School spending and new construction

David M. Brasington

Economics Department, University of Cincinnati, United States

ARTICLE INFO

JEL classification:
H27
H41
I25
R31

Keywords:
School finance
Regression discontinuity
Real estate construction
Property tax voting

ABSTRACT

School districts that vote in favor of property tax levies may signal that they are education-oriented. Through Tiebout sorting and housing developer activity, new residents might move to such communities. New retail development may occur near these new residents, and office firms that rely on high-skilled residents might be drawn too. Using regression discontinuity we find school districts that renew property tax levies have a higher value of new construction than districts that do not renew these school expenditures. School tax levy renewal is responsible for 14% of new residential construction and 25% of new commercial construction.

1. Introduction

Education is an important good that takes up more spending than any other local service. A large literature examines school district spending. Some investigates the return to schooling expenditures on wages later in life. Other research examines the relationship between school spending and house prices. Still another strand investigates the link between school spending and the performance of a school district.

The current study attempts to fill a gap in the literature by linking school spending to new residential and commercial construction. People Tiebout (1956) sort to local governments that provide the mix of taxes and public services that most closely match people’s preferences. When a community passes a school property tax levy, it signals that it cares about education, drawing education-minded parents as well as people who believe that school spending protects property values. In turn an influx of new residents makes retail firms want to locate there to have access to shoppers. It draws office firms that want a location that lowers workers’ commuting costs, especially if the office firms require a highly educated workforce.

It would make sense, then, for school spending to spur residential and commercial construction. The current study seems to be the first to document such a link. We collect school property tax voting data and new construction data from 1994 to 2014 in Ohio. Using regression discontinuity, we find passing a property tax levy in period \( t \) increases the value of commercial construction three and four years later, the timing of which is fairly consistent with some speed of adjustment studies. The average treatment effect is $400,000, meaning the tax levy passage is responsible for about 25% of the value of new construction. This $400,000 represents 0.5% of total commercial value in the typical Ohio school district. The effect on the value of new construction could include some combination of the number of new structures being built, the size of new structures with no change in number, or an increase in assessed value with no change in number or size.

2. Literature review

The current study is related to the literature on new construction and the literature on school spending.


E-mail address: david.brasington@uc.edu.


http://dx.doi.org/10.1016/j.regsciurbeco.2017.01.001
Received 15 June 2016; Received in revised form 29 December 2016; Accepted 19 January 2017
Available online 21 January 2017
0166-0462/ © 2017 Elsevier B.V. All rights reserved.
of new residential construction. Simons et al. (1998) examines the
effect of new subsidized residential construction on residential sales
prices. Archer et al. (1996) shows that areas with higher population
growth have higher house price appreciation rates.

Some literature discusses commercial and industrial construction,
mainly as it applies to the speed of adjustment to market disequilibriums. Epple and Shilling (1995) tests a stock-adjustment model of real
estate investment and finds the time it takes for the U.S. real estate market
to be 90% adjusted is almost two years for offices, under one
year for industry, and over 10 years for retail. Benjamin et al. (1995)
suggests a lag of 5.3 years in adjustment for shopping center invest-
ment, and Benjamin et al. (1998) adds that there is considerable
variation in this lag by urban area. Sivitanidou and Sivitanides (2000)
finds the construction of new office and commercial space depends
on the volatility of office and FIRE employment, net rental income flows,
office employment growth levels, construction costs, vacancy rates, and
the discount rate. They add that once decisions are made, 80% of
investments are realized in about 3.5 years.

The current study looks at voting on school spending, and school
spending has been examined in various ways. Brasington and Haurin
(2006), Leguzamon and Ross (2012) and most of the studies surveyed
by Nguyen-Hoang and Yinger (2011) find school expenditures per
pupil is positively related to house prices. Cellini et al. (2010) finds
spending on school buildings is positively related to house price.2

Several studies examine the link between K-12 school expenditures and
a person's earnings later in life. One such example is Grogger (1996),
who finds school expenditures are positively related to post-schooling
earnings, but only with an elasticity of 0.068. Other studies such as
Card and Krueger (1996) suggest a stronger link between school
expenditures and earnings. School spending should theoretically be
associated with schooling achievement, and some studies find such
a link, like the Card and Krueger (1996) study just cited; other studies do
not find improved outcomes from increased spending on certain school
inputs (Glewwe (2002); Hanushek (2003)). Glaeser (1994) finds that
schooling levels are correlated with an increase in per-capita income
not so much because schooling is an investment that spurs growth, but
because schooling in time t fuels further growth in schooling in future
time periods. In other words, current schooling decreases the costs and
increases the benefits of future schooling.

3. Empirical approach

3.1. Regression discontinuity design

Regression discontinuity is a type of quasi-experimental design. It
claims to find the causal effect of one variable on another by
comparing, in our case, school districts that pass and fail to pass a
school district property tax levy. Only districts that pass levies receive
the funding, and because treatment (receiving the funding) is perfectly
correlated with observable characteristics, it is orthogonal to unobser-
vable characteristics.

Regression discontinuity starts by considering an assignment
variable X, like the percent of voters who vote in favor of a property
tax. In order for the tax levy to pass in Ohio, a critical value c of 50%
must be breached. If school districts – even while having some
influence – are unable to precisely manipulate the assignment variable,
a consequence of this is that the variation in treatment near c is
randomized as though from a randomized experiment (Lee and
Lemieux, 2010). So whether a district is just above 50% or just below
50% is basically determined by a coin toss. A consequence of this
random assignment of the treatment is that any effect of the treatment
is a causal effect, not simply a correlation.3 The cleanliness of the
regression discontinuity approach allows identification of causal effects
using ordinary least squares as in Eq. (1):

$$Y = \alpha + D\tau + XP + \varepsilon$$

In Eq. (1), Y is an outcome variable. The outcomes we consider in
the current study are the value of new residential and commercial
construction. α is an intercept which subsumes a series of year fixed
effects dummies. D is a dummy variable that equals 1 if X>c; it equals 0
otherwise, so that a district that has over 50% of votes in favor of the
tax levy receives the treatment τ, the renewed property tax funding. τ is
a weighted average treatment effect across school districts, where the
weights are the relative ex ante probability that the value of a school
district’s assignment variable will be in the neighborhood of the
threshold c. Again, X is Percent For, the proportion of votes in favor of
the tax levy. Finally, ε represents the error term.

While Eq. (1) is sufficient for consistent estimation of the treatment
effect, researchers often add covariates W as in Eq. (2):

$$Y = \alpha + D\tau + X\beta + W\delta + \varepsilon$$

A covariate is a variable that is not influenced by treatment, but a
variable that might affect the probability of treatment. The inclusion
of covariates can increase the precision of the estimate of the treatment
effect.

Although Eqs. (1) and (2) are often adequate for estimating
treatment effects, an alternative specification estimates two separate
regressions, one on each side of the cutoff point. It is convenient to run
a pooled regression to estimate the treatment effect and its standard
errors as in Eq. (3):

$$Y = \alpha + D\tau + \beta_1 X + \beta_2 X + \varepsilon$$

In Eq. (3) L refers to the left of the cutoff and R refers to the right of
the cutoff point. One may add covariates to Eq. (3) as follows:

$$Y = \alpha + D\tau + \beta_1 X + \beta_2 X + \delta_1 W + \delta_2 W + \varepsilon$$

Regression discontinuity is not applicable to many situations, but
for those situations in which it can be used, it provides a powerful way
to identify the causal effect of one variable on another. Its primary
assumption—that individuals cannot precisely control the assignment
variable—is testable. There are established ways in which to test this
assumption described in Section 4.4, but Fig. 1 shows prima facie
evidence.

There is a bin with no observations, but the density of votes seems
fairly continuous, even at the 0.50 threshold. If the graph had shown a
much larger number of votes just above 0.50 Percent in Favor with a
much smaller number of votes below, for example, it would suggest a
possible violation of the assumption of no precise control. Other
challenges to identification include endogenous sorting by agents into
treatment and random jumps in the data, both of which are examined
in the Results section.

3.2. Estimation approach

Although it is traditional to perform regression discontinuity
studies with simple ordinary least squares, the current data set
contains an unbalanced panel of school districts over time. The panel
nature of the data allows additional safeguards to identification over
pooled time series cross sectional analysis.

We perform a random effects estimation. Recognizing that the
assumptions of random effects are untenable, we also model unob-
served heterogeneity with a two-way fixed effects estimator, to try to

---

2 We emphasize that our study does not examine the link between school building bond levy passage and the average sale price of houses in the school district like Cellini et al. (2010). We study the link between the passage of tax levies for all purposes, current expenses and school building spending combined; and our outcomes are new construc-
tion: the value of new housing and new commercial property completed in a given year.

3 Or, in a stroke of bad luck, instead of a true causal effect, the treatment effect could instead be capturing a spurious correlation between X and the error term, and there is no way to distinguish between these possibilities in practice (Lee and Lemieux, 2010).
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات