EMPLOYMENT TRAJECTORY PATTERNS OF EX-INMATES : A HOLISTIC APPROACH TO HETEROGENEOUS LABOR MARKET TRAJECTORIES

JooHee Han

School of Labor and Employment Relations

University of Illinois Urbana-Champaign

504 E. Armory

Champaign, IL 61820

joohee@illinois.edu

September 15, 2018

Abstract

A negative spiral of joblessness and crime/incarceration suggests that employment states between pre- and post-incarceration mutually constitute one unit of trajectory, including incarceration periods in between the two phases. Previous research is often divided into two separate phases of the life course, either the pre-incarceration or the post-incarceration phase, with little attention to how the two phases are related each other. Furthermore, previous research focusing on the negative spiral between unsuccessful employment states and incarceration hides potential heterogeneity of labor market trajectories of the ever-incarcerated population. Using the holistic approach of Sequence Analysis, I explore the employment trajectories of the ever-incarcerated population from the National Longitudinal Survey of Youth 1997 cohort sample. I find that there is significant heterogeneity resulting in five distinct trajectory patterns: unstable employment, early exit from the survey, prisoner career, withdrawn from the labor force, and stable employment, and that the patterns are stratified by race.

EMPLOYMENT TRAJECTORY PATTERNS OF EX-INMATES : A HOLISTIC APPROACH TO HETEROGENEOUS LABOR MARKET TRAJECTORIES

Introduction

African American young men, the less educated in particular, not only struggle with joblessness but also face a high risk of crime/incarceration (Wilson 1987; Pettit and Western 2004). Research documents that joblessness and unstable employment are conducive to criminal involvement and incarceration and that race and social class are conducive to living in more highly surveilled and criminalized contexts (Berk, Lenihan and Rossi 1980; Crutchfield and Pitchford 1997; Goffman 2009). Once released from prison, ex-inmates often encounter discrimination by employers due to their criminal record (Pager 2009). African American ex-inmates face doubled discrimination due both to their race and their criminal record, which results in slower earnings growth, employment penalties, and in lessened mobility (Lyons and Pettit 2011; Pager 2009; Western and Beckett 1999). Such a negative spiral of joblessness and crime/incarceration suggests that employment states between pre- and post-incarceration need to be understood as one unit of trajectory, which includes stints of incarceration between the two.

However, research on the relationship between employment and crime/incarceration is often divided into two separate phases of the life course. One strand of research focuses on how employment states influence the risk of crime/incarceration (e.g. Berk, Lenihan and Rossi 1980; Crutchfield and Pitchford 1997).

These studies treat incarceration as a consequence at the end point of one's criminogenic labor market trajectory over the life course. The other strand of research examines how prison incarceration influences ex-inmates' post-incarceration labor market outcomes (e.g. Apel and Sweeten 2010; Lyons and Pettit 2011; Pager 2009; Western 2007; Western and Beckett 1999). In these studies, an incarceration experience is treated as a cause, rather than a consequence, of labor market trajectories. Taken together the two streams of research indicate that crime/incarceration is both a consequence and a cause of labor market status over the life course. As such, the pre- and post-incarceration employment states are not just connected with each other but plausibly mutually constitutive of entire employment trajectories over the life course.

In addition, previous research often focuses on the negative spiral between unsuccessful employment states and incarceration, portraying it as the most common experience of people with a criminal record (e.g. Goffman 2009, Sugie 2018). This is due, in part, to the fact that incarceration concentrates among African American high school dropouts (Western 2007; Western and Beckett 1999), who often live in an inner city community of concentrated poverty. This tendency to look at places of concentrated poverty, however, may hide potential heterogeneity of labor market trajectories of the ever-incarcerated population, which needs to be examined further for better policy interventions as well as better understanding of the mobility of at-risk-of-incarceration youth.

In this study, I examine holistic employment trajectories, including both pre- and post-incarceration periods, of young men with a criminal record in the National Longitudinal Survey of Youth 1997 cohort data. Using Sequence Analysis, I explore

heterogeneous patterns of labor market trajectories. I discuss the implication of mass incarceration with regard to racial inequality in the labor market. This study contributes to the current literatures on labor market inequality in the era of mass incarceration in several ways, by treating incarceration holistically rather than as either a consequence at the end point or a cause at the starting point of one's life course. In addition, this study discovers heterogeneous patterns of labor market trajectories for young men at-risk-of-incarceration, which can provide policy implications by showing the existence of positive employment patterns.

Labor Market and Incarceration

Criminogenic Employment Careers

A rich literature documents the close relationship of crime/incarceration with labor market states. An adverse labor market status often induces crime/incarceration (Berk, Lenihan and Rossi 1980; Crutchfield and Pitchford 1997). One mechanism is that low income and poverty from unstable employment induce people to commit crimes. Conversely, employment provides income, which in turn reduces incentives to commit property crimes or get involved in illicit underground economy to compensate income deficits. Berk, Lenihan and Rossi (1980), for example, examined how monetary compensation to ex-inmates returning to the civilian society influences their recidivism rates. They found that monetary compensation of the Transitional Aid Research Project (TARP) to ex-inmates in Georgia and Texas reduced their property and non-property crime rates whereas experimentally induced unemployment increased the risk of both property and non-property crimes.

Aggregate level studies also indicate that labor market conditions are critical for ex-inmates' social integration. Strong economic conditions in the community where ex-prisoners return substantially reduce their property crime rates (Hannon and DeFina 2010). Macro-level welfare policies also influence the incarceration rates for the poor. Beckett and Western (2001) show that the reduction in welfare spending for the poor, including employment assistance and unemployment benefits, in the early 1980s increased incarceration. Although their focus was on the effect of the political economic shift of U.S. welfare policies to a punitive workfare regime on incarceration at the aggregate level, the finding implies that such a contraction of welfare for the poor leads structurally to an increase in incarceration at the individual level as well.

Employment provides not only income but also institutional attachments to work, which prevents young men from getting involved in criminal activities and cuts them off the criminogenic environments (Sampson and Laub 1990). Crutchfield and Pichford (1997), for example, found that longer spells out of the labor force increase the risk of criminal involvement while longer spells of employment reduce criminal involvement. They conclude that employment increases stability by raising an individual's trust relationship with employers, also discouraging criminal involvement. Bad jobs rarely provide such stability for low-skilled workers because such jobs are often low-wage and irregular. Similarly, Sampson and Laub (1990) found that job stability, along with the institutional attachment to marriage, inhibits criminal and deviant behaviors over the life course.

Incarceration Effects on Labor Market Outcomes

Incarceration effects on subsequent labor market outcomes are detrimental (Pager

2009; Western and Beckett 1999; Western 2007). Three main mechanisms are identified as the cause of poor job prospects for ex-inmates: selection, transformation, and stigmatization (Pager 2009). The selection argument is that ex-inmates have qualitatively different personalities and abilities from others, such as lower motivation to work and lesser skills than those without a conviction. An individual with these characteristics will have bleak employment opportunities even without an incarceration experience. The transformation explanation is that incarceration disrupts the opportunity to accumulate human/social/cultural capital and/or changes personal identities while in prison, which produces employment/wage penalties in the labor market after release. The stigmatization explanation argues that ex-inmates are discriminated against by employers solely due to their criminal records.

Scholars estimate net effects of each mechanism and find that incarceration has an effect that is not only negative but also long lasting. Pager (2009), in an audit experiment of entry level job hiring process, found that employers discriminate against job applicants with a criminal record by not calling them back for an interview even when they have the same experiences and human capital as applicants without a prison record. Such discrimination against applicants with a criminal record is the pure stigmatization effect net of selection and transformation effects as post-incarceration condition is made the same across the control and the treatment groups. Western and Beckett's (1999) study finds that juvenile incarceration negatively influences ex-inmates' employment state up to 15 post-release years. The substantially negative effect is robust even net of pre-incarceration employment, which controls for unobserved individual attributes (selection).

On the other hand, Apel and Sweeten (2010) argue that erosion of human capital while in prison is the main cause of low labor market participation of ex-inmates rather than stigma associated with a criminal record. They found that ex-inmates' labor market detachment is due to non-participation (voluntary non-working) rather than unemployment (involuntary non-working). Furthermore, several studies unexpectedly find that the probability of employment increases for a short period of time after prison release (e.g. Pettit and Lyons 2007). These mixed findings in regard to the effect of incarceration on post-incarceration employment states suggest that employment patterns for ever-incarceration population are not uniformly negative.

Potential Heterogeneity of Employment Trajectories among Criminals

Pre- and post incarceration employment are connected by incarceration periods. All three phases constitute one life course trajectory for ever-incarcerated young men. Studies often incorporate pre-incarceration employment states to estimate the net effect of incarceration on post-incarceration employment (e.g. Apel and Sweeten 2010; Lyons and Pettit 2011; Myers 1983; Western and Beckett 1999) but only for controlling purposes rather than studying it directly.

Such studies rarely take the timing (age) and the duration of incarceration into account, despite the fact that these variables influence employment trajectories by constituting a part of the trajectories. Nonetheless, previous literature suggests that incarceration timing, duration, and sequences of employment states shape labor market trajectories. Uggen (2000) shows that marginal employment opportunities decrease the rate of self-reported recidivism only for those age 27 or older, suggesting that age of release (and incarceration) may be associated with differing employment patterns. At the

same time, the transformation hypothesis predicts that the penalty of incarceration on post-release employment will be stronger if the duration of incarceration extends as it erodes inmates' human capital (Apel and Sweeten 2010).[1]

In addition, as these studies compare the employment states between those ever incarcerated and those never incarcerated, it fails to capture heterogeneity of employment state patterns within the ever-incarcerated population. Research on the effect of pre-incarceration on the incarceration outcome examines who ends up being incarcerated among the full sample. Likewise, research on the effect of incarceration on post-release labor market outcomes compares those who were incarcerated and those not. However, the existing studies suggest potential heterogeneity of employment patterns are stratified by race within the ever-incarcerated population. Unemployed black young men, in particular, are more likely to be incarcerated than other racial groups net of other attributes (Chiricos and Bales 1991). Once released from prison, black ex-inmates have a greater wage penalty of incarceration than white ex-inmates (Lyons and Pettit 2011). In addition, the reduction of callback rates for a job interview is larger for black ex-inmates than for white ex-inmates (Pager 2009). These findings suggest that whites will have more stable employment trajectories despite a criminal record than blacks who will struggle with more unstable employment trajectories.

In a few exceptional studies, scholars find heterogeneous employment-related patterns over time. Apel and Sweeten (2010: 465) document five typical employment trajectory patterns: stable employment, stable unemployment, stable nonparticipation,

[1] The empirical findings are mixed. Apel and Sweeten (2010) find erosion of human capital while in prison is the main cause of employment penalty of ex-inmates. However, Kling (2006) find that incarceration length does not cause employment and earnings differentials for ex-inmates.

unstable employment, and unstable nonemployment, finding that formerly incarcerated youth are more likely to have stable nonparticipation (stable detachment from work) or unstable nonemployment patterns (switching between unemployment and nonparticipation) than never incarcerated youth. Sugie (2018) examines job search patterns among the recently released ex-inmates and finds that there are five distinct patterns: early exit; early exit with low response (to the survey); recurring work; persistent job search; and low response.

However, these studies are limited in that they examine only post-incarceration periods and do not analyze how the patterns are associated with race. Thus, I extend previous research by (1) including all three pre-incarceration, incarceration, and post-incarceration phases to capture the holistic patterns of ever-incarcerated youths (2) identifying heterogeneous patterns within the ever-incarcerated population, and by (3) examining how the patterns are stratified by race.

Holistic Approach to Criminal Careers

Conventionally, in order to analyze rich information in panel datasets, scholars often use event history analysis (survival models), or fixed effect models. Event history models estimate the effects of time-constant and time-varying covariates on the risk of experiencing critical labor market events such as voluntary/involuntary job separation (Park and Sandefur 2003), unemployment, getting a job back after unemployment (Rothstein 2011). Fixed-effect models are used to estimate the treatment effect of incarceration on post-release labor market outcomes net of unobserved time constant attributes (Apel and Sweeten 2010; Western 2002). Recently, however, interest in understanding holistic patterns and trajectories of labor market statuses are growing

among scholars. Since event history analysis focuses mainly on discrete events with little attention to subsequent events, holistic patterns and lifetime trajectories are often missed using these models. Although repeated events survival models take subsequent events into account they cannot capture the holistic transition patterns and they usually focus on only one recurring event of interest. While competing risk models can estimate risks of multiple events, they cannot model subsequent events since individuals who experience whichever event occurs first are pulled out of sample from that time point.

One alternative way to examining factors leading to incarceration and the effect of incarceration only at a same time is to examine entire life course trajectories including the incarceration period. Sequence Analysis is "the holistic treatment of life-course trajectories by calculating similarities or distances between pairs of trajectories, viewed as whole units" (Halpin 2012:1). Unlike many conventional statistical analyses, sequence analysis does not test hypotheses drawn from theories and previous research. Rather, it inductively explores emerging patterns from observations and examines how the patterns are associated with other factors (Abbott 1995; Blair-Loy 1999). For example, Scherer (2001) compares school to work transition patterns by gender in Great Britain and West Germany by analyzing the sequences of full/part-time employment, unemployment, and non-participation (full-time education and family care/maternity leave) in the workforce. She finds more heterogeneous transition trajectories in Great Britain with more unemployment interruptions than in West Germany where the education system is more oriented toward vocational training. Pollock et al. (2002) analyze men's and women's employment histories using British Household Panel Survey (BHPS) and identify 13 distinct clusters of trajectories. Among them, the authors find more women stayed mainly

in part-time employment with short periods in some other employment states while most men had mostly full time employment with often short periods in other states over the life course.

Thus, a holistic approach to the employment states of the ever-incarcerated population using sequence analysis may yield meaningful findings that previous research missed despite intense interests in long-term causes and consequences of incarceration. Susie's study (2018) on the job search trajectory pattern of recently released ex-inmates is the only study that employs this method that I am aware at this point. Thus, the current study is the one of the few first studies that employs sequence analysis in the U.S. incarceration context.

Data/Measures, and Methods

To study the labor market trajectories of young men with an incarceration history, I analyze the National Longitudinal Survey of Youth 1997 cohort data, one of the few panel datasets that include the incarcerated populations. Out of 8,984 individuals initially interviewed in the first round in 1997, the sample is limited to 634 men (unweighted) who have ever been incarcerated (over 19 years: 17 rounds of survey plus previous 2 years information at the first round). The age range of the sample in the latest round of survey is 30 to 36. I limit the sample only to men because males disproportionately experience incarceration.

Labor market states are defined as seven categories. As the labor market statuses are measured weekly in the survey, I collapse them into monthly measures to make them

comparable to other monthly measures.[2] Full-time employment is defined as working 35 hours a week on average in that calendar month.[3] Part-time employment is defined as working less than 35 hours a week but more than zero hours a week on average. Unemployment and out of the labor force states are measured weekly and coded as such if an individual is unemployed or out of the labor force for three weeks or more in the calendar month. While these labor market states are mutually exclusive, they may not be so with other important non-labor market states like schooling. Because K-12 education is compulsory to age 16 or 18, depending on state law, one's labor market state is coded as school enrollment if he was enrolled in K-12 school for the month even while participating in the labor force at the same time.[4] [5] In the same way, a monthly state is replaced as incarceration if one's incarceration state overlaps with other labor market states in order to avoid underestimating incarceration duration. Such overlaps between incarceration state and employment state may occur as labor market states are measured weekly and transformed monthly afterwards but an incarceration state is measured

[2] Although it is also possible to convert monthly measure to weekly measure, it will produce measurement errors as well without knowing the source of errors.

[3] There is no official definition of full-time employment. However, 35 hours a week on average is conventionally applied in social science research (Kalleberg 2000).

[4] Although GED is treated as equivalent as a high school diploma in the labor market, the current state of enrollment but not the completion of high school is of interest, GED is not considered as a state.

[5] Unlike the K-12 schooling, it is difficult to clearly delineate states between college education and out of the labor force because it is common that college students are working while pursuing college education (Weiss and Roksa 2016). Thus, the state of being out of the labor force may include college students in this study. However, it is not likely to cause much bias considering that incarceration concentrates among the high school dropouts and high school graduates but not among those with college education (Western 2007).

monthly in the original dataset. Not having any of these sates is coded as missing. Missing can be of two sorts: either respondents did not answer all of the particular questions or opted out of the annual survey (attrition), especially in the later rounds of the survey. Because respondents started to participate in the survey at different ages (12-18 at the first round survey in 1997) and K-12 education is compulsory by age 16 or 18, I aligned the starting point of labor market trajectories at the first month of age 16 for everyone, censoring the information prior to age 16. However, this does not influence the censoring for the respondents who started the survey at age 18 because the first round questionnaire asked about the previous 3 years of employment history and the previous 2 years of incarceration history.

Sequence analysis calculates distances between pairs of sequences. Optimal Matching Analysis is a widely used method in sequence analysis. It uses the optimal matching algorithm that applies three operation mechanisms: insertion, deletion, and substitution in calculating distances (Abbott 1995). [6] For example, the following pair of sequences represent two individuals' employment trajectory over time,

	Month						
	1	2	3	4	5	6	7
Person 1	U	F	F	P	U	O	I
Person 2	O	F	U	O	I		
Operation	Substitution		Insertion(2) /Deletion(1)	Insertion(2) /Deletion(1)			
Cost	1.87	0	1	1	0	0	0

where, U=Unemployed; F=Full-time employment; P=Part-time employment; O=Out of

[6] There are debates regarding the meaning of distances. Some argue that distance has no practical meaning in the social science context unlike in natural sciences. However, distance measure itself serves its own role for clustering sequences using each sequence's distances to others (Cornwell 2015).

the labor force; I=Incarcerated, and the second sequence is short by two spells due to a different observation period.

For the two sequences to become identical, at least two steps need to be taken. First, either two spells (F and P) need to be inserted into the second sequence or the two spells in the first sequence need to be deleted. Second, the first spell needs to be substituted, either substituting U in the first sequence with O or vice versa. In optimal matching method, such an insertion or a deletion produces indel (insertion + deletion) cost. For example, if we define the indel cost as 1 and we insert the spells F and P into the second sequence, it produces 1+1=2 points of indel cost total. Next, if the first state in the second sequence, out of the labor force, is substituted with unemployment, it produces substitution cost, which can be defined based on many metrics. However, it is controversial how to define substitution costs between states particularly in social sciences where states are qualitatively different unlike DNA structures, for example, in natural science of which differences can be calculated based on other proven metrics. One proposed solution is to define substitution costs based on observed transition rates among states in a sample (e.g. Halpin 2017; Sugie 2018). For example, the transition from full-time employment to incarceration likely occurs less often than the transition from unemployment to incarceration. Then, the substitution cost between full-time employment and incarceration is larger than that between unemployment and incarceration. The observation-based substitution cost matrix between states are provided in Appendix, Table A.1.[7] The substitution cost between unemployment and out of the

[7] Because states are recurrent in the life-course (state at t+1 can be same as at t: for example, unemployed for two months consecutively), diagonals (t and t+1) are included when calculating transition rates (see Cornwell 2015).

labor force, calculated from the data, is 1.87. The sum (3.87) of indel cost (2) and substitution cost (1.87) is the distance between the two sequences. Because the Optimal Matching algorithm finds the operations that produce the shortest distance contingent on substitution cost and indel cost, the relative cost of indel to substitution cost influences which operations (insertion, deletion, or substitution) to be used in matching two sequences identical. If substitution cost is considerably lower than indel cost, the optimal matching algorithm utilizes substitution operation rather than insertion or deletion. However, how to set indel cost is controversial as some argue that indel cost should be set at about 1/10 of the highest substitution cost and some others argue that it should be set at slightly higher than 1/2 of the highest substitution cost (Cornwell 2015). Following the second approach I set the indel cost at 1.5 since the highest substation cost calculated based on observed transition rates is 1.99 (Table A.1).[8] Using optimal matching method, distance for each 634 ever-incarcerated men's employment sequences to the other 633 sequences is calculated, producing a 634×634 distance matrix with diagonals are null.

One of the critiques of such a way of measuring distances in the optimal matching algorithm is that the context of sequences is not taken into account. For example, 2 months' part-time employment followed by 2 months' full-time employment can be different from that followed by 20 months' full-time employment in terms of the stability of sequences. Various alternative ways of measuring distances are developed to reflect the context of sequences. Time-Warping Edit Distance (TWED) measure, for example, adjusts indel cost (here it works as compression and expansion) based on duration of

[8] Setting indel cost differently yields similar trajectory patterns although the distributions of clusters are different from when the indel cost is set at 1.5. Frequency distributions of employment trajectory clusters are provided in the Appendix, Table A.2. with indel cost of 0.2, 1/10 of highest substitution cost, and in Table A.3. with indel cost of 1, 1/2 of highest substitution cost.

subsequences. Other distance measures like Hollister's local optimal matching and Halpin's duration adjusted optimal matching have different weighting solutions but share the similar logic with TWED in that they apply duration based weights in calculating these costs (Cornwell 2015; Halpin 2012). The clustering sequences using TWED distance measures yields the similar patterns to the clusters using the optimal matching method in this study, but with a different distribution of clusters (provided in the Appendix, Table A.4).

Based on the distance measures created from optimal matching, cluster analysis groups the individual sequences into several groups with identical or similar sequences. Decision on how many clusters would best explain the heterogeneous sequences can be made in many ways (Calinski and Harabasz 1974; Cornwell 2015; Halpin 2012). While various statistical methods also developed, finding emerging patterns often use dendrograms [9] of clusters because finding meaningful clusters in social science relies heavily on context (e.g. Sugie 2018). In this study, after examining different number of clusters, I found five distinct meaningful clusters. The dendogram is provided in Appendix Figure A.1.

Analysis

The distribution plot (Figure 1) by status across individuals at each month presents the overall summary of labor market states of the ever-incarcerated sample. At age 16, about 60% was enrolled in K-12 schools. The next largest proportion (35%) was

[9] A dendrogram, known as a tree graph, shows to what extent grouped clusters are dissimilar within themselves depending on the number of clusters. As individual observations are grouped into smaller number of clusters, within-cluster dissimilarity increases.

out of the labor force, and a smaller proportion was either working part time or unemployed. A very small proportion was incarcerated at that time. However, as respondents leave high school (either dropping out or graduating), the proportion of full-time, part-time employment, and unemployment is increasing. It is not surprising that an increasing proportion of the sample became incarcerated as well as missing from the sample as they age and survey rounds extend. Throughout the time span, the proportion of the sample working full-time is less than 50%, which is relatively low.

[Figure 1 & 2 about here]

However, the employment patterns are not homogenous. Five distinct trajectory patterns are found: (1) unstable employment; (2) early exit from the survey; (3) long-term prison incarceration followed by out of the labor force; (4) withdrawn from the labor force; and (5) stable employment. Figure 2 presents cumulative percentage plots by 5-cluster Optimal Matching Analysis (OMA) solution. It is not surprising that the most common employment trajectory pattern for individuals with a criminal history is (1) unstable employment. About a half (48.6%) of the sample (*N*=308) falls into the cluster, where young men experience, after K-12 schooling, frequent unemployment, part-time employment, and out of the labor force while less than 50% was working full-time in each month by their early 30s. Timing of incarceration is not limited to a specific period as it occurs throughout the time span, suggesting that the states of young men in this group frequently switch back and forth between incarceration and labor market participations. Second panel depicts the early exit pattern where individuals drop out of

the survey starting in relatively early rounds of surveys, after experiencing full-time employment, out of the labor force, and incarceration in their early 20s. A relatively small proportion (6.3%) falls into this group. Third panel depicts the long-term prison incarceration pattern, where young men spend most of their time behind bars for a long period in their 20s. This "prisoner career" accompanies with a large proportion of staying out of the labor force, in their early 20s in particular, while few works full-time. Concentration of incarceration in their mid-20s rather than in earlier period can be interpreted as they initially participated in the labor market but unsuccessful employment led them to incarceration. This group is the third largest group (14.2%) of the five clusters. Fourth cluster (6.6%) is the withdrawn pattern, where young men mostly stay out of the labor force in their 20s, rarely working full-time or part-time. The last group is stable employment. Young men in this group find mostly full-time employment in their careers. Unexpectedly, this cluster is the second largest group (23.4%), suggesting that significant proportion of ever-incarcerated young men still find stable employment despite their criminal record.

[Table 1 about here]

Cumulative mean duration of each state by clusters, summarized in Table 1, shows that prevalent employment states differ by clusters. Individuals in each cluster follow different employment trajectories from the other trajectories as they have a longer duration in a specific state than others. Those in the unstable employment trajectory worked part-time for 22.8 months on average (about one-tenths of the total 223 months

observation periods), stayed out of the labor force for 33.4 months, were unemployed for 21.2 months, and incarcerated for 17.4 months while having worked full-time only for 59.9 months. Men in this group spent a longer period in unstable employments (part-time, unemployment, out of the labor force) than in stable employment. Missing period (101.9 months) is the longest cumulative duration for those in the early exit trajectory and incarceration period (67.9 months) is the longest state for those in prisoner career trajectory. While those who withdrew from the labor force spent most of time (114.3 months) out of the labor force, those in the stable employment trajectory worked full-time most for about a half (117.9 months) of the observation period. In addition, those in the stable employment trajectory have a shorter incarceration period (5.9 months) relative to those in the other trajectories (17.4 month in the unstable employment pattern; 14 months in the early exit pattern; and 8.6 months in the withdrawn pattern), which suggests that incarceration period is associated with employment trajectories.

[Table 2 about here]

Table 2, which summarizes frequency distribution of clusters by racial groups, reveals that racial groups do not evenly follow this heterogeneous employment trajectory patterns. While 23.4% of the sample (2nd largest cluster) finds stable full-time employment and 33.8% of whites and 31% of other racial group do, only 10.7% of blacks follow this pattern. On the other hand, blacks disproportionately either follow long-term prisoner career (25.6%) or withdraw from the labor force (10.3%). Among whites only 5.5% follow the prisoner careers and 3.4% withdraw patterns. Chi-square test shows that

the differences in the distribution of clusters by race is statistically significant at $p<.001$.

[Table 3 about here]

Further analysis shows that the association of blacks with the unstable employment trajectory pattern, the early exit, prisoner career, and the withdrawn pattern persists even net of human capital, family socio-economic status, and regions. Table 3 summarizes the relative risks of unstable employment, early exit, prisoner career, and withdrawn patterns to stable employment trajectory (reference category) from a multinomial logistic regression predicting employment trajectory clusters for blacks and whites. Blacks have a 3.56 times higher relative risk (exponential of the coefficient) of unstable employment than whites net of individual attributes, 5.54 times higher relative risk of early exit, 18.29 times higher risk of prison career, and 5.15 times higher relative risk of withdrawn patterns. The results suggest that the penalty of incarceration on employment trajectories is stronger for blacks than for whites.

Discussion and Conclusion

Previous research on the relationship between employment states and incarceration has been divided by incarceration period: one examining how pre-incarceration employment states cause incarceration and the other examining how incarceration influences subsequent labor market outcomes. However, one's employment trajectory is not disconnected but continuous with incarceration period in between the two. Thus, previous studies fail to observe holistic employment trajectory patterns of the ever-incarcerated population by not taking into account the timing (age), duration, and

sequences of labor market states and incarceration. In addition, previous studies mostly portray the negative spiral between unsuccessful employment and incarceration, which often hide potential heterogeneity in trajectories. In this study, using panel data from the NLSY 1997 cohort, I explore the entire employment trajectories of millennial young men who have ever been contacted with the penal system.

I find that there is a significant degree of heterogeneity in the employment trajectories of the ever-incarcerated population. Consistent with previous literatures that portray the negative spiral of joblessness leading to incarceration, which in turn deteriorates subsequent employment prospects (Apel and Sweeten 2010; Berk, Lenihan and Rossi 1980; Crutchfield and Pitchford 1997; Goffman 2009; Pager 2009; Western and Beckett 1999; Western 2007), the majority of young men (48.6%) who experienced the penal system have unstable employment, switching between full-time employment, part-time employment, unemployment, and out of the labor force in their entire young adulthood (1st panel in Figure 2). Even worse, a smaller proportion (6.6%) of the sample stays out of the labor force for most of the periods by their early 30s (4th panel in Figure 2). These trajectory patterns are more prevalent among blacks than among whites. One in ten black men (10.3%) who have been ever incarcerated follows this type of trajectory whereas only 3.4% of whites and 5.8% of other race do. They are likely discouraged workers who gave up searching for a work, either due to their low human capital (Western 2002) or to stigmatization from criminal records (Pager 2007). Although the majority of the ever-incarcerated population stays in the labor market struggling with unemployment and working part-time, it is also possible that many of this group will opt to withdraw from the labor force in the future if such unstable employment states persist

longer. Long-term unemployment, 26 consecutive weeks or more of unemployment, reduces reemployment probability considerably to about 20% (Shimer 2008), which in turn likely induces long-term unemployed ex-inmates back to prison. In addition, early exit from the survey may be the consequence of "system avoidance" although attrition in panel surveys is common (Western et al. 2016). Not only ex-inmates under parole but also those who had contact with the criminal justice system like being stopped or arrested by the police but not incarcerated tend to avoid institutions like workplaces, banks, schools, and hospitals where their formal records are likely kept (Brayne 2014; Goffman 2009).

However, it is noteworthy that about one in four young men (23.4%) who have been incarcerated still finds stable full-time employment by their early career (5th panel in Figure 2) although this pattern is observed three times more frequently among whites (33.8%) than blacks (10.7%). Policy interventions like "Ban the Box" and prison education are introduced in order to help ex-inmates to return to their community and family successfully. However, it will also be necessary to understand what enabled the young men in this group to maintain stable employment successfully despite stigmatization from a criminal record. Thus, future research should examine what factors distinguish this group of young men from others, in terms of education (e.g. prison education, vocational training) (Western 2007), community environment where they grew up and they returned to after incarceration (Hannon and DeFina 2010), and social networks (criminal capital) they build (MacCarthy and Hagan 1995).

Recently, Sugie (2018) found that recently released ex-inmates tend to "forage" extremely short employment like hourly and daily jobs and return to searching for a next

work, rather than building longer employment careers. Such a "foraging" employment pattern is rather inconsistent with the finding in this study that one-fourth of young men find stable full-time employment despite their criminal record. It may be due to the differences in the duration of observation in the two studies. The current study covers 19 years of employment trajectory including even pre-incarceration period whereas Sugie (2018) observed the participants over the first three months after they were released from prison but at a finer daily basis. It is found that even the relatively stable employment trajectory pattern (5th panel in Figure 2) accompanies with unstable states as well. Thus, it may be also true that even some of the participants in Sugie's study (2018) can be successfully integrated into the civilian labor market in the long run. However, the opposite may be also true because the current study does not take into account the number of jobs respondents held but only the total hours worked, which can be the sum of work hours from multiple jobs. Thus, future study should examine more dynamic mechanisms of trajectories including occupations, earnings, job tenures, and types of crime to better understand ex-inmates' labor market mobility.[10]

This study also reveals that the timing (age) and the duration of incarceration shape employment trajectories. In most of the patterns, incarceration occurs relatively evenly across time over the observation period. However, the timing and duration are different between the withdrawn pattern (2nd panel in Figure 2) and the prisoner career pattern (3rd panel in Figure 2). Young men in the withdrawn pattern are likely to become incarcerated early then exit from the survey. On the other hand, young men in the prison career pattern are likely to become incarcerated relatively later but stay longer in prison.

[10] Both studies have limitations in that only formal employment is measured. However, ex-inmates often engage with illicit works in the underground economy for various reasons (Apel and Sweeten 2010).

Such a heterogeneity of incarceration-employment trajectory patterns cannot be fully understood in conventional statistical models like fixed effect models and survival analysis where it is difficult to control for duration and timing. On the other hand, sequence analysis does not analyze dynamic causal effects of relevant variables. Thus, future study should consider incorporating the two different approaches for better understanding of trajectory dynamics.

BIBLIOGRAPHY

Abbott, Andrew. 1995. "Sequence Analysis: New Methods for Old Ideas." *Annual Review of Sociology* 21:93–113.

Apel, Robert, and Gary Sweeten. 2010. "The Impact of Incarceration on Employment during the Transition to Adulthood." *Social Problems* 57 (3): 448–79.

Beckett, Katherine and Bruce Western. 2001. "Governing Social Marginality: Welfare, Incarceration, and the Transformation of State Policy." *Punishment & Society* 3(1):43-59.

Berk, Richard A., Kenneth J. Lenihan and Peter H. Rossi. 1980. "Crime and Poverty: Some Experimental Evidence From Ex-Offenders." *American Sociological Review* 45(5):766-786.

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

Brayne, Sarah. 2014. "Surveillance and System Avoidance: Criminal Justice Contact and Institutional Attachment." *American Sociological Review* 79(3):367-391.

Calinski, T. and Harabasz, J. 1974. "A dendrite method for cluster analysis." *Communications in Statistics* 3(1):1–27.

Chiricos, Theodore and Miriam Delone. 1992. "Labor Surplus and Punishment: A Review and Assessment of Theory and Evidence." *Social Problems* 39(4):421-46.

Cornwell, Benjamin. 2015. *Social Sequence Analysis: Methods and Applications*. New York, NY: Cambridge University Press.

Crutchfield, Robert and Susan Pitchford. 1997. "Work and Crime: The Effects of Labor Stratification." *Social Forces* 76(1):93-118.

Goffman, Alice. 2009. "On the Run: Wanted Men in a Philadelphia Ghetto." *American Sociological Review* 74(3):339-357.

Halpin, Brendan. 2012. "Sequence analysis of life-course data: a comparison of distance measures." *Working Paper* WP2012-02.

Halpin, Brendan. 2017. "SADI: Sequence Analysis Tools for Stata." *The Stata Journal* 17(3):546-572.

Hannon, Lance and Robert DeFina. 2010. "The State of the Economy and the Relationship Between Prisoner Reentry and Crime." *Social Problems* 57(4):611-629.

Kalleberg, Arne L. 2000. "Nonstandard Employment Relations: Part-time, Temporary and Contract Work." *Annual Review of Sociology* 26:341-365.

Kling, Jeffrey. 2006. "Incarceration Length, Employment, and Earnings." *American Economic Review* 96(3):863-876.

Lyons, Christopher and Becky Pettit. 2011. "Compounded Disadvantage: Race, Incarceration, and Wage Growth." *Social Problems* 58(2):257-280.

MacCarthy, Bill and John Hagan. 1995. "Getting into Street Crime: The Structure and Process of Criminal Embeddedness." *Social Science Research* 24:63-95.

Myers, Samuel and William Sabol. 1987. "Unemployment and Racial Differences in Imprisonment." *The Review of Black Political Economy* 16(1):189-209.

Pager, Devah. 2009. *Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration*. Chicago: University of Chicago Press.

Park, Hyunjoon and Gary Sandefur. 2003. "Racial/ethnic differences in voluntary and involuntary job mobility among young men." *Social Science Research* 32:347-375.

Pettit, Becky and Bruce Western. 2004. "Mass Imprisonment and the Life Course: Race and Class Inequality in U.S. Incarceration." *American Sociological Review* 69(2):151-69.

Pettit, Becky and Christopher J. Lyons. 2007. "Status and the Stigma of incarceration: The Labor-Market Effects of Incarceration, by Race, Class, and Criminal Involvement." Pp. 203–26 in Barriers to Reentry? *The Labor Market for Released Prisoners in Post-Industrial America*, edited by Shawn Bushway, Michael A. Stoll, and David F. Weiman. New York: Russell Sage Foundation.

Pollock, Gary, Valerie Antcliff and Rob Ralphs. 2002. "Work Orders: Analyzing Employment Histories Using Sequence Data." *International Journal of Research Methodology* 5(2): 91-105.

Rothstein, Jesse. 2011. "Unemployment Insurance And Job Search In The Great Recession." NBER Working Paper 17534.

Sampson, Robert and John Laub. 1990. "Crime and Deviance over the Life Course: The Salience of Adult Social Bonds." *American Sociological Review* 55(5):609-627.

Scherer, Stefani. 2001. "Early Career Patterns: A Comparison of Great Britain and West Germany." *European Sociological Review* 17(2): 119-144.

Shimer, Robert. 2008. "The probability of finding a job." *American Economic Review,* (98)2:268-273.

Sugie, Naomi F. 2018. "Work as Foraging: A Smartphone Study of Job Search and Employment after Prison." *American Journal of Sociology* 123(5):1453–91.

Uggen, Christopher. 2000. "Work as a Turning Point in the Life Course of Criminals: A Duration Model of Age, Employment, and Recidivism." *American Sociological Review* 65(4):529-546.

Weiss, Felix and Josipa Roksa. 2016. "New dimensions of educational inequality: Changing patterns of combining college and work in the U.S. over time." *Research in Social Stratification and Mobility* 44:44-53.

Western, Bruce. 2007. *Punishment and Inequality in America.* New York: Russell Sage Foundation.

Western, Bruce, Anthony Braga, David Hureau, and Catherine Sirois. 2016. "Study retention as bias reduction in a hard-to- reach population." *PNAS* 113(20):5477–5485.

Western, Bruce and Katherine Beckett. 1999. "How Unregulated Is the U.S. Labor Market? The Penal System as a Labor Market Institution." *American Journal of Sociology* 104(4):1030-60.

Wilson, William Julius. 1987. *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

Table 1. Cumulative Mean Duration (Month) of Each State by Employment Trajectory Clusters of the Ever-incarcerated Population

Clusters	K12 School	Full-time Employment	Part-time Employment	Out of the Labor Force	Unemployed	Incarceration	Missing
1. Unstable Employment	20.0	59.9	22.8	33.4	21.2	17.4	18.9
2. Early Exit	14.6	25.6	6.4	28.3	6.7	14.0	101.9
3. Prisoner Career	17.3	16.4	10.1	55.5	14.1	67.9	12.9
4. Withdrawn	13.0	14.3	13.6	114.3	14.5	8.6	16.6
5. Stable Employment	19.1	117.9	19.1	14.2	10.2	5.9	10.5

Table 2. Frequency Distribution of Employment Trajectory Clusters of the Ever-incarcerated Population by Race

	Total (%)	White (%)	Black (%)	Other (%)
1. Unstable Employment	308 (48.6)	121 (51.1)	109 (45.0)	78 (50.3)
2. Early Exit	40 (6.3)	15 (6.3)	20 (8.3)	5 (3.2)
3. Prisoner Career	90 (14.2)	13 (5.5)	62 (25.6)	15 (9.7)
4. Withdrawn	42 (6.6)	8 (3.4)	25 (10.3)	9 (5.8)
5. Stable Employment	154 (23.4)	80 (33.8)	26 (10.7)	48 (31.0)
Total	634 (100.0)	237 (100.0)	242 (100.0)	155 (100.0)

Pearson $Chi^2 = 80.7861$ Pr = 0.000

Table 3. Relative Risks to Stable Employment Trajectory (reference cluster) from Multinomial Logistic Regression Predicting Employment Trajectory Clusters for Blacks and Whites.

VARIABLES	Unstable Employment	Early Exit	Prisoner Career	Withdrawn
Black (ref.=white)	3.56***	5.54***	18.29***	5.15***
	(1.18)	(2.85)	(8.69)	(2.88)
AFQT Score Percentile [a]	1.00	0.99	0.99	0.97**
	(0.01)	(0.01)	(0.01)	(0.01)
Less Than High School or GED	3.43***	3.20**	6.29***	4.52***
	(0.94)	(1.47)	(2.55)	(2.31)
Not living with both parents	0.97	0.82	0.75	1.25
	(0.28)	(0.37)	(0.28)	(0.63)
Log Household Income	1.04	1.29	1.16	0.91
	(0.16)	(0.34)	(0.23)	(0.21)
Biological Parent's Education Years	1.02	1.00	1.08	1.07
	(0.08)	(0.13)	(0.12)	(0.15)
Northcentral (ref.=Northeast)	0.97	0.98	0.60	0.37
	(0.40)	(0.64)	(0.34)	(0.29)
West (ref.=Northeast)	1.44	1.36	1.00	0.33
	(0.78)	(1.14)	(0.74)	(0.41)
South (ref.=Northeast)	0.51*	0.48	0.35**	0.51
	(0.20)	(0.30)	(0.18)	(0.32)
MSA (ref.=Rural)	1.25	3.17*	1.98	1.64
	(0.35)	(1.87)	(0.86)	(0.84)
Constant	0.52	0.01*	0.01**	0.18
	(0.88)	(0.02)	(0.02)	(0.48)
Log Likelihood		-576.58		
Pseudo R^2		0.11		
N		479		

Standard Errors (Exponential) in Parenthesis
*** p<0.01, ** p<0.05, * p<0.1

a. AFQT: Armed Forces Qualification Test

Figure 1. Cumulative Percentage Plot of Labor Market States for Individuals with Incarceration History after Age 16 (*N*=634).

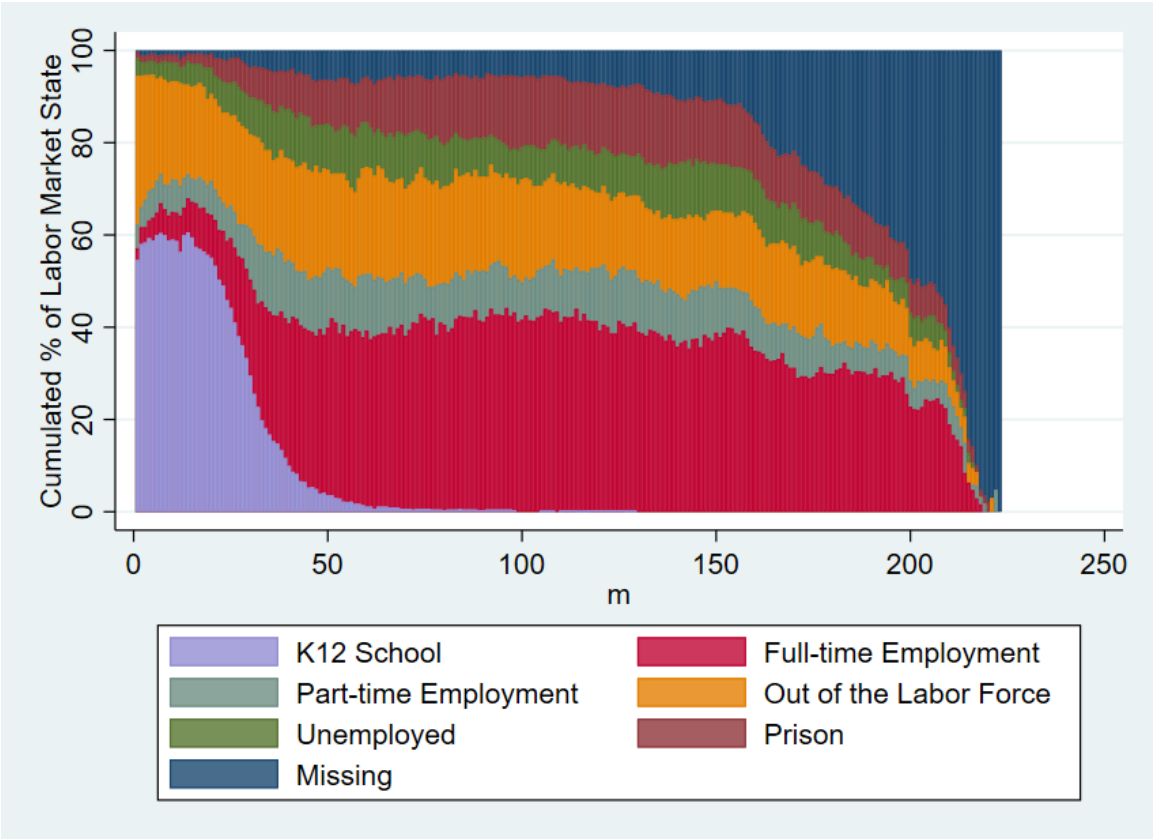
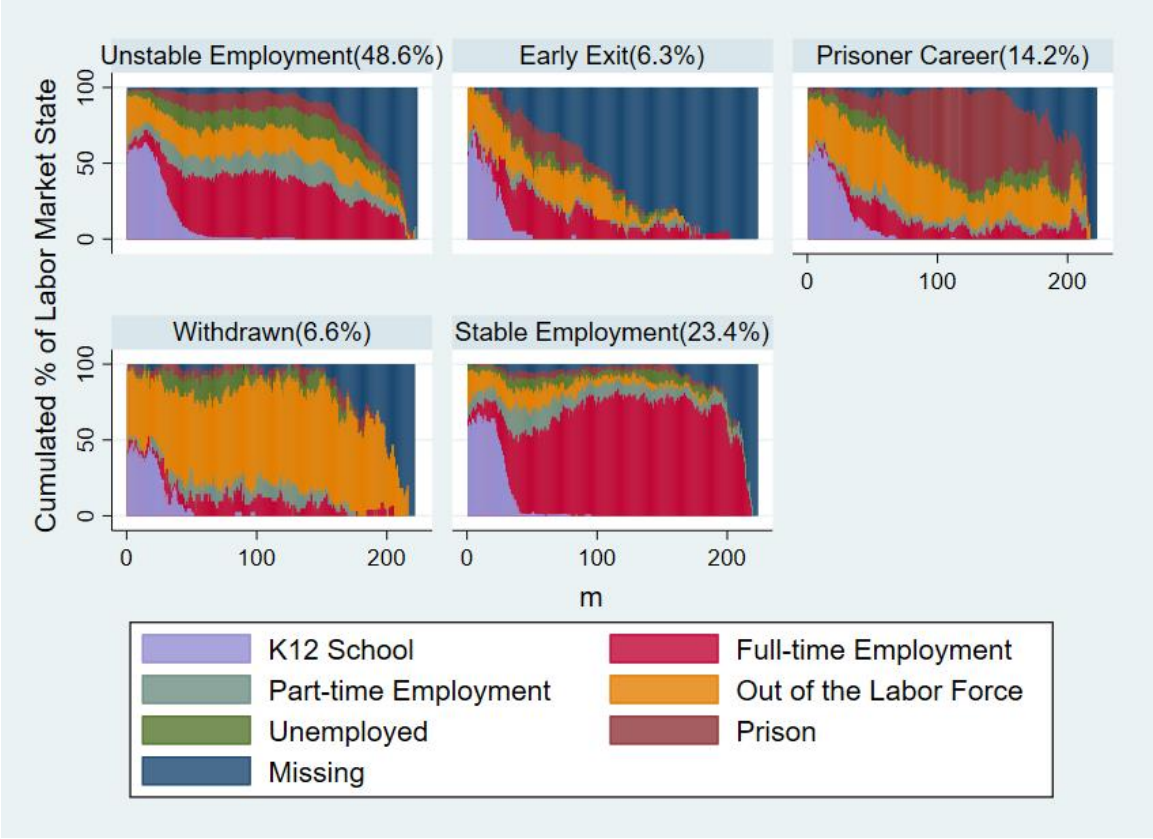


Figure 2. Cumulative Percentage Plot of Labor Market States for Individuals with Incarceration History after Age 16 by 5-cluster Optimal Matching Analysis solution.



APPENDIX

Table A.1. Substitution Cost Matrix (7×7) of Employment States for Individuals with Incarceration History using Optimal Matching Method (Based on Observed Transition Rates with Diagonals Included)

	K12 School	Full-time Employment	Part-time Employment	Out of the Labor Force	Unemployed	Incarceration	Missing
K12 School	-						
Full-time Employment	1.970	-					
Part-time Employment	1.953	1.710	-				
Out of the Labor Force	1.930	1.950	1.902	-			
Unemployed	1.980	1.936	1.907	1.870	-		
Incarceration	1.994	1.968	1.983	1.958	1.980	-	
Missing	1.994	1.988	1.958	1.957	1.961	1.990	-

Table A.2. Frequency Distribution of Employment Trajectory Clusters of the Ever-incarcerated Population by Race (Indel cost fixed at .02, 1/10 of highest substitution cost in Table A.3.1.)

	Total (%)	White (%)	Black (%)	Other (%)
1. Unstable Employment	148 (23.3)	56 (23.6)	43 (17.8)	49 (31.6)
2. Early Exit	68 (10.7)	25 (10.5)	33 (13.6)	10 (6.5)
3. Prisoner Career	183 (28.9)	56 (23.6)	94 (38.3)	33 (21.3)
4. Withdrawn	68 (10.7)	11 (4.6)	44 (18.2)	13 (8.4)
5. Stable Employment	167 (26.3)	89 (37.6)	28 (11.6)	50 (32.3)
Total	634 (100.0)	237 (100.0)	242 (100.0)	155 (100.0)

Pearson $Chi^2 = 80.9375$ Pr = 0.000

Table A.3. Frequency Distribution of Employment Trajectory Clusters of the Ever-incarcerated Population by Race (Indel cost fixed at 1, 1/2 of highest substitution cost in Table A.3.1.)

	Total (%)	White (%)	Black (%)	Other (%)
1. Unstable Employment	240 (37.9)	98 (41.4)	72 (29.8)	70 (45.2)
2. Early Exit	126 (19.9)	41 (17.3)	66 (27.3)	19 (12.3)
3. Prisoner Career	67 (10.6)	12 (5.1)	43 (17.8)	12 (7.7)
4. Withdrawn	65 (10.3)	12 (5.1)	40 (16.5)	13 (8.4)
5. Stable Employment	136 (21.5)	74 (31.2)	21 (8.7)	41 (26.5)
Total	634 (100.0)	237 (100.0)	242 (100.0)	155 (100.0)

Pearson $Chi^2 = 85.7826$ Pr = 0.000

Table A.4. Frequency Distribution of Employment Trajectory Clusters of the Ever-incarcerated Population by Race (Time-Warping Edit Distance, lamda=0.5 and nu=0.04)

	Total (%)	White (%)	Black (%)	Other (%)
1. Unstable Employment	291 (45.9)	113 (47.7)	108 (44.6)	70 (45.2)
2. Early Exit	58 (9.1)	19 (8.0)	23 (9.5)	16 (10.3)
3. Prisoner Career	36 (5.7)	7 (3.0)	23 (9.5)	6 (3.9)
4. Withdrawn	86 (13.6)	13 (5.5)	59 (24.4)	14 (9.0)
5. Stable Employment	163 (25.7)	85 (35.9)	29 (12.0)	49 (31.6)
Total	634 (100.0)	237 (100.0)	242 (100.0)	155 (100.0)

Pearson $Chi^2 = 75.0580$ Pr = 0.000

Figure A.1. Dengrogram for Optimal Matching Cluster Analysis for Individuals with Incarceration History (*N*=634)