



Do school entry laws affect educational attainment and labor market outcomes?

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ABSTRACT

Age based school entry laws force parents and educators to consider an important tradeoff: though students who are the youngest in their school cohort typically have poorer academic performance, on average, they have slightly higher educational attainment. In this paper we document that for a large cohort of California and Texas natives the school entry laws increased educational attainment of students who enter school early, but also lowered their academic performance while in school. However, we find no evidence that the age at which children enter school effects job market outcomes, such as wages or the probability of employment. This suggests that the net effect on adult labor market outcomes of the increased educational attainment and poorer academic performance is close to zero.

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1. Introduction

Recently there has been substantial interest in the choice that parents face as they decide at what age to enroll their children in kindergarten. Several papers have documented the adverse effects on academic performance of being the youngest student in a classroom in the United States. [Bedard and Dhuey \(2006\)](#) use data from OECD to show that the youngest members of fourth and eighth grade classes have standardized test scores that are 2–12 percentiles lower than the oldest students in the same cohort. Similarly, [Datar \(2006\)](#) used variation in school entry cutoff dates to document that children that start kindergarten later get higher test scores.¹ [Elder and](#)

[Lubotsky \(forthcoming\)](#) used the Early Childhood Longitudinal Study to document that a 1 year increase in the age at which an individual enters school reduces the probability they will be held back a grade at some point in elementary school by approximately 13%. They also find differences in test scores, but this outcome is largely driven by accumulation of skills prior to kindergarten and declines rapidly as children age. Studies focused on other countries found more mixed effects.² Overall, these findings have lead to substantial concern among both parents and educators about the effect of age based school entry laws, and legislators in several U.S. states have changed their school entry dates in order to increase the age at which children enter kindergarten.³

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¹ A current debate in the education literature tries to understand if the cause of this academic disadvantage for young kids is due to their relative age to peers or due to their absolute age at which they are exposed to a material. For a review of this debate see [Stipek \(2002\)](#).

² [Allen and Barnsley \(1993\)](#) report that oldest boys in a cohort in Canada are more likely to thrive in professional sports, and [Fredriksson and Öckert \(2006\)](#) found a negative impact on wages for the youngest individuals in a cohort in Sweden. However, [Black, Devereux, and Salvanes \(2008\)](#) find that being relative older at the start of kindergarten has no effect on educational attainment and earnings in Norway.

³ See [Bedard and Dhuey \(2007\)](#).

All these results from the literature suggest that enrolling children in kindergarten as soon as they are eligible may be adversely affecting them. However, as we document in this paper, there is at least one positive effect of enrolling in kindergarten at the earliest age possible. The youngest students in a class complete high school at higher rates than their older peers as noted by Angrist and Krueger (1991).⁴ This suggests that there is an important tradeoff to consider. This paper provides estimates of the net *long run* impact of these opposing mechanisms on labor market outcomes in the United States. In addition to getting at the net effect of the tradeoff described above, labor market outcomes of adults are arguably of greater interest than the intermediate outcomes, such as academic performance, that are typically considered in the literature.

To conduct our analysis we use the restricted access Decennial Census Long Form Data for the states of California and Texas.⁵ Unlike the publicly available micro-sample (PUMS), the restricted-access data has the exact day of birth for each individual for a 15% random sample of the population of each state. Our research design uses state school entry laws that regulate the minimum age at which students are eligible to enroll in school as a source of exogenous variation in the timing of school entry. The state of Texas requires that a child must be at least 5 years old by September 1st in order to enroll in kindergarten that academic year, while the threshold date is December 2nd in California for most of the age groups we examine. We take advantage of these threshold dates to implement a regression discontinuity (RD) design. The RD approach lets us estimate the long run consequences of early school entry, by comparing individuals who are similar on all dimensions, but enter school at different ages on account of the school entry laws.⁶

The analysis focuses on adult outcomes of individuals over the age of 30 as they are more likely to have completed their education. We find that the school entry laws have a modest effect on educational attainment: adults born right before the cutoff for school entry in Texas and California are about a percentage point more likely to complete high school. They are also about a half percentage point more likely to complete 9th, 10th and 11th grades. Evidence from contemporary cohorts shows that though school entry laws have a very pronounced effect on the timing of school entry,

a substantial part of the difference is undone through retention. Data from recent cohorts also show that youngest students have lower academic performance, as measured by retention rates.

Interestingly, we find no evidence that school entry laws and the additional education that results from them leads to differences in employment rates, wages, or in any of the other outcomes we observe in the Census, such as family income, house ownership, house value and marital status. We find no evidence that early school entry has an impact on adult outcomes for any of the age, gender and race subgroups we examine, not even for Hispanics who have the largest difference in educational attainment of any of the contemporary cohorts.

The rest of the paper is organized as follows: in Section 2 we discuss the empirical model and data sources. In Section 3 we examine the impact of school entry laws on educational attainment. In Section 4 we present evidence on adult labor market outcomes. In Section 5 we show educational attainment and labor market outcomes by subpopulation. Section 6 presents estimates of the impact of school entry laws on contemporary cohorts. Section 7 concludes.

2. Econometric methods and data

In this section we describe the regression discontinuity design model we use to estimate the effect of school entry laws on adult educational attainment and labor market outcomes. A complete review of the RD method can be found in Imbens and Lemieux (2008); and Lee and Lemieux (2009). Here we just focus on the econometric specification used to estimate the parameters of interest. Following Lee (2008) and Lee and Card (2008), we use a parametric rather than a nonparametric approach since the threshold for school entry laws is based on the discrete variable age, which is measured in days.⁷

The first outcome we examine is educational attainment in the adult population. We estimate the impact of the school entry laws on this outcome by fitting the following equation:

$$Educ_i = \delta_0 + \delta_1 Cut_i + \delta_2 Bday_i + \delta_3 Cut_i \times Bday_i + \delta_4 Bday^2 + \delta_5 Cut_i \times Bday^2 + \Psi X_i + \varepsilon_i \quad (1)$$

where $Educ_i$ is an indicator variable that takes on a value of 1 if individual i has completed more than a particular number of years of education. For example, the 10th grade indicator variable is equal to 1 if the individual has completed at least 10th grade, and zero otherwise. We run separate regressions for each possible level of educational attainment between 7th grade and college completion. The use of indicator variables for completed years of education makes it possible to determine at what points in the distribution of educational attainment the school entry laws

⁴ Angrist and Krueger (1991) originally showed that individuals born in the 1st quarter of the year have lower education attainment than individuals born in the 4th quarter of the previous year. Such difference was arguably due to the interaction of compulsory schooling laws with school entry laws, which makes individuals born in the first quarter more likely to start school later and therefore more likely to quit formal education before completing a high school degree. Angrist and Krueger (1992) also pointed out that they only used quarter of birth because a large data set with both exact day of birth and education attainment did not exist at that time, and therefore they could not explicitly examine the impact of school entry laws on education attainment.

⁵ We use those states because of their large and diverse population, and due to the availability of data.

⁶ Cascio and Lewis (2006) used a similar design to estimate the impact of schooling on AFQT performance. Early applications of RD design can be found in Thistlethwaite and Campbell (1960) and Cook and Campbell (1979). We discuss the details of the RD model and the most recent literature in the next section.

⁷ See Hahn, Todd, and Van der Klaauw (2001) for non-parametric estimation of the RD model when the discontinuity occurs on a continuous variable.

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