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## Reference

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# Diagnosing ADHD in Prison:

# The Effects on Inmates and Their Families*

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*Abstract*

Attention Deficit and Hyperactivity Disorder (ADHD) is highly prevalent amongst criminal justice populations: ADHD diagnoses and medication are upwards of five times more likely for individuals who have a Swedish prison record than those without. We merge Swedish prison registers (with detailed healthcare data) to out-of-prison healthcare, crime, and employment data to study the effect of in-prison ADHD diagnoses. For individuals with no ADHD history, this new diagnosis treatment can include an information shock, medication and/or therapy. We compare the pre- and post-prison dynamics for treated inmates to alternative undiagnosed comparison groups: all untreated individuals, untreated early spells for repeat offenders treated in later spells, or a matched and reweighted control group. A robust set of findings emerge. New in-prison ADHD diagnoses significantly and persistently increase post-prison ADHD and substance abuse related healthcare. Crime and labor market outcomes, however, do not improve. There are also significant family spill-over effects: both children and siblings with no previous history of ADHD are more likely to be treated for ADHD after a newly diagnosed family member's prison spell. Though prison appears to serve as an institution to bring high-risk, vulnerable populations into the public healthcare system, our results suggest that ADHD related care may not be as effective at lowering crime as many policy makers argue.

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*Keywords*: Prison, Health, ADHD, Medication, Crime, Recidivism

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## 1. Introduction

Offender populations worldwide are negatively selected with respect to mental health: upwards of 50% of U.S. prisoners have known mental health problems, ranging from depression and anxiety to personality and substance abuse disorders (Bronson and Berzofsky, 2017).[1] A less-cited but increasingly acknowledged phenomenon is the severe over-representation of Attention Deficit and Hyperactivity Disorder (ADHD) – a childhood onset mental health diagnosis with symptoms of inattentiveness and/or hyperactivity – among criminal offenders. Young et al.'s (2015) meta-analysis estimates that 25% of adult prisoners have ADHD, while the estimated worldwide prevalence of ADHD for children is 7.2% (Thomas, 2015). Such over-representation amongst the criminal justice population is also seen in Sweden – the context of our study: ADHD medication rates are more than five times larger for individuals with a prison sentence than non-criminals.[2] Motivated by these statistics, concerns about under-diagnoses of vulnerable populations, and highly publicized research suggesting that offenders commit significantly less crime while medicated (e.g., Lichtenstein et. al., 2012), politicians and criminal justice authorities around the world increasingly emphasize ADHD diagnoses and treatment in prisons and society as a potential crime control policy.[3, 4]

This paper speaks to the potential effectiveness of such policies by evaluating the impact of receiving an ADHD diagnosis in Swedish prisons, especially for those who were not previously treated for ADHD. A new diagnosis of ADHD is a bundle of multiple potential treatments, including an information shock, medication, and/or cognitive behavioral therapy (CBT). We study whether a new in-prison ADHD diagnosis impacts post-release: (i) take-up of ADHD medication from the public healthcare system, (ii) criminal behavior, and (iii) mental health and labor market outcomes. We not only consider the direct effect of such a diagnosis on the treated inmates themselves, but also whether there are spill-over effects onto the ADHD-related and crime outcomes of the inmates' children and siblings.

Though focused on the case of in-prison ADHD treatment, the paper speaks to a much

[1] In the UK, 60% of prisoners suffer from personality disorders and 50% from depression/anxiety (Burkhi, 2017) while more than 50% in Sweden had a psychiatric or substance abuse disorder diagnosis (Haglund et al., 2014).
[2] According to author calculations from the 2006-16 Swedish prescription registers for individuals born 1955-95, 1.4%, 3.6%, and 7.4% of non-criminals, convicts, and those with a prison spell have been on ADHD medication.
[3] See Tully (2022) for a recent review of this trend and debate.
[4] In Sweden, for instance, there are active debates about whether children in vulnerable areas should be screened for ADHD (as a strategy to prevent gang crime). See: https://www.expressen.se/nyheter/m-adhd-utred-alla-barn-i-utsatta-omraden/; https://www.dn.se/sverige/m-adhd-testa-barn-i-utsatta-omraden-for-att-stoppa-gangen/. In the UK, there are calls for ADHD screening upon prison admission. See: https://www.theguardian.com/society/2022/jun/18/uk-prisoners-attention-deficit-disorder-adhd-prison and, for 2025 a parliamentary debate, https://hansard.parliament.uk/commons/2025-07-01/debates/4B02F8F9-4C9E-42EE-817C-710E59C713E5/ADHDImpactOnPrisonRehabilitationAndReoffending.

broader set of questions: What is the impact of prison healthcare in general on prisoners' post-release health, healthcare use, and behavior? Can prison healthcare be used as a vehicle to bring this unhealthy and under-treated population into the public healthcare system? And does this healthcare uptake then encourage the family of former inmates to increase their own use of the same types of healthcare? Such spill-overs may be especially likely if prison diagnoses provide inmates new information about conditions for which there are genetic predispositions and where family members and history play a role in diagnoses – as is the case for ADHD (see e.g., Persson et al. 2025). Yet, despite both large prison healthcare costs (more than 20% of US prison budgets or eight billion US dollars per year; Pew Charitable Trusts, 2017) and the potential scope for external benefits, there is little causal evidence on how prison healthcare impacts offender health and societal reintegration or public health and safety.

The Swedish context provides a unique opportunity to overcome the two hurdles – data and identification – in estimating the causal effect of in-prison healthcare, and ADHD diagnoses in particular, on inmate outcomes. With regards to data, Swedish prison registers include detailed in-prison healthcare information (e.g., medical visits, diagnoses, medications, vaccines, treatment programs) that is rarely available in other contexts. Moreover, these registers can be matched to national crime, labor market, and non-prison health registers.

The identification challenge is two-fold: correlated observables and simultaneity. The former arises because in prison healthcare is not randomly assigned but rather a function of an inmate's healthcare needs. The Swedish ADHD context allows us to address this issue in two ways. First, we can directly control for an inmate's pre-prison health records, which may be related to both in-prison treatment and post-prison health outcomes. Second, during our 2009 to 2013 sample period, the Swedish prison authorities (Kriminalvården or KV) rolled out an ADHD plan, which included training prison staff at selected facilities to diagnose and treat ADHD. During this time, the share of inmates per year with a new diagnosis of ADHD in prison nearly doubled. In other words, an in-prison ADHD diagnosis is not only a function of whether an inmate has ADHD but also the timing and location of the inmate's prison spell, which introduces an element of randomness into prison ADHD diagnoses.

The simultaneity issue arises because non-healthcare aspects of the prison experience can impact inmate health (e.g., stress, anxiety, depression, and exposure to communicable diseases). However, our emphasis on ADHD mitigates such simultaneity concerns given that ADHD is a child-onset condition that should not be caused by prison itself (and even requires proof of childhood symptoms for an adult diagnosis). Moreover, ADHD is not just a convenient case study: ADHD is the second most common in-prison diagnosis next to drug

disorders in our sample period.

Our raw data include about 37,000 prison spells (for 26,000 unique individuals) for sentences of 36 months or less that began between 2009 and 2013. Given that a novel feature of our paper is its definition of treatment – namely receiving a *new diagnosis of ADHD* in prison – our core analyses focus on more than 32,000 prison spells for individuals with no pre-prison history of ADHD (i.e., no ADHD medication or child onset behavioral diagnoses). Inmates in 950 of these spells are treated with a new ADHD diagnosis in prison while the remaining spells comprise the potential control group.

Descriptive statistics presented in Section 4 highlight that the Swedish prison population is as negatively selected, especially in terms of their mental health, as criminal justice populations worldwide. In the full sample of spells, for instance, there are high pre-prison prescription rates for anti-depressants (30%), anti-anxiety (40%), and anti-psychotics (12%) as well as diagnoses for alcohol and substance abuse disorders (42%). We also observe many important differences between the focal treated and potential control sample spells. Individuals with a new prison ADHD diagnosis: (i) have longer sentences and are more likely to be in an ADHD-trained facility, (ii) are younger and disproportionately Swedish citizens, (iii) are more negatively selected in every observable dimension of pre-prison health, and (iv) receive more prison healthcare. Analyses that trace out the dynamics of healthcare and crime in the months before and after the prison start and release show that Swedish prison appears to sharply increase the take-up of ADHD healthcare (medication and diagnoses), decrease non-ADHD mental healthcare (consistent with Bhuller et. al, 2025), and lower post-release crime.

Prison is a black box of many treatments, including prison healthcare and, specifically, ADHD diagnoses. To what extent does a new in-prison diagnosis of ADHD explain these patterns? Section 5 answers this question by estimating the effect of receiving a new ADHD diagnosis in prison on a wide range of post-release health, crime, and labor market outcomes. We use multiple research designs that essentially control for observables and unobservables in different ways and to varying extents. First, we simply trace out how these outcomes change in the months leading up to and following the prison spell for both the treated group with a new ADHD diagnosis and the full potential control group (i.e., with no pre-prison ADHD). Second, we estimate spell-level OLS regressions of the effect of the new ADHD diagnosis on post-release outcomes when controlling for a large set of observable demographic, health and criminal history characteristics that may be correlated with in-prison treatment status and post-release outcomes. Third, we take advantage of offenders with repeat spells but differential treatment across spells to control for fixed individual unobservable characteristics. Fourth, we

estimate static and dynamic difference-in-differences specifications where treatment is a new ADHD diagnosis and the control group contains either (i) all non-treated individuals or (ii) a matched and reweighted sample that is more comparable to the treated inmates.

The conclusions reached generally do not depend on the estimation approach. First, we find that a new in-prison ADHD diagnosis results in a large, significant and permanent increase in post-prison ADHD medication and diagnoses. The in-prison treatment of a new ADHD diagnosis is a bundle of an information shock, ADHD medication, and/or cognitive behavioral therapy: we find that the new diagnosis itself, i.e., the information shock, even in the absence of medication or therapy, is enough to push individuals into post-release ADHD healthcare. Second, a new diagnosis of ADHD does not significantly reduce crime (overall or across crime categories). Third, the increase in ADHD take-up and null effect on crime is seen across a wide range of subsamples defined by factors strongly correlated with ADHD: gender, Swedish citizenship, age, alcohol and narcotics convictions, and substance abuse histories. Fourth, there is a significant increase in post-release diagnoses of substance abuse disorders. Given that narcotics crimes do not increase (and, if anything, decrease in the short-term), we interpret this finding as an increase in healthcare utilization rather than drug crime; in other words, an in-prison ADHD diagnosis brings inmates into contact with the public healthcare system post-release and results in the treatment of comorbidities (e.g., drug dependence) of ADHD. Fifth, we do not observe an effect on annual earnings or employment.

Finally, Section 6 finds significant family spill-over effects of a new in-prison ADHD diagnosis. Both children and siblings of inmates are more likely to be treated for ADHD after the incarceration spell, the timing of which is arguably exogenous to the child's or sibling's own ADHD history. This makes sense given both the new information in such a diagnosis and the role family members and family history play in ADHD diagnoses (e.g., Persson et al. 2025). We also, however, do not observe any crime reductions for the children or siblings.

This study makes significant contributions to multiple literatures. The first is the large body of work by economists, psychologists, and sociologists studying the relationship between ADHD and life outcomes. ADHD is associated with many adverse outcomes, including more accidents, premature death and suicide, more crime, worse education and employment outcomes, and more substance abuse. These adverse behaviors appear less prevalent while individuals are on ADHD medication. See Faraone et al. (2021) for a review. Of particular

relevance to the current paper is the ADHD-crime relationship.[5] One of the first studies (Lichtenstein et. al., 2012) to document a significant relationship between ADHD medication and crime was conducted using Swedish register data from 2006 to 2009 and a within-individual analysis. The authors find a large decrease (increase) in crime when men and women are on (off) their medication. This internationally spot-lighted study was also one of the catalysts for the expansion of ADHD diagnoses in Swedish prisons. Mohr-Jensen et. al., (2019) reach similar conclusions about the ADHD medication and crime relationship for Danish juveniles. Studies such as these, however, may not lend itself to a causal interpretation if there is some unobserved external factor, such as motivation, that affects the timing of both medication adherence and crime. Just two studies try to use quasi-experimental variation to estimate the causal effect of ADHD medication on crime. Both focus on juveniles in Denmark. Using the propensity of hospitals to prescribe medication as an instrument, Dalsgaard et. al., (2014) find that medication at an early age decreases crime. Anker and Fallesen (2022) find that ADHD medication discontinuation increases conviction, using a control group of medical non-responders (i.e., for whom medication had side-effects or did not reduce symptoms).

Our study differentiates itself from and furthers this research frontier in multiple ways. First, most existing research focuses on ADHD in children while we we study ADHD diagnoses made by prisons for a high-risk adult population. As these individuals are no longer monitored by parents and/or teachers, prisons may be one of the few centralized institutions where undiagnosed ADHD can be caught. Second, existing literature tends to focus on the impact of ADHD medication, whereas we study the effect of ADHD diagnoses, i.e., the bundle of potential treatments that include not only therapy and medication but also information. The impact of a new diagnosis is important both because it is a relevant policy margin debated today (e.g., whether to more broadly test for ADHD) and because this information shock can impact offender and family member outcomes even in the absence of therapy or medication. Third, our use of prison as an exogenous shock to the timing of ADHD diagnoses (and medication) contrasts most of the existing literature, which cannot control for unobserved factors that affect both the timing of going on/off medication and crime.

[5] Many studies use Swedish and Danish data to show an association between ADHD medication and improved school performance (Jangmo et al., 2019; Lu et al., 2017; Keilow et al., 2018), reduced injury rates (Ghirardi., 2020; Dalsgaard et al., 2015), depression and suicide rates (Chang et al., 2016; Chen et al., 2014), and substance abuse rates (Chang et al., 2014). ADHD-related economics studies find that the youngest children in a school cohort are more likely to be diagnosed with ADHD (Elder, 2010; Evans et al., 2010), little benefit of ADHD medication on emotional and academic functioning for children in Quebec (Currie et al., 2014), and that Swedish adults with ADHD diagnoses are more likely to experience financial stress (Beauchaine et al., 2020).

The second relevant literature is that studying the causal effects of the black box of prison on inmates and their family members.[6] Western (2021) highlights that: "Unlike research on other institutional settings, like schools or hospitals, what happens inside prisons and jails does not figure greatly in the analysis of their effects." Our paper opens this black box to study the role of prison healthcare in general and prison ADHD treatment in particular, a condition that is highly prevalent amongst criminal justice populations worldwide. Our paper is unique in its access to individual-level prison healthcare data and its focus on ADHD diagnoses – a highly relevant policy margin today. Though a growing number of papers are at the frontier of opening the prison black box,[7] just one other papers (to our knowledge) focuses explicitly on prison healthcare. Specifically, Alsan and Yang (2025) conduct an RCT to evaluate the effects of healthcare accreditation for jails, which finds a reduction in mortality in jail and recidivism.

Finally, we contribute to research on the relationship between health(care) and crime more generally. One strand of this literature studies the effects of access to non-prison healthcare on crime.[8] While most of this quasi-experimental work finds a crime reducing effect, a null effect of Medicaid coverage for low-income adults on crime has been recently found using the Oregon Health Insurance Experiment (Finkelstein et. al., 2024). We thus provide further evidence that healthcare access may not always be an effective crime control policy. However, we also find novel evidence of potentially unintended benefits – namely that prison healthcare can bring this vulnerable population and their family members into contact with the public healthcare system upon release. Increased contact with healthcare providers (in prison and beyond) can help explain recent research findings that incarceration can have surprisingly beneficial impacts on inmate health (Hjalmarsson and Lindquist, 2022; Norris et al., 2024; Bhuller et al., 2025).[9]

## 2. Data: Sources and Key Variables

To study the impact of in-prison healthcare on post-release health, crime and other outcomes, one must observe (i) detailed prison healthcare data, which can be matched to (ii) non-prison

[6] See Loeffler and Nagin (2022), Doleac (2023), and Chalfin and McCrary (2017) for reviews. The findings of papers studying family spill-over effects of incarceration are quite mixed (negative, null and positive). See Bhuller et al. (2018), Dobbie et al. (2018), Norris et al. (2021), Arteaga (2023), Grönqvist et al. (forthcoming).

[7] For instance, Alsan et al. (2025) study the effects of the educational program, IGNITE, in jails, Mastrobuoni and Terlizzese (2022) study open-cell prisons, Arbour (2022) studies a cognitive behavioral therapy program, and Arbour, et al. (2024) study prison treatment programs.

[8] E.g., Doleac (2018), Jacome (2020), Bondurant et al. (2018), Wen et al. (2017), Vogler (2017), Aslim et al. (2019). There is also evidence that diversion into substance abuse treatment reduces crime (Aurora and Bencsik, 2021).

[9] The non-economics literature mainly finds prison is associated with worse health (Wildeman and Muller, 2012).

healthcare data (pre- and post- incarceration), and (iii) population-wide crime and non-crime registers. Sweden is one of the few countries where such data are available. This section briefly describes the data sources and key variables used to both illustrate the institutional context of ADHD in Sweden in Section 3 and conduct our empirical analyses in Sections 4-6.

For all prison spells starting in 2009 or later and ending before 2016, the Swedish Prison and Probation Service (Kriminalvården or KV for short) provided data on: (i) admission and release dates, (ii) facility identifiers, and (iii) in-prison healthcare. We can observe medical visits with doctors, nurses, and psychologists, vaccinations (mainly hepatitis), treatment program participation, diagnoses, and medications (from 2012). Using the ICD10 code, we track diagnoses for: alcohol disorder, drug disorder, depressive episode, stress, personality disorder, ADHD, high blood pressure, and pain.[10] We use the 4-digit ATC-code to track prescriptions for ADHD, anti-anxiety, anti-psychotics, and anti-depressants.[11]

We measure non-prison healthcare using three registers. The inpatient register includes the dates of overnight hospital spells and diagnoses since 1964. The outpatient register includes specialist care diagnoses (that do not require a hospital stay) from 2001. Though these registers do not include diagnoses from local doctor offices, ADHD diagnoses typically would not be made by primary care physicians but rather after a referral to a specialist. Using the 2-digit ICD10 diagnosis codes (which are less detailed than our prison diagnoses), we measure the following broad diagnosis categories: alcohol, drugs or substance issues, mood disorders (including depression), anxiety and stress disorders, adult-onset personality/behavioral disorders, and child-onset behavioral disorders (including ADHD).[12] The prescription register includes *all* prescriptions filled by patients from 2006, regardless of the diagnosis source; we code the exact same prescription categories as for in-prison medication.

We match on the conviction register maintained by the Swedish National Council for Crime Prevention. These data span 1973 to 2016 and include offense and conviction dates, crime types, and sanctions. From Statistics Sweden, we use: (i) the Multi-Generational Register to

[10] We code the ICD10 codes based on: https://www.icd10data.com/ICD10CM/Codes . These correspond to the following ICD10 codes, respectively: F10, F11-16, F32, F43, F60, F90, I10, and R52.

[11] We code ATC codes based on the WHO ATC/DDD Index 2022. Last accessed January 13, 2022: https://www.whocc.no/atc_ddd_index/ . The four digit codes are: N06B (ADHD), N05B,C (anti-anxiety), N05A (anti-psychotics), and N06A (anti-depressants). More than 90% of the in-prison ADHD medications are classified as stimulants, with ATC codes of N06BA02 (0.07%; Dexamphetamine), N06BA04 (90.28% are Methyphenidates: 38% Ritalin, 23% Concerta, 15% Medikenet, 14% Methylphenidate Sandoz), and N06BA07 (0.42%; Modafinil). The remaining 10% of prescriptions are N06BA09 (Atomoxetine, a non-stimulant).

[12] The ICD10 codes are: alcohol/drugs/substance issues (F10-F19), mood disorders (F30-39), anxiety/stress (F40-49), adult-onset behavioral disorders (F60-F69), and child-onset behavioral disorders (F90-98).

identify siblings and children of inmates, (ii) data on birth year, gender, and municipality of residence, and (iii) data from the official tax register to measure real annual earnings and employment in the month of November (including self-employed) from 2006 to 2016.

Given the need for a sufficient post-prison observation period, our core analyses focus on the 36,578 prison spells (for 25,996 individuals): (i) starting from 2009 to 2013, (ii) for sentences of less than 36 months (which according to the Swedish two-thirds law should serve at most 24 months in prison), and (iii) ending in 2014 or earlier.[13]

## 3. Institutional Background: Attention Deficit Hyperactivity Disorder (ADHD)

### 3.1. What is ADHD and How Is It Diagnosed and Treated?

ADHD is one of the most common childhood mental health diagnoses worldwide. Danielson et al. (2016) estimate that 9.1 million children aged 2-17 in the US (9.4%) ever had a diagnosis; rates are higher for males (12.9%) than females (5.6%). Thomas et al. (2015) estimate a 7.2% worldwide ADHD prevalence rate. Prevalence has increased over time, as parents, teachers, and doctors become more familiar with the symptoms and criteria for an ADHD diagnosis.

There are two categories of ADHD symptoms: inattentiveness (e.g., daydreaming, forgetfulness, easily distracted, carelessness) or hyperactivity and impulsiveness (e.g., fidgeting, talking too much, difficulty sitting still, interrupting others). A diagnosis can be made for children 17 or younger in the presence of at least six symptoms.[14] Though a child-onset condition, ADHD symptoms can persist into adulthood. Song et al. (2021) estimate that 2.6% of adults have ADHD diagnosed as a child while 6.8% display symptoms without a diagnosis. An adult diagnosis requires five symptoms, some of which were present before age 12. Symptoms cannot be setting specific or better explained by another disorder, and must clearly interfere with social, school, or work functioning.[15] In our context, this means that symptoms cannot be specific to the prison experience. A diagnosis can be made by a licensed clinician, and depends in part on patient, parent, and/or caregiver interviews (Faraone et al., 2021).

Symptoms can be treated by medication or cognitive behavioral therapy, which strengthens positive behaviors and reduces problematic ones, though medication is believed more effective (Faraone et al., 2021). Methylphenidate – a stimulant with the brand name Ritalin — is the first-choice pharmacological treatment, which reduces symptoms in about 70%

[13] These sample restrictions lose just a small share of spells, which are disproportionately long. From 2009-2013, there were 38,762 admissions. But sample characteristics do not change: both the full and restricted samples are 93% male, 38 years old at start, 81% Swedish citizen with almost identical offense distributions.
[14] See CDC description: What is ADHD? | CDC
[15] Much of this description in based on the Swedish Prison Authorities report on ADHD by Lundholm (2014).

of cases (Swanson, Baler, & Volkow, 2011; Volkow & Swanson, 2013). Atomoxetine (brand name Strattera), a non-stimulant alternative, may be preferred if addiction is a concern but is less effective than stimulants (Faraone et al., 2021). Medication side-effects can include cardiovascular issues, reduced appetite, insomnia, headache, stomachache, and mood changes.

### 3.2. ADHD Prevalence and Trends in Sweden

To illustrate ADHD prevalence and trends in Sweden, Figure 1 plots the share of each birth cohort with ADHD medication in the prescription register (2006-2016) and a diagnosis for child onset behavioral disorder (1997-2016), including ADHD. Three stylized facts emerge. First, ADHD medication and diagnosis rates trend up for all groups – men and women who do and do not have a criminal record. Amongst non-offenders, close to 0% of cohorts born from 1955 to 1985 were diagnosed and/or medicated for ADHD while there is a sharp increase in prevalence for cohorts born after 1985. For the youngest cohort (born 1995), 8.5% of males are diagnosed and 5.7% medicated. Amongst offenders, these upward trends tend to start earlier and be steeper. For the youngest cohort, around 23% and 14% and of those convicted with and without a prison sentence, respectively, are medicated. These statistics illustrate the second and third stylized facts: ADHD (diagnosis/medication) is more prevalent amongst criminal justice populations in general, and markedly higher for those with a prison record.

### 3.3. Swedish Prison Conditions and Healthcare

Sweden and the other Nordic countries are known for their relatively good prison conditions (Pratt 2008; Ugelvik and Dullum 2012). In fact, Sweden spends more money per inmate than any other country, has one of the lowest staff-to-inmate ratios, and during the sample period studied, provided private cells to inmates. While incarcerated, an inmate's time is governed by a treatment and activity plan designed during their first week. This plan includes: (i) details about working, education, and substance abuse or psychological treatment, (ii) visitation rights, and (iii) a clear sentence end date (Swedish law prescribes – for most sentences – a stay of two-thirds of the sentence). The plan can also include health information and routines, based on the results of a health exam given to all new prisoners. All prisons have health clinics with nurses on call every day and doctors available one or two days a week. Some larger prisons have a full-time psychologist.[16] An acutely ill inmate will be transported to a local hospital.

The provision of medication in prison is closely monitored. Inmates with medication

[16] Swedish prisons are relatively small. Just three house more than 200 inmates, and many have less than 100.

must have these prescriptions re-prescribed by a prison doctor and medication cannot be kept in one's cell; rather the necessary daily dose is provided by specially trained custodial staff. Prison authorities, however, cannot force an inmate to take medicine. Finally, with the exception of non-acute dental visits, healthcare and medication in detention and prison are free. Though medication outside of prison is free for Swedish youths, it is only discounted and/or free for adults after reaching various annual thresholds (today, this threshold is 2600 Swedish crowns or about $250). Thus, offenders face an additional barrier to taking medication upon prison release compared to within the prison environment.

### 3.4. The Rapid Expansion of ADHD Treatment in Swedish Prisons

One of central mandates of the Swedish prison authorities (KV) is to reduce the recidivism behavior of its inmates. In-prison diagnoses of and treatment for ADHD has emerged over the last 15 years as a central component of the KV toolkit. This emphasis on ADHD treatment as a vehicle to reduce crime was especially informed by two Swedish research studies published in 2012. Using Swedish register data, Lichtenstein et al. (2012) documented in the New England Journal of Medicine that there was a 32% (41%) decrease in crime for men (women) when they are on their medication, and vice versa when off their medication. Worldwide newspaper headlines strongly suggested at the time that ADHD medication reduces criminal behavior; this article is still regularly cited by policy makers today.[17] [18] The second influential study (Ginsberg et al., 2012) consisted of a small-scale RCT (N=30) that evaluated the effects of ADHD medication on a sample of Swedish prisoners between May 2007 and April 2010; it found beneficial effects on cognition and quality of life though did not study recidivism.

The Swedish Prison Authorities (KV) wrote an ADHD action plan in 2010 that was to be updated annually, which included a description of how ADHD should be diagnosed by KV. According to the 2013 plan, a KV diagnosis of ADHD includes multiple investigative steps: a computerized test of attention, hyperactivity and impulsivity, self-assessments of childhood and current symptoms, an interview with a relative, reviews of previous medical journals, and a somatic and psychiatric exam performed by a doctor. Consistent with national guidelines, KV emphasizes the confirmation of symptoms before age 12.

[17] Examples of media coverage in 2012 include: The Times: "Ritalin 'could stop prisoners re-offending", CBS News "Medicated ADHD patients less likely to be criminals", BBC: "ADHD treatment 'may reduce risk of criminal behaviour'", and The New York Times: "ADHD Study Suggests Medication May Reduce Crime". A UK Labour MP is quoted in a BBC News article saying: "If ADHD goes undiagnosed then reoffending rates are around 32%, studies show".

[18] Professor Lichtenstein, one of the authors of the New England Journal of Medicine paper, has been on the Scientific Advisory Board of Kriminalvården for many years.

According to our conversations with the chief medical advisor Lars-Håkan Nilsson for Swedish prisons during this period, KV's emphasis on diagnosing ADHD in prison expanded after the completion of Ginsberg's research. Specifically, he highlighted that staff were trained to diagnosis ADHD in seven prisons (Fosie, Kristianstad, Täby, Tidaholm, Hällby, Norrtälje, and Luleå) in 2012. However, he also emphasized that a facility does not have to be designated ADHD-equipped or trained for an ADHD diagnosis to be made since some staff, e.g., the psychologist, often serve multiple prisons. This is consistent with 2013 action plan's conclusion that there is regional and facility variation in the number of ADHD investigations, as not all prisons have the resources to complete an intensive ADHD investigation.

A central take-away of this institutional context is that there is exogenous variation in the likelihood that an inmate in our analysis sample of 2009 to 2013 prison spells will be diagnosed with ADHD in prison. This exogenous variation is driven by the timing of the prison spell and the ADHD diagnosis resources of the assigned (or nearby) prisons. We illustrate these sources of variation in Figure 2. Panel A shows that the share of inmates with an in-prison ADHD diagnosis increases from around 4% to 10% from 2009 to 2013 (solid line). This is not just driven by diagnoses for individuals previously treated for ADHD, as the share of new diagnoses for ADHD by Kriminalvården also increases; we see this for all individuals with no pre-prison ADHD medication or diagnosis history (dashed line) and the subsample of individuals with multiple spells but no ADHD history at the time of the first spell (dotted line). Panel B decomposes the prison ADHD diagnoses according to the facility at which the inmate's spell ended; the red and blue lines correspond to the ADHD trained and untrained facilities. Though more inmates are diagnosed with ADHD at the trained facilities throughout the whole period, there is a substantive shift in levels (from less than 10% of inmates to more than 14%) in the trained facilities from 2010 to 2011. This is around when the training was provided. Panel C demonstrates that there is a negative relationship between share of new ADHD diagnoses in a facility and the distance from that facility to the nearest ADHD trained facility. Panel D presents a map of Swedish prisons, indicating whether each facility is ADHD trained or within 50, 100, or more than 100 kilometers from a trained facility.

## 4. The Data Structure, Treatment, and Preliminary Descriptives

### 4.1. Analysis Data Structure

For each prison spell in our analysis sample, we create a balanced event study panel of monthly observations from January 2006 (month 1) to December 2016 (month 132). As the earliest prison start is January 2009, at least 36 pre-prison months are observed for all spells. For each

spell by calendar month cell, we measure both (i) the amount of healthcare in prison (medical visit, vaccine, diagnoses, prescriptions, programs) and out of prison (diagnoses, medication, hospital visits) and (ii) non-health outcomes, e.g., monthly convictions.

Our analyses necessitate knowing the months during which the spell starts and ends. Though we directly observe the prison release date in our data, we only observe the official prison start date. That is, we do not directly observe time served in detention (e.g., prior to or during trial) that is later deducted from the official prison sentence. We can, however, use the fact that Swedish law determines the share (usually two-thirds) of a given sentence one should serve to calculate the estimated detention date. Specifically, we subtract the number of days an individual should serve from the observed release date. All event study specifications presented in the paper use the estimated detention date as the start of the detention and prison spell.

We also collapse these monthly observations into a spell-level data set that has a single observation per individual-spell. For each spell, we measure offender characteristics, pre-prison health and criminal history, in-prison healthcare, and post-prison outcomes.

### 4.2. The Treatment: New ADHD Diagnoses in Prison

A novel feature of our analysis compared to existing research is the definition of treatment — namely a *new diagnosis* of ADHD in prison. This diagnosis is a bundle of many potential treatments, including information, therapy, and medication. Even if one does not receive medication, the information associated with a new ADHD diagnosis is a treatment in itself. The information shock of a new diagnosis can also have spill-over effects onto family members. Our analyses therefore focus on New ADHD Diagnoses in prison, which we define as diagnoses by KV of ADHD for inmates who have no pre-prison ADHD history (ADHD medication or child onset behavior disorder diagnoses, F90-F98, which includes ADHD).[19]

### 4.3. Descriptive Statistics: Pre-Prison Characteristics and In-Prison Healthcare

Table 1 first presents summary statistics for the full sample of prison spells. Panel A presents offender and sentence characteristics. The average prison sentence is 7.8 months long, and 8% of offenders are released from an ADHD-trained facility. 93% of the sample is male and 81% a Swedish citizen, while the average inmate age is around 38. The most prevalent offense

[19] Diagnoses of ADHD in prison are also made for those who had ADHD medications or diagnoses in the (recent or distant) past. We do not focus on these individuals since: (i) the KV diagnosis is not a new diagnosis and does not contain an 'information' shock, (ii) not receiving a KV diagnosis can be potentially perceived as a treatment in itself (i.e., the comparison group may also be treated), and (iii) ADHD diagnoses for this population may be under-reported in prison registers if there is communication with non-prison healthcare professionals.

categories underlying these prison spells are violent offenses (35%), drug and alcohol offenses (22%) and property (excluding minor theft) offenses (22%). Panel B characterizes the pre-prison health (from January 2006 to the prison start date) of offenders. Like the criminal justice population worldwide, Swedish inmates are negatively selected in terms of their health, and especially mental health. On average, they had 2.4 hospital admissions and high prescription rates for anti-depressants (30%), anti-anxiety drugs (40%), and anti-psychotics (12%). 42% had a diagnosis for alcohol, drugs or other substance disorders. In terms of ADHD, 9% previously had medication and 10% previously had a child onset behavioral disorder diagnosis, which includes ADHD. Panel C presents statistics about the intensity and nature of in-prison healthcare. 51% of inmates see a doctor at least once while just 6% see a psychologist. 41% participate in at least one treatment program, while 13% participate in what we classify as a cognitive behavioral therapy program. (See Appendix Table 1 for a list of programs.) The two most common in prison diagnoses during the sample period are for drug disorder (9%) and ADHD (8%). For the years with prescription data, 6% have a prescription for ADHD.

The next two columns focus on the more than 32,000 prison spells in our main analysis sample: these individuals have no pre-prison history of ADHD (ADHD medication or F90-F98 diagnoses). We decompose this sample into two groups – spells with a new in-prison ADHD diagnosis (the treatment group) and spells without a new ADHD diagnosis (the largest potential control group). There are some clear differences between these two groups: those with a new in prison ADHD diagnosis have longer sentences, are released later, and are nearly twice as likely to be released from an ADHD-trained facility. They are also on average substantially younger (35.2 versus 38.6) and more likely to be Swedish (90% versus 79%). The distribution of offense types is similar across these two groups, with the exception being that DUI is more common and drugs and alcohol offenses less common for those without a diagnosis. In terms of their pre-prison health, those with a new in-prison ADHD diagnosis are more negatively selected in all dimensions, with higher rates of mental health related prescriptions, diagnoses, and hospital admissions. Once in prison, those with an in-prison ADHD diagnosis are much more likely to see a doctor (83% versus 48%) or psychologist (20% versus 6%), participate in a CBT program (30% versus 12%), be diagnosed with other mental health disorders, and be prescribed medication. Finally, for the sample period with prison medication data, 37% of those diagnosed with ADHD in prison are medicated for ADHD.

The last column presents statistics for those who have a pre-prison history of ADHD. This group is younger, more Swedish, and more negatively selected in all pre-prison health dimensions than those who are first diagnosed in prison. In general, inmates with new

diagnoses have pre-prison health histories that are more similar to those with no diagnoses than those with a pre-prison history of ADHD. For example, the average number of hospital admissions is 2.1, 2.2 and 4.3 for the three subsamples, with the outlier being those with a pre-prison ADHD history. Yet, despite the worse health of those with a pre-prison history of ADHD, our sample of newly diagnosed inmates receive more prison healthcare in many dimensions, including doctor visits (83% versus 63%), psychologist visits (20% versus 9%), program participation (55% versus 40%), and CBT program (30% versus 15%). Finally, not everyone with a pre-prison history of ADHD is recorded as receiving a diagnosis of ADHD in prison (42%) or ADHD-related prescription (31%).[20]

A number of take-aways from this section inform our analyses. First, in-prison (mental) healthcare needs are high amongst Swedish prisoners. Second, ADHD is highly prevalent. Third, ADHD diagnoses in Swedish prisons are strongly related to pre-incarceration ADHD history as well as offense/sentence characteristics. Fourth, inmates diagnosed with ADHD have many other co-morbidities, which may also be treated in prison. We maintain an awareness of this fact throughout our analysis; we assess the sensitivity of our results to controls for such comorbidities and whether ADHD treatment impacts mental health more generally. Fifth, the nature of an in-prison ADHD diagnosis depends on pre-prison ADHD history. We focus on those we classify as having a *new* diagnosis.

The previous descriptives emphasize that healthcare is a central component of the Swedish prison black box, and especially so for ADHD diagnosed inmates. But when is healthcare provided in prison and to what extent does it substitute for non-prison care? Panel A of Figure 3 looks at the share of offenders with *any* healthcare in each month leading up to when we observe the offender begin the detention and prison spell (to the left of the red line) and while incarcerated (to the right of the red line). Individuals drop out of the sample as they exit prison; thus, the sample is comprised of those with longer and longer sentences as we move further from the prison start date. Black lines correspond to healthcare provided in prison by Kriminalvården while gray lines show non-prison healthcare; solid, dashed and dotted lines correspond to diagnoses, prescriptions (2012-2013 cohorts), and hospitalization respectively. Panel B presents the corresponding figure for ADHD-specific diagnoses and medication.

These figures demonstrate that the monthly take-up of prison healthcare (diagnoses and medication) is large, immediate, and persists throughout the entire prison spell. Moreover, non-prison healthcare (diagnoses, prescriptions, and hospitalization) decreases while in prison:

[20] This is in-part attributable to differences in how recent the pre-prison ADHD medication was.

there is a visible and sharp incapacitation effect, as in-prison healthcare is generally not recorded in out-of-prison health registers. The higher recording rate of prescriptions and diagnoses (due to the monitoring of medication) while incarcerated cautions against direct comparisons of the changes in the amount of prison and non-prison care. Two other patterns stand out in Figure 3: in-prison healthcare is not zero in the months prior to the current prison spell while out-of-prison healthcare is not zero while incarcerated. The former can be attributed to KV healthcare treatment during earlier incarceration spells while the latter is explained by the fact that not all healthcare can be provided in prison. Hospital visits may for instance be necessary, at which time medication can be prescribed.[21]

### 4.4. Pre- and Post-Prison Outcome Dynamics: Crime, ADHD and Mental Health

This section traces out how the outcomes — ADHD and non-ADHD healthcare and crime — change in the months leading up to and following a Swedish prison sentence. Specifically, Figure 4 presents simple monthly averages of ADHD medication (Panel A), child onset behavioral disorder diagnoses (Panel B), convictions (Panel C) and non-ADHD mental health medication, including anti-anxiety, anti-depressants and anti-psychotics (Panel D) for the two years leading up to the date an individual is estimated to have begun detention and/or prison and the two years following the individual's prison release date.[22] In other words, the red vertical line at t = 0 corresponds to the entire prison spell, regardless of how long it is. In each figure, the black and gray lines are the monthly averages for the whole sample and sample of inmates for which there was no pre-prison ADHD history, respectively.

For both samples, these simple descriptives demonstrate that the take-up of ADHD related healthcare – both medication and diagnoses – is sharply (about 40%) higher upon release from prison and persists for the next two years. Moreover, it is not simply the case that all medical treatment is larger after prison, as non-ADHD mental health prescriptions decrease. Finally, criminal behavior improves after a Swedish prison spell, as monthly conviction rates are sharply lower post-release. There is a visible spike in convictions in periods *t-1* and *t-6,* which is expected and represents the offenses resulting in the current prison spell.

Thus, time in a Swedish prison appears to lead to lower post-release crime and improved mental health in general but a sharply higher take-up of ADHD medication. To what extent

[21] From 2007 on, Kriminalvården had the opportunity to fill prescriptions from non-prison apothecaries. These prescriptions are included in the national prescription register and excluded from the in-prison prescription data.
[22] Since non-prison prescriptions can be filled for multiple months at a time, the level of monthly prescriptions is lower than the number of people on any specific medication.

does an in-prison ADHD diagnosis — and in particular, a new ADHD diagnosis — explain this set of relationships?

## 5. The Impact of New In-Prison ADHD Diagnoses on Post-Release ADHD, Health, Crime and Labor Market Outcomes

This section takes multiple approaches to estimating the effect of receiving a new diagnosis of ADHD in prison on post-release outcomes. Section 5.1 simply traces out how these outcome variables change around the prison spell for those treated with a new ADHD diagnosis compared to those who also have no ADHD history but are not treated. Section 5.2 turns to a spell-level analysis where we regress the post-release outcomes on receiving a new ADHD prison diagnosis and control for observable pre-prison demographic, health, and criminal history characteristics that may be correlated with both treatment and post-release behavior. Section 5.2 also takes advantage of a sample of offenders with repeat spells but differential treatment across spells to control for unobservable characteristics with individual fixed effects. Section 5.3 estimates static and dynamic difference-in-differences (DiD) specifications, where treatment is receiving a new in prison ADHD diagnosis. We estimate these specifications both when: (i) including all inmates without a new diagnosis in the control group and (ii) matching and reweighting the control group to be more comparable to the treated inmates.

The main findings are robust to the estimation approach. New in prison diagnoses for ADHD bring inmates into the healthcare system post release to treat both their ADHD and other comorbidities like substance abuse. Yet, we see little to no evidence of a crime reducing effect nor any improvements in the labor market.

### 5.1. Preliminary Evidence: Raw Event Studies by New KV ADHD Diagnosis Status

The previous section found that ADHD medication and related diagnoses increased after a prison spell while convictions and other mental health medications decreased. As a first step in assessing whether new in-prison ADHD diagnoses explain these patterns, Figure 5 similarly traces the path of non-prison outcomes but decomposes the sample of individuals with no ADHD history into two groups: those with (solid blue) and without (dashed green) a new in prison ADHD diagnosis. These figures allow for a visual inspection of parallel trends between these two groups and whether in prison ADHD diagnoses impact post-prison outcomes.

As pre-prison ADHD medication (Panel A) and F90-F98 diagnoses (Panel B) are zero for both groups by definition, parallel trends cannot be directly assessed from these figures. The other outcomes (convictions, mental health medication, substance abuse diagnoses, and

alcohol and narcotics convictions), however, do not suffer from the same issue and indeed suggest parallel pre-trends; we provide formal tests in Section 5.3.

In terms of the post-prison outcomes, we see that an in-prison ADHD diagnosis is associated with a sharp increase in monthly ADHD medications (about 13% versus 2% for those treated and not) and monthly F90-F98 diagnoses (4% versus less than 1%). There is a spike in both non-prison ADHD medication and diagnoses immediately after prison release as inmates establish new contacts with non-prison medical professionals. These monthly statistics understate the true post-release take-up of ADHD care because medications are prescribed for more than one month at a time. It is not only ADHD-specific care that increases for the treated group post-release: Panels D and E suggest an increase in non-ADHD mental health medication and substance abuse related diagnoses, which contrasts the decrease seen for untreated individuals. Turning to convictions (Panel C for all crime and Panel F for alcohol and narcotics related crime), we see that there are higher pre-prison crime levels but similar trends for inmates with and without new in prison ADHD diagnoses. Crime decreases for both groups after prison, such that the pre- and post-prison conviction gaps appear similar in size. The only exception is the sharp decrease in convictions for the treated group in first post-release months. This short-term reduction in convictions is especially large for alcohol and narcotics crimes, but also visible for traffic, property, and other convictions (see Appendix Figure 1).

Taken together, these results provide suggestive evidence that an in-prison ADHD diagnosis increases contact with the public healthcare system post-release and treatment for ADHD and other mental health conditions. But there is little corresponding evidence of an effect on crime, with the exception of a very short-term reduction in convictions. Thus, the remainder of this section more formally assesses these conclusions in specifications that allow us to: (i) control for observable and unobservable pre-prison health, demographic and behavioral differences between inmates diagnosed with ADHD and not and (ii) formally test for pre-trends and estimate the size and significance of these effects.

### 5.2. OLS Regressions with Observable Controls and Individual Fixed effects

Both the descriptive statistics and dynamics make clear that individuals newly diagnosed with ADHD in prison are systematically different in many pre-prison dimensions, including mental health, substance abuse, demographics, and even crime. Our first approach to disentangling the causal effect of an in-prison ADHD diagnosis on post-release outcomes – namely ADHD medication and criminal behavior – relies on cross-spell variation in prison ADHD diagnosis status and a large set of observable controls. As a reminder, some of this cross-spell variation

is attributable to whether the facility has ADHD specific training and the timing of the spell.

For the full sample of spells with no pre-prison ADHD history, columns (1) – (4) of Table 2 present the results of regressing post-release outcome Y on whether the individual received a new in-prison (KV) diagnosis of ADHD, as depicted in the equation below.

$$Y_i^{post} = \alpha + \beta_0 ADHD\_Diag_i^{KV} + Health_i^{pre}\delta_1 + Demo_i\delta_2 + Crime_i^{pre}\delta_3 + Care_i^{KV}\delta_4 + \propto_i + \epsilon_i$$

The raw relationship between an in-prison ADHD diagnosis and post-release outcomes is in column (1). Given the potential for omitted variables, column (2) controls for pre-prison health (i.e., non-ADHD mental health medications, diagnoses, and hospitalization) and demographics (gender, citizenship, and age at admission) and column (3) for crime characteristics (i.e., sentence length fixed effects, and current and past offense types). Column (4) assesses whether it is the in-prison ADHD diagnosis that matters or other prison diagnoses or treatments by controlling for other aspects of prison healthcare.

Finally, given that there can still be unobservable differences across inmates diagnosed with and without ADHD, we take advantage of the fact ADHD diagnoses are more likely in the latter sample period by restricting the analysis in columns (5)-(7) to repeated spell individuals and controlling in column (7) for individual fixed effects ($\propto_i$).

*The Effect of an In-Prison Diagnosis on Post-Prison ADHD Outcomes.* Panels A and B of Table 2 present the impact of a new in-prison ADHD diagnosis on ADHD medication and childhood developmental disorder (F90-98) diagnoses in the 12 months post release. In the raw data, an in-prison ADHD diagnosis is associated with an increase in the likelihood of ADHD prescriptions and F90-F98 diagnoses by almost 27 and 24 percentage points, respectively. These coefficients decrease only slightly in size with the vast set of controls; even in the fully saturated specification (column 4), a new in prison ADHD diagnosis increases the 12-month chance of an ADHD prescription and F90-98 diagnosis by 24 and 22 percentage points, respectively. The stability of these coefficients and associated R-squares when adding controls suggests that selection on unobservables is unlikely to confound a causal interpretation of the relationship between in prison ADHD diagnoses and post-prison ADHD care. Nevertheless, similar and still significant estimates are seen with individual fixed effects in column (7).

*Decomposing the Treatment: Information, Medication, and CBT.* As highlighted throughout the paper, our analysis is novel in its definition of treatment as a bundle of everything associated

with an in-prison ADHD diagnosis. This diagnosis includes information, but can also include medication and/or cognitive behavioral therapy. This section focuses on the 2012 and 2013 prison admission cohorts, for whom we observe in-prison medication, to assess what aspect of the ADHD diagnosis bundle matters most for post-prison ADHD related healthcare. Is the information itself enough to nudge offenders into the public healthcare system upon release?

For this restricted sample, Table 3 presents the results of regressing the post-prison ADHD medication (columns 1-3) and F90-98 diagnoses (columns 4-6) on whether an inmate received a new in-prison ADHD diagnosis as well as the nature of their in-prison treatment. Over and above the diagnosis, we control for whether individuals: (i) participated in a CBT program but had no ADHD medication, (ii) had in-prison ADHD medication without CBT, or (iii) had both in-prison ADHD medication and CBT.

There are a number of take-aways from these results. First, an in-prison ADHD diagnosis impacts post-prison ADHD related treatment, even if one is not treated in prison with medication or therapy: such individuals are still 10 percentage points more likely to receive ADHD medication post-release. This suggests that the information content of an in-prison ADHD diagnosis is valuable, and that defining treatment as broader than medication is appropriate. Second, the strongest predictor of post-prison ADHD care is in-prison ADHD medication: individuals with ADHD medication in prison are more than 30 percentage points likely to take up medication post release. This could be both because KV helped establish these individuals on medication but also because these individuals have worse symptoms of ADHD. Third, CBT has only a small additional effect (especially relative to the effect of the diagnosis and medication) on post-prison ADHD medication or F90 – F98 diagnoses.

*The Effect of an In-Prison ADHD Diagnosis on Crime Outcomes.* But does the new in-prison ADHD diagnosis result in a change in crime behavior? Panel C of Table 2 presents results when the dependent variable is any conviction within 12 months of release. In the raw data, individuals newly diagnosed with ADHD in prison are 19 percentage points more likely to be convicted post-release (consistent with the level differences between groups in the descriptive figures). In contrast to the regressions for post-release ADHD healthcare, however, the relationship between in prison ADHD diagnoses and post-release convictions is very sensitive to observable controls: in the fully saturated specification presented in column (4), the coefficient has decreased to 2.5 percentage points and is insignificant. It remains insignificant, though more imprecise, in the individual fixed effect specification. Taken at face value, these results suggest that an in-prison ADHD diagnosis does not decrease post-release crime.

*Heterogeneity Analysis and Sensitivity Checks.* Figure 6 presents coefficient plots that assess the extent to which these relationships are heterogeneous across subsamples and robust to sensitivity checks. Results for when the outcome is ADHD medication and convictions are presented in Panels A and B, respectively. For each subsample or sensitivity check, we present two coefficients, which correspond to the fully saturated OLS and fixed effects specifications in columns (4) and (7) of Table 2. Our heterogeneity analyses demonstrate that both the large and significant effect of an in-prison ADHD diagnosis on post-release medication but null effect on crime behavior persist across a variety of subsamples defined by factors that are strongly correlated with whether one has ADHD. Specifically, we look at gender, Swedish citizenship, birth cohort, alcohol and narcotics conviction histories, and substance abuse (F10-F19) diagnosis histories. The figure also shows that the results are robust to alternative post-prison periods of 6 and 24 months and omitting the small sample of individuals who die.

### 5.3. Difference-in-Differences Strategy

#### 5.3.1. Unmatched and Matched Specifications

This Section uses our monthly panel data to estimate both static and dynamic difference-in-differences (DiD) models that control for both individual and time fixed effects. The baseline DiD models use our primary sample of individuals with no pre-prison ADHD medication or diagnosis history (i.e., the same sample used in the OLS regressions in Table 2). The *treated* are those who receive a new ADHD diagnosis in prison. The *controls* are those who do not.

Our static DiD regression model is given by

$$\boldsymbol{Y_{i,s,t} = \alpha_s + \gamma_t + \beta * Post_{i,s,t} * Treated_{i,s} + \varepsilon_{i,s,t}}$$

where $Y_{i,s,t}$ is the outcome of interest for individual *i* in month *t* when *not* incarcerated (i.e. in the 24 months before going to prison and during the 24 months after leaving prison). Individual prison spell fixed effects, $\alpha_s$, address the fact that some individuals have more than one spell during our observational window. Spell fixed effects capture information about both the individual and the prison spell, including sentence length, offense type, and pre-prison mental and physical health history. We also include year-by-month dummies, $\gamma_t$. The variable $Treated_{i,s}$ is equal to one for those individuals *i* who receive an ADHD diagnosis during prison spell *s* and zero otherwise. $Post_{i,s,t}$ turns from zero to one after being released from prison spell *s*. The coefficient of interest, $\beta$, represents the effect of receiving a new in-prison ADHD

diagnosis on post-incarceration outcome, $Y_{i,s,t}$.[23]

Our dynamic DiD regression model is given by

$$\boldsymbol{Y_{i,s,t} = \alpha_s + \gamma_t + \sum_{\substack{k \in L; \\ -24 \leq L \leq 24; L \neq 0}} \beta_k \, I(t = k) * Treated_{i,s} + \varepsilon_{i,s,t}}$$

where $\beta_k$ represent the dynamic effects (both pre- and post-release) of an in-prison ADHD diagnosis.

We estimate our DiD models using Borusyak et al.'s (2024) imputation method. Given the robustness of this method to both time varying and heterogenous treatment effects, we avoid the potential problem of negative weighting discussed at length in the recent literature on two-way fixed effects models.[24] We report Borusyak et al.'s (2024) analytical standard errors (which are corrected for the imputation method) and cluster them on individuals, since some individuals have more than one prison spell during our observation period.

The main identifying assumption is that in the absence of treatment the outcome variable of both the treatment and control groups would have developed along parallel paths during the post-release period. We investigate the plausibility of this assumption by examining whether the outcomes of the treated and control groups exhibit parallel trends during the pre-treatment period. First, as seen earlier in Figure 5, there are meaningful differences in levels, but not trends, in the raw data for both crime and non-ADHD mental health related variables. Second, in Figure 7 (below), we show estimates of the pre-treatment differences between the treatment and control groups. These differences are always statistically indistinguishable from zero. Lastly, we report the *p*-value of the joint test that pre-treatment coefficients are equal to zero when reporting static DiD results; all are well above 0.10. Taken together, these results support the plausibility of our identifying assumption.

In the baseline DiD model described above, the control group used to estimate the counterfactual is comprised of both not-yet treated and never-treated individuals. Most of the controls are in this never-treated group, which is comprised of all inmates with no previous ADHD history who do not receive an in-prison ADHD diagnosis. In Table 1, we saw that these control individuals differ from treated individuals along a number of observable characteristics. As such, they may not necessarily pin down the most relevant counterfactual time trend.

We therefore also report results from a matched and reweighted DiD model alongside

[23] Some treated inmates do return to prison at a later date. These future spells are excluded from all of our DiD analyses to maintain the purity of treated and control prison spells.
[24] See, e.g., de Chaisemartin and D'Haultfœuille (2020), Goodman-Bacon (2021), and Borusyak et al. (2024).

the results from our baseline DiD model. In these matched regressions, we match on sex, age ventiles, Swedish citizenship, number of previous convictions[25], previous use of non-ADHD mental health drugs (yes/no), and previous diagnoses for substance abuse disorders (yes/no). We calculate weights for each cell and then reweight the data so that our large control group looks more similar (along these matched observable characteristics) when running our matched DiD regressions.[26] We present the results, and corresponding pre-trend tests, of the matched DiD models alongside our baseline model.

Table 4 reports descriptive statistics and sample sizes before and after this matching and re-weighting procedure. The new, matched control group is much more similar along important dimensions that we have not explicitly matched on, e.g. crime type, earnings, and employment. Appendix Figure 2 demonstrates how our matching procedure makes the treated and control groups similar in terms of their monthly conviction rates. After matching, the two groups are similar in terms of *both* trends and levels.

### 5.3.2. Difference-in-Differences Results

*The Effect of a New In-Prison ADHD Diagnosis on Post-Prison ADHD Outcomes.* Figure 7 presents the dynamic DiD estimates using the baseline model without matching and confirms the patterns seen in the raw data (Figure 5). Receiving a new diagnosis of ADHD in prison has an immediate effect on post-prison ADHD medication and diagnoses, which is large, significant and permanent. Table 5 presents the static difference-in-differences estimates. Overall, there is a 14.3 percentage point increase in the take-up of ADHD medication for this group after prison, and a 4.9 percentage point increase in ADHD diagnoses (see Panel A). Our matched DiD estimates produce similar results with an increase in medication and diagnoses of 13.8 and 4.7 percentage points, respectively (see Panel B in Table 5).

*The Effect of a New In-Prison ADHD Diagnosis on Crime Outcomes.* In Section 5.2, we saw no indications that an in-prison ADHD diagnosis decreases crime after leaving prison. In contrast, we do see some evidence that an in-prison ADHD diagnosis may lower post-release crime using our DiD approach. In Panel C of Table 5, we see statistically significant reductions for alcohol and narcotics crimes, and a weakly significant effect on other crimes for the unmatched analyses. However, when running the same exercise on our matched and

[25] Previous convictions are binned into 10 groups, including: 0, 1, 2, 3, 4, 5, 6, 7-10, 11-50, 51-100.
[26] Cells that do not include both treated and control individuals receive a missing weight and are subsequently dropped from the matched and weighted regressions. This procedure drops 3 treated and 5,704 control spells.

reweighted sample (Panel D), these estimated coefficients become much smaller and insignificant. The *p*-values associated with the pre-trend tests are well above 0.10 for each crime category in both the matched and unmatched specifications. We conclude that there is no strong evidence in favor of a crime reducing effect of an in-prison ADHD diagnosis.[27]

*The Effect of a New In-Prison ADHD Diagnosis on Other Health and Labor Outcomes.* In Table 6, we investigate the potential effects of a new in-prison diagnosis on several other post-release outcomes. In Panels A (unmatched) and B (matched), we observe no significant change in former inmates' use of other non-ADHD mental health medications. We do, however, see a clear increase in post-release diagnoses for substance abuse: 33% and 23%, respectively, relative to the pre-treatment means in the unmatched and matched specifications. This increase was already visible in the raw event study presented in Figure 5 (and again in Figure 7). We interpret this increase as higher healthcare utilization and not as a signal of increased problems with substance abuse. After leaving prison, former inmates with new ADHD diagnoses have more contact with the healthcare system; they receive ADHD medication, continued ADHD diagnoses, and additional diagnoses and help to deal with issues of substance abuse. Consistent with such an interpretation, we saw no evidence of an increase in narcotics related convictions (and, if anything, a decrease). Lastly, in Panels C and D of Table 6, we see that a new ADHD diagnosis does not appear to have any significant effect on annual earnings or employment probabilities; both remain quite low in the two years following release from prison.

## 6. Spill-Over Effects of New Diagnoses onto Family ADHD Diagnoses and Crime

There are a number of reasons why a *new* in-prison ADHD diagnosis may have spill-over effects from newly treated inmates onto the ADHD healthcare of children and siblings. First, a new ADHD diagnosis may provide the inmate new knowledge and information about a previously unknown health condition. This new knowledge about the condition, symptoms, and treatments may lead the inmate to consider whether their family members are at risk for the same condition. Second, one component of an ADHD investigation is interviews about and with family members: a diagnosis of one family member can increase the medical professional's perception that ADHD is the 'right' diagnosis for another family member (see,

[27] We have also run an additional matching DiD exercise where we used a random forest, together with a richer set of control variables, to calculate the probability of receiving a new in-prison ADHD diagnosis. We then reweighted the data using these probabilities when estimating our DiD model. This exercise also generated a set of small and statistically insignificant point estimates.

e.g., Persson et al. 2025). Both channels are specific to obtaining a new diagnosis in prison: One would not expect such a spill-over effect for families with a pre-prison history of ADHD (for the inmate or the children and/or sibling) given the absence of an information shock.

The analysis in this section uses data from 10,123 parents and 22,477 children. We also study 16,341 inmates with 25,791 siblings. To be included in the sample, a child or sibling must be (i) potentially observed in the prescription drug register at least once between ages 7 and 40, (ii) have no ADHD history prior to their parent's incarceration spell, and (iii) have no brothers or sisters with an ADHD history before their parent or sibling went to prison. As such, this analysis focuses on those treated and control families with 'clean' ADHD histories.

We estimate the same dynamic difference-in-differences model as before with spell and year-by-month fixed effects and a treatment dummy equal to one if the inmate has received a new ADHD diagnosis while in prison. The dichotomous outcome variable for the child or sibling equals one if they have filled a prescription (outside of prison) for ADHD medicine during the month and zero otherwise. These outcomes are then summed for each inmate in each month, such that the dependent variable for an inmate with two children can take on the values zero, one, or two, while it can only take on the values of zero or one for an inmate with only one sibling. In other words, the dependent variable is the number of the inmate's children or siblings who have filled an ADHD prescription during the month.

To interpret our estimates as the causal effect of an inmate's ADHD diagnosis on the outcomes of their family members, we assume that the exact timing of the child or sibling's new ADHD diagnosis is conditionally exogenous to the exact start date of the inmate's prison sentence and new ADHD diagnosis. In essence, this boils down to the standard post-treatment parallel trends assumption. In practice, the inmate's treatment leads to a new treatment among family members that would have either never occurred or that would have occurred in the future, but is now pushed forward in time. These assumptions are likely to hold in our setting, especially for older children and adult children and siblings; even to receive a diagnosis of ADHD later in life, a person must have shown clear symptoms of ADHD before age 14. There is little reason to think that this is related to the timing of the parent's or sibling's prison spell. And while we cannot look at pre-treatment parallel trends in ADHD healthcare uptake (since we are studying families with no pre-prison ADHD history), we can examine pre-trends in other outcomes such as criminal behavior, which we do below.

The results of our spill-over analysis are presented on the left and right, respectively, of Figure 8 for children and siblings. Panel A looks at the effect of prison (regardless of the inmate's ADHD treatment in prison) while Panels B and C consider whether there are

differential spill-over effects depending on whether the inmate was treated with a new ADHD diagnosis in prison.

Panel A shows that children with no previous history of using ADHD medication begin to take-up medication during the time their parents are in prison. Some of this increase in take-up may be due to heightened contacts with the child welfare authorities (at least for 'children' still under age 18), but much of this increase is simply due to the passage of time and natural diagnosis rates in these populations. Though this is true for all children regardless of whether their parent was diagnosed with ADHD, Panel B shows that the increase in ADHD medication is more than twice as large for children whose parents received a new ADHD diagnosis. In Panel A of Table 7, we estimate a 2.2 percentage point higher monthly medication rate for children with parents who were newly diagnosed with ADHD in prison compared to children with non-diagnosed parents (see also the dynamic DiD estimates in Panel C of Figure 8).

Importantly, Appendix Figure 3 shows no such differential reaction among children whose parents receive either a *semi-new* diagnosis (i.e., parents had a pre-prison ADHD diagnosis more than 12 months prior to the prison spell) or a *renewed* diagnosis (i.e., parents had an ADHD diagnosis in the 12 months prior to prison). This is (as noted above) expected given these in-prison diagnoses do not contain new information. We therefore conclude that receiving a new ADHD diagnosis in prison not only affects the inmate's own take-up of ADHD medication post-release, but also that of their children.

We find similar spill-over effects onto the siblings of former inmates, albeit somewhat muted and a bit delayed (see Panels A and B in Figure 8). Those whose siblings receive a new ADHD diagnosis in prison have a 0.8 percentage point higher monthly medication take-up rate than those whose siblings were not diagnosed (see Panel B in Table 7). Outside of prison, new ADHD diagnoses are less common among adults and the diagnostic process generally takes longer (e.g., children are prioritized in queues and have access to additional clinics that specialize in child health and wellbeing); these two facts likely explain why sibling spill-over effects are somewhat smaller than the spill-over effects from parents to children.[28]

[28] Inmates with new ADHD diagnoses have prison sentences that are (on average) 4.4 months longer than those who do not receive an ADHD diagnosis in prison (see Table 1). In Sweden, inmates are released from prison after serving two-thirds of their sentence. Thus, newly diagnosed inmates spend (on average) 2.9 more months in prison than those who receive no diagnosis. As such, a small part of the level differences seen in Panel B of Figure 8 could be due to the natural, monthly out-of-prison diagnosis rates for these populations, together with these additional three months spent in prison. In Appendix Figure 4, we re-create Panel B of Figure 8 after first matching (and re-weighting) treated and control inmates by sentence length in months. These new figures are almost identical to the figures shown in Panel B of Figure 8. Thus, the differences seen in the data reflect true spillover effects and not differences in sentence length between the treated and control groups.

### *6.1. Criminal behavior of children and siblings*

In our convictions data, court decisions are only recorded for those aged 15 or older, which means that we have fewer children involved in this exercise. To lose as few children as possible, we limit the pre-treatment period to the four months prior to their parent's incarceration. Otherwise, these exercises are the same as those presented above. The dependent variable is the number of a former inmate's children (or siblings) with a conviction in a particular month.

In Panel C of Table 7, we see that that a parent's *new* ADHD diagnosis has no overall effect on criminal convictions for children with no previous ADHD diagnosis. The point estimate for having received a conviction is negative, but insignificant, and the associated standard errors are quite large. In fact, we can neither rule out large reductions in crime nor large increases in crime; as such, one should be cautious when interpreting this result.

In Panel D of Table 7, we see that that an inmate's *new* ADHD diagnosis also has no statistically significant effect on criminal convictions among siblings without a previous ADHD diagnosis. We can rule out increases or reductions in crime larger than +/- 18 percent relative to the pre-treatment mean. Overall, we find no strong evidence in favor of the hypothesis that an increase in the use of ADHD medication among the children and siblings of newly diagnosed inmates reduces their criminal behavior.[29]

## 7. Conclusion

Prisons around the world house a criminal justice population that is both high needs in terms of physical and mental health, but for many reasons, often under-diagnosed and under-treated. The latter may be especially true in countries like the United States, where healthcare is not a constitutional right. In fact, in the U.S., it is only while incarcerated that one has the right to healthcare – the absence of which would be classified as cruel and unusual punishment. Rather than seeing prison healthcare as an obligation, Swedish prison authorities see healthcare as a fundamental component of rehabilitation and treatment. This paper assessed the potential (public) health and safety benefits of one such prison healthcare treatment – ADHD diagnoses. The findings allow us to speak to two policy related questions.

The first is specific to ADHD: can ADHD treatment serve as a channel to reduce crime? Contrary to existing perceptions amongst policy makers, we do not find strong evidence that post-prison crime is reduced for inmates newly diagnosed with ADHD in prison. One possible

[29] In Table 7, the outcome variable is defined as the number of children or siblings that pick up their ADHD medication or commit a crime in a given month. Point estimates change negligibly if we, instead, dichotomize the outcome so that equals one if at least one child or sibling picks up their medication or commits a crime.

explanation for this is that these individuals are too far down the criminal path for such treatment to be effective in reducing crime. Though we cannot rule out that these new in-prison ADHD diagnoses improve general well-being, we do not find any evidence of this when considering other non-crime outcomes, such as mental health, employment, and earnings.

The second policy related question is whether prison can serve as an institution to bring this unhealthy but untreated population into the public healthcare system. Studying the case of ADHD, we find strong evidence that the answer is yes. New diagnoses in prison resulted in inmates receiving ADHD-related care from the public healthcare system upon release, which persists throughout our two-year follow-up period. Moreover, and perhaps somewhat surprisingly, these new prison diagnoses resulted in a knowledge transfer within the inmates' families, such that their children and siblings also took up publicly provided ADHD-healthcare.

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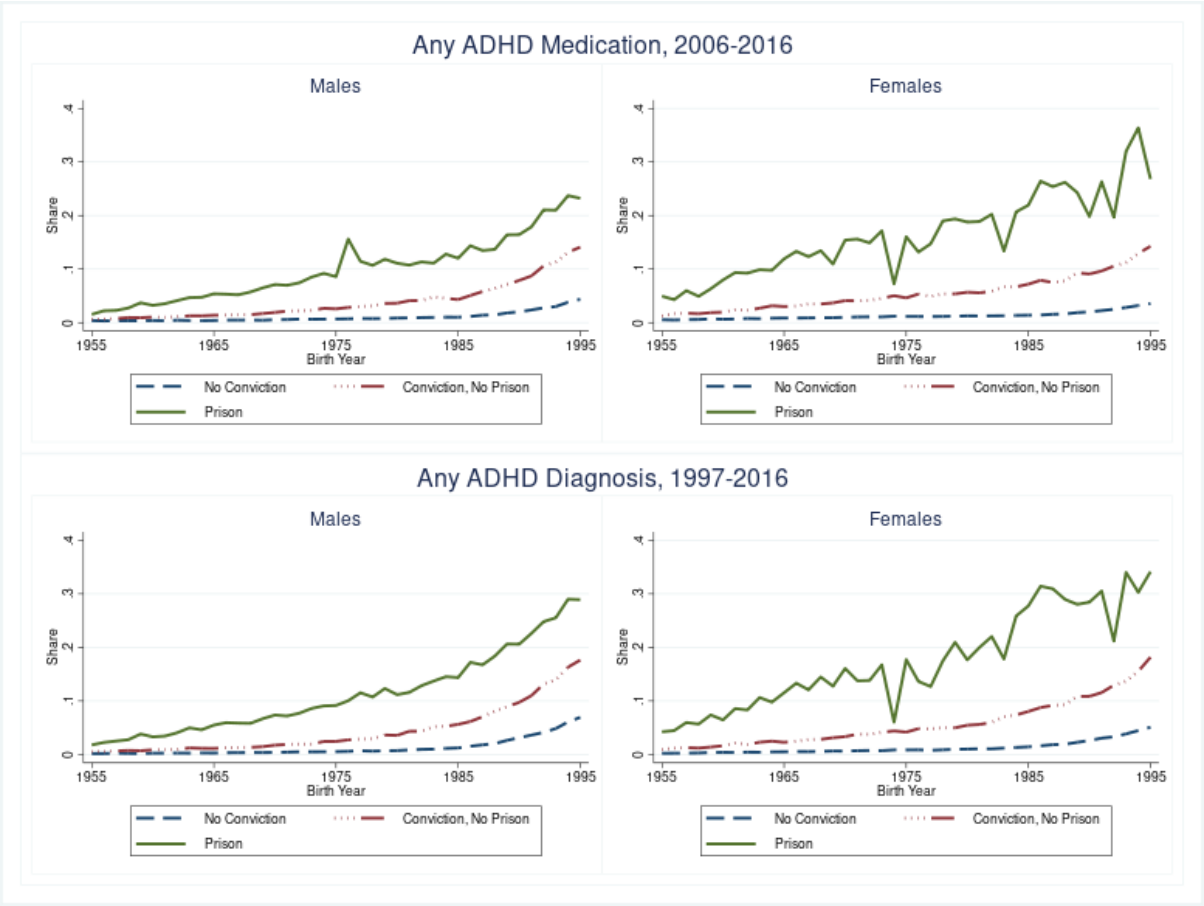
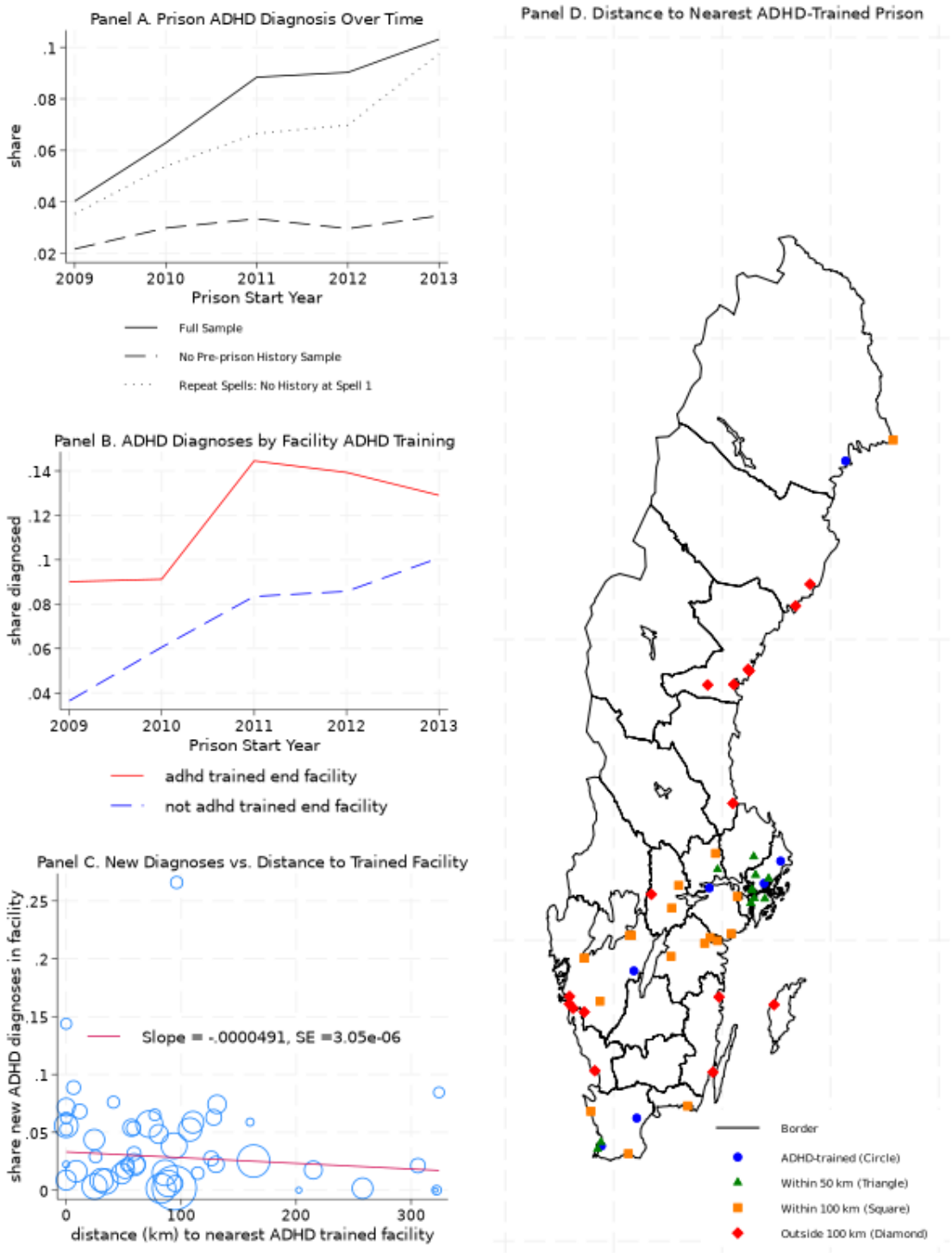
**Figure 1. ADHD Medication and Diagnosis Rates by Birth Cohort and Criminal Record**



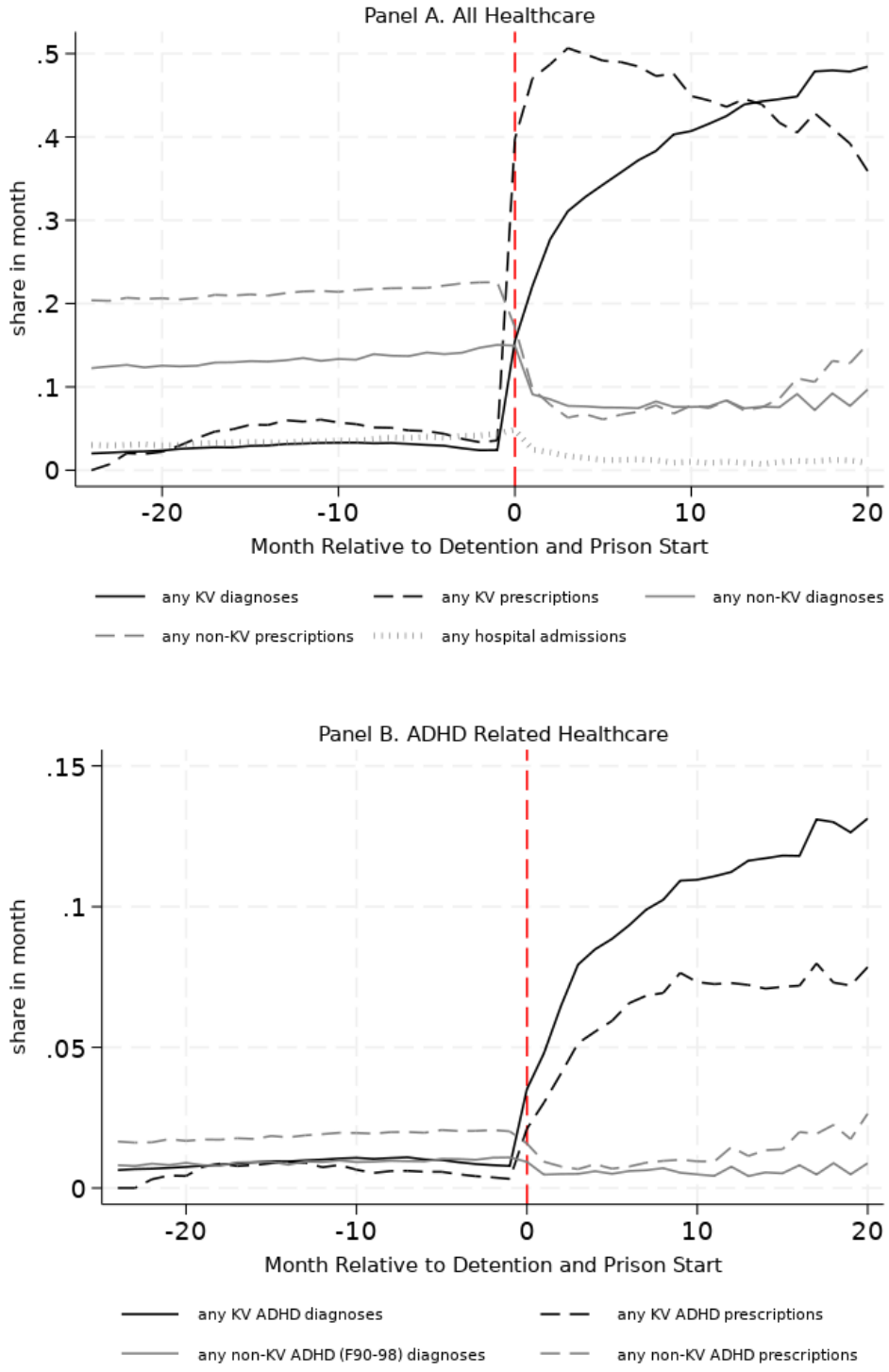

Note – The top row shows the share of males and females in each cohort born 1955-1995 that has received ADHD medication (NO6B) at least once during the period 2006-2016. Prescription data are sourced from the National Prescribed Drug Register held at the National Board of Health and Welfare. The bottom row shows the share of males and females in each cohort born 1955-1995 that has received a diagnosis for a child-onset behavioral disorder (F90-98). The most common diagnosis is ADHD. Diagnoses are sourced from the National Patient Register held at the National Board of Health and Welfare. They include diagnoses from both in-patient hospital visits and out-patient hospital visits. They do not include diagnoses from local community healthcare providers. Males and females are separated into three mutually exclusive categories: (i) those with no conviction during the years 1973-2016, (ii) those with at least one conviction but no prison sentence during the years 1973-2016, and (iii) those who have received at least one prison sentence between 1973-2016. Convictions and prison sentences are sourced from the National Convictions Register held at The National Council for Crime Prevention.

**Figure 2. The Rollout of Prison ADHD Diagnoses: Over Time and Across Facilities**



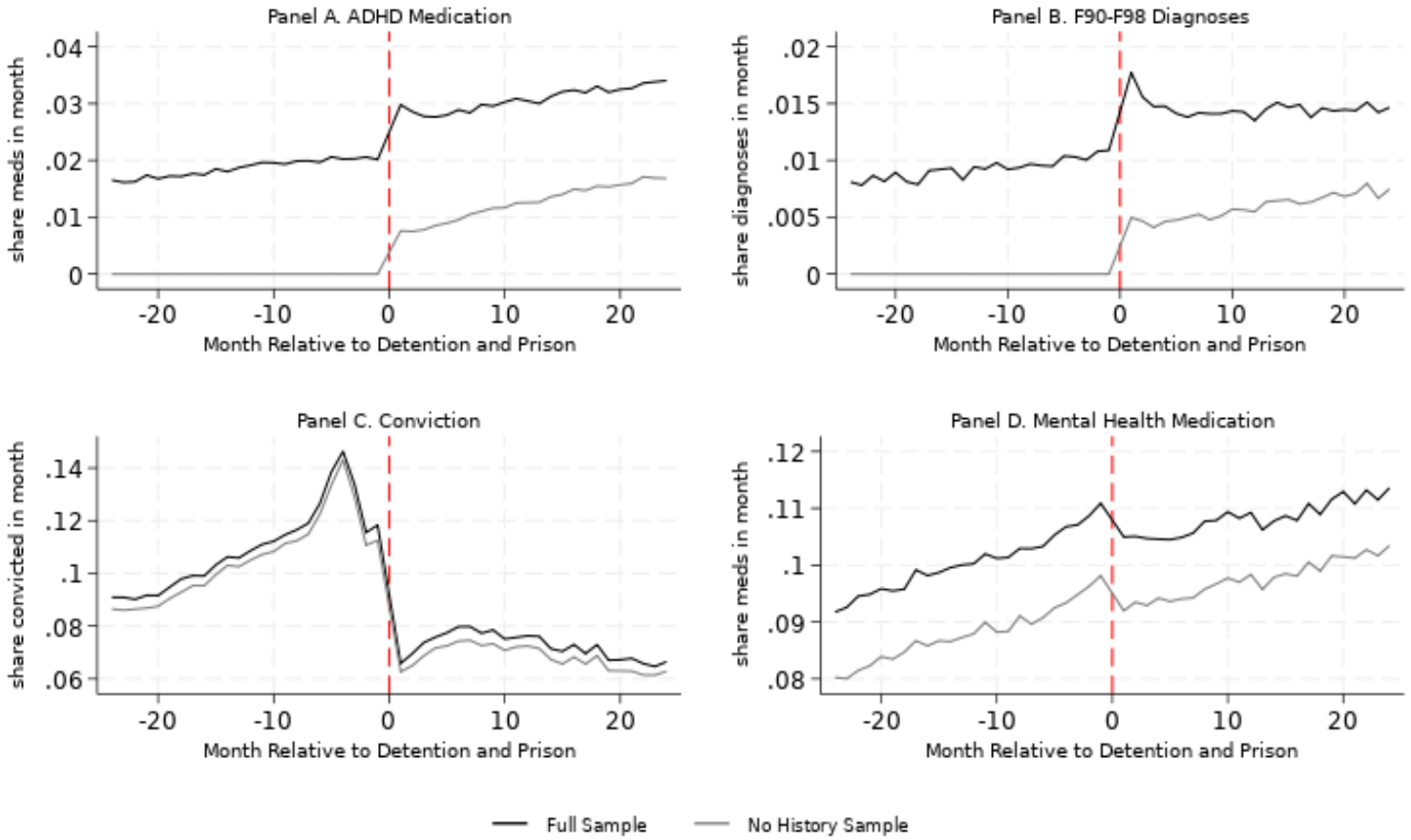

Note – This figure includes four panels that demonstrate the prevalence of ADHD diagnoses in Swedish prisons across time and space. Panel A shows the share on prison ADHD diagnoses for the full sample (solid line), sample with no pre-prison ADHD medication or pre-prison F90-98 diagnosis, such that the diagnosis is considered a *new* diagnosis (long dashed line), and the sample of offenders with multiple spells and no history at the first spell (dotted line). Panel B plots the share of inmates over time who receive a prison diagnosis of ADHD in the facility from which they are released for two facility types: those with (red, solid line) and without (blue, dashed line) ADHD training. Panel C plots the relationship between the share of new diagnoses in each facility and the distance to the nearest ADHD trained facility. The size of the circles is weighted by the number of individuals released from each facility. Panel D maps each prison and indicates the distance from the nearest ADHD trained facility.

**Figure 3. Substitution of Prison and Non-Prison Healthcare while Incarcerated**



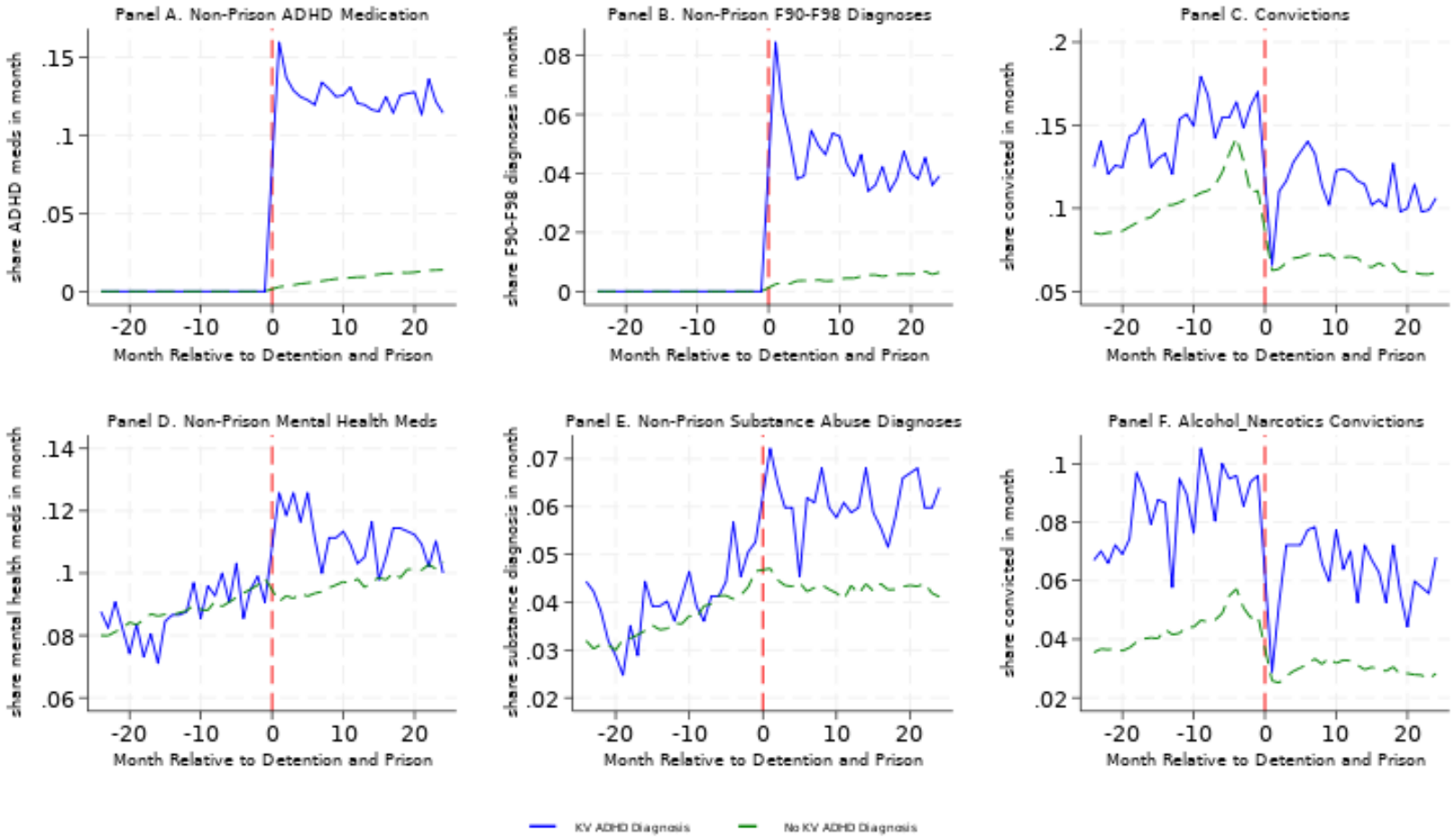

Note: These figures present the raw monthly share of in prison (KV) and non-prison (non-KV) diagnoses and medications in the months leading up to and during prison spells. Panel A includes all types of healthcare while Panel B is ADHD-specific. These figures use the baseline analysis sample of sentences that are less than or equal to 36 months and which start in 2009-2013, and which are completed by December 2014. The red line corresponds to the start of the detention and prison spell. In Panel A, this is the observed prison start date. Spells are only included in the post period if the individual is still in prison, i.e. the post period conditions on being in prison.

**Figure 4. Pre and Post-Prison Dynamics of ADHD Care, Mental Healthcare, and Crime**



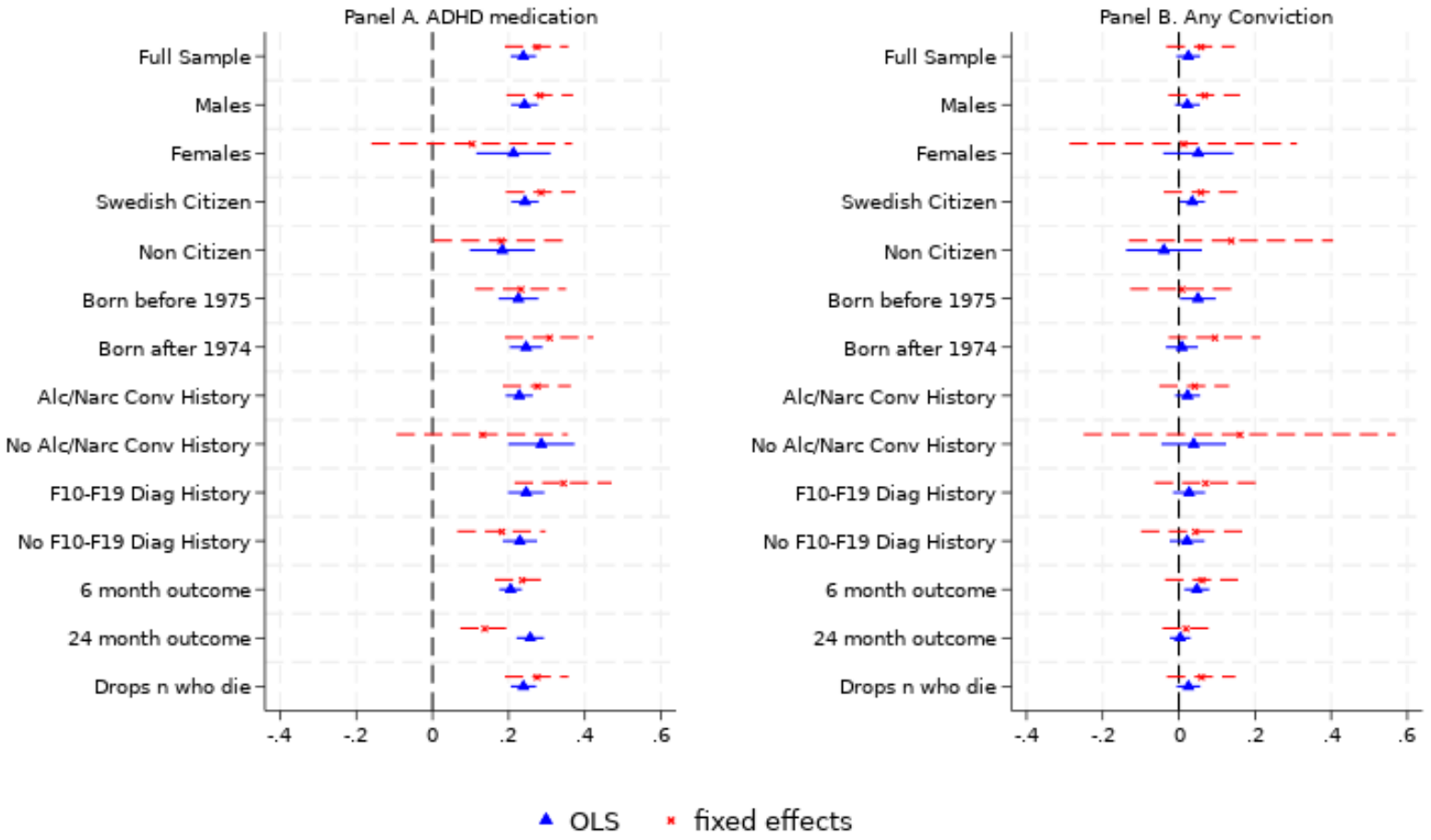

Note: These figures present the raw monthly share of non-prison ADHD prescriptions (Panel A), non-prison childhood onset mental health diagnoses (Panel B), convictions (Panel C), non prison mental health medications, including anti-depressants, anti-anxiety, and anti-psychotics (Panel D) in the months leading up to and following the detention and prison spell (demarcated by the red vertical line). The black line in each figure corresponds to the full baseline analysis sample of sentences that are less than or equal to 36 months and which start in 2009-2013, and which are completed by December 2014. The gray line further restricts the sample to those with no history of ADHD medication or F90-F98 diagnoses.

**Figure 5. Pre and Post-Prison Dynamics by New In Prison ADHD Diagnosis Status: ADHD Care, Mental Healthcare, and Crime**



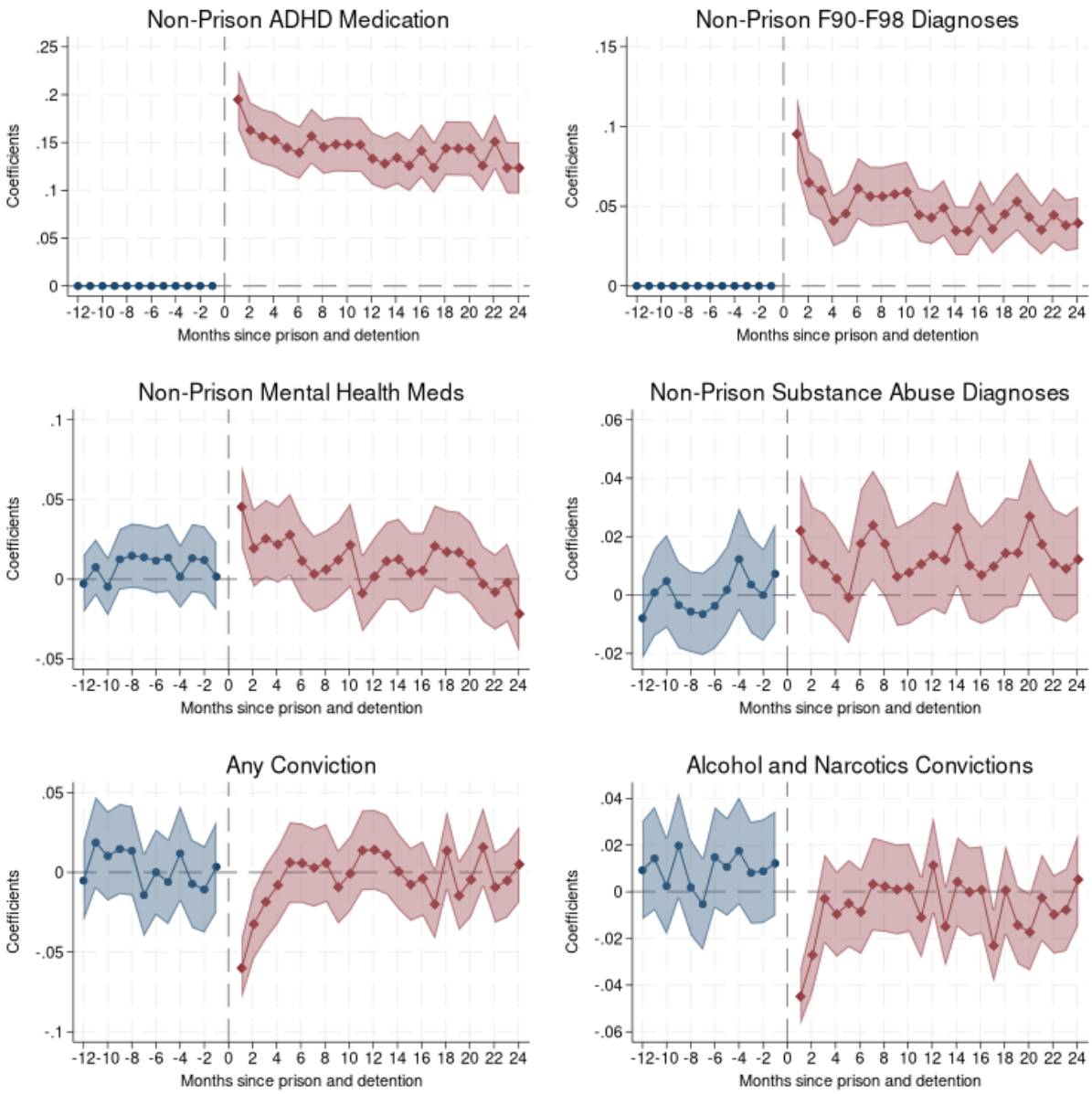

Note: For the sample with no pre-prison ADHD medication or F90-F98 diagnosis history, these figures present the raw monthly share of non-prison ADHD prescriptions (Panel A), non-prison childhood onset mental health diagnoses (Panel B), convictions (Panel C), non prison mental health medications, including anti-depressants, anti-anxiety, and anti-psychotics (Panel D), substance abuse diagnoses, F10-19 (Panel E), and alcohol and narcotics convictions (Panel F) in the months leading up to and following the detention and prison spell (demarcated by the red vertical line). The blue line in each figure corresponds to those newly diagnosed with ADHD in prison and the green line to those with no diagnosis.

**Figure 6. Heterogeneity and Sensitivity: Spell-Level Regressions of Post Prison ADHD Meds and Conviction on In-Prison Diagnoses**



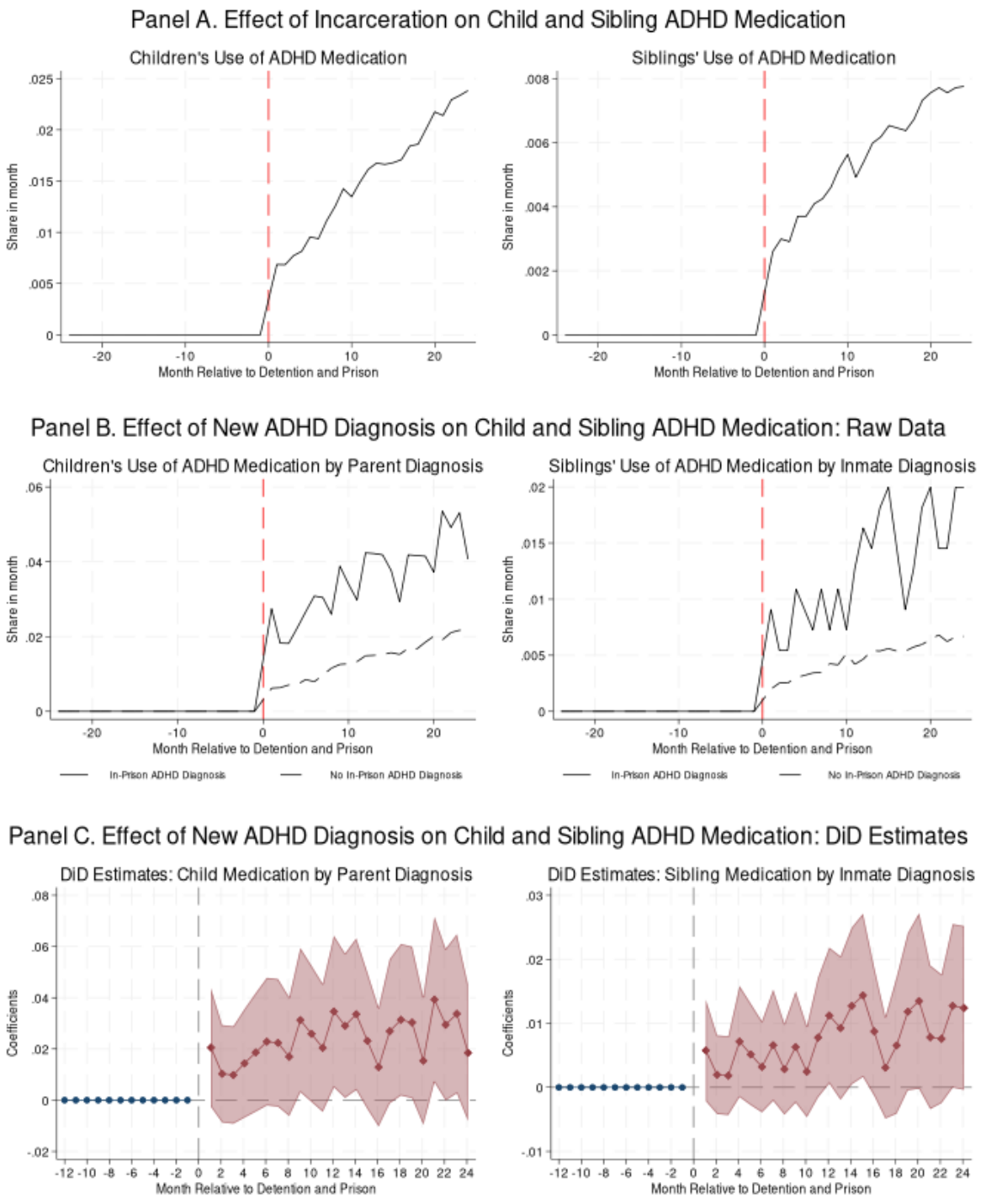

Note: This figure presents heterogeneity and sensitivity checks for the spell-level regression estimates presented in Table 2. The OLS coefficient corresponds to column (4), i.e., OLS with full controls, and the fixed effects coefficient corresponds to column (7), i.e., the repeat offender sample with individual fixed effects. Unless otherwise noted, the dependent variable in Panels A and B are ADHD medication and conviction, respectively, within 12 months of release. Each marker corresponds to the coefficient on the variable of interest – an in prison ADHD diagnosis. 95% confidence intervals are reported using robust standard errors clustered on offender.

**Figure 7. Dynamic difference-in-differences estimates using the unmatched sample of treated and controls.**




Note: This figure reports dynamic DiD estimates using our baseline model without matching. Estimates are produced using Borusyak et al's (2024) robust imputation method. We use their analytical standard errors and cluster them on individuals, since some individuals have more than one prison spell during our observation period. The shaded areas represent 95% confidence intervals. The pre-treatment coefficients (in blue) are estimated using $t - 13$ to $t - 24$ as the reference period. The post-treatment DiD coefficients (in red) are then estimated using the entire pre-period, $t - 1$ to $t - 24$, as the reference period.

**Figure 8. Family Spill-Overs: New In-Prion Diagnoses Increase Child and Sibling ADHD Medication**




Note – Panels A and B present the raw data on take-up of ADHD medication among children and siblings who have no previous history of ADHD medication before their parent or sibling went to prison. In panels C and D, we show the raw data on take-up of ADHD medication among these same children and siblings, but we distinguish between those whose parent or sibling received a *New* in-prison ADHD diagnosis versus those whose parent or sibling received no in-prison ADHD diagnosis. Panels E and F translate Panels A and B into difference-in-differences estimates using Borusyak et al.'s (2024) imputation method.

**Table 1. Summary Statistics**

| | | | No History of ADHD Meds or F90-98 diagnoses: | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Full Sample | | No KV ADHD Diag. | | KV ADHD Diag. | | Pre-prison History | |
| Variable | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| *Panel A. Sentence and Offender Characteristics* | | | | | | | | |
| Prison Start Year (observed) | 2010.9 | 1.4 | 2010.84 | 1.4 | 2011.02 | 1.36 | 2011.3 | 1.34 |
| Prison End Year | 2011.24 | 1.47 | 2011.17 | 1.47 | 2011.57 | 1.45 | 2011.64 | 1.4 |
| Prison Sentence (in months) | 7.77 | 8.19 | 7.67 | 8.19 | 12.02 | 9.68 | 7.49 | 7.54 |
| ADHD Trained End Facility (1/0) | 0.08 | 0.27 | 0.07 | 0.26 | 0.13 | 0.34 | 0.11 | 0.31 |
| Male (1/0) | 0.93 | 0.26 | 0.93 | 0.26 | 0.9 | 0.29 | 0.92 | 0.27 |
| Age at Prison Start | 37.92 | 12.76 | 38.64 | 12.91 | 35.19 | 11.43 | 33.35 | 10.78 |
| Swedish Citizen? (1/0) | 0.81 | 0.39 | 0.79 | 0.4 | 0.9 | 0.3 | 0.92 | 0.27 |
| Current offense: Minor theft? (1/0) | 0.08 | 0.27 | 0.08 | 0.27 | 0.08 | 0.28 | 0.09 | 0.29 |
| Current offense: DUI? (1/0) | 0.11 | 0.31 | 0.12 | 0.32 | 0.01 | 0.12 | 0.04 | 0.2 |
| Current offense: Drug or alcohol? (1/0) | 0.22 | 0.41 | 0.21 | 0.41 | 0.31 | 0.46 | 0.25 | 0.43 |
| Current offense: Traffic? (1/0) | 0.07 | 0.25 | 0.07 | 0.25 | 0.03 | 0.18 | 0.06 | 0.24 |
| Current offense: Property? (1/0) | 0.22 | 0.41 | 0.21 | 0.41 | 0.26 | 0.44 | 0.23 | 0.42 |
| Current offense: Violent (1/0) | 0.35 | 0.48 | 0.34 | 0.47 | 0.35 | 0.48 | 0.39 | 0.49 |
| Current offense: Other (1/0) | 0.04 | 0.2 | 0.05 | 0.21 | 0.02 | 0.15 | 0.02 | 0.15 |
| *Panel B. Pre-Prison Prescriptions and Diagnoses* | | | | | | | | |
| Any anti-depressants (N06A) | 0.30 | 0.46 | 0.26 | 0.44 | 0.35 | 0.48 | 0.52 | 0.50 |
| Any anti-psychotics (N05A)? | 0.12 | 0.33 | 0.09 | 0.29 | 0.14 | 0.35 | 0.34 | 0.47 |
| Any anti-anxiety (N05B, N05C)? | 0.40 | 0.49 | 0.37 | 0.48 | 0.43 | 0.50 | 0.67 | 0.47 |
| Any ADHD drugs (N06B)? | 0.09 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 0.43 |
| # hospital admissions | 2.36 | 5.31 | 2.09 | 4.92 | 2.16 | 3.68 | 4.34 | 7.46 |
| Diag: Any alcohol, drugs, substance ? (F10-F19) | 0.42 | 0.49 | 0.37 | 0.48 | 0.52 | 0.50 | 0.72 | 0.45 |
| Diag: Any mood disorder (e.g. depression)? (F30-F39) | 0.11 | 0.31 | 0.09 | 0.29 | 0.11 | 0.31 | 0.21 | 0.41 |
| Diag: Any anxiety and stress related? (F40-F49) | 0.18 | 0.38 | 0.15 | 0.36 | 0.20 | 0.40 | 0.36 | 0.48 |
| Diag: Any adult onset personality and behavioral? (F60-F69) | 0.07 | 0.25 | 0.05 | 0.21 | 0.08 | 0.28 | 0.22 | 0.41 |
| Diag: Any child onset behavioral (e.g ADHD)? (F90-F98) | 0.10 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 0.37 |
| *Panel C. In-Prison Healthcare* | | | | | | | | |
| any doctor visits? | 0.51 | 0.5 | 0.48 | 0.5 | 0.83 | 0.37 | 0.63 | 0.48 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| any nurse visits? | 0.83 | 0.37 | 0.83 | 0.38 | 0.91 | 0.29 | 0.86 | 0.34 |
| any psychologist visits? | 0.06 | 0.25 | 0.06 | 0.23 | 0.2 | 0.4 | 0.09 | 0.29 |
| any programs started? | 0.41 | 0.49 | 0.4 | 0.49 | 0.55 | 0.5 | 0.4 | 0.49 |
| any CBT (Cognitive behavioral therapy) programs? | 0.13 | 0.34 | 0.12 | 0.33 | 0.3 | 0.46 | 0.15 | 0.36 |
| any diagnoses: alcohol disorder? F10 | 0.04 | 0.2 | 0.04 | 0.19 | 0.05 | 0.23 | 0.07 | 0.26 |
| any diagnoses: drug disorder? F11-F16 | 0.09 | 0.29 | 0.07 | 0.25 | 0.23 | 0.42 | 0.21 | 0.4 |
| any diagnoses: depressive episode? F32 | 0.03 | 0.16 | 0.02 | 0.15 | 0.06 | 0.24 | 0.04 | 0.19 |
| any diagnoses: stress? F43 | 0.03 | 0.17 | 0.03 | 0.16 | 0.06 | 0.24 | 0.03 | 0.18 |
| any diagnoses: personality disorder? F60 | 0.03 | 0.17 | 0.02 | 0.13 | 0.08 | 0.28 | 0.09 | 0.28 |
| any diagnoses: ADHD? F90 | 0.08 | 0.26 | 0.00 | 0.00 | 1.00 | 0.00 | 0.42 | 0.49 |
| any diagnoses: high blood pressure? I10 | 0.02 | 0.15 | 0.02 | 0.15 | 0.03 | 0.16 | 0.02 | 0.14 |
| any diagnoses: pain? R52 | 0.03 | 0.17 | 0.03 | 0.17 | 0.04 | 0.21 | 0.04 | 0.2 |
| any prescriptions for ADHD? (N06B) | 0.06 | 0.24 | 0.00 | 0.06 | 0.37 | 0.48 | 0.31 | 0.46 |
| any anti anxiety prescriptions (N05B, N05C) | 0.24 | 0.43 | 0.22 | 0.41 | 0.29 | 0.45 | 0.32 | 0.47 |
| any anti psychotic prescriptions? (N05A) | 0.11 | 0.31 | 0.09 | 0.28 | 0.19 | 0.39 | 0.21 | 0.41 |
| any anti depressant prescriptions? (N06A) | 0.2 | 0.4 | 0.18 | 0.38 | 0.35 | 0.48 | 0.31 | 0.46 |
| N | 36578 | | 31267 | | 950 | | 4361 | |
| N (KV prescriptions) | 13492 | | 11017 | | 364 | | 2111 | |

Note: Note-- This table presents summary statistics for the full analysis sample of sentences that are less than or equal to 36 months and which start in 2009-2013, and which are completed by December 2014. It also presents summary statistics for three samples. The first two restrict to spells in which the offender had no pre-prison history of ADHD medication or F90-98 diagnoses; summary statistics are presented separately for those with a new diagnosis of ADHD in prison (KV ADHD Diagnosis) and to those without. The final sample includes those with some pre-prison history of ADHD (medication and/or F90-98 diagnosis). Panel A presents offender and sentence characteristics, Panel B shows pre-prison healthcare characteristics and Panel C shows in prison healthcare. In-prison medication is only availabe for the latter two years of the sample, and corresponding sample sizes are noted at the bottom of the table.

**Table 2. Spell Level Regressions: In-Prison ADHD Diagnoses Increase Post-Prison ADHD Medication and Diagnoses but Do Not Affect Recidivism**

| | Full Sample with No Pre-Prison ADHD Medication or F90-F98 Diagnosis History | | | | Restricted to Offenders with Repeat Prison Spells | | |
|---|---|---|---|---|---|---|---|
| *Dependent Variable (within 12 months post release)* | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Panel A: Any ADHD prescriptions | 0.266*** | 0.259*** | 0.252*** | 0.239*** | 0.176*** | 0.166*** | 0.273*** |
| | [0.017] | [0.017] | [0.017] | [0.017] | [0.020] | [0.020] | [0.042] |
| | *0.079* | *0.087* | *0.092* | *0.1* | *0.056* | *0.068* | *0.611* |
| Panel B: Any F90-98 Diagnoses | 0.242*** | 0.235*** | 0.228*** | 0.217*** | 0.160*** | 0.149*** | 0.217*** |
| | [0.016] | [0.016] | [0.016] | [0.016] | [0.019] | [0.019] | [0.040] |
| | *0.061* | *0.07* | *0.075* | *0.079* | *0.041* | *0.054* | *0.607* |
| Panel C: Any convictions | 0.187*** | 0.144*** | 0.035** | 0.025 | 0.060*** | 0.012 | 0.057 |
| | [0.019] | [0.019] | [0.016] | [0.016] | [0.021] | [0.020] | [0.045] |
| | *0.004* | *0.06* | *0.263* | *0.264* | *0.001* | *0.078* | *0.546* |
| N | 32,217 | 32,217 | 32,217 | 32,217 | 14,039 | 14,039 | 14,039 |
| Pre-prison Health: Meds, Diagnoses, Hospitalization | | X | X | X | | X | X |
| Demographics (Gender, Swedish, Age) | | X | X | X | | X | X |
| Sentence Month FE, Current and past offense types | | | X | X | | X | X |
| In prison healthcare: programs, medical visits, diagnoses | | | | X | | | |
| Individual Fixed Effects | | | | | | | X |

Note – This table uses the sample of prison spells for which the offender had no history (medication or F90-98 diagnoses) of ADHD prior to prison. Columns (1)-(4) include all such individuals, while columns (5)-(7) include those with multiple spells. We regress whether the offender had any ADHD prescriptions (Panel A), any F90-98 diagnoses (Panel B), any convictions (PanelC) in the 12 months post-release on whether they received a new diagnosis of ADHD in prison and controls reported in the bottom panel. Only the coefficient on receiving a new ADHD prison diagnosis is shown. Robust standard errors, clustered on offender, are in brackets. R-squared is in italics. *** p<0.01, ** p<0.05, * p<0.1

**Table 3. Decomposing an In-Prison ADHD Diagnosis: Diagnosis, Medication, and Cognitive Behavioral Therapy**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *DV: ADHD Medication 12 months post release* | | | *DV: F90-98 Diagnosis 12 months post release* | | |
| New KV ADHD Diagnosis | 0.222*** | 0.099*** | 0.095*** | 0.191*** | 0.093*** | 0.086*** |
| | [0.024] | [0.021] | [0.021] | [0.023] | [0.021] | [0.021] |
| KV CBT Program & No ADHD Meds | | 0.016*** | 0.011** | | 0.020*** | 0.014*** |
| | | [0.004] | [0.005] | | [0.005] | [0.005] |
| KV ADHD Meds and No CBT | | 0.346*** | 0.337*** | | 0.263*** | 0.255*** |
| | | [0.052] | [0.052] | | [0.050] | [0.050] |
| KV ADHD Meds and CBT | | 0.319*** | 0.319*** | | 0.268*** | 0.261*** |
| | | [0.059] | [0.058] | | [0.057] | [0.057] |
| Constant | 0.014*** | 0.011*** | 0.003 | 0.018*** | 0.014*** | -0.006 |
| | [0.001] | [0.001] | [0.011] | [0.001] | [0.001] | [0.011] |
| Controls | | | X | | | X |
| Observations | 11,381 | 11,381 | 11,381 | 11,381 | 11,381 | 11,381 |
| R-squared | 0.073 | 0.129 | 0.142 | 0.049 | 0.081 | 0.095 |

Note: This table uses the sample of prison spells starting in 2012 and 2013 for which the offender had no history (medication or F90-98 diagnoses) of ADHD prior to prison. It is only these prison start years in which we observe prison medication. The outcome variable in columns (1)-(3) is whether the individual obtained ADHD medication within 12 months of release from prison; in columns (4)-(6) it is a F90-98 diagnosis. We regress these outcomes on whether the offender had a new KV ADHD diagnosis in columns (1) and (4), and then on whether in addition to the diagnosis, the offender received ADHD medication while in prison or participated in program we classified as containing cognitive behavioral therapy. Columns (3) and (6) add controls, which include individual and spell characteristics, many dimensions of pre prison health, and offense and criminal history characteristics. Robust standard errors, clustered on offender, are in brackets. *** p<0.01, ** p<0.05, * p<0.1

**Table 4. Descriptive Statistics for Difference-in-Differences Samples, Unmatched Compared to Matched (and reweighted).**

| | Treated | Controls | Matched treated | Matched & reweighted controls |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Male | 0.888 | 0.927 | 0.892 | 0.892 |
| Birth year | 1976.4 | 1971.9 | 1976.3 | 1975.6 |
| Swedish citizen | 0.901 | 0.794 | 0.902 | 0.902 |
| History of alcohol/drug abuse | 0.492 | 0.371 | 0.490 | 0.490 |
| History of non-ADHD mental health medications | 0.518 | 0.432 | 0.519 | 0.519 |
| Previous convictions | 5.516 | 4.468 | 5.536 | 5.536 |
| Violent crime | 0.573 | 0.491 | 0.573 | 0.559 |
| Property crime | 0.722 | 0.557 | 0.724 | 0.665 |
| Alcohol/Narcotics crime | 0.821 | 0.556 | 0.823 | 0.704 |
| Traffic crime | 0.676 | 0.598 | 0.678 | 0.648 |
| Other crime | 0.631 | 0.469 | 0.634 | 0.571 |
| Pre-prison avg annual earnings SEK | 33,449 | 55,484 | 33,569 | 42,482 |
| Pre-prison avg employment November | 0.276 | 0.348 | 0.277 | 0.322 |
| Number of spells | 630 | 29,760 | 627 | 24,056 |

Note: The matched control group is match on sex, age ventiles, Swedish citizenship, number of previous convictions, previous use of non-ADHD mental health drugs (yes/no), and previous diagnoses for substance abuse disorders (yes/no). Previous convictions are binned into 10 groups, including: 0, 1, 2, 3, 4, 5, 6, 7-10, 11-50, 51-100.We calculate weights for each cell and then reweight the data so that our large control group looks more similar to the smaller treatment group. Cells that do not include both treated and control individuals receive a missing weight and are subsequently dropped from the matched and weighted regressions. This procedure drops 3 treated spells and 5,704 control spells.

**Table 5. Static Difference-in-Differences Estimates of Post-Release Outcomes Using Both Matched and Unmatched Samples.**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **ADHD Medication** | **ADHD Diagnoses** | | | | |
| *Panel A: Unmatched sample*, N = 1,458,720 (*n* treated spells = 630, *n* control spells = 29,760) | | | | | | |
| $\hat{\beta}$ | 0.143*** | 0.049*** | | | | |
| (s.e.) | (0.010) | (0.004) | | | | |
| *Panel B: Matched sample*, N = 1,184,784 (*n* treated spells = 627, *n* control spells = 24,056) | | | | | | |
| $\hat{\beta}$ | 0.138*** | 0.047*** | | | | |
| (s.e.) | (0.010) | (0.004) | | | | |
| | **Any Conviction** | **Violent** | **Property** | **Alcohol & Narcotics** | **Traffic** | **Other** |
| *Panel C: Unmatched sample*, N = 1,458,720 (*n* treated spells = 630, *n* control spells = 29,760) | | | | | | |
| $\hat{\beta}$ | -0.004 | -0.001 | -0.003 | -0.007** | -0.004 | -0.003* |
| (s.e.) | (0.005) | (0.001) | (0.002) | (0.003) | (0.003) | (0.002) |
| Pre-Treatment mean | 0.11 | 0.02 | 0.04 | 0.04 | 0.05 | 0.02 |
| Pre-Trend test | 0.76 | 0.58 | 0.41 | 0.55 | 0.77 | 0.20 |
| *Panel D: Matched sample*, N = 1,184,784 (*n* treated spells = 627, *n* control spells = 24,056) | | | | | | |
| $\hat{\beta}$ | -0.001 | -0.000 | -0.001 | -0.004 | -0.001 | -0.002 |
| (s.e.) | (0.005) | (0.002) | (0.002) | (0.003) | (0.003) | (0.002) |
| Pre-Treatment mean | 0.11 | 0.02 | 0.04 | 0.05 | 0.05 | 0.02 |
| Pre-Trend test | 0.75 | 0.50 | 0.46 | 0.83 | 0.76 | 0.24 |

Note: DiD coefficients are estimated using Borusyak et al.'s (2024) imputation method. We report Borusyak et al.'s (2024) analytical standard errors and cluster them on individuals, since some individuals have more than one prison spell during our observation period. Standard errors are reported in parentheses. Stars indicate significance levels: *** 1%, ** 5%, and * 10%. We report the *p*-value of a pre-trend test that tests for the joint significance of all coefficients $\hat{\beta}_{t-1}$ … $\hat{\beta}_{t-12}$ using $t-13$ to $t-24$ as the reference period. A *p*-value > 0.10 indicates that pre-treatment differences (between treated and controls) are not significantly different from zero. The post-treatment DiD coefficients are then estimated using the entire pre-period, $t-1$ to $t-24$, as the reference period.

**Table 6. Static Difference-in-Differences Estimates of Other Health and Employment Post-Release Outcomes Using Both Matched and Unmatched Samples.**

| | (1) | (2) |
|---|---|---|
| | **Non-ADHD mental health medication** | **Substance abuse diagnosis** |
| *Panel A: Unmatched sample*, N = 1,458,720 (*n* treated spells = 630, *n* control spells = 29,760) | | |
| $\hat{\beta}$ | 0.010 | 0.013*** |
| (s.e.) | (0.008) | (0.004) |
| Pre-Treatment mean | 0.09 | 0.04 |
| Pre-Trend test | 0.74 | 0.82 |
| *Panel B: Matched sample*, N = 1,184,784 (*n* treated spells = 627, *n* control spells = 24,056) | | |
| $\hat{\beta}$ | 0.006 | 0.009** |
| (s.e.) | (0.008) | (0.004) |
| Pre-Treatment mean | 0.09 | 0.04 |
| Pre-Trend test | 0.81 | 0.75 |
| | **Average annual earnings** | **Employed in November** |
| *Panel C: Unmatched sample*, N = 155,871 (*n* treated spells = 587, *n* control spells = 21,848) | | |
| $\hat{\beta}$ | -489 | -0.008 |
| (s.e.) | (3,434) | (0.016) |
| Pre-Treatment mean | 68,993 | 0.41 |
| Pre-Trend test | 0.12 | 0.13 |
| *Panel D: Matched sample*, N = 62,397 (*n* treated spells = 561, *n* control spells = 17,466) | | |
| $\hat{\beta}$ | -5,255 | 0.002 |
| (s.e.) | (3,292) | (0.017) |
| Pre-Treatment mean | 71,503 | 0.43 |
| Pre-Trend test | 0.19 | 0.18 |

Note: DiD coefficients are estimated using Borusyak et al.'s (2024) imputation method. We report Borusyak et al.'s (2024) analytical standard errors and cluster them on individuals, since some individuals have more than one prison spell during our observation period. Standard errors are reported in parentheses. Stars indicate significance levels: *** 1%, ** 5%, and * 10%. We report the *p*-value of a pre-trend test that tests for the joint significance of all coefficients $\hat{\beta}_{t-1} \ldots \hat{\beta}_{t-12}$ using $t - 13$ to $t - 24$ as the reference period. A *p*-value > 0.10 indicates that pre-treatment differences (between treated and controls) are not significantly different from zero. The post-treatment DiD coefficients are then estimated using the entire pre-period, $t - 1$ to $t - 24$, as the reference period.

**Table 7. Static Difference-in-Differences Estimates of Spillover Effects on the Children and Siblings of Inmates Who Receive *New* ADHD Diagnoses.**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Panel A: ADHD Medication, Children, N = 582,830, *n* treated spells = 205, *n* control spells = 13,138 | | | | | | |
| $\hat{\beta}$ | | | 0.024** | | | |
| (s.e.) | | | (0.009) | | | |
| Panel B: ADHD Medication, Siblings N = 1,089,360, *n* treated spells = 551, *n* control spells = 22,144 | | | | | | |
| $\hat{\beta}$ | | | 0.008** | | | |
| (s.e.) | | | (0.004) | | | |
| Panel C: Any Conviction, Children, N = 352,009, *n* treated spells = 205, *n* control spells = 13,071 | | | | | | |
| $\hat{\beta}$ | | | -0.0014 | | | |
| (s.e.) | | | (0.0046) | | | |
| Pre-Treatment mean | | | 0.015 | | | |
| Pre-Trend test | | | 0.31 | | | |
| Panel D: Any Conviction, Siblings, N = 1,089,360, *n* treated spells = 551, *n* control spells = 22,144 | | | | | | |
| $\hat{\beta}$ | | | -0.0001 | | | |
| (s.e.) | | | (0.0023) | | | |
| Pre-Treatment mean | | | 0.025 | | | |
| Pre-Trend test | | | 0.27 | | | |

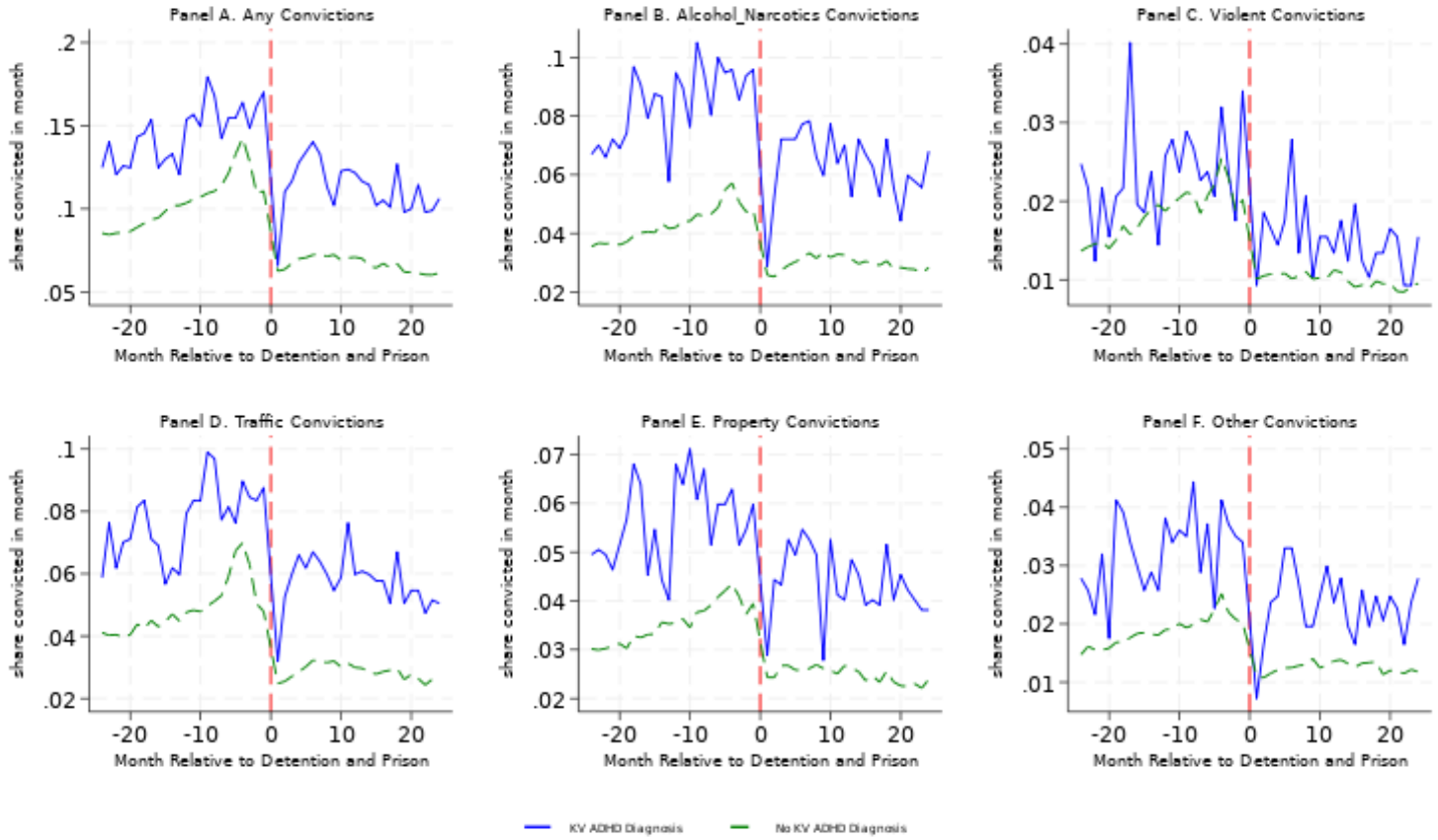
Note: DiD coefficients are estimated using Borusyak et al.'s (2024) imputation method. We report Borusyak et al.'s (2024) analytical standard errors and cluster them on individuals, since some individuals have more than one prison spell during our observation period. Standard errors are reported in parentheses. Stars indicate significance levels: *** 1%, ** 5%, and * 10%. We report the *p*-value of a pre-trend test that tests for the joint significance of all coefficients $\hat{\beta}_{t-1}$ … $\hat{\beta}_{t-12}$ using $t-13$ to $t-24$ as the reference period. A *p*-value > 0.10 indicates that pre-treatment differences (between treated and controls) are not significantly different from zero. The post-treatment DiD coefficients are then estimated using the entire pre-period, $t-1$ to $t-24$, as the reference period.

**For Online Publication**

Appendix Tables and Figures

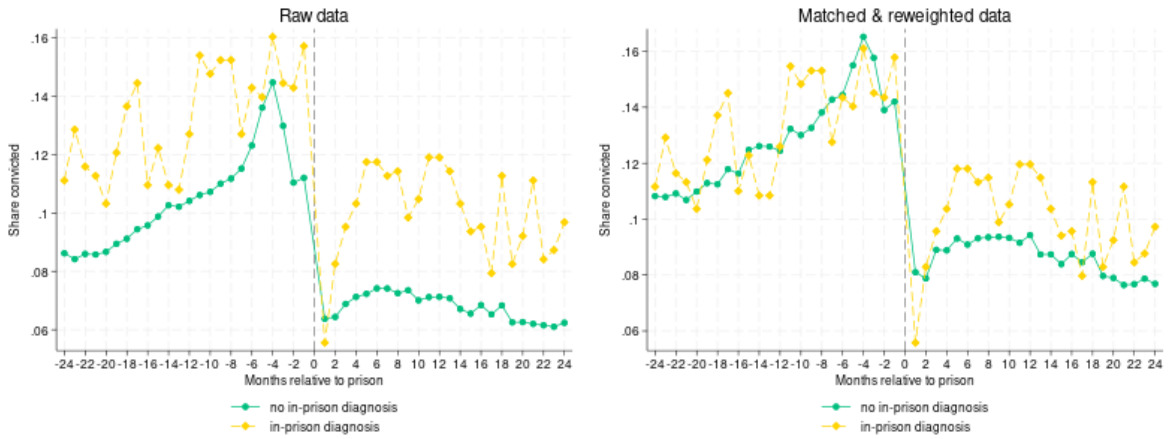
Diagnosing ADHD in Prison: The Effects on Inmates and Their Families

**Appendix Figure 1. Pre and Post-Prison Dynamics by New In Prison ADHD Diagnosis: Crime Types**



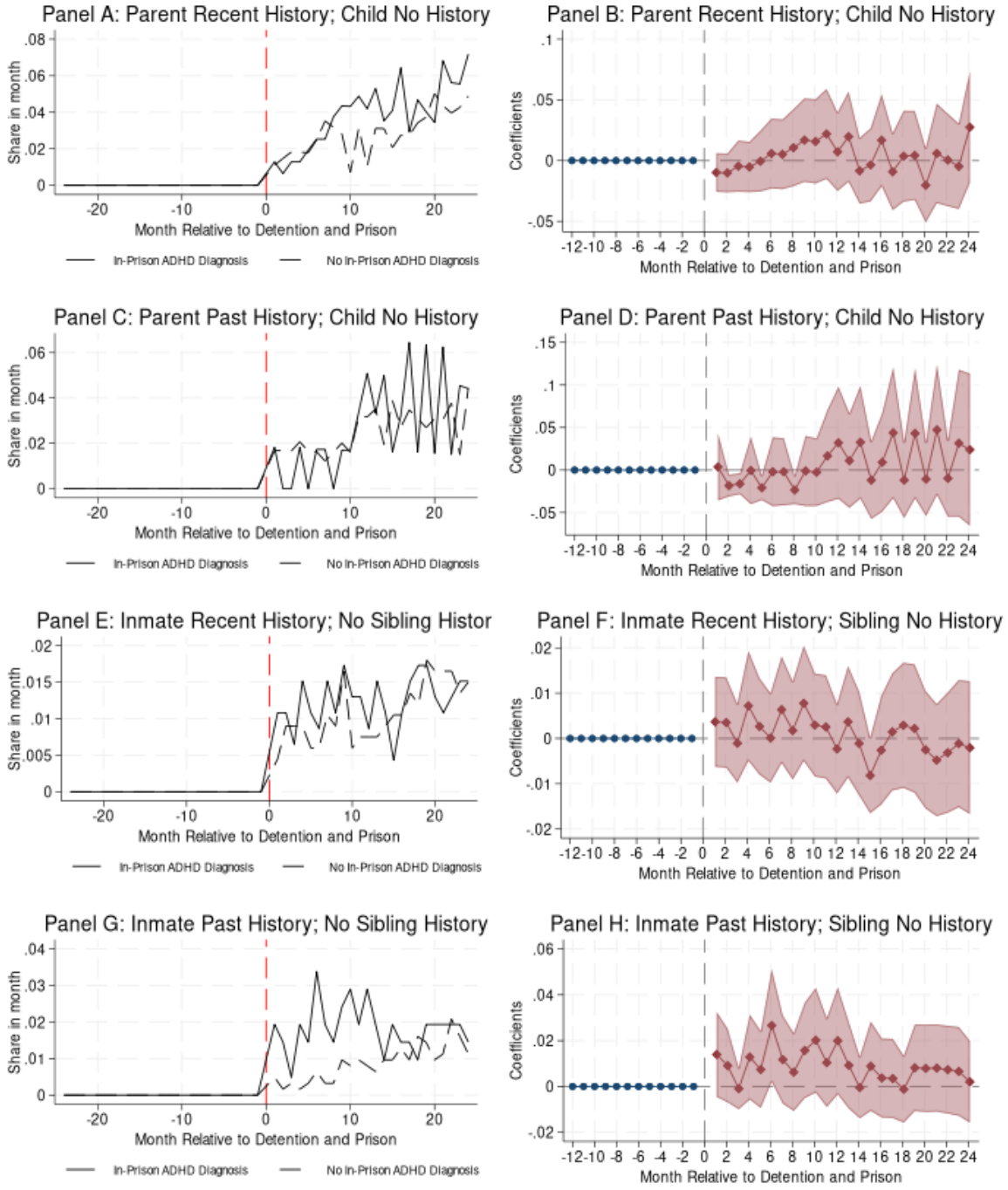

Note: For the sample with no pre-prison ADHD medication or F90-98 history, these figures present the raw monthly share with a conviction overall (Panel A) and by crime type. Panels B-F show alcohol and narcotics, violent, traffic, property, and other convictions respectively in the months leading up to and following the detention and prison spell (demarcated by the red vertical line). The blue line in each figure corresponds to those newly diagnosed with ADHD in prison and the green line to those with no diagnosis.

**Appendix Figure 2. Monthly Conviction Rate (Any Conviction), Raw Data versus Matched and Reweighted Data.**



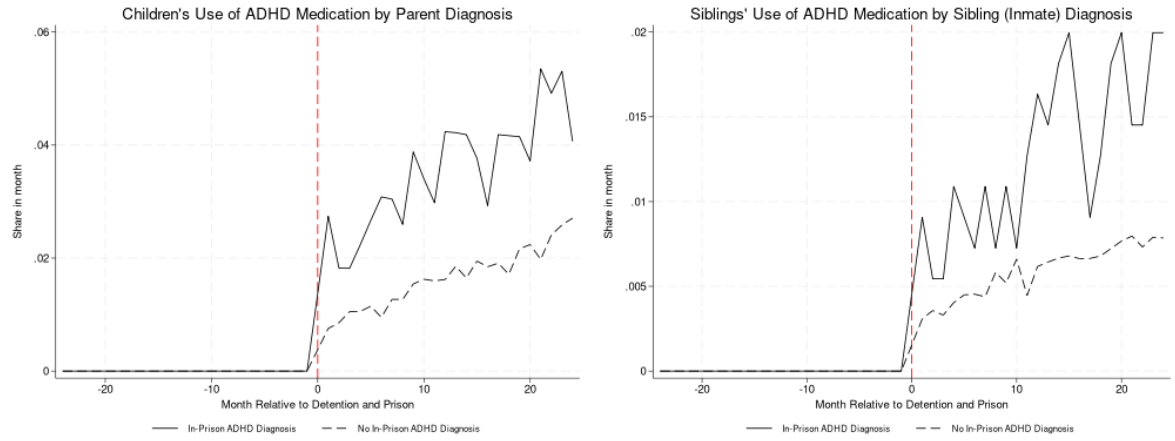

Note: The matched control group is match on sex, age ventiles, Swedish citizenship, number of previous convictions, previous use of non-ADHD mental health drugs (yes/no), and previous diagnoses for substance abuse disorders (yes/no). Previous convictions are binned into 10 groups, including: 0, 1, 2, 3, 4, 5, 6, 7-10, 11-50, 51-100.We calculate weights for each cell and then reweight the data so that the large control group looks more similar to the smaller treatment group. Cells that do not include both treated and control individuals receive a missing weight and are subsequently dropped from the matched and weighted regressions. This procedure drops 3 treated spells and 5,704 control spells.

**Appendix Figure 3. Family Spill-Overs: Renewed and Semi-New Diagnoses in Prison Do Not Affect Children and Siblings**




Note –Panels A and B show the raw comparison and DiD estimates of ADHD medication use among children who had no ADHD history whose parent did or did not receive an in-prison ADHD diagnosis, among parents that have a recent history of ADHD. Panels C and D show the raw comparison and DiD estimates of ADHD medication use among children who had no ADHD history whose parent did or did not receive an in-prison ADHD diagnosis, among parents that have a past history of ADHD. Panels E and F show the raw comparison and DiD estimates of ADHD medication use among siblings who had no ADHD history whose inmate sibling did or did not receive an in-prison ADHD diagnosis, among inmate siblings that have a recent history of ADHD. Panels G and H show the raw comparison and DiD estimates of ADHD medication use among siblings who had no ADHD history whose inmate sibling did or did not receive an in-prison ADHD diagnosis, among inmate siblings that have a past history of ADHD.

**Appendix Figure 4. Raw Level Differences in ADHD Medication Use of Children and Siblings of Treated and Control Inmates after Matching on Sentence Length.**




Note: This figure re-creates Panel B of Figure 8 after first matching (and re-weighting) treated and control inmates by sentence length in months. This figure demonstrates that it is not differences in the average sentence length between treat and controls that generates the observed level differences; sentence differences are controlled for in this figure.

**Appendix Table 1. In Prison Treatment Program Descriptions**

| *Full Program Name* | *Program Description* | *CBT* | *Alc/Sub Use Focused* | *Intensity* |
|---|---|---|---|---|
| Motivational interviews | Tries to change addicts behavior by focusing on their motivation to change. | | X | |
| Prime for Life | Aimed to increase awareness of risks of alcohol and other drugs. Discontinued in 2014 after KV evaluation found harmful impacts on risk of drunk driving recidivism. | | X | |
| 12-Step A (12-Step Introduction program) | Introduction to classic-12 step program for people with substance abuse and addiction problems that originated in Alcoholics Anonymous. Done in groups; less emphasis on faith than in the US version | | X | 70 hours |
| 12-Step B (Classic 12-step Program) | More intensive 12-step program. | | X | 200 hours |
| Addiction Relapse Prevention Program | Participant practices handling risky situations, for drug relapse, through conversations and exercises. Contains cognitive and behavioral strategies | X | X | 8 90-minute sessions in 4-16 weeks |
| Enhanced Thinking Skills | Cognitive behavioral therapy program for general crime conducted in group format. Aims to improve problem solving skills, self control and social skills. | X | | 53 hours in 21 sessions in 7 weeks |
| Integrated Domestic Abuse Program (IDAP) | Program for men who committed violence against (ex) partner. Also uses cognitive based therapy approach. | X | | 27 group, 4 individual meetings |
| Crime Break (Brottsbrytet) | Cognitive behavioral therapy program done in groups and individual sessions | X | | 25 2-hour group and 3+ individual sessions |
| Dare to Choose (Våga Välja) | Cognitive behavioral therapy program for drugg addicts. | X | X | 26 3 hour sessions. |
| Program for Reducing Individual Substance Misuse (PRISM) | Individual cognitive behavioral therapy for offenders whose crime is linked to substance abuse. | X | X | 33 hours, 21 sessions in 18-26 weeks |
| One to One | Individual cognitive beahvioral therapy program from England. Aims to reduce recisivism | X | | 20 meetings, 1-2 times/week |
| 12-Step C (Extended 12 Step Program?) | Even more intensive 12 step program | | X | 400 hours. |

Program descriptions are largely sourced from Kriminalvården (2014) "Utvärdering av Kriminalvårdens Behandlingsprogram Sammanfattningsrapport."