

A National Study Comparing Charter and Traditional Public Schools Using Propensity Score Analysis

Dissertation Proposal

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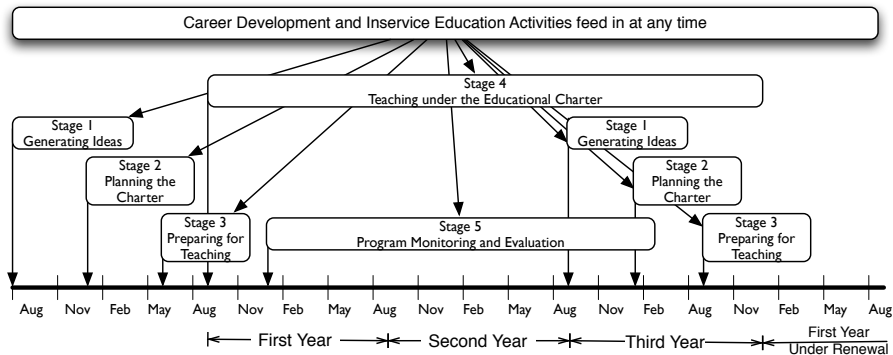
December 19, 2011

Agenda

- 1 Overview
- 2 Method
- 3 Analysis
- 4 Preliminary Results
- 5 Discussion

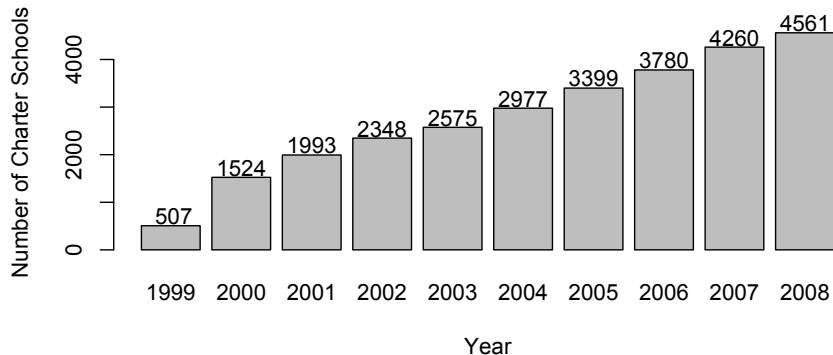
What are Charter Schools?

The first charter school opened in Minnesota in 1991. In principle, charter schools have opted out of bureaucratic rules and union contracts in order to gain academic autonomy. The standard argument has become that this autonomy will lead to higher student test scores and better academic environments (Wells, 2002). The idea is that, under the charter framework, teachers, administrators, students and the community that comprise the charter school would be free to innovate.

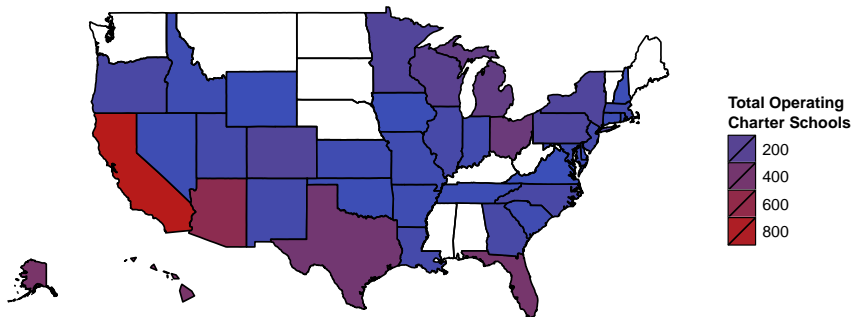


(Adapted from Budde, 1988)

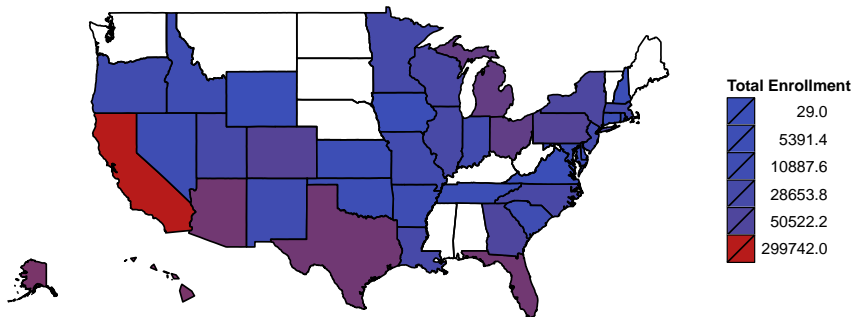
Growth in Number of Charter Schools



Charter Schools are National (Operating)



Charter Schools are National (Enrollment)



National Studies Examining Charter and Traditional Public Schools

- 1 Braun, Jenkins, and Grigg (2006) examined charter and traditional public schools using hierarchical linear modeling (HLM) with NAEP 2005. They found that there was often no difference, and in some instances charter school students performed worse.

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- 2 *The CREDO Study* - Center for Research on Education Outcomes (2009) conducted a study of more than 1.7 million records from 2400 charter within 16 states. The methodology involves creating a Virtual Control Record (VCR) for each charter school student which is used to find matching student from an eligible traditional public school. Overall results show that charter school students performed, on average, 0.01 and 0.03 standard deviations below public school students for reading and math, respectively.

If, however, charter schools are not improving the achievement of disadvantaged children, it may be that the cause of low student performance is not bureaucratic rules but something else. When a treatment is based on a diagnosis, and the treatment doesn't work, it is prudent to examine not only whether the treatment should be improved, but also whether the diagnosis might be flawed. (Carnoy, Jacobsen, Mishel, & Rothstein, 2005)

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- 1 The issue of selection bias
- 2 The variation in types or kinds of charter schools.
- 3 The nature of student achievement. Research has shown there are numerous factors that contribute to student success including, but not limited to, social economic status, parental education, motivation, etc. The ability to decipher how school choice contributes to student learning in the context of all the other factors cannot help but be difficult.

Guiding Research Questions

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- ➋ If so, what is the nature and magnitude of this difference for the two outcomes reading and mathematics (for two grade levels)?
- ➌ And finally, do identified differences differ between states with differing charter school laws?

Propensity Score Analysis

① *Propensity score analysis using stratification.*

- ① Full logistic regression. This method will estimate propensity scores using logistic regression with all available covariates.
- ② Logistic regression with step AIC. The `stepAIC` in the MASS package (Venables & Ripley, 2002) will select the best logistic model based upon the Akaike Information Criterion (Akaike, 1974).
- ③ Conditional inference trees.

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② *Propensity score matching.*

- ① One-to-one
- ② One-to-five
- ③ One-to-ten.

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③ *Multilevel propensity score analysis.*

- ① Full logistic regression.
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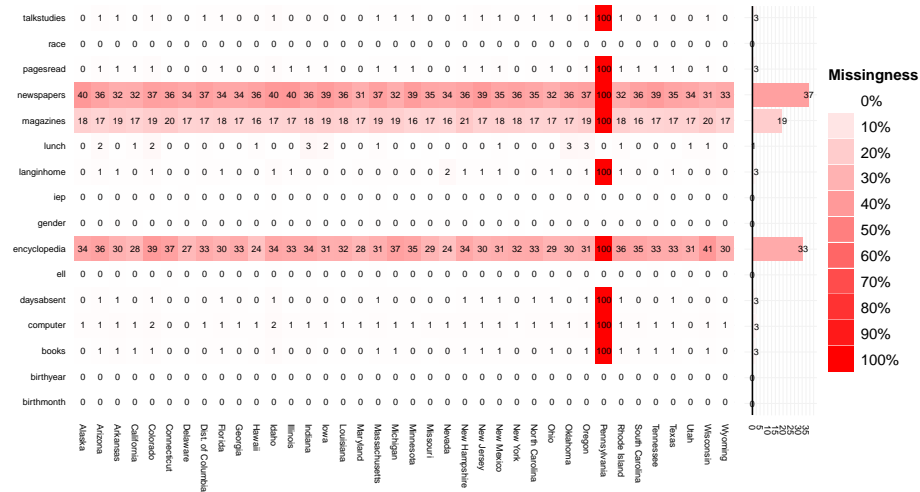
National Assessment of Educational Progress (NAEP)

- 1 Congressionally mandated.
- 2 Started in 1971
- 3 Provides national measures of student achievement in many subjects including mathematics, reading, science, writing, history, civics, and the arts.
- 4 The 2007 assessment included over 6,000 public schools and over 200 charter schools comprising of over 145,000 and 3,000 students, respectively.

Covariates Available from NAEP

- 1 Are you Hispanic or Latino? [No, I am not Hispanic or Latino; Yes, I am Mexican, Mexican American, or Chicano; Yes, I am Puerto Rican or Puerto Rican American; Yes, I am Cuban or Cuban American; Yes, I am from some other Hispanic or Latino background]
- 2 Which of the following best describes you? [White; Black or African American; Asian; American Indian or Alaska Native; Native Hawaiian or other Pacific Islander]
- 3 Does your family get a newspaper at least four times a week?
- 4 Does your family get any magazines regularly?
- 5 About how many books are there in your home?
- 6 Is there a computer at home that you use?
- 7 Is there an encyclopedia in your home? It could be a set of books, or it could be on the computer.
- 8 About how many pages a day do you have to read in school and for homework?
- 9 How often do you talk about things you have studied in school with someone in your family?
- 10 How many days were you absent from school in the last month?
- 11 How far in school did your mother go? [Grade 8 Only]
- 12 How far in school did your father go? [Grade 8 Only]
- 13 How often do people in your home talk to each other in language other than English?

Missing Data



For the logistic regression models the MICE (van Buuren & Groothuis-Oudshoorn, n.d.) package will be used to impute missing values.

Related Projects

- All of the R and \LaTeX code will be available on Github (<http://github.com/jbryer/Dissertation>).
- multilevelPSA - An R package for the methods outlined here. Hosted at <http://github.com/jbryer/multilevelPSA>
- naepR - An R package for accessing and analyzing NAEP data. This work is being supported by Educational Testing Services.
- I am writing a chapter on using NAEP with R for the *NAEP Primer* with Emmanuel Sikali.

Thank You

Jason Bryer (jason@bryer.org)

<http://bryer.org>

<http://github.com/jbryer/Dissertation>

<http://github.com/jbryer/multilevelpsa>

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