Do Schooling Cutoff Dates Influence Crime? Evidence from Florida and Illinois

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Abstract

This paper investigates whether school entry cutoff dates causally influence long-run individual prison admissions. Using administrative prison data from Florida and Illinois—two states that gradually moved up their kindergarten eligibility cutoff dates by one month per year during the 1980s—I exploit quasi-random assignment of school start age based on date of birth to estimate effects on incarceration. Children born just after the cutoff were required to delay kindergarten entry by a year, which reduced their required schooling and altered peer interactions during formative years. I combine a fuzzy regression discontinuity design with a Poisson model to estimate the impact of this delayed entry on prison admissions later in life. Leveraging temporal variation in school entry cutoffs, I link school start age to incarceration outcomes observed decades later and offer novel evidence on how school start age can shape long-run criminal outcomes.

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I Introduction

There is a large literature connecting human capital accumulation to criminal behavior, both in theory (e.g. Becker 1968, Ehrlich 1973, and Lochner 2004) and empirical work (e.g. Lochner and Moretti 2004, Anderson 2014, and Bell, Costa, and Machin 2022). Education raises the opportunity cost of crime, making criminal activity less appealing and shifting the margin for those choosing between legal and illegal behavior. In this paper, I exploit an understudied source of variation in the fields of education and crime economics: the birthday cutoff to start kindergarten. These cutoffs determine whether a child starts kindergarten at age four or five, depending on their date of birth.

I use variation in school starting age that comes from policy reforms in Florida and Illinois during the 1980s. Both states gradually moved their kindergarten eligibility cutoffs earlier in the calendar year. This change caused children born just after the new cutoff date to delay kindergarten by a year. I examine whether this delay affects adult incarceration.

Two channels may explain how school entry cutoffs affect crime. The first is what I call the peer and maturity channel. A child born just after the cutoff becomes one of the oldest in their grade, while a child born just before becomes one of the youngest. This relative age can shape a child's academic performance and social development. Both Black, Devereux, and Salvanes (2011) and Fredriksson and Ockert (2013) find being older at school entry improves educational performance, although long-run consequences remain ambiguous.

The second channel relates to human capital accumulation. Historically, all compulsory schooling laws are based solely on age rather than grade level or achievement. In most states, students can leave school at sixteen with parental permission or at eighteen without it. Several papers exploit this structure. Angrist and Krueger (1991) use quarter of birth as an instrument for education, showing that additional schooling leads to higher earnings. Lochner and Moretti (2004) use state-level changes in compulsory schooling laws and find that more education reduces arrests and incarceration. Hjalmarsson, Holmlund, and Lindquist (2015) reach similar conclusions using Swedish data. Variation in cutoffs is particularly important in my context, as demographic groups with high crime rates are also those most likely to exit before completing high school (Lochner and Moretti 2004).

The relationship between schooling and crime is also strengthened by incapacitation effects. Anderson (2014) finds that when the legal dropout age is lowered, juvenile crime increases. Bell, Costa, and Machin (2022) finds evidence of both a short-term and long-term incapacitation effect caused by compulsory schooling, with the long-term effect stemming from individuals' reduced likelihood of exposure to criminal environments during adolescence.

My paper makes a novel contribution by linking school entry age and compulsory schooling to long-run incarceration, as existing studies reach mixed conclusions. Dobkin and Ferreira (2010) find that starting school earlier lowers test scores initially, increases schooling, and mixed effects on adult wages and employment. In contrast, Cook and Kang (2016) find that youth born just after the cutoff in North Carolina are more likely to commit felonies by nineteen. Landersø, Nielsen, and Simonsen (2015) find supporting evidence using Danish data. Closest to my study, McAdams (2016) uses U.S. Census data and finds that earlier school entry cutoffs reduce incarceration in adulthood.

A related identification strategy appears in Arenberg, Neller, and Stripling (2024), who use Medicaid eligibility cutoffs based on date of birth to estimate the long-run effects of childhood healthcare access on incarceration. Using Florida prison data, they find that Medicaid access reduces incarceration rates for Black youth, particularly for financially motivated offenses.

This paper contributes to related literature using Florida and Illinois administrative prison data to exploit the gradual change of school entry cutoffs in the 1980s. Because the reforms were enacted after the affected cohorts were conceived, this, in combination with compulsory schooling laws, generates plausibly exogenous variation in school start age and required schooling. I estimate the causal effect of being born after the cutoff on prison admissions using a fuzzy regression discontinuity design and a Poisson model.

II Institution

School entry cutoffs[1] refer to the date used to determine whether a child starts school that year or must wait until the following year. In both Florida and Illinois, children must turn five by the cutoff date of the school year to be eligible to begin kindergarten that same school year. Prior to any variation I exploit, Florida had a kindergarten birthday cutoff of January 1 and Illinois had a

[1] I use kindergarten and school cutoffs synonymously.

cutoff of December 1. Thus, children in Florida must turn five before January 1 of the school year in which they begin kindergarten. This creates a discontinuity where the running variable is date of birth. Children born on December 31 and January 1 of the following year in Florida are only one day apart, but the older child begins school a full year earlier. Additionally, because compulsory schooling laws are age-based, they become eligible to leave school only one day apart. Thus the cutoff alone allows for them to receive up to a year less of required schooling. Similar examples hold for Illinois where the cutoff was December 1 initially.

Prior to the 1980-1981 school year, neither state had changed the cutoff date since their inception in 1965 and 1895 for Florida and Illinois, respectively (Florida Senate Committee on Education Innovation 1999 and Education Week 1987). In 1978, Florida House Bill 1036 was proposed in Florida to move the kindergarten birthday cutoff by one month per year for four years. This policy ultimately moved the cutoff from January 1 to September 1 over four years. Florida House Bill 1036 was enacted in 1979 and implemented in the 1980-1981 school year where the school cutoff date was now December 1st rather than January 1st. This initially delayed the school start of children born between December 2, 1975 and December 31, 1975 (inclusive) (Florida Legislature 1979).

Illinois had a similar change in kindergarten cutoff proposed in 1984, with the Illinois General Assembly enacting it in 1985 (Education Week 1987). This law also moved the cutoff by one month per year, but for only three years since Illinois's cutoff was already a month earlier than Florida's. This first affected the 1986–1987 cohort, whose cutoff date moved from December 1st to November 1st. This delayed the school start of children born between November 2, 1981 and November 30, 1981 (inclusive). I include a timeline of the change in cutoff dates for Florida and Illinois relative to the initial year in figure 1 as well as a more detailed version in table 1 of the appendix. These cutoffs remained constant in Florida and Illinois for decades following these changes (Education Commission of the States 2014).

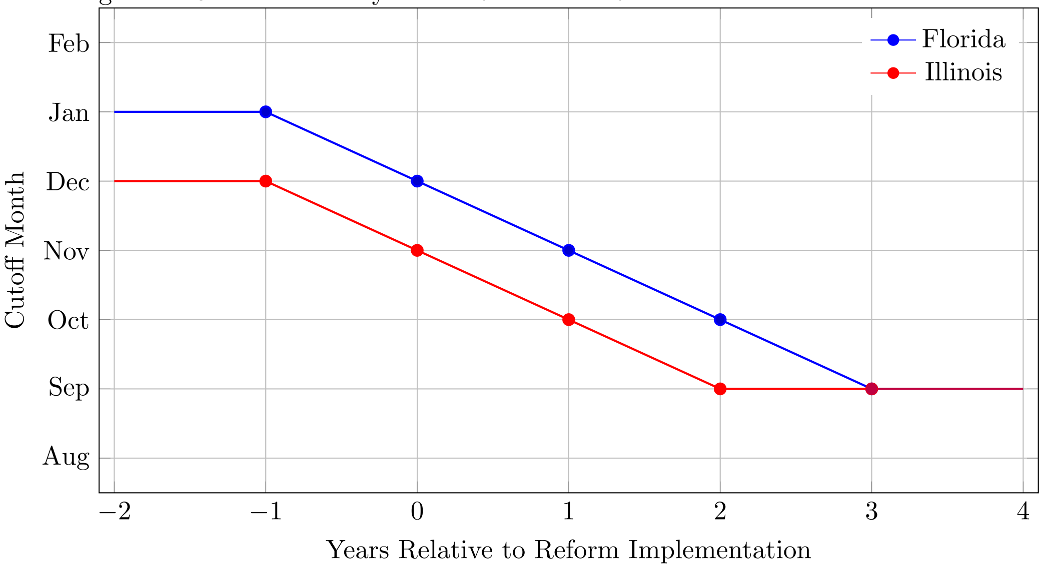
In addition to the initial birthdays delayed which I mention above, each subsequent year, an additional month of birthdays was delayed until each state had a cutoff of September 1[2]. This creates additional discontinuities, which I exploit since subsequent cutoffs should not be influenced

[2]Those delayed include individuals born between the following dates (inclusive) in Florida: November 2- December 31, 1976, October 2-December 31, 1977, and September 2-December 31, 1978. The following were also delayed in Illinois: October 2-November 30, 1982, and September 2-November 30, 1983

by earlier changes. I include observations within a month bandwidth for each change in the cutoff.

Importantly, neither Florida nor Illinois experienced changes in the minimum age at which students could legally withdraw from school[3] during the sample period (Angrist and Krueger 1991; Florida Legislature 1970; Illinois General Assembly 1970). Thus all variation in the amount of required schooling for these individuals is solely determined by the time that they can enroll in kindergarten[4].

Figure 1: Cutoff Month by Years Relative to Reform for Florida and Illinois



Note: The school cutoff always took place on the first of the month. Florida implemented the reform in the 1980-1981 school year while Illinois did so in the 1986-1987 school year. These school years serve as year 0 in the figure. Based on information from Florida Senate Committee on Education Innovation (1999), Florida Legislature (1979), and Education Week (1987). A more detailed version of this is included in table 1 within the appendix.

[3]Defined as the upper bound of compulsory schooling.

[4]This is under the assumption that parents always enrolled students in school when they were first eligible for kindergarten as compulsory schooling laws at the time allowed children to legally be out of school until six and seven in Florida and Illinois, respectively (Angrist and Krueger 1991; Florida Legislature 1970; Illinois General Assembly 1970).

III Data and Methodology

III.A Florida and Illinois Data

I use public data from the Florida Offender-Based Information System (FOBIS) and Illinois Department of Corrections (IDOC). FOBIS includes all Florida prisoners admitted since 1981, while IDOC includes those in Illinois since 2005[5]. Most importantly, both datasets include the date of birth for all prisoners admitted so that I can know when they were eligible to start school[6]. Other demographic information is available, including race, gender, and offense type.

Because the cutoff moved up one month per year for four years in Florida and three in Illinois, I pool observations across both states and each cutoff change. It is possible that time-variant unobservables create heterogeneous effects, but I include state and year fixed effects to account for time-invariant differences between states and the staggered policy timing[7]. Thus the estimate is the average effect of the change across Florida and Illinois for each change.

Each law was enacted in the year prior to taking effect. Since the full rollout in each state took fewer than five years, I can exploit the discontinuity at each new cutoff since all children were born before the policy was proposed. This timing ensures that parents could not have timed births in response to the policy. This exogeneity and assuming that birthdays are as good as random around the cutoff gives the ability for a regression discontinuity design (RDD)[8].

III.B Regression Discontinuity Design

I begin with a bandwidth of one month around the cutoff. This includes individuals born up to thirty-one days before or after the cutoff. I define my running variable, $Distance_{ic}$, as in equation 1.

$$Distance_{ic} = DateOfBirth_i - Cutoff_c \tag{1}$$

[5]It is important to note that the initially affected cohort were twenty-four in 2005. Thus this will attenuate the estimated effect in Illinois

[6]I make the implicit assumption that all prisoners observed grew up in the same state they went to prison in. This is likely not the case, and will attenuate my results since I do not have data on where prisoners started school or were born.

[7]I will report results on only Florida and only Illinois in addition to both of them in the future.

[8]This assumption is common in the literature (e.g. Angrist and Krueger 1991 and Cook and Kang 2016).

Here, $Distance_{ic}$ is the number of days between individual i's birthday and the cutoff date for cohort c which can be negative. $Cutoff_c$ is the cutoff that cohort c was applicable to based on the state's birthday cutoff to begin kindergarten[9]. I show the RDD in equation 2.

$$\begin{aligned} PrisonerAdmissions_{id} = \beta_0 + \beta_1\, PostNewCutoff_i + \beta_2\, Distance_{ic} \\ + \beta_3\, PostNewCutoff \times Distance_{ic} + State_s + \tau_t + \epsilon_d \end{aligned} \tag{2}$$

Here, $PrisonerAdmissions_d$ is the number of prisoners admitted at some point with the same birthday d as individual i. $PostNewCutoff_i$ is an indicator equal to one if $Distance_{ic}$ is at least 0 meaning that individual i in cohort c was delayed kindergarten entry a year due to the change in birthday cutoff for their cohort. $State_s$ and τ_t are state and year-of-birth fixed effects which are required due to the policy implementation occurring in two states and over multiple years for each state. I also cluster standard errors by the date of birth.

If β_1 is statistically significant, then there is a discontinuous change in the number of prisoners born just after the cutoff compared to before. Assuming that births are random around the cutoff, a significant estimate provides evidence of increased rates of incarceration due to being born after the cutoff. Thus the combination of being the oldest in your cohort and being required to have up to one year less of education increased the likelihood of incarceration.

III.C Poisson Model

Additionally, I measure the difference in incarcerations of individuals with birthdays relative to the cutoff using a Poisson pseudo-maximum likelihood (PPML) model (Santos Silva and Tenreyro 2006). This accounts for a plausibly nonlinear relationship between the birthday relative to the cutoff and incarceration as Fredriksson and Ockert (2013) found nonlinear effects of start cutoffs on educational attainment. The Poisson model in equation 3 allows me to measure the increase in prisoners born just after the cutoff as a percentage change.

[9]This is either December 1, November 1, October 1, or September 1 in Florida and November 1, October 1, or September 1 in Illinois.

$$
\begin{aligned}
log(E\,[Admitted_i]) = {} & \alpha_0 + \alpha_1\, PostNewCutoff_i + \alpha_2\, Distance_{ic} \\
& + \alpha_3\, PostNewCutoff_i \times Distance_{ic} + State_s + \tau_t
\end{aligned} \tag{3}
$$

Here, $Admitted_i$ is an indicator equal to one if individual i is ever admitted to prison. In my case, $Admitted_i = 1$ for all individuals since all individuals are admitted to prison[10]. $PostNewCutoff_i$, $Distance_{ic}$, $State_s$, and τ_t are the same as in the RD model in equation 2. I also cluster standard errors by the date of birth.

The coefficient of interest is α_1. Individuals born just after the cutoff are $(\exp(\alpha_1) - 1)\%$ more likely to be admitted to prison than those born just before the cutoff. $\exp(\alpha_1)-1$ reflects a percentage change in the expected number of prison admissions by birthday, rather than a level shift as in the RDD.

[10]It is my understanding that in a Poisson model, this is not an issue. Since Poisson models count data, it relies on variation in the running variable, $Distance_i$ here, to identify the difference in the number of observations with $Admitted_i = 1$ on either side of the cutoff. This is mostly from information from Santos Silva and Tenreyro (2006)

IV Appendix

Table 1: Kindergarten Cutoff Birthday by State and Year

State	Pre-1980	1980	1981	1982	1983	1984-1985	1986	1987	1988	Post-1988
Florida	Jan 1	Dec 1	Nov 1	Oct 1	Sept 1	Sept 1	Sept 1	Sept 1	Sept 1	Sept 1
Illinois	Dec 1	Dec 1	Dec 1	Dec 1	Dec 1	Dec 1	Nov 1	Oct 1	Sept 1	Sept 1

Note: Based on information from Florida Senate Committee on Education Innovation (1999), Florida Legislature (1979), and Education Week (1987).

References

Anderson, D. M. (2014). "In School and Out of Trouble? The Minimum Dropout Age and Juvenile Crime". *Review of Economics and Statistics* 96.2, pp. 318–331.

Angrist, J. D. and A. B. Krueger (1991). "Does Compulsory School Attendance Affect Schooling and Earnings?" *Quarterly Journal of Economics* 106.4, pp. 979–1014.

Arenberg, S., S. Neller, and S. Stripling (2024). "The Impact of Youth Medicaid Eligibility on Adult Incarceration". *American Economic Journal: Applied Economics* 16.1, pp. 121–156.

Becker, G. S. (1968). "Crime and Punishment: An Economic Approach". *Journal of Political Economy* 76.2, pp. 169–217.

Bell, B., R. Costa, and S. Machin (2022). "Why Does Education Reduce Crime?" *Journal of Political Economy* 130.3, pp. 732–765.

Black, S. E., P. J. Devereux, and K. G. Salvanes (2011). "Too Young to Leave the Nest? The Effects of School Starting Age". *Review of Economics and Statistics* 93.2, pp. 455–467.

Cook, P. J. and S. Kang (2016). "Birthdays, Schooling, and Crime: Evidence from a Regression Discontinuity Design". *Economic Journal* 126.593, pp. 107–134.

Dobkin, C. and F. Ferreira (2010). "Do School Entry Laws Affect Educational Attainment and Labor Market Outcomes?" *Economics of Education Review* 29.1, pp. 40–54.

Education Commission of the States (2014). "State Kindergarten Policies". *Education Commission of the States Reports* 2014. URL: https://www.ecs.org/clearinghouse/79/58/7958.pdf.

Education Week (June 1987). "Legislatures, Districts Move to Raise Age for Kindergarten". *Education Week*. URL: https://www.edweek.org/education/legislatures-districts-move-to-raise-age-for-kindergarten/1987/06.

Ehrlich, I. (1973). "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation". *Journal of Political Economy* 81.3, pp. 521–565.

Florida Legislature (1970). "Florida Statutes, Title XLVIII, Chapter 232: Compulsory School Attendance". *State of Florida Legislative Documents*. No amendments raising the dropout age from 1970 to 1999. URL: http://www.leg.state.fl.us/Statutes/.

Florida Legislature (1979). "Summary of General Legislation: 1979". *Florida State University Law Library Digital Collections*. URL: https://library.law.fsu.edu/Digital-Collections/FLSumGenLeg/FlSumGenLeg1979.pdf.

Florida Senate Committee on Education Innovation (1999). "Bill Analysis and Economic Impact Statement: House Bill 307". *Florida Senate Bill Analyses*. URL: https://www.flsenate.gov/Session/Bill/1999/307/Analyses/19990307HEDK_HB0307S1.EDK.pdf.

Fredriksson, P. and B. Ockert (2013). "Life-Cycle Effects of Age at School Start". *Economic Journal* 124.579, pp. 977–1004.

Hjalmarsson, R., H. Holmlund, and M. J. Lindquist (2015). "The Effect of Education on Criminal Convictions and Incarceration: Causal Evidence from Micro-data". *Economic Journal* 125.587, pp. 1290–1326.

Illinois General Assembly (1970). "School Code of Illinois: Compulsory Attendance Law (105 ILCS 5/26-1)". *State of Illinois Legislative Documents*. No amendments raising the dropout age from 1970 to 1999. URL: https://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=1005&ChapterID=17.

Landersø, R., H. S. Nielsen, and M. Simonsen (2015). "School Starting Age and the Crime-Age Profile". *Economic Journal* 127.602, pp. 1096–1118.

Lochner, L. (2004). "Education, Work, and Crime: A Human Capital Approach". *International Economic Review* 45.3, pp. 811–843.

Lochner, L. and E. Moretti (2004). "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports". *American Economic Review* 94.1, pp. 155–189.

McAdams, J. M. (2016). "The Effect of School Starting Age Policy on Crime: Evidence from U.S. Microdata". *Economics of Education Review* 54, pp. 227–241.

Santos Silva, J. M. C. and S. Tenreyro (2006). "The Log of Gravity". *The Review of Economics and Statistics* 88.4, pp. 641–658.