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Student Misconduct and Learning Outcomes
Evidence from Pennsylvania's K-12 Building Records: 1999-2018
Robert P Strauss
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ABSTRACT

This paper compares and contrasts two required building level school violence measures under NCLB, arrests and incidents of well-defined school misconduct acts, across 20 years of Pennsylvania's approximately 3,000 public school buildings. Generally, both arrests for school violence and incidents of school violence are rare events. Over 20 years, the third quartile arrest rate was zero and, the third quartile incident rate was 3.3%. Relatively few, 4.1% overall, of Pennsylvania's school buildings were *persistently dangerous* as defined and reported pursuant to Pennsylvania's state plan to the US Department of Education; however, these buildings represented about 7.8% of the student population statewide. When we measure whether or not a school building is dangerous based on reported school violence incidents, that is without an arrest requirement, fully 36.9% of Pennsylvania's school buildings were dangerous, and they represented 46.7% of the students statewide. Both Philadelphia and Pittsburgh public school buildings were disproportionately unsafe and among the top 20 districts in the state which were unsafe over the 20 year study period.

Exploratory regression analysis of mean building scale scores for math and language arts explained about 58% of the variation in such learning outcome measures. As expected, household poverty, holding all else constant, has very strong, negative effects on learning outcomes. A school building composed entirely of low income students will score about 240 scale points lower, about 1.24 standard deviations lower, than a school building without any low income students. A school building at the 90th percentile in terms of student misconduct and poverty rates, would have lower student test scores by about 1 to 1.28 standard deviations. Were a school administrator to reduce student misconduct rates from the 90th percentile to the 50th percentile, our regression coefficients predict learning gains on the order of $(100-43) = 2/3$ of a standard deviation in mean scale scores.

JEL Classification: H75, I21

¹Professor of Economics and Public Policy, Heinz College, Carnegie Mellon, and Senior Research Associate, Rochester Center for Economic Research, University of Rochester. Email rpstrauss@gmail.com. The author wishes to acknowledge the able assistance in this research project from the following students: Ms. Shelby Cunningham, Mr. Rhajiv Ratunga, Ms. Tessa Hochberg, Ms. Natalie Bucklin, Natasha Nunnez, Esther Kim and David Strauss. Thanks also to Marcus Berliant, Miguel Gouveia, Dave Davare, Stuart Knade, Julie Cullen, Leanna Stiefel and Robert Siegler for comments and suggestions. Responsibility for the paper rests solely with the author.

1.0 Introduction

Common sense suggests that student and teacher safety are important predicates for learning to take place in any classroom. Consequently, local, state, and federal education policy have long sought to assure a calm and safe classroom setting. This paper has two objectives: i] explore the extent of k-12 student misconduct, measured either by arrests for misconduct or misconduct incidents involving violence and/or weapons, at the individual school building level in one major industrial state over long period of time, and ii] explore how correlated changes in these two misconduct measures of school performance are with changes in student achievement while controlling for changes in student socioeconomic status.

From a measurement perspective, there are several different ways to make inferences about the extent of student misconduct in public education. One approach is to examine complaints made by parents and other interested parties about safety issues arising in and around school buildings. Major urban school districts maintain “hot-lines,” and keep records of such phone call reports which contain confidential oral communications. A second approach exploits victimization and opinion surveys from students, teachers and staff for which there is a large and growing research literature on bullying, gun violence and shootings, as well as an extensive education research literature on the interaction of school climate and school violence.² Third, there are extensive literatures on the subsequent impacts of school safety issues post-graduation in terms of income trajectories as well further interactions with the criminal justice system. These literatures have examined subsequent peer effects of patterns of school violence as well as the impacts of various disciplinary practices. Contributions using these different methodologies can be found in literatures based in criminology, public and mental health, psychology and human development, sociology, and economics.³

While there has been extensive research on school misconduct and its effects on career outcomes, typically relying on sampled individual histories, there is relatively little research using administrative records at the building level which are maintained by local school districts in compliance with state laws which relate to student misconduct levels. Also, under state and federal laws, there are administrative records which summarize independent measures of learning outcomes. A disadvantage of examining administrative records at the building level is that much of student heterogeneity cannot be easily accounted for. On the other hand, state and federally required building level administrative reports provide a far more complete picture than might the study of one or several school buildings or districts. Such administrative records can thus inform how the universe of students fare within the control of state education policy in terms of student misconduct issues viz. a viz learning outcomes. Because such reporting is designed to measure results of policies, such administrative data can be viewed as general enough to inform adaptations or corrections in policy. Further, administrative records at the building level about school safety,

² For examples of this second approach see, Sharkey, Dowdy, Tyford and Furlong(2006) and Klinger and Hussain(2015) for reviews of research methodologies, strategies and empirical findings, as well as discussions of normative and intervention issues arising from the study of school safety.

³ For summaries of findings from many of these extensive literatures, see Jimerson and Furlong(2016).

poverty and learning outcomes are more readily available than data at the individual student, staff, and administrator levels. For these reasons, we shall examine the school safety, learning outcomes, and household poverty administrative records which were obtained from the Pennsylvania Department of Education for the 20 year period 1999/2000-2018/2019.

Under the No Child Left Behind federal legislation which was signed into law in January, 2002 and took effect for school year 2002/3 through 2014/5, states received federal grant monies to support the costs of local education in conjunction with state specific plans that promised to measure and improve student learning outcomes and agreed to comply with other requirements in such areas as teacher quality and school safety. States agreed to define, measure, report and notify parents that a child in a “persistently dangerous” school building could have the opportunity to be moved to a safe building in the same district if such a safe building existed. States were required in their state plans to define specifically what a weapons violation was, what a violent school safety incident was, and how the prevalence and duration of such weapons and violence incidents were defined that would trigger a school building being deemed “persistently dangerous.” Under the Unsafe School Option, parents were to be notified of the option to move their child from an unsafe school to a safe school if such a safe school existed within the school district. While federal education policy was dramatically changed on December 10, 2015 by the enactment of Every Student Succeeds Act (ESSA), the Unsafe School Option was retained by Congress and remains in force today.⁴

In this paper we i] review how federal school safety legislation has been implemented in Pennsylvania, ii] measure with state administrative records at the building level across time how varying definitions of school safety violations, measured by the rate of arrest or the rate of violent and weapons incidents⁵, inform one’s interpretation of whether or not public education occurs in a safe setting, and iii] inquire how learning outcomes at the building level are affected by school safety problems, while controlling for properly measured household poverty.

In particular, we compare observed patterns of “persistently dangerous” buildings, based on a definition which may induce systematic under-reporting, because it requires that school safety incidents or violations of weapons and violence prohibitions result in actual arrests to patterns of just reported incidents themselves. We expect, because reported school safety violation incidents *per se* do not result in financial penalties, that such incidents will be more reliable indicators of the extent of school violence and weapons violations than those which administrators choose to engage law enforcement authorities in order to make actual arrests. Because we examine the impact which administratively reported school safety violations have on learning outcomes, we shall compare the effects of reported arrest rates on student test scores vs. the effects of reported incident rates on the level and variability of student test scores while controlling for student socioeconomic status.

⁴ See § 7912 of Title 20 of the US Code.

⁵ The *rate* of arrest and the *rate* of incidents are generally defined as the ratio of the count of the particular student misconduct to total enrollment in a building-year.

The paper is organized as follows. Section 2 describes Pennsylvania’s school safety rules and the state reporting system. Section 3 describes the administrative records to be analyzed and operational measures of school violence, household poverty and learning outcomes. Section 4 reports aggregate and building level patterns of school arrests and incidents of school safety violations related to weapons and violence, and compares and contrasts two definitions of the notion of a persistently dangerous school. It also examines the extreme concentration of school safety issues, and provides detailed results for Philadelphia and Pittsburgh school districts which are the two largest in the state. Section 5 explores the statistical relationship between learning outcomes as measured on Pennsylvania’s standardized math and reading assessments, and measures of school misconduct while controlling for SES. Section 6 summarizes findings and identifies areas for further research.

2.0 School Safety Rules in Pennsylvania to Implement the NCLB Unsafe School Option

On June 30, 1995, Pennsylvania’s first separate school safety statute took effect, and has been periodically amended since. In particular, Article 13 of Chapter 1 of Title 24 of Pennsylvania’s Consolidated Statutes deals with (A) Safe Schools, (B) School Safety and Security, and (C) School Security. The statute is quite comprehensive and defines and establishes within the Pennsylvania Department of Education an Office for Safe Schools⁶, regulatory and reporting requirements⁷, maintenance of records,⁸ and establishes for the School District of Philadelphia a Safe Schools Advocate.^{9 10} In 2005 Pennsylvania banned corporal punishment¹¹, and in 2008, a policy relating to bullying was established which defined bullying for state purposes, and requires each local school entity to review its written policy every three years.¹² In December 2011, the Office of Safe Schools Advocate (OSSA) was reestablished under the Pennsylvania Crime Commission and Delinquency to deal solely with school safety issues in Philadelphia¹³. At the close of 2019, a k-12 student’s possession of a weapon became explicit grounds for expulsion for no less than one

⁶? See § 13-1302-a of Title 24 of Pennsylvania Statutes.

⁷? See § 13-1302.1-a and §13-1303-a Title 24 of Pennsylvania Statutes.

⁸? See § 13-1307-a of Title 24 of Pennsylvania Statutes.

⁹? See §13-1310-a of Title 24 of Pennsylvania Statutes.

¹⁰? This series of state actions reflected Pennsylvania’s response to the federal 1990 Gun Free Zones Act and 1995 amendments.

¹¹ Paddling, *per se*, was statutorily prohibited in 2005 and took effect in school year 2006/7; however, see § 509 of Title 18 of Pennsylvania Statutes which enables a teacher to use force against a student under specific circumstances.

¹²? See §13-1303.1-A of Title 24 of Pennsylvania Statutes.

¹³ <https://www.pccd.pa.gov/AboutUs/Documents/Annual%20Reports/2012-13%20Annual%20Report.pdf>

year.¹⁴

Each year, every local Pennsylvania chief school administrator is required to report in standardized format to the Office of Safe Schools “all new incidents involving acts of violence, possession of a weapon on school property, use or sale of controlled substances as defined under Pennsylvania’s Controlled Substance, Drug, Device and Cosmetic Act of 1972, or possession use or sale of alcohol or tobacco by any person on school property”.¹⁵ The definition of violent acts is related to a list of state defined crimes and offenses or misconduct¹⁶: local education agencies are required to report misconduct against persons, property, society, as well as illegal possession of weapons. Detailed information about perpetrators, victims, and the nature of each act of misconduct or school safety incident are collected as to location and time along with whether or not a subsequent arrest was made and the nature of any school sanction.¹⁷ In this paper we shall focus on two measures of student misconduct: the reported numbers of incidents in a building-year, and the reported number of arrests in a building-year. Each is normalized by total enrollment in a building-year to obtain arrest *rates* and incident *rates*.

In Pennsylvania, a “dangerous incident” is defined as a weapons possession incident ***resulting in arrest*** (guns, knives, or other weapons) or a “violent incident” ***resulting in arrest*** (homicide, kidnapping, robbery, sexual offenses, and assaults) as reported on the Violence and Weapons Possession Report (PDE-360), which school districts file each year. An arrest can be performed by a municipal law enforcement authority or by the state police if there is no municipal law enforcement authority and is typically governed by bilateral school district-municipality memoranda of understanding¹⁸. Pennsylvania is among a handful of states which requires that for any weapon and/or violent incident to be dangerous, it must result in an actual arrest. In the summer of 2019, the Pennsylvania State Board of Education limited the definition of an arrest to that only involving a municipal police authority.¹⁹

¹⁴ ? See §13-1317.2 of Title 24 of Pennsylvania Statutes.

¹⁵? See §13-1303-A of Title 24 of Pennsylvania Statutes.

¹⁶ ? The prohibitions include attempts, solicitation or conspiracy to commit any of the enumerated crimes.

¹⁷ See Pennsylvania Department of Education Form 360 and attending instructions

¹⁸ The demography of Pennsylvania local governments is quite complex. There are 500 school districts, 1,103 Municipal Governments, and 1,546 Township Governments, and about 1,000 local police departments and 35 *regional* or multi-municipal police departments. The Pennsylvania State Police provide local police services to approximately ½ of local governments.

¹⁹ Pennsylvania’s requirement of an arrest might be expected to induce under-reporting of arrests since they can lead to enabling parents to move children to safe schools, and, potentially, to separate charter schools with associated financial outflows. Both effects can reduce funding to individual school districts. On the other hand, the reporting of incidents of various kinds, *per se*, does not have the same level of financial risk. As we shall see below, both the level and variability of reported arrests is much greater than the level

Under Pennsylvania's *Unsafe School Option* plan accepted by the US Department of Education as a qualification to receive federal monies under No Child Left Behind,²⁰ a Pennsylvania school building is deemed "dangerous" in a given school year for federal reporting purposes if the school building meets one of the following three conditions in conjunction with a duration test:

1. For a school whose enrollment is 250 or less, at least 5 dangerous incidents resulting in arrests;
2. For a school whose enrollment is 251 to 1000, a number of dangerous incidents resulting in arrests that represents at least 2% of the school's enrollment; or
3. For a school whose enrollment is over 1000, 20 or more dangerous incidents resulting in arrests.

Finally, for a Pennsylvania school building to be "persistently dangerous," the above designation of a "dangerous" building must have occurred in 2 or more of the preceding 3 years.

3.0 Sources of Pennsylvania Data on School Safety Violations, Poverty, and Learning Outcomes.

While compliance with state measurement and public reporting of persistently dangerous buildings has been uneven across the US according to the Inspector General of the US Department of Education²¹, Pennsylvania has annually reported various building level school safety and enrollment data in some fashion on the state's web site.²² Pennsylvania's annual school safety reports, obtained under Right to Know Requests, display total enrollment, number of arrests, the total number of incidents, and details of incidents in terms of various kinds of weapons and violence events at the individual school building level across various kinds of local education agencies.

The organizational demography of Pennsylvania's local *public* education agencies is complex, and broadly is composed of:

- 1) traditional public school districts with the power to impose real property and earned income taxes, and elect nine person school boards;

and variability of reported incidents, and provides support for the interpretation that various reported school safety violations are indicative, in fact, of the extent of school safety issues in any school building.

²⁰ See Strauss, Bucklin and Hochberg (2016, revised) for a classification of each state's school safety criteria for No Child Left Behind reporting purposes in 2013, available at: http://www.andrew.cmu.edu/user/rs9f/rpstrauss_school_safety_3_1_2016.pdf

²¹ See Office of the Inspector General of the US Department of Education (2007) for audit findings of selected state implementations of the Unsafe School Choice Option.

²² In general, see: <https://www.safeschools.pa.gov/Main.aspx?App=6a935f44-7cbf-45e1-850b-e29b2f1ff17f&Menu=dbd39a1f-3319-4a75-8f69-d1166dba5d70&res=>

- 2) area vocational schools which provide career and technical education services under bilateral contracts to participating school districts;
- 3) formally organized Intermediate Units which provide contractual special education services to local, public school districts, and
- 4) state juvenile agency facilities.

In addition to these local public education agencies, there are a plethora of other local education agencies which include independent charter and cyber charter schools, private, and religious schools. Given that the Unsafe School Option largely pertains to public schools because there must be other safe buildings within the administrative control of the local education agency and due to data limitations surrounding various kinds of charter schools, we focus²³ on the first category of traditional public school buildings for the school years 1999/2000 through 2018/2019. Pennsylvania identifies school districts with a 9 digit Administrative Unit Number, and individual buildings with a 4 digit Building Number²⁴ under the supervision of individual school districts. Considerable effort was devoted to manually checking the identification numbers of school districts and school buildings from the yearly spreadsheets of data obtained from the Pennsylvania Department of Education and its contractors who collect and process the school safety data for them. Across the study period, Pennsylvania had 500²⁵ organized school districts with approximately 3,000 local public school buildings.

Information about the socio-economic characteristics of students at the building level are due to the Pennsylvania Department of Education, and measure the fraction of students who are determined to be “poor.” Historically, Pennsylvania, like other states, had measured poverty based on student participation in the US Department of Agriculture’s School Lunch Program as captured in the administration of its standardized tests. However, because many Pennsylvania local school districts have chosen to provide free school lunches at local expense for nonpoor students to avoid stigmatization, PDE in conjunction with the US Department of Education implemented a measure of student poverty based on actual participation in the federal Temporary Assistance to Need Families and Food Stamps programs. These data were provided in response to a formal request under the Pennsylvania Right to Know Request statute.

Information on learning outcomes comes from the annual administration of the Pennsylvania System of Student Assessment (PSSA), and reflects the annual, mean building *scale* score on the grade level specific reading and mathematics exams. Annual, grade level specific mean scale score

²³ This approach is more focused than that reported in Strauss, Bucklin and Hochsberg (2016, revised).

²⁴ In determining what a local school building is for the purposes of database construction, we rely on the assigned 4 digit building number rather than the name assigned to each school building. Pennsylvania follows the federal requirement of maintaining the unique identification of a school building unless there is more than a 50% change in enrollment from one year to another.

²⁵ We define a school district as one which offers education through 12th grade. Under this definition, there were 500 school districts in Pennsylvania until school year 2009-2010 when a consolidation occurred which reduced the number of school districts to 499 in that and subsequent years.

and standard deviation scale scores were provided in response to a formal request under the Pennsylvania Right to Know statute.

4.0 Patterns of Pennsylvania’s Building and School District Level School Safety Violations

In this section we report first several statewide trends in terms of the levels and rates of arrests and incidents, and then the frequency of Pennsylvania’s approximately 3,000 local public school buildings which have been “dangerous” and “persistently dangerous.” In reviewing patterns below, recall that since measurement for the Unsafe School Option began in 2002/3, the earliest determination of “persistently dangerous” with school choice options would have begun in 2004/5 due to the duration requirement. We also perform counter-factual calculations of what these patterns would be were there no arrest requirement.

4.1 State Wide Levels and Rates of School Safety Violations: 1999-2018

Statewide, Figure 1 indicates that the reported number of Pennsylvania school safety arrests and weapons and violence incidents peaked respectively at about 11,900 and 76,000 in school years 2006/7. Over the period 1999/2000- 2018/19, statewide arrests as a percentage of statewide incidents have varied from as little as 5.4% in school year 2018/9 to as high as 18.4% in school year 2003/4. Generally, the ratio of statewide arrests to statewide incidents has been declining since 2003/4.

[Insert Figure 1 and Figure 2]

Given that Pennsylvania public school enrollment has declined from 1.75 million students in school year 1999/2000 to about 1.57 million in school year 2018/2019, it is also of interest to examine annually the statewide aggregate arrest and incident data as a fraction of total statewide, public school enrollment. Total arrests due to violence or weapons violations, when viewed as a proportion of total, local public school enrollment, are relatively rare events, and ranged annually from .2% to .69% of total enrollment across the study period. Total weapons and violence *incidents* which may or may not have led to arrests were more frequent, ranging annually from 2.4% to 4.5% of total enrollment. Note that the arrest *rate* nearly tripled during the period 2001/2 through 2009/10 while the incident *rate* was less variable. Figure 3 displays the pattern of arrest and incident rates with school year 1999-2000 set to an index value of 1.0. Note also that the arrest rate displays far more volatility than the incident rate, although both display substantial drops. Note that the incident rate has increased substantially in the last three years of the study period.

[Insert Figure 3]

4.2 Distribution of Building Level Annual Arrest and Incident Rates.

These comparisons of aggregate state totals mask extreme variability in the prevalence of arrests and incidents at the building and school district levels. Both the frequency and rate of arrests and incidents are highly concentrated. Overall, for the 58,335 local buildings with reported enrollment, $\frac{3}{4}$ of the buildings had a zero arrest rate. If we order the approximately 3,000 school buildings x 20 years from those with the most arrests to least arrests, the top 586 buildings (the top 1% over 20 years of data) had an arrest rate of 4.6% or higher. One building in 2006 had more

arrests than student enrollment. As might be expected, the distribution of incident rates is more spread out; the median incident rate was approximately 1%.

[Insert Table 1 and Table 2]

Another way to examine the extreme concentration of arrests and violent and weapons incidents is to rank the 500 school districts each year in descending order by arrests, and again, separately, by descending order of incidents, and then compare each year the share of statewide arrests and incidents reflected by the top 20 school districts. If the distribution of arrests and incidents were evenly distributed, then the top 20 districts, or 4% of the 500 districts, would have 4% of the arrests and incidents. Table 3 shows these calculations each year, and reports that in school year 1999/2000 the top 20 districts had **65.9%** of *arrests*, compared to 4% of the count of school districts, and compared to 19.9 % of statewide enrollment. With respect to *incidents*, we see that the top 20 districts had **33.6%** of total incidents in school year 1999/2000 compared to 21.6% of enrollment. Over time, the concentration of *arrests* has declined substantially to 46.6% in 2018/2019, while the concentration of *incidents* of the top 20 school districts more than doubled from **33.6%** in 1999/2000 to **69.3%** in 2004/2005, and then slowly declined to 47.8% in 2018/9.

[Insert Table 3]

4.3 Further Examination of School Districts which have the Largest Share of Arrests and Incidents 10 or More Times Out of 20 Possible Years

Table 4 reports which Pennsylvania school districts were among those 20 each year having the largest share of arrests (Panel A), or incidents (Panel B). That is, we rank the district each year by their share of total arrests (or incidents) each year, next find the top 20 each year, and then identify which districts were consistently in the top 20 at least 10 of 20 years. With regard to arrests, there were 16 such districts which were in the top 20 at least 10 of 20 years. With regard to incidents, there were 14 districts which were in the top 20 at least 10 of 20 years. The membership of Panel A and Panel B are surprising disparate. There were only 4 districts which were tops in terms of both share of arrests and incidents (denoted by an * next to their names in Panel A and B): Allentown, Bethlehem Area, Philadelphia and Pittsburgh.

Given the relatively stable membership each year in the top 20 most violent school districts, one may observe that they continue to have school violence issues which they have had difficulty in successfully addressing.

[Insert Table 4]

4.4 Patterns of Dangerous Schools in Pennsylvania: 1999/2000 through 2018/2019

With a sense of what the overall pattern of arrests and incidents are in Pennsylvania, statewide, and at the building and district levels, we now turn to measuring buildings that were “dangerous” and “persistently dangerous” based on the counts of incidents and arrests and duration as defined above. We also offer a second measure which does not require arrests in the determination of whether or not a building is dangerous or persistently dangerous. Table 5 summarizes our two-way classification of school safety violations in terms of whether or not an arrest is contained in

the definition of the safety violation, and in terms of whether or not the designation of “dangerous” takes into account duration.

[Insert Table 5]

Table 6 reports that over the entire measurement period 4.5% of Pennsylvania’s local public school buildings were “dangerous” in the sense that the *annual* frequency and rate of school safety incidents met the requirements described in Section 2.0 above. The *annual rate* of dangerous school buildings (the number of buildings which were dangerous divided by the total number of buildings in the state) varied from 2.0% to 8.4%. However, if one defines and measures “dangerous” without regard to the arrest requirement, then overall **37%** of Pennsylvania public school buildings were dangerous, and the annual *rate* of dangerous schools ranged from **29.9%** to **43.7%**. Note that the range of the latter measure of “dangerous” is smaller than the former measure of “dangerous”, and that the extent of school safety violations measured by incidents reported is considerably higher -- compare 37% to 4.5%, an eight-fold difference. Whether or not learning can be reasonably expected to and in fact takes place in such buildings is something we explore in Section 5 below.

[Insert Table 6]

4.5 Patterns of “Persistently Dangerous” Pennsylvania School Buildings

Next, we examine 20 years of Pennsylvania public school building level school safety data to analyze how many buildings were “persistently dangerous” based on incidents, arrests, and duration, and compare these results to the number of Pennsylvania public school buildings based on just incidents and duration. Table 7 reports the results, and we see that adding the duration requirement reduces the overall number of buildings that are “persistently dangerous” to 2,070 out of 51,191 total comparisons or 4.0% overall. This is a bit lower than the 4.5% rate of “dangerous” buildings found overall and reported in Table 6. As expected, when determining “persistently dangerous” without regard to arrests, but with duration in the analysis, we find overall that 18,874 out of the 51,191 buildings over the study period, or 36.9%, were “persistently dangerous” without the arrest requirement. This is a slightly lower rate than the 37.1% overall rate reported in Table 6. Note also that there is much greater variability in the percent of school buildings persistently dangerous (varying from 7.1% to 1.7% or as much as 4:1) when the arrest requirement is taken into account than when not (varying from 42.6% to 31.2% or as little as 1.4:1).

[Insert Table 7]

4.6 School Safety Patterns for Philadelphia and Pittsburgh School Districts

We now turn to measuring the safety of the two largest school districts in Pennsylvania: Philadelphia and Pittsburgh. Table 8 shows the results for Philadelphia, and Table 9 shows the results for Pittsburgh. Again, we see that when one measures “persistently dangerous” with an arrest requirement, Philadelphia appears to be the only district above the overall state rate at 13%; however; taking into account the number of students in each building leads to the conclusion that

now 20% of school buildings in Philadelphia are “persistently dangerous.” However, dropping the arrest requirement in the measure of school safety in Philadelphia leads to the conclusion that overall, 70% of Philadelphia’s school buildings are “persistently dangerous”, and fully 90.6% are “persistently dangerous” when accounting also for enrollment.

The results for Pittsburgh are perhaps more dramatic than those for Philadelphia. Over all, about 8% of the building years are found to be “persistently dangerous” with the arrest requirement, whereas we see that about 84% of the building years are persistently dangerous without the arrest requirement.²⁶ Thus, one’s perception of the school safety situation in Pittsburgh changes more dramatically when one drops the arrest requirement when ascertaining just how much Pittsburgh’s school buildings are “persistently dangerous.” Overall, using the NCLB definition, we find that Pittsburgh’s school buildings were “persistently dangerous” 7.9%; taking into account student enrollment, this rises to 12%. When dropping the arrest requirement, however, the fraction of “persistently dangerous” schools rises to 84.4%, and weighted by enrollment, it rises to 89.5%!

[Insert Table 8 and Table 9]

5.0 An Exploratory Reduced Form Building Level Model of Learning Outcomes and Student Misconduct

We now turn to the explore how correlated changes in one measure of school performance (i.e., school misconduct) are with changes in student achievement while controlling for changes in student socioeconomic status. The data and statistical model are described and then empirical results presented.

5.1 Data and Statistical Model

The mean scale test score and its standard deviation on Pennsylvania’s State System of Assessment²⁷, by type of test, per year, per building and grade were obtained from the Pennsylvania Department of Education through Right to Know Requests, along with the percentage of students in the school building who were “poor” as determined by household receipt of TANF, SNAP, and other parts of Pennsylvania’s system of income maintenance as collected by the Pennsylvania Department of Education. Prior to school year 2004/2005, Pennsylvania only administered statewide reading and mathematics tests for grades 5,8, and 11. Subsequently, as part of Pennsylvania accepted state plan under NCLB, it administered statewide reading and mathematics tests on a phased in basis for grades 3-8 and 11.

²⁶ Whether or not parents in any school found to be “persistently dangerous” with an arrest requirement were in fact accorded the opportunity to move their child in such an unsafe school to one actually safe is a very interesting administrative matter, and the subject of future research.

²⁷ Pennsylvania’s standardized tests are designed and tabulated by the Data Recognition Corporation of Maple Grove, Minnesota which designs and administers standardized k-12 tests for the majority of American States. See <https://www.datarecognitioncorp.com/>

During the 20 year study period, 1999/2000-2018/9, Pennsylvania tested at grades 5, 8 and 11. Data on building level poverty, total enrollment, arrests and incidents were matched to the PSSA data by school year, and building number, and then manually checked.

In our exploration of test scores, a “standard school building” is defined to be a standard school building and not an administrative facility such as a central office; such a standard school building is not an intermediate or vocational school nor a charter or cyber charter school, and whose students took PSSA tests at grade 5, 8 or 11. In the former case, attendance can be part-time or populated by special education students, while consistent data on charter and cyber charter are not readily available. The mean test score and its standard deviation reported and utilized here represents the test score of students who attended that building for the school year in question. Thus, were a student to take a standardized test in a different building than that attended, the test score would be attributed to the building attended and not to the place of test administration. Similarly, the fraction of students whose families receive public assistance refers to students attending the building in question. Finally, reported arrests and misconduct incidents refer to events happening at the school building where the arrest or incident was attributed to by the state’s required reporting system.²⁸

Table 10 summarizes the three operational measures to be statistically explored, and Table 11 summarizes their simple correlations. Mean standard building PSSA scale scores ranged across the 20 years from a low of 783 to a maximum of 1976 and a mean score of 1316. Reported incident rates, the ratio of incidents in a building to total enrollment in a building-year, ranged from a low of 0% in a school year to a high of 257%, while reported arrest rates ranged from a low of 0% to a high of 41%. Student poverty rates ranged from a low of 0% to a high of 100% and a mean of 38%. Mean scale score tests were inversely related to the student poverty rate, and inversely related to the school misconduct incident rates, but weakly correlated positively with the arrest rate. Over time, mean scale scores have been declining as has their coefficient of variation. All correlations are statistically significant from zero at the 99% confidence.

[Insert Table 10 and Table 11]

Generally, we are interested in how arrest or safety incident rates, whose patterns were reported above, affect the level and variability of student achievement as measured holding constant student socioeconomic status. Two measures of the level of learning at the building level are available:

- 1] the mean language arts or reading scale score and the mean math scale test score, and
- 2] the coefficient of variation in mean language arts or reading scale score, score and the mean math scale test score,

²⁸ As is well known, there is a fair bit of school violence which occurs in central administration buildings, and in the immediate area around school buildings, but not actually on or in school property or during the school day during which public education is legally responsible for the health and safety of school children under state and federal law. See Russo(2012).

We view student misconduct rates, either reflected in arrest rates or incident rates, as disruptions to the educational process which can distract students from learning the required curriculum through the Fall and Spring of each school year. We expect the *rate of* such incidents to be inversely related to mean math and English or Language Arts scale scores. Moreover, we expect that the greater the rate of such disruptions in a building, we expect the variability in learning outcomes in math and reading to increase in a building.

The second factor we are able to control for in explaining variations in mean math and English test scores is the socioeconomic status of students attending each building which we expect to be inversely related to mean scale scores.

It is well known in the practitioner community that standardized tests have evolved over time for reading/language arts as well as mathematics. Academic standards, the test anchors and questions have evolved over time which suggests the use of year dummy variables will enable us to distinguish changing patterns of test difficulty, independent of school misconduct and poverty patterns. Since it is likely that household poverty and measured misconduct are themselves correlated or related, we add an interaction term of household poverty x measured school safety incidents to account for possible collinearity.

For each school building year, test grade level, (k=5, 8, 11 with grade 5 the dropped category), test type mathematics or reading/language arts (math=1), school years 1999/2000 through 2018/2019, we estimate a linear ordinary least squares regression of the form:

$$\begin{aligned} & \text{Mean Building Scale Score (or Coefficient of Variation in Mean Building Scale Score)}_t \\ &= \beta_1 + \beta_2 \text{Poverty Rate}_t + \beta_3 \text{School Misconduct Rate}_t + \\ & \beta_4 \text{Poverty Rate}_t \times \text{School Misconduct Rate}_t + \beta_5 \text{Test Type}_t + \delta \text{Test Grade}_t + \Omega \text{Year} + \varphi_t \quad [1] \end{aligned}$$

where δ and Ω are vectors of dummy variable coefficients and φ_t is an error term.

Because the measurement of misconduct rate admits of two types, arrests/enrollment and incidents/enrollment, we shall report two versions of [1] explaining the Mean Building Scale Scores and two versions of [1] explaining the Coefficient of Variation in Mean Building Scale Scores or 4 sets of regressions.

5.2 Effects of Poverty Rate, Arrest Rate, Incident Rate on Mean Math and Language Arts Scale Scores

Table 12 and Table 13 report, respectively, the ordinary least squares regression results using the poverty rate, arrest rate or incident rate as the main school misconduct measure to explain mean building scale score tests. The poverty and arrest rates are inversely related to mean scale scores and the inverse relationship is statistically significant at a very high confidence level. The inverse relationship between the arrest rate and mean scale scores suggests that there is no contemporaneous deterrence effect of relatively more students being arrested for various types

of misconduct. Rather, the disruptive effects of misconduct leading to arrests simply indicates that learning suffers even if students are sanctioned within the same school year.²⁹

[Insert Table 12 and Table 13]

Consider now several implications of the estimated coefficients. Were a building composed entirely of children from poor families but without any school misconduct measured by the arrest rate, the regression model suggests that mean building scale scores would be lower scale score by about 240 points, or lower by about 1.24 standard deviations. A building with a 10% arrest rate and students without any poverty background would be associated with a lower predicted scale score of 1.65 standard deviations. A building composed entirely of children from poor households *and* which experienced a 10% arrest rate would likely score 260 scale points lower or about 1.35 standard deviations lower than a building with no students from a poor household and no arrests.

Overall, about 58% of the variation across the 78,963 building level scale scores were explained by the above models using the arrest or incident rate as the measure of student misconduct.

Turning to the effect of the rate of incidents of student misconduct on mean scale scores as displayed in Table 13, we find that the effect of household poverty is quite similar to that in Table 12; a building entirely composed of students from poor households will score 247 points lower or 1.28 standard deviations lower, and this result is highly statistically significant. A building with a 10% incident rate and composed entirely of children from poor households would score about 237 scale score points lower or about 1.23 standard deviations lower than a building with no students from a poor household and no misconduct incidents.

5.3 Effects of Poverty Rate, Arrest Rate, Incident Rate on the Relative Variability of Mean Math and Language Arts Scale Scores

Table 14 and Table 15 report the ordinary least squares results explaining variations in the coefficient of variation in mean scale scores which we interpret to reflect peer effects. We find that a building with a 100% poverty rate and a 10% arrest rate will actually reduce the relative variation in mean scale test scores at the building level; this finding is based on statistically significant regression coefficients, and the *reduction* in relative variability of mean scale scores is 48% of the standard deviation in the coefficient of variation in mean scale scores. Here, it would appear that arrests provide a calming effect on buildings. On the other hand, a building with a 100% poverty rate and a 10% incident rate will increase by about 15% of a standard deviation in the coefficient of variation in mean scale scores.

[Insert Table 14 and Table 15]

It is evident that there are distinctive time trends in all model results which indicate that, compared to the omitted year, 1999/2000, mean test scores rose systematically through school year 2013, and then declined rather systematically thereafter. By school year 2018/9 the mean test score,

²⁹ Exploiting the dynamic nature of incidents, arrests and subsequent learning outcomes is a suggested follow up research project.

holding all else constant, was about 147 scale score points lower than in 1999/2000. We interpret this to reflect changes in the difficulty of the test instruments.

We note further from Table 12 and Table 13 that 8th and 11th grade test scores, compared to the omitted 5th grade test grade category were systematically larger, rising by around 10 to 12 scale score points, due to arrests or incidents, for 8th grade students and about 1220 to 118 mean scale score points for 11th grade students. This jump in mean 11th grade scale scores could reflect an opting or dropping out of school of the weakest students before achieving a high school diploma. The third regularity across model results is that math test scores, on average holding all else constant, were about 5 scale score points higher than language arts test scores.

5.4 Effects of Extreme Values of Student Poverty and Student Misconduct on the Level and Relative Variability of Mean Student Scale Scores

In Section 4.2 and 4.3 above, we inferred that arrests and student misconduct incidents are relatively rare events. Also, in Section 5.1 - 5.3 above, we reported some initial calculations of the effects of assumed levels of student misconduct and poverty measures on the level and the relative variability of mean scale scores. Here, we exploit more systematically some of the implications of the regression results in Tables 12-15 by changing the assumptions of the values of right hand side variables, earlier assumed to be a poverty rate being either 0 or 1.0, and arrest and incident rates being 0 or .10. In particular, we use here *observed*, joint extreme values for school misconduct and poverty measures corresponding to the 50th, 75th and 90th percentile values, and then calculate what the regression models predict for mean scale score results, and also calculate what the regression models predict for the coefficient of variation in mean scale score results.

By comparing predicted effects for the 90th percentile student misconduct rates and poverty rates to those calculated at the joint medians, we can begin to see how student learning outcomes could be improved were student misconduct and poverty reduced through policy or control. In the case of misconduct, the counter-factual reflects the possible beneficial effects of school safety interventions which might reduce misconduct. In the case of poverty, we can reduce poverty rates by ½ which is the widely predicted benefit of the newly enacted federal, refundable child care tax credit.

Another way to think about these calculations is to consider them an amalgam of fortuitous policy interventions by school administrators who might be able to reduce student misconduct from the 90th percentile to the median for a hypothetical building, as well as a reduction in poverty rates through the federal tax system. We thus inquire as to what might happen to the level and relative variability of mean test scores should both such policies be simultaneously implemented.

[Insert Table 16]

Table 16 displays the calculated effects for learning outcomes at various percentile levels of the right hand side variables and compared to the standard deviation of mean scale scores. At the *median* arrest and poverty rates, mean scale scores are lower by about 43% of a standard deviation in the mean scale score.. Were student poverty reduced by half due to the newly enacted refundable child care tax credit, the mean scale scores would be lower by 21%, a decrease of about half. Using the *median* incident rate and poverty rate, we find a somewhat larger impact on mean scale scores.

Here, the impact is about 46.8% of the standard deviation in mean scale scores. Again, were the median poverty rate to be halved, as predicted to be the result of the new federally refundable child care credit, the impact of the median incident rate is a 25% reduction compared to the standard deviation of the mean scale score (again 193 scale score points).

Moving down to the effects of a building being at the 90th percentile in terms of student misconduct and poverty rates, we see that drop in student achievement is about 1 standard deviation lower. Were a school administrator to reduce student misconduct rates from the 90th percentile to the 50th percentile, our regression coefficients predict learning gains on the order of $(100-43) = 2/3$ of a standard deviation in mean scale scores. The coefficients also imply a somewhat larger gain in learning outcomes if school incidents can be reduced from the 90th percentile to the median $(123-42) = 81\%$ and poverty were also halved by the refundable child care credit.

Table 17 displays a parallel analysis of the implications of the models explaining the coefficient of variation in mean scale scores. One can readily interpret the size of the coefficient of variation in mean building year test scores to reflect peer effects of misconduct disruptions. Here, we find that at more and more extreme values of student misconduct rates, the relative variability in scale score increases somewhat due to higher incidents, although, surprisingly, the effects of the refundable child care credit will slightly *increase* the adverse effects of student misconduct on the relative variability of the coefficient of variation in mean scale scores.

6.0 Summary and Some Outstanding Research Questions

In this paper I have compared and contrasted legally required reports of two building level school violence measures under NCLB, arrests and incidents of well-defined school misconduct acts, across 20 years of Pennsylvania's approximately 3,000 public school buildings. Generally, both arrests for school violence and incidents of school violence are rare events. Over 20 years, the third quartile arrest rate was zero and, the third quartile incident rate was 3.3%. Relatively few, 4.1% overall, of Pennsylvania's school buildings were *persistently dangerous* as defined and reported pursuant to Pennsylvania's state plan to the US Department of Education; however, these buildings represented about 7.8% of the student population statewide. When we measure whether or not a school building is dangerous based on reported school violence incidents, that is without an arrest requirement, fully 36.9% of Pennsylvania's school buildings were dangerous, and they represented 46.7% of the students statewide. Both Philadelphia and Pittsburgh public school buildings were disproportionately unsafe and among the top 20 districts in the state which were unsafe over the 20 year study period.

Regression analysis of mean building scale scores for math and language arts across the 20 years of data explained about 58% of the variation in such learning outcome measures. We have also found that household poverty, holding all else constant, has very strong, negative effects on learning outcomes. A school building composed entirely of low income students will score about 240 scale points lower, about 1.24 standard deviations, than a school building without any low income students. We also found that the relative variability in learning outcomes, the coefficient of variation in mean reading and math scale scores, generally increased with poverty and various measures of student misconduct; however, these effects in relation to standard errors of the

coefficient of variation in scale scores was generally smaller than in the case of the *level* of mean scale scores.

Having documented that school misconduct is prevalent and concentrated, we should emphasize that we have *not* discovered nor evaluated interventions which reduce school misconduct and thereby might be reasonably expected to improve learning outcomes. What we have found is that a careful examination of administrative reports of school violence indicates that it as much as ½ of one state's students are in buildings which may reasonably be characterized as unsafe.

While these empirical results reflect a careful exploration of essentially the universe of administrative data in one, major industrial state over a considerable period of time, and confirm much about the commonsense proposition that school misconduct is associated with lower learning outcomes, there remain a host of outstanding research questions which further exploration of such system-wide administrative records could reveal.

First, can one differentiate among different types of student misconduct arrests and incidents which differentially impact learning outcomes? Second, can one discern in the data time-dependent *patterns* per building? That is, can one relate previous interventions aimed at reducing student misconduct to current levels of learning outcomes, and move towards both a structural understanding of the relationship between school misconduct and learning outcomes, as well as evaluating system-wide the efficacy of focusing school resources on reducing misconduct? Another possible line of inquiry would entail a review of the dollar amounts of federal and state funding school districts receive, and which might, as a matter of policy be put at risk if unacceptable levels of school misconduct persist.³⁰ Finally, given the extensive nature of student misconduct measured over time, one might inquire just how many parents and children were in fact afforded school choice by local districts, the Commonwealth of Pennsylvania and/or the federal government, and how many in fact took advantage of such choice.³¹

³⁰ Manipulation of the National Center for Education Statistics Common Core financial data suggests that federal monies may not provide a great deal of leverage. K-12 education in Pennsylvania received overall \$1.4 billion of federal education funding of which about \$400 million was for NCLB in 2002/3; this compared to total k-12 education revenues of about \$20B. In 2014/5, NCLB had grown to \$591 million compared to \$31.6B of total k-12 education revenues.

³¹ Attempts to obtain statewide reporting from state and federal authorities on the extent to which the Unsafe School Option has been afforded and utilized have, to date, proven unsuccessful.

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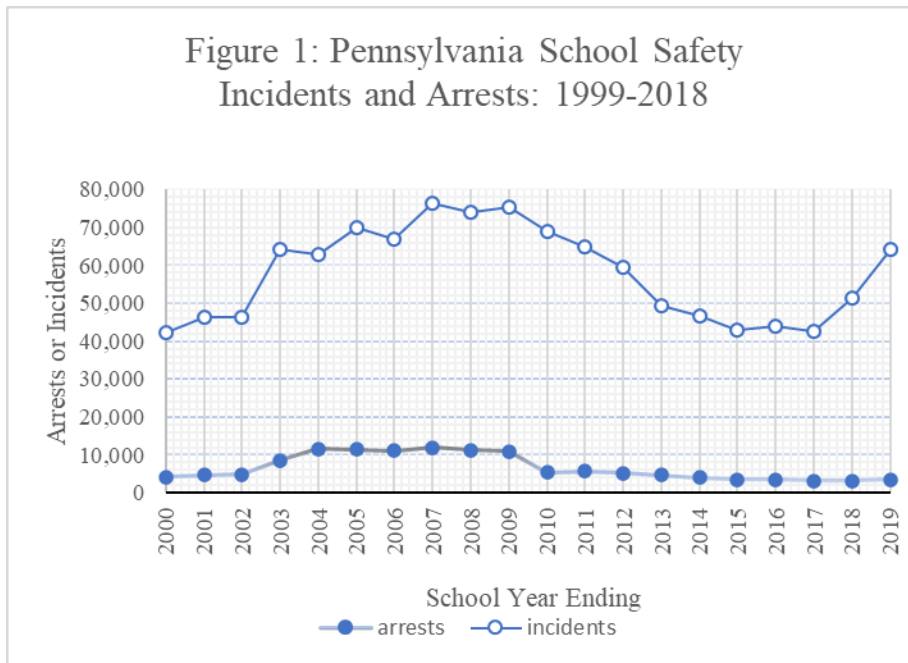
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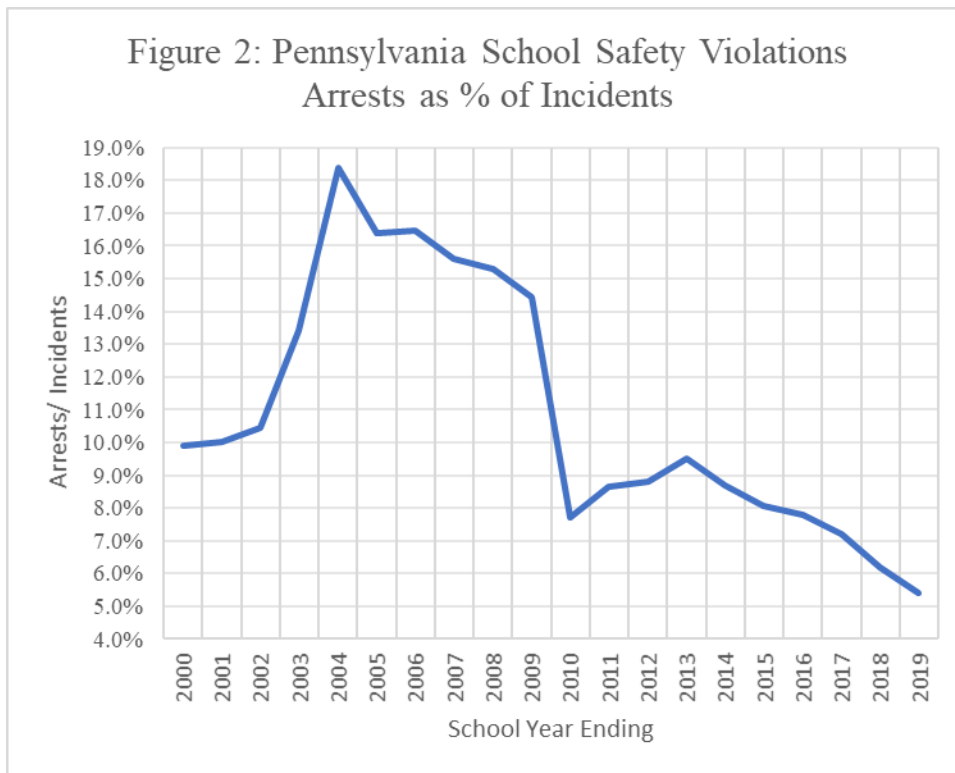
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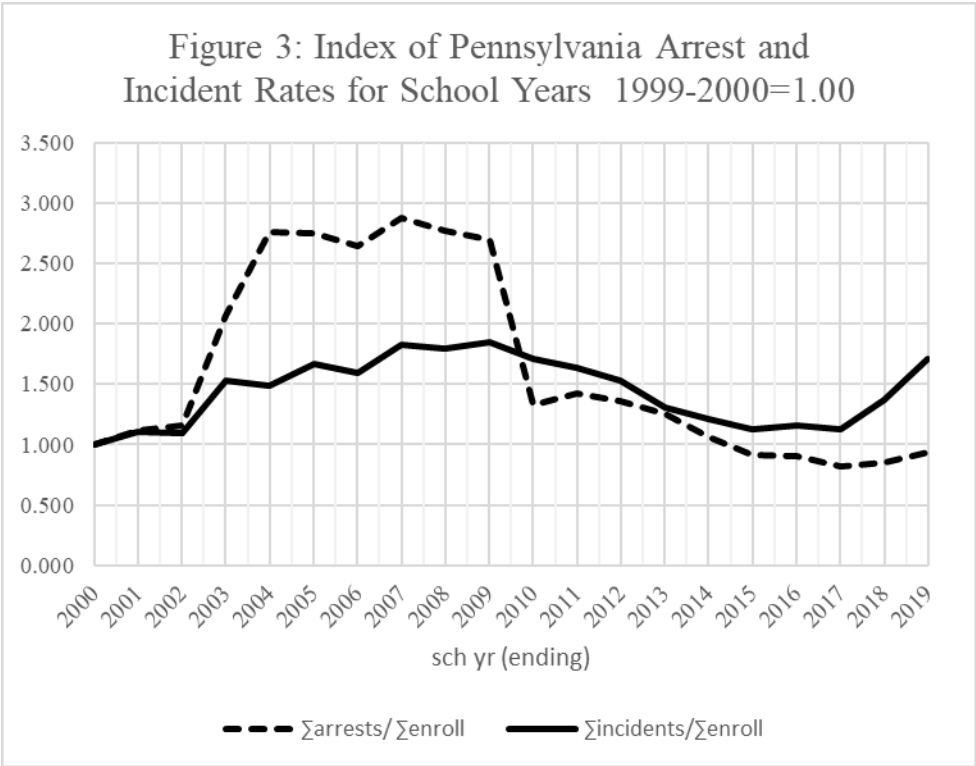
8.0 Figures and Tables



Source: Author's tabulations of Pennsylvania Department of Education school safety obtained under Right to Know Requests.



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Table 1: Distribution of Pennsylvania School Safety Arrest Rates (Arrests/Enrollment) by Year

School Year Ending	Number of Buildings	Arrest Rate 75 th Percentile	Arrest Rate 90 th Percentile	Arrest Rate 95 th Percentile	Arrest Rate 99 th Percentile	Maximum Arrest Rate
2000	3,003	0.00000	0.00419	0.00891	0.02542	0.22353
2001	3,015	0.00000	0.00433	0.00990	0.02638	0.17757
2002	3,049	0.00000	0.00410	0.01004	0.03229	0.22148
2003	3,033	0.00131	0.00855	0.01951	0.04823	0.21505
2004	3,039	0.00264	0.01422	0.02618	0.06604	0.19920
2005	3,037	0.00245	0.01279	0.02684	0.06308	0.88000
2006	3,034	0.00226	0.01295	0.02505	0.06195	1.06667
2007	3,020	0.00217	0.01500	0.02813	0.07271	0.91429
2008	3,027	0.00187	0.01463	0.02736	0.07482	0.41429
2009	3,038	0.00179	0.01395	0.02828	0.07254	0.29412
2010	3,002	0.00000	0.00580	0.01400	0.04188	0.28571
2011	2,966	0.00000	0.00638	0.01472	0.04225	0.13953
2012	2,894	0.00000	0.00742	0.01505	0.03801	0.20227
2013	2,793	0.00000	0.00670	0.01395	0.04032	0.14286
2014	2,796	0.00000	0.00477	0.01089	0.03371	0.15385
2015	2,780	0.00000	0.00351	0.00939	0.02941	0.14286
2016	2,756	0.00000	0.00345	0.00940	0.02637	0.13333
2017	2,736	0.00000	0.00303	0.00708	0.02367	0.07164
2018	2,718	0.00000	0.00420	0.00962	0.02513	0.13253
2019	2,599	0.00000	0.00344	0.01043	0.03487	0.33333
Overall	58,335	0.00000	0.00735	0.01627	0.04594	1.06667

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Now requests to Pennsylvania Department of Education.

Table 2: Distribution of Pennsylvania School Safety Weapons and Violence Incident Rates (Incidents/Enrollment) by Year

School Year Ending	Number of School Buildings	Distribution of Pennsylvania School Safety Violations: Incident Rates at Percentile						
		25 th	50 th	75 th	90 th	95 th	99 th	Maximum Incident Rate
2000	3003	0.00000	0.00627	0.02439	0.05696	0.08489	0.19058	1.15152
2001	3015	0.00000	0.00816	0.02714	0.05875	0.09344	0.23633	1.10714
2002	3049	0.00000	0.00861	0.02837	0.05519	0.08571	0.24242	2.25000
2003	3033	0.00000	0.00877	0.02913	0.06271	0.09836	0.49470	4.17011
2004	3039	0.00000	0.00727	0.02484	0.05281	0.09121	0.52412	3.83634
2005	3037	0.00000	0.00748	0.02844	0.06513	0.11203	0.47688	4.96000
2006	3034	0.00000	0.00786	0.03002	0.06274	0.10984	0.60811	4.00000
2007	3020	0.00000	0.01017	0.03361	0.07571	0.12893	0.67282	10.11429
2008	3027	0.00000	0.01208	0.03853	0.08974	0.14972	0.71193	4.96296
2009	3038	0.00188	0.01437	0.04087	0.09137	0.16410	0.70956	4.06122
2010	3002	0.00000	0.01390	0.04179	0.09318	0.14749	0.46578	10.92857
2011	2966	0.00154	0.01235	0.03946	0.08052	0.12766	0.51111	12.17391
2012	2894	0.00146	0.01280	0.03951	0.08361	0.13251	0.37539	14.18750
2013	2793	0.00000	0.01081	0.03520	0.07007	0.11260	0.24553	1.87758
2014	2796	0.00000	0.00959	0.03175	0.06316	0.09766	0.24286	0.86798
2015	2780	0.00000	0.00890	0.02930	0.06106	0.10015	0.24744	0.91743
2016	2756	0.00000	0.00980	0.03080	0.06299	0.09474	0.24064	1.02273
2017	2736	0.00000	0.00857	0.02922	0.06096	0.09310	0.20254	0.67191
2018	2718	0.00122	0.01112	0.03548	0.07365	0.11670	0.32819	3.92771
2019	2599	0.00000	0.01048	0.04348	0.09635	0.14865	0.37500	5.40741
Overall	58,335	0.00000	0.00976	0.03284	0.07050	0.11364	0.36538	14.18750

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Now requests to Pennsylvania Department of Education.

Table 3 Pennsylvania’s Top 20 School Districts’ Share of Total Arrests, Incidents, and Enrollment: School Years 1999/2000 through 2018/2019

School Year Ending	Top 20 Districts' Share of Arrests	Top 20 Districts' Share of Enrollment	Top 20 Districts' Share of Incidents	Top 20 Districts' Share of Enrollment
2000	65.9%	19.9%	33.6%	21.6%
2001	65.6%	19.8%	35.1%	21.1%
2002	65.9%	18.3%	37.7%	21.4%
2003	51.9%	18.7%	56.6%	21.0%
2004	46.9%	20.6%	62.4%	20.9%
2005	50.1%	19.2%	69.3%	21.1%
2006	52.0%	19.4%	66.4%	21.8%
2007	55.7%	19.3%	65.4%	19.1%
2008	50.9%	19.0%	61.6%	19.0%
2009	50.1%	19.2%	58.1%	18.3%
2010	58.3%	18.4%	52.1%	19.7%
2011	55.5%	18.8%	50.6%	19.1%
2012	53.0%	18.5%	48.4%	20.4%
2013	52.5%	17.1%	47.4%	20.4%
2014	57.3%	17.0%	48.2%	19.4%
2015	52.3%	17.7%	47.6%	20.7%
2016	51.3%	17.6%	47.0%	19.8%
2017	53.7%	17.9%	47.9%	19.2%
2018	48.4%	17.6%	47.2%	20.6%
2019	46.6%	18.1%	47.8%	20.9%

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Now requests to Pennsylvania Department of Education.

Table 4: Pennsylvania School Districts among Top 20 Annually in Terms of Highest Share of Arrests or Incidents at Least 10 Years or More Out of Possible 20 Years.

Panel A: Arrests School District	2018/2019 Enrollment	Share of Statewide Arrests
Albert Gallatin Area	3,313	2.20%
Allentown City *	16,821	4.90%
Bethlehem Area *	13,618	3.10%
Central Dauphin	11,880	2.90%
Chambersburg Area	9,315	5.00%
Dubois Area	3,465	1.50%
Easton Area	8,584	2.10%
Hazleton Area	11,406	5.20%
Philadelphia City *	128,110	45.40%
Pittsburgh *	22,567	10.20%
Pottstown	3,221	1.20%
Red Lion Area	5,132	2.20%
Scranton City	9,932	2.50%
Upper Darby	12,439	2.90%
Wilkes Barre Area	7,138	4.50%
York City	6,019	3.00%
Panel B: Incidents School District	2018/2019 Enrollment	Share of Statewide Incidents
Allentown City *	16,821	7.40%
Bensalem Township	6,474	0.70%
Bethlehem Area *	13,618	1.90%
Central Bucks	18,144	1.10%
Erie City	10,773	10.40%
Harrisburg City	6,383	3.70%
Lancaster	11,003	1.40%
Norristown Area	7,491	2.40%
Philadelphia City *	128,110	20.60%
Pittsburgh *	22,567	41.80%
Reading	17,725	8.60%
Southeast Delco	4,342	2.10%
Upper Darby	12,439	1.50%
William Penn	5,069	1.80%

Source: Author's tabulations of Pennsylvania school safety data obtained under Right to Now requests to Pennsylvania Department of Education. * Denotes membership in Panel A and B.

Table 5: Classification of 4 Types of School Safety Violations

Duration	Dangerous with Arrest Requirement	Dangerous w/o Arrest Requirement
Annual	[A]: Dangerous with Arrest	[B]: Dangerous without Arrest
2 of 3 years	[C]: Persistently Dangerous with Arrest (NCLB accepted definition)_	[D:] Persistently Dangerous w/o Arrest Requirement

**Table 6: Number and Percent of “Dangerous” Pennsylvania School Buildings
“Dangerous” with and without Arrest Requirement: 1999/2000 through 2018/2019**

School Year Ending	Number Buildings	"Dangerous " Buildings [A]	“Dangerous Buildings” (No Arrest Requirement) [B]	Percent "Dangerous " Buildings [A]	Percent “Dangerous Building” (No Arrest Requirement) [B]
2000	3,003	66	897	2.2%	29.9%
2001	3,015	71	966	2.4%	32.0%
2002	3,049	83	1,029	2.7%	33.7%
2003	3,033	167	1,043	5.5%	34.4%
2004	3,039	239	951	7.9%	31.3%
2005	3,037	232	1,008	7.6%	33.2%
2006	3,034	225	1,055	7.4%	34.8%
2007	3,020	255	1,181	8.4%	39.1%
2008	3,027	241	1,261	8.0%	41.7%
2009	3,038	243	1,334	8.0%	43.9%
2010	3,002	109	1,289	3.6%	42.9%
2011	2,966	124	1,241	4.2%	41.8%
2012	2,894	107	1,214	3.7%	41.9%
2013	2,793	108	1,087	3.9%	38.9%
2014	2,796	84	1,037	3.0%	37.1%
2015	2,780	58	952	2.1%	34.2%
2016	2,756	62	977	2.2%	35.4%
2017	2,736	54	961	2.0%	35.1%
2018	2,718	54	1,045	2.0%	38.4%
2019	2,699	72	1,180	2.7%	43.7%
Total	58,335	2654	21,708	4.5%	37.1%

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Know requests from Pennsylvania Department of Education.

Table 7: Number and Percent of Pennsylvania School Buildings “Persistently Dangerous” with and without Arrest Requirement: 1999/2000-2018/2019

School Year Ending	Number Buildings with History 3 Years of Data	NCLB Number of School Buildings “Not Persistently Dangerous” [C]	NCLB Number of School Buildings “Persistently Dangerous” [C]	NCLB Percent Persistently Dangerous [C]		Not Persistently Dangerous (No Arrest) [D]	Persistently Dangerous (No Arrest) [D]	Percent Persistently Dangerous (No Arrest) [D]
[1]	[2]	[3]	[4]	[5]		[6]	[7]	[8]
2002	2,953	2,898	55	1.9%		2,033	920	31.2%
2003	2,945	2,864	81	2.8%		1,961	984	33.4%
2004	2,975	2,856	119	4.0%		1,993	982	33.0%
2005	2,968	2,766	202	6.8%		2,017	951	32.0%
2006	2,974	2,776	198	6.7%		1,998	976	32.8%
2007	2,962	2,772	190	6.4%		1,937	1,025	34.6%
2008	2,955	2,759	196	6.6%		1,834	1,121	37.9%
2009	2,961	2,752	209	7.1%		1,758	1,203	40.6%
2010	2,902	2,730	172	5.9%		1,667	1,235	42.6%
2011	2,904	2,790	114	3.9%		1,659	1,245	42.9%
2012	2,863	2,770	93	3.2%		1,653	1,210	42.3%
2013	2,760	2,664	96	3.5%		1,639	1,121	40.6%
2014	2,693	2,610	83	3.1%		1,647	1,046	38.8%
2015	2,656	2,589	67	2.5%		1,684	972	36.6%
2016	2,711	2,660	51	1.9%		1,757	954	35.2%
2017	2,694	2,645	49	1.8%		1,766	928	34.4%
2018	2,667	2,621	46	1.7%		1,704	963	36.1%
2019	2,648	2,599	49	1.9%		1,610	1,038	39.2%
Total	51,191	49,121	2,070	4.0%		32,317	18,874	36.9%

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Know requests from Pennsylvania Department of Education.

Table 8: Unweighted and Weighted Percentage of *Philadelphia* Public School Buildings under Alternative Definitions of “Persistently Dangerous”

Philadelphia SD	Accepted NCLB "Persistently Dangerous" [C]	Accepted NCLB "Persistently Dangerous" Enrollment Weighted [C]*	Based on Incidents "Persistently Dangerous" [D]	Based on Incidents "Persistently Dangerous" Enrollment Weighted [D]*
Arrests Counted?	Yes	Yes	No	No
2001/2	14.8%	26.6%	30.4%	84.4%
2002/3	17.1%	30.1%	36.4%	89.9%
2003/4	16.6%	28.3%	45.9%	95.5%
2004/5	19.5%	30.9%	65.2%	98.2%
2005/6	17.2%	28.7%	86.7%	98.8%
2006/7	17.6%	26.5%	92.2%	97.3%
2007/8	19.8%	29.0%	90.7%	96.2%
2008/9	20.4%	27.8%	90.7%	97.1%
2009/10	18.3%	24.5%	86.3%	96.1%
2010/11	15.1%	20.9%	80.7%	91.9%
2011/12	11.3%	16.6%	78.6%	88.2%
2012/13	11.2%	15.8%	75.9%	86.4%
2013/14	9.9%	15.6%	72.4%	80.7%
2014/15	8.9%	13.5%	68.0%	78.2%
2015/16	4.3%	4.4%	58.3%	83.3%
2016/17	1.0%	1.2%	59.0%	83.0%
2017/18	0.5%	0.8%	64.0%	87.7%
2018/19	0.5%	0.8%	68.5%	86.1%
Total	13.0%	20.4%	69.8%	90.6%

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Know requests from Pennsylvania Department of Education. * Denotes weighted by enrollment.

Table 9: Unweighted and Weighted Percentage of *Pittsburgh* Public School Buildings under Alternative Definitions of “Persistently Dangerous”

Pittsburgh SD	Accepted NCLB "Persistently Dangerous" [C]	Accepted NCLB "Persistently Dangerous" Enrollment Weighted [C]*	Based on Incidents "Persistently Dangerous" [D]	Based on Incidents "Persistently Dangerous" Enrollment Weighted [D]*
Arrests Counted?	Yes	Yes	No	No
2001/2	0.0%	0.0%	79.7%	84.4%
2002/3	0.0%	0.0%	85.0%	89.9%
2003/4	0.0%	0.0%	93.7%	95.5%
2004/5	24.7%	39.3%	97.5%	98.2%
2005/6	25.6%	40.1%	98.8%	98.8%
2006/7	22.2%	34.8%	93.7%	97.3%
2007/8	20.6%	32.6%	90.5%	96.2%
2008/9	14.7%	25.7%	91.2%	97.1%
2009/10	5.0%	7.7%	90.0%	96.1%
2010/11	0.0%	0.0%	84.7%	91.9%
2011/12	1.8%	0.4%	82.5%	88.2%
2012/13	2.0%	0.5%	78.0%	86.4%
2013/14	2.0%	0.6%	74.0%	80.7%
2014/15	2.0%	0.5%	70.6%	78.2%
2015/16	0.0%	0.0%	75.0%	83.3%
2016/17	0.0%	0.0%	64.8%	72.4%
2017/18	0.0%	0.0%	69.6%	78.4%
2018/19	3.7%	7.7%	75.9%	83.1%
Total	7.9%	12.0%	84.4%	89.5%

Source: Author’s tabulations of Pennsylvania school safety data obtained under Right to Know requests from Pennsylvania Department of Education. * Denotes weighted by enrollment.

Table 10: Descriptive Statistics Used in Regression Analysis

Variable	Observations	Mean	Std. Dev.	Min	Max
Mean Scale Score	78,964	1316.3770	193.0575	782.7273	1805.8260
Coefficient of Variation of Mean Scale Score	78,964	12.7989	4.3609	1.0776	27.6087
Poverty Rate	78,964	.3815	.2463	0.0000	1.0000
Arrest Rate	78,964	0.0031	.0094	0.0000	0.4143
Incident Rate	78,964	.0308	.0634	0.0000	2.5776

Table 11: Pearson Correlations among Variables used in Regression Analysis

Variable	Mean Scale Score	CV Mean Scale Score	Poverty Rate	Arrest Rate	Incident Rate	Year
Mean Scale Score	1					
CV Mean Scale Score	0.1040	1				
Poverty Rate	-0.4080	-0.1033	1			
Arrest Rate	0.0094	0.1129	0.0948	1		
Incident Rate	-0.0703	0.0134	0.2592	0.2257	1	
Year	-0.3548	-0.5258	0.2806	-0.0674	-0.0092	1

Table 12: Mean Scale Scores Explained by Poverty Rate and Arrest Rate

OLS Model: Mean Scale Score =	Coefficient	Std. Err.	t
Intercept	1350.314	2.3024	586.5
Poverty Rate	-240.0016	2.0199	-118.8
Arrest Rate	-3202.225	108.853	-29.4
Interaction: Poverty Rate x Arrest Rate	2992.409	190.4254	15.7
Test Type: Math=1, Reading=0	5.7553	0.8911	6.5
Grade Dummies			
Grade 8	11.986	1.068	11.2
Grade 11	122.4671	1.1907	102.9
Year Dummies (1999 dropped)			
2000	2.4318	2.9943	0.8
2001	11.7769	2.9862	3.9
2002	36.6457	2.9803	12.3
2003	76.5089	2.9771	25.7
2004	85.6235	2.9694	28.8
2005	89.3524	2.9549	30.2
2006	93.1938	2.9444	31.7
2007	113.6799	2.9463	38.6
2008	121.5955	2.9363	41.4
2009	130.0136	2.9126	44.6
2010	139.0847	2.91	47.8
2011	135.8217	2.9039	46.8
2012	160.5692	2.9055	55.3
2013	170.277	2.8815	59.1
2014	151.4533	2.8795	-52.6
2015	148.5112	2.8717	-51.7
2016	149.6575	2.8643	-52.3
2017	142.1836	2.8697	-49.6
2018	147.0381	2.8659	-51.3
Observations	78,964		
R ²	0.5796		
Adjusted R ²	0.5794		

Table 13: Mean Scale Scores Explained by Poverty Rate and Incident Rate

OLS Model: Mean Scale Score=	Coefficient	Std. Err.	t
Intercept	1358.192	2.33488	581.7
Poverty Rate	-247.571	2.1062	-117.6
Incident Rate	-553.721	25.1663	-22
Interaction: Poverty Rate x Incident Rate	641.7331	33.0995	19.4
Test Type: Math=1, Reading=0	5.7559	0.8958	6.4
Grade Dummies			
Grade 8	12.3474	1.1039	11.2
Grade 11	118.1371	1.214	97.3
Year Dummies (1999 dropped)			
2000	2.508	3.01	0.8
2001	11.4946	3.0018	3.8
2002	30.7664	2.9918	10.3
2003	66.9537	2.9846	22.4
2004	76.4205	2.9786	25.7
2005	81.0628	2.9657	27.3
2006	86.3015	2.9554	29.2
2007	107.6963	2.9586	36.4
2008	116.6103	2.9486	39.6
2009	129.7232	2.9284	44.3
2010	137.8764	2.9257	47.1
2011	134.9621	2.9192	46.2
2012	158.7218	2.9215	54.3
2013	168.7091	2.8983	58.2
2014	-152.874	2.8958	-52.8
2015	-149.663	2.8877	-51.8
2016	-150.587	2.8804	-52.3
2017	-142.953	2.8851	-49.6
2018	-146.227	2.881	-50.8
Observations	78,964		
R ²	0.5751		
Adjusted R ²	0.575		

Table 14: Coefficient of Variation in Mean Scale Score Explained by Poverty Rate and Arrest Rate

OLS Model: CV of Mean Scale Score=	Coefficient	Std. Err.	t
Intercept	13.5922	0.0553	246
Poverty Rate	0.8847	0.0485	18.3
Arrest Rate	96.9674	2.6124	37.1
Interaction: Poverty Rate x Arrest Rate	-126.835	4.570157	27.75
Test Type: Math=1, Reading=0	-0.4634	0.0214	-21.7
Grade Dummies			
Grade 8	0.3462	0.0256	13.5
Grade 11	-1.6777	0.0286	-58.7
Year Dummies (1999 dropped)			
2000	0.2747	0.0719	3.8
2001	0.638	0.0717	8.9
2002	0.8056	0.0715	11.3
2003	1.763	0.0715	24.7
2004	2.5442	0.0713	35.7
2005	2.5964	0.0709	36.6
2006	1.5568	0.0707	22
2007	1.9258	0.0707	27.2
2008	1.6776	0.0705	23.8
2009	1.9564	0.0699	28
2010	1.3231	0.0698	19
2011	1.4355	0.0697	20.6
2012	-1.5135	0.0697	-21.7
2013	-1.042	0.0692	-15.1
2014	-5.5374	0.0691	-80.1
2015	-5.0746	0.0689	-73.6
2016	-5.3894	0.0687	-78.4
2017	-5.4092	0.0689	-78.5
2018	-5.3233	0.0688	-77.4

Observations 78,964
R² 0.5254
Adjusted R² 0.5253

Table 15 Coefficient of Variation in Mean Scale Score Explained by Poverty Rate and Incident Rate

OLS Model: CV of Mean Scale Score=	Coefficient	Std. Err.	t
Intercept	13.4454	0.0561	239.8
Poverty Rate	0.94	0.0506	18.6
Incident Rate	14.0132	0.6044	23.2
Interaction: Poverty Rate x Arrest Rate	-17.4411	0.795	-21.9
Test Type: Math=1, Reading=0	-0.4634	0.0215	-21.5
Grade Dummies			
Grade 8	0.3213	0.0265	12.1
Grade 11	-1.5924	0.0292	-54.6
Year Dummies (1999 dropped)			
2000	0.2714	0.0723	3.8
2001	0.6427	0.0721	8.9
2002	0.9581	0.0719	13.3
2003	2.0134	0.0717	28.1
2004	2.7802	0.0715	38.9
2005	2.8024	0.0712	39.3
2006	1.7293	0.071	24.4
2007	2.0711	0.0711	29.2
2008	1.7949	0.0708	25.4
2009	1.9718	0.0703	28
2010	1.3607	0.0703	19.4
2011	1.462	0.0701	20.9
2012	-1.4629	0.0702	-20.9
2013	-0.9961	0.0696	-14.3
2014	-5.4855	0.0696	-78.9
2015	-5.0309	0.0694	-72.5
2016	-5.3481	0.0692	-77.3
2017	-5.366	0.0693	-77.4
2018	-5.316	0.0692	-76.8

Observations 78,964
R² 0.5197
Adjusted R² 0.5196

Table 16: Predicted Effects of Student Misconduct on Mean Scale Scores As a % of standard deviation of Mean Scale Scores (193.1)

Base Model Impact as % of Std dev of Mean Scale Score	Base Model with variable values:	Impact on Base Model Results with 50% Poverty Rate Reduction due to New Child Care Credit Impact
Panel A	LHS: Mean Scale Scores	
-43.1%	RHS: Median arrest rate, Median poverty rate	-21.5%
-46.8%	RHS: Median incident rate, Median poverty rate	-25.4%
Panel B	LHS: Mean Scale Scores	
-66.3%	RHS: 75 th percentile arrest rate, poverty rate	-33.9%
-69.5%	RHS: 75 th percentile incident rate, poverty rate	-39.8%
Panel C	LHS: Mean Scale Scores	
-100.5%	RHS: 90 th percentile arrest rate, poverty rate	-58.0%
-100.6%	RHS: 90 th percentile incident rate, poverty rate	-60.1%

Source: Non-stochastic simulation with Table 12 and 13 estimation results with marginal effects from distributions of arrest rate, poverty rate, and incident rate drawn from Table 1 and Table 2.

Table 17: Predicted Effects of Student Misconduct on Coefficient of Variation (CV) in Mean Scale Scores as a % of Standard Deviation of the Coefficient of Variation (CV) in Mean Scale Scores (4.361)

Base Model Impact as % of Std dev of CV of Mean Scale Score	Base Model with variable values:	Impact on Base Model Results with 50% Poverty Rate Reduction due to New Child Care Credit Impact
Panel A	LHS: CV of Mean Scale Scores	
7.0%	RHS: Median arrest rate, poverty rate	3.5%
10.2%	RHS: Median incident rate, poverty rate	5.0%
Panel B	LHS: CV of Mean Scale Scores	
14.1%	RHS: 75 th percentile arrest rate, poverty rate	7.6%
15.4%	RHS: 75 th percentile incident rate, poverty rate	13.7%
Panel C	LHS: CV of Mean Scale Scores	
15.4%	RHS: 90 th percentile arrest rate, poverty rate	18.1%
17.5%	RHS: 90 th percentile incident rate, poverty rate	20.2%

Source: Non-stochastic simulation with Table 14 and 15 estimation results with marginal effects from distributions of arrest rate, poverty rate, and incident rate drawn from Table 1 and Table 2.