



Born on the wrong day? School entry age and juvenile crime[☆]



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ARTICLE INFO

Article history:

Received 26 August 2015

Revised 7 September 2016

Available online 14 September 2016

JEL classification:

K42

I20

I24

I28

Keywords:

Juvenile crime

School starting age

Human capital

Regression Discontinuity Design

ABSTRACT

Kindergarten entry age is known to impact schooling outcomes. Less is known, however, about the role of school starting age on economic outcomes outside of the classroom. In this paper we use administrative data from Louisiana to analyze the effect of school starting age on juvenile crime. We find that late school entry by one year reduces the incidence of juvenile crime for young black females, particularly in high crime areas. The mediating effects of late school entry for this subgroup appear to be driven by reductions in non-felony offenses. We propose age related differences in human capital accumulation as a potential explanation for our findings.

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1. Introduction

Delaying a child's entry into kindergarten has become more popular over time. In 2008, 83% of six-year-old children were enrolled in first grade, compared to 91% of children in 1995. The increase in average school starting age is mostly driven by the choices of parents and the law changes at the state level (Deming and Dynarski 2008). Delayed entry may provide a child with a competitive edge through increased cognitive, emotional and physical development. Teachers may also encourage late entry because mature children are likely to be more amenable and cause less distraction in the classroom (Aamodt and Wang 2012).¹

Recent trends in delayed entry coupled with non-negligible variation in school entry laws across states have attracted the in-

terest of many researchers regarding the role of school entry age on various outcomes.² Several studies find strong and positive associations between entry age and achievement. These papers generally attribute the observed effects to differences in the rate of learning between older and younger entrants (see, for example, Bedard and Dhuey 2006; Datar 2006; and Barua and Lang 2008). Another set of research indicates that the estimated effects of school starting age partly reflect the endowment differences between students when they start school and they find little evidence that older entrants learn more in school (see, for example, Cascio and Schanzenbach 2007; and Elder and Lubotsky 2009).

In addition to achievement effects, research has also examined the relationship between school entry age and longer-run outcomes. Most commonly studied has been the effect of school entry age on educational attainment and labor market outcomes (Dobkin and Ferreira 2010; Black et al. 2011; McCrary and Royer 2011; Bedard and Dhuey 2012; and Fredriksson and Öckert 2014). Black et al. (2011) also find that starting school at a younger age increases the probability of teen pregnancy in Sweden. In a study of U.S. mothers, McCrary and Royer (2011) show that starting school

[☆] The Louisiana Department of Education and the Louisiana Office of Juvenile Justice provided the data used in this study. The authors thank Cecile Guin, Judith Rhodes, Samuel Robison, and the Office of Social Service Research and Development (OSSRD) in the College of Human Sciences and Education at the Louisiana State University in their guidance with the data. The authors thank from Louis-Philippe Beland, Elizabeth Dhuey, Lars Lefgren, Daniel Millimet, and Naci Mocan for helpful comments.

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¹ Deming and Dynarski (2008) show that two-thirds of this increase in starting age is explained by parents and teachers choosing to keep younger students out of kindergarten and first grade. The other one-third is the result of states increasing the legal entrance age of kindergarten.

² Forty-three states have set their minimum school entry age at age five. The remaining states do not have a uniform law and regulations regarding kindergarten entry are at the local education agency's discretion. Within those with a uniform law, twenty-seven have September age cutoff, nine have August age cutoff and the rest of the states have other months of the year as their cutoff ranging from January 1st to December 31st (National Center for Education Statistics, 2014, Table 5.3).

at a younger age improves the quality of a woman's mate without any significant effect on fertility and infant health.

Until recently, the relationship between school starting age and crime had been overlooked. However, given the robust results of school starting age on student achievement, it is plausible that children who are younger when they start school are more likely to pursue non-educational activities as they fail to be competitive and fall behind in the classroom. Crime is one alternative activity and is one of the most damaging avenues a youth can be diverted to. Research has shown that children that become involved in criminal activity are significantly less likely to graduate from high school (Hjalmarsson, 2008).

Two recent studies have analyzed the link between school start age and crime. Using detailed register-based Danish data, Landersø et al. (2013) find that late school entry by one year lowers the propensity to commit crime before the age of 18. The other recent study uses administrative data from North Carolina (Cook and Kang, 2016). They find that individuals born immediately after the school starting date cutoff (oldest in their cohort) are less likely to receive a formal juvenile complaint between the ages of 13–15, but more likely to receive an adult felony conviction between the ages 17 and 19. Cook and Kang (2016) suggest that crime reducing effects of late school entry observed at early ages are driven by better school performance while they attribute the increase in adult crime for this same group at later ages to a higher propensity to drop out of high school. As suggested by Cook and Kang (2016), at first glance, the findings of Landersø et al. (2013) and their own findings on felony convictions for 17–19 year-olds seem to be at odds with one another. However, since compulsory schooling is tied to age (legally allowed to drop out at 16) in North Carolina and grade level (completed 9th grade) in Denmark, they suggest the studies may actually reinforce each other.

Given that there are only two previous studies analyzing school starting age and crime, that the two studies are in different countries with different institutional features, and that the findings do not exactly align, additional evidence from different settings is beneficial to policymakers and researchers. Using administrative data from the Louisiana public school system, we build on the work of the two previous studies by further investigating the association between school start age and crime. The diverse population of students in Louisiana schools provides us with an excellent opportunity to study the potential effects by race and gender. Given the increasing trends in juvenile crime involvement over the last three decades, a separate discussion by race and gender may be warranted.³

To obtain the effect of school start age on juvenile crime, we implement a similar identification strategy as in Cook and Kang (2016). Specifically, a child must be five years old by September 30 in order to start kindergarten in the state of Louisiana. We compare children born just before and just after the school entry cutoff to identify the effects of school entry age. Like the previous two studies, we cannot completely purge out years of schooling effects from entry effects, given students with late entry are likely to accumulate fewer years of schooling by the end of the window over which juvenile crime is measured (i.e., early entrants

are likely to graduate by 17, while late entrants are still in twelfth grade). We have three distinct contributions in the U.S. context.

First, our data set allows us to observe the complete juvenile delinquency history of all children in the state through age 17. The majority of the juvenile offenses, at least in the state of Louisiana, occur between ages 15–17 and thus we can get a complete picture of the juvenile crime. Second, detailed information on convictions allow us to classify juvenile crime into broad categories (i.e., felony vs. non-felony), and estimate the school entry age effects by severity and types of crimes. Finally, we can estimate both the reduced form and two stage least squares (2SLS) effects due to availability of the actual age of entry into public kindergarten in the data. The effect for compliers is an equally interesting parameter (Imbens and Wooldridge, 2009). Apart from these empirical contributions, we also have a methodological contribution. Specifically, we introduce Lee's (2009) bounds estimator for sample selection in the regression discontinuity design (RDD) framework.

Viewing the complete set of results, we have the following findings. Late school entry age by one year seems to statistically reduce the incidence of juvenile crime among young black females. This effect on young black females is more prominent in high crime areas. We also find strong evidence that the mediating effects of late school entry for black females is driven by reductions in non-felony offenses, i.e., less serious offenses. Potential contamination of the estimated effects for white females due to attrition does not allow us to make firm conclusions in our main set of analysis. For males, however, we do not find any effect of late school entry on the propensity to commit juvenile crime. Several robustness checks, placebo regressions using false entry cutoffs and bounds estimators support our findings. To further explore the potential channels leading to these heterogeneous effects, we analyze test scores in English and Math at eighth grade. Our findings from this exercise similarly show that late school entry significantly increases test scores for females, but not males. We propose age related differences in human capital accumulation as a potential explanation for crime reducing effects of school starting age.

The remainder of the paper is as follows. Section 2 discusses the identification strategy and RDD. Section 3 discusses the institutional settings and the data used in the analysis. Section 4 tests for potential sample selection, presents results on juvenile crime, provides additional robustness checks to the main results, presents additional analysis and results that account for sample selection, and discusses potential mechanisms. Section 5 concludes.

2. Empirical methodology

To estimate the effect of school entry age on juvenile crime, we begin by presenting the following model,

$$JC_i = \beta_0 + \beta_1 Late_i + X_i' \beta_2 + u_i, \quad (1)$$

where JC_i is an indicator variable that takes the value of one if child i commits a crime over the window in which juvenile crime is measured. The variable of interest, $Late_i$, is an indicator variable that takes on the value of one if child i enters the school late, i.e., begins school at age six rather than age five. X_i is a vector of observed covariates and u_i is an unobserved term. The coefficient β_1 represents the effect of late school entry on juvenile crime.

Straightforward estimation of Eq. (1) via OLS will provide an unbiased coefficient estimate of β_1 if school starting age is exogenously determined. However, there are many potential unobserved factors that affect juvenile crime that are also correlated with the school starting age of a child (e.g., parental motivation, child's maturity). Ignoring these factors in the estimation of Eq. (1) will likely yield a biased coefficient estimate of the impact of school entry age on juvenile crime.

To address these potentially confounding effects, we rely on the exogenous variation generated by the school entry policies in

³ In 2011, courts with juvenile jurisdiction handled 3400 delinquency cases per day, compared to 1100 delinquency cases in 1960 (Hockenberry and Puzanchara 2014). In addition to this upward trend, there have been also some remarkable changes in gender- and race-specific juvenile crime involvement. Although males comprise a majority of cases, female involvement in juvenile crime grew considerably over the last three decades. Specifically, between 1985 and 2011, the number of delinquency cases involving females increased 55%, as opposed to a decrease of 5% for males. Turning to racial profile of juvenile crime, in 2011, black youth made up 16 percent of the U.S. population under juvenile court jurisdiction, but approximately 33% of all delinquency cases involved black youth. Unlike white youth, involvement in juvenile crime for black youth has displayed a constant increase from 30% in 2001 to 33% in 2011.

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