Parental Arrest and Incarceration: How Does it Impact the Children?

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May 30, 2018

Abstract

Parental arrest and incarceration impacts almost 3 million children in the U.S. and scholars in criminology and sociology consistently find negative impacts on a child's academic and behavioral outcomes. The research presented here provides evidence that parental arrest coincides with negative outcomes for children, but that the incarceration of a parent may benefit the child. Benefits occur for end-of-grade exams and school behavioral outcomes with effects concentrated among young children with mothers that commit violent crimes or fathers with alcohol/drug offenses. Results suggest that parental incarceration changes a child's home environment through the removal of a negative role model.

1. Introduction

The large number of adults incarcerated in the U.S. and the age profile of criminals entails that a number of young and school age children have the traumatic experience of a parental figure being removed from the household through the criminal justice system. In fact, Western and Pettit (2010) estimate about 2.7 million children have an incarcerated parent which represents about 1 in every 28 children. Given the prevalence of this childhood experience, a robust literature in sociology, criminology and economics consistently highlights a large negative effect of parental incarceration on the life course outcomes of children.[2] Scholars find evidence that parental incarceration is linked to negative academic outcomes[3] , greater child mortality[4] and more antisocial behavior[5] among children. This research attributes these negative outcomes to factors such as reduced social capital, changes in a child's living arrangements, financial loss, trauma of actual arrest and incarceration and change or loss of relationship with a parent.

Unfortunately and often recognized in this literature, criminal parents are likely to have non-criminal negative impacts on a child through an abusive or unstable home environment, living in high crime neighborhoods or attending lower-performing schools. Therefore, it is not clear how much direct involvement with the criminal justice system matters beyond these other risk factors. This issue is well discussed in Johnson (2009) who finds a positive correlation between parental incarceration and children's deviant behavior and provides evidence that some of this effect is causal in nature. More recent and parallel work provides strong casual evidence of the impact of parental incarceration on children. For the case of Sweden, Dobbie et al. (2018) use administrative data and random judge assignment to highlight large positive effects of parental incarceration on teenage convictions and teen childbearing and negative effects on employment at age 20. The authors conclude that negative impacts on children are related to the trauma and stigma of having a parent sent to prison. Using a similar methodology for neighboring Norway, Bhuller et al. (2018) find limited evidence that paternal incarceration affects a child's later criminal activity or school performance. In some preliminary work, Arteaga (2018) uses random judge assignment and finds positive effects of parental incarceration on educational attainment in Colombia.

In the paper presented here, I estimate the impacts of parental incarceration on children

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[2] e.g. Wildeman et al. (2014) , Foster and Hagan (2007), Wildeman and Western (2010) , Besemer et al. (2011), Murray et al. (2014), Hjalmarsson and Lindquist (2012)

[3] e.g. Cho (2009), Cho (2010), Foster and Hagan (2007)

[4] e.g. Wildeman et al. (2014)

[5] Murray and Farrington (2005), Murray, Farrington and Sekol (2012), Murray, Loeber and Pardini (2012), Wildeman (2010) , Roettger et al. (2011)

in the United States. My analysis differs from the literature beyond geography in two distinct ways. First, I focus on short-term effects around a given incarceration event whereas recent papers in this literature are longer-term in focus and thus include the cumulative criminal justice activity that develops since an incarceration spell. Second, I focus on parents living with children rather than birth parents, which helps address the fact that estimates may attentuate toward zero if a large number of children live in single mother households with absentee birth fathers that are incarcerated.[6]

In order to quantify the impacts of parental arrest and incarceration on their children, I match rich administrative data on children, adult arrests and incarcerations to provide a student level panel of outcomes (e.g absences, school crimes, suspensions, test scores and grade retention) through public school and directly link the timing of arrest and incarceration to annual outcomes. My data incorporates all incarcerations of individuals 16 and older in Mecklenburg county (city of Charlotte, NC) jails and North Carolina state prisons and thus includes both pretrial incarceration as well as post-trial sentencing.[7] Matching of parents to children is done based on names and addresses to ensure that parental figures live in the same residence as children.[8]

In order to identify the effects of parental incarceration, I leverage the panel nature of this dataset and use temporal variation in when a parent is incarcerated versus when a parent is only arrested. In order to limit potential bias from the positive correlation between parental incarceration and a child's home environment, I include individual fixed effects as well as detailed covariates that include information on the type of crime committed by a parent, past arrests and if the crime was committed in the home or involved a child victim. These covariates should control for most factors that determine if a parent is released after arrest or sentenced to prison or jail. With a sufficient number of covariates to measure all factors that determine sentencing, remaining variation should be closely related to random judge variation in leniency or other idiosyncratic elements of the criminal justice system.[9]

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[6]Directly determining if parents are living and regularly interacting with children is important since the incarceration of an absentee father or mother would have substantially different impacts than a parent living with the child. This point is particularly salient given that Glaze and Maruschak (2008) find that only 42% of incarcerated fathers and 60% of incarcerated mothers live with children prior to incarceration.

[7]I cannot directly disentangle pretrial from post-sentencing incarcerations since this data does not include criminal court records or specific sentences but later analysis based on incarceration length and release type does not highlight substantial differences between these two types of incarceration.

[8]This type of matching does allow the inclusion of other relatives that live with the child such as uncles or aunts. I therefore use the definition of parent more broadly to include any relative providing care for the child. I do restrict the designation of parent to the age profiles that would allow the individual to be old enough to be a biological parent.

[9]e.g. the time of day when a defendant sees a judge, competency of publicly provided legal representation etc.

Given concerns that the timing of incarceration is endogenous to other changes in parenting behavior, I also bound my estimates by drawing on the qualitative criminal justice literature where the incarceration of a parent typically follows traumatic and other negative changes in a child's household environment.[10] Under this assumption, the timing of more serious criminal activity will lead to parental incarceration and also coincide with larger non-criminal negative impacts on a child's home environment. My estimates will be conservative as unobserved parental attributes such as substance addiction, limited financial resources or violence in the home are positively correlated with criminal arrest and incarceration thus biasing estimates toward finding negative impacts of parental incarceration on a child's outcomes. Therefore, positive impacts are likely a result of improvements in a child's home environment through the removal of a negative role model or allowing the other parental figure to end or even escape an abusive or negative relationship. I provide two compelling facts that reinforce this empirical strategy. First, I show that in aggregate, children of parents with more arrests and more incarcerations have worse outcomes. Second, I show that consistent with the removal of negative bias, the incremental inclusion of control variables and fixed effects for family or student shift the effects of parental incarceration from negative to positive.

Results highlight a positive and significant benefit from parental incarceration on behavioral outcomes with parental incarceration generating an impact of 0.07 standard deviations on an annual summary index of a student's school behavior. Smaller positive results of 0.02 standard deviations also hold for test scores, but not grade retention. Effect sizes grow to 0.09 and 0.05 for behavioral and education index outcomes when focusing on biological parents living with the child. Even though I cannot provide causal estimates that the act of arresting a parent impacts children, estimates for parental arrest do support a joint negative impact of home environment and parental arrest on the educational and behavioral outcomes of children. Using heterogeneity in benefits based on the age of the child at the time of incarceration, I find limited effects of parental incarceration on dropping out of high school or adult crimes.

For contemporanous outcomes, estimated benefits are largest for maternal incarceration and for younger-aged children with effect sizes reaching 0.23 standard deviations in a behavior index when the the mother is a violent offender and when the father is a alcohol/drug offender. My behavioral effect sizes for all young children (0.16) are similar in magnitude to the estimated behavorial benefits from early childhood education programs[11] as well the negative impacts from maternal drug use (Chatterji and Markowitz

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[10]See Braman (2004) , Turanovic et al. (2012) and Parke and Clarke-Stewart (2003) for examples or summaries of this qualitative literature.

[11]see Aos et al. (2004) for a meta-analysis of early childhood education programs. Deming (2009) finds

(2001)). Overall, my results are consistent with benefits from removing adults that are involved in domestic violence in the home.

In terms of family responses to parental incarceration, I show that parental incarceration increases the probability that a child leaves the school district, but does not impact the probability of moving within the school district for the next academic year.[12] I also provide evidence that incarcerated parents are more likely to live at a different address if rearrested after release from incarceration. Taking these mobility results together suggests that families respond to the incarceration of a parent by altering the child's home environment – through moving (far) away from the criminal parent or not having the criminal parent return to the home upon release.

Overall, my results suggest that parents involved in the criminal justice system may provide negative role models for children's behavior, but effects are more limited for educational outcomes. Therefore, the removal of parents, that may demonstrate or make acceptable antisocial behavior, may benefit a high risk population of students - namely children with incarcerated parents. The presence of mostly short-term benefits from parental incarceration could simply be a result of new household formation initiated by the incarceration of a parent which may simply replace an incarcerated parent with another similar type of parent.

My main results draw different conclusions than the existing literature, even taking into account ongoing work by Dobbie et al. (2018) and Bhuller et al. (2018). These contrasting results can partially be explained by my focus on the US criminal justice system and the inclusion of younger children in my sample.[13] Beyond differences due to study area and population, my identification and results are unique in that I focus on the short-term effects or the timing of parental incarceration. In essence, estimated benefits in my model are based on effects that occur after parental arrest when the family environment changes due to a parent being incarceration rather than longer-term inter-generational

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similar effects on young adult outcomes due to Head Start and Perry Preschool.

[12]One may be concerned about families that move out of the school district during the year and thus limit one's ability to observe behavioral outcomes. I show that incarceration does not impact if a student takes end-of-grade exams which implies that incarcerations do not impact if a student is currently enrolled in the last few weeks of school.

[13]Some of the differences between the US and commonly studied countries like Sweden and Norway include the fact that the US has incarceration rates that are more than 10 times that of Sweden or Norway and the prison experience is likely quite different in Scandinavian countries (e.g. Bhuller et al. (2016)). Additionally, one could imagine that older kids are effected differently by parental incarceration due to a large body of research that supports the larger impact of changes in a child's environment at a young age including effects from early childhood interventions (e.g. Anderson (2008), Deming (2009) , Hoynes et al. (2016) , Billings and Schnepel (2018)) , school and peer effects (e.g. Billings et al. (2014), Deming et al. (2014) , Carrell et al. (2016)) and neighborhoods (Kling et al. (2007) , Chetty and Hendren (2015), Chetty et al. (2016))

relationships between incarcerated parents and their children.

These results contribute to a broader economics literature that provides evidence that parental envrionment can have profound effects on the outcomes of children. Gertler et al. (2004) find that children whose parents died were twice as likely to drop out of school in Indonesia. Shocks to maternal health also generate behavorial issues among children (Mühlenweg et al. (2016)) and poor parental health helps explain black and white academic achievement gaps. Balsa (2008) shows that parental alcoholism is associated with worse adult labor market outcomes for children while Snow Jones et al. (1999) and Chatterji and Markowitz (2001) link parental alcohol-use to worse behavioral outcomes. Doyle Jr et al. (2007) and Doyle Jr (2008) highlight negative impacts on children's adult labor market outcomes from foster care placement for children on the margin of being removed from their parent's home. Of this literature, military deployment papers are the most related to the research presented here as they highlight the effect of removing a parental figure from the household. Angrist and Johnson IV (2000) find parental absence impacts divorce rates and spousal employment and results differ between male and female soldiers. Specifically for children, Lyle (2006) finds a negative effect of about one-tenth of a standard deviation in test scores for the school year of parental absence.

More consistent with the presence of family stress and negative role models, there is a more sizeable literature on the relationship between parental job loss and children's outcomes. Parental job loss impacts children negatively through higher likelihood of divorce (Doiron and Mendolia (2012)), lower ability to pay for or attend college (Hilger (2016)) , short-term academic difficulties (Ananat et al. (2011) ; Stevens and Schaller (2011)), higher rates of physical injuries and mental disorders (Schaller and Zerpa (2015)) and even intergenerational effects with children of displaced workers earning less as adults (Page et al. (2007) ; Oreopoulos et al. (2008)). Specifically related to parental environment, Rege et al. (2011) find that parental job loss negatively impacts children' school performance and this effect is most consistent with mental distress, not income loss surrounding job displacement.

Consistent with this literature on the effects of parental environment on children, I find removing negative potential role models through incarceration benefits children. Given these findings, policies that focus on removing negative or even promoting positive adult role models for children may have more immediate benefits. These policies could range from social service assistance that helps mothers move their children away from domestic abuse by a father to assisting fathers or mothers in ending parental relationships that are unhealthy to providing in-patient drug and alcohol addiction programs for parents. This paper is organized as follows. Section 2 highlights the administrative data incorporated

into this study as well as details about the population of criminal parents. Section 3 presents a simple empirical model of the impacts of both parental arrest and incarceration on academic and behavioral outcomes for children. Section 4 provides the main results as well as a number of specifications that further explore heterogeneous results with respect to both parental and children attributes. Section 5 concludes.

2. Data

In order to examine the relationship between parental incarceration and a child's outcomes one needs a panel dataset that links children to adult criminals. One also needs to be able to determine if a given adult criminal lives with a child. This study utilizes four administrative databases from North Carolina, US which includes detailed pupil records from Charlotte-Mecklenburg Schools (1999-2011); detailed arrest records from Mecklenburg County, NC (1998-2011); Mecklenburg County jail records (1998-2011) and North Carolina State Prison Records (1998-2011). I limit my sample of children to those born between 1990 and 2001 to allow all individuals to be observed for at least two years in public school records that overlap with arrest and incarceration records. This data is comprehensive with student demographics on race, gender, home address, yearly end-of-grade (EOG) test scores for grades 3 through 8 in math and reading[14], number of days absent, days suspended from school, and the number of incidents of school crime.[15] The three databases from the criminal justice system allow one to determine the timing of arrests, demographic information about the criminal including full name and date of birth, the home address of the arrestee, criminal charges as well as all subsequent jail and prison periods of incarceration.[16]

The key for my analysis is to be able to determine the timing of arrests and incarcerations for adult criminals that are the parents of school-age children and highlight academic and behavioral outcomes for those children. The first main task is to link a criminal parent to the student database. One could use birth records to link children to parents and then link parents to arrest and incarcerations records using full names and date-of-birth.[17] The problem with this strategy is the large number of birth records that contain missing

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[14]Test scores are standardized at the state level by grade and year.

[15]According to NC State Statute 115C – 288(g), any incident at school involving any violent or threats of violent behavior, property damage, theft or drug possession must officially be reported to the NC school crimes division. This statute ensures that this measure of school crime is consistently reported across schools and cannot be treated differently based on school administrators.

[16]Approximately 16% of arrestees have non-geocodable or missing residential address information.

[17]My student records are uniquely identified in terms of full name and date-of-birth since I drop the approximately 50 students out of 194,163 that are not uniquely identified by full name and date-of-birth

information on fathers as well as the overall low match rate between birth records and the student database. In order to later explore this type of matching, I incorporate a database of all birth records from 1990-2001 in North Carolina with individual identifying information and match children's full name and date-of-birth to the student records. For my main estimation sample, I match about 66% of student records to birth records.[18] Even with a better match rate, missing information on fathers is problematic given the large number of male criminals as well as the fact that a birth father could be absent and thus not even live with their children which would weaken my ability to estimate a relationship between father's incarceration and a child's outcomes.

Therefore, I turn to an alternative strategy of last name and address matching.[19] The advantage of this method of matching is twofold. First, it leverages the detailed and well populated address information available in my student and criminal justice records. Second, it allows this analysis to focus on parental figures that live with the child thus eliminating concerns of absentee fathers. Appendix Section A.1 provides more detail on address based matching.

In some cases, this matching procedure may capture other relatives with the same last name living in the home with the child.[20] This is unlikely to be problematic for capturing parental environment since these other relatives also provide "parental" guidance to the child. There are some issues with using address and last name to match students. One concern is the uniqueness of last name and address in a given year. This potential problem is most likely for children with common last names living in large apartment complexes.[21] In cases where student records match multiple arrested individuals of the same gender based on address and last name , I do not consider any of the matched individuals as a parent and the student is dropped for my main analysis. I also drop any student living in a larger apartment complex (> 5 units).[22] Approximately 5% of arrests have multiple same gender matches in terms of last names and addresses and

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[18]This relatively low match rate is likely due to the time period between birth and public school, outmigration to neighboring South Carolina as well as some missing information in the birth records database. This is about 20 percentage points below Figlio et al. (2016)'s study in Florida but their data was administratively matched using social security numbers.

[19]One of the main assumptions is that a child is given the same last name as the parent. This cannot directly be verified for my sample, but for the universe of birth records in our sample, 65% of children share a last name with their birth mother and 85% with their birth father.

[20]Later analysis highlights how effects vary across different definitions of parental matching as well as birth records based matching.

[21]Information on apartment numbers is not provided in the student records since addresses are simply used for school assignment in this database. Mailing address and contact information for students is not made available to outside researchers.

[22]Apartments with more than 5 units tends to increase the portion of students with arrested parents and makes one concerned about false positive matches for same last name families living in different apartments.

15% of arrests are linked to students living in large apartment complexes. I later provide results where I keep all observations irrespective of multiple matches or living in large apartment complexes and results are quite similar.

Two elements of my analysis limit concerns about overall match quality. First, identification is based off of changes in parental arrest and incarcerations over time conditional on matching an arrestee to a child. Therefore, missing address information for arrestees would only serve to change the generalizeability of results to those parents with established residences and no clerical errors in criminal justice records. Additionally, there may be concerns about matching across individuals that switch between homes and apartment complexes, but these cases are quite rare and later results that include matches in large apartment complexes are quite similar. Second, I perform a back of the envelope calculation to get a sense of the portion of likely criminal parents I am able to match to the student database. I estimate that about 55% of the estimated population of criminal parents are matched to student records.[23]

Since my analysis focuses on parsing out the effects of incarceration while controlling for arrest, one would like to know the typical criminal justice experience in my data. When an individual is arrested they are booked and then depending on the nature of the offense, they may be released within a few hours and thus never enter the jail/prison system or held for longer periods in a county jail facility or transferred into a state prison. My data captures all stints of incarceration in jail or prison and treats almost all transfers from county jail to state prison as a single incarceration lasting the entire span of jail and prison. For more serious crimes, arrestees are often arraigned in court and released upon payment of bond or serve time until a scheduled court appearance.[24] Figure 1 provides the breakdown of parental incarceration spells in my main dataset which excludes incarcerations of 2 days or less. The most frequent spell of incarceration is 1-3 months with the second largest group being incarcerated for more than 2 years. About one-third of parental incarcerations are for less than 30 days.

Even though my dataset is mostly populated by shorter term incarcerations, there are still potential impacts on children as the removal of a parent allows for shifts in residence and changes in parental relationships as well as other public interventions. Furthermore, a released individual may have been reformed while incarcerated or is under parole/other supervision that instills more positive parenting behavior. The use of shorter term

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[23]See Appendix for details and Appendix Figure A1 that highlights estimated match rates across different years. Absentee parents and duplicates when matching limit this percentage from being close to 100.

[24]Appendix Figure A2 provides a breakdown of the typical arrest and incarceration experience of adults in my dataset. As one can see, a little less than 1/2 of arrests lead to incarceration and 1/3 of those incarcerations lead to 2 days or less in jail. Even among individuals incarcerated for more than 3 days, the majority of people are incarcerated for less than 30 days.

incarcerations also limits potential negative bias from more serious criminals that likely have worse non-criminal parenting behavior. The main results will not count parents incarcerated less than 3 days as incarcerated and thus all children with an incarcerated parent had parents in jail or prison at least 3 days. I limit the sample of incarcerations to this length because based on North Carolina statutes, local jurisdictions are required to hold an arraignment to determine release conditions including the setting of bail for an arrested individual within 48 hours of booking. Therefore, I am excluding individuals that are released at initial arraignment and do not return to jail or prison at a later date since they may have had charges dropped and also spent very little time away from the home. Later results highlight that this restriction has minimal impact on my results as models that include all incarcerations no matter how long they last or only incarcerations of a month or more generate small changes in the main results.

Table 1 provides a summary of my dataset. I provide mean, standard deviations and the number of observations for each variable in order to provide a sense of the structure and coverage of the dataset. I do lose some observations for residence or neighborhood from the 2% of student observations with missing residential information and I have fewer observations for some outcomes such as test scores which are taken in grades 3 through 8 and school crimes which are not reported consistently until 2007. I also lose some observations for outcomes in the following year, like changing residence and leaving the school district (Left CMS), because I need two years of data to determine these outcomes. Overall, my data is comprised of a unbalanced panel of students for years observed in public school. Since I restrict the sample to students born between 1990 and 2001, I ensure overlap with arrest records (1998-2011) for school age years and later incorporate a number of controls and fixed effects to address differences in potential exposure to an arrested and incarcerated parent based on cohort and school year. For all students in the dataset, I observe $194,163$ unique students and have $957,611$ observations which represents an average of 4.9 school years per student.

Focusing on the population of all students, one can see that the population of public school students is racially diverse, and most public school students live in single-family homes. Thirteen percent of students in my dataset have one parent that is arrested sometime during their time in the public school system. The majority of crimes that lead to a parental arrest are for relatively minor offenses and about 3% of students have a parent that was ever arrested and incarcerated. In general, incarceration occurs for more serious crimes, but incarceration can occur for even minor offenses especially if the family is not able to pay for bail or if the parent has a more serious history of problems

with the criminal justice system.[25] In an average school year about 2% of children have a Parent Arrested and 1% have a Parent Incarcerated for at least 3 days.

Turning to my main dataset for analysis, students that have arrested parents, I observe $18,858$ unique students with 26% of these students having an incarcerated parent. For my unit of observation of each student in a given school year, the annual rate of parental arrest is 16% and parental incarceration is 5%. I find about two-thirds of parental arrests to be fathers and one-third to be mothers and 10% of students have both parents arrested at some time during their school years. Students with arrested parents are different than other students and disproportionately black, live in lower income neighborhoods and have worse educational and behavioral outcomes.

In order to test multiple outcomes and avoid concerns about multiple hypothesis testing issues with my results, I provide most of my results using summary indices for two types of outcomes: educational achievement and behavioral problems in school. I create indices for annual outcomes based on student records and follow the methodology for creating a summary index as outlined in Anderson (2008) in a re-evaluation of several early childhood intervention programs. The educational index is composed of three outcomes: reading test scores, math test scores and grade retention and is standardized to mean zero and standard deviation one. The behavior index is composed of three different outcomes: days absent from school, number of days suspended and school reported crimes and is also standardized to mean zero and standard deviation one. I also estimate and present results separately for individual outcomes used in the summary indexes in a number of results.

3. Empirical Model

My main empirical model is given by Equation 1, where Y_{icgt} is an outcome for individual i in time period t, grade g and who is in birth cohort c. The main variable of interest is a indicator for parental incarceration ($ParentIncarc_{icgt}$) in year t for student i, with $ParentArrest_{icgt}$ controlling for the effects of parental arrest on the child. By construction, $ParentArrest_{icgt}$ must be equal to one if $ParentIncarc_{icgt}$ is equal to one. Therefore, δ is identified off of student-years when a parent is arrested but not incarcerated. My main models include individual fixed effects (γ_i) and all models include assigned grade by school year fixed effects (λ_{cgt}) with assigned grade based on starting

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[25]Appendix Figure A3 provides the breakdown of crime types by individuals just arrested and individuals arrested and incarcerated. These distributions do not have large differences, but one sees a larger share of serious crimes such as assault and burglary and fewer minor offenses.

kindergarten if age 5 by September 1st. In models without student fixed effects, I include basic controls for student and neighborhood attributes based on initial school year values ($\mathbf{X}_{icg}$). My main models also include additional controls for parental arrests in previous and subsequent years (t-2, t-1, t+1, t+2) and a series of controls for criminal charge (dummies for indexed crime categories as well as other crimes) as well as indicators if a crime was committed in a private residence or involved a victim that was a child or family member. All models include standard errors clustered by individual i.

$$Y_{icgt} = \alpha + \delta ParentArrest_{icgt} + \beta ParentIncarc_{icgt} \qquad (1)$$
$$+ \beta_2 \mathbf{X}_{icg} + \gamma_i + \lambda_{cgt} + \epsilon_{icgt}$$

Identification in Equation 1 results from variation over time in parental incarceration for students that have at least one parent arrested during school age (7-17). I include controls for arrests to address the presence of a number of incarcerated parents that have arrests in previous or subsequent time periods. This model treats all non-incarcerated time periods as the counterfactual and thus limits incarceration impacts to contemporaneous outcomes.[26] I am limited in any ability to examine the impacts of parental criminal activity prior to elementary school and thus any model I estimate may have issues of contamination due to longer-lasting effects of parental criminal activity prior to age 7. Later models test and validate if parental incarcerations last beyond a given year and thus highlight if there are any concerns with using non-incarcerated time periods as the counterfactual.

The key coefficient in Equation 1 is β and controlling for parental arrest is important for two issues. First, non-criminal parental attributes are likely correlated with the timing of arrest and varies over time which requires an annual control for criminal activity, $ParentArrest_{it}$. Annual measures of parental arrest should control for a number of factors that negatively influence a child's outcomes including the trauma of parental arrest, potential job loss and financial problems related to fines and legal costs. Conditional on parental arrest, β identifies the impact of parental incarceration which could include changes in a child's living arrangements and change or loss of relationship with a parent. Loss of parental figure and moving to a new residence could generate negative effects if moving leads to loses in social relationships for the child or if the incarcerated parent was a positive role model. Conversely, if parental incarceration leads to the removal of a

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[26]Incarcerations lasting more than one year are coded as one for each year that a parent is incarcerated. In the preferred models, I also code arrest equal to one for all years of a multi-year incarceration, but results are almost identical if I do not.

negative role model or moving to an improved household or neighborhood environment, then we may see positive effects on the child from parental incarceration.

The main identification issue is that incarcerated parents are different than parents that are only arrested or parents with no criminal justice experience. In the simplest sense, incarcerated individuals are either more serious criminals or have more limited resources to incur legal costs and avoid incarceration through legal representation or payment of bond. Figure 2 highlights the relationship between criminal parent type and a child's average educational and behavioral outcomes. Irrespective of outcomes, children with parents that have more arrests and/or more incarcerations have worse outcomes, lower values for test scores and higher values for the behavioral index. Furthermore, this relationship holds even when one conditions on individual attributes, neighborhood attributes and fixed effects for cohort by school year as shown in Appendix Figure A4.

Given I want to highlight the role of incarceration, the relationship highlighted in Figure 2 leads to issues with any results that find worse outcomes for children with parental incarceration since one cannot disentangle the effects of incarceration from parental environment. Finding a policy that generates random variation in parental incarceration is challenging and recent literature has used sentencing variation due to random judge assignments (Aizer and Doyle (2015) , Mueller-Smith (2017)) to generate credible estimates of the impacts of incarceration on a criminal's post-release outcomes. In my context using variation in sentencing by judges is not possible given data limitations. Therefore, I bound the impact of parental incarceration by using the fact that any concerns regarding unobserved parenting quality or financial resources would only serve to bias my estimates toward finding a negative effect of incarceration. To disentangle the incarceration effects from the initial effects of arrest, I control for arrests and use only variation in the share of arrests that lead to incarcerations. In general, results that show any benefits from incarceration will be conservative in nature since any concerns about omitted variables would bias results toward finding no benefits.

In order to limit downward bias, it is important to properly control for as much as possible about the timing of arrests and other parental attributes. The incorporation of individual fixed effects as well time-varying controls for the nature of a given crime and lag and lead measures of arrests should help address omitted parental quality that may vary over time.[27] These controls are helpful in addressing the criminal history of a parent and the nature of the current offense in time t which should lead to more idiosyncratic variation in the assignment of a parent to incarceration.[28]

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[27]Omitted parental quality may include parental financial resources, violence or instability in the family as well as negative role modeling.

[28]With perfect controls for the nature of a crime and past criminal history, my empirical model should

Given identification is based on examining changes in outcomes due to parental incarceration, a simple test for the validity of this assumption is to examine trends in the raw outcomes in an event study framework. Figure 3 highlights three summary measures of academic, behavioral and mobility outcomes for a sample of children with a parental incarceration relative to a sample of children with only parental arrest. In order to maintain most of the original sample when I incorporate pre and post trends for school-age outcomes, I assign parental arrest and incarceration to children under the assumption that their residential address prior to Kindergarten is the same when they begin attending school or after dropping out of school.[29] These figures do not control for data trends nor account for non-incarceration arrests in other years. In general, figures for average test scores and a index of behavioral outcomes show a sharp improvement in these outcomes for child with incarcerated parents and not for children with only arrested parents at time period t. There is an increase in mobility for kids with incarcerated parents which I address in later analysis to make sure attrition does not have a large impact of my main results. Pre-trends for all these outcomes appear similar with any differences favoring finding less benefit for the parental incarceration sample.

Some additional concerns arise in determining the impact of parental incarceration on children including sorting away from the public school system in response to parental incarceration, incarceration length being influenced by family structure, mean reversion from previous family shocks and teachers or schools treating the children of parental incarceration differently. One potential impact of parental incarceration is that the remaining parent moves the child to a new residence or the child may even be relocated to other family member homes or even a social service facility.[30] This relocation may be problematic for observing children in subsequent school years especially if children leave the county or attend school at a private facility. Since later results do highlight movement away from the school system after both arrest and incarceration, I am limited in my ability to examine the longer-term impacts of incarceration for children leaving the school district. Later results do highlight that leavers and stayers have similar short-term outcomes. It may be the case that leaving the school district benefits a child in terms of

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approach a model based on random judge variation.

[29]I am still bounded from extending this too far before or after school-age given the years of criminal justice data and I maintain most of the sample (90%) within a 3 year window of parental arrest or incarceration but lose about 30% of the main sample extending to a 5 year windows. This assumption is relatively innocuous in most of my analysis since I focus on contemporaneous outcomes and parental arrest and incarceration results are similar even in models that include some lag and lead measures of arrest and incarceration.

[30]Based on Bureau of Justice Statistics Inmate Surveys, most parents reported (84%) that at least one of their children was in the care of the other parent; Fifteen percent identified grandparents as caregivers, 6 percent other relatives and 3 percent that at least one child was in a foster home/agency. (Glaze and Maruschak (2008))

removing a negative role model, but this effect may be decreased by the cost to the child of moving further away or changing to a new school. Stayers in the school district after parental incarceration may receive lower benefits from parental incarceration, but do not incur the costs of moving.

One may be concerned about differential sentencing for arrested parents. Since I only focus on children with arrested parents this concern is minimized, but any differential sentencing may relate to more serious criminals and incarceration. In general, sentencing may be less harsh if a judge worries about negatively impacting families through incarceration while sentencing may be harsher if a judge wants to protect children. Ultimately, I cannot verify differential sentencing for parents, but later results do show that my main results hold across different criminal charges as well as for the incarceration of either a mother or father.

One story that could explain positive effects of incarceration is mean reversion. For example, if families experience a shock such as job loss or health problem 1-2 years prior to incarceration, the families may have just recovered from this shock at the time of arrest and incarceration. The idea would be that both arrest and incarceration would have a bias towards beneficial outcomes since fixed effects would incorporate previous year negative shocks. For this to be a relevant issues, there should be evidence of a temporal correlation between the timing of a family-wide shock and later arrest and incarceration. To try and capture this unobserved shock, one has to assume that it would impact academic and behavioral outcomes in the year of the shock. One way to test this story is by estimating Equation 1 using future year parental arrests and incarceration and current outcomes. In Appendix Figures A5 and A6 , I run a serious of models that falsely assign parental arrest and incarcerations from each prior and future year and examine their effect on current outcomes. This exercise highlights no evidence of previous year shocks impacting current year arrest and incarceration.

One also may be worried that teachers or administrators are treating kids whose parents are incarcerated differently and this may lead to harsher or more lenient punishments for bad behavior. This type of change in teacher or administrator behavior should not influence test scores but may influence suspensions or grade retention. This concern is not directly testable, but later results provide some evidence that this concern is not the main determinant of my results. For example, I only find significant effects on education outcomes for state standardized test scores. Also, I find that behavioral results are consistent across all three outcomes (school suspensions, absences and school crimes) even though there is really only discretion in the use of school suspensions.

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4. Main Results

As presented in Figure 2, one sees that arrested and incarcerated parents have children with worse academic and behavioral outcomes. These large effects are on the extensive margin of having a parent ever arrested as well as on the intensive margin as parents with more arrests and incarceration had children with even worse outcomes. My main regression results restrict the sample to only students that have a parent that is ever arrested to focus on models that use variation in the timing of arrests and incarceration to identify the impacts of parental incarceration.

Table 2 provides 7 models that begin with a basic model in column 1 and moves to my preferred specification in column 7. Column 1 indicates that in the year a parent is arrested, a student has a 0.04 standard deviation lower value for test scores and a 0.11 standard deviation higher behavior index.[31] These results are similar for incarcerated parents in column 2. Since incarceration is preceded by an arrest, remaining models include both parental arrest and incarceration. In essence, the parental incarceration variable indicates the additional effect of incarceration conditional on arrest. Models 3 and 4 continue to highlight worse outcomes for children whose parents are arrested and incarcerated even with Census Block Group (CBG) fixed effects. Model 5 introduces family fixed effects where one identifies families based on two children with a shared last name living in the same residence in the same school year. Once I control for family fixed effects, one sees the negative effects of incarceration on test scores becoming positive and the impact of parental incarceration on the behavior index changing to a negative coefficient and thus a positive effect on children. Better controlling for family environment and using temporal variation in arrests and incarceration removes some of the negative effects captured in the incarceration variable. I further refine controls for parenting and family environment by introducing student fixed effects in column 6 and adding controls for individual i's parental arrests in the two years just prior and just after time period t as well as a series of dummies for the criminal charge and nature of crime at the time of arrest in column 7. The key trend to observe in the seven models in Table 2 is that as I introduce successively better controls for parental environment and criminal history, results show benefits from parental incarceration. Column 7 finds a positive impact of 0.023 standard deviations in test scores and 0.067 standard deviation in behavioral problems due to contemporaneous parental incarceration. These effects more

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[31]I will typically just incorporate measures of academic outcomes using a composite of EOG test scores and exclude grade retention since grade repetition consistently provides small and imprecise impacts from parental arrest or incarceration and thus mutes the impacts of test scores. Test scores are normalized to mean of zero and standard deviation of one based on North Carolina statewide test score for a given grade and year.

than offset the decrease in test scores and completely offset the increase in behavioral problems that coincide with parental arrest.

Table 3 breaks down effects for specific outcomes, one sees slightly larger positive impacts of parental incarceration on reading relative to math test scores. Grade repetition is not affected by parental incarceration. The finding of no effect on grade retention may simply be that test scores effects are too small to influence the larger decision to have a child repeat a grade. Results for all outcomes that are used to create my behavioral index show consistent benefits from parental incarceration. In general, behavioral effects are small in magnitude with specific outcome effects ranging from about 5% to about 14% of mean annual values. Since these are only the effects on outcomes for one school year, the effects of repeated incarcerations could be cumulatively quite larger or could even effect long-term outcomes.

The age of a child may matter for academic and behavorial outcomes due to the varying influence of parents as a child gets older. To test the effects of a child's age at the time of parental incarceration, Figures 4 and 5 provide results where I interact dummies for age groups with incarceration and arrest variables. Results for test scores are small, but indicate positive effect for ages 7-8 and 9-10. The age profile for the behavioral outcomes is more heterogenous with large and significant effects for young children (ages 7-8, 9-10). Effects disappear for the older groups with 15-17 years old providing imprecise and opposite effects. Stronger effects of parental incarceration on younger children is consistent with Lyle (2006) finding larger academic effects for young children whose parents were subject to military deployments. It may be the case that incarcerations have very different effects on young children relative to older children. For example, young children are staying in the house with a parental figure and incarceration will likely just change the adults in the home, while older kids may simply leave the home in the case of parental incarceration and stay with friends or other families. These older kids may still attend school, but have less supervision and support which could lead to worse outcomes.

4.1. The Duration of Impacts

One way to explore the plausibility of the main results is to examine how results change based on the time of year when a parent is incarcerated. Since I begin assigning parents to the school year of a child starting in the summer prior to the first day of the school year, I focus on four seasons of the year where a parental incarceration would impact the child for a given school year. Summer could impact the entire school year, fall and winter

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would only impact part of the year and spring would only impact the last few months of the school year.[32] Figures 6 and 7 provide the results of my main model (col. 7) in Table 2 where I interact parental incarceration and arrest with a dummy for each of the four seasons of the year. Result are quite compelling with estimates on the behavioral index showing a clear trend of smaller and smaller effects as we shorten the time frame upon which one observes behavioral outcomes. One would expect larger effects for summer or fall parental incarceration on behavioral outcomes simply because there are more school days for a student to be absent or get in trouble after the parental incarceration happens. The most interest result is Figure 7 where one sees only a positive effect for spring incarceration. This result seems strange at first in comparison to the behavioral index, but makes sense when one considers that test scores are based on end-of-grade (EOG) exams which are taken during the last 3 weeks of school in the spring. Therefore, parental incarceration may generate an improved home environment in the months just prior or during EOG test taking where students are doing in-class practice exams, homework to prepare for exams and getting adequate sleep during the week(s) of exams.

Given that results so far focus on same year effects, I do explore if effects last beyond a given year as well as test for pre-existing trends in outcomes prior to incarceration. Formally, I estimate an event study using the following model based on a series of dummies that indicate that an arrest or incarceration occurs one, two and three years prior and post a parental arrest and incarceration.

$$Y_{icgt} = \alpha + \sum_{j=-3}^{3} \delta_j \, \mathrm{ParentArrest}_{icg(t+j)} + \sum_{j=-3}^{3} \beta_j \, \mathrm{ParentIncarc}_{icg(t+j)} \quad (2)$$

$$+ \gamma_i + \lambda_{cgt} + \epsilon_{icgt}$$

Equation 2 does not exclude any time periods because one observes student-year observations that may be more than three time periods before or after parental arrest and incarceration and a student can have multiple years of parental arrests and incarcerations. Since I include student fixed effects, all coefficients are identified off of outcomes within three years of parental arrest and incarceration relative to outcomes more than three years prior or after arrest and incarceration. The choice of a three year window is due to the loss of observations when using larger spans for lag and lead arrest and incarceration relative to year t.[33]

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[32]Summer is June, July, August; Fall is September, October and November; Winter is December, January and February; Spring is March, April and May.

[33]As discussed earlier, even with matching parents in years prior or post school-age years using a student's

Figures 8 and 9 provide the coefficients and confidence bands for a single model for each outcome based on the inclusion of variables for three years prior and post the year of Parent Arrest and/or Parent Incarceration for a given student and year. This event study figure is informative in two ways. First, arrest likely coincides with negative parental environments which may begin prior to an actual arrest as well as continue after an arrest and this figure will highlight this relationship. Second, years prior to incarceration test if there exists any pre-trends in outcomes leading up to parental incarceration while years after incarceration test if incarcerations have lasting impacts beyond a given year. Consistent with the main results for test scores in Table 3, results in Figure 8 highlight a positive and significant effect in the year of parental incarceration. One sees limited effects from prior year incarcerations and no clear trend in outcomes. There is a marginally significant effect three years after parental incarceration which could indicate some longer-term benefits or even some additional benefits from multi-year incarcerations.[34] Remaining coefficients capturing years since incarceration are small and noisy.

Results for the Behavioral Index in Figure 9 show large and significant effects in the year of incarceration and the positive arrest coefficient shows the negative outcomes surrounding arrests on behavioral outcomes limited to time period t. These results indicate that a child's behavior is worse right around the time of parental arrest. Results for the years leading up to parental incarceration indicate mostly small, but imprecise benefits in the year prior to parental incarceration. The largest and only significant effect is in the year of parental incarceration where effects sizes are -0.07. The benefits of parental incarceration persist into future years with effects fading out by year three.

Since parental incarceration could have longer-term impacts, I would like to test the impacts of parental arrest and incarceration on some adult outcomes for a subset of earlier cohorts. In order to do this, I estimate a slightly different model in Table 4. Here I can no longer use individual fixed effects since outcomes are for young adults and limited to the last year(s) of matriculation in public school. Therefore, I include each student with a parent ever arrested only once and focus on the subset of cohorts (1990-1995 birth year) where I observe school matriculation for children through age 17. In some models, I limit my sample to only children with parents that were incarcerated at some point between ages 7 and and 17 in order to properly control for the correlation between more serious criminals and children's outcomes highlighted in Figure 2. Given earlier results showing that only young children benefit from parental incarceration, identification in this model is based on the prevalence of parental incarcerations for young-aged children relative to

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address from the first or last year in school, I still lose at least 30% of observations extending time periods to five or more years from time t.

[34]Later results specifically explore the impacts of multi-year incarcerations on a child's outcomes.

older children.[35] Specifically, I estimate the following model (Equation 3) which allows the age(s) when a child experienced a parental arrest or incarceration to identify my effects on long-term outcomes.[36]

$$Y_{ic} = \alpha + \beta_1 ParentArrest_{ic} * D(age7 - 11) + \beta_2 ParentIncarc_{ic} * D(age7 - 11) + \tag{3}$$
$$\beta_3 \mathbf{X}_{ic}\delta + \lambda_c + \epsilon_{ic}$$

In this model, $D(age7 - 11)$ is an indicator if a child was age 7 through 11 when a parent was arrested or incarcerated respectively. I estimate this model for my two longer-term outcomes - Dropping out of High School (age 16-17) & Adult Arrests (age 16-19). The first set of results in columns 1 and 3 of Table 3 are based on models that directly estimate Equation 3 for the main sample of arrested parents for a subset of cohorts that are old enough to be observed at this age in my data. Since I cannot incorporate student fixed effects, I further limit my sample to just kids with parental incarcerations in columns 2 and 4.

When I provide results in columns 1 and 3 for kids with arrested parents, the strong positive correlation between more serious criminal parents and worse young adult outcomes for a child are present and consistent across both outcomes. When I restrict the sample to only more serious criminal parents (those ever incarcerated), results become slightly negative and imprecise. The limited impacts of parental incarceration on adult outcomes and the fade out of effects in the years following incarceration shown in Figures 8 and 9 are indicative of short-term benefits from parental incarceration. Short-term benefits may be explained by the dynamics of household formation, where the incarceration of a parent initiates new family formation and an incarcerated parent may simply be replaced with another similar type of parent in later years. I explore how households respond to parental incarceration in the next section.

4.2. Mobility and Sample Attrition

One of the first things to explore regarding the mechanisms underlying my main results is the impact of parental incarceration on household mobility. Table 5 provides a number of mobility based outcomes for the main model given by Equation 1. Results provide

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[35]I also limit my sample of students to individuals that matriculate for at least one year in high school in CMS. Results are similar without this restriction.

[36]Since I limit my sample to children ages 7 through 17 , I am comparing two parents that were incarcerated that only vary in the child's age at the time of incarceration.

some interesting insight into how families react to the incarceration of a parent. First, one sees a small and marginally significant effect of incarceration on moving during a school year with parental incarceration decreasing the probability of moving by about 1.4 percentage points (12%). Another significant result in Table 5 is leaving the Charlotte-Mecklenburg School (CMS) District in the following year. Parental incarceration increases the probability of transferring out of a CMS public school for the next school year by 2 percent points which represents a 33% increase over the 6 percentage point baseline annual probability of leaving CMS. Leaving the school district likely indicates moving out of Mecklenburg County, but could represent transferring to a private school. Given the income profile of this population, resources would be limited for any private school attendance. One potential explanation for leaving the school district is due to the loss of financial resources and/or childcare from the incarceration of a parent. This may lead families to move to other relatives that live outside the school district in order to afford housing or replace childcare.

Leaving the school district is not consistent with social service intervention for children of incarcerated parents since social service agencies would keep children in the public school system. Based on previous literature, children of incarcerated parents are most likely living with the other parent, but some children are transferred to other relatives and only a small percent are transferred to foster homes/institutions.[37]

One additional concern with children moving out of CMS is that they may be leaving in the middle of the school year and that behavioral outcomes may just mechanically be lower due to observing students for only a portion of the school year. To test for this issue, column 6 asks if a student took a required End-of-Grade (EOG) exam. EOG exams are administered in the last couple weeks of school and all students in 3rd-8th grade are required to take the exams. In my data, 81% of student-grade observations in grades 3 through 8 indicate a completed EOG exam and results indicate that parental incarceration has no impact on taking EOG exams. This result limits any concerns that the children of incarcerated parents are leaving the school district prior to the end of the school year. Column 7 of Table 5 provides evidence that an incarcerated parent is more likely to live at a new address after incarceration. Using the address information from future parental arrests, I examine if incarcerated parents are less likely than just arrested parents to have a future arrest while living at the same address as given at the

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[37] Based on inmate surveys, Glaze and Maruschak (2008) highlight that most children (88%) of an incarcerated father live with the mother and only a small percentage of children are transferred to foster homes (2.9%). Results are quite different for maternal versus paternal incarceration with maternal incarceration leading to about two-thirds of kids to live with a relative other than the father and 10.9% being in foster care.

time of a parent's original arrest.[38] Given that children with a incarcerated parent are not really any more likely to move residences within the school district and we only observe arrests within the school district, the fact that a incarcerated parent is more likely to be at a new address suggests that an incarcerated parent is less likely to live with the child after release from jail/prison.[39] This result is consistent with new household formation for the child that does not include the incarcerated parent.

4.3. Robustness Tests and Alternative Definitions of Parent

To ensure my specification is robust to different assumptions regarding parental matching, types and lengths of incarcerations as well as control variables, I present a series of models in Table 6 that vary along a couple of dimensions and highlight consistent results. Column 1 of Table 6 presents my main results and columns 2 and 3 provides results that vary in their inclusion of apartment complexes and duplicate matches. Column 4 provides a model where I match adult arrestees to children only based on addresses. These models allow for other relatives, housemates and some neighboring units (with the same address) to be counted as parental arrests and incarcerations. Results provide small and insignificant impacts on behavioral outcomes and a small and insignificant effect on test scores when we include same address individuals that have different last names. This result indicates that the incarceration of other relatives or co-residents does not impact test scores and behavorial outcomes.

Columns 5 and 6 of Table 6 examine the impacts of using different sets of incarcerations as a measure of parental incarceration. Irrespective of including all incarcerations (even those less than 3 days) or only incarcerations that last at least a month give similar results. At first, one would expect that focusing on longer-term incarceration in column 5 would generate stronger effects, but two things work against this finding. First, parents with longer-term incarcerations are likely more serious criminals thus creating potential bias towards finding a negative effect of incarceration. Second, treating short-term incarcerations as non-incarcerations changes comparisons in my model since it may produce better outcomes for those time periods assigned as simply arrests if short-term incarcerations have any benefits.[40] The remaining two columns in Table 6 test the

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[38]This sample is limited in size to only include student-year observations with an arrest and information about future arrests as well as public school information in the future arrest school year.

[39]Since it is clearly selective who gets rearrested and while incarcerated a parent can not be rearrested, this evidence is only suggestive that an incarcerated parent is less likely to live with the child post-release.

[40]In the end, I adopted a conservative definition of incarcerations (at least 3 days in length) in my main model since it better mirrors the arrest and criminal process which requires bail hearings within the first 48 hours and thus does not assign incarcerations to any individuals that are released after arrest due to insufficient evidence to prosecute or individuals held to avoid domestic conflict or for

effects of the inclusion of additional control variables for current Census Block Group of residence and school by grade fixed effects. Results are quite consistent with the main results.

Table 7 provides results that incorporate data on birth records. Column 1 presents my main results and column 2 provides a specification that limits my sample to only children with incarcerated parents not simply arrested parents as in column 1. Results are virtually unchanged across these two samples and I maintain the larger sample of children with arrested parents to provide more precise estimates. In column 3, I restrict the sample to children with arrested parents that can be identified only by birth records linking children to parents to criminal justice records using names and dates of birth.[41] Results using birth records do suggest differences with using birth records to measure criminal parents. Behavorial results for parental incarceration in column 3 are about half the magnitude of main results and less precise while incarceration effects for test score are even negative. Beyond limitations in matching birth record, this result is consistent with the presence of absentee criminal parents that have no influence of their children. Columns 4 and 5 provide some mixed samples of residential and birth record based matching and effect sizes are smaller than the main results. Column 6 explores the role of birth parents further by limiting analysis to only criminal parents from my main results that can be verified via birth records. Results for Test Scores and Behavior Index outcomes are both larger in magnitude than my main results. These larger impacts are consistent with stronger impacts of actual birth parents on children's outcomes. It is likely the case that birth parents are a more substantial role models than other family members or step parents and/or that imprecise matching based on address is muting the main results. I further examine the role of alternative parental definitions for mothers versus fathers in Appendix Table A2 and show that mothers are generating the largest effects in both main results as well as main results verified by birth records.

Another way to test if the intuition of the main results are consistent with the idea of benefits accruing to the removal of a parental figure is to see if the type of release matters. Table 8 provides a model for my outcomes where I separate the parental incarceration variable into four categories of inmate release. I restrict my sample to the 2005 through 2011 school years due to limitation in the availability of specific release types for this dataset. The idea is to test if individuals released through bond, by time served, other

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intoxication.

[41]The smaller sample of parental arrests and incarceration relative to column 1 using birth records occurs for two reasons. First, about 66% of birth records are matchable to student records. Second, approximately one-third of birth records are missing information on fathers and given the large share of men in the criminal justice system this generates a substantially smaller sample size.

types of release and longer-term sentences with a release in a subsequent school year.[42] Incarcerated parents are fairly evenly split among these release types and other releases in this context would indicate transfers to another jurisdiction, case dismissed, a weekender program where an individual only serves time on the weekends until their sentence is completed or released to the custody of another person.[43] In general, these other release types would still indicate time served in jail or prison.[44] Table 8 provides some evidence that my main results are primarily driven by longer-term releases that occurred in subsequent school years as well as release after time served. Results are somewhat noisy but are consistent with the main effects for behavioral outcomes. Bond release would typically indicate an individual that after arraignment had the resources to pay bond and was released. The fact that bond release generates no effects on behavioral outcomes is consistent with individuals with more financial resources generating more limited behavioral effects on children.

Variation in release type also reflects variation in incarceration length, which I explore in more detail in Figures 10 and 11. These figures provide a plot of parental incarceration coefficients for a version of the main results in Table 3 where I replace the parents incarcerated variable with a series of dummy that disaggregate all incarcerations by the length of incarceration. Figures 10 shows no consistent effects based on length on incarceration and reflects my general finding of small positive effects of parental incarceration on same year test score outcomes. Figure 11 highlights a consistent effect of parental incarceration decreasing behavioral outcomes with some larger effects for 3-6 month incarcerations and 2 or more year incarcerations. Differences across different incarceration lengths may reflect the complex nature of having a parent removed from the home with the potential for short-term behavioral reactions as well as longer-term changes in behavior due to changes in parental environment.

4.4. Heterogeneous Impacts of Parental Incarceration

Table 9 provides some insight into the main result by testing some elements of heterogeneity in my results. Columns 2 and 3 interact parental arrest and incarceration variables by the gender of parent and then gender of student. Effects for mother are imprecise

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[42]In North Carolina, offenders that commit crimes after October 1st, 1994 are not given early release and parole, but rather released on post-release supervision.

[43]Ideally, I would examine all of these unique release types, but the sample size would get quite small to look at specific release program such as the weekender program.

[44]In some cases, I am unable to see later incarceration after initial bond release due to transfer to other jurisdictions, federal cases or incarcerations that occur after the end of study time period. These cases are likely the exception since I see all county jail and state prison incarcerations including coding up transfers from jail to prison as a single incarceration spell.

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but suggest larger benefits from the incarceration of a mother for both test scores and behavioral outcomes. The gender of the student has little effect on estimated impacts. For movers in column 4, there are imprecise larger benefits for test scores, but smaller benefits for behavioral outcomes. Column 5 shows almost no difference in effects on outcomes for students that left the school district in the following year. Column 6 examines if my findings differ for parents that are only arrested one time in our study period and column 7 for families where both parents are arrested at some point.[45] In both of these results, estimates are imprecise and highlight similar effects across less serious criminal parents as well as families where both parents are involved in the criminal justice system. Appendix Table A3 furthers test the role of heterogeniety in family decision to move or leave the school district by different student attributes and results indicate move decisions do not vary by maternal incarceration, student gender or variation in the degree to which families are involved in the criminal justice system.

I further explore the role of parental and child gender in Appendix Table A4 by disaggregating my variable for parental incarceration into specific effects by a child's and parent gender. In general, effects are imprecise but consistent with earlier results showing larger benefits from maternal incarceration than paternal incarceration. Appendix Table A5 explores effects for different criminal charges at the time of parental arrest. Result are small in magnitude and imprecise for educational outcomes but again behavioral outcomes provide some support that more serious crimes - indexed property and violent crimes have larger and more precise estimated benefits.

Combining the results for parental gender, crime type and focusing on young children provides some stronger benefits from parental incarceration. Specifically, Table 10 shows the effects of maternal versus paternal incarceration on young children based on the criminal charge at the time of arrest. Across these different groups, the effects on average test scores are small and not precise. Effects for behavioral outcomes are more interesting and shows that maternal incarceration has a larger effect on younger children than paternal incarceration and represents about a 0.19 standard deviation decrease. These effects are mostly heavily concentrated in more serious crimes for mothers and the largest and most precise effects are for mothers who commit violent crimes. For fathers, the largest effect is for drug and alcohol crimes and may represent potential benefits from a paternal incarceration in terms of recovery from addiction while in jail/prison.

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[45]I am unable to specifically examine years where both parents are arrested and incarcerated given the small sample of children and years where both parents are arrested and incarcerated (n=30).

5. Conclusions

The dual results for arrests and incarceration highlight the potential for trauma and a negative parental environment at the time a parent is arrested, but incarceration may benefit children and this is likely through its ability to remove negative role models from the household. In fact, parental incarceration offsets the increase in antisocial behavioral outcomes that coincide with parental arrest in a given school year, with average benefits of about 0.07 standard deviations in absenteeism, suspensions and school crimes. I provide evidence that these benefits coincide with changing household composition after incarceration.

These results contradicts existing literature that consistently finds a negative relationship between parental incarceration and the outcomes of children. The novelty of results here is that I provide evidence of benefits due to parental incarceration in the US criminal justice system. Results are important for policy given the substantial debates regarding the failure of the criminal justice system to provide any benefits to families and the criticism that factors that lead to parental incarceration are often transferred inter-generationally. This and future research should help tailor policies that leverage the benefits of removing negative role models while minimizing the long-term costs of incarcerating a parent.

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Figure 1: Distribution of Parental Incarcerations
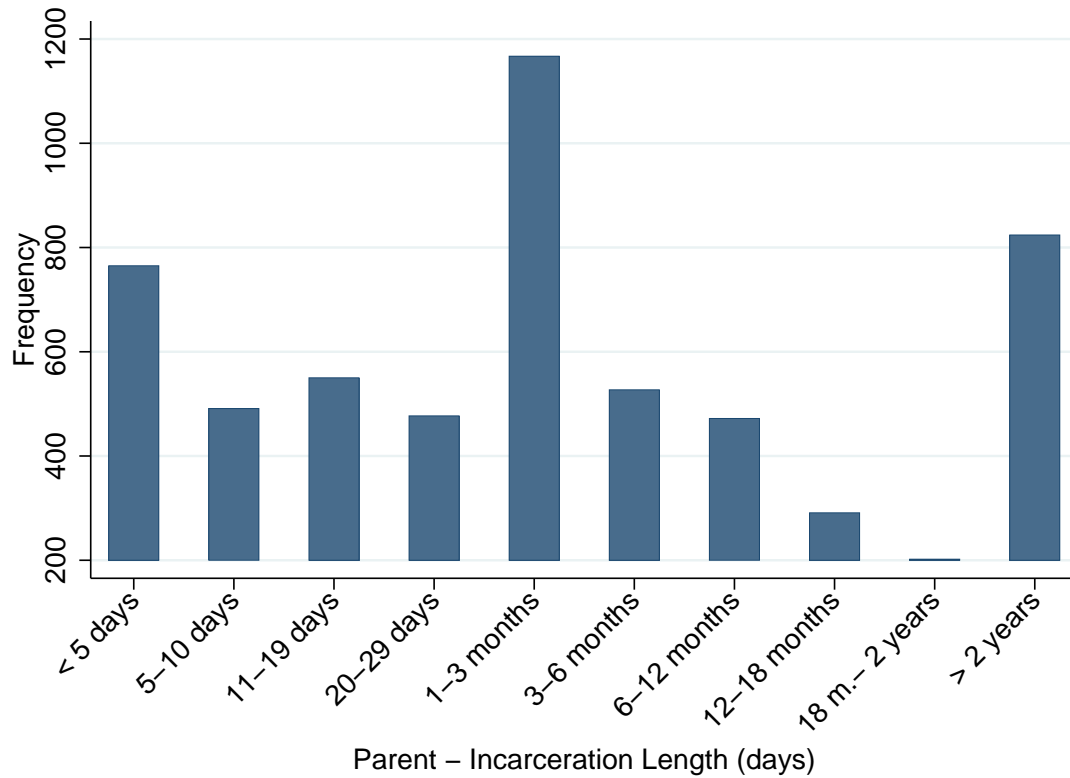
This figure provides the distribution of incarceration length for a dataset of incarcerations that is matched to student records. N=6,032

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Figure 2: Average Index Outcomes by Criminal Parent Type

A. Average Test Scores

B. Behavior Index

Notes This figure depicts mean outcomes for each child by different types of criminal parents. Average Test Scores are the average of end-of-grade math and reading test scores. Serious refers to criminal charge at the time of arrest and includes all indexed violent and property crimes.

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Table 1: Summary Statistics - Individuals

	All Students			Students w/ Parents Ever Arrested		
	Mean	*Std Dev*	*N*	*Mean*	*Std Dev*	*N*
<u>Student Attributes</u>						
Male	0.51	(0.50)	957,611	0.51	(0.50)	122,747
Black	0.43	(0.50)	957,611	0.66	(0.48)	122,747
Hispanic	0.12	(0.33)	957,611	0.08	(0.28)	122,747
Single-Family Residence	0.76	(0.43)	938,802	0.74	(0.44)	120,629
CBG Pop Density (000s/sq mile)	2.25	(1.87)	938,802	2.62	(2.01)	120,629
CBG Median HH Income ($000s)	56.83	(24.78)	938,802	45.99	(20.09)	120,629
CBG Percent Unemployed	3.37	(3.20)	938,802	4.26	(3.89)	120,629
Parent Ever Arrested	0.13	(0.33)	938,802	1.00	(0.00)	120,629
Parent Ever Incarcerated	0.03	(0.18)	938,802	0.26	(0.44)	120,629
Mother Ever Arrested	0.05	(0.22)	938,802	0.38	(0.49)	120,629
Father Ever Arrested	0.09	(0.28)	938,802	0.69	(0.46)	120,629
Parent Arrested	0.02	(0.14)	938,802	0.16	(0.36)	120,629
Parent Incarcerated	0.01	(0.08)	938,802	0.05	(0.21)	120,629
<u>Outcome Variables</u>						
Education Index	0.00	(1.00)	824,864	−0.17	(1.14)	110,582
Read Test Score	0.01	(1.00)	539,058	−0.35	(0.94)	73,022
Math Test Score	0.01	(1.00)	553,412	−0.36	(0.90)	75,513
Repeat Grade Next Year	0.04	(0.20)	768,698	0.06	(0.24)	104,665
Behavior Index	0.00	(1.00)	957,611	0.29	(1.35)	122,747
Days Absent	7.65	(9.78)	957,611	10.21	(12.71)	122,747
Days Suspended from School	0.97	(3.98)	957,611	1.87	(5.71)	122,747
Total School Reported Crimes	0.51	(1.69)	456,681	0.93	(2.32)	54,299
Changed Residence Next Year	0.18	(0.38)	740,042	0.27	(0.44)	100,975
Next Year Left CMS	0.10	(0.29)	836,707	0.06	(0.24)	109,706
Number of Unique Students			194,163			18,858

Means and standard deviations are reported above.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

Table 2: Regression - Incarceration Models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Average Test Scores							
Parent Arrested	−0.037***		−0.022**	−0.020**	−0.005	−0.007	−0.009
	(0.009)		(0.009)	(0.009)	(0.006)	(0.005)	(0.009)
Parent Incarcerated		−0.068***	−0.049**	−0.033*	0.022*	0.022**	0.023**
		(0.018)	(0.020)	(0.019)	(0.012)	(0.011)	(0.011)
Observations	74,652	74,652	74,652	74,652	74,652	74,652	72,249
Behavior Index							
Parent Arrested	0.113***		0.108***	0.104***	0.057***	0.059***	0.056***
	(0.012)		(0.012)	(0.012)	(0.012)	(0.012)	(0.021)
Parent Incarcerated		0.112***	0.017	0.003	−0.050*	−0.055**	−0.067**
		(0.025)	(0.026)	(0.026)	(0.026)	(0.027)	(0.028)
Observations	120,629	120,629	120,629	120,629	120,629	120,629	116,718
Basic Controls	✓	✓	✓	✓	✓	✓	✓
CBG FE	-	-	-	✓	-	-	-
Family FE	-	-	-	-	✓	-	-
Individual FE	-	-	-	-	-	✓	✓
Additional Controls for Arrests	-	-	-	-	-	-	✓

Basic controls include individual covariates for the initial school year for a given student and include race, gender, stand-alone residence home as well as neighborhood attributes based on Census Block Group 2000 measures of population density, median household income and percent unemployed. All models also include assigned cohort by school year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student. Additional Controls for Arrests includes dummies for arrests within each year for 2 years prior through 2 years post and a series of dummies for the criminal charge at arrest as well as if the crime occurred in a private residence or involved children/partners for a given student-year observation. Average Test Scores are an average of end-of-grade math and reading test scores.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

Table 3: Incarceration - All Outcomes

	(1) Average Test Scores	(2) Read Test Score	(3) Math Test Score	(4) Repeat Grade	
Parent Arrested	−0.009	−0.015	−0.005	0.009**	
	(0.009)	(0.011)	(0.010)	(0.005)	
Parent Incarcerated	0.023**	0.027*	0.023*	−0.001	
	(0.011)	(0.015)	(0.013)	(0.006)	
Dep. Var. (mean)	-0.36	-0.34	-0.36	0.06	
Observations	72,249	69,678	72,038	99,540	
	Behavior Index	Days Absent	Days Suspended	School Crimes	
Parent Arrested	0.056***	0.653***	0.106	−0.027	
	(0.021)	(0.190)	(0.097)	(0.070)	
Parent Incarcerated	−0.067**	−0.412	−0.261**	−0.145*	
	(0.028)	(0.276)	(0.131)	(0.079)	
Dep. Var. (mean)	0.28	10.14	1.85	0.92	
Observations	116,718	116,718	116,718	51,690	

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table 4: Incarceration - Adult Outcomes

|	HS Dropout	HS Dropout	Adult Arrest (age 16-19)	Adult Arrest (age 16-19)
Parents Arrested (child age 7-11)	−0.005	0.034	−0.007	−0.002
	(0.006)	(0.024)	(0.009)	(0.032)
Parents Incarcerated (child age 7-11)	0.025**	−0.028	0.039**	−0.014
	(0.010)	(0.022)	(0.015)	(0.036)
Dep. Var. (mean)	0.10	0.13	0.19	0.24
Observations	9,476	2,357	9,476	2,357
Basic Controls	✓	✓	✓	✓
Just Kids w/ Incarc Parents	-	✓	-	✓

For these models, I limit my sample to students born between 1990-1995 and only include one observation per student. The outcomes of dropping out of HS at for ages 17 or 18 and the number of adult arrests ages 16-19. I cannot extend to later adult outcomes given data limitations and individual fixed effects are not possible given that I include each student only once.

Figure 3: Trends in Raw Outcomes

A. Average Test Scores

B. Behavior Index


C. Mobility
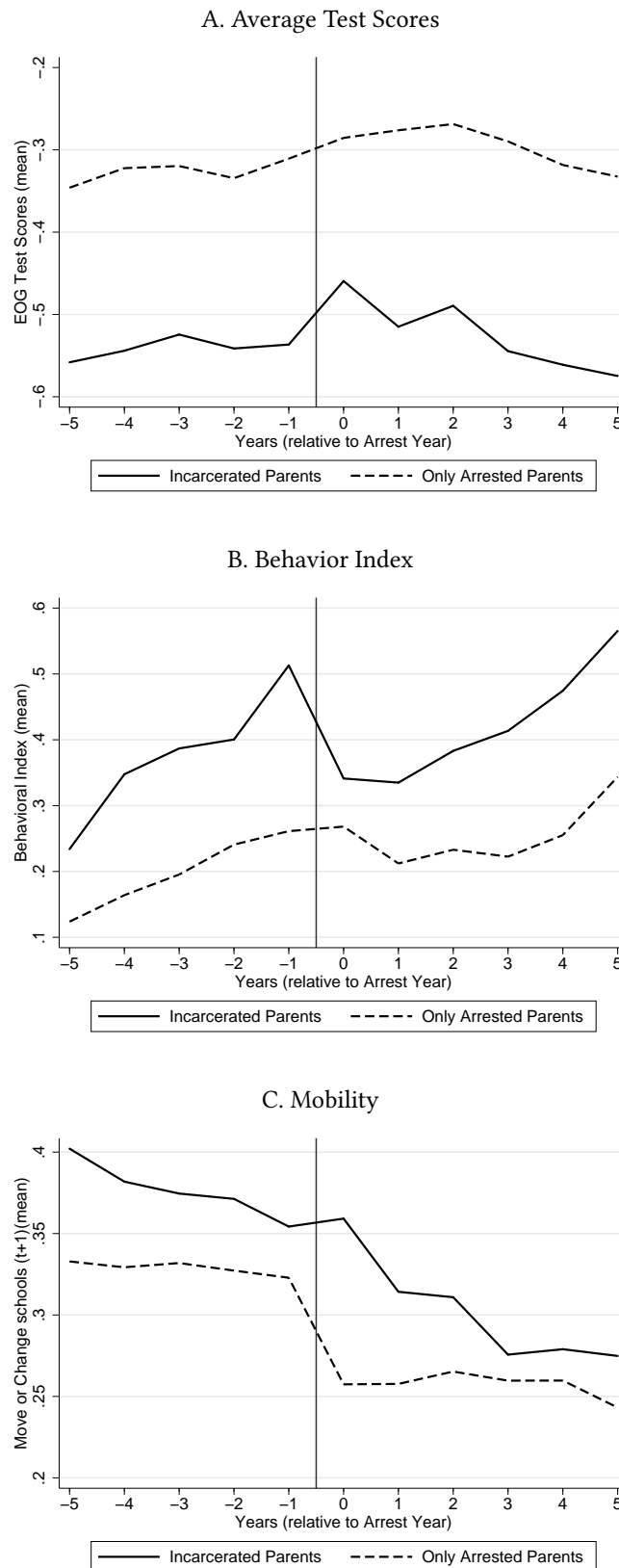
Notes This figure depicts mean outcomes for the time periods leading up to and following an arrest event. Results are for two samples = child with arrested and incarcerated parents and children with only arrested parents. Outcomes are for raw data and do not include any controls. Mobility indicates a child moved residence or changed schools in the year following arrest. The number of observations in each time period vary with time period zero including the full sample, within 3 years, I can include approximately 90% of the sample and within 5 years 70% of the sample.

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Figure 4: Interaction with Age - Test Scores
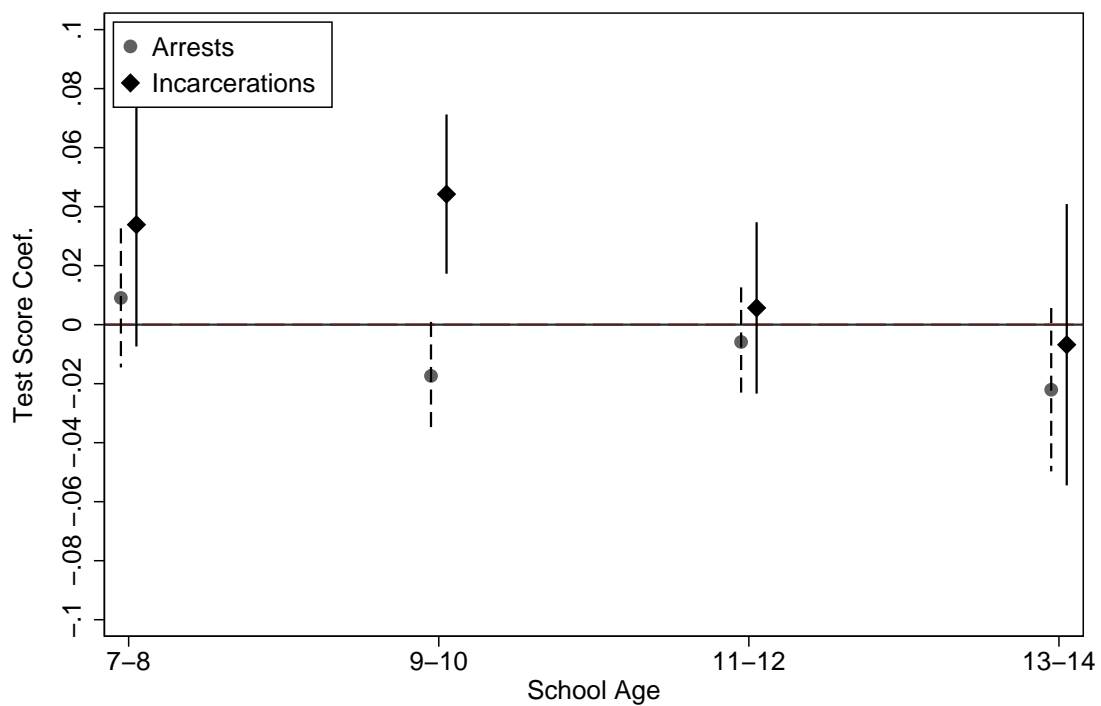
This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables and interacts arrests/incarceration variables with dummies for different ages of a student based on the student-year observation. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.

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Figure 5: Interaction with Age - Behavior Index
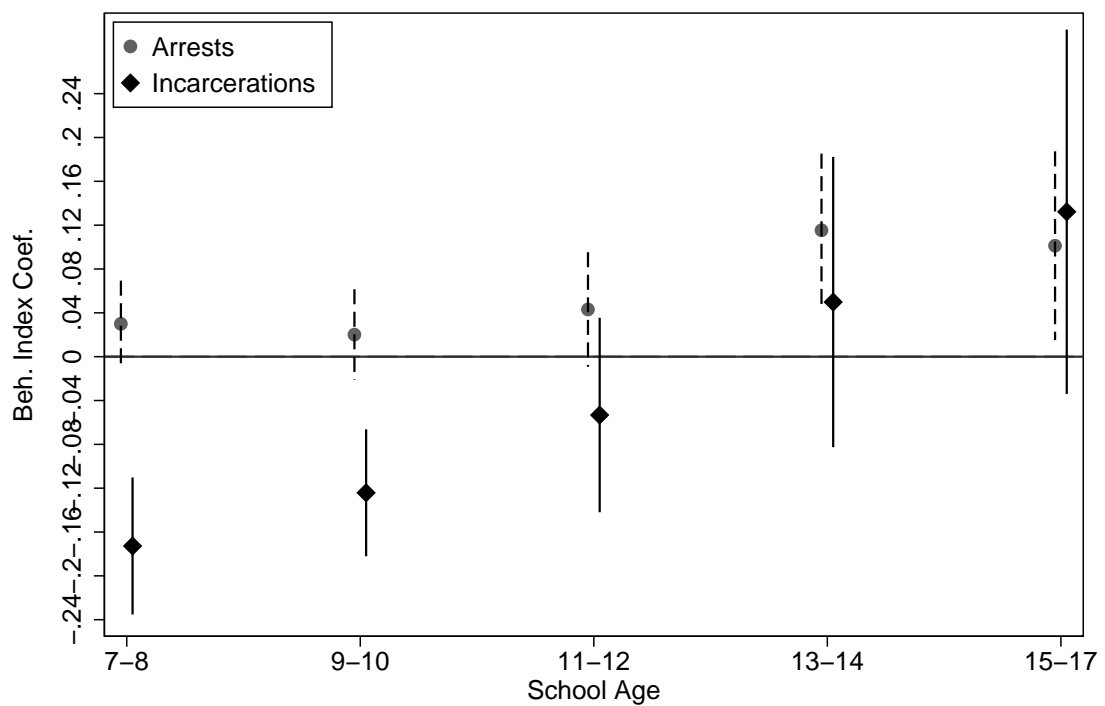
This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables and interacts arrests/incarceration variables with dummies for different ages of a student based on the student-year observation. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.
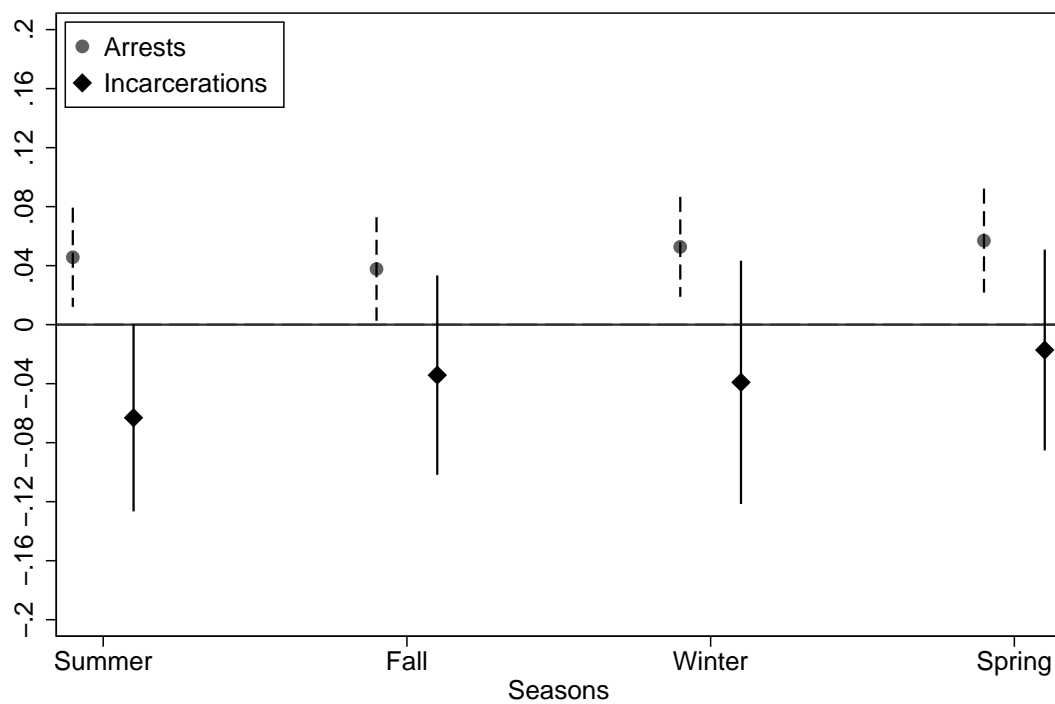
Figure 6: Interaction with Season - Behavior Index

This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables and interacts arrest and incarceration variables with dummies for the time of year a parent is initially arrested or sent to jail/prison. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.
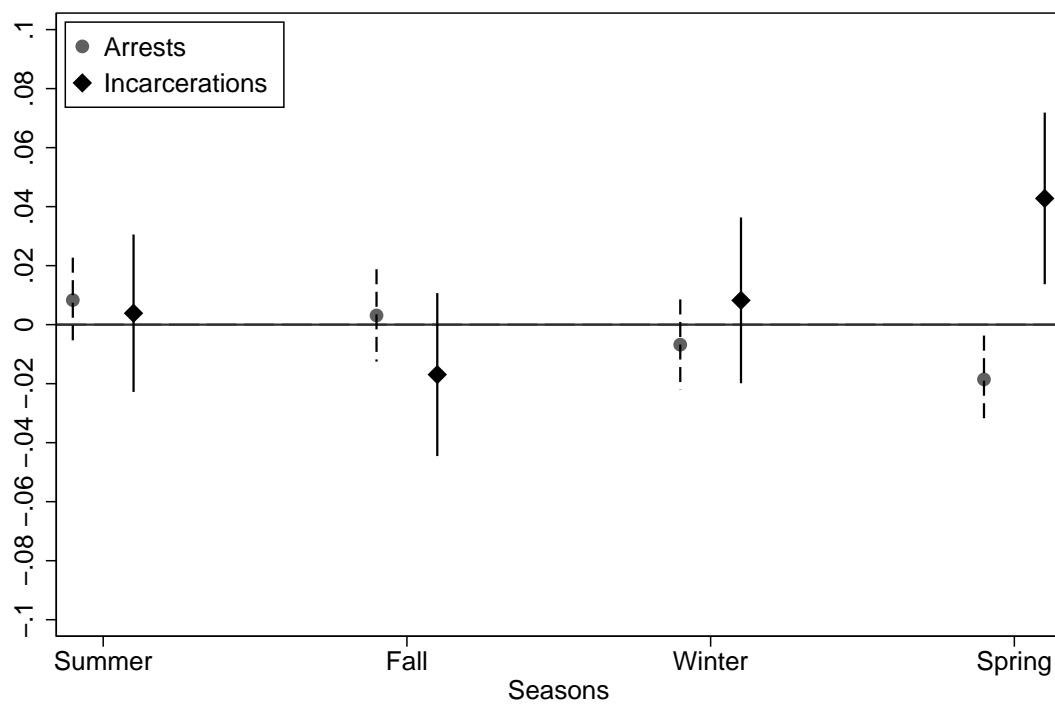
Figure 7: Interaction with Season - Test Scores

This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables and interacts arrest and incarceration variables with dummies for the time of year a parent is initially arrested or sent to jail/prison. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.

Figure 8: Tests Score Effects over Time
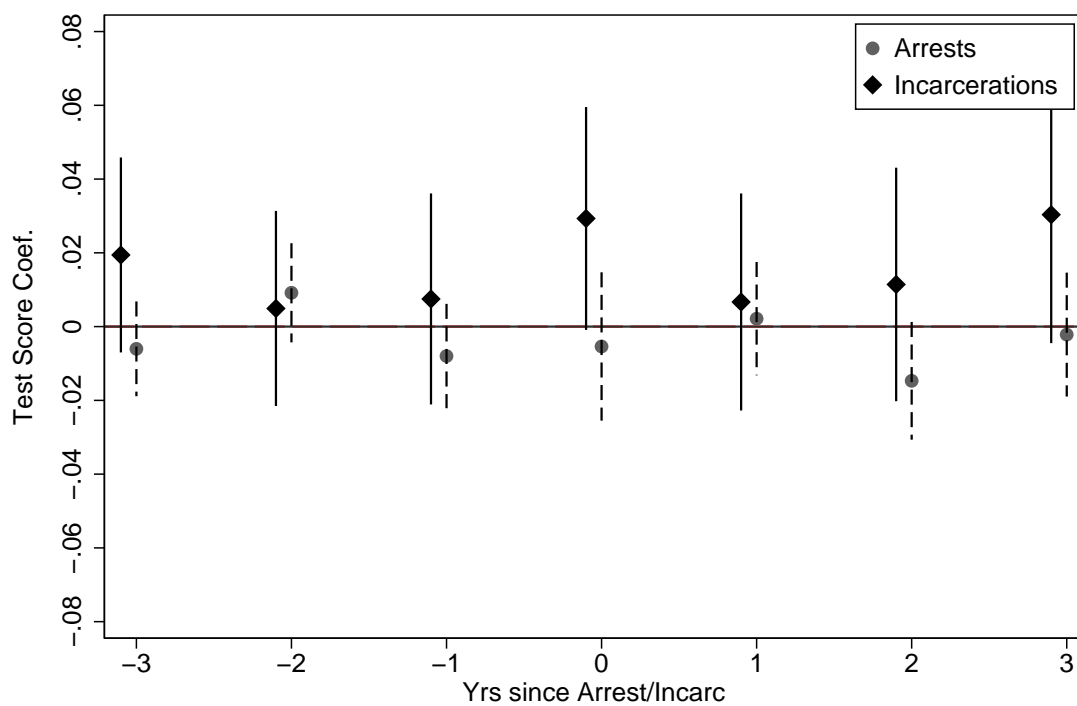
This figure provide the coefficients and 95% confidence bands for a single model for each outcome based on the inclusion of dummies indicating years prior or post a parental arrest or incarceration for a given student and year. Estimation incorporates my main model given in Table 3.

Figure 9: Behavior Index Effects over Time

This figure provide the coefficients and 95% confidence bands for a single model for each outcome based on the inclusion of dummies indicating years prior or post a parental arrest or incarceration for a given student and year. Estimation incorporates my main model given in Table 3.

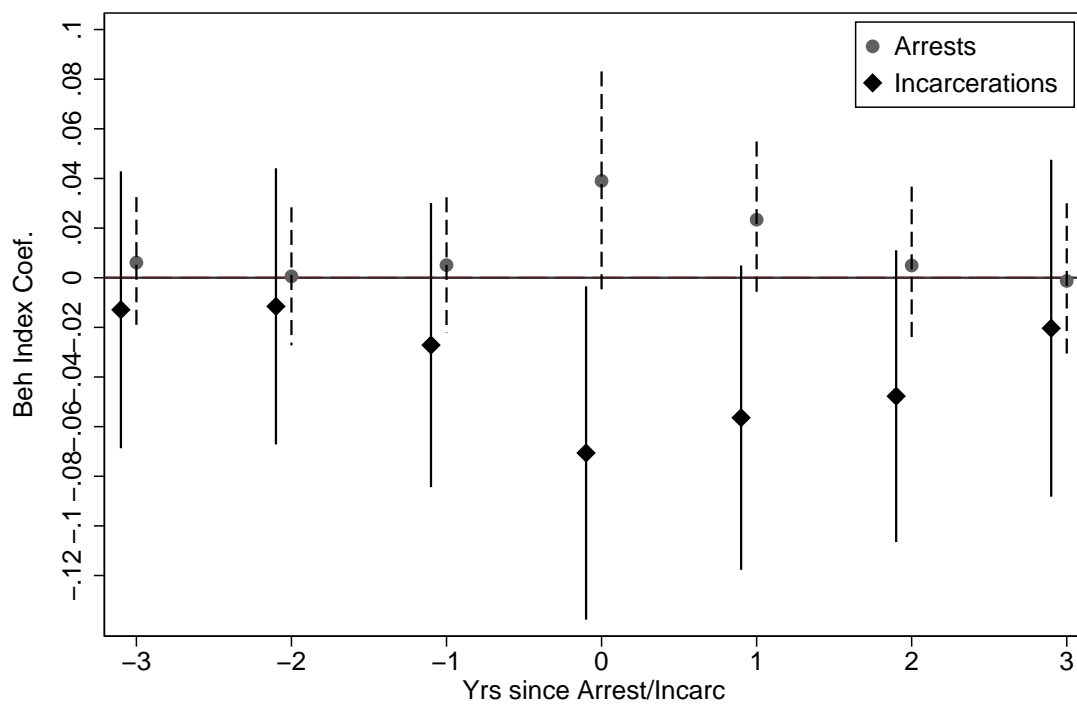Figure 10: Interaction with Days Incarcerated - Test Scores

This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables where I disaggregate the incarceration variable into different intervals of total days incarcerated for the parental incarceration for student i in time period t. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.
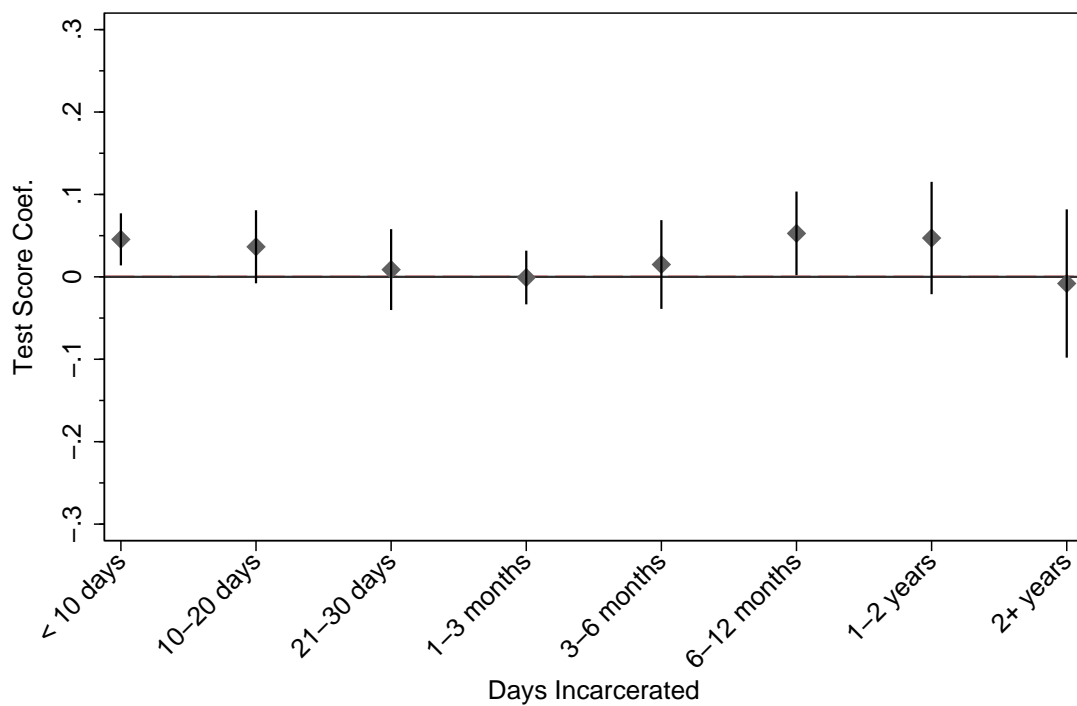
Figure 11: Interaction with Days Incarcerated - Behavior Index
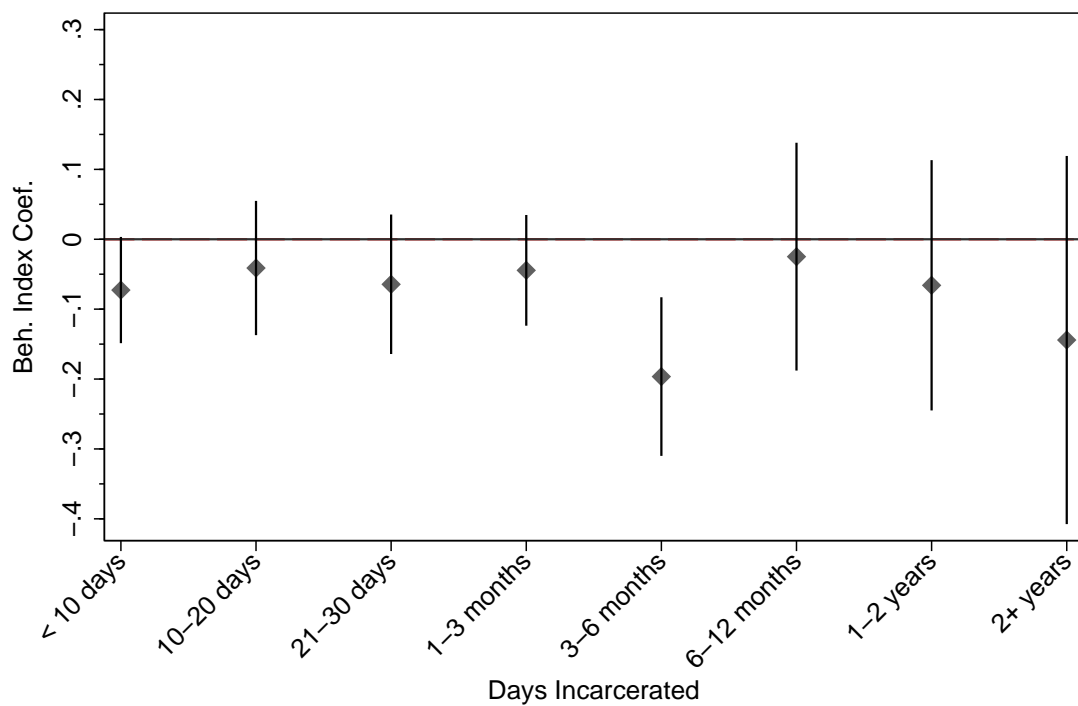
This figure provides the results of the main estimation model with student fixed effects, assigned cohort by year fixed effects and parental arrest variables where I disaggregate the incarceration variable into different intervals of total days incarcerated for the parental incarceration for student i in time period t. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.

Table 5: Incarceration - Other Outcomes

	(1) Moved Next Year	(2) Moved During School Year	(3) Left CMS Next Year	(4) Left CMS, But Return Later Years	(5) Switch Schools Non-Transition Years	(6) Take EOG Exam	(7) Parent Rearrest New Address
Parent Arrested	0.015***	0.011**	−0.011***	−0.001	0.013**	0.009***	
	(0.005)	(0.004)	(0.003)	(0.001)	(0.005)	(0.003)	
Parent Incarcerated	−0.002	−0.014*	0.020***	0.000	−0.008	−0.010	0.069***
	(0.010)	(0.008)	(0.005)	(0.002)	(0.010)	(0.006)	(0.013)
Dep. Var. (mean)	0.27	0.12	0.06	0.01	0.20	0.82	0.49
Observations	100,975	120,629	107,868	107,868	96,192	87,467	7,378

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

Dependent variable Left CMS Next Year indicates if a student was no longer in Charlotte-Mecklenburg Schools (CMS) in the following year. EOG = end-of-grade. All regressions include assigned cohort by year fixed effects and parental arrest variables. Columns 1 through 6 includes individual fixed effects while column 7 does not contain individual fixed effects given that the sample is limited in size to only student-years with a parental arrest and a subsequent parental rearrest where both arrests contain geocodable address information. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table 6: Robustness Checks

	(1) Main	(2) Include Multiple Parent Matches & All Apts.	(3) Include All Apts	(4) Parent Match Address Only	(5) Include All Incarcs	(6) Include Only All Incarcs >30 days	(7) (1) + CBG FEs	(8) (7) + School by Grade FEs
Average Test Scores								
Parent Arrested	-0.010*	-0.011**	-0.014***	-0.003	-0.010	-0.007	-0.012**	-0.011*
	(0.006)	(0.005)	(0.006)	(0.004)	(0.007)	(0.006)	(0.006)	(0.006)
Parent Incarcerated	0.024**	0.018**	0.025***	0.010	0.012	0.011	0.028***	0.025**
	(0.011)	(0.009)	(0.009)	(0.007)	(0.009)	(0.014)	(0.011)	(0.010)
Observations	74,652	100,612	95,858	147,480	74,652	74,652	74,652	74,652
Behavior Index								
Parent Arrested	0.065***	0.060***	0.068***	0.033***	0.079***	0.066***	0.069***	0.069***
	(0.013)	(0.011)	(0.012)	(0.009)	(0.014)	(0.013)	(0.013)	(0.013)
Parent Incarcerated	-0.067**	-0.048**	-0.065***	-0.013	-0.067***	-0.065*	-0.075***	-0.060**
	(0.026)	(0.021)	(0.022)	(0.015)	(0.022)	(0.036)	(0.026)	(0.025)
Observations	120,629	164,341	156,555	245,743	120,629	120,629	120,629	120,629

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

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Table 7: Regression - Alternative Parent Definitions

| | (1) | (2) | (3) | (4) | (5) | (6) |
	Main	Only Kids w/ Incarc Parents	Only BR Match	BR Not Main	Main Not BR	BR & Main
Average Test Scores						
Parental Arrest	−0.010	−0.017	−0.007	−0.007	−0.009	−0.017**
	(0.006)	(0.013)	(0.006)	(0.008)	(0.008)	(0.009)
Parental Incarc	0.024**	0.031**	−0.012	−0.014	0.021	0.046**
	(0.011)	(0.015)	(0.009)	(0.012)	(0.015)	(0.019)
Observations	75,652	19,598	80,153	42,188	37,461	31,468
Behavior Index						
Parental Arrest	0.065***	0.065**	0.008	0.012	0.052***	0.055***
	(0.013)	(0.031)	(0.013)	(0.019)	(0.016)	(0.020)
Parental Incarc	−0.067**	−0.058	−0.032	−0.048*	−0.030	−0.093**
	(0.026)	(0.035)	(0.020)	(0.027)	(0.036)	(0.044)
Observations	120,629	31,920	126,896	67,081	62,286	49,599

BR = parent is matched to a student based on full name using NC state birth records. Main = residential address and last name based matching that is incorporated into main results first presented in Table 3.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table 8: Incarceration - Heterogeneity by Release Type

	(1) Average Test Scores	(2) Average Test Scores	(3) Read Test Score	(4) Math Test Score	(5) Repeat Grade
Parent Incarcerated	0.021 (0.015)				
Incarcerated Bond Release		0.032 (0.020)	0.049* (0.025)	0.013 (0.025)	−0.005 (0.011)
Incarcerated Time Served/Parole		−0.013 (0.025)	−0.006 (0.032)	−0.017 (0.031)	−0.004 (0.014)
Incarcerated Other Release		0.010 (0.021)	0.022 (0.027)	0.006 (0.026)	0.011 (0.012)
Incarcerated Release Future Year		0.033 (0.033)	0.079* (0.042)	−0.012 (0.042)	0.008 (0.019)
Dep. Var. (mean)	-0.35	-0.35	-0.34	-0.35	0.08
Observations	48,035	48,035	47,708	47,908	67,725
	Behavior Index	Behavior Index	Days Absent	Days Suspended	School Crimes
Parent Incarcerated	−0.098*** (0.034)				
Incarcerated Bond Release		−0.010 (0.045)	−0.068 (0.479)	0.018 (0.224)	−0.005 (0.099)
Incarcerated Time Served/Parole		−0.064 (0.057)	−0.730 (0.576)	−0.261 (0.238)	−0.059 (0.133)
Incarcerated Other Release		−0.072 (0.046)	0.005 (0.509)	−0.273 (0.213)	−0.182* (0.095)
Incarcerated Release Future Year		−0.112 (0.087)	−1.132 (0.782)	−0.553 (0.377)	−0.216 (0.264)
Dep. Var. (mean)	0.36	0.36	10.78	2.21	0.92
Observations	84,081	84,081	84,081	84,081	51,690

Release type are distributed across incarcerations with 28% released with a bond; 22% released with time served/parole; 32% released for other reasons (transferred to another jurisdiction, case dismissed, weekender program - serve time on the weekends only, released to custody of another person, etc.); 18% are released in a subsequent school year. We restrict models to the shorter time window of 2005-2011 due to the availability of specific information on the type of incarceration release which began in 2005.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table 9: Regression - Heterogeneity

	(1) Main	(2) Mother	(3) Male	(4) Moved	(5) Left CMS	(6) One Time Arrest	(7) Both Parents Ever Arrest
Average Test Scores							
Parent Arrested	−0.009	−0.013	−0.015	−0.003	−0.009	−0.008	−0.009
	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.009)
Parent Incarcerated	0.023**	0.023*	0.030**	0.028**	0.022*	0.011	0.025*
	(0.011)	(0.013)	(0.015)	(0.013)	(0.012)	(0.015)	(0.013)
Parental Arrests*[col]		0.012	0.013	−0.017*	−0.122	0.000	0.003
		(0.010)	(0.011)	(0.009)	(0.081)	(0.010)	(0.015)
Parental Incarc*[col]		0.010	−0.013	−0.009	−0.097	0.035*	−0.008
		(0.027)	(0.023)	(0.019)	(0.139)	(0.021)	(0.027)
Observations	72,249	72,249	72,249	72,248	66,724	72,249	72,249
Behavior Index							
Parent Arrested	0.056***	0.040*	0.055**	−0.009	0.078***	0.037	0.056***
	(0.021)	(0.022)	(0.023)	(0.022)	(0.023)	(0.025)	(0.022)
Parent Incarcerated	−0.067**	−0.044	−0.080**	−0.104***	−0.051*	−0.067*	−0.073**
	(0.028)	(0.031)	(0.035)	(0.031)	(0.030)	(0.038)	(0.031)
Parental Arrests*[col]		0.043*	0.002	0.197***	−0.399***	0.041*	0.003
		(0.026)	(0.024)	(0.026)	(0.077)	(0.023)	(0.038)
Parental Incarc*[col]		−0.079	0.025	0.077	−0.031	0.022	0.024
		(0.074)	(0.057)	(0.060)	(0.145)	(0.053)	(0.075)
Observations	116,718	116,718	116,718	116,699	104,339	116,718	116,718

Interaction terms are defined by the variable named in the column headings and for all interactions results the column headings represent dummy variables interacted with the parental arrest and incarceration variables. Moved is equal to one if a student moved within the school year or for the next academic year.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. $p < 0.1$, $p < 0.05$, $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table 10: Incarceration - Heterogeneity for Young Children

	(1) Average Test Scores	(2) Average Test Scores	(3) Behavior Index	(4) Behavior Index
Any Parent Incarc.	0.019 (0.012)	0.020* (0.012)	−0.045 (0.030)	−0.047 (0.030)
Mom Incarc. & Young Child	0.029 (0.027)		−0.191*** (0.071)	
Mom Incarc. & Young Child & Vio. Crime		−0.005 (0.042)		−0.228** (0.096)
Mom Incarc. & Young Child & Prop. Crime		0.031 (0.043)		−0.172 (0.114)
Mom Incarc. & Young Child & Other. Crime		0.005 (0.070)		0.042 (0.144)
Mom Incarc. & Young Child & Drug Crime		0.062 (0.051)		−0.181 (0.124)
Observations	72,249	72,249	116,718	116,718
Any Parent Incarc.	0.016 (0.014)	0.018 (0.013)	−0.014 (0.038)	−0.018 (0.036)
Dad Incarc. & Young Child	0.018 (0.019)		−0.140*** (0.045)	
Dad Incarc. & Young Child & Vio. Crime		0.041 (0.026)		−0.142** (0.060)
Dad Incarc. & Young Child & Prop. Crime		0.020 (0.033)		−0.062 (0.069)
Dad Incarc. & Young Child & Other. Crime		0.003 (0.029)		−0.086 (0.061)
Dad Incarc. & Young Child & Drug Crime		−0.041 (0.031)		−0.233*** (0.068)
Observations	72,249	72,249	116,718	116,718

This table provides results for mothers versus fathers and different crime types for younger aged children (age 7-11) at the time of parental arrest and incarceration.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

A. Appendix

A.1. Parental Matching based on Addresses and Last Name

Appendix Table A1 provides an example of the structure of the data and what potential matches look like. In this example, I observe a student John Williams for five years in my dataset and he lives in the same residence the entire time. In the arrest records, I have arrests of people with the same last name and in some cases the same address. For all matching, I require that same last name and addresses must match between student records and an arrestee's home address at the time of booking. Incarceration records are easily linked to arrest records based on arrestee information and provide the timing of subsequent incarcerations. These records do not provide the exact incarceration for a given arrest, but do give the exact dates of arrest and incarceration spells. I do have to make some assumptions on assigning a specific arrest to an incarceration and do so based on the incarceration occurring closest in time immediately following a given arrest but no more than 1 year after the arrest. Most cases involve an arrest that is immediately followed by an incarceration. For all arrests and incarcerations I aggregate to a given school year and separate school years based on July 1st.[46]

In order to get a sense of the portion of likely criminal parents I am able to match to the student database, I created Appendix Figure A1. Appendix Figure A1 provides match rates between arrest and student records for each year relative to the estimated population of children with arrested parents. This figure highlights that I am able to match about 55% of the estimated population to the student records.[47] The dotted line provides the share of students that had a parent arrested in a given year. To create the solid line, I estimate the population of arrestees with children using Census data from the American Community Survey for the study area of Mecklenburg County, NC. The main assumption is that adult arrestees have similar number of children as the overall population. Based on Census 2000 data, I assume that 16.8% of households have children age 6-17 and multiply this times the population of adult arrestees of parental age (age 15-42 for women; 16-48 for men) from the arrest records. I then divided this estimate of parental arrestees by the number of students in the population of student records. I conduct this for each year of overlapping student and arrest records 1999-2011 and present this share in this figure as the dotted line. One would not expect address matching to capture anything close to 100% of the estimated population because of the large prevalence of absentee fathers in this population of incarcerated parents. Furthermore, the estimated population may even be too low if parents involved in the criminal justice system have above average number of children.

A.2. Appendix Figures and Tables

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[46]I use July 1st as our cutoff since I want to make sure to link all arrests and incarceration that occur just prior and during a school year to that school year's outcomes. Other cutoffs during the summer provide minimal difference in my results.

[47]This calculation is based on excluding children matched to more than one arrestee as well as children in large apartment complexes. Including these types of matches would bring the average closer to 75%.

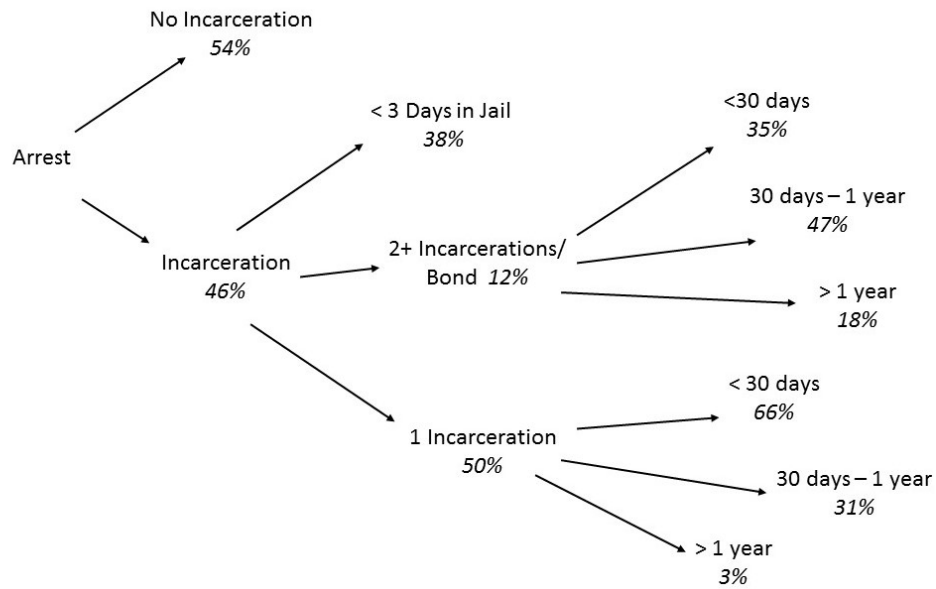Figure A1: Quality of Parental Arrest Match to Student Records
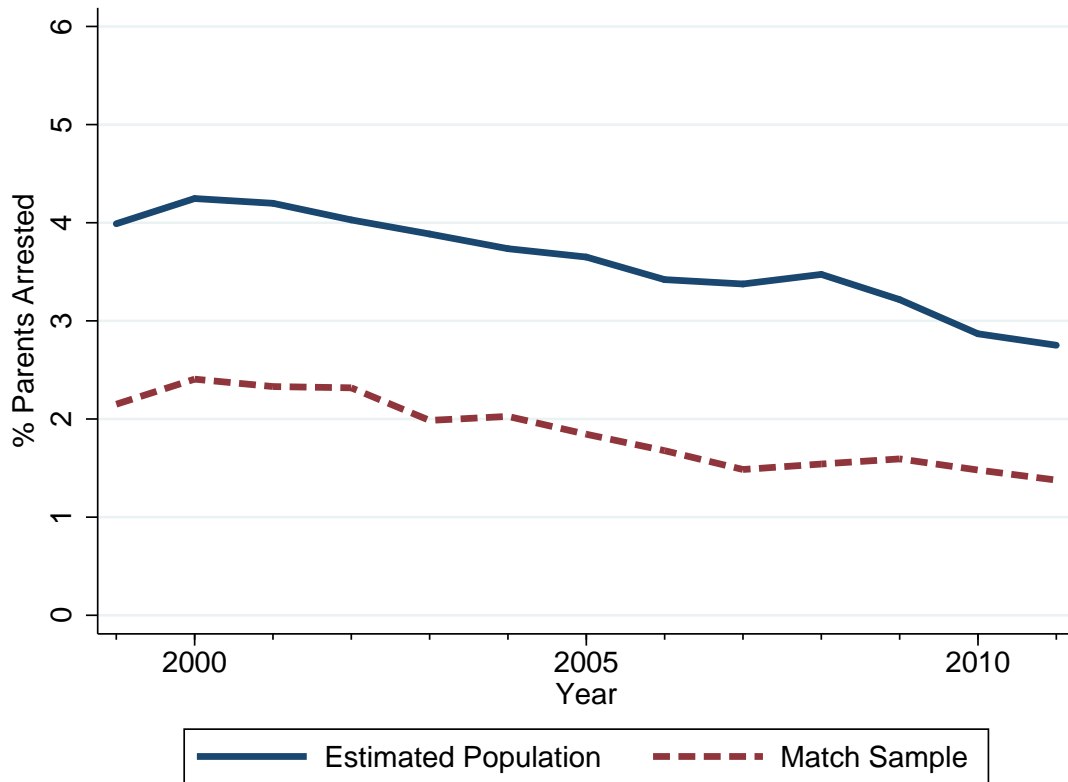
This figure provides my sample match rates of arrest and student records for each year relative to the estimated population of children with criminal parents.
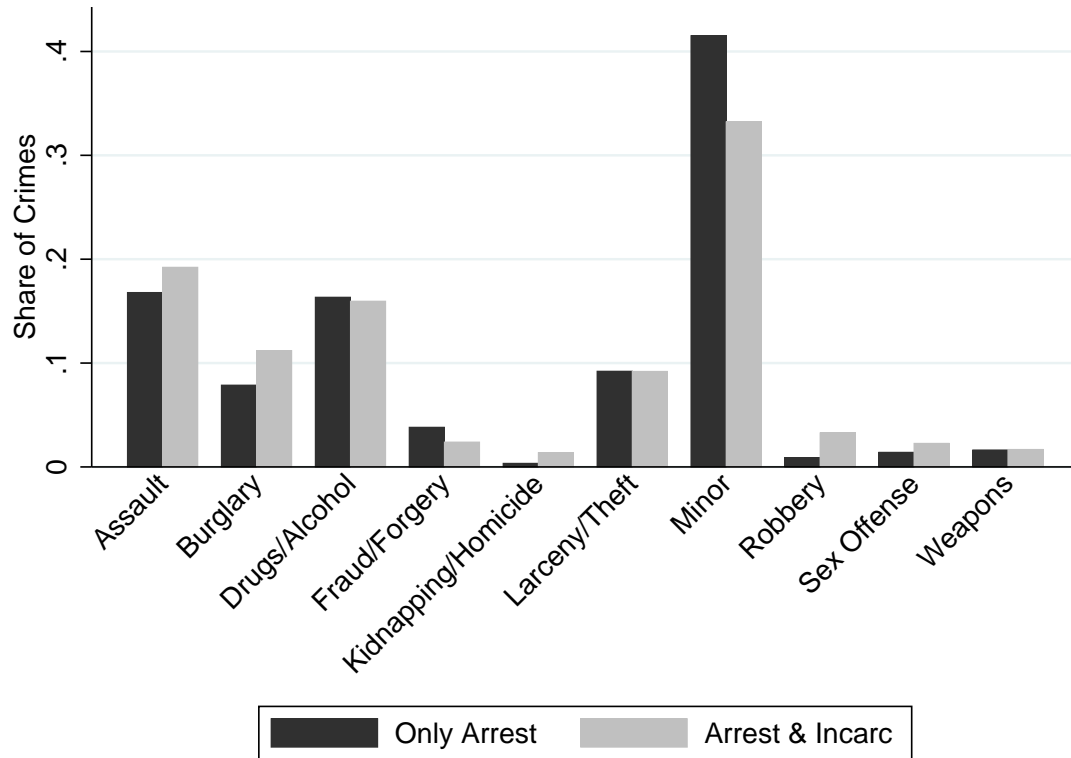
Figure A2: Incarceration Experience

This figure provides the breakdown of arrest and incarceration experiences for individuals in the arrest and incarceration records for Mecklenburg County, NC.

Figure A3: Distribution of Crimes

This figure provide the distribution of crime categories used in criminal charges across two groups: individuals only arrested and individuals arrested and incarcerated. We consolidate crimes into broader categories with minor crimes mostly composed of crimes such as vandalism, disorderly conduct or other offenses that do not harm individuals and are typically more public nuisance crimes.

Figure A4: Conditional Average Index Outcomes by Criminal Parent Type

A. Avg. Test Scores

B. Behavior Index
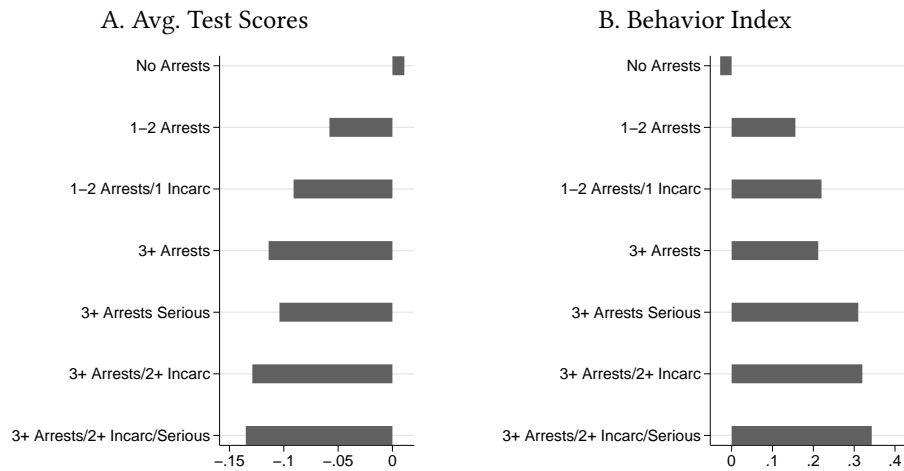
Notes This figure depicts mean outcomes by the different types of criminal parents conditional on initial school year student demographics (e.g. race, gender, etc.), neighborhood attributes and fixed effects for assigned cohort by year fixed effects. Serious refers to criminal charge at the time of arrest and includes all indexed violent and property crimes.

Figure A5: Falsification - Test Scores
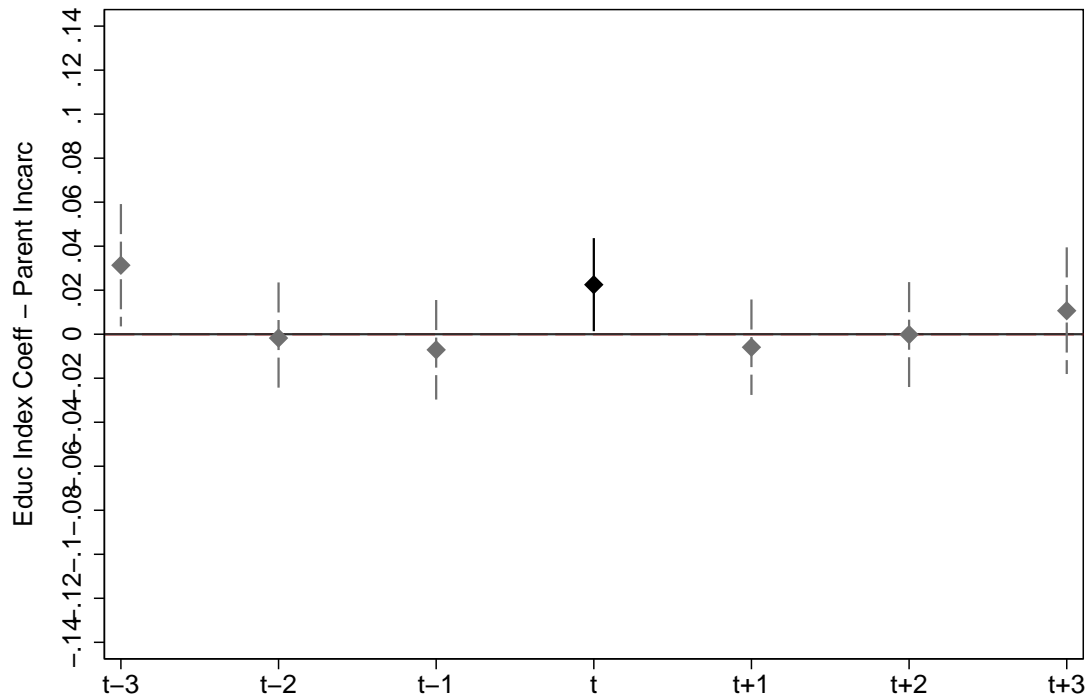
This figure provides my main results in comparison to models where I falsely assign future and past time periods to current year arrests and incarcerations. Each coefficient is based on separate models where I simply substitute a lagged or lead measure of parental arrest or incarceration in my main estimation model with student fixed effects and other arrest controls. The falsely assigned time period is given by the x-axis. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.

Figure A6: Falsification - Behavior Index
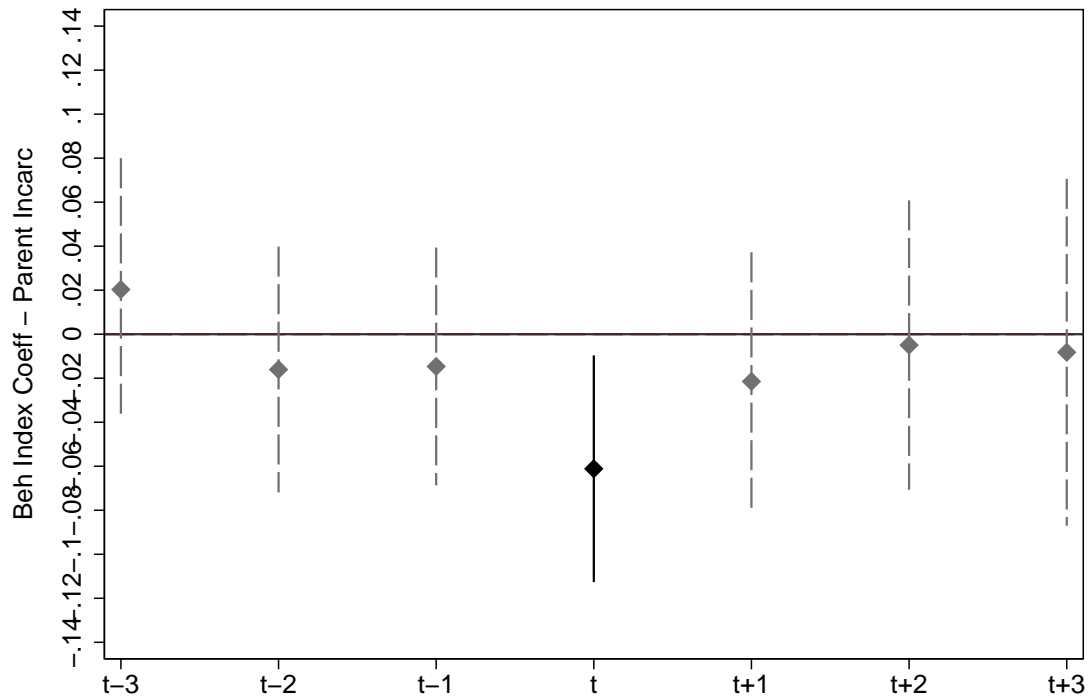
This figure provides my main results in comparison to models where I falsely assign future and past time periods to current arrests and incarcerations. Each coefficient is based on separate models where I simply substitute a lagged or lead measure of parental arrest or incarceration in my main estimation model with student fixed effects and other arrest controls. The falsely assigned time period is given by the x-axis. Points represent coefficients for column heading variables and lines represent 95% confidence intervals.

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Table A1: Parental Matching

Student Records

First Name	Last Name	Student Address	School Year	Arrest	Incarc.
John	Williams	200 E 43rd Street	2001	0	0
John	Williams	200 E 43rd Street	2002	0	0
John	Williams	200 E 43rd Street	2003	1	1
John	Williams	200 E 43rd Street	2004	0	0
John	Williams	200 E 43rd Street	2005	1	0

Arrest Records

First Name	Last Name	Address at Arrest	Arrest Year	Incarc. Year
Sam	**Williams**	**200 E 43rd Street**	**2003**	**2003**
Sam	Williams	200 E 43rd Street	2007	
John	Williams	100 N Broadway Ave.	2004	2004
Mary	**Williams**	**200 E 43rd Street**	**2005**	

Table A2: Regression - Alternative Parent Definitions (Mothers vs. Fathers)

	(1)	(2)	(3)	(4)	(5)	(6)
		Mothers Only			Fathers Only	
	Main	Only BR Match	BR & Main	Main	Only BR Match	BR & Main
Average Test Scores						
Parental Arrest	−0.004	−0.016**	−0.030**	−0.011	−0.000	−0.001
	(0.010)	(0.008)	(0.013)	(0.007)	(0.007)	(0.011)
Parental Incarc	0.033	−0.002	0.067**	0.019	−0.017	0.019
	(0.024)	(0.017)	(0.034)	(0.012)	(0.010)	(0.021)
Observations	28,998	42,433	15,141	52,316	50,609	20,859
Behavior Index						
Parental Arrest	0.089***	0.025	0.094***	0.036**	−0.005	0.021
	(0.026)	(0.021)	(0.035)	(0.016)	(0.015)	(0.025)
Parental Incarc	−0.095	−0.080*	−0.163	−0.011	−0.004	−0.020
	(0.066)	(0.043)	(0.100)	(0.030)	(0.021)	(0.043)
Observations	47,176	67,713	24,127	84,399	79,202	32,704

BR = parent is matched to a student based on full name using NC state birth records. Main = residential address and last name based matching that is incorporated into main results first presented in Table 3.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table A3: Regression - Heterogeneity 2

| | (1) | (2) | (3) | (4) | (5) |
| | | | | One Time Arrest | Both Parents Ever Arrest |
	Main	Mother	Male		
Moved (next or within year)					
Parent Arrested	0.021**	0.018**	0.021**	0.021**	0.018**
	(0.008)	(0.009)	(0.010)	(0.010)	(0.009)
Parent Incarcerated	−0.027**	−0.032***	−0.030**	−0.030**	−0.025**
	(0.011)	(0.012)	(0.015)	(0.014)	(0.012)
Parental Arrests*[col]		0.009	0.001	0.000	0.022
		(0.010)	(0.010)	(0.010)	(0.015)
Parental Incarc*[col]		0.031	0.005	0.008	−0.015
		(0.025)	(0.021)	(0.021)	(0.028)
Observations	116,699	116,699	116,699	116,699	116,699
Left CMS					
Parent Arrested	−0.015***	−0.014***	−0.019***	−0.009**	−0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Parent Incarcerated	0.020***	0.016***	0.016**	0.017***	0.020***
	(0.005)	(0.006)	(0.007)	(0.006)	(0.006)
Parental Arrests*[col]		−0.002	0.007	−0.013***	0.001
		(0.005)	(0.005)	(0.005)	(0.007)
Parental Incarc*[col]		0.020*	0.008	0.001	0.000
		(0.012)	(0.010)	(0.010)	(0.012)
Observations	104,339	104,339	104,339	104,339	104,339

Interaction terms are defined by the variable named in the column headings and for all interactions results the column headings represent dummy variables interacted with the parental arrest and incarceration variables.

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table A4: Incarceration - Heterogeneity by Gender

	(1) Average Test Scores	(2) Read Test Score	(3) Math Test Score	(4) Repeat Grade
Father Incarcerated * Daughter	0.026*	0.043**	0.011	−0.005
	(0.016)	(0.020)	(0.019)	(0.008)
Mother Incarcerated * Daughter	0.022	0.028	0.032	−0.009
	(0.030)	(0.041)	(0.035)	(0.017)
Father Incarcerated * Son	0.013	0.009	0.019	0.005
	(0.018)	(0.023)	(0.021)	(0.009)
Mother Incarcerated * Son	0.051	0.033	0.063	−0.001
	(0.036)	(0.049)	(0.042)	(0.019)
Dep. Var. (mean)	-0.36	-0.34	-0.36	0.06
Observations	72,249	69,678	72,038	99,540
	Behavior Index	Days Absent	Days Suspended	School Crimes
Father Incarcerated * Daughter	−0.066*	−0.559	−0.172	−0.165
	(0.037)	(0.366)	(0.172)	(0.101)
Mother Incarcerated * Daughter	−0.141*	−1.066	−0.543**	0.097
	(0.073)	(0.821)	(0.260)	(0.180)
Father Incarcerated * Son	−0.056	−0.337	−0.260	−0.256**
	(0.046)	(0.422)	(0.217)	(0.117)
Mother Incarcerated * Son	−0.072	0.255	−0.412	0.070
	(0.111)	(1.084)	(0.503)	(0.285)
Dep. Var. (mean)	0.28	10.14	1.85	0.92
Observations	116,718	116,718	116,718	51,690

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.

Table A5: Incarceration - Heterogeneity by Crime Type

	(1) Average Test Scores	(2) Read Test Score	(3) Math Test Score	(4) Repeat Grade
Incarcerated Property Crime	0.048**	0.036	0.067**	−0.000
	(0.024)	(0.030)	(0.028)	(0.013)
Incarcerated Violent Crime	0.026	0.022	0.017	−0.004
	(0.019)	(0.024)	(0.022)	(0.010)
Incarcerated Drug/Alc Crime	−0.006	0.004	−0.002	0.015
	(0.023)	(0.030)	(0.027)	(0.012)
Incarcerated Other Crime	0.007	−0.001	0.026	0.004
	(0.021)	(0.027)	(0.025)	(0.010)
Incarcerated Technical Violation	0.015	0.037	−0.014	0.005
	(0.032)	(0.044)	(0.041)	(0.018)
Dep. Var. (mean)	-0.35	-0.34	-0.36	0.06
Observations	73,300	70,689	73,087	101,237
	Behavior Index	Days Absent	Days Suspended	School Crimes
Incarcerated Property Crime	−0.058	−0.400	−0.393	−0.294
	(0.063)	(0.646)	(0.255)	(0.220)
Incarcerated Violent Crime	−0.062	−0.634	−0.296	−0.236
	(0.044)	(0.409)	(0.203)	(0.144)
Incarcerated Drug/Alc Crime	−0.056	−0.355	−0.225	0.136
	(0.078)	(0.649)	(0.374)	(0.194)
Incarcerated Other Crime	−0.037	0.154	−0.226	−0.162
	(0.047)	(0.501)	(0.204)	(0.123)
Incarcerated Technical Violation	−0.001	0.627	0.005	0.018
	(0.072)	(0.756)	(0.327)	(0.154)
Dep. Var. (mean)	0.28	10.15	1.85	0.93
Observations	118,773	118,773	118,773	52,569

The data sample consists of an unbalanced panel of students observed during the 1998/1999-2010/2011 school years. I restrict the sample to only individuals born between 1990-2001 that attend a public school in Mecklenburg County, NC between 1999-2011.

I restrict the sample to students that had a parental figure that was arrested for at least one crime between 1998 and 2011 while living at the same residence as the student. Details on matching parents to children is provided in the Data Section.

All regressions include individual i fixed effects, assigned cohort by year fixed effects, controls for arrests within a 2 years window. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors robust to arbitrary correlation by individual student.