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INCARCERATION EXPERIENCE AT OLDER AGES. DOES EMPLOYMENT PROTECT AGAINST RECIDIVISM?

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ABSTRACT. We investigate whether employment protects against and/or postpones recidivism among males who committed their first crime late in life. We use administrative data on 34,401 individuals, 44% of whom were employed at least once during the analysed period. We apply a multi-state model and difference in-differences approach. The results of the multi-state model indicate that employment reduced the risk of recidivism by 7% for those who were at risk of a second incarceration. On the other hand, employment increased the probability of subsequent recidivism by 8-10% for those who were at risk of a third or fourth incarceration. Our results suggest that institutional interventions should seek to increase the labour market attachment of former prisoners, and, in particular, should focus on ex-offenders with only one conviction. Being attached to the labour force seems to matter more, the fewer imprisonment spells an individual has experienced.

Introduction

Many ex-offenders are unrealistically optimistic shortly after they are released from prison, and are convinced that they will easily cope outside of prison without committing another crime (Zamble & Quinsley, 1997). Nevertheless, ex-prisoners are particularly likely to

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recidivate in the months immediately after release (Langan & Levin, 2002; Wartna et al., 2011). The main explanations for recidivism are that ex-offenders often have a poor economic situation, are unemployed after release, are illiterate, or fail to adhere to social norms (Nally et al., 2014, Visher & Travis, 2003). The crime-reducing effect of employment stems from a combination of factors, such as job stability, work intensity, and earnings (Sampson & Laub, 1990; Kleck & Jackson, 2016; Lageson & Uggen, 2013). Having a job provides ex-offenders with financial independence, social contacts, and the opportunity for informal social control of the workplace (Sampson and Laub, 1993). Employed individuals have less time to spend on criminal behaviour (Warr, 1998). Employment can delay the point in time when an ex-offender engages in another criminal act (Tripodi et al., 2010), and having a longer period of employment can decrease the likelihood of recidivism (Verbruggen et al., 2012). There is, however, evidence, that not all forms of employment prevent ex-offenders from committing criminal acts (Ramakers et al., 2017). Ex-prisoners often work in temporary and poorly paid jobs (Western, 2006). They may face discrimination in the labour market, and their employability level is often low (Holzer et al., 2004; Pager, 2007). They may also be stigmatised by employers, who try to avoid the risk related to employing a new employee after the time spent in prison. Still, receiving benefits might postpone recidivism, as there is evidence that the crime rates of ex-offenders are lower during the active benefit period (Bennett, 2020).

Within the current study we investigate the relationship between employment and reincarceration risk among older males who committed their first crime late in life. Crimes in Poland are most often committed by young people, aged 20 and up; the same applies to recidivism. More than half of the recidivists are people under the age of 35. For example, in 2017, the number of convicted men aged 45-49, 50-59, and 60 and more was approximately 7%, 10% and 5%, respectively (Polish Ministry of Justice 2020, p. 72). The most numerous age cohorts are those between 25 – 35 who account for 32% of all convicted men. Criminals over 45, who are in the period of well-established life activity, constitute a group of 22% of all convicted persons, and most often commit these crimes in the conditions of recidivism (Grabowska 2018, p. 428). Criminals rarely start their criminal activities at this age. As of now, the longest longitudinal research on recidivists in Poland covered the years 1987-2002. It showed that criminal activity started at the age of over 41 concerned 2.7% of the surveyed recidivists (Bałandynowicz 2006, p. 10).

Our paper contributes to the literature in three major ways. First, we investigate whether employment protects older males who committed a first crime late in life from recidivism. Since criminal activity usually develops in the early stages of life, there is little research that focuses on crimes committed by 50-year-olds, in particular on crimes committed for the first time. Moreover, this is a group that seemed to be functioning properly in the earlier years of life, and the imprisonment is caused by a singular violation of the law. Criminals at this age covered in the research are most often recidivists with a large number of crimes and a developed criminal career that continues into late adulthood. The group of criminals around the age of 50 is included in studies on members of organized crime groups who want to withdraw from crime, most often between 30 and 40 and between 40 and 50 years of age (Płwaczewski, 2010). The research we present to some extent fills the gap in the literature, pointing to the links between activity in the labour market and the ethology of a criminal act and the effectiveness of social rehabilitation. We analyse a very specific group of inmates who after certain struggles in life served a sentence and unlike to general observations they were on average 51 years old when their first imprisonment started. We define recidivism broadly, as the reincarceration at any time after the first incarceration spell.

Second, we refer to Poland, which is an understudied country characterized by mild penitentiary system with overcrowded prisons and insufficient institutional solutions aimed at helping ex-prisoners to learn how to cope on their own.

Third, we apply methods tailored to longitudinal analysis: sequence analysis and multistate models. They do not allow for causal interpretation, but since we use rich administrative data (34,401 individuals), they allow for a broad observational study.

Previous quantitative studies have often referred to paroles, young males, participants of employment programmes. Various countries have been studied, still most often these were USA, Scandinavian countries, Italy, Australia. Moreover, analyses were mostly based on relatively small samples, with a few exceptions like D'Alessio (2013), Kang (2019), Schnepel (2017), and Skardhamer and Telle (2012). Such research has not been published for Poland yet.

Previous research using longitudinal approach is limited (Ramakers et al., 2017). Usually, survival analysis was applied (Skardhamer & Telle, 2012; Tripodi et al., 2010). Survival analysis requires assumption that failure times are independent and recurrent event data violate this assumption. Our multiple-failure data and indicated methods allow us to account for interdependencies between states and multiple incarceration spells. We identify up to four incarcerations per individual and we check the robustness of the results by accounting for the ordinal number of the imprisonment. Such approach provides more holistic view.

So far, few studies have found evidence of a causal relationship between employment and recidivism. Visher et al. (2005) performed a meta-analysis of eight random-assignment employment programs for individuals with a criminal record who were not in custody, and the results did not indicate a reduction in recidivism. More recent studies have shown that employment reduces recidivism (Skardhamer and Telle, 2012; Verbruggen et al., 2012). Fallesen et al. (2018) investigated the effects of active labour market policy programmes (ALMP) on crime, focusing on the effects on unemployed, uninsured welfare recipients who were active. Borland and Hunter (2000) examined a potential simultaneity bias between an individual's employment status and arrest record. D'Alessio (2013) also studied the curvilinear relationship between unemployment and crime. Ramakers et al. (2017) also compared the fact of being employed after release versus unemployment. They used among others propensity score matching technique. In our study, next to longitudinal approach we estimate an equation that resembles difference-in-differences approach, as we differentiate between individuals who were (treated) and were not (control) employed after incarceration. However, since there has not been any exogenous intervention we refrain from causal interpretation. Muhlhausen (2015) stresses, based on the research presented therein, that evaluation design is critical for retrieving causal interpretation and still a lot of unobserved heterogeneity may come into play in the background.

Our findings confirm that being employed postponed and reduced the risk of recidivism. But, when we account for multi-state interdependencies, the effect of employment on the risk of reincarceration varied and depended on the number of the imprisonment spells. These results may be useful for developing social reintegration policing directed at older ex-offenders, which in turn will also contribute to an increase of the effective labour supply.

1. Older inmates in the literature on Poland

1.1. Types of crimes committed by older men in Poland

The types of crime committed by men change with age and lose their violent character. Criminal acts requiring strength or dexterity are replaced by acts requiring knowledge and contact networks (thieves move on to selling stolen goods). What makes it difficult to assess

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male crime committed in old age is the fact that conviction becomes expunged with time, meaning that years later it is not known whether a given offender had already violated the law in the past. This results in frequent lenient sentences for older offenders, refraining from imposing imprisonment sentences by the courts and replacing them with other types of punishment. Crimes committed by the elderly are committed in a more complex, and therefore difficult to identify, manner (Hryniewicz-Lach, 2018, p. 19). The analysis of preparatory proceedings in which the suspect is an elderly person shows that 25% of the proceedings concerned driving while drunk, 10% causing a traffic accident, 7% theft, 7% bullying, 6% punitive threat, 6% violation of a court ban and 5% fraud (Świerczewska-Gąsiorowska, 2021, p. 496). These crimes are situational in nature, and it is an opportunity that triggers them.

1.2. Reasons why older men commit crimes

Among the causes of crime are: lifestyle of the convicts, functioning on the fringe of social norms, risky alcohol consumption or alcohol addiction. The causes of committing crimes may also be the excess of free time once children stop requiring care, and the excess of free time at certain times of the year. Research indicates that convicts committing crimes in their old age used to belong to the disadvantaged, poorly educated group, were not particularly active in the labour market, used to make a living from occasional work or were dependent on their family. Being dependent on the family, in particular, concerns recidivists who experience excess of free time and lack of stabilization (Grabowska, 2018). In the case of recidivists, crimes committed in old age are a consequence of treating criminal activity as a professional activity and a criminal lifestyle. Older people are also perpetrators of violence, often against elderly people they are supposed to be taking care of. This happens when they are exhausted and frustrated as a result of taking care of their parents and often of their children at the same time. Consequently, they are violent towards the people they are supposed to be taking care of and may abandon them or neglect them in other ways. Violence is also generated through financial dependence from the victim as in the case in rural communities. Violence also increases with addiction to psychoactive substances. Furthermore, violence occurs when domestic violence is reversed - the former perpetrator becomes the victim and the victim becomes the perpetrator. This is the case of families where violence occurred in the past (Jaroszewska, 2012).

1.3. How the system handles older prisoners

The system does not provide any special activities aimed at the group of criminals around 50 years of age. Persons convicted for the first time, regardless of their age, can count on lenient sentences imposed by the court. A crime at this age rarely marks the beginning of a recidivist career, but it may be a continuation of a previously started criminal career and the adopted style of functioning. Older convicts are mostly peaceful prisoners, they adapt well to prison conditions and rarely participate in the prison subculture. If they have a particular rehabilitation program (addiction therapy, aggression prevention program), it is due to specific conditions imposed by the court and the individual situation of each convict not directly related to their age.

The importance of work for social readaptation is emphasized in the literature on Poland. This applies to convicts of all ages. Vocational guidance should focus more on their skills and motivation to work. In particular, people over 45 leaving prisons should be supported with finding employment. These people require greater motivation to seek, to take up and to keep a job. Their ability to search for a job with the use of new technologies may be insufficient. The same may apply to their ability to self-present during an interview and, if employed, to

develop the qualities of a good employee (assertiveness, teamwork, responsibility, punctuality). Expectations of convicts towards their potential employer are sometimes unrealistic, which also requires revising while serving the sentence (Nowak, 2019).

Social readaptation of convicts matters since these males are to play again various social roles – those of a family member, an employee, a neighbour. This particularly concerns older former prisoners, whose criminal acts were not violent. Spending time on positive activities can act both as rehabilitation and prevention.

2. Older previously incarcerated men

In Poland, when workers register with a public employment office as unemployed, they are asked to provide information on previous contributory periods, which include incarceration. This information is complemented along each subsequent registration; and criminal records are not expunged with time from administrative data. In this way, administrative data are a unique source of longitudinal information of ex-offenders. There are two main sources of potential sample selection bias in this data generating process. First, registering with a labour office is not compulsory. Some workers may decide not to do so and they either reintegrate with the society and find a job on their own, or remain inactive. On the other hand, inmates face certain incentives to register even if they are not active job seekers. This may occur, since employment offices do not verify active job search methods, and administrative unemployment status is a prerequisite to obtain free health insurance and social welfare. That applies to all unemployed workers. However, that incentive may be even stronger among the former prisoners. Registering with the labour office in Poland is also compulsory for workers who claim unemployment benefits (subject to having fulfilled eligibility conditions).

We assessed the population coverage by comparing administrative data to demographic data. Around 30% of those individuals born in the 1940s, but more than 50% of those born between 1950 and 1965, ever appeared in a public employment office registry. We have also tried to estimate our coverage of incarceration spells by comparing our data with penology data for the 2004-2017 period. Our data provide information on around 2% of the stock of ex-prisoners at the end of a given year, and on 3.5% of the inflow and 3.5% of the outflow of ex-offenders during a given year. While these figures seem small, the time trends were similar, which is, undoubtedly, an advantage.

We study the period between 1 June 2004 and the end of 2017. In that period, labour market legislation was partially amended, but there was no special labour market policy directed at ex-offenders. We focused on ex-offenders who experienced incarceration period(s) with a single duration of no longer than two years. This time-censoring is based on the criminal code. Most of the ex-offenders who had been in prison for up to two years had committed a nonviolent crime, such as theft or burglary, an unintentional offence, or a minor, low-harm crime. The ex-offenders who committed major crimes were excluded from the analysis, as they were often antisocial and prone to violate social norms even before incarceration[1]. Such exercise can potentially generate selection bias, but we assumed ex-offenders who experienced shorter imprisonment spells should, in general, have a stronger labour market attachment.

We focused on men who were convicted for the first time late in life: that is, we examined those individuals who had all of their incarceration spells in the 2004-2017 observation period. *Table 1* displays descriptive statistics. Most men were poorly educated, and their total employment tenure before their last registration with a public employment office was

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[1] Out of the entire dataset for the 1990-2017 period, around 85% of the ex-prisoners had served sentences with a maximum length of two years.

quite short. The data also included information on the occupations of the men who found employment, although there were many gaps in this information. Of these occupations, 30% were simple jobs. In addition, 25-27% of the men were employed in services or trade, or were industrial workers or craftsmen (one-digit indications of ISCO major groups). Almost 97% of the men were employed in routine manual jobs[2]. Around 20% of all individuals collected unemployment benefits[3] at least once, but 62% of them did so exactly once. However, the ex-offenders collected unemployment benefits in only 8.0% of unemployment spells.

Table 1. Descriptive statistics of the individuals' characteristics

	Mean	Std. dev.
Age at the beginning of the 1st spell (in years)	47.6	5.2
Educational level (percentage distribution)		-
primary	0.553	
vocational	0.362	-
secondary vocational, general secondary, post-secondary, or tertiary	0.085	-
Total tenure (in years)	12.5	9.8
Unemployment benefit duration (in months)	6.0	3.9

Notes: no. of observations (individuals) 34,401, no. of observations for education 34,312, no. of observations for total tenure 27,898.
Source: *own elaboration.*

We observed 44,094 incarceration spells. Almost 79% of the ex-offenders had experienced only one incarceration spell in the analysed time span, while 16% had two such spells, almost 4% had three spells, and less than 1.5% had at least four imprisonment spells. The sentences were usually expressed in full months, in line with the criminal code, as confirmed in the duration histogram. The mean duration of the incarceration spells did not differ with respect to the ordinal number. However, if we look at the longest incarceration period each individual experienced, we see that the recidivists spent more time in prison. Moreover, the mean gap between multiple incarceration spells was 1.9 years, while the median gap was 1.4 years. These values decreased with each subsequent incarceration period: on average, the second spell occurred within 2.1 years of the first one (median equaled 1.5 years), while the third spell occurred within 1.7 years of the second spell (median equaled 1.2 years).

3. Is employment associated with a lower recidivism rate?

The data included information on the labour market status, which we grouped into four main categories: employment (including ALMP), unemployment, incarceration and non-participation. Employment referred to formal employment regardless the type of contract as well as participation in ALMP that resulted in deregistration from labour office. Unemployment referred to being registered with public employment office. Non-participation included all other situations that could not be classified as employment, unemployment or incarceration. Data included daily dates of transitions between particular states what allowed us to retrieve the full

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[2] Occupations unified according to the international standard classification of occupations (ISCO-08) assigned to task content groups in Acemoglu and Autor (2011), and adjusted for the Polish labour market by Hardy et al. (2018).
[3] In 2009, the unemployment benefit system was reformed. Since then, unemployment benefits are granted for 180 or for 365 days (previously, they were granted for up to 18 months), depending on the local labour market conditions and the tenure and the age of the unemployed person.

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labour market attachment history of individuals. We investigated complete spells and we explored the trajectories of the ex-offenders in the labour market.

In the first step, we employed longitudinal analysis: social sequence analysis and multistate models to examine the relationship between employment and recidivism. *Table 2* displays descriptive statistics concerning the duration of particular states. The distribution of the length of particular kinds of spells was generally asymmetric: i.e., it was right-skewed, with some outliers at the ends of both tails. As the ex-offenders frequently transitioned between states, many of them experienced multiple spells. Nonetheless, slightly more than 56% of the ex-offenders did not work even once during the analysed time span. The incarceration spells were directly preceded by unemployment spells in 44% of cases and by non-participation in 52% of cases. The mean duration of these non-participation spells was 13.5 ± 19 months, although the median duration was just 6.0 months. The incarceration spells were followed by unemployment spells in 15% of cases, and by non-participation spells in almost 85% of cases. These spells were, however, very short: the median was just 11 days, while the mean was 2.2 ± 7 months. In 95% of cases, the unemployment spell occurred after these short non-participation spells.

Table 2. Descriptive statistics of the duration of particular spells (in months)

	Mean	Std. dev.
Employment	7.0	10.6
unemployment	9.6	12.0
non-participation	7.3	12.4
incarceration	7.8	5.7

Notes: no. of observations: employment 38,462; unemployment 142,447; non-participation 158,459; incarceration 44,094
Source: *own elaboration.*
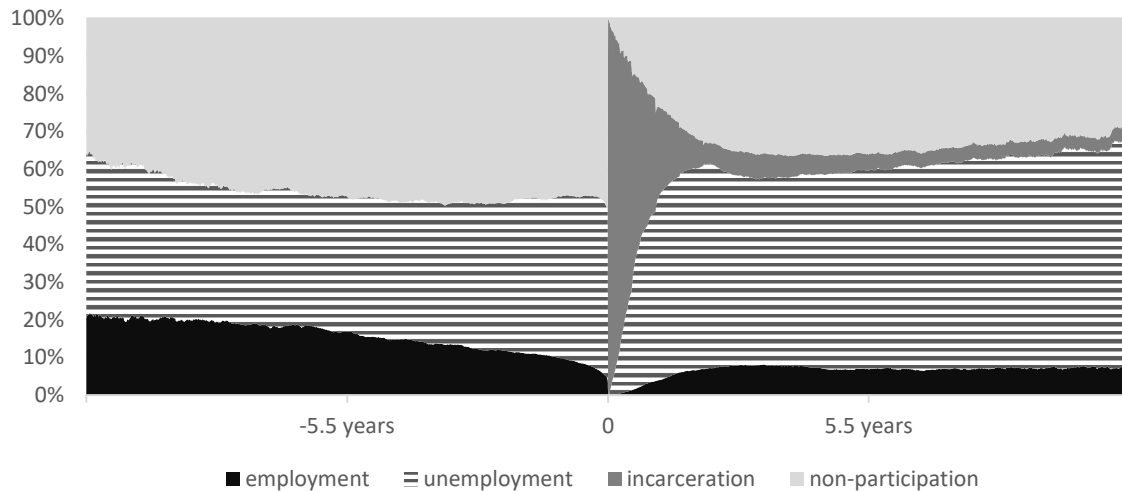
Graph 1. Stacked tempogram of the shares of ex-offenders in a particular labour market state in the observation period before and after the beginning of the first incarceration spell
Notes: For around 9000 of the ex-offenders, the first observed spell was imprisonment.
Source: *own elaboration.*

We formally tested the relationship between employment and recidivism by applying longitudinal approach. To grasp the general idea of how employment affect the likelihood of

recidivism we estimated the Kaplan-Meier survivor functions (*Graph A1* in the Appendix). We also estimated a set of Cox models to quantify the impact of indicated covariate (*Table A1* in the Appendix). We stratified the dataset into samples according to the number of incarceration spells observed (two, three, and four), and whether an individual experienced a subsequent imprisonment. If that person had a subsequent imprisonment we checked if covariates accelerated or postponed recidivism (compare Tripodi et al., 2010), if not – we checked if variables increased or decreased the likelihood of recidivism. In each case, we analysed a time span since the end of the previous incarceration till the beginning of a potential reincarceration. For example, for workers who had three imprisonment spells, we examined the time span between the second and the third incarceration and analysed if employment accelerated or postponed the third spell. On the other hand, for workers who had two imprisonment spells but not more than three such spells we investigated if employment increased or decreased the likelihood of the subsequent recidivism.

Visual inspection (Figure A1 in the Appendix) indicates that there is a non-linear relationship, as the difference between survivor functions increases over time (up to around three years) and then decreases gradually (when we refer to postponing recidivism) or remains reasonably constant over time (when we examine if recidivism occurs). Estimated coefficients in turn indicate that employment decreases the hazard of reincarceration by 65 to even 75%. On the other hand, employment postpones recidivism by 40-60% and it seems that the effect is stronger the fewer imprisonment spells an individual had.

The longitudinal data we use provide information on recurrent events. We were able to examine the impact of employment on recidivism by accounting for entire labour market attachment history of an individual. To do so, we employed a multi-state model (MSM). In such models, individuals move among a finite number of states. If a state is transient, further transitions are possible, otherwise the state is absorbing. A multi-state process (compare Meira-Machado et al., 2009; de Wreede et al., 2010) is a stochastic process $(X(t), t \in T)$ with a finite state space $S = \{1, ..., N\}$, where $T = [0, \tau], \tau < \infty$ is a time interval and the value of the process at time t is the state occupied at that time. Over time, as the process evolves, a history H_{t-} is generated over the interval $[0, t)$. It includes information on the preceding states, the timing of transitions, etc. The multi-state process is fully characterised through transition probabilities between states h and j: $p_{hj}(s, t) = \mathbb{p}(X(t) = j | X(s) = h, H_{s-})$, for $h, j \in S, s, t \in T$, $s < t$ or through transition intensities, which represent the instantaneous hazard of progression to state j conditionally on occupying state h: $\alpha_{hj}(t) = \lim_{\Delta t \to 0} \frac{p_{hj}(t, t+\Delta t)}{\Delta t}$ (Meira-Machado et al., 2009). The flexibility of the multi-state models allows us to account for the transition-specific covariates in semi-parametric analysis. Here, we can diversify the impact of particular variables on certain transition rates; for example, between states h and j (de Wreede et al. 2011):

$$\alpha_{hj}(t|\mathbf{Z}) = \alpha_{hj,0}(t) exp(\beta^T \mathbf{Z}_{hj})$$

where: $\alpha_{hj,0}(t)$ is the baseline hazard for this transition, $\mathbf{Z}$ is the vector of covariates at baseline, and $\mathbf{Z}_{hj}$ is the vector of transition-specific covariates.

We proposed a semi k-progressive model, which is displayed in *Graph 2*. Here we reclassified the type of spells. We created a new type of spell: a non-incarceration spell which comprised all spells but imprisonment between subsequent incarceration spells. In this model, we observed individuals since the beginning of the first incarceration spell that occurred no sooner than on 1 June 2004 (so we censored non-incarceration spell before the first imprisonment). When an ex-offender ended the incarceration spell, he experienced a non-incarceration spell, which included information on his employment experience. Next, an ex-offender may have had another incarceration spell if he was a recidivist. Each state could be

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transient or absorbing (apart from the first incarceration spell)[4] if it finished the trajectory we observed for the given individual. We estimated the model non-parametrically and semi-parametrically by applying *mstate* package in R (compare de Wreede et al. 2010; de Wreede et al. 2011).
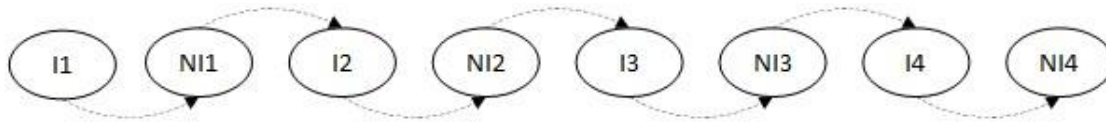
Graph 2. K-progressive model describing a transition pathway between incarceration and non-incarceration spells
Notes: I1 – first incarceration spell, NI1 – first non-incarceration spell, I2 – second incarceration spell, NI2 – second non-incarceration spell, I3 – third incarceration spell, NI3 – third non-incarceration spell, I4 – fourth incarceration spell, NI4 – fourth non-incarceration spell.
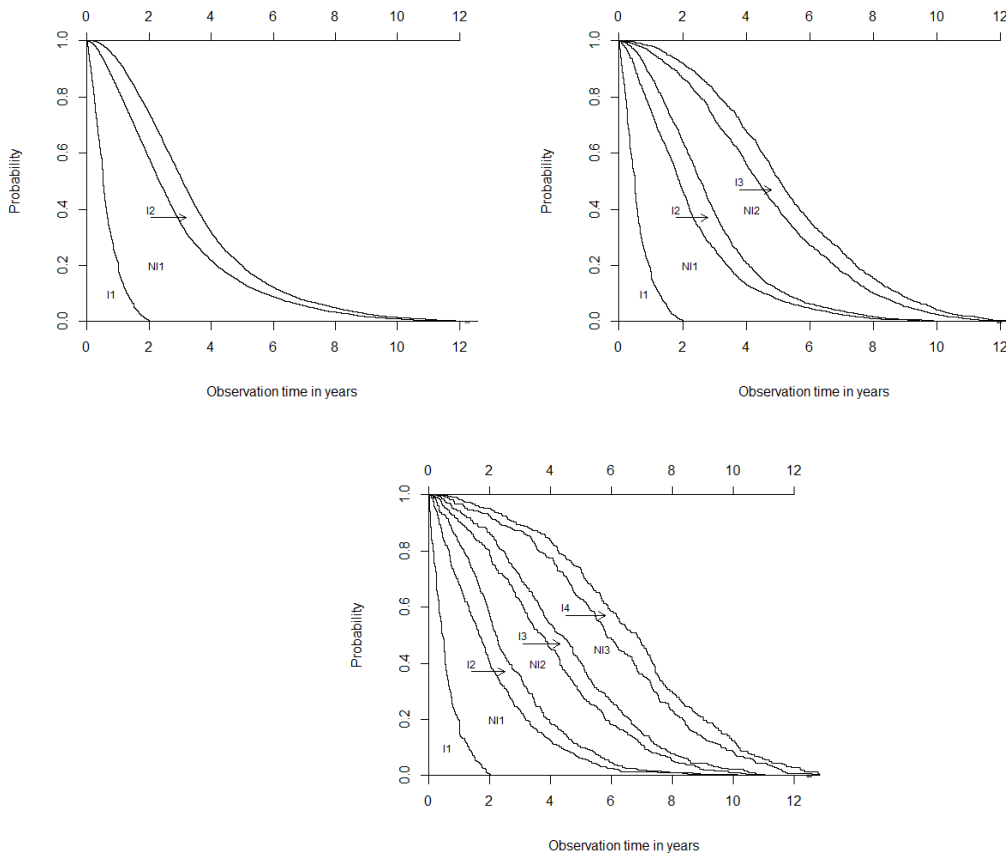Source: *own elaboration.*

In the non-parametric estimates, we computed transition intensities and transition hazards, while assuming a separate baseline hazard for each of the transitions. Next, we identified a transition probability matrix. Non-parametric methods were applied to samples of ex-offenders who experienced either two, three, or four incarceration spells. *Graph 3* displays the results by means of stacked transition probabilities for particular models. The vertical distance between two adjacent curves represents the probability of being in the corresponding state in a given moment (de Wreede et al., 2011).

In the next step, we applied a semi-parametric approach to the k-progressive model. We examined both whether employment postponed recidivism, and whether employment affected the risk of recidivism. In the first part, we grouped individuals into samples of those who had a given number of incarceration spells. In the second part, we grouped individuals into samples of those who had either n or $n + 1$ incarceration spells. We also accounted for some other covariates. As in the case of non-parametric estimates, we assumed a separate baseline hazard for each transition. The estimated coefficients and their standard errors are shown in *Table 3*.

Only employment in the last non-incarceration spell for ex-offenders who either had or did not have a subsequent incarceration can be interpreted as the covariate affecting the likelihood of recidivism (columns 4-6 in *Table 3*). In all other cases, the parameter estimate should be interpreted according to whether it postponed recidivism, since all of the individuals in the given sample experienced a subsequent incarceration spell. For example, for ex-offenders who had two or three imprisonment spells, employment after the first conviction postponed (or did not postpone) recidivism, but employment after the second conviction affected (or did not affect) whether reincarceration occurred.

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[4] We excluded ex-offenders for whom we observed only one incarceration spell (I1) and nothing thereafter (1273 individuals). For them we did not observe any complete non-incarceration spell. This might mean that the person registered with a public employment office, but the spell was incomplete.

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Graph 3. Non-parametric estimates of stacked transition probabilities, ex-offenders who had either two, three, or four incarceration spells
Notes: I1 – first incarceration spell, NI1 – first non-incarceration spell, I2 – second incarceration spell, NI2 – second non-incarceration spell, I3 – third incarceration spell, NI3 – third non-incarceration spell, I4 – fourth incarceration spell. The vertical distance after the last incarceration spell is not interpretable, since for some individuals the given imprisonment spell was the last one observed and in consequence we did not observe complete non-incarceration spell thereafter.
Source: *own elaboration.*

Table 3. Semi-parametric estimates of the k-progressive model

Variable / estimate	Parameter estimate (standard errors)					
type of analysis	if employment postpones recidivism			if employment affects recidivism		
no. of incarceration spells	2	3	4	1 or 2	2 or 3	3 or 4
empl. NI1→I2 (no – yes)	-0.2758*** (0.022)	-0.2734*** (0.037)	-0.1147 (0.069)	-0.0727*** (0.013)	-0.3124*** (0.020)	-0.2693*** (0.034)
empl. NI2→I3 (no – yes)	-	-0.0880** (0.040)	-0.1387 (0.084)	-	0.0750*** (0.020)	-0.1380*** (0.037)

empl. NI3→I4 (no – yes)	-	-	-0.1796** (0.089)	-	-	0.0979*** (0.033)
Concordance	0.636 (se=0.003)	0.589 (se=0.005)	0.571 (se=0.009)	0.841 (se=0.001)	0.631 (se=0.003)	0.590 (se=0.004)
Likelihood ratio test	3059 (df=8)	616.6 (df=9)	138.9 (df=10)	39788 (df=8)	3147 (df=9)	691.5 (df=10)
Wald test	3121 (df=8)	644.5 (df=9)	146.7 (df=10)	32058 (df=8)	3246 (df=9)	726.2 (df=10)
Number of events	15854	6385	2203	36678	20134	7731

Notes: standard errors reported in parentheses, ** - significant at the 5% level, *** - significant at the 1% level; equations also included: age at the beginning of the last non-incarceration spell observed, education estimated at the last non-incarceration spell observed, longest incarceration spell observed estimated at the last non-incarceration spell observed (up to one month, 1-3 months, 3-6 months, 6-12 months, 12-24 months).
Source: *own elaboration.*

Employment reduced the risk of recidivism by 7% for those who were at risk for a second incarceration spell. But those who were at risk of a third or fourth incarceration spell fared worse, as employment increased their probability of subsequent recidivism by 8-10%. The other results consistently indicated that employment postponed the subsequent incarceration spell. Among most of the ex-offenders, the greatest impact was after the first imprisonment, regardless of the total number of convictions the individual had. However, among those who had four imprisonment spells, the greatest and significant only effect was after the third conviction.

In the last step, we applied a difference-in-differences method to examine the relationship between employment and reincarceration. The ex-offenders who were employed were 'treated', while the 'control' group consisted of those who did not work. We are aware that the estimated equation did not allow for causal interpretation, since we did not have an exogenous intervention that occurred at a certain point in time. Rather, we centred the time before or after particular incarceration spells, which could have occurred at any time between 2004 and 2017 (compare Goodman-Bacon, 2018; Ryan et al., 2015). The interaction term referred to those ex-offenders who were employed in the last non-incarceration spell (that preceded potential reincarceration). We have also accounted for the high-dimensional fixed-effects vector that included the year of the first incarceration spell observed, the level of education, and the longest incarceration spell observed. The equation became:

$$y_{it} = \beta_0 + \beta_1 \cdot treat_i + \beta_2 \cdot interact_i + \mu FE_{it} + u_{it}$$

where y_{it} is the outcome variable (i.e., whether the individual had a subsequent incarceration spell, or the time to reincarceration), $treat_i$ refers to whether the person was employed at any time in the observation period), $interact_i$ refers to whether the employment occurred in the last non-incarceration spell, and FE stands for fixed effects. β_2 is the coefficient of interest.

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Table 4. Quasi difference-in-differences analysis results

Variable / estimate	Parameter estimate (standard errors)					
type of analysis	whether employment postpones recidivism			whether employment affects recidivism		
dependent variable	time to reincarceration			dummy on reincarceration		
no. of incarceration spells	2	3	4	1 or 2	2 or 3	3 or 4
interact	604.6488*** (29.377)	506.4416*** (53.499)	390.69*** (113.002)	-0.1469*** (0.006)	-0.0972*** (0.015)	-0.1205*** (0.032)
no. of observations	5,448	1,309	321	32,475	6,757	1,630

Notes: standard errors reported in parentheses, ** - significant at the 5% level, *** - significant at the 1% level; equations also included: age, education, longest incarceration spell observed (up to one month, 1-3 months, 36 months, 6-12 months, 12-24 months), and year of the first incarceration spell observed.
Source: *own elaboration.*

The results reported in *Table 4* indicate that employment postponed subsequent convictions (columns 1-3); that employment reduced the risk of reincarceration; and that the negative effect occurred, irrespective of the number of previous incarceration spells.

Concluding remarks

We investigated the relationship between employment and reincarceration by applying longitudinal and difference-in-differences approaches. We examined the criminal behaviour of a particular group of older males who were first convicted of a crime late in life. However, we restricted the sample to those who were sentenced to spend up to two years in prison (in a single spell), and who might have retained an attachment to the labour force.

Our study indicates that employment affected the likelihood of recidivism. Our estimation results produced a consistent picture showing that employment postponed recidivism and reduced the risk of it (survival analysis and difference-in-differences results). However, when we accounted for multi-state transitions, the effect of employment on the risk of reincarceration was mixed depending on the ordinal number of the imprisonment spell. This indicates the need for further in-depth research accounting for multi-period interdependencies.

Our results are in line with those of previous research, which indicated that not all kinds of employment are equally efficient in helping ex-offenders re-integrate into society (Ramakers et al., 2017). Most of the ex-offenders in the sample had simple jobs that were poorly paid and did not require specific qualifications. We performed a robustness check of the results by re-estimating survival models and a k-progressive model with an additional covariate indicating whether the individual collected unemployment benefits. We restricted the analysis to examining the impact of receiving unemployment benefits, and not to being unemployed in general. The eligibility criteria included having been employed for at least 12 months out of the preceding 18 months. Thus, collecting benefits was a direct indication of prior labour market attachment. In Cox models' estimates the fact of collecting the unemployment benefit decreased the risk of second and third incarceration. In multi-state model, the statistically significant results proved that collecting unemployment benefits postponed a second incarceration spell (for those who were at risk of third imprisonment spell), decreased the risk of a second incarceration spell, but increased the risk of a third and fourth imprisonment spell. Compared to the effect of employment, the impact of collecting unemployment benefits on the likelihood

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of recidivism (survival analysis) was weaker and also weaker on postponing recidivism and was stronger on the likelihood of recidivism, although it was similar in direction (multi-state model). These findings may suggest that income alone is not a sufficient proxy for employment diversity. These results are also in line with those of a study (Bennett 2020) showing that transitions between different states (between being employed and receiving passive benefits and between receiving active benefits and receiving social assistance) might be linked to crime spikes, and could, therefore, generate associated social costs. Other job characteristics – like the type of job; or the quality, safety, and stability of the job – may also influence the quantitative impact of employment on reincarceration.

Using a multi-state model and a difference-in-differences approach, we also accounted for the impact of other covariates[5]. Across the samples and the methods we applied, the effects of the ex-offenders' age, educational level, and longest incarceration spell were found to be mixed in terms of significance, magnitude, and direction. These results might be explained in part by the peculiarities of the sample we examined, and the substantial asymmetries in the distribution of particular covariates.

We are aware that even though our findings are very promising and robust (especially with respect to the labour market attachment covariates), our analysis has some limitations, and that there are major concerns about the representativeness of the data we used. Apart from the sample selection bias discussed above, it should be noted that the administrative data are not representative of all unemployed individuals. Between 1995 and 2016 in Poland, an average of 72% of the workers who were unemployed according to the LFS were registered with a public employment office. On the other hand, around 61% of those registered with a public employment office were unemployed, according to the ILO definition adopted in LFS.

Our database did not allow us to unequivocally explain all of the observed relationships. The attitudes of former prisoners towards employment are not caused by their lack of knowledge of their rights. It is the duty of the prison services, often in cooperation with social welfare centres, to instruct prisoners leaving prison about their options for securing a job. Nevertheless, while keeping in mind the limitations of our research, we argue that employment played an important role in postponing and reducing the risk of recidivism among the men we studied. Our policy recommendation is that the state should take action to increase the labour market attachment of ex-prisoners. It seems reasonable to account for multi-state interdependencies. Multi-recidivists might find themselves in a vicious circle, and may be doomed to subsequent reincarceration. Thus, helping these individuals may be more difficult.

Still, employability, as expressed by direct employment and job search skills, is essential to reintegrating ex-offenders into society. Making use of this largely untapped labour supply is crucial not only for the ex-offenders themselves, but for society, as the failure to do so has social costs, as well as direct labour market costs.

Acknowledgement

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[5] Detailed results are available from the authors upon request.

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Appendix

Table A1. Cox model estimates

Variable / estimate	Parameter estimate (standard errors)					
type of analysis	if employment postpones recidivism			if employment affects recidivism		
no. of incarceration spells	2	3	4	1 or 2	2 or 3	3 or 4
employment (no – yes)	-0.6546*** (0.038)	-0.5965*** (0.087)	-0.5406** (0.220)	-1.0827*** (0.038)	-1.0491*** (0.079)	-1.3520*** (0.213)
Log likelihood	-34382.818	-6572.654	-1203.543	-44680.722	-11198.608	-1751.989
LR χ^2 (p-value)	344.24 (0.000)	54.56 (0.000)	6.98 (0.008)	1034.45 (0.000)	228.28 (0.000)	58.66 (0.000)
Number of observations	5455	1310	322	31351	6610	1484

Notes: standard errors reported in parentheses, ** - significant at the 5% level, *** - significant at the 1% level; • - the hazard function stratified by the variable: longest incarceration spell observed (up to one month, 1-3 months, 3-6 months, 6-12 months, 12-24 months).
Source: *own elaboration.*

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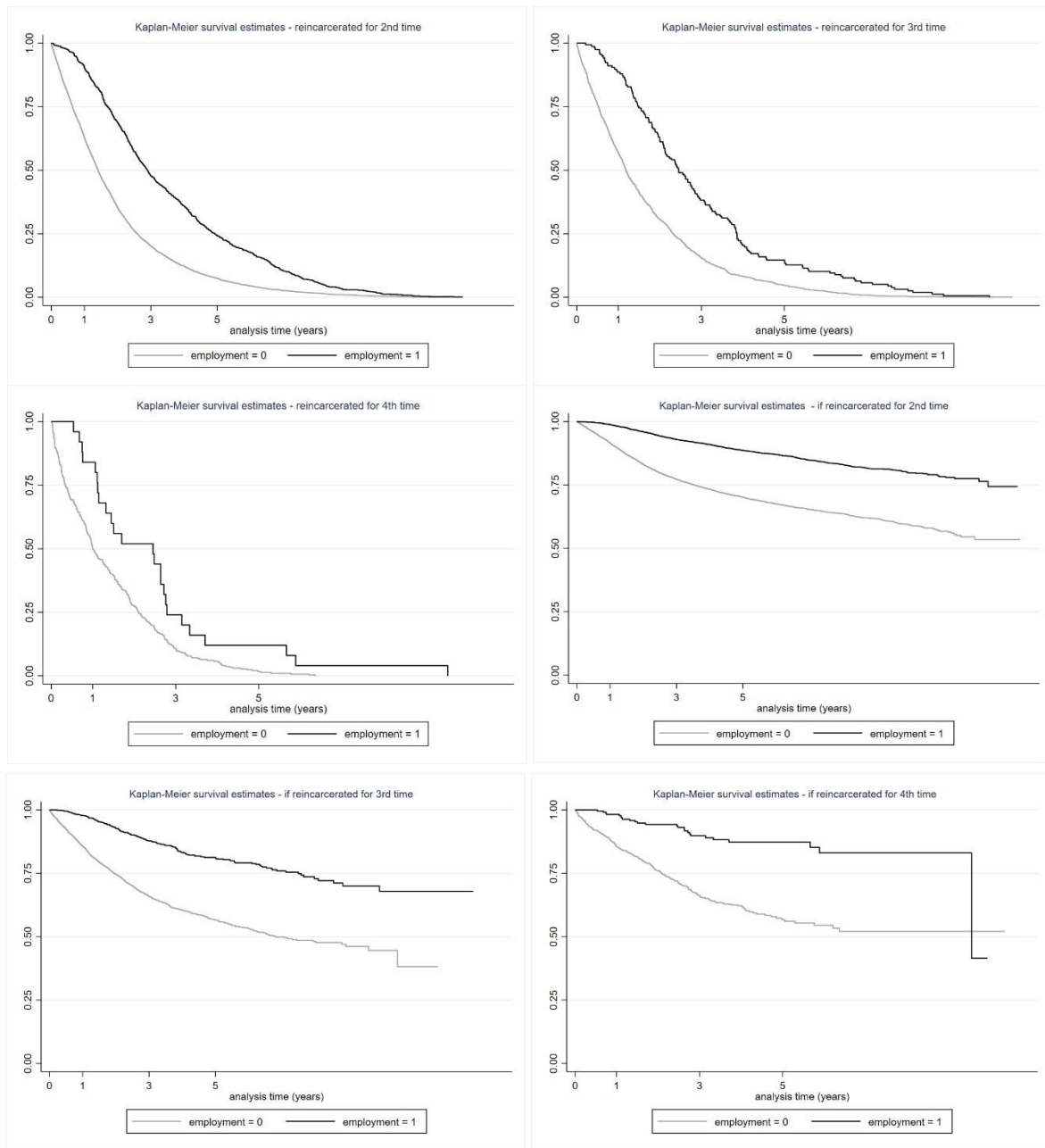
Graph A1. Kaplan-Meier survivor function estimates
Source: *own elaboration.*