Wife E:					
43	V245	94/97 99 101	WF E	About how many hours a week did she work?	Last year	1=1-19, 2=20-34, 3=35-39, 4=40, 5=41-47, 6=48, 7=49-59, 8=60+, 9=NA, 0=NIU
44	V244	94/96	WF E	About how many hours a week did she work?	Last year	1=1-13, 2=14-26, 3=27-39,4=40-47,5=48-49,6=50-51,7=52,9=NA,0=NIU
45	ER2718	97/101	WF E	Wife's weeks worked on main job(s), CAI computed	Last year	1-52, 98=DK, 99=NA, 0=NIU
46	V4906	94/97 99 101	WF E	On the average, how many hours a week did you work at your extra job(s)?	Last year	1-98, 99=NA,0=NIU
47	V4905	94/97 99 101	WF E	And how many weeks did you work on your extra job(s) last year?	Last year	1-52, 99=NA,0=NIU
48	V10785	94/97 99 101	WF E	--All extra jobs except first	Last year	1-98, 99=NA,0=NIU

Appendix A. Variables Used for Deriving Employment Status Trajectories (Cont.)

49	V10784	94/97 99 101	WF E	--All extra jobs except first	Last year	1-52, 99=NA,0=NIU
50	ER2771	94/97 99 101	WF E	-- Third extra job/Job 4	Last year	1-112, 998=DK, 999=NA, 0=NIU
51	ER2770	94/97 99 101	WF E	-- Third extra job/Job 4	Last year	1-52, 98=DK, 99=NA, 0=NIU
52	ER2793	94/97 99 101	WF E	-- Fourth extra job/Job 5	Last year	1-112, 998=DK, 999=NA, 0=NIU
53	ER2792	94/97 99 101	WF E	-- Fourth extra job/Job 5	Last year	1-52, 98=DK, 99=NA, 0=NIU
	Wife U:					
54	V4955	94/97 99 101	WF U	On average, how many hours a week did you work when you worked?	Last year	1-97, 98=98+, 99=NA, 0=NIU
55	V4954	94/96	WF U	How many weeks did you actually work on your job last year?	Last year	1-98 (98+), 99=NA, DK, 0=NIU
56	V4956	97 99 101	WF R	How many weeks did you work last year?	Last year	1-97, 99=DK, NA, 0=NIU
57	V10838	94/97 99 101		Second extra job/ Job 3 only	Last year	1-97, 98=98+, 99=NA, 0=NIU
58	V9252	94/97 99 101	WF U	How many weeks did your wife work on her extra job(s) last year?	Last year	1-52, 99=NA,0=NIU
59	V9253	94/97 99 101	WF U	Second extra job/Job 3	Last year	1-112, 998=DK, 999=NA, 0=NIU
60	V10837	94/97 99 101	WF U	Second extra job/Job 3	Last year	1-97, 99=DK, NA, 0=NIU
61	ER3015	94/97 99 101	WF U	Third extra job/Job 4	Last year	1-112, 998=DK, 999=NA, 0=NIU
62	ER3014	94/97 99 101	WF U	Third extra job/Job 4	Last year	1-97, 98=98+, 99=NA, 0=NIU
63	ER3037	94/97 99 101	WF U	Fourth extra job/Job 5	Last year	1-112, 998=DK, 999=NA, 0=NIU
64	ER3036	94/97 99 101	WF U	Fourth extra job/Job 5	Last year	1-97, 98=98+, 99=NA, 0=NIU
65	ER21377	94/97 99 101	WF U	Has she done any work for money since Jan. 1, 2001[two years ago]? Please include any type of work ,no matter how small.	Past 2 years	1=Yes, 5=No, 8=DK, 9=NA, 0=NIU
66	V4936	76 79/97 99 101 103 105	WF U	Have you ever had a job?		1=Yes, 5=No, 9=NA,DK, 0=NIU
Unemployment and Laid-off						
	Head:					
67	V1291	70/75	HD E	In the last year, how work did you miss? [unemployment+strike]	Last year	0.5-52, 98=DK,99=NA,0=NIU
68	V1336	70/75	HD U	--[employed+strike]	Last year	0.5-52, 98=DK,99=NA,0=NIU
69	V10757	84/87	HD E	How much work have you missed [due to unemployment and layoff]? --head if working	This year	1-52, 99=NA,DK, 0=NIU
70	V10642	84/87	HD U	--head if last worked before prior calendar year	This year	1-52, 99=NA,DK, 0=NIU
71	V11757	85/87	HD U	--head not working now but has since prior calendar year	This year	1-52, 99=NA,DK, 0=NIU
72	V4505	76/93	HD E	How much work did you miss?	Last year	1-52, 99=DK, 0=NIU
73	ER2189	94/96	HD E	How much work did you miss?	Last year	1-52, 98=DK, 99=NA, 0=NIU

Appendix A. Variables Used for Deriving Employment Status Trajectories (Cont.)

74	V11755	85/97 99 101	HD U	--head, last worked before prior calendar year	Last year	1-52, 99=DK, 0=NIU
75	V4568	76/93	HD U	--head, not currently working but worked since prior calendar year	Last year	1=1 week or less, 2~97, 99=NA, DK, 0=NIU
76	ER2434	94/96	HD U	--head, not currently working but worked since prior calendar year	Last year	1=1 week or less, 2~97, 99=NA, DK, 0=NIU
77	ER2191	94/97 99 101	HD E	How much work did you miss? [unemployment + layoff]	Last year	0.5-52, 98=DK, 99=NA, 0=NIU
78	ER2436	94/97 99 101	HD U	--head, not currently working but worked since prior calendar year	Last year	0.5-52, 98=DK, 99=NA, 0=NIU
79	ER24086	103 105	HD	Head's total weeks of unemployment in prior year	Last year	1-52, 99=NA,DK, 0=NIU
80	ER24085	104 105	HD	Head's total weeks of layoff in prior year	Last year	Same as above
	Wife:					
81	V4060	75	WF E/U	Number of weeks lost [unemployment + strikes]	Last year	Same as above
82	V10787	84/87	WF E	How much work has she missed?	This year	Same as above
83	V10840	84/87	WF U	--wife if last worked before prior calendar year	This year	Same as above
84	V12120	85/87	WF U	--wife if not working now but has since prior calendar year	This year	Same as above
85	V4952	76/93	WF U	--wife, not currently working but worked since prior calendar year	Last year	Same as above
86	ER2683	94/96	WF E	How much work did she miss?	Last year	Same as above
87	V12118	85/97 99 101	WF U	--wife, last worked before prior calendar year	Last year	Same as above
88	V4888	76 79/93	WF E	How much work did you miss? [unemployment + layoff]	Last year	1-52, 99=NA,DK, 0=NIU
89	ER2928	94/96	WF U	--wife, not currently working but worked since prior calendar year	Last year	1-52, 99=NA,DK, 0=NIU
90	ER2685	94/97 99 101	WF E	How much work did she miss? [unemployment + layoff]	Last year	0.5-52, 98=DK, 99=NA, 0=NIU
91	ER2903	94/97 99 101	WF U	--wife, not currently working but worked since prior calendar year	Last year	0.5-52, 98=DK, 99=NA, 0=NIU
92	ER24097	103 105	WF	Wife's total weeks of unemployment in prior year	Last year	1-52, 99=NA,DK, 0=NIU
93	ER24096	104 105	WF	Wife's total weeks of layoff in prior year	Last year	1-52, 99=NA,DK, 0=NIU
Out of the Labor force						
	Head:					
94	V10577	84/87	HD E	How much time was that? [time out of labor force]	This year	1-52, 99=NA,DK, 0=NIU
95	V10644	84/88	HD U	--head, not currrently working	This year	1-52, 99=NA,DK, 0=NIU
96	V10560	84/93	HD E	How much time was that? [time out of labor force]	Last year	1-52, 99=NA,DK, 0=NIU
97	V10628	84/93	HD U	--head, not currrently working	Last year	1-52, 99=NA,DK, 0=NIU

Appendix A. Variables Used for Deriving Employment Status Trajectories (Cont.)

98	ER2208	94/97 99 101	HD E	How much time was that? [time out of labor force]	Last year	0.1-52.0, 0=NIU
99	ER2453	94/97 99 101	HD U	--head, not currrently working	Last year	0.1-52.0, 0=NIU
100	ER24087	103 105	HD	Head's total weeks out of the labor force in prior year, imputed	Last year	0.1-52.0, 0=NIU
	Wife:					
101	V10789	84/87	WF E	How much time was that? [time out of labor force]	This year	1-52, 99=NA,DK, 0=NIU
102	V10842	84/88	WF U	--wife, not currently working	This year	1-52, 99=NA,DK, 0=NIU
103	V10774	84/93	WF E	How much time was that? [time out of labor force]	Last year	1-52, 99=NA,DK, 0=NIU
104	V10828	84/93	WF U	--wife, not currently working	Last year	1-52, 99=NA,DK, 0=NIU
105	ER2702	94/97 99 101	WF E	How much time was that? [time out of labor force]	Last year	0.1-52.0, 0=NIU
106	ER2946	94/97 99 101	WF U	--wife, not currently working	Last year	0.1-52.0, 0=NIU
107	ER21586	103 105	WF	Wife's total weeks of out of labor force in prior year, imputed	Last year	1=Yes, 5=No, 8=DK, 9=NA, 0=NIU

Appendix B. Basic Measures for Trajectory Characteristics

	Employment Status Trajectories	
(i) States: Proportion of time spent on each state in trajectory (100=whole sequence)		
V1	Employed full-time	(Number of years on full-time employment/number of years in trajectory)*100
V2	Employed part-time	(Number of years on part-time employment/number of years in trajectory)*100
V3	Unemployed or temporarily absent from w	(Number of years on unemployment or tempoarily absence from work/number of years in trajectory)*100
V4	Economically inactive (out of the labor fo	(Number of years outside the labor force/number of years in trajectory)*100
(ii) Duration and Pacing of Episodes		
V5	Number of episodes in sequence	Number of non-missing episodes
V6	Average duration of episodes (years)	Sum(duration of all non-missing episodes)/number of episodes
V7	Duration of the longest episode (years)	Number of years (duration) on the longest episode
V8	Maximum difference in duration among episodes (years)	Duration of the longest episode - duration of the shortest episode
(iii) Modal transitions (restricted to people who changed employment status)		
V9	Scope of modal transition:	
	Far (between work and non-work)	if the most frequent transition was between full-time/part-time work and non-work (unemployment, absence from work, or economically inactive)
	Near (between full-time and part-time)	if the most frequent transition was full-time to part-time or the opposite
	Other transitions	if the most frequent transition was among nonemployment, absence from work, or economically inactive
V10	Direction of modal transition:	
	Upward	if the most frequent transition was from part-time to full-time, or from non-work (unemployment, absence from work, or economically inactive) to full-time/part-time work
	Downward	the opposite direction of above
	Other transitions	if the most frequent transition was among nonemployment, absence from work, or economically

Appendix C. Descriptive Statistics of Sequence, Episode, or Transition Characteristics of Employment Trajectories by Age Period: The Panel Study of Income Dynamics, 1967-2005

		Young Adulthood (Age 25-34 Years)					Young Middle Age (Age 35-44 Years)				
		N	Mean (Count)	St.D. (%)	Min	Max	N	Mean (Count)	St.D. (%)	Min	Max
	Sequence and states:										
	Proportion of time spent on each state (100=whole sequence)										
V1	Employed full-time (%)	15,949	59.26	37.94	0.00	100.00	12,149	62.17	38.50	0.00	100.00
V2	Employed part-time (%)	15,949	20.46	25.12	0.00	100.00	12,149	17.93	24.95	0.00	100.00
V3	Unemployed or absent from work (%)	15,949	3.98	11.93	0.00	100.00	12,149	3.34	11.47	0.00	100.00
V4	Economically inactive (%)	15,949	16.29	30.49	0.00	100.00	12,149	16.56	31.79	0.00	100.00
	Episodes and transitions:										
V5	Number of episodes in sequence	15,949	2.75	1.87	1.00	10.00	12,149	2.55	1.82	1.00	10.00
V6	Average duration of episodes	15,949	3.56	2.87	1.00	10.00	12,149	3.94	3.07	1.00	10.00
V7	Duration of the longest episode	15,949	4.66	2.87	1.00	10.00	12,149	4.99	3.00	1.00	10.00
V8	Maximum difference in duration among episodes	15,949	1.82	2.16	0.00	8.00	12,149	1.76	2.20	0.00	8.00
	Among those who had transition on employment status:										
V9	Scope of modal transition:										
	Far (between work and non-work)		(4,175)	(43.36%)				(2,620)	(40.10%)		
	Near (between full-time and part-time)		(5,267)	(54.71%)				(3,758)	(57.52%)		
	Other transitions		(186)	(1.93%)				(155)	(2.37%)		
		Total	(9,628)	(100.00%)			Total	(6,533)	(100.00%)		
V10	Direction of modal transition:										
	Upward		(3,029)	(31.46%)				(2,252)	(34.47%)		
	Downward		(6,413)	(66.61%)				(4,126)	(63.16%)		
	Other transitions		(186)	(1.93%)				(155)	(2.37%)		
		Total	(9,628)	(100.00%)			Total	(6,533)	(100.00%)		

		Late Middle Age (Age 45-54 Years)					later adulthood (Age 55-65 Years)				
		N	Mean (Count)	St.D. (%)	Min	Max	N	Mean (Count)	St.D. (%)	Min	Max
	Sequence and states										
	Proportion of time spent on each state (100=whole sequence)										
V1	Employed full-time (%)	7,664	58.30	40.31	0.00	100.00	4,968	36.87	37.86	0.00	100.00
V2	Employed part-time (%)	7,664	17.76	25.55	0.00	100.00	4,968	18.53	25.03	0.00	100.00
V3	Unemployed or absent from work (%)	7,664	2.41	9.27	0.00	100.00	4,968	1.94	9.11	0.00	100.00
V4	Economically inactive (%)	7,664	21.53	36.32	0.00	100.00	4,968	42.65	41.81	0.00	100.00
	Episodes and transitions										
V5	Number of episodes in sequence	7,664	2.48	1.78	1.00	10.00	4,968	2.62	1.85	1.00	11.00
V6	Average duration of episodes	7,664	4.13	3.15	1.00	10.00	4,968	4.40	3.36	1.00	11.00
V7	Duration of the longest episode	7,664	5.20	3.02	1.00	10.00	4,968	5.78	3.27	1.00	11.00
V8	Maximum difference in duration among	7,664	1.78	2.24	0.00	8.00	4,968	2.32	2.67	0.00	9.00
	Among those who had transition on employment status:										
V9	Scope of modal transition:										
	Far (between work and non-work)		(1,580)	(40.19%)				(1,683)	(57.87%)		
	Near (between full-time and part-time)		(2,257)	(57.42%)				(1,162)	(39.96%)		
	Other or no transitions		(94)	(2.39%)				(63)	(2.17%)		
		Total	(3,931)	(100.00%)			Total	(2,908)	(100.00%)		
V10	Direction of modal transition:										
	Upward		(1,088)	(27.68%)				(441)	(15.17%)		
	Downward		(2,749)	(69.93%)				(2,404)	(82.67%)		
	Other or no transitions		(94)	(2.39%)				(63)	(2.17%)		
		Total	(3,931)	(100.00%)			Total	(2,908)	(100.00%)		

Appendix D. Summary of Statistical Testing for Variations in Trajectory Distance Scores and Trajectory Characteristics by Gender, Birth Cohort, and Gender-by-Cohort Interactions

		Young Adulthood (Age 25 to 34 Years)			Young Middle Age (Age 35 to 44 Years)			Late Middle Age (Age 45 to 54 Years)			later adulthood (Age 55 to 65 Years)		
	Variable	Gender	Cohort	Gender - Cohort	Gender	Cohort	Gender - Cohort	Gender	Cohort	Gender - Cohort	Gender	Cohort	Gender - Cohort
	Sequence: distance from stable, full-time career (optimal matching distance score)												
Y1	Distance score, numeric	*** women +	*** older cohort +	*** women decreased faster	*** women +	*** older cohort +	*** women decreased faster	*** women +	*** older cohort +	*** women decreased faster	*** women +		*** women decreased faster
	States: Proportion time spent on each state												
V1	Employed full-time	*** women -			*** women -			*** women -	*** young (leading boomers)+		*** women -		
V2	Employed part-time				*** women +								
V4	Economically inactive	*** women +			*** women +			*** women +			*** women+		
	Episodes and transitions												
V5	Number of episodes in sequence	*** women +											
V7	Duration of the longest episode					*** old cohort+			*** old cohort +				
V9	Far modal transitions	*** women +	*** young cohort +	*** women-, men ++; gender gap decreased	*** women +	* U shaped + - +	*** women -, men ++; gender gap decreased	*** women +		*** women -, men +; gender gap decreased			
V10	Downward modal transitions		* young (Gen. X) -		*** men +	*** old cohort (Silent Gen.) +	*** men --; gender gap decreased	* men +				*** old cohort +	** men-, women --; gender gap increased

Note: Trajectory characteristics not significantly associated with gender and cohort (V3 porportion time on unemployment and absence from work, V6 average duration of episodes, and V8 maximum difference in duration among episodes) are omitted from this table.

Appendix E. Selection of Models in Cluster Analysis by PROC FASTCLUS and PROC MODECLUS

K-Means Method (PROC FASTCLUS)										Density-based Method (PROC MODECLUS)								
		Sample Size in Each Cluster					Goodness-of-fit statistics [2]					Sample Size in Each Cluster			Goodness-of-fit statistics [3]			
															P value, Saddle Test		ANOVA	
radius [1]	No. Suggested Clusters	n1	n2	n3	n4	n5	Pseudo-F statistics	R squared	CCC	radius [1]	No. Suggested Clusters	n1	n2	n3	Cluster 1	Cluster 2	F statistics	(d.f.)
I. Young Adulthood: Y (Cluster membership)= Distance score at Age 25-34 Years (N=15,949)																		
1	15	---	---	---	---	---	685049.5	0.996	88.15	1	11	---	---	---				
2	8	---	---	---	---	---	142897.0	0.984	-0.47	1	10	---	---	---				
3	5	7,478	3,717	1,270	1,441	2,043	123078.8	0.960	22.70	1	9	---	---	---				
4	5	7,478	3,717	1,270	1,441	2,043	123078.8	0.960	22.70	1	8	---	---	---				
5	3	10,209	2,290	3,450	---		74662.8	0.889	14.47	1	7	---	---	---				
6	3	10,209	2,290	3,450	---		74662.8	0.889	14.47	1	6	---	---	---				
7	3	10,209	2,290	3,450	---		74662.8	0.889	14.47	2	2	14,776	1,173	---	0	0	11466.49	(1)
8	3	10,209	2,290	3,450	---		74662.8	0.889	14.47	*3	2	14,516	1,433	---	0	1	15186.49	(1)
9	3	10,209	2,290	3,450	---		74662.8	0.889	14.47	4	1	---						
10	2	12,021	3,928	---			57063.4	0.750	16.99									
11	2	12,021	3,928	---			57063.4	0.750	16.99									
12	2	12,021	3,928	---			57063.4	0.750	16.99									
13	2	12,021	3,928	---			57063.4	0.750	16.99									
14	2	12,021	3,928	---			57063.4	0.750	16.99									
15	2	12,021	3,928	---			57063.4	0.750	16.99									
16	1	---																
II. Young Middle Age: Y (Cluster membership)= Distance score at Age 35-44 Years (N=12,149)																		
1	14	---	---	---	---	---	599617.8	0.995	92.8	1	12							
2	7	---	---	---	---	---	117845.7	0.980	15.0	1	11							
3	5	2,361	1,230	6,297	1,093	1,168	97261.8	0.960	22.7	1	10							
4	4	2,950	1,385	6,297	1,517		81182.0	0.938	23.0	1	9							
5	3	8,735	1,385	2,029	---		50274.6	0.889	2.7	1	8							
6	3	8,615	1,450	2,084	---		52463.4	0.889	6.1	1	7							
7	2	9,552	2,597	---			43582.9	0.750	15.1	1	6							
8	2	9,552	2,597	---			43582.9	0.750	15.1	1	5							

Appendix E. Selection of Models in Cluster Analysis by PROC FASTCLUS and PROC MODECLUS (Cont.)

9	2	9,552	2,597	---			43582.9	0.750	15.1	2	2	11,180	969	---	0	0	10836.71	(1)
10	2	9,552	2,597	---			43582.9	0.750	15.1	*3	2	11,086	1,063	---	0	1	12382.16	(1)
11	2	9,552	2,597	---			43582.9	0.750	15.1	4	1	---						
12	2	9,552	2,597	---			43582.9	0.750	15.1									
13	2	9,660	2,489	---			42314.7	0.750	12.5									
14	2	9,660	2,489	---			42314.7	0.750	12.5									
15	1	---																
III. Late Middle Age: Y (Cluster membership)= Distance score at Age 45-54 Years (N=7,664)																		
1	14	---	---	---	---	---	434046.8	0.995	82.2	1	11							
2	7	---	---	---	---	---	90130.1	0.980	23.9	1	10							
3	6	---	---	---	---	---	85582.8	0.972	29.1	1	9							
4	4	4,081	1,429	1,199	955	---	57613.1	0.938	25.8	1	8							
5	4	4,081	1,450	1,193	940	---	57633.2	0.938	25.8	1	7							
6	3	4,265	1,809	1,590	---		44381.0	0.889	23.8	1	6							
7	3	4,368	1,479	1,817	---		45135.1	0.889	24.9	1	5							
8	3	4,368	1,477	1,819	---		45124.5	0.889	24.9	1	4							
9	2	5,531	2,133	---			33119.7	0.750	24.9	2	2	6,216	1,448	---	0	0	11804.87	(1)
10	2	5,531	2,133	---			33119.7	0.750	24.9	3	2	6,645	1,019	---	0	1	11208.58	(1)
11	2	5,531	2,133	---			33119.7	0.750	24.9	*4	2	6,491	1,173	---	0	1	14461.92	(1)
12	2	5,531	2,133	---			33119.7	0.750	24.9	5	1	---						
13	2	5,531	2,133	---			33119.7	0.750	24.9									
14	2	5,531	2,133	---			33119.7	0.750	24.9									
15	2	5,531	2,133	---			33119.7	0.750	24.9									
16	1	---																

Appendix E. Selection of Models in Cluster Analysis by PROC FASTCLUS and PROC MODECLUS (Cont.)

IV. later adulthood: Y (Cluster membership)= Distance score at Age 55-65 Years (N=4,968)																		
1	15	---	---	---	---	---	199877.6	0.996	45.75	1	11							
2	9	---	---	---	---	---	65251.9	0.988	13.48	1	10							
3	6	---	---	---	---	---	49291.3	0.972	17.45	1	9							
4	5	1,369	1,070	632	918	979	41540.1	0.960	16.69	1	8							
5	4	1,369	1,070	1,470	1059	---	31102.3	0.938	11.36	1	7							
6	3	1,799	1,501	1,668	---		25506.8	0.889	12.86	1	6							
7	3	1,799	1,503	1,666	---		25525.6	0.889	12.90	1	5							
8	3	1,876	1,568	1,524	---		25931.3	0.889	13.72	1	4							
9	3	1,876	1,568	1,524	---		25931.3	0.889	13.72	1	3							
10	2	2,643	2,325	---			17963.3	0.750	10.06	2	2	3,412	1,556	---	0	0	578.98	(1)
11	2	2,643	2,325	---			17963.3	0.750	10.06	3	2	3,873	1,095	---	0	1	812.62	(1)
12	2	2,643	2,325	---			17963.3	0.750	10.06	4	2	3,660	1,308	---	0	1	941.85	(1)
13	2	2,643	2,325	---			17963.3	0.750	10.06	5	2	2,735	2,033	---	0	1	10779.26	(1)
14	2	2,643	2,325	---			17963.3	0.750	10.06	*6	2	3,343	1,625	---	0	1	14341.90	(1)
15	2	2,643	2,325	---			17963.3	0.750	10.06	7	1							
16	1	---																

Notes:

1. Radius (r) is a parameter to be input in SAS PROC FASTCLUS and PROC MODECLUS. Different radiuses may lead to different solutions.

2. Models from PROC FASTCLUS are compared by three goodness-of-fit statistics: Pseudo F statistics, R squared, and cubic clustering criterion (ccc). Larger values in all three statistics suggest better fit.

3. Models from PROC MODECLUS are compared by statistics from Saddel tests. Large P values (>0.5) indicates that simple models are sufficient.

Appendix F. Multinomial Logistic Regression of Patterns of Employment Status on Gender, Cohort, and Occupation (Including Economically Inactive Category)

	(I) Unstable, part-time cluster vs. Stable, full-time cluster												
	(A) Young adulthood (Age 25-34 years)			**(B) Young middle age** (Age 35-44 years)			**(C) Late middle age** (Age 45-54 years)			**(D) Later adulthood** (Age 55-65 years)		
Variable	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value
Gender (reference=male)												
Female	5.207	0.32	<.0001 ***	5.37	0.44	<.0001 ***	2.71	0.23	<.0001 ***	1.73	0.15	<.0001 ***
Birth cohort												
Leading boomers	1.062	0.12	0.567	0.63	0.05	<.0001 ***	0.78	0.11	0.073	0.71	0.06	<.0001 ***
Trailing boomers	0.586	0.06	<.0001 ***	0.26	0.02	<.0001 ***	0.24	0.04	<.0001 ***	NA	NA	NA
Generation X	0.212	0.03	<.0001 ***	NA	NA	NA	NA	NA	NA	NA	NA	NA
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Primary occupation in career (reference=professional)												
Managers and administrators	0.33	0.05	<.0001 ***	0.33	0.06	<.0001 ***	0.51	0.10	<.0001 ***	---	---	---
Sales/clerical workers	0.78	0.06	0.001 **	0.55	0.05	<.0001 ***	0.83	0.11	0.166	---	---	---
Craftsmen	---	---	---	0.45	0.09	<.0001 ***	---	---	---	---	---	---
Operatives	0.74	0.07	0.002 **	0.47	0.06	<.0001 ***	---	---	---	0.69	0.11	0.018 *
Service workers, laborers, farmers, armed forces	---	---	---	---	---	---	1.58	0.17	<.0001 ***	---	---	---
Economically inactive	3.441	0.21	<.0001 ***	2.83	0.21	<.0001 ***	4.35	0.45	<.0001 ***	1.72	0.16	<.0001 ***
	(II) Stable, inactive cluster vs. Stable, full-time cluster											
Gender (reference=male)												
Female	8.50	0.92	<.0001 ***	4.44	0.51	<.0001 ***	4.90	0.54	<.0001 ***	3.20	0.25	<.0001 ***
Birth cohort												
Leading boomers	0.57	0.08	<.0001 ***	0.23	0.02	<.0001 ***	0.57	0.08	<.0001 ***	0.39	0.03	<.0001 ***
Trailing boomers	0.19	0.03	<.0001 ***	0.07	0.01	<.0001 ***	0.08	0.01	<.0001 ***	NA	NA	NA
Generation X	0.05	0.01	<.0001 ***	NA	NA	NA	NA	NA	NA	NA	NA	NA
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		

Appendix F. Multinomial Logistic Regression of Patterns of Employment Status on Gender, Cohort, and Occupation (Cont.)

Primary occupation in career (reference=professional)												
Managers and administrators	0.27	0.16	0.029 *	0.71	0.28	0.381	0.65	0.21	0.174	---	---	---
Sales/clerical workers	0.57	0.14	0.020 *	0.97	0.24	0.890	1.55	0.30	0.025 *	---	---	---
Craftsmen	---	---	---	0.12	0.12	0.038 *	---	---	---	---	---	---
Operatives	0.34	0.15	0.013 *	0.39	0.17	0.033 *	---	---	---	0.60	0.10	0.003 **
Service workers, laborers, farmers, armed forces	---	---	---	---	---	---	1.69	0.31	0.005 **	---	---	---
Economically inactive	41.86	6.14	<.0001 ***	44.48	7.52	<.0001 ***	28.28	4.19	<.0001 ***	6.18	0.49	<.0001 ***
Number of observations	15,949			12,149			7,664			4,968		
Log pseudolikelihood	-8151.64			-5654.05			-4375.75			-4132.55		
Pseudo R2	0.290			0.299			0.271			0.149		

Notes:

'NA' denotes 'not applicable' while '---' indicates coefficients are not statistically significant.

* P<0.05, ** P<0.01, *** P<.001.

Includes cases whose primary occupational episode was economically inactive, such as retired people, permanently disabled, housekeepers, students, or those whose occupational status was don't know or not ascertained.

Appendix G. Multinomial Logistic Regression of Patterns of Employment Trajectories on Gender, Cohort, and Class of Worker (Includining Ecnomically Inactive Category)

	(I) Unstable, part-time cluster vs. Stable, full-time cluster											
	(A) Young adulthood (Age 25-34 years)			**(B) Young middle age** (Age 35-44 years)			**(C) Late middle age** (Age 45-54 years)			**(D) Later adulthood** (Age 55-65 years)		
Variable	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value	OR	Robust SE	P value
Gender (reference=male)												
Female	5.56	0.33	<.0001 ***	5.89	0.46	<.0001 ***	2.97	0.25	<.0001 ***	1.73	0.15	<.0001 ***
Birth cohort												
Leading boomers	1.07	0.12	0.553	0.63	0.05	<.0001 ***	0.77	0.11	0.053	0.71	0.07	<.0001 ***
Trailing boomers	0.58	0.06	<.0001 ***	0.26	0.02	<.0001 ***	0.24	0.04	<.0001 ***	---	---	---
Generation X	0.21	0.03	<.0001 ***	---	---	---	---	---	---	---	---	---
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Class of Worker (reference=White-collar)												
Blue-collar	1.11	0.07	0.100	1.03	0.08	0.662	1.44	0.14	<.0001 ***	0.91	0.10	0.365
Economically inactive	4.43	0.26	<.0001 ***	4.16	0.30	<.0001 ***	5.07	0.49	<.0001 ***	1.73	0.19	<.0001 ***
	(II) Stable, inactive cluster vs. Stable, full-time cluster											
Gender (reference=male)												
Female	9.00	0.98	<.0001 ***	4.76	0.54	<.0001 ***	5.36	0.56	<.0001 ***	3.24	0.26	<.0001 ***
Birth cohort												
Leading boomers	0.57	0.08	<.0001 ***	0.23	0.02	<.0001 ***	0.56	0.08	0.001 **	0.39	0.03	<.0001 ***
Trailing boomers	0.19	0.03	<.0001 ***	0.07	0.01	<.0001 ***	0.08	0.01	<.0001 ***	---	---	---
Generation X	0.05	0.01	<.0001 ***	---	---	---	---	---	---	---	---	---
(reference=)	*the Silent Generation*			*the Silent Generation*			*the Greatest Generation*			*the Greatest Generation*		
Class of Worker (reference=White-collar)												
Blue-collar	1.00	0.22	0.985	0.77	0.18	0.256	0.95	0.14	0.718	1.03	0.12	0.817
Economically inactive	64.68	9.30	<.0001 ***	49.74	7.32	<.0001 ***	21.74	2.48	<.0001 ***	6.73	0.67	<.0001 ***
Number of observations	15,949			12,149			7,664			4,968		
Log pseudolikelihood	-8193.45			-5706.73			-4397.78			-4138.75		
Pseudo R2	0.286			0.292			0.267			0.148		

Note:

'NA' denotes 'not applicable' while '---' indicates coefficients are not statistically significant.

* P<0.05, ** P<0.01, *** P<.001.

Includes cases whose primary occupational episode was economically inactive, such as retired people, permanently disabled, housekeepers, students, or those whose occupational status was don't know or not ascertained.