Chapter 5

Age and Quality-Graded Effects for Employment and Offending

Abstract

Empirical evidence has indicated that the correlation between employment and offending becomes more negative with maturation and higher employment quality. Yet, little is known about the interaction between these moderating factors in longitudinal settings, where employment can influence offending and offending can influence employment. To empirically investigate the influence of age and employment quality on the bidirectional employment-offending relationship we apply dynamic probit panel data models which allow us to separate statistical aspects such as state dependence, reciprocal effects and unobserved heterogeneity. For a sample of $N = 493$ juvenile sex offenders, who are observed from age 18 until 28, we find significant negative effects for employment on offending and vice versa. This holds for all ages, but the negative effect of employment on offending becomes stronger as sample members age, while the effect of offending on employment decreases in magnitude. The quality of employment, as measured by duration, is found to be an important moderating factor when interacted with age. The strong evidence in favor of bidirectional negative relationships that increases in magnitude with age and employment duration, suggests the importance of general criminological theories that emphasize cumulative (dis)advantage, such as social control theory, in explaining the adult criminal careers of juvenile sex offenders.

*Keywords:* Life course, Panel data, Reciprocal association, Heterogeneity, Moderating effects, Age, Employment quality
5.1 Introduction

Employment is considered important in promoting desistance from criminal activities and enabling reintegration of ex-offenders into society (Bushway, 2011). The association has been emphasized by many theories from different fields of research. And although the proposed mechanisms are different throughout these theories, they all hypothesize a reducing effect of employment on criminal activity (e.g., Uggen & Staff, 2001; Lageson & Uggen, 2013).

Despite the availability of numerous theoretical frameworks, individual-level empirical evidence has shown mixed results for the association between offending and employment. This may be partly attributed to the influence of moderating factors, such as age, which possibly alters the sign and magnitude of relationship between employment and offending (Lageson & Uggen, 2013). The moderating factor does not only generate different empirical results, but also holds important implications for theory testing and development. Specifically for life course theories (e.g., Sampson & Laub, 2003).

Evidence for a moderating influence of age has been established in several empirical studies, for instance in the work of Shover (1996), Uggen (2000) and Paternoster et al. (2003). Most of these studies found the relationship between employment and crime to vary in influence with maturation. For instance, intensive (stable) employment has been found to increase delinquency during adolescence and is associated with a reduction in offending after the transition into adulthood (e.g., Uggen, 2000; Uggen & Wakefield, 2008). Not only age might be moderating the employment-offending association, employment duration might be important as well. Sampson and Laub (1993) assume an increase in social capital can only be achieved by stability in employment (i.e., commitment to employment). Therefore, they perceive employment duration as a measure of employment quality. Several other empirical studies also found evidence for a moderating effect of employment quality rather than the mere status of employment (Uggen & Wakefield, 2008). Yet, what quality entails differs per study. The most commonly used measure of employment quality is stability or duration (e.g., Sampson & Laub, 1993; Crutchfield & Pitchford, 1997; Sampson & Laub, 2003; Verbruggen et al., 2012). Visher et al. (2005) found stable employment to be a critical predictor for a successful reintegration into society. But empirical evidence for other operationaliza-
tions of employment quality has also been found, for instance, for job satisfaction and the long-term prospects of employment (e.g., Uggen, 1999; Van der Geest et al., 2011).

The majority of the studies that investigate the effect of employment on offending – with or without moderating factors – do not simultaneously investigate the reciprocal effect from offending on employment, while empirical evidence has shown that the probability of obtaining employment after contact with the criminal justice system decreases (e.g., Pager, 2003; Apel & Sweeten, 2010; Loeffler, 2013). Moreover, recent work by Mesters, Van der Geest, and Bijleveld (2014) has shown the importance of explicitly modeling both directions of the employment-offending association in a longitudinal setting.

Next to the influence of moderating factors and the bidirectional nature of the employment-offending relationship, several other sample and methodological related aspects can lead to mixed empirical evidence for the employment-offending association. First, different samples may generate different results. For instance, the outcomes of cross-sectional and longitudinal studies showed distinct differences, as well as general population and high-risk samples. Second, selection problems resulting from incomplete information available to the researcher are often addressed by using diverse methods, for example, by applying propensity score matching, fixed effects panel data modeling and instrumental variable regression (e.g., Apel & Sweeten, 2010; Loeffler, 2013).

All in all, the employment-offending relationship is complex, influenced by moderating factors and sensitive to the use of different methodologies. This paper aims to empirically assess the influence of the moderating factors age and employment quality on the bidirectional employment-offending relationship while taking into account selection effects. We simultaneously model the employment and offending variables in a longitudinal setting using a dynamic bivariate probit panel data model which enable us to separate the so-called ‘true structural’ effects from any spurious effects that are caused by selection (e.g., Heckman, 1981a, 1981b). Our model explicitly allows for state dependence\(^1\), reciprocal effects and unobserved heterogeneity (e.g., Thornberry

\(^1\)state dependence is the process of previous criminal delinquent behavior increasing the chances of future criminal behavior due to incarceration and exclusion from society, which reduces the social capital attributed by conventional social bonds (Sampson & Laub, 1993). The same can be assumed for employment, as previous employment will increase chances of future employment, simultaneously increasing social capital.
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& Christenson, 1984; Nagin & Paternoster, 2000). We extend the bivariate panel data model in novel ways to investigate the moderating effects of age and employment quality and the interaction among them.

The sample for which we investigate the moderated bidirectional relationships consists of a large \((N = 493)\) group of juvenile sex offenders who are observed in early adulthood between ages 18 and 28\(^2\). In addition to having committed a sexual offense as a juvenile, the sample can also be seen as vulnerable youths in terms of problematic background characteristics, such as adolescent and childhood deviant behavior, adverse personality and environmental characteristics and low educational levels. These characteristics lead to prolonged criminal activity over the life course and limit employment chances (Moffitt, 1993). Over the years, finding stable employment has become difficult for vulnerable youths, including juvenile sex offenders, since the demand for individuals with a higher educational level has increased (e.g., Arnett, 2004; Osgood, Foster, Flanagan, & Ruth, 2005). Higher education is often not a possibility for vulnerable youths as they may be disadvantaged by learning disabilities, mental health problems, stigmatization from prior offenses, or lack of support from parents or family (Osgood et al., 2005). Therefore, their chances of finding good employment that keeps them from re-offending are limited.

By unraveling the employment-offending association for juvenile sex offenders, we can estimate when and how employment is associated with offending. Such knowledge can be used to design effective policies that promote desistance by creating suitable employment opportunities for juvenile sex offenders.

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\(^2\)The original sample consists of 498 juvenile sex offenders, but due to the nature of the models used in this article 5 individuals could not be taken into account. These individuals emigrated or died before age 19 and were considered loss to follow-up.
5.2 Age- and Quality-Graded Theory and Empirical Evidence for the Relationship between Employment and Offending

5.2.1 Theoretical Background

The link between employment and crime is documented by different theoretical mechanisms. Some theories use an economic point of view to explain the relationship between offending and employment. The underlying framework is the concept of the ‘homo economicus’, or economic man, that views humans as rational beings who weigh the costs and benefits of their behavior out of self-interest and the desire for economic gain (Wadsworth, 2006). Rational choice theories build on this concept by assuming that individuals make decisions whether to employ legal (paid employment) or illegal means (like stealing, robbing etc.) to obtain the desired outcome (e.g., G. S. Becker, 1968; Ehrlich, 1973). Strain theory by Merton (1968) also focuses strongly on utilitarian crimes committed to achieve economic success in society (measured by wealth and material possessions) that cannot be achieved through legitimate means. These theories explain the association between employment and offending by financial aspects that result from time allocation, implying that sufficient wages are the main feature of employment influencing the reducing effect on income-generating crimes.

The use of a framework focused on non-economic gains allows for a broader understanding of the relationship between employment and offending (Wadsworth, 2006). For instance, the routine activities approach states that there is an instantaneous effect of employment on offending, as routine activities change daily time structuring. When an individual is engaged in regular employment, time to engage in criminal opportunities is limited (Cohen & Felson, 1979). In a related fashion, when an individual spends more time at their job, the values, attitudes and behavior of others in the same positions are learned. These values and attitudes associated with the job culture will mostly disapprove of criminal activity (Sutherland & Cressey, 1978). In addition, the supervision of co-workers may have an inhibiting effect on offending (Hirschi, 1969).

Most of the above theories can be positioned in an age-graded framework, indicating the moderating effect of age, where different outcomes for the employment-offending re-
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...relationship are assumed for different age-groups. In such a framework certain aspects of employment that have a reducing effect on offending for adults may have an increasing effect or no effect for adolescents.

For example, adolescents are usually employed in minimum wage jobs with little prospects due to limited schooling, therefore the likelihood of the presence of delinquent co-workers increases (Wright & Cullen, 2000). Therefore, full-time employment may increase criminal activity for adolescents, as they are inclined to learn adult values and attitudes from their older co-workers according to learning theory (Sutherland & Cressey, 1978). These behaviors can be positive when the co-workers exhibit conventional behavior. However, less conventional co-workers may introduce the adolescents to deviant behavior, increasing the chances of delinquent behavior (Wright & Cullen, 2000). Also, social control becomes limited as adolescents spend more time away from parents and school when employed. Moreover, due to increased monetary abilities, adolescents are able to spend unstructured time with peers in pubs, clubs and other settings associated with deviance. Adults, however, will be more inclined to use the economic gains of employment to support their family instead of spending it on unstructured time with peers.

Sampson and Laub (1993) also postulate such an age-graded effect as they use a life course developmental perspective that focuses on the changes in relevant institutions of social control that vary by age. For instance, social bonds with family, school and peers are important for the adolescence period. When the value that these social bonds hold for an individual exceeds the costs of offending (e.g., losing friends), delinquency will become less attractive. Sampson and Laub (1993) named this value social capital; the importance that the ties to society hold for the individual. After adolescence, a period of preparation for adulthood follows. This so-called emerging adulthood ranges from about age 18 up to 25 and is characterized by exploration with limited parental control, and with the aim of establishing a unique personal identity (Arnett, 2004). In this period a shift occurs in relevant institutions of social control, from family, school and peers to more prominent bonds with partners and co-workers. For employment, Arnett (2004) argues that in the early stages of emerging adulthood the individuals will experience job instability (e.g., short and temporary employment) while they are still exploring their options. Yet, in the later stages of emerging adulthood employment explorations become more serious and enduring, since stakes will be higher as stable
employment is needed as a foundation for adult life (Arnett, 2004). Overall, several theories state that the nature of employment changes with the coming of age and its effect on delinquency may thus vary per age period or even year. Implicitly the above theories also hypothesize a moderating effect of employment duration when interacted with age. With maturation the importance of stable employment becomes more clear and as stated by Arnett (2004) is needed as a foundation for adult life. Moreover, Sampson and Laub (1993, 2005) view the accumulation of human and social capital as a gradual and cumulative process. Therefore, over time social capital obtained by stable employment will increase due to the accumulating bond to conventional society. This bond will enhance the possibilities for the individual to knife-off the (delinquent) past, engage in routine activities, invest in new relationships that foster social support causing direct or indirect supervision and control, and to allow identity change (Sampson & Laub, 2005, p. 34).

All of the above theories view employment as a social process that has the ability to reduce offending over time. However, many theories suggest that offending also impacts employment. Hirschi (1969) states that prior offending can weaken social bonds which may prevent individuals from future employment. Sampson and Laub (1997) also suggest the weakening of conventional bonds to society by the gradual process of cumulative disadvantage and state dependence. Sampson and Laub (1993) identify cumulative disadvantage as the dynamic process of childhood antisocial behavior and adolescent delinquency as a possible cause of adult crime that limits individuals from obtaining adult social bonds. The process of state dependence postulates that delinquent behavior has a causal effect on future delinquent behavior by reducing social capital attributed by conventional social bonds, due to incarceration as well as exclusion form society after incarceration (Sampson & Laub, 1993). Moreover, criminal behavior, and interaction with the criminal justice system, labels an individual as an offender, tainting the individuals’ self-image and public identity which in turn affects future life outcomes (Nagin & Paternoster, 1991). H. S. Becker (1963) underlines that the label of offender will reduce associations with non-delinquent peers, conventional institutions and roles. All in all, individuals who have been incarcerated or received other types of punishment may experience problems in obtaining legal employment.

In sum, the relationship between offending and employment is likely bidirectional and moderated by age and employment duration. While many different mechanisms
have been hypothesized to apply to the relationship between employment and criminal activity, it remains unclear how both moderating factors simultaneously influence the bidirectional employment-offending association.

5.2.2 Empirical Evidence

The empirical findings for the association between employment and offending are mixed. A large proportion of the studies is cross-sectional and can therefore not examine within-individual differences (Uggen & Wakefield, 2008). Longitudinal studies that use careful control methods in an attempt to deduce causality have found a reducing effect of employment on criminal activity for various samples (e.g., Sampson & Laub, 1993, 2003; Crutchfield & Pitchford, 1997; Savolainen, 2009; Uggen, 2000; Wadsworth, 2006; Van der Geest et al., 2011).

Some studies found the effect of employment on offending to be dependent on age. For instance, Uggen (2000) analyzed data from an experimental employment project and found that in the age group of 27 and over, recidivism rates were significantly lower when employed than when not employed. For teenagers, Wright and Cullen (2000) found evidence suggesting that during employment spells, offending may actually increase. Using the National Longitudinal Survey of Youth (NLSY) several studies looked into the effect of (intensive) employment (e.g., Apel et al., 2006, 2007; Apel, Bushway, Paternoster, Brame, & Sweeten, 2008; Paternoster et al., 2003; Wright, Cullen, & Williams, 2002). Paternoster et al. (2003) found mixed results for the relationship between intensive employment and criminal behavior in adolescents, dependent on the statistical method used. A first analysis showed a significantly reinforcing relationship between intensive employment and crime. However, a second more sophisticated analysis found no significant effect. Apel et al. (2007) also found no effect and Apel et al. (2008) found limited evidence for a reducing effect of employment on offending in adulthood. Therefore, these authors conclude that the association of employment and offending differs for adults and adolescents. Staff and Uggen (2003) emphasize this, as they find that certain aspects of employment which are deemed important for adults (status, wages etc.) seem to increase delinquency in adolescence.

Furthermore, Skardhamar and Savolainen (2014) highlight the moderating effect of age as they pose that employment is a consequence of natural desistance which occurs
with maturation over time, rather than a cause of desistance.

Employment quality has also been used in many studies as a measure of employment. However, the conceptualization of employment quality varies over studies. In their theory Sampson and Laub (1993) hypothesized that the quality of social bonds (e.g., employment) is important in generating social capital. They assume that employment alone does not increase social capital, but that this will only be achieved by stability in employment (and therefore commitment).

For this reason, they used employment stability as a measure of employment quality in their initial empirical work. The findings supported their theory as their measure of employment quality was found important in predicting desistance (Sampson & Laub, 1993). In their later work Sampson and Laub (1993) collected life history narratives from 52 men in the Glueck sample. The findings again supported the assumption that stable employment is a salient life-event that may lead to desistance. Crutchfield and Pitchford (1997) also found that the time spent being employed (duration) significantly reduced offending. However, some studies using stability or duration as a measure of employment found no effect on offending (e.g., Giordano et al., 2002; Piquero et al., 2002).

Another operationalization of employment quality uses scales composed of several constructs like job satisfaction and future perspectives. Wadsworth (2006) used both employment stability and an employment quality scale as measures of employment. In this study no evidence was found for a possible effect of employment stability on offending. However, the employment quality scale (consisting of a subjective interpretation by the respondent about his/her employment) did have a significant negative effect on offending. Van der Geest et al. (2011) used both measures (quality as reflected by the kind of employment - i.e., with an employer or through a temporary job agency - and by stability) in their study of high-risk offenders. The results were similar: employment stability did not have any effect on criminal behavior (possibly the high-risk offenders very rarely had stable jobs) but employment quality did significantly reduce offending.

For the reverse effect of offending on employment a large body of literature has documented difficulties of obtaining legal employment after criminal behavior, particularly after detention (e.g., Pager, 2003, 2007; Pager, Western, & Bonikowski, 2009; Apel & Sweeten, 2010; Raphael, 2011; Loeffler, 2013). The majority of studies focus on the consequences of incarceration rather than convictions and a variety of methods
are used. Pager (2003) and Pager et al. (2009) use field experiments and find that the mark of a criminal record significantly decreases the probability of getting a job. Apel and Sweeten (2010) and Loeffler (2013) use registered data and advanced statistical methods, such as propensity score matching and instrumental variables regression, to show that a substantial part of the negative relationship might be spurious.

Overall, the empirical evidence for the association of various aspects of employment and offending is mixed. This is largely attributable to the moderating influences of age and employment quality, as well as the differences in statistical methods and samples.

5.3 Juvenile Sex Offenders and the Labor Market

The theoretical mechanisms by which employment may reduce offending do not exclude sex offenders. Yet, specific theory for the development over the life course for juvenile sex offenders is currently not available. Therefore it is difficult to formulate specific hypothesis for the employment-crime association for juvenile sex offenders. Despite the absence of tailored theory, previous empirical studies found juvenile sex offenders to resemble general offender populations: a decreasing effect of employment on crime was found. This evidence, which is discussed in detail below, should be seen in the context of the legal position of sex offenders, which is different with respect to other offenders. Since 2004, all sex offenders in the Netherlands, the country where this study took place, are excluded from specific types of employment in which they might be able to spend unsupervised time with children or individuals dependent on their care. A broad range of occupations are included under this rule, for instance taxi- or bus drivers, caregiver jobs, babysitters and janitors at schools. For the above reason the employment opportunities for sex offenders are limited. Therefore, they might experience more difficulties in obtaining stable employment than other (ex-) offenders. These limitations make them an interesting group to study, because if employment is found to reduce the offending probability in juvenile sex offenders, reducing employment opportunities for sex-offenders might not be an advisable policy.

Empirically, only a few studies investigated the extent to which employment reduces offending in sex offenders. The studies that were conducted emphasized the importance of stable employment; we are not aware of any studies that have focused on the age-graded effect of the employment-crime association in sex offenders. Kruttschnitt et
al. (2000) found sex offender treatment and stable employment to be the only aspects related to reduced general recidivism rates in a sample of male adult sex offenders. Another study by Hanson and Harris (1998) found that the sex offenders with the highest reoffense risk were those who lacked stable employment. Within clinical practice the importance of employment is also acknowledged as a rehabilitative factor. The Good Lives Model assumes that sex offenders require certain ‘primary goods’ like excellence in employment, that can enhance psychological well-being and reduce offending (Laws & Ward, 2011). However, empirical support for the Good Lives Model is scarce and practitioners use it mainly as a framework that gives an overview of treatment options (Fortune et al., 2012).

We are aware of only one study that explicitly looked into the relationship between employment and offending for juvenile sex offenders. Van den Berg et al. (2014) studied a large sample of juvenile sex offenders over a long period from adolescence to young adulthood (age 18 up to 28). They found juvenile sex offenders to start off on the labor market early, but with the coming of age the employment rate stagnates and even declines after age 27. They explain this phenomenon by the fractured employment careers with many short contracts and different job types (regular employment and employment through an employment agency), but also the lack of schooling and unappealing personal characteristics (lacking social skills, low IQ, psychological problems). However, Van den Berg et al. (2014) did find a significant reducing effect of regular employment on offending. This finding raises many questions about the mechanisms behind the relationship of employment and offending. Although the sample of juvenile sex offenders faced many (legal) barriers in the obtaining of stable and qualitative employment, and the findings from the study by Van den Berg et al. (2014) highlighted low quality and instability of the employment, employment still significantly reduced general offending.

5.4 The Current Study

The focus of our empirical study is on the bidirectional nature of the employment-offending association and the influence of age and employment duration. Specifically we address the following research question:
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To what extent is the bidirectional structural relationship between employment and offending influenced by age and employment duration?

To answer the research question we will explore the employment-offending association in three steps. First, the theoretical and empirical evidence indicates that we need to distinguish between three “paths” that can cause correlation between employment and crime: (i) a structural effect from employment on offending, (ii) a structural effect from offending on employment and (iii) a spurious relationship between employment and offending. The third path stems from other variables that influence both employment and offending, i.e., spurious (selection) effects. In order to disentangle the structural effects from the spurious effects we model both the employment and offending outcomes using a dynamic bivariate probit panel data model. A more detailed discussion of the general model is given below. The results from this first step are not moderated by age and employment duration, but serve as a benchmark to guide the further disentangling of the employment-offending association.

Second, we investigate how the employment-offending association is moderated by age. Theoretically, a variety of mechanisms have been proposed that all suggest that the effect of employment on offending becomes more negative with maturation. Less theory is available for the moderating influence of age for the effect of offending on employment. The moderating influence of age is investigated by modeling the structural model parameters as time-varying processes. Hereby we establish how age influences the effect of employment on offending and the effect of offending on employment.

Finally, we combine employment duration and age influences to study how they affect the structural bidirectional employment-offending association simultaneously. We focus on the stability of employment following the theory of Sampson and Laub (1993). This theory assumes that when a person is employed for most of the year, commitment to other individuals, institutions and more generally investments in social capital will increase and form a barrier to further offending. Following empirical and theoretical accounts, the effect of stable employment is hypothesized to grow stronger over time.
5.5 Data and Analytical Strategy

5.5.1 Sample

The research group consists of 493 juvenile sex offenders who committed a sexual offense between 1988 and 2001. Their age at the selection offense ranged from 10 to 17 years, with an average of 14.4 years ($SD = 1.8$). The selection offense consisted of at least one conviction for a contact sexual offense (where physical contact between offender and victim occurred) ranging from sexual assault to rape. During the sampling offense all perpetrators had an active role. About 16% of the sample committed the offense with at least one co-offender, the remaining 84% were solo offenders. In 2009 and 2010 information was collected from register records about offending, employment and personal life circumstances (marriage and parenthood). The mean follow-up time by then was 14 years, as the sample members were between age 18 and 40 with an average of 28.7 years ($SD = 3.9$). Before the end of the observation period, seven persons had died and fourteen emigrated (according to the Dutch Municipal Personal Records Database).

Previous research found a high prevalence for psychological and psychiatric disorders in sex offenders (e.g., Seto & Lalumière, 2010; Smallbone, 2006; Van Wijk et al., 2005). Moreover, (juvenile) sex offenders were found to be socially isolated, as their social skills were less developed causing difficulties in their social functioning within society (e.g., Seto & Lalumière, 2010; Van Wijk et al., 2005). For the current sample we found similar adverse background characteristics. About half of the sample members have been diagnosed with a psychiatric or psychological disorder. 80% had limited social interaction with peers and 81% had low self-esteem. Moreover, the sample is characterized as, on average, highly neurotic and introvert.

All in all, the current sample of juvenile sex offenders strike as vulnerable and at high-risk of continued offending, with profiles comparable to high-risk juveniles in other studies (e.g., Verbruggen et al., 2012; Van der Geest et al., 2011). Furthermore, Van den Berg et al. (2011) showed that not only the profiles of the juvenile sex offenders are comparable, but that also their criminal career are similar to those of other high-risk juvenile samples.
5.5.2 Register Data

Three sources of register data were used: judicial documentation, municipal marriage and parenthood registrations, and centralized employment records. The offending data originates from the Judicial Documentation (JD) registered at the Judicial Documentation Center in Almelo. The JD can be considered as a ‘rap sheet’ and contains all offenses registered for prosecution in the Netherlands, regardless of the verdict. The offenses in the JD are registered by date of perpetration, offense committed (coded according to the Dutch Criminal Code [Wetboek van Strafrecht]), conviction date and sentence.

For this study all offenses for which the sample member was acquitted or when prosecution dropped the case on ‘technical grounds’ (mainly when the case was expected to end in acquittal). For our dependent variable offending, a dichotomous variable (1 = one or more offenses, 0 = no offenses) per age year for each individual is used. This variable contained the following offense categories (as defined by Statistics Netherlands (CBS, 2010)): sexual offending, (non-sexual) violent offending, property offending and other offending (consisting mainly of drug offenses and offenses as described in the Dutch law on weapons and ammunition). The offending data is complete for all sample members from age 12 up to the end of the data collection. However, for the analysis we used age 18 to 28, since we are interested in the effect of employment on offending and our employment data is complete from age 18 and onward. The Dutch Ministry of Security and Justice granted permission for the use of this data.

All information on employment was obtained from the database ‘SUWINET’ of the Ministry of Social Affairs and Employment in the Netherlands and from the trade register of the Netherlands Chamber of Commerce [Kamer van Koophandel]. The first data source holds individual level information on employment by an employer, by an employment agency and social benefits. In order to use the employment data from this source in our analysis, the number of days employed was calculated from the start to end date of an employment contract. The second data source refers to business ownership information, and registration and termination date of the business were used to compose the employment variable. Combining the two data sources we constructed a variable that counts the number of days per year an employment contract(s) spanned. We included employment when a sample member had regular
employment with an employer, was a business owner, was employed through sheltered workshops for the (mentally) disabled, or employed through a temporary employment agency. Permission for the use of this data was granted by the Ministry of Social Affairs and Employment.

In our analysis we used several control variables measured at the individual level. The control variables are exposure (percentage of time out of prison per year), marriage and parenthood. These variables are all dynamic variables and may lead to changes in offending (Sampson & Laub, 1993; e.g., for marriage and divorce: Bersani & Laub, 2009; Stolzenberg & D’Alessio, 2007). Exposure will influence offending since in our sample not all individuals have served time in prison: for the sample members who were in prison their time at risk or exposure time to re-offend will be shorter than for the never incarcerated sample members (e.g., Nagin, Cullen, & Jonson, 2009). By including marriage and parenthood we control for their influence on the relationship between offending and employment.

Aside from to the individual control variables, we also include several statistical control variables. In particular, we include individual-specific effects that capture time-invariant differences between the individuals. Second, we include age-specific dummies which capture the common age-specific effects.

5.5.3 Analytical Strategy

Next, we discuss the dynamic bivariate probit panel data model that facilitates the modeling of the employment and offending outcomes. Let each individual be indexed by \( i \), for \( i = 1, \ldots, N \), with \( N = 493 \). In each age period \( t \), for \( t = 18, \ldots, 28 \), the individuals make a decision whether or not to participate in legal employment and whether or not to commit a crime. We code the outcome variables as \( y_{i,t}^e = 1 \) if individual \( i \) is employed in year \( t \), and 0 else. Initially, we use the threshold of 90 days to select an individual into the employment category. This is in accordance with other studies that have used 90 days employment a year as a cut-off point in order to establish if the employment was ‘serious’ (e.g., Verbruggen et al., 2012; Van der Geest et al., 2011; Van den Berg et al., 2014). Later on we vary this threshold to study the influence of employment duration.

Also, we define \( y_{i,t}^o = 1 \) if individual \( i \) commits at least one offense in year \( t \), and 0
else. Following Durlauf, Navarro, and Rivers (2010) we link the outcome variables to the net-expected utilities via

\[ y_{i,t}^e = 1 \text{ if } v_{i,t}^e > 0 \quad \text{and} \quad y_{i,t}^o = 1 \text{ if } v_{i,t}^o > 0, \]

where \( v_{i,t}^e \) is the unobserved net-expected utility that is derived from employment and \( v_{i,t}^o \) is the unobserved net-expected utility that is derived from offending. The net-expected employment utility is defined as \( v_{i,t}^e = u_{i,t}^e(1) - u_{i,t}^e(0) \), where \( u_{i,t}^e(1) \) is the expected utility from employment, \( y_{i,t}^e = 1 \), and \( u_{i,t}^e(0) \) is the expected utility from unemployment \( y_{i,t}^e = 0 \). Similarly, the net-expected utility of offending is defined as \( v_{i,t}^o = u_{i,t}^o(1) - u_{i,t}^o(0) \). The interpretation is simple: within this framework individual \( i \) commits an offense in time period \( t \) if and only if \( v_{i,t}^o > 0 \). Thus, if the net-expected utility is greater than zero. Also, individual \( i \) has legal employment if and only if \( v_{i,t}^e > 0 \).

Framework (5.1) allows the individuals to commit offenses and in the same time period participate in the legal employment sector, since \( v_{i,t}^e \) and \( v_{i,t}^o \) can both be greater than zero. A dynamic linear model for the net-expected utility terms is given by

\[ v_{i,t}^e = \gamma_{ee} y_{i,t-1}^e + \gamma_{eo} y_{i,t-1}^o + x_{i,t}^e \beta^e + \mu_i^e + \epsilon_{i,t}^e, \]

and

\[ v_{i,t}^o = \gamma_{oe} y_{i,t-1}^e + \gamma_{oo} y_{i,t-1}^o + x_{i,t}^o \beta^o + \mu_i^o + \epsilon_{i,t}^o, \]

where \( \gamma_{ee}, \gamma_{eo}, \gamma_{oe} \) and \( \gamma_{oo} \) are the structural model parameters, \( x_{i,t}^e \) and \( x_{i,t}^o \) are vectors of observed control variables that include marriage, parenthood and exposure, \( \beta^e \) and \( \beta^o \) are parameter vectors, \( \mu_i^e \) and \( \mu_i^o \) are unobserved individual-specific effects and finally \( \epsilon_{i,t}^e \) and \( \epsilon_{i,t}^o \) are the disturbance terms. The level shifting parameters \( \gamma \) capture the structural effects from offending and employment.

In particular, the parameters \( \gamma_{ee} \) and \( \gamma_{eo} \) capture the effects of being employed and offending in the previous year on the current net employment utility.
parameters $\gamma^{ae}$ and $\gamma^{ao}$ capture the effects of being employed and of offending in the previous year on the current net offending utility.

The observed and unobserved spurious effects that are captured by the $x_{i,t}$, $v_{i}$ and $\epsilon_{i,t}$. For the initialization of (5.2) and (5.3) we follow Wooldridge (2005). In particular, the random individual-specific effects $\mu_j^i$ and $\mu_j^o$ are likely to be correlated with the initial observations ($y_{i,0}^e$ and $y_{i,0}^o$) and the control variables ($x_{i,t}^e$ and $x_{i,t}^o$). To capture these correlations we specify

$$\mu_j^i = \delta_0^j + \sum_{s=1}^T \delta_s^j x_{i,s}^j + \lambda_1^j y_{i,0}^e + \lambda_2^j y_{i,0}^o + v_j^i,$$

for $j = e, o$, where $\delta_0^j$ captures the common mean, $\delta_s^j$ captures the correlation between $\mu_j^i$ and $x_{i,s}^j$, for $s = 1, \ldots, T$, $\lambda_1^j$ and $\lambda_2^j$ capture the correlation between $\mu_j^i$ and the initial observations and $v_j^i$ is the random individual-specific effect, which is considered uncorrelated with the initial observations and the explanatory variables. The disturbance terms $v_i = (v_i^e, v_i^o)'$ and $\epsilon_{i,t} = (\epsilon_{i,t}^e, \epsilon_{i,t}^o)'$ are modeled by

$$v_i \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_v^e & \rho_v \\ \rho_v & \sigma_v^o \end{bmatrix}\right)$$

and

$$\epsilon_{i,t} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho_\epsilon \\ \rho_\epsilon & 1 \end{bmatrix}\right),$$

where the off-diagonal elements $\rho_v$ and $\rho_\epsilon$ capture the magnitude of the spurious correlation between the employment and crime equations. In particular, $\rho_v$ captures the time-invariant correlation between the unobserved parts of the employment and offending utilities and $\rho_\epsilon$ captures the contemporaneous correlation between the unobserved parts of the utilities. The diagonal elements of the variance matrix of $\epsilon_{i,t}$ are normalized for identification purposes. The estimation of the model parameters is performed by Monte Carlo maximum likelihood methods.

The approach is based on the estimation method that is proposed in Mesters and Koopman (2014). The technical appendix accompanying this paper can be found online at: www.geertmesters.nl, it provides a detailed discussion of the implementation for the bivariate probit panel data model. We extend the basic dynamic bivariate probit panel model in several ways. First, we investigate the moderating effects of age on the structural employment-offending association by considering the parameters $\gamma$ as
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time-varying processes. In other words, we change $\gamma^{ee}$, $\gamma^{eo}$, $\gamma^{oe}$ and $\gamma^{oo}$ into $\gamma^{ee}_t$, $\gamma^{eo}_t$, $\gamma^{oe}_t$ and $\gamma^{oo}_t$, for $t = 18, \ldots, 28$. Since it is likely that the effect of the $\gamma$ parameters varies over age in a smooth way, we model the dependence between the parameters using smooth splines (Poirier, 1976). In particular, for each parameter $\gamma_t$ we select ages 18, 24 and 28 as the knots of a cubic spline and estimate the location of these knots along with the other parameters. This provides a flexible and parsimonious way for modeling time-varying parameters.

Finally, we combine the analysis for the age-grading with different durations for the employment variable. This gives us insight in the simultaneous moderation of age and employment duration for the structural part of the employment-offending association. In particular, we change $y^{e,k}_{i,t} \rightarrow y^{e,k}_{i,t}$, where $k$ denotes the indicator such that $y^{e,k}_{i,t} = 1$ if individual $i$ was employed for at least $k$ days during age $t$. In the basic model we consider $k = 90$, but this choice is arbitrary and may influence the outcomes. To investigate this, we estimate the bivariate probit panel data model for all choices $y^{e,k}_{i,t}$ where $k = 10, 30, 50, \ldots, 350$.

5.6 Results

The results are discussed in four separate sections. First, we show descriptive statistics for the employment and offending variables. Second, the parameter estimates for the bivariate model are discussed for the full sample of observations. These estimates provide the overall disentanglement of the correlation into the structural and the spurious parts. Third, the moderating influence of age on the bidirectional structural relationships is investigated. And finally, the age- and duration-graded effects are combined to study the interaction between them.

5.6.1 Descriptive Statistics

About 10% (51 individuals) of the sample were never (legally) employed during the follow-up period. The remainder of the sample had at least one employment spell between age 18 and 28. Figure 5.1 shows the distributions for the average number of days an individual had an employment contract or multiple thereof between age 18 and 28 (panel (i)). A lot of variation is found for the average number of days individuals are
employed. The bars close to zero indicate that a considerable number of individuals are unemployed or had short employment contracts for most of the follow-up years. There are also some individuals who have stable employment contracts throughout the follow-up period. The overall average is 192 days of employment (contracts) a year.

In panel (ii) of Figure 5.1 we show the distribution of the total number of years the individuals committed at least one offense. A substantial part of our sample (50.1%) never commits an offense between the ages 18 and 28. With the increase in age the number of offenses shows an exponential decay, indicating that the sample contains few persistent offenders. Only 24 individuals within the sample have a criminal career of at least 5 years. At age 18 about 20% of the sample is criminally active, with maturation this percentage gradually declines to only 7% of the sample at age 28. The correlation between a minimum of 90 days of employment a year and offending prevalence is, over all ages and individuals, -0.192.

5.6.2 Bivariate Probit Panel Data Model Results

Next, we separate the overall correlation between employment and offending into a structural and a spurious part by using the bivariate panel data model. All sample members and observations are used to estimate the model parameters ($N = 493$ individuals and time periods $t = 18, \ldots, 28$). Again, the value of the employment variable is equal to 1 if an individual was employed for more than 90 days during an age year.

Table 5.1 shows the parameter estimates for the bivariate probit panel data model for both the employment and offending equations. The structural parameters for the employment equation indicate that employment is ‘persistent’: when a person is employed in one year the chances of employment in the next year are significantly increased ($\gamma_{ee} = 1.541$). The structural parameter for the effect of previous offending on employment ($\gamma_{eo}$) is negative and significant with magnitude -0.235, implying that offending lowers the chances of subsequent employment. The structural parameters for the offending equation indicate that offending is positively influenced by prior offending ($\gamma_{oo} = 0.349$). This is in accordance with several theoretical studies that indicate a positive effect of prior offending on future offending (Nagin & Paternoster, 2000). Employment has a negative influence on offending ($\gamma_{oe} = -0.193$). Thus, offending significantly lowers employment and employment significantly lowers offending.
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Figure 5.1. Empirical distributions of dependent variables. Panel (i): distributions over the individuals for the average number of days that an individual had an employment contract per year. Panel (ii): the number of years that an individual committed at least one offense. The sample includes $N = 493$ individuals and 11 time periods ($t = 18, \ldots, 28$).

This indicates that univariate models for the current sample of juvenile sex offenders would indeed be less appropriate (Alessie, Hochguertel, & Van Soest, 2004), as they would not reveal the structural bidirectional nature of the employment-offending association.

In addition to the structural relationships, the parameter estimates for the distributions of the random effects $\mu_i$ and $\epsilon_{i,t}$ indicate that substantial spurious correlation exists between the employment and offending outcomes: both correlations $\rho_v$ and $\rho_e$ are negative and significant. The time-invariant correlation is -0.122 and the contemporaneous correlation between employment and offending is -0.147. Further, the $\lambda$ coefficients indicate that there exists correlation between the initial observations for age 18 and the individual-specific effects $\mu_i$. Therefore, we conclude that both structural and spurious relationships determine the overall correlation between employment
and offending.

The control variables for the employment equation show that marriage and exposure both increase the utility of employment. For parenthood a small negative effect is found. This indicates that life-events do influence each other and should be studied in combination (see; Shanahan, 2000). The fact that exposure increases the utility of employment is as expected since imprisonment interrupts life course transitions and therefore will arguably have a negative influence on employment opportunities (Apel & Sweeten, 2010). Periods without or with little incarceration will therefore positively influence the employment utility. The control variables for the offending equation indicate that marriage has a small negative effect on the offending utility. This is in accordance with several empirical studies which found marriage to reduce the offending probability (Bersani & Laub, 2009). Exposure has a negative effect on the offending utility, while parenthood has a positive effect.

Overall the model separates structural effects from spurious correlations in a panel data setting. The model also distinguished the two different structural relationships. It showed that both structural effects (offending on employment and employment on offending) are negative and significant, indicating that the association between offending and employment is indeed reciprocal.

\[ \gamma_{ee}^{t} \] (checkered), \( \gamma_{eo}^{t} \) (circles), \( \gamma_{oe}^{t} \) (triangles) and \( \gamma_{oo}^{t} \) (squares), for \( t = 18, \ldots, 27 \).

The estimates show that employment remains strongly dependent on previous employment outcomes for all ages (checkered line). The effect increases slightly with age starting at 1.429 for age 18 and ending at 1.664 for age 27. Interestingly, the structural effect of employment on offending switches in sign. For the young ages (18, 19) there is a small positive effect (0.122, 0.049) of employment on offending. For the older ages it

5.6.3 The Moderating Influence of Age

Using the probit panel data model with time-varying structural parameters, this section focuses on studying the moderating influence of age on the employment-offending association. In particular, the structural parameters are modeled using flexible cubic spline functions such that the effects are allowed to vary smoothly with age.

In Figure 5.2 we show all four estimated structural time-varying parameter paths: \( \gamma_{ee}^{t} \) (checkered), \( \gamma_{eo}^{t} \) (circles), \( \gamma_{oe}^{t} \) (triangles) and \( \gamma_{oo}^{t} \) (squares), for \( t = 18, \ldots, 27 \).

The estimates show that employment remains strongly dependent on previous employment outcomes for all ages (checkered line). The effect increases slightly with age starting at 1.429 for age 18 and ending at 1.664 for age 27. Interestingly, the structural effect of employment on offending switches in sign. For the young ages (18, 19) there is a small positive effect (0.122, 0.049) of employment on offending. For the older ages it
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Table 5.1.
Baseline Parameter Estimation Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter</th>
<th>Employment ($y_{i,t}^{e,90}$)</th>
<th>Offending ($y_{i,t}^{o,90}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural estimates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State dependence employment</td>
<td>$\gamma_{ee}$</td>
<td>1.541* $0.068$</td>
<td>-</td>
</tr>
<tr>
<td>Effect offending on employment</td>
<td>$\gamma_{eo}$</td>
<td>-0.235* $0.096$</td>
<td>-</td>
</tr>
<tr>
<td>Effect employment on offending</td>
<td>$\gamma_{oe}$</td>
<td>-</td>
<td>-0.193* $0.089$</td>
</tr>
<tr>
<td>State dependence offending</td>
<td>$\gamma_{oo}$</td>
<td>-</td>
<td>0.349* $0.088$</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage</td>
<td>$\beta_1$</td>
<td>0.382* $0.161$</td>
<td>-0.062* $0.182$</td>
</tr>
<tr>
<td>Parenthood</td>
<td>$\beta_2$</td>
<td>-0.005* $0.080$</td>
<td>0.119* $0.085$</td>
</tr>
<tr>
<td>Exposure</td>
<td>$\beta_3$</td>
<td>3.534* $0.406$</td>
<td>-2.178* $0.237$</td>
</tr>
<tr>
<td><strong>Random effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean employment</td>
<td>$\delta^e_0$</td>
<td>-4.233* $0.404$</td>
<td></td>
</tr>
<tr>
<td>Mean offending</td>
<td>$\delta^o_0$</td>
<td></td>
<td>0.744* $0.239$</td>
</tr>
<tr>
<td>Corr init obs. (e on o)</td>
<td>$\lambda^e_1$</td>
<td>-0.134* $0.091$</td>
<td></td>
</tr>
<tr>
<td>Corr init obs. (o on o)</td>
<td>$\lambda^o_1$</td>
<td>0.363* $0.087$</td>
<td></td>
</tr>
<tr>
<td>Corr init obs. (e on e)</td>
<td>$\lambda^e_2$</td>
<td></td>
<td>0.339* $0.100$</td>
</tr>
<tr>
<td>Corr init obs. (o on e)</td>
<td>$\lambda^o_2$</td>
<td></td>
<td>-0.222* $0.097$</td>
</tr>
<tr>
<td>Variance employment</td>
<td>$\sigma^e_v$</td>
<td>0.246* $0.060$</td>
<td></td>
</tr>
<tr>
<td>Variance offending</td>
<td>$\sigma^o_v$</td>
<td></td>
<td>0.264* $0.065$</td>
</tr>
<tr>
<td>Time-invariant corr</td>
<td>$\rho_e$</td>
<td>-0.122* $0.042$</td>
<td></td>
</tr>
<tr>
<td>Contemporaneous corr</td>
<td>$\rho_o$</td>
<td>-0.147* $0.052$</td>
<td></td>
</tr>
</tbody>
</table>

*Note. The sample includes $N = 493$ individuals and 11 time periods ($t = 18, \ldots, 28$).
The standard errors are displayed in subscript.
The notation: “Corr init obs”, refers to the correlation between the individual specific effect from either employment or offending and the initial observations from employment or offending.
The parameter estimates $\delta^j_s$, for $j = e, o$ and $s = 18, \ldots, 28$ are not shown as they are not of interest for our research question.
*p < 0.05.
becomes strongly negative (e.g., -0.543 for age 27), indicating that being employed the previous year has a stronger reducing effect on the offending utility for the individuals in the last stages of emerging adulthood than for the younger emerging adults.

Persistence in offending decreased with maturation. In the previous analysis the average effect over all ages was 0.349, suggesting that previous offending increases the likelihood of further offending. However, when we allow the effect to vary over age, we find that this persistence is due to the effects at younger ages. Over time, the influence of prior offending in fact becomes smaller over age: the value of the parameter is 0.443 for age 18 and ends with 0.111 for age 27. This decreasing trend illustrates how the juveniles sex offenders age out of crime.

At the older ages the structural effect of offending on employment decreases in magnitude. Moreover, previous offending has little effect on employment as the estimates are statistically indistinguishable from zero. This is unexpected since one would assume that the effect of offending on employment would be much less for younger individuals than for adults who are regarded as fully responsible for their own actions.

5.6.4 The Moderating Influence of Age and Employment Duration

Next, we study the interaction between age and employment duration for the employment-offending association. Following empirical and theoretical assumptions it is assumed that stable employment will positively influence offending in adolescence, while in adulthood stable employment will have a negative influence on criminal behavior. In particular, we study the structural parameters which are allowed to vary with age and vary the definition of the employment variable. In Figure 5.3 the structural parameter estimates are shown by age for the employment variable constructed as: more than 10 days a year, more than 90 days a year and more than 180 days a year.

In Figure 5.2 we already displayed the 90 days or more estimates, the 10 and 180 days or more are added in this section. Differences in the three curves indicate the interaction between age and employment duration.

The top left graph shows that the state dependence parameters for offending are almost identical for all measures of employment duration. The slope of the effect over the age years becomes more negative with increasing age. This indicates that
Figure 5.2. Estimated age-graded effects of the structural parameters. The sample includes $N = 493$ individuals and 11 time periods ($t = 18, \ldots, 28$). Employment was only included if it was 90 days or more a year.

all individuals age out of offending, regardless of how many days they are employed. For the structural effects of offending on employment different patterns per age group and number of days employed are found (bottom left graph). In particular, at young ages offending reduces employment for all measures of employment duration. For the older ages offending only reduces employment chances when employment duration is more than 180 days. For both 10 and 90 days of employment per year the effect of offending on employment becomes smaller. Thus, offending reduces the probability of all employment durations for young individuals, while it also reduces the probability of long-term employment (180 days) for older individuals.

Next, the state dependence parameters for employment differ somewhat per curve (bottom right graph). For those with the steadiest employment, we see a small increase of state dependence over age; for both those employed only incidentally (10 days) and those employed for shorter periods (90 days) we see an increase in state dependence.
This denotes that overall, persistence becomes stronger as people age, since all curves show an increasing effect with age of previous employment on future employment.

The structural effect of employment on offending is similar for all ages whether employment duration is either 90 days or 180 days (top right curve). These two curves show an effect close to zero of employment on offending for the young ages, but a large negative effect for the older ages. While the effect for those employed is linear, the interpretation is, apart from a small increasing effect of employment at younger ages, identical. Regardless of how many days they are employed, employment reduces offending more at later ages.

Overall, we conclude that positive interaction exists between age and employment duration for both structural relationships between employment and offending. The strongest interaction is found for the effect of offending on employment.
In this study we analyzed a large sample of juvenile sex offenders who had been followed from emerging adulthood into adulthood (age 18-28). Our main variables employment and offending were constructed using objective registered information. The aim was to answer the research question: “To what extent is the bidirectional structural relationship between employment and offending influenced by age and employment duration?”

We found, in correspondence with the theoretical literature, that when employed the probability of offending was negatively affected, and with prior offending chances of employment were reduced. The estimates were both significant, indicating that studies that impose uni-directional relationships between employment and offending may incorrectly attribute a part of the overall correlation to either direction of the employment-offending association. The distributions of the random effects provided further evidence that a part of the relationship between employment and offending is spurious. In particular, we identified both time-invariant and contemporaneous spurious correlations between employment and offending outcomes. Overall, we found that individuals who on average gain more utility from employment gain less utility from offending.

We also found employment to be self-reinforcing: when an individual is employed in the previous year the probability of future employment is increased. The same was found for offending: prior offending increased chances of future offending. Combined, this shows that a ‘vicious’ circle exists of offending increasing the utility of future offending and decreasing the utility of employment. This conforms to the process of cumulative disadvantage hypothesized by Sampson and Laub (1993).

However, as the employment-offending association is reciprocal with strong state dependence, the workings of ‘hooks for change’ as postulated by Giordano et al. (2002) also fit our findings. Once someone manages to gain employment (of sufficient duration) this will reduce the probability of offending, and the likelihood that employment is continued is also increased.

Next, we studied the age-graded effects of employment on offending. Several theoretical age-graded frameworks state that at the younger ages (age 18 up to about 20) will experience little benefit in terms of reduced offending from being employed. However, with maturation the effect of employment on offending will become stronger,
leading to a reducing effect of employment on offending at older age, i.e., in the last stages of early adulthood. The analysis in this study confirmed these theoretical notions. Our analysis even showed that within the same sample the effect of employment on offending switches in sign, from a very small positive effect at young ages to a large negative effect for the older ages. The remaining structural effects showed that the influence of offending on employment over time becomes less important and even non-existent at the older ages, indicating that an offense affects employment for the younger ages more than for the individuals in the later stages of emerging adulthood. It could be that this effect is generated those individuals in the later stages of emerging adulthood who follow a criminal career and are not employed. However, this seems counter-intuitive since one would expect that at the older ages offending would have a more negative effect on employment, since adults are generally held more responsible for their own actions. In the final analysis this is explained by the interaction between age and employment duration: the individuals with employment contracts spanning more than 180 days a year indeed experience a negative effect of offending on employment that becomes more negative with the coming of age. This indicates that for the older age with longer employment duration, offending will have a more negative effect than for the younger individuals with short employment contracts.

Further, we found that offending has a positive (increasing) influence on offending, however this state dependence effect becomes smaller with the coming of age. This points to an aging-out of crime effect, where the influence of prior offending over time increased the probability of future offending. This also indicates that the juvenile sex offenders are less inclined to offend when they are at the end of the emerging adulthood period. For employment the opposite is detected: over time the effect of employment becomes more positive. This denotes a certain aging-in employment effect where holding a job at the older ages has a larger positive influence of future employment than in the early ages of adulthood. Again, this could indicate both the salience of employment for individuals at the end of emerging adulthood in promoting desistance.

In our final analysis the interaction between age and employment duration is investigated. Both state dependence estimates (employment and offending) were almost identical for the different measures of employment duration and ages. Our interpretation that people age out of crime and age into employment is reflected, as the association

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is independent of other variables like employment duration.

The structural effect of employment on offending becomes more negative over time for all measures of employment duration. Important is that the curves of 90 days and 180 days or more employed are similar, with little effect for the younger ages and after age 22 a decreasing magnitude in the estimates.

We find that at young ages employment increase offending for those working sporadically. In the empirical and theoretical literature a possible increasing effect of intense employment on offending was hypothesized for adolescents and young adults. However we find that only a few days of work a year has an increasing effect on offending for the younger ages, while intensive work (long duration) has no effect. Why we find this remains unclear, it could be that it is just a simple effect of not having enough time as a young adult to spend with peers due to intense work, causing limited offending possibilities with peers for these young adults with longer employment durations.

Regarding the structural effect of offending on employment we again find interesting results for the individuals in the 10 days curve. For the young ages little effect is found, however after age 22/23 the effect of offending becomes less salient and even shifts in sign having an increasing effect on employment for the older ages. This implies that those who continue offending are more prone to have short employment durations, possibly because they hold limited value to employment. The 90 days curve follows a similar path where the effect of offending becomes almost 0. With aging it seems that the individuals with less stable employment are becoming less and less influenced by offending. Probably due to the effect of aging-out of crime. For the individuals employed for 180 days or more a year the effect of offending on employment is negative and over time becomes even stronger. As we would expect, since the people who work many days a year will hold a certain value as well as little time that can be spend in an unstructured setting.

In conclusion, we used novel statistical techniques in order to unravel the complex association between employment and offending. We found that not only is the association reciprocal, it is also influenced by moderating factors such as age and employment duration and the interaction between them. In particular, effects may shift over the life course, possibly due to a change in mindset or a change in relevant institutions of social control with the coming of age as indicated by Arnett (2004) and Sampson and Laub (1993). Our findings have clear policy implications. Most saliently, our find-
ings - somewhat counter-intuitively - advise against employment policies for criminally active young people. However, the findings do advise employment past the emerging adulthood, regardless of duration. Our findings also show that offending becomes increasingly detrimental to full societal integration (in terms of holding long term jobs) at higher ages.

This study has strong points. First of all we used a prospectively gathered, rich dataset consisting of long-term objective and detailed information on offending and employment. Moreover, we employed advanced methods to control and allow for reciprocal effects, state dependence and unobserved heterogeneity. On the other hand our study has limitations. Our employment variable might be thought of as incomplete, since we were only able to look at official employment registration, and we have no measures of ‘unofficial’ labor. Also, there is no knowledge of their salaries or whether the individuals were employed full-time or part-time. However, it is likely that most contracts spanned a substantial part of the working week given that the employment records showed that very few applied for supplementary benefits that citizens in the Netherlands are entitled to if their income is below a certain minimum. Also, we do not know whether people were cohabiting or otherwise romantically involved: we only know from the register data if people have officially registered as partners whether by marriage or through a registered partnership. Moreover we do not have data on disabilities, or drugs addiction, or mental health issues. All in all, through the register data we could only study the in a sense ‘outside appearance’ of these individuals’ lives. More in-depth research with for instance interviews is needed, to be able to further disentangle the employment-offending association. A next step could be to use the register data to look at individual characteristics (beyond age) to determine whether the effect of employment is moderated by stable individual characteristics such as intelligence, personality characteristics or educational level.