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## **Sociohistorical Context and Post-prison Life Course**

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# Sociohistorical Context and Post-prison Life Course

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## **Abstract**

Life-course criminology has recently begun to focus on the sociohistorical context, with the use of multi-cohort studies. However, those studies have mostly concentrated on offending or aggregate crime rates. Desistance research, in turn, has largely overlooked the impact of the broader sociohistorical context. Based on recent work on the sociohistorical context and offending, we propose that context can also shape the desistance process.

We examined the employment, housing, and marriages of Finnish first-time prisoners released between 1995 and 2014 (N = 23 358) until 2019. We quantified the link between selected macro-level indicators and these three outcomes using applied age-period-cohort-models.

The results showed that the outcomes evolved in separate ways post-release. Employment and marriage became more common, but only employment showed distinct periodical changes. The probability of living in housing remained relatively stable. A higher level of national unemployment was associated with all outcomes. The association between background factors and the outcomes changed depending on release year.

Post-prison societal integration should not be measured by recidivism alone. Desistance studies should address the societal context when comparing different times or countries. Early studies may require replication if the associations between demographic factors and desistance outcomes are subject to change.

## Introduction

Between 1995 and 2019, over 17 million offenders were released from state and federal prisons in the U.S. alone (Bureau of Justice Statistics 2020). As society changed, these people faced different conditions at the time of their release. Research on desistance, the cessation of offending, has focused on its internal and external drivers and their interactions (Fox 2022) but has largely overlooked the impact of the sociohistorical context in a life-course setting. Different sociohistorical contexts may offer differing possibilities for desisting from crime, as labor, housing, and even the “marriage” markets change. Recently, Neil and others have demonstrated the cumulative effect of the periods in which people age on the crime rates of different birth cohorts, with cohorts born later offending less (Neil and Sampson 2021; Neil, Sampson, and Nagin 2021). Therefore, the sociohistorical context plays a role in the lives of future, current, and past offenders.

Life-course criminology aims to describe and explain changes in individuals’ criminal behavior and find ways to affect it (Blokland and Nieuwbeerta 2010:52). Recent research has shown that the sociohistorical context affects crime and incarceration rates. For example, Shen et al. (2020) showed that a more stringent criminal policy in adolescence was associated with increased incarceration rates throughout the life course, while Bjerk and Bushway (2022) demonstrated that people who were involved in high levels of crime at certain ages exhibited higher incarceration rates later. Period context can also exert more immediate effects on criminality. For example, police presence has been observed to reduce some forms of crime (Dau et al. 2021); the homicide rate is correlated with multiple macro-level economic and demographic measures (Koeppel, Rhineberger-Dunn, and Mack 2015), and a recent study by Nivette et al. (2021) showed that the COVID-19 stay-at-home restrictions reduced crime globally.

Analysis of sociohistorical change has recently become the focus of life-course criminology, with the use of multi-cohort study designs (Piquero 2022). Such an approach has been adopted because of the suggested limitations of single-cohort follow-up studies, which are considered to prevent analysis of historical change, as all participants of those studies experience changes at the same time and age (Farrall 2021; Neil and Sampson 2021). This claim relies on an assumption originally expressed by Ryder (1965) that sociohistorical change carries age-graded effects. Nonetheless, despite innovative study designs and new interest in analyzing sociohistorical change, less attention has been paid to the contribution of the changing societal context on measures related to desistance. A recent National Academies’ report (2022) recommended including measures of success in the analysis of post-prison life courses rather than focusing exclusively on recidivism, a measure of failure. Furthermore, while theoretical work on desistance recognizes the importance of a more proximal social context (e.g. neighborhood and family; Farrall, Bottoms, and Shapland 2010), more distal processes on the macro-level have been less studied. Moreover, most research on desistance has examined individuals released within a short temporal frame, inhibiting sociohistorical analysis.

This study aims to contribute to our understanding of the importance of the sociohistorical context in three ways. Recent multi-cohort studies have focused primarily on offending or aggregate crime rates. Moreover, earlier desistance studies have concentrated narrowly on recidivism in a neighborhood context, a criticism also levelled by Morenoff and Harding (2014). Therefore, first, we widen the scope of interest to encompass the employment, housing, and marriages of released prisoners in the context of Finland. Employment and marriage are important to both an individual’s wellbeing and social integration even if the direction of causality vis-à-vis desistance can be contested (Skardhamar et al. 2015; Skardhamar and Savolainen 2014). Homelessness, in turn, has

been found to be a risk factor for recidivism in both the U.S. (Jacobs and Gottlieb 2020) and Finland (Aaltonen et al. 2021).

In addition, previous research has either focused on how macro-level changes predict aggregate crime rates (for homicide see e.g. Koepfel et al. 2015; Rudolph and Starke 2020) or individual-level criminal offending (e.g. van de Werve, Blokland, and Weerman 2022). Consequently, this study attempts, second, to quantify the link between societal, macro-level changes and the life courses of former prisoners using the three outcomes of employment, marriage, and housing. This analysis helps us understand the aspects of societal shifts that are relevant for the desistance and social integration of former prisoners. Furthermore, indicators that correlate with aggregate crime rates of the entire population are likely to differ from those predicting the employment, housing, and marriage rates of ex-offenders. Moreover, instead of examining outcomes at a single point in time, we examine the development of these outcomes over time in individual lives for up to 15 years after release from prison.

Thirdly, we explore the life courses of people who have been released from prison for the first time in Finland. Factors driving marriage rates and employment for the general population may be very different from those affecting the prisoner population. Furthermore, the labor, housing, and marriage market in which these people participate may also differ from that of the general population. The Finnish prisoner population also faces multiple health disadvantages, such as substance use (Lintonen et al. 2011) and infectious diseases (Viitanen et al. 2011), rendering it a distinctive, yet fragile group in the face of societal changes. Finland itself is an appealing context for the study, as the country's labor, housing, and marriage markets have experienced substantial changes. Unemployment has halved since 1995 (figure 1; Sotkanet.fi 2023b), a successful homelessness reduction program has been implemented (Pleace 2017), and Finns display a diminishing preference for traditional unions, with more individuals opting to cohabit (Jalovaara and Andersson 2022). Finally, Finland's rich register data, which obviate the problem of non-response bias, facilitate complex study designs and long follow-ups.

### Setting and research questions

In this study, we analyzed the post-release employment, housing, and marriage rates of Finnish first-time prisoners after release from prison. The subjects were released between 1995 and 2014, and their lives were followed until the end of 2019 using Finnish population registers. The study's statistical analysis was based on a modified age-period-cohort-model (APC-model). In a typical APC analysis, birth cohorts are followed through their lives, and each of the components—age, period, and cohort—uses the natural definitions of chronological age, calendar year, and birth year, respectively. In our framework, we formed the cohorts using their release years. This approach was motivated by the fact that members of the same cohort faced similar conditions in prison and encountered the same sociohistorical context post-release. In turn, the age component in the analysis referred to elapsed time since release.

Our research was guided by four major research questions. The first was *how rates of employment, living in housing, and marriage develop after release (RQ1)*. The rates were computed for all cohorts and visualized with heatmaps. Changes in the sociohistorical context would then be visible in annual and cohort-wise fluctuations. Employment rates were expected to increase with time post-release. This assumption is in line with a previous Norwegian study where the proportion of former prisoners in employment indeed increased over time (Skardhamar and Telle 2012), although it should be noted that earlier research on Finnish prisoners sentenced in 2004 and 2005 found that the

proportion of ex-offenders in employment remained relatively stable post-release (Aaltonen et al. 2017). Prisoners' homelessness and marriage rates have not been studied longitudinally in Finland. However, in Australia, Moschion and Johnson (2019) found that incarceration raises the probability of homelessness after release, but not immediately.

Second, we examined *the differences and similarities between cohorts of released prisoners (RQ2)* using a modified version of the APC-interaction model presented by Luo and Hodges (2022). To examine whether *the possible differences between release cohorts were driven by changes in their sociodemographic composition (RQ2.1)*, we controlled for different sociodemographic and criminogenic covariates. We also examined whether *the association between sociodemographic factors and the three outcomes was same for all cohorts (RQ2.2)*. This three-step analysis was performed to explore whether differences existed between the cohorts of released prisoners in the outcomes measured generally and whether these differences were the result of the changing composition of the cohorts or the changing contribution of cohort composition to the outcomes. For instance, it might have been the case that there were no cohort differences in the aggregate levels of outcomes, but demographics and its contribution to cohort composition changed over time in the opposite directions. For example, more women might be present in later release cohorts, but over time women could be better employed, thus attenuating the differences between cohorts. A changing association with the outcomes for later cohorts would also imply changes in the post-release sociohistorical context and indicate whether specific sub-groups have become more disadvantaged in their integration.

Third, we studied *how different measurable changes in society at large contributed to the development of the outcomes (RQ3)*. Motivated by prior research, we chose five indicators (the general unemployment rate, percentage change in average rent, the price of alcohol, the number of police officers, and the Gini coefficient) to examine the association between different macro-level changes and the lives of the prisoners on a micro-level. Previous research has shown that adverse macro-level developments can affect integration attempts. For example, Schnepel (2018) found that increased number of new hires reduced recidivism. Other studies are briefly reviewed in the subsection "Sociohistorical context."

Fourth, we performed a subgroup analysis to *explore differences by gender (RQ4.1) and principal offence (RQ4.2)*. Re-entry experiences may vary for different subgroups, and the context may enhance existing differences. RQ4.1 was partly informed by the Finnish context, where it is known that female prisoners are even more disadvantaged than their male counterparts (Viitanen et al. 2011, 2012, 2013), with diverged life courses. For example, female prisoners are many times more likely than male prisoners to have been physically, psychologically, and sexually abused by their partners (Joukamaa et al. 2010), and their ability to work is known to be at a lower level (Viitanen et al. 2012). In turn, principal offences are the offences in a sentence which carry the most severe punishment, and they were categorized as crimes of violence, property crimes, alcohol and drug crimes, and other crimes.

## **Theories and previous research**

### Multi-cohort studies

The ideas of Ryder, Riley and Elder laid the foundation for multi-cohort studies. Riley (1973) and Elder (1975) noted that age-group differences observed in cross-sectional studies may have resulted

from cohort or life-course differences and that such studies were unlikely to be unable to recover the actual causes of those differences. Ryder claimed that as cohorts age, they carry the imprint of their societal encounters throughout their lives (Ryder 1965:844) and thus are differentiable as they participate in their own piece of history. Further, in his view, the ability to analyze cohort differences rested on the assumption that the sociohistorical context affects people of different age differently (Ryder 1965).

Later, with the advancement of computational methods, studies on age, period, and cohort have become abundant. Multiple new methods to estimate their effects have been devised, not without critique (Bell 2020; Fosse and Winship 2019). These studies have found varying cohort effects for crime rates (Lu and Luo 2021; Spelman 2022) and incarceration rates (Shen et al. 2020). Next, we should be able to move beyond merely estimating APC-model coefficients and attempt to understand the underlying reasons for the variability in the estimates without resorting to speculation.

The first study in crime research to move towards a sociohistorical analysis with multiple cohorts was Fabio and colleagues (2006), which examined the self-reported violence of two cohorts of males from the Pittsburgh Youth Study and concluded that period effects were the driving force behind cohort differences. Later studies using multi-cohort designs have revealed that similar individuals born in different years display different offending trajectories (Neil and Sampson 2021; Neil et al. 2021) due to exposure to different societal contexts during their life course. The use of multi-cohort designs and Scandinavian register data have also revealed that changes in aggregate rates of crime may hide changes in the criminal offending of cohorts born in different years (Sivertsson, Nilsson, and Bäckman 2021).

### Employment

Employment has played a central role in theories and empirical studies on desistance. Skardhamar and Savolainen (2014) categorize desistance-related theories using three ideal-typical offending trajectories that assign either a causal, conditional, or spurious role to employment as a cause of desistance. Laub and Sampson's (1993) theory on age-graded social control suggests employment works as a "turning point," an exogenous change in life course, which leads to a reduction in offending after gaining employment. Contrary to this, the maturation perspective emphasizes that desistance precedes employment, or other turning points, completely and is not a consequence of it (Skardhamar and Savolainen 2014). The "hook for change" theory occupies the middle ground between the two, claiming that the first steps in desistance are taken earlier, but that gaining employment expedites the process (Laub and Sampson 1993). Recent results by Thomas et al. (2022) support the maturation perspective by suggesting that transitions to employment and marriage are preceded by changes in values. Similarly, in the Norwegian context, it has been observed that offending frequency falls before entry into employment (Skardhamar and Savolainen 2014).

Both Schnepel (2018) and Yang (2017) provide a macro-level perspective on post-prison recidivism studies, finding that recidivism rates tend to be lower when there is a higher demand for low-skilled labor at the time of release. Their results, along with those of LaBriola (2020), emphasize that the quality of post-prison employment affects the potential of employment to promote desistance.

Mears et al. (2014) also highlight the existence of racial discrepancies in the effects of the labor market on recidivism in the U.S.

Labor market status before incarceration may also be important. For instance, Bhuller et al. (2020) demonstrated that the crime-preventing effect of Norwegian prison was driven by those offenders who did not work before imprisonment but who later gained some form of employment. Similarly, Bäckman et al. (2018) found small negative effects of imprisonment on post-release employment in Sweden, but only for those who participated in the labor market prior to their incarceration. In turn, results from Ohio showed that those who gained employment only after release displayed recidivism rates similar to those who were stably employed before and after prison (Kolbeck, Lopez, and Bellair 2023). Finally, Ramakers et al. (2016) reported that a third of Dutch pretrial prisoners returned to their previous employer after release.

In Finland, previous research has found that the labor attachment of prisoners is poor even before incarceration and that post-release employment may only reflect employment status before incarceration (Aaltonen et al. 2017). A Finnish prisoner health study found that, based on a medical examination, only half of Finnish male prisoners and a third of female prisoners were fully able to work (Joukamaa et al. 2010:55). More generally, the technological changes witnessed in recent decades have led to a partial polarization of the Finnish labor market (Alasoini and Varje 2021; Asplund et al. 2011). In the private sector, middle-income jobs have disappeared in favor of both low- and high-income jobs, whereas in the public sector only low-income occupations have become less common (Alasoini and Varje 2021). Income inequality in Finland is low, but the income ratio between the top decile and the lowest decile has increased, although more slowly than in other Nordic countries and the U.S. (Asplund et al. 2011).

### Lack of housing

Lack of housing and criminal behavior can be examined in the contexts of general strain theory and the theory of social control. General strain theory (Agnew 1992) states that adverse and stressful life experiences, such as homelessness, can increase criminal behavior. In turn, the theory of social control, by Hirschi (1969), posits that social bonds reduce criminal offending as people do not want to sacrifice their relationships. In their review, Lee et al. (2010) write that homeless people remain intermittently in touch with their housed family members and friends and that they seek the company of their homeless peers for non-judgmental socialization.

Empirical studies have linked housing insecurity with increased recidivism and crime. For instance, Moschion and Johnson (2019) found that incarceration increased the risk of homelessness with a delay, and Lutze et al. (2014) linked homelessness periods with increased risk of recidivism. An international review found that housing interventions produced multiple benefits, including reduced substance use, increased housing tenure, and, specifically for the Housing First model, reduced contact with the criminal justice system (Luchenski et al. 2018). In Finland, Aaltonen et al. (2021) studied Finnish prisoners released in 2000–2015 and found that risk factors for end-of-year-homelessness were young age, male gender, a high number of prior prison sentences, and unemployment. Furthermore, they estimated that one third of Finnish prisoners lacked housing at the time of release (Aaltonen et al. 2021).

Finnish law offers tenants wide-ranging protection, and landlords do not possess the right to evict or deny housing solely based on criminal records. However, if rent is not paid, damage is incurred to



the property, or tenants repeatedly disturb their neighbors and the surrounding area, eviction is legal (61§, Ministry of the Environment 1995). In Finland, homelessness is relatively low due to the successful implementation of a long-term homelessness reduction program (see figure 1B; Pleace et al. 2015). The program was based on the Housing First model from the U.S. (Pleace et al. 2015) and was implemented in two phases, starting in 2008 and 2012. The public sector also offers a large amount of housing; for instance, one in seven people living in the capital, Helsinki, are housed by the Helsinki City Housing Company (2022).

### Marriage and cohabitation

Recent global developments in rates of marriage and divorce have been explained with the theories of second demographic transition (SDT) and “gender revolution.” SDT refers to a value shift towards individualism, ultimately leading to fewer marriages and more births outside marriages (Van De Kaa 1987). However, a lack of consideration for gender roles has been noted as one deficiency of the SDT (for an overview see Zaidi and Morgan 2017). Consequently, Goldscheider et al. (2015) supplemented the SDT with the idea of gender revolution, where demographic changes are induced by gender role changes, which occur in two phases. In the first phase, women’s labor force participation increases and their participation in domestic work decreases, while in the second phase men become increasingly involved “in the private sphere of home and family” and take part in housework (Goldscheider et al. 2015:211).

Empirical studies in Finland have shown that the marriage rates of the less educated are lower and that gender differences within educational groups are small (Jalovaara and Fasang 2015). In Finland, recessions have been associated with fertility declines (Hiilamo 2017), but the dynamics between education, fertility changes, and recessions changed from the 1990s to the early 2010s. During that period, the proportion of children born outside of marriage increased from 25 to 45 percent, as proposed by SDT, but the majority of those births were accounted for by cohabiting couples (Statistics Finland 2017). Jalovaara (2013) found that low education, unemployment, and the male partner’s low income increased the risk of dissolution of both cohabitations and marriages. The association between male unemployment and marriage dissolution has also been found in other societal contexts (Lyngstad and Jalovaara 2010).

The marriage-crime relationship has long been a central focus of research. For Laub and Sampson (1993), it was a vehicle which conveyed social control, thereby affecting offending. However, more recent studies in the Scandinavian context have disputed this claim and in turn suggest that marriage is merely an end point of the desistance process and that identity transformation and crime reduction already occur before marriage (Lyngstad and Skardhamar 2013; Skardhamar et al. 2015) reflecting changes in gender roles. Moreover, Finnish studies have found that cohabitation is associated with greater reductions in offending than is marriage (Airaksinen et al. 2023; Savolainen 2009). Beyond this study, the trends of marriage and cohabitation among individuals involved in the Finnish criminal justice system are unknown.

Imprisonment itself has been found to be disruptive for both cohabitating and married couples (Apel 2016). After comparing released prisoners to men deployed in the military, a study by (Massoglia, Remster, and King 2011) explained this in terms of the time of separation imposed by incarceration. Alternative forms of sanctioning could help: for instance, electronic monitoring has been discovered to lower the risk of divorce for five years after a conviction in the Danish context (Fallesen and Andersen 2017).

The Finnish criminal justice system

In the Nordic countries, only the most serious offences lead to incarceration, and most sanctions are less severe (Lappi-Seppälä and Tonry 2011). Partly as a result of this policy, the prisoner population is highly selective and marginalized and faces multiple health disadvantages (Joukamaa et al. 2010; Lintonen et al. 2011; Viitanen et al. 2012). In the last 50 years, justice system reforms in Finland have led to decreased prisoner rates despite increasing crime trends (Lappi-Seppälä 2012). In general, the prisoner rate in Finland is low (figure 1A; FIN: 51 / 100,000 pop. vs USA: 505 / 100,000 pop., 2020 data; World Prison Brief 2023). These low incarceration rates have been attributed to the general use of fines and community sanctions (Lappi-Seppälä and Tonry 2011). A sanction reform in 1992 introduced community sanctions, which were taken into permanent use in 1995 after a brief experimental period (Lappi-Seppälä 2016).

According to the law, the objective of imprisonment is to prepare offenders for a crime-free life and improve their life management (Ministry of Justice 2005). In general, prison conditions are humane and prisoners are treated with dignity, following the ethos of “Scandinavian exceptionalism” (Pratt 2007). During incarceration, prisoners are obliged participate in activities, including work, education, and training (Ministry of Justice 2005).

\*\*\* Figure 1 about here. \*\*\*

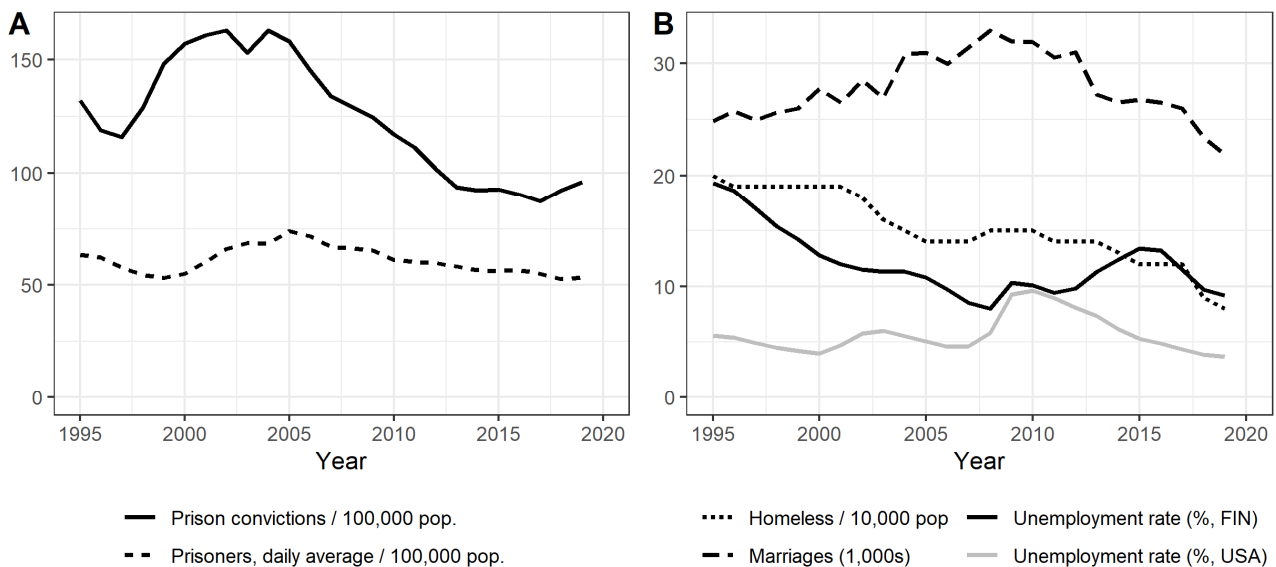


Figure 1: A: Conviction and prisoner rates in Finland (Criminal sanctions agency 2022:24). B: Number of marriages (Statistics Finland 2023a), lone homeless persons (Sotkanet.fi 2021, 2023a) and unemployment rates in the general population for Finland (Sotkanet.fi 2023b) and the USA (U.S. Bureau of Labor Statistics 2023). Unemployment rate in the USA provided for reference.

Sociohistorical context

Research on macro-level processes and their relation to crime can be categorized into macro-macro and macro-micro studies. Macro-macro research focuses on macro-level changes impacting other macro-level processes. This line of research has traditionally concentrated on investigating the

association between macro-level processes or indicators and aggregate crime rates (Koeppel et al. 2015; Rudolph and Starke 2020). Macro-micro research focuses on the distal macro processes affecting life at the micro-level. For example, van de Werve et al. (2022) examined how general trust in the economy affects crime and found that lower trust increases crime on an individual level.

The present study examined the association between five period-specific macro-level indicators—the general unemployment rate, annual percentage change of rents, alcohol price, number of police officers and Gini coefficient—and employment, housing and marriages after release from prison in the Finnish context. We argue that these five indicators should be able to quantify the relevant aspects of the Finnish economy and Finnish society during the post-release life of prisoners. The following reviews recent research that has been conducted in connection to these five measures and three outcomes.

The local unemployment rate has been associated with post-prison employment, at least in the U.S. context (Sabol 2007). Moreover, research on crime has investigated the relationship between the unemployment rate and crime. For instance, in their study, Van de Werve et al. (2022) reported that only trust in the economy, but not the general unemployment rate, was associated with criminal behavior. In turn, Bjerk and Bushway (2022) studied whether crime rates at specific ages were related to later incarceration while controlling for unemployment rate, finding associations for crime rates but failing to report the estimates for unemployment rate. A study in Australia found that ex-prisoners were no more likely to become homeless than other respondents when controlling for socioeconomic features and housing and the labor market situation, but they were nevertheless more prone to enter homelessness if the housing market changed (Johnson et al. 2019). More broadly, Hanratty's (2017) review of the previous literature found only mixed evidence for the association between the general unemployment rate and homelessness. No studies on the association between the general unemployment rate and marriage after prison could be found, but Solaz et al. (2020) studied aggregate unemployment rates and divorce risk in the general population and did not find an association between them in Finland.

Rent increases in UK have been observed to increase property crime and evictions (Fetzer, Sen, and Souza 2023). Higher average rents in general have been positively associated with homelessness (Hanratty 2017; Quigley and Raphael 2001), and an instrumental variable study suggests a causal interpretation (Byrne, Henwood, and Orlando 2021). Moreover, increases in house prices have been shown to be negatively associated with fertility (Dettling and Kearney 2014; Simon and Tamura 2009). Furthermore, a UK study found that negative house price shocks increased the risk of divorce (Rainer and Smith 2010). However, previous research has produced mixed evidence for the association between entry into homelessness due to rent increases and employment (Chigavazira et al. 2014; Desmond and Gershenson 2016; Swami 2018).

In 2004, Finland reduced the tax rates on alcoholic beverages. The health effects of those price changes were found to disproportionately affect vulnerable subpopulations, such as the unemployed and those with lower education (Herttua, Mäkelä, and Martikainen 2008; Room et al. 2013). By contrast, a review by Nelson and McNall (2016) found mixed results from policy-driven natural experiments with alcohol prices on alcohol-related harms, and, further, the impact on crime and drunk driving was found to be zero or even negative. Nevertheless, in a representative study of Finnish prisoners, approximately 70% were diagnosed with alcohol dependence (Lintonen et al. 2011). Therefore, lower alcohol prices are expected to be associated with lower levels of

employment and marriages and increased homelessness due to the health effects of alcohol for this vulnerable population.

We used the number of police officers as a proxy measure for formal control by the state. However, using studies from the U.S., a review by Lee et al. (2016) concluded that the “effect size for police force size on crime is negative, small, and not statistically significant.” A review by Dau et al. (2021) augmented this view in part by demonstrating that it is police presence which matters where crime effects are concerned, not the number of police officers. However, in the present study we are interested in the indirect effects of increasing policing and the outcome is not crime. Motivated by deterrence theories and the theory of rational choice, we hypothesize that this proxy measure of police presence should exert positive effects on employment, housing, and marriage rates among those released from prison, as increased policing could induce former prisoners to obtain income legally and refrain from a delinquent lifestyle.

The Gini coefficient measures inequalities in income. Income inequalities have been linked to homelessness (Byrne et al. 2021) and reduced entries to marriage (Cherlin, Ribar, and Yasutake 2016). The macroeconomic literature acknowledges that increasing unemployment affects the shape of income distribution at its lower end, driving income inequalities; however, an analysis by Aaberge et al. (2000) demonstrated that the Gini coefficient “hardly responded” to increasing unemployment in Finland in the early 1990s. Now, assuming changes in income inequalities are driven by labor market polarization (increase of low- and high-income jobs; Alasoini and Varje 2021; Asplund et al. 2011), we hypothesize that increases in income inequality and the Gini coefficient should be positively associated with the probability of employment for this subpopulation, as they are likely to be employed in low-income occupations.

## **Materials and methods**

Macro- and micro-level data were used in this study. The macrolevel indicators were retrieved or derived from publicly available official statistics. For subject-level analysis, we utilized Finnish population registers and data from district courts. Permission for the use of data was given by Statistics Finland (TK-53-1490-18). The anonymized data were processed in a secure environment at Statistics Finland.

### Data preparation

We identified first-time prisoners and estimated their release year using data from Finnish district courts for the years 1977 to 2019. The data included the year of conviction and information on the length of prison sentences for all the sub-offences in each conviction. The total length of a conviction was the full length of the longest prison sentence (principal offence) and one third of all other sub-offences. Prisoners who received life sentences were removed from the data, as their release year is not decided upon sentencing. Only the release years 1995–2014 were used due to the introduction of community sanctions in the 1992 prison reform. In Finland, the length of the sentence does not equate to the actual time incarcerated; first-time prisoners are incarcerated for half their sentence if they are over 21 at the time of sentencing and one third if they are under 21. The release year was then inferred using the age of the person at the time of sentencing and assuming that incarceration began on July 1 as exact dates of incarceration were unknown.

The population register data contained information on people permanently residing in Finland at the end of the year from 1995 onwards. The data contained sociodemographic information, such as age,

gender, place of residence, and educational level, which were measured at the end of the corresponding year. The data did not contain information for a person in a specific year if that person died or emigrated by the end of the year. Consequently, we excluded such individuals from the study. Data from the population registers were linked to conviction data using Finnish personal identification numbers.

### Dependent variables

The analysis used three dependent variables. *In employment* was construed from the population register variable indicating main economic activity at the end of the year. Possible activities were employed, unemployed, student, (unemployment) pensioner, conscript, and ‘other outside the labor force’. If a person was incarcerated at the end of the year, they were categorized as being outside the labor force. When using employment as the dependent variable, the analysis was limited to persons of working age (18–64 years old).

The dependent variable *in housing* was defined as those among the population living in dwellings. Finnish population registers exclude “persons permanently institutionalized, living in residential homes and abroad, homeless people and persons living in buildings classified as residential homes whose living quarters do not meet the definition of dwelling” from the dwelling population (Statistics Finland 2023b). People’s living quarters were inferred from their address. Previous research has shown that population register information on homelessness is comparable to that collected by the Finnish Criminal Sanctions Agency directly from the prisoners before their release (Aaltonen et al. 2021). Despite the similar results, those not in the dwelling population may not be literally homeless, and therefore this measure captures a variety of forms of precarious and unconventional housing in addition to homelessness proper.

*Married* people were identified using the population register variable indicating the marital status of a person. People were defined as married if they were married or in a registered relationship. Persons considered not married were either single, divorced, or widowed. As previous research has highlighted the role of cohabitation in the Scandinavian context, it was examined in a separate analysis. Using a ready-made variable in the register data, people residing in the same apartment were identified as cohabiting if they were not married, of different sex, not siblings, and aged over 18 with less than 16 years age difference (Statistics Finland n.d.-a). Additionally, female couples with a common child living in the same dwelling were considered to cohabit (Statistics Finland n.d.-a).

Recidivism was not the focal interest of this study, but descriptive figures for the release cohorts are presented. Table 2 shows the 10-year recidivism rates for the release cohorts. Recidivism was determined based on a new prison conviction in the following 10 years after release from the first conviction. The average number of new prison convictions for recidivists is also presented.

### Compositional covariates

Gender, age at release, education, foreign background, place of residence, principal offence of sentence, and length of sentence were used to control for the changing demographic composition of the cohorts of released prisoners. Education was binarized based on the length of education (under 12 years or 12+ years). In Finland, upper secondary education is completed after 12 years of schooling. Persons whose both parents or the only known parent had been born abroad were categorized as having a foreign background (Statistics Finland n.d.-b). Moreover, if a person had

been born abroad and there was no information on the nationality of their parents they, too, were considered to have a foreign background (Statistics Finland n.d.-b).

The association between place of residence and the outcomes was inspected by comparing urban regions to rural regions and comparing different geographical areas using the Nomenclature of Territorial Units for Statistics (NUTS) level 2 classification. Finland consists of five NUTS2 regions: Helsinki-Uusimaa, Southern Finland, Western Finland, Northern and Eastern Finland and Åland. As the Åland region contains only 0.5% of the Finnish population and is located nearest to the Western Finland region, these two regions were merged in the statistical analysis. The urban-rural division used a binarized version of the classification by the Finnish Environment Institute SYKE (SYKE 2021). The Municipality of Residence Act stipulates that each Finnish citizen must be assigned a municipality of residence, which was taken as an approximation of the general area of living for those not in the dwelling population.

Two covariates were derived from the district court data, the principal offence of the sentence and sentence length. Principal offences were classified into four categories: violent crimes, property crimes, drug and alcohol crimes, and other crimes. The principal offence is the crime in a sentence carrying the most severe punishment. Sentence lengths were categorized into three groups: under 8 months, 8 months to 2 years, and over 2 years. The categorization was informed by Finnish law as sentences under eight months can be converted into community sanctions and sentences under two years can be given as suspended sentences. The length of the sentence was used as a proxy for the severity of the crime.

### Contextual covariates

Contextual covariates are shown in table 1 and describe the national context each year. The rationale for their selection is presented in the subsection “Sociohistorical context.” Time series figures of the variables are presented in the supplementary material. As the Eurostat time series for average rents only extended back to 1996, the inflation-adjusted price changes before this were calculated using Statistics Finland data. The number of police officers in the Finnish police force was requested from the Police Administration (ref. POL-2022-111464) for the years 1999–2019. For 1995–1998, the number of police officers was retrieved from the annual reports of the Police Department (Ministry of the Interior, Police Department 1996–1999). In the models, for clarity of presentation, the index value for the price of alcohol was scaled to have a standard deviation of one. Originally, an inflation adjusted index price of rents was used in the statistical models, but it resulted in a variance inflation factor over four and was transformed to indicate percentage point changes in rents from the previous year.

Variable	Description	Source	Mean	SD
Unemployment rate	Unemployed as percentage of labor force.	Sotkanet.fi (indicator 181, see also figure 1)	12.0	3.0
Annual rent change	Inflation adjusted annual percentage change of average rents.	Harmonized Index of Consumer Prices, Eurostat and Statistics Finland	1.4	1.2
Alcohol price (index)	Inflation adjusted retail price of alcohol in index points. Scaled to have standard deviation 1.	Finnish Institute for Health and Welfare	14.4	1

Police / 10,000 pop.	Number of police officers in the Finnish police force per 10,000 inhabitants.	Police administration and Annual reports 1995–1998 of the police. Population from Statistics Finland.	14.5	0.9
Gini coefficient	Income inequality measure, ranges from 0 to 100. If zero, then income is equal for all. Higher values indicate higher inequality.	Income based on disposable cash income (incl. capital gains), data from Statistics Finland.	27.0	1.8

Table 1: contextual covariates. SD = Standard deviation.

### Statistical analysis

This study employed an applied age-period-cohort-analysis (APC-analysis) to investigate the data. In a typical APC-analysis, cohorts are defined by birth year, and both age and period follow their natural definitions. In this study, the conventional setup was modified such that cohorts were defined by the estimated release year, and “age” then referred to elapsed time since release. In what follows, this “age” will be called “index years” or “index time” to avoid confusion with the period-specific age of the subjects or their age at release.

All the following models were estimated using logistic regression models with generalized estimating equations to account for correlated responses (Liang and Zeger 1986). An AR(1) correlation structure was used in all models. Computations were performed with R (v. 4.0.5; R Core Team 2020) using the package *geepack* (Højsgaard, Halekoh, and Yan 2005).

### ***APC-models***

In an APC-model, any one of the time components (age, period, cohort) can be expressed using the other two, resulting in an APC-identification problem. In this analysis, the APC-identification problem was approached using the APC-interaction (APC-I) model presented by Luo and Hodges (2022). In the APC-I model, one of the time components is expressed as an interaction of the two others to remove collinearity. Originally, Luo and Hodges expressed cohort as the interaction of age and period, referring to Ryder’s conceptualization, where cohorts are understood to emerge because period changes carry age-graded effects (Ryder 1965:844). This formulation of the APC components avoids the APC-identification problem, as it does not assume a linear form for the period component. Furthermore, an interaction of two variables in a regression expresses the change in the outcome while the value of one variable changes and the other is held constant. Hence, even when expressing the concept of one time component, the interaction in the APC-I model does not linearly depend on the two others and thus sidesteps the identification issue.

In this study, we expressed period as the interaction of index time and cohort,  $P := I \times C$ . As this model is the APC-I model with age substituted by index time, we refer to our model as the IPC-I model. With this IPC-I model, period coefficients were reconstructed as the means of the corresponding interaction coefficients (Luo and Hodges 2022). For example, the period coefficient of 1997 was calculated as the mean of the interaction coefficients  $I^2 \times C^{1995}$ ,  $I^1 \times C^{1996}$  and  $I^0 \times C^{1997}$  (index year two for the 1995 cohort; index year one for the 1996 cohort, etc.). Confidence intervals were then calculated as the conventional Wald intervals for periods with three

or more corresponding interaction coefficients. Index year zero (the year of release) was included in the model as all the dependent and independent variables were measured at the end of the year.

The analysis was based on four models. The first model was a naïve model including only the index time, cohort, and index-cohort-interaction variables. For subject  $j$  observed in period  $p$

$$\text{logit}\left(E(y_{jp})\right) = I_{jp} + C_j + I_{jp} \times C_j ,$$

where  $y_{jp}$  is the response for that person-year and  $I$  and  $C$  are the index time and cohort components. Following the recommendations of Luo and Hodges (2022), both  $I$  and  $C$  were coded using sum-to-zero coding. Under this coding scheme, the coefficients are interpreted as deviations from the grand mean (mean of means), and subsequently an interaction represents a deviation from the cell mean implied by the main effects.

Next, to inspect the effect of the changing sociodemographic composition of the cohorts (RQ2.1), different sociodemographic and criminogenic variables were added to M1, rendering model 2 as

$$\text{logit}\left(E(y_{jp})\right) = I_{jp} + C_j + I_{jp} \times C_j + \beta X_{jp}.$$

Here  $X_{jp}$  refers to the covariate values for person  $j$  in year  $p$ . This specification allowed the covariate values to change during the follow-up (cf. place of residence).

In general, comparison of the coefficients of nested models is not straightforward and thus should be performed with care (Mood 2010). Yan et al. (2013) presented a method to compare nested linear models estimated with generalized estimating equations, but they did not provide a solution for non-linear models. Therefore, as a method for formally comparing the coefficients of nested models for this type of model does not exist, we only present the main effect coefficients for both models. The results are, however, qualitatively similar.

### ***Context models***

The main aim of this study was to analyze the effect of the societal context on the chosen outcomes (RQ3). This was achieved by replacing the interaction  $I \times C$  with period-specific values  $S_p$  of the contextual variables presented in table 1, resulting in model 3:

$$\text{logit}\left(E(y_{jp})\right) = I_{jp} + C_j + \gamma S_p .$$

As for models 1 and 2, we also wished to explore whether controlling for sociodemographic composition would change our estimates when examining the contextual variables. Model 4 controlled for both the societal context and the sociodemographic composition by including the period-specific variables  $S$  and compositional covariates  $X$ :

$$\text{logit}\left(E(y_{jp})\right) = I_{jp} + C_j + \gamma S_p + \beta X_{jp}.$$

This approach echoes the idea of the proxy variables approach employed by Heckman and Robb (1985). In that approach, the APC identification problem is solved by replacing one of the time components with the characteristics describing it. Here, we replaced the period component with measures describing the economic cycle and other aspects of society most related to our outcomes. Farkas (1977) utilized a similar approach by replacing the period component with the



unemployment rate when studying women's employment. O'Brien (2000) classifies these types of models as APC-characteristic models and presents a solution where the cohort component is replaced by measurable characteristics describing that cohort.

Winship and Harding (2008:397) noted that if one proxy variable is used and it fails to capture all the causal mechanisms of the variable it replaces, the APC effects will not be correctly estimated. As we estimated the APC main effects with and without the proxy variables using the IPC-I model, we visually examined the main effect plots to assess any changes in the coefficients. To examine the impact of our selection of context variables on the period and cohort coefficients, we also estimated models 2 and 4 using the general unemployment rate as the only context variable. The results were largely similar to those presented here and can be found in the appendix.

### ***Sub-group analysis and robustness checks***

To investigate RQ4, the data were partitioned by gender and by principal offence. After stratifying the data, models 2 and 4 were estimated on all strata separately. Selected results from these analyses are presented in the subsection "Sub-group analysis," and the full main effect figures and coefficient estimates can be found in the supplementary material.

To study the robustness of our findings to changes in the selected follow-up time, we also estimated models 2 and 4 with 15 and 5 years of follow-up. We adjusted the latest release year of the cohorts at the same time to maximize the available data while still allowing a full follow-up for all cohorts. I.e., for the 15-year follow-up, the last release year used was 2004, and for the 5-year follow-up it was 2014. As previously mentioned, main effect figures and coefficient estimates are presented in the supplementary material.

## **Results**

The entire data set contained 328 106 person-years from 23 358 persons. For the IPC-I models, the analysis data (index years 0–10, cohorts 1995–2009) contained 180 300 person-years from 18 127 persons. Figure 2 presents the proportions of the cohorts in employment, housing, and marriage for all years after release until 2019. Diverging patterns are observed in the figures. For employment, there were clear period patterns, and the employment rate was seen to improve as index time increased. Line graph 2B shows the relatively low employment rate in general (approximately 17 to 30 percent) and how the 2008 financial crisis reduced employment rates regardless of elapsed index time.

In contrast to employment, the proportion of cohorts in housing did not seem to exhibit a clear pattern in any of the time dimensions (index, period, cohort), though minor cohort effects may be discerned. The proportion of cohorts married (figure 2E) was period time stable, and the association with index time was most pronounced. The release cohorts of 2000–2007 were less likely to be married at release than other cohorts.

\*\*\* Figure 2 here. \*\*\*

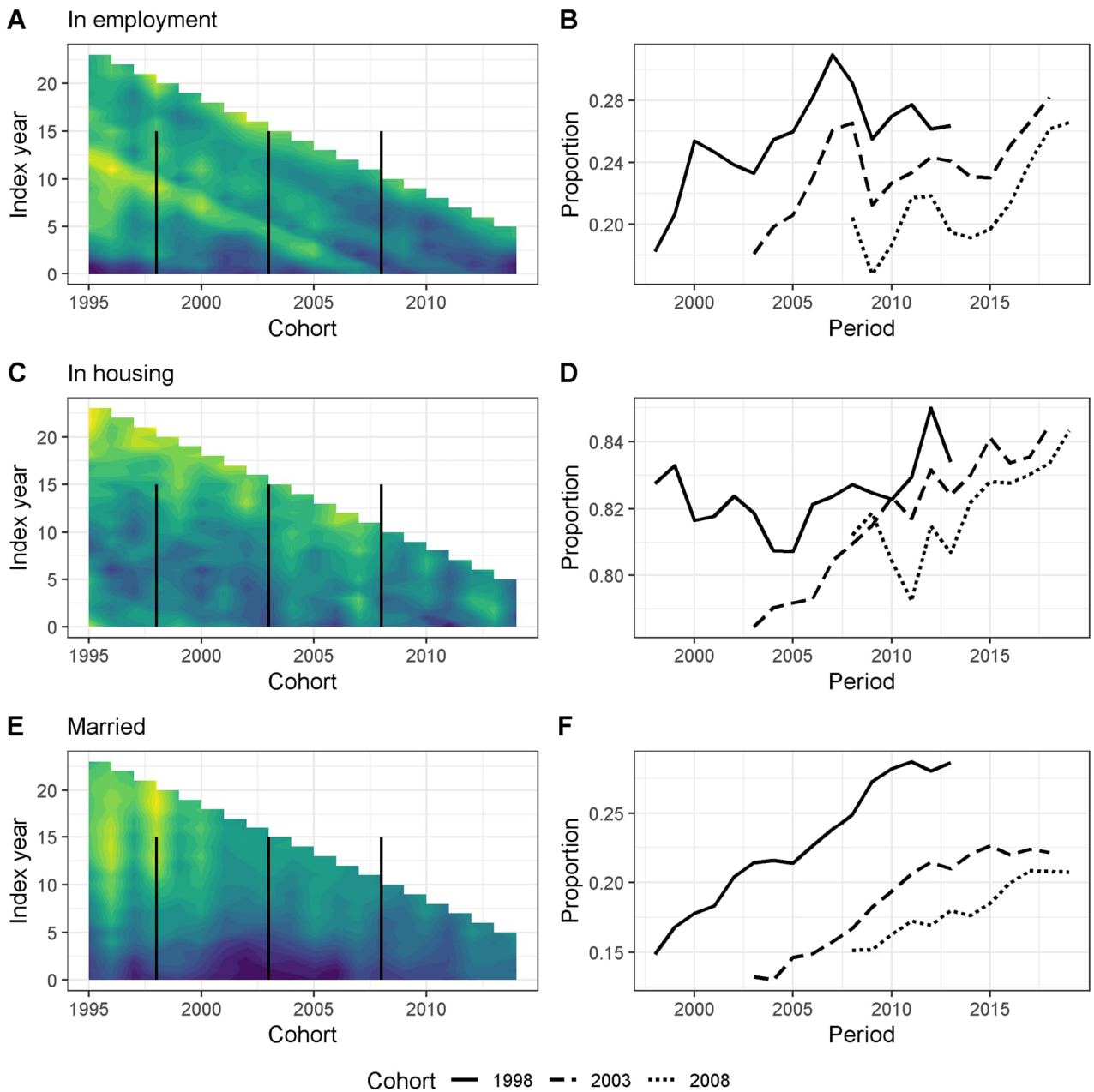


Figure 2: Relative proportions of the cohorts in employment (subfigures A, B), housing (C, D), and marriage (E, F) for all years after release for all (left column) and selected cohorts (right column). In subfigures A, C, and E, calendar years are on a descending diagonal. The light colors (yellow) signify higher proportions, and the darker colors (blue) reflect lower proportions. The black lines in subfigures A, C, and E reflect the cross-sectional line graphs B, D, and F presented on the right. The colors of the heat maps are not comparable between figures.

Cohort demographics have changed

The sociodemographic composition of selected cohorts and all cohorts in total is presented in table 2. The size of the release cohorts increased from 978 in 1995 to 1 409 in 2005 and then decreased again. In general, the cohorts have become older and contain more women and persons with a foreign background. The proportion of the cohort which received a new prison sentence in 10 years increased from 54.4 to 61.1% and then decreased again to 47.8%. The recidivists in the later cohorts received fewer prison convictions in the following 10 years than the first cohorts, the average

number decreasing from 6.4 to 5.1. Sentence length distribution is provided only as descriptive information, and no policy conclusions should be drawn, as average sentence length estimates based on exits in a given year may be inaccurate if the population is not constant (for details see Patterson and Preston 2008).

\*\*\* table 2 here \*\*\*

Table 2: Demographics of the release cohorts. Values are percentages unless otherwise stated. Avg = average, sd = standard deviation. <sup>1</sup>Among recidivists during the next 10 years.

	All cohorts	1995	2000	2005	2009	2014
N	23358	978	1171	1409	1173	884
Age at release (avg)	33.5	31.4	32.4	33.6	34.5	36.4
Died in 5 years	7.4	7.5	7.7	9.2	7.5	6.3
Women	8.9	6.1	6.0	9.5	10.0	13.7
≥12 years of education	38.5	36.6	36.7	39.5	36.8	43.9
Foreign background	6.9	2.9	4.7	5.0	7.7	13.6
Living in urban area	58.5	67.5	59.1	55.2	57.5	60.2
Recidivated in 10 years	-	54.4	61.1	54.2	47.8	-
No. of sentences (avg) <sup>1</sup>	-	6.4	6.2	5.1	5.1	-
No. of sentences (sd) <sup>1</sup>	-	6.7	5.3	4.9	5.2	-
Sentence length						
Under 8 months	52.8	52.4	57.6	58.8	51.6	34.5
8 months to 2 years	25.4	28.5	24.2	23.0	23.7	30.8
Over 2 years	21.9	19.1	18.2	18.2	24.7	34.7
Principal offence						
Alcohol/drugs	10.2	7.3	11.5	8.9	9.2	11.7
Violence	21.8	18.6	19.0	20.7	24.5	27.8
Property	25.2	36.8	29.7	21.4	20.6	20.2
Other	42.7	37.3	39.7	49.0	45.7	40.3
NUTS2 region						
Helsinki-Uusimaa	30.3	30.5	29.5	30.3	29.9	35.9
Southern Finland	22.1	21.1	23.1	22.4	22.8	17.5
Western Finland	24.9	24.4	23.7	23.6	25.5	26.6

### IPC-I-model results

Figure 3 presents the results from the IPC-I-models. Adding the compositional covariates to the model did not change the period coefficients. The probability of being employed or married increased almost monotonously post-release. The probability of living in housing decreased until index year 6 and then increased, but the differences were more moderate.

The period deviations in subfigure 3C for employment are distinctive and follow the labor market cycles. Reductions in employment coincide with the financial crisis in 2008 and the recession in 2012–2014. Period effects for the proportion of ex-prisoners in housing followed a U-shape, reaching a low-point around 2005 and increasing after that. Marriage rates exhibited weak annual

fluctuation, with positive period coefficient values during 2009–2011. The same years also witnessed a high number of marriages in the general population (figure 1B).

\*\*\* IPC-I model coefficient figure here. Figure 3 \*\*\*

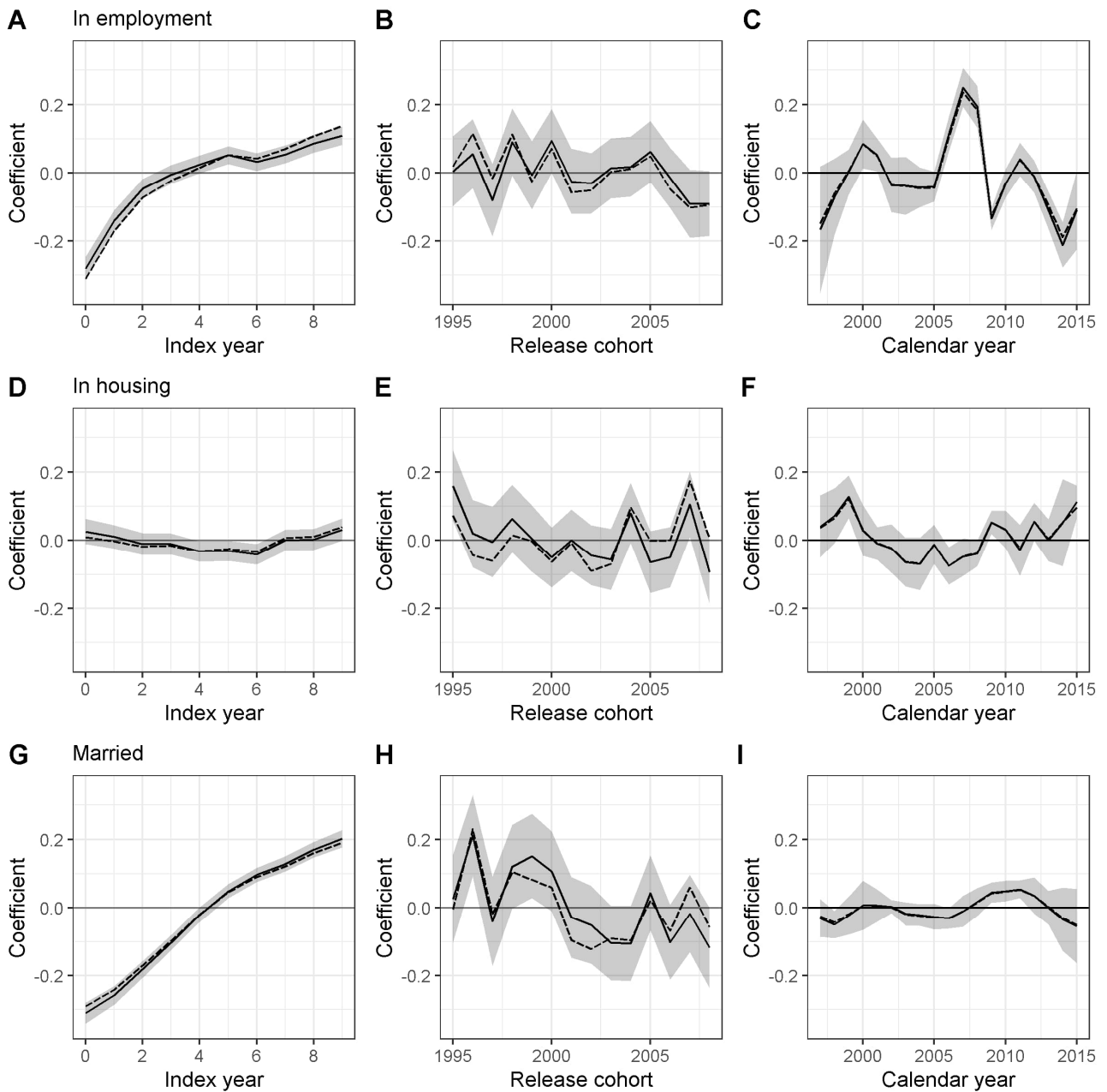


Figure 3: Index time, cohort, and period coefficient estimates for employment (subfigures A–C), homelessness (D–F), and marriages (G–I). Grey shading indicates 95% confidence intervals for the adjusted model with the compositional covariates (solid line). The dashed line without confidence intervals indicates coefficient estimates for the unadjusted model without the covariates. The two lines overlap completely in subfigures C, F, and I.

Comparison of covariate coefficients

We analyzed the drift of regression coefficients in time by stratifying the data into three parts by release year (1995–1999 vs. 2000–2004 vs. 2005–2009) and estimating model 2 on each part separately. The results of this analysis are presented in figure 4, below. Although direct

comparisons between models estimated on different data should be made with caution, the results can be considered at least indicative of whether the conclusions are robust for the examined periods.

The proportion of women and persons with a foreign background had increased among released prisoners over the last 20 years (table 2). Most notably, figure 4 shows that foreign background predicted a lower probability of being employed for the cohorts released before 2004 but not for those released after 2005. This may be related to changes in the structure of the labor market (Alasoini and Varje 2021; Asplund et al. 2011) or changes in the immigration status of the prisoner population with a foreign background (resident, refugee, tourist). The association between foreign background and marriage was also slightly weaker for those released after 2000 than for those released before.

Education, gender, and age were all differently associated with each of the outcomes. Completing secondary education (12+ years) quite consistently predicted better integration outcomes. However, for marriage, the association attenuated to non-significant for those released later. Male gender was associated with higher levels of employment and lower rates of living in housing and marriage; moreover, these associations became stronger for those released later. Age steadily predicted higher rates of living in housing, whereas the association between age and marriage weakened for those released later. Higher age predicted lower rates of employment only for those released after 2000.

No systematic change in regional differences was observed. From previous research, we know that homelessness is concentrated in urban areas. Of the four regions, Helsinki-Uusimaa (reference region in figure 4) is the most urban and populous, accounting for just 4% of Finland's landmass but over 31% of its population. By contrast, the region of Northern and Eastern Finland covers 61% of the country and consists primarily of rural areas. It was associated with the lowest levels of employment for those released before 2005 but became equal with other areas after that.

A principal offence of alcohol or drug crimes predicted lower levels of employment and housing for the earlier release cohorts. Longer sentences were associated with higher rates of marriage and employment, but no association or systematic change in that association was observed for living in housing. In general, it should be noted that no other covariate than education displayed a positive association with all the outcomes, and even for education the association was non-significant for those released after 2000.

\*\*\* Figure 4 about here \*\*\*

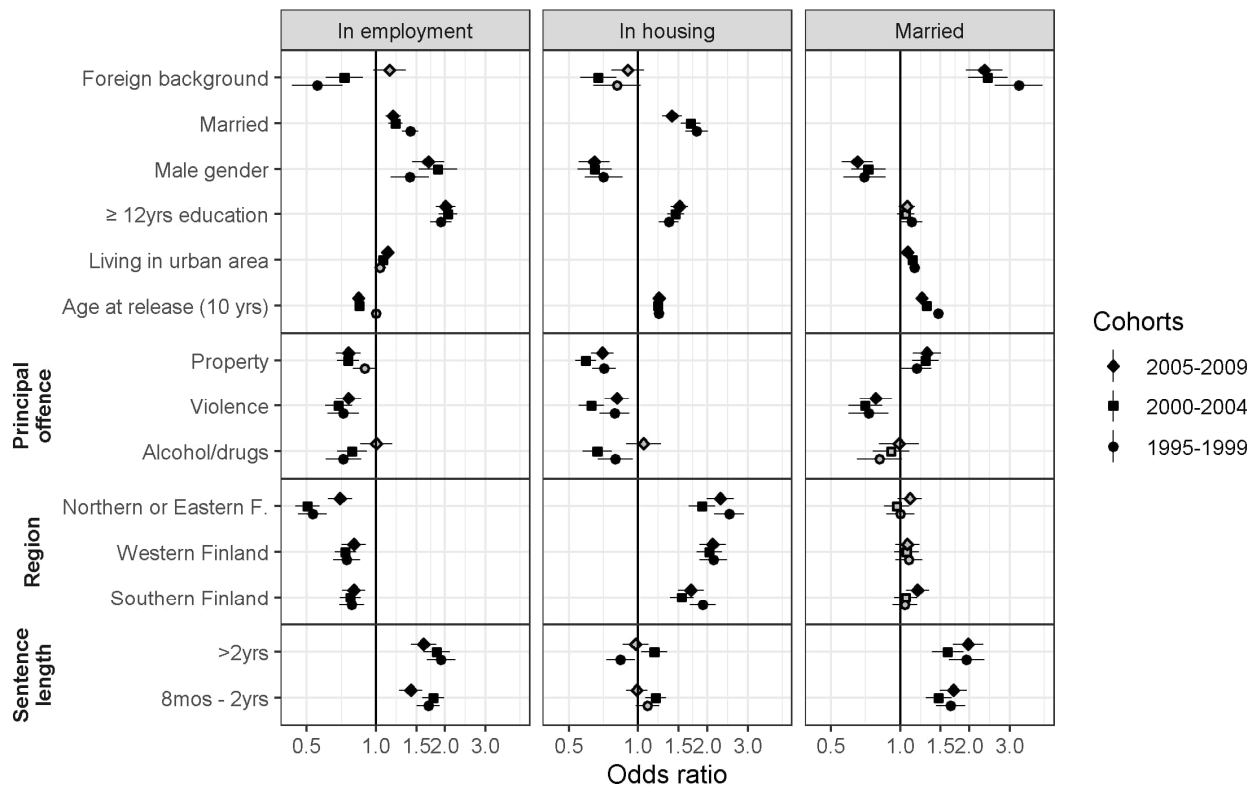


Figure 4: Odds ratio estimates for compositional covariates for all outcomes. The estimates are from model 2 fitted separately for cohorts released in 1995–1999, 2000–2004 and 2005–2009. The black fill indicates  $p < 0.05$ . Reference categories: Principal Offence, Other Crimes; Region, Helsinki-Uusimaa; Sentence Length, under 8 months.

Societal context

Figure 5 shows the employment, housing, and marriage rates post-release after adjusting for the societal context. Controlling for the sociodemographic composition of the cohorts changed the index and cohort coefficients, but qualitatively the conclusions remain the same. The association between index time and employment was largely attenuated, and the cohort coefficients for cohorts released in 1995 and 1996 changed after replacing the period component of the IPC-I model with the contextual covariates. The changed cohort coefficients may imply that when considering the compositional differences of the cohorts and differences in the labor market during the 10 years following their release, cohorts from the late 1990s were more likely to be in employment than later cohorts. Some reservations may be required when interpreting the results if the chosen variables do not scope the full period effect (Winship and Harding 2008).

The general unemployment rate was negatively associated with the employment rate of the prisoners, signifying that the employment rates of this population followed the general economic cycles. A higher number of police officers was inversely associated with employment, implying that increased formal control may reduce employment outcomes for this population. Furthermore, positive price shocks in rents were significantly associated with lower rates of employment. It could be that a rent increase drives people out of housing and decreases the probability of employment, a phenomenon observed in the U.S. (Desmond and Gershenson 2016) but not in Australia (Chigavazira et al. 2014; Swami 2018).

In their analysis, Alasoini and Varje (2021) suggest that developments in the private sector Finnish labor market have followed a U-shaped pattern, where low- and high-income jobs have become more common. The results in figure 5 show that the Gini coefficient was positively associated with being in employment, which could be interpreted in the context of labor market polarization to be the result of low-income jobs becoming more prevalent.

After adjusting for the societal context, index time did not associate with living in housing. Moreover, changing the period component to the contextual covariates did not change the cohort associations. The coefficient estimates in subfigure 4F show that, surprisingly, positive price shocks in rents were not associated with living in housing. In turn, counterintuitively, the general unemployment rate was positively associated with living in housing. Here, the most likely explanation is that the initiation of the long-term homelessness program at the start of the economic downturns created a spurious correlation between the two.

After controlling for the changing societal context, index time remained positively associated with being married. Cohort coefficients were also similar to subfigure 3H in IPC-I model. The general unemployment rate was inversely associated with being married, contrary to the results of Solaz et al. (2020). Other contextual measures were not associated with being married. For example, the price of alcohol was associated neither with the probability of being married nor with any other outcome.

\*\*\* IC-context model coefficient figures / Figure 5 about here. \*\*\*

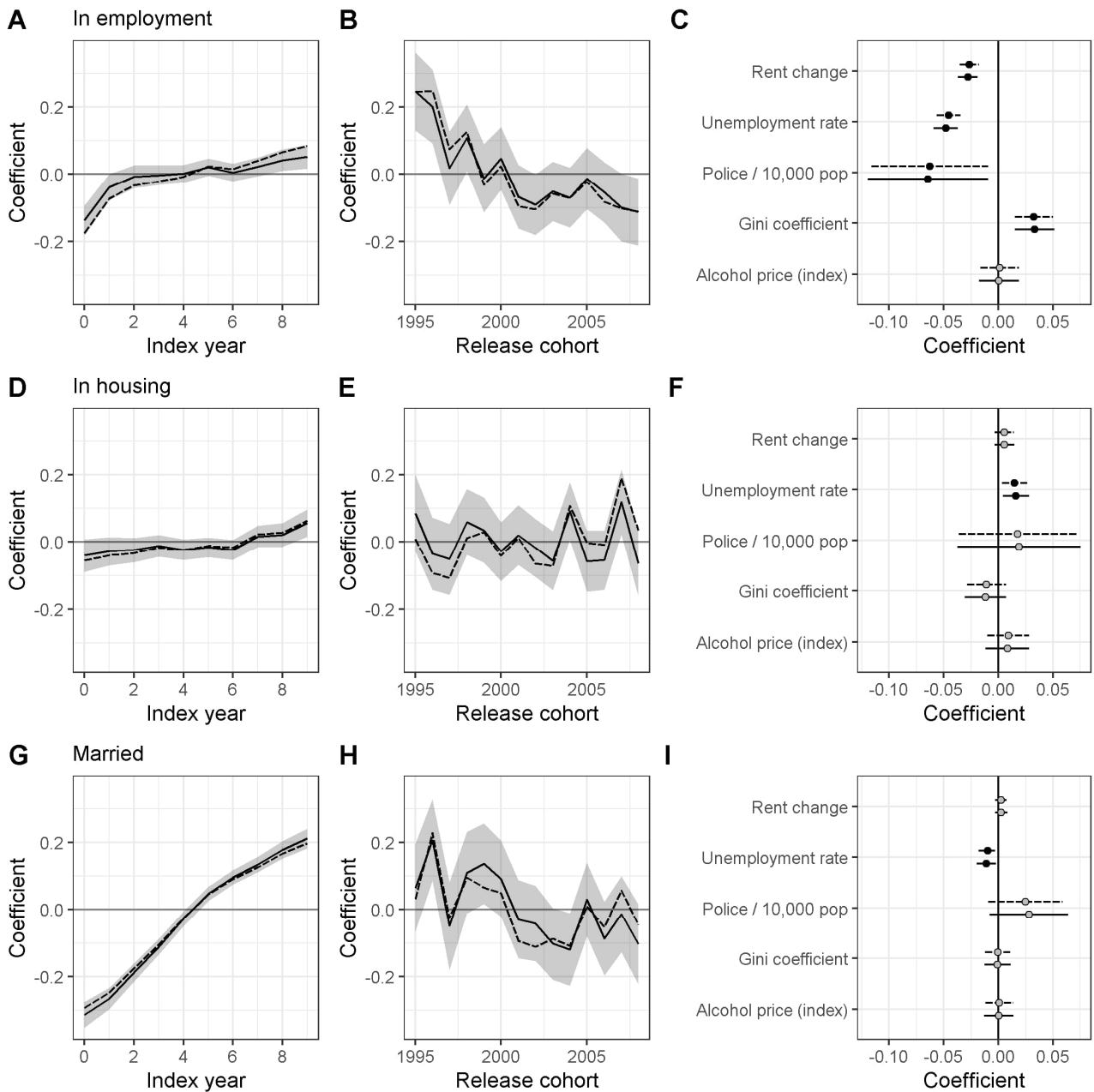


Figure 5: Index time, cohort, and context variable coefficient estimates for employment (subfigures A–C), homelessness (D–F) and marriages (G–I). The grey shading indicates 95% confidence intervals for the adjusted model (solid line). The dashed line indicates coefficient estimates for the unadjusted model. In subfigures C, F, and I, a black fill indicates  $p < 0.05$ .

### Sub-group analysis

Sub-group analysis was performed for different principal offence groups and for men and women. In the analysis stratified by principal offence, the heterogeneous group *Other* was dropped; the results are presented in figure 6, below. The results are largely similar for all groups, although the lack of sample size rendered some associations non-significant. For those with an alcohol- or drug-related principal offence, the trajectories regarding index time differ slightly and the cohort effects for housing exhibit an increasing trend. Rent increases were negatively associated with being employed among those convicted of property offences, a finding not replicated in other groups. The only consistent finding in all groups was the negative association between the general



unemployment rate and the probability of being employed. The association between higher alcohol prices and being employed was only found among those whose principal offence was substance related.

\*\*\* Figure 6 about here. \*\*\*

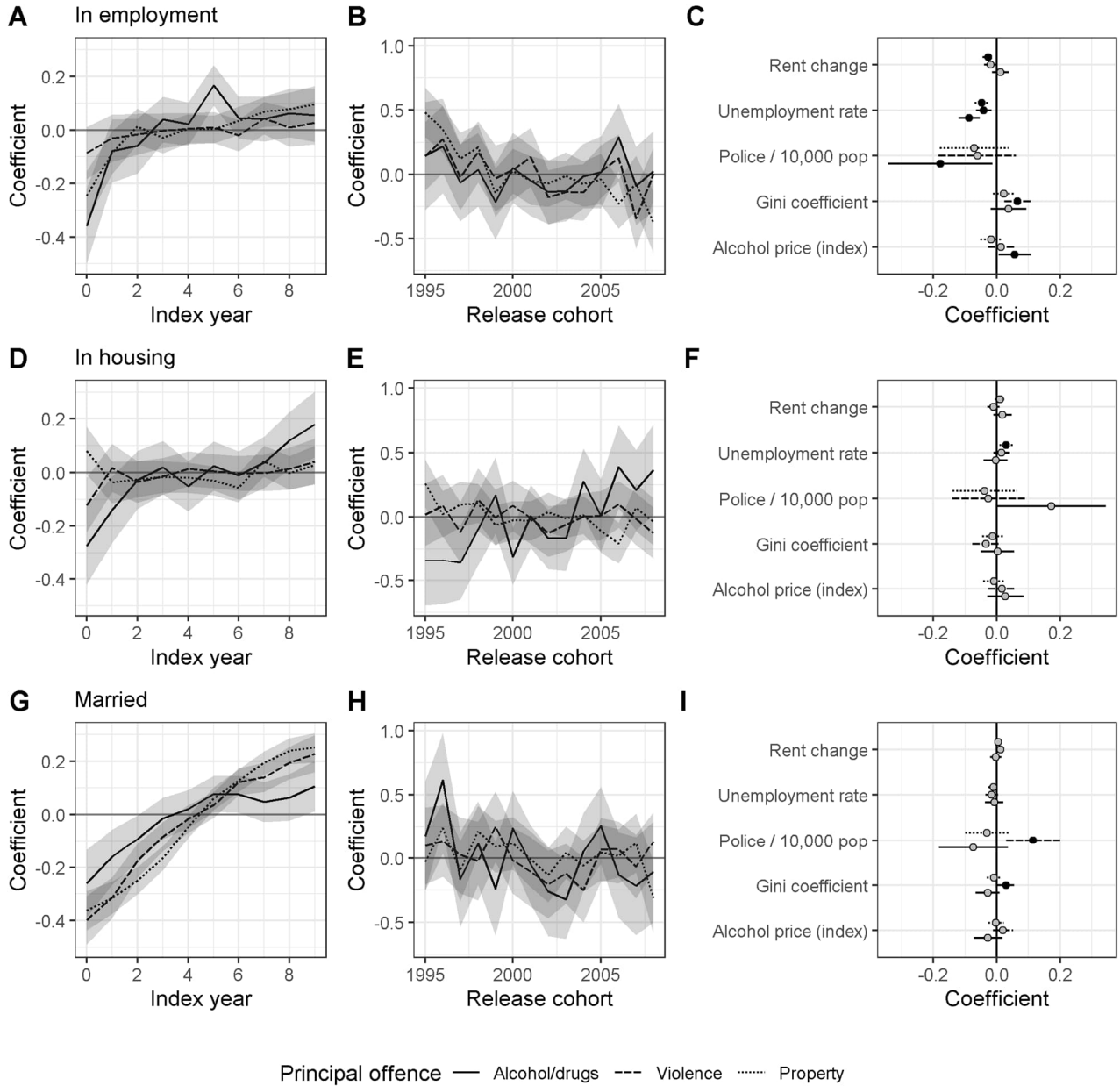


Figure 6: Index time, cohort, and context variable coefficient estimates for employment (subfigures A–C), homelessness (D–F) and marriages (G–I) stratified by principal offence. The principal offence group Other was omitted from the analysis. The grey shading indicates 95% confidence intervals. In subfigures C, F, and I, a black fill indicates  $p < 0.05$ .

The results of the gender-specific analyzes are presented in the appendix. They show diverging patterns for men and women and illustrate that the main results in figures 3 and 5 primarily represent men. For women, both employment and the probability of living in housing increased

with index time, while the marriage rate did not increase (figure A3). Cohort and period coefficients fluctuated more for models 2 and 4, but that is likely to be attributable to the smaller sample size. Context variables displayed largely similar associations, although the only statistically significant association in the model for women was the general unemployment rate with employment.

Analysis of cohabitation and robustness checks

We also explored whether our findings on marriage were robust when cohabiting couples were included. In general, similar patterns were observed to those previously reported. For marriage alone, index time was monotonously associated with marriage rates, as reported in figures 3 and 5. However, when considering both cohabitation and marriages, the rate increased with index time until year 5 and then flattened out (figure 7). Cohort patterns were more pronounced when only marriage was considered. Period patterns were similar for both outcomes. When controlling for the post-release societal context, the directions and effect sizes of the contextual covariates were the same, but the rent changes and number of police officers were statistically significantly associated with being married or cohabiting.

\*\*\* Figure 7 about here. \*\*\*

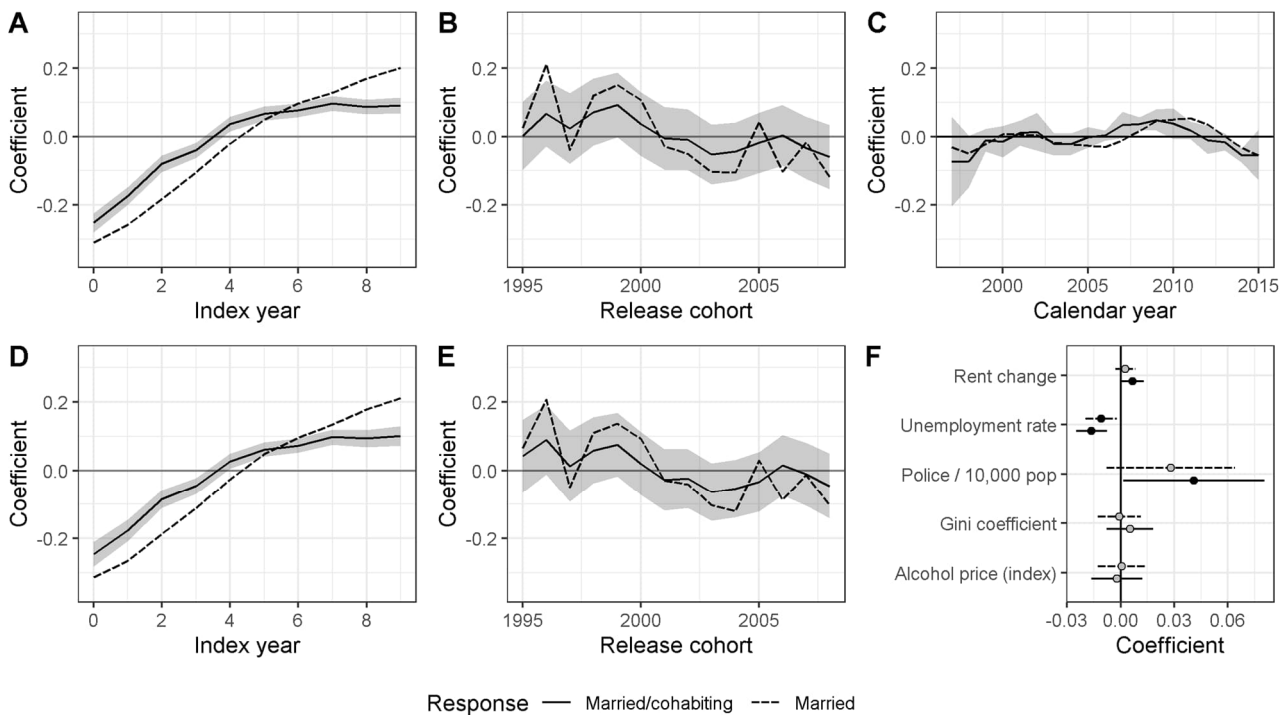


Figure 7: Index time (subfigures A and D), period (B, E), and cohort (C) associations with either being married or cohabiting (solid line) or only being married (dashed line). Associations of contextual covariates shown in subfigure F, where a black fill indicates  $p < 0.05$ .

To investigate the robustness of our findings regarding the selected follow-up length, we increased the length of follow-up while decreasing the number of cohorts and vice versa. For employment, the findings were generally consistent with the original results. However, when the follow-up time was increased to 15 years, we observed that the probability of being employed decreased after year nine,

while it exhibited a monotonous increase before that, as in figure 3. In the IPC-I models, when follow-up time was decreased and the number of cohorts increased, the results showed more positive cohort effects for cohorts released around 2005 and a clear decrease after that. Despite this, the effect sizes and directions of the contextual covariates were similar in both data specifications. For homelessness, similar period patterns were observed as earlier. When increasing the follow-up time, the results of figure 3 were replicated: a U-shaped curve for index time, with the trough at index year six. For all outcomes, context variables exhibited largely similar coefficients, regardless of the length of follow-up. However, the association between marriage and the general unemployment rate was not significant ( $p > 0.05$ ) with the 5- and 15-year follow-up.

## Discussion

The aim of this study was to analyze the role of sociohistorical context in the lives of prisoners after their first release from prison in Finland. The findings emphasize that examining recidivism alone fails to provide a complete understanding of the post-release life course and that societal conditions during the study period should always be considered. The results are consistent with prior works demonstrating the impact of sociohistorical context on individual-level crime (Neil and Sampson 2021; Neil et al. 2021) and supplements them by showing that other areas of life are also affected by this context. Finally, we also show that despite sharing the same release time, the experiences of prisoners returning to their former lives can vary greatly depending on personal factors such as gender. These findings are in line with previous research (for example Rodermond et al. 2016; Weaver 2019), but we offer a new perspective on them by embedding them in a life-course context.

### Diverging patterns in post-prison outcomes

A recent National Academies' report (2022) concluded that the recidivism rate—a measure of failure—should be used with measures of desistance, which signify success. Our first research question (RQ1) concerned the development of these measures of success post-release. The results support the idea of moving the focus away from recidivism; despite decreasing recidivism rates for cohorts released later, we do not see improvements in other outcomes when comparing different release cohorts. Further, our results highlight that any selected life course measure after release may develop independently of others—here we observed increases in employment after release while rates of living in housing remained relatively stable after accounting for small periodical changes. Additionally, both marriage and employment rates increased after release, but only employment rates exhibited strong periodical changes. This suggests that recidivism cannot automatically be considered a reliable proxy for more general social integration post-release.

### Cohorts under change

Ryder (1965) dubbed the perpetual replacement of individuals in societies “demographic metabolism,” as new birth cohorts are incorporated into society and old members die. Prisons undergo this process more directly and quickly as individuals are imprisoned and released. Our second research question (RQ2) was related to the differences between cohorts. The results showed that first-time prisoners released from incarceration in Finland are becoming increasingly older, female, and foreign. Despite these developments, our models revealed that differences between cohorts were minor and that adjusting for the sociodemographic characteristics of the cohorts did not drastically change the results.

However, our findings also indicate that the association between sociodemographic background variables and outcomes varies with release year. For example, foreign background predicted an increased risk of unemployment for those released before the year 2000, but not for those released after 2005. Similarly, in their work, Neil and colleagues (Neil and Sampson 2021; Neil et al. 2021) have demonstrated that members of cohorts born later offend less despite possessing the same psychometric properties, with the authors attributing these differences to changes in the neighborhoods where the cohorts grew up. These coefficient drifts pose a methodological challenge that should be acknowledged and studied. Coefficients in regression models measure how a unit change in a measured covariate will change the dependent variable *ceteris paribus*—all else being equal. If this assumption does not hold, coefficient estimates could be biased. Only moderate differences between cohorts were found in this study, which may have been the result of sociohistorical change eliminating cohort associations in a comprehensive manner, unresolvable by single interaction terms. Future studies should extend the current findings on how the associations between predictors of desistance (and other similar outcomes) and sociodemographic factors have changed over the decades.

### Context

Previous studies have found that industry-specific labor needs matter for post-release recidivism rates (Schnepel 2018; Yang 2017) and that lower unemployment rates increase post-release employment (Sabol 2007). We utilized different modelling techniques to separate periodical changes in our post-release life course trajectories. We observed that, on average, the employment rate increased post-release with periodical changes. The extended analysis showed that the periodical changes were associated with the general unemployment rate, almost fully attenuating the association of time after release. Therefore, studies concerned with post-release employment trajectories should consider the current labor market cycle when performing cross-temporal or cross-national comparisons.

On aggregate, we found that the general unemployment rate was positively associated with living in housing. As mentioned earlier, this may have been the result of initiating a homelessness reduction program at the height of the 2008 financial crisis and the program's successful implementation (Pleace 2017). Surprisingly, price shocks in rents were not associated with living in housing, contrary to findings in the UK (Fetzer et al. 2023), but we consider that this result should be further examined with more frequently measured data. For example, a study from Australia estimated that the median length of a spell of actual homelessness was 2.6 months (Cobb-Clark et al. 2016). The results may also imply that the Finnish housing market is elastic, as public housing prioritizes those in danger of losing their housing, so rent shocks may not push those precariously housed out of housing.

Marriage has been extensively discussed in the desistance literature, and in the Nordic context research has shifted towards emphasizing cohabitation (Airaksinen et al. 2023; Jalovaara 2013; Skardhamar et al. 2015). As for living in housing, in this study, the period-wise context was only negligibly associated with marriage probabilities, but cohort coefficients exhibited a falling trend. These results seem consistent, and even rather obvious, with SDT and the gender revolution theory developed by Goldschreider and colleagues (2015). Increases in individualism reduce the propensity for marriage over the life course, and later cohorts tend to marry less. In this light, criminologists are urged to review findings and theories from the field of demography, which may provide insights into the processes driving central demographic processes and help reframe existing

theories in modern societies. However, it should be borne in mind that the principles governing the behavior of the general population may not pertain to ex-offenders.

From an epidemiological and public health standpoint, the lack of an association between the price of alcohol and any of our outcomes seems surprising. Previous research has emphasized the effect of alcohol price reductions on those in lower socioeconomic groups (Mäkelä, Herttua, and Martikainen 2014) and has found that 70% of prisoners in Finland are alcohol dependent (Lintonen et al. 2011), a figure higher than that proposed in an earlier international review (Fazel, Yoon, and Hayes 2017). In our study, we observed only a weak association between higher alcohol prices and employment among those sentenced for alcohol and drug crimes.

The results showed a statistically significant negative association between the number of police officers and the probability of being employed. As the estimate and its standard errors were large, the association is likely to be a result of random variation. Previous research has established that increasing police force size does not reduce crime (Lee et al. 2016), rather it is police presence that matters (Dau et al. 2021). Therefore, while Finland is a large and sparsely populated country, interpreting the magnitude of the association observed here as a true signal could lead to incorrect conclusions and M- or S-type errors, where the magnitude or the sign of the estimate differ from the true effect.

The national context of Finland, a Nordic welfare state, may underestimate some of the results, as the level of social security is high. Detrimental effects in housing could be exacerbated in other contexts by the lack of social support and affordable housing. Simultaneously, the Finnish criminal justice system treats imprisonment as a last resort, thereby implying lower incarceration rates. The proportion of people with a foreign background is currently increasing in Finland, even though the population is generally rather homogeneous. Moreover, the importance of immigration is increasingly recognized as an important means of correcting the dependency ratio, which may have been reflected in the results, as those with a foreign background were equally well employed as those with a regular Finnish background in the later cohorts.

#### Re-entry context may be different for sub-groups

Our fourth research question related to differences between men and women and differences between principal offence groups. We observed that the proportion of women among released prisoners has grown and that their re-entry trajectories differ from those of men. Over time, women's housing situation and employment rate has improved, while their marriage rate has remained stable. Although we found gender-specific differences in personal life courses, our context models revealed similar associations for both men and women. These findings align with a previous review which concluded that desistance theories based on male experiences are applicable to women as well (Rodermond et al. 2016), although some differences exist in labor market participation. In Finland, women are more frequently employed in sectors such as education and health and social work, whereas male-dominated industries in Finland include construction and logistics (Statistics Finland 2022). Therefore, some differences in labor market responses were expected, although future studies should explore prisoners' post-release occupations in more detail.

We also explored differences in post-release outcomes between offenders with different principal offences (RQ4.2). The results were largely similar for each group, although for those with an alcohol- or drug-related principal offence, post-release life course trajectories differed from the other groups, and their employment rate was positively associated with higher alcohol prices. The

only consistent finding across all offender groups was the association between the general unemployment rate and the employment rate. To summarize, assuming a homogenous re-entry context and re-entry experience for all would be ill-advised as our results showed differences for some groups of offenders in the association between the societal context and their integration outcomes. In the U.S., Mears et al. (2014) previously observed a differing labor market impact on recidivism for black and white male ex-prisoners.

### Methodological considerations

In interpreting the results of our study, some limitations related to the data and the chosen methods should be considered. A central limitation was the lack of precise dates for entering and exiting incarceration. We used available information on sentencing principles to estimate these dates. Altogether, as a large proportion of sentences were relatively short and as the data were collected at the end of each year, we consider this limitation minor.

Secondly, the granular nature of the data also may limit our estimates on the housing circumstances of the ex-prisoners. It is known from previous research that homelessness is a rapidly changing state for individuals, and therefore an end-of-year measurement could be inadequate for describing seasonal differences and any short-term changes. Housing circumstances were also measured with the concept of the dwelling population. Those not in this population may reside in nursing homes or treatment facilities for addictions. This may limit some interpretations on the general level of actual homelessness (living on the streets) as many prisoners have substance use disorders and other cognitive impairments, which may increase the likelihood of in-patient treatment. However, not belonging in the dwelling population does imply some level of housing precarity as found in prior studies (Aaltonen et al. 2021).

Third, we did not control for pre-prison life courses. Some individuals may have received other criminal sanctions before their imprisonment, such as fines. For some such sanctions could not be controlled for if they were minors at the time of their first imprisonment. Additionally, we did not adjust for employment, housing, and relationship histories. However, no information would have been available for some in the early release cohorts, as the data only extended to 1988. For others, it would also have been necessary to adjust for the labor market cycle before imprisonment, but we consider that the cohort estimates in our models nevertheless reflect the overall impact of the pre-prison history.

Despite these limitations, our study makes an important contribution to the literature on factors relating to desistance by using an extensive register-based data set that contains consistently defined measures over time and that does not suffer from the non-response bias common to, for example, surveys. In addition, we used a long follow-up for all subjects, 24 years for the oldest cohorts. Furthermore, the study employed theories in an interdisciplinary way and showed that they can provide new insights into past results. Finally, we employed state-of-the-art methods to separate annual changes to analyze cohort differences in post-release life courses.

### **Conclusions**

There exists no single proxy measure for desistance from crime. We studied the employment, housing and marriages of Finnish prisoners for up to 24 years after release from prison and found

each of them developed differently. Studies on life after prison should take the societal context at release into account, as it may enhance or impair the possibility of a life without crime. The general unemployment rate was associated with all the outcomes, demonstrating that this population is not completely excluded from society. Replications of previous studies on desistance may be required, as the associations between background factors and desistance outcomes have changed over time.

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