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School shootings and private school enrollment

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ABSTRACT

We find that school shootings are followed by a 10%–12% increase in private high school enrollment. The effects are most pronounced following shootings in nonurban areas, which is consistent with their more intense media coverage.

1. Introduction

School shootings, through excessive media coverage, create panic (Jemphrey and Berrington, 2000; Muschert, 2007) and generate a perception of a public health problem that exceeds its actual danger (Burns and Crawford, 1999). According to a post-Columbine survey, two-thirds of Americans believed that it is at least somewhat likely that a similar shooting could happen in their area (Saad, 1999). Such widespread fear may prompt reactions from the public that surpass the scope of these isolated events. We offer evidence of one such reaction to school shootings by showing a significant increase in private school enrollments the school year following a shooting. At the same time, public school enrollments decline.[1]

We confirm that these reactions are likely media-driven. Since socioeconomic factors drive the nature of how school violence is covered by the media, with shootings in urban and predominantly minority schools receiving more limited coverage (see, e.g., Menifield et al., 2001), we would expect stronger effects to follow shootings in nonurban settings. This is supported by our data. We also find that the impact of school shootings is temporary, with a post-shooting effect only observed in the Fall following the shooting. No effects are found in subsequent years, confirming that these enrollment decisions are likely heat-of-the-moment in nature.

These results suggest school shootings serve as a viable source of exogenous variation in private school enrollments for future studies wishing to employ a natural experiment approach for assessing the economic implications of private school enrollment.

2. Basic empirical approach and data

To assess the impact of school shootings on enrollments, we estimate weighted least squares regressions on state-level data, summarized by:

$$lprivate_{it} = \alpha_i + \gamma_t + \delta_1 SS_{it} + \delta_2' X_{it} + \varepsilon_{it} \quad (1)$$

and

$$lpublic_{it} = \alpha_i + \gamma_t + \beta_1 SS_{it} + \beta_2' X_{it} + \varepsilon_{it}. \quad (2)$$

These regressions are weighted by population, which allows for less weight to be placed on smaller states that have higher variability in enrollment. The variables *lprivate* and *lpublic* are logs of private and public school enrollment in state i in year t for the school year beginning in the Fall. State (α) and year (γ) fixed effects are included. The variable *SS* is a dummy variable indicating that a shooting occurred in the previous academic year. We also separate the *SS* variable into urban shootings and nonurban shootings. Specifically, we define urban shootings as those in places with more than 100,000 people.[2]

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[1] The only study of the effect of school shootings by economists that we are aware of showed that test scores for high school students fell following school shootings in Finland. The results were linked to post-traumatic stress syndrome (Poutvaara and Ropponen, 2010).

[2] There were two cases (Antioch, CA and El Cajon, CA) that were close to the 100,000 cutoff but circumstances of the shootings clearly guided the classifications into urban and nonurban, respectively.

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The variable X comprises the control variables in all specifications, including the log of a state's population of those aged 14–18. The log of unemployment is also included since a poorer economic climate might limit private school enrollments. In some specifications, each state dummy variable is interacted with a linear time trend. This allows for identification of state enrollment effects free of confounding trends.[3]

We consider shootings to be exogenous so the controls only add to the efficiency of the estimations. To verify that shootings are exogenous, we use the 2007–2008 School Survey on Crime and Safety from the National Center for Education Statistics to test if school characteristics such as school size, location (urban vs. nonurban) and racial characteristics are statistically different between schools in which a shooting has happened versus other schools. They are not. Moreover, since shootings in our database included wealthy states (CA and MD), poor states (AL and TN), and quintessentially average states (GA and WI), these shootings can and do occur anywhere.

We aggregate private and public high school enrollments using data from the 1998 to 2009 October Current Population Surveys (CPS) and the CPS population weights. Annual unemployment rates are obtained from the Bureau of Labor Statistics. Our final data consist of fifty states and the District of Columbia from 1998 to 2009, which totals 612 observations.

3. Results

3.1. Basic weighted least squares estimation

Panel A and Panel B of Table 1 present the basic private and public enrollment results, respectively. Starting in column (1), where only state and year fixed effects are included, and proceeding through column (3), which adds state-specific trends to the population and unemployment controls, the effect on private school enrollment is a 9.7%–11.6% increase. The public school enrollment effect shows a 0.4%–1.3% decrease.

Despite being statistically insignificant and small, the public school enrollment decrease is consistent with the private school enrollment increase in both sign and magnitude. According to Snyder and Dillow (2011), 1,389,000 students were enrolled in private high schools and 14,807,000 were enrolled in public high schools in 2009. A 9.7%–11.6% increase in private school enrollment therefore corresponds to an 135,000–161,000 increase in the number of students enrolled. A 0.4%–1.3% decline in public school enrollment corresponds to a 59,000–192,000 decrease in public school enrollment.

The mechanism by which we suspect school shooting to translate into changes in enrollment is excessive media coverage. Such coverage is more likely following shootings in suburban and rural areas, as opposed to urban areas where youth violence is more expected and not overplayed. In column (4), we report different effects for the urban vs. suburban shootings, and the results are consistent with the expected mechanism.

3.2. Additional estimates

Table 2 presents additional estimates and robustness checks applied specifically to the private school enrollment results, which were the effects that proved significant in the basic specifications. We first probe the media coverage explanation more deeply by eliminating those shootings that resulted in no deaths, which we would suspect might prompt more limited reaction from parents. The difference in the nonurban and urban effects on enrollment becomes more pronounced, with only the former being negative.

The log specifications using weighted least squares provide easily interpretable elasticities, but we recognize there was an obvious alternative. In the second row of Table 2, we create a measure of the proportion of enrollments among those aged 14–18 that were in private high schools in each state-year cell. The effect of nonurban shootings is a 0.011 increase in the proportion enrolled in private schools. Given that the proportion enrolled in private high schools is just under 9% in the sample, the magnitude of this estimation is comparable in size to the log enrollment specification estimates presented in Table 1. We also present unweighted OLS estimations, confirming weighted least squares was providing, if anything, more conservative estimates.

We used school shootings in the previous academic year to explain enrollment in the subsequent year. We suspect these reactions are heat-of-the-moment decisions amid intense coverage and do not last long. The last three rows of Table 2 are consistent with these expectations. Private school enrollments surge in the school year immediately following a shooting but quickly return to old levels.

Table 1
Weighted least squares regression.

	(1)	(2)	(3)	(4)
Panel A: private high school enrollment				
School shooting occurred in previous academic year	0.111 (0.037)	0.097 (0.038)	0.116 (0.054)	
x nonurban shooting				0.151 (0.080)
x urban shooting				0.071 (0.082)
Log of 14–18 yrs old pop.		0.631 (0.437)	−0.195 (0.971)	−0.263 (0.987)
Log of unemployment		0.123 (0.131)	0.082 (0.183)	0.102 (0.184)
State specific trends	No	No	Yes	Yes
Panel B: public high school enrollment				
School shooting occurred in previous academic year	−0.004 (0.015)	−0.013 (0.015)	−0.005 (0.018)	
x nonurban shooting				−0.010 (0.026)
x urban shooting				0.001 (0.023)
Log of 14–18 yrs old pop.		0.707 (0.201)	0.533 (0.334)	0.543 (0.334)
Log of unemployment		0.017 (0.047)	−0.045 (0.053)	−0.048 (0.054)
State specific trends	No	No	Yes	Yes

Note: each column from each panel is from a separate regression, weighted by the population of the state, with the log of state private school enrollment the dependent variable in the top panel and log of state public school enrollment the dependent variable in the bottom panel. State and year fixed effects are included in all regressions. The level of observation is the state-year. Each regression includes 612 observations (50 states and the District of Columbia from 1998–2009). The numbers in parentheses are clustered (at the state level) standard errors.

4. Conclusion

We establish a previously overlooked result linking school shootings to private school enrollments. Despite the fact that

[3] Adding a richer set of control variables such as mean personal income, percentage of people with a Bachelor's degree, and percentage of African Americans in states only makes the estimated coefficient of shootings on private school enrollment stronger.

Table 2
Robustness checks for enrollment effects in private schools.

	Nonurban (2)	Urban (3)
Robustness checks		
Excluding shootings with no deaths	0.185 (0.084)	−0.047 (0.110)
Proportion enrolled in private high schools as dependent variable	0.011 (0.006)	0.005 (0.009)
Unweighted OLS	0.217 (0.090)	0.110 (0.108)
Lagged effect of shootings		
Subsequent school year	0.154 (0.094)	0.038 (0.079)
Two school years later	−0.073 (0.075)	0.070 (0.135)
Three or more school years later	−0.017 (0.134)	−0.209 (0.194)

Note: each row is from a separate regression, with shooting effects separated into those that occur in nonurban and urban areas, as in the last column of Table 1. State and year fixed effects, state-specific trends, and controls listed in Table 1 are included in all estimations in this table. The numbers in parentheses are clustered (at the state level) standard errors. The number of observations in the first row, which removes observations where a non-fatal shooting occurred, is 605. Results in other rows include the full 612 observations. The results in the last part of the table (lagged effects) come from a single regression in which we include first lag, second lag and third or more lag in the model.

shooting incidents are relatively rare, their impacts are widely felt. Parents overestimate the potential for such events to be repeated, particularly those that occur in suburban and rural areas, because of intense media coverage. Because this manifests itself in changes in enrollment, we provide a potential source of exogenous variation in school enrollment type for future studies wishing to assess the implications of private school enrollment through a natural experiment approach. For example, the literature on the effect of private schools on student achievement is wrought with conflicting results stemming from issues related to the unobservable factors that explain private school enrollment decisions.[4] Currently, the best evidence on the benefit of private schools comes from randomized field trials.[5] As an alternative, one could presumably track students over time that switch schools following school shootings. These students might provide a reliable treatment group for studies of private schooling.

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[4] See Vandenberghe and Robin (2004) for a comprehensive review of the international evidence.

[5] For example, voucher experiments provide compelling evidence of the potential benefits of private schools (see, for example, Angrist et al. (2002) and Wolf et al. (2011)).