What's the Role of Schools in Juvenile Crime?

Yu XIA
Department of Law,
School of Politics & Law and Public Administration,
Hubei University, China

ABSTRACT

This paper analyzed students' discipline behavior at school and its relationship with their crime outcome afterward. The analysis is based on a sample of 98863 students in Texas Public School System of U.S. who were at Grade 5 in school year 2001. To control for non-randomness of class assignment, "additional" fixed effect is added. The result shows that for those who have a discipline breaching history, exposure to bad or "criminal" peers could increase the probability of breaching again in the future. However, for those who do not have such history, the exposure, on the contrary, could lower their probability of breaching the discipline. I also find that for those dropping out during high school, "bad" peer exposure could increase ever-discipline-violators' probability of being arrested in the future, while this kind of exposure makes never-violators less likely to be arrested. And this effect is especially salient for the most serious discipline violations.

1. Introduction

Crime is a wide-spread and important social phenomenon across countries, the prevention of which has countless economic and social benefits. The study of crime, as a result, has drawn the attention of researchers from various fields, such as psychology, sociology and economics, to name a few. In the arena of economics, the origin of crime is generally studied in the framework of cost-benefit analysis. The cost of crime includes the suffering of punishment if arrested, the opportunity cost of lost income due to incarceration, and so on. The benefit of crime could refer to the economic value obtained from the criminal activities and psychological satisfaction, if there is any. Thus, researchers tend to relate the labor market outcomes, law enforcement and psychological anomalies to the interpretation of crime. For example, in their prominent analysis of beauty and crime, Mocan and Tekin (2010) find that the ugly people are generally at a disadvantage in labor market, and thus face a lower opportunity cost of committing a crime. In another paper, Mocan and Rees (2005) investigates the determinants of criminal activity among juveniles in the United States, and finds that employment opportunities and policies designed to increase the probability of arrest may be effective tools for reducing juvenile crime. Lochner and Moretti (2004) analyze the relationship between education and crime, and find

that education could reduce the occurrence of crime, mainly due to the improved labor market outcomes brought by education. In addition, they points out that enhanced cognitive ability and less exposure to off-school life when young also contribute to the reduction of crime behavior.

However, Glaeser et al (1996) show that crime exhibits extremely high variance across time and space and that only a small portion of this could be explained by detailed measures of fundamental economic and social conditions. Thus, as Bayer, Hjalmarsson and Pozen (2008) point out, empirical research has documented evidence consistent with the possibility that social interactions are of first-order importance in criminal behavior. Then they studies the peer effect of criminals in the prison, making use of the micro-data on over 8000 individuals serving time in 169 juvenile correctional facilities during a two-year period in Florida. And they conclude that, criminals are learning the skills of crime when in prison, which confirms a famous saying relating to prison: I went in with a bachelor of marijuana and came out with a doctorate of cocaine.

A natural question here to ask is that: does school or education has an effect on crime only through providing better job market outcome? Do criminals learn to make crime only through peer effect in out-of-school social life or behind the bars? Could school be a place where crime knowledge is learned and thus an origin of crime? If so, what's the micro mechanism behind this? A large part of juvenile crimes happen when the criminals are in school, which informally provides the answer to the questions above. However, little empirical research has been done on this topic, partly because schools are generally thought as an institution of providing education service to people, not a place to train people how to make crime. Young children are under critical development stage when in school, both physical and psychological, and if there does exist some mechanism or origin of crime in school, to identify and clear it would have enormous social and economic benefits.

This paper tries to fill this gap by analyzing the peer effect of discipline behavior among a cohort of primary students, and looking into the relationship between the discipline behavior of them and the criminal outcome several years later.

2. Data Description
2.1 Texas Department of Education Data

To analyze the peer effect of discipline behavior, I make use of Department of Education Data in the state of Texas, U.S. The data set includes the discipline records of all the students of grade 1 to 12 under Texas public school system from 1997 to 2008. The variables in the data include the social security number of students, academic year, school code, sex, ethnic, discipline code, entry reason code, grade placement, if the student eligible for a free lunch or not, aggregate days present during the year, and aggregate days absent. The key variable is the discipline code or the type of infraction, which is the primary reason for which a student has received a particular disciplinary action. The code value and its explanation are listed in table 1.

Table 1: Discipline Code and its Explanation

Code Value	Infraction
01	Willful disobedience
02	Treats an authority with disrespect
03	Makes an unfounded charge against authority
04	Uses profane and/or obscene language
05	Is guilty of immoral or vicious practices
06	Is guilty of conduct or habits injurious to his/her associates
07	Uses or possesses any controlled dangerous substances governed by law
08	Uses or possesses tobacco or lighter
09	Uses or possesses alcoholic beverages
10	Disturbs the school or habitually violates any rule
11	Cuts, defaces, or injures any part of public school building
12	Writes profane and/or obscene languages or draws obscene pictures
13	Possess weapons as defined in section 921 or title 18 or the US code.
14	Possesses firearms, knives, or other implements, which can be used as weapons
15	Throws missiles liable to injure others
16	Instigates or participates in fights while under school supervision
17	Violates traffic and safety regulations
18	Leaves school premises or classroom without permission
19	Is habitually tardy or absent
20	Is guilty of stealing
21	Commits any other serious offense
22	Murder
23	Assault and/or battery
24	Rape and sexual battery
25	Kidnapping
26	Arson
27	Criminal damage to property
28	Burglary
29	Misappropriation with violence to the person
30	Discharge or use of weapons prohibited by federal law
31	Possesses pocket knife with a blade length of less than 2.5 inches
32	Serious bodily injury
33	Use of medication in a manner other than prescribed
34	Possession of body armor
35	Bullying

Source: Manuals for the Department of Education in Texas

Because there are too many categories of discipline violation, to facilitate empirical analysis, I re-categorize the violations into 4 groups. The first group consists of 01-06 categories, which could be considered as minor discipline problems. The second group consists of 07-13 categories, which is more severe than group one. The third group consists of 14-24 categories, which is very close to the violence crime and theft in characteristics. And the last group consists of 25-35 categories, which has the nature of severe crime. To simplify the analysis, I only choose one cohort of students, who were grade 5 primary students in 2001. Of course, this choice is very arbitrary, and when time is allowed, more robust and sensitive research is with no doubt worthwhile. In this sample, there are lots of students transferring to other schools frequently, but also leave records there. This results in many records in different schools for a student in a specific year. To simplify analysis, I just drop the records where the aggregate present days in the school year are less than 50 days. Further on, I notice that a large part of the cohort did not finish the high school, and drop out in the middle. This will create a problem of selection bias if I use the panel data from 1997 to 2008. It is obvious that this problem could be addressed in future research, but at the time being, and as a tentative research in this topic, I just choose 2 years: 2002 and 2003. During this period, the proportion of dropouts is very negligible, and I kick them out of the sample. (The sample selection problem should be minor in this case, since the dropouts in 2 years are negligible.) To capture the peer effects, I construct a peer measurement, which is simply the sum of the number of discipline violations for a class in a specific year.

Table 2 presents the descriptive statistics of the variables I am using. It shows that white and black constitute most of the sample. About 51.89% students are male. 65.41% students are eligible for free or reduced price lunch on average. Freelunch status could proxy for the family income status of the student, i.e. poor students will tend to be eligible for free or reduced price lunch. On average, 20.18% students are recorded as group one violation; 13.58% students are recorded as group two violation; 16.38% students are recorded as group three violation; and 6.48% students are recorded as group four violation. Peer1 to Peer4 refer to the sum of the number of discipline violations for a class in a specific school year, for group one to four discipline respectively, which capture the peer influence faced by a student. It shows that as the severity of discipline violation increases, the average number of violation decreases, which is within our expectation. You might suggest that it would be better if we could add some neighborhood information into the analysis, such as the average income of the district the student lives in, the crime rate of that district, and the unemployment rate of it. Actually, I could do this, for the data set provides the zip code of the student's family, and then I could extract these kinds of information using FBI regional crime data and census data. However, due to data limitation, it will be left to future research.

Table 2: Descriptive Statistics

Variables	N	Mean	Standard Deviation
Demographic			
Black	61691	.5304188	.4990759
Asian	61691	.0098123	.0985701
Hispanic	61691	.0133804	.1148975
White	61691	.4387286	.4962336
Male	61691	.5189207	.4996439
Freelunch	61691	.6541974	.4745312
Absent_ratio	61691	.0733678	.08846
Less170	61691	.2136	.4099
Discipline			
Disp1	61691	.2018	.04013
Disp2	61691	.1358	.3426
Disp3	61691	.1638	.3701
Disp4	61691	.0648	.2462
Peer measurement			
Peer1	61691	78.077	83.66
Peer2	61691	43.61	59.05
Peer3	61691	45.80	48.75
Peer4	61691	18.65	33.52

Note: Data description: Black: 1 if the student is black, 0 otherwise; Asian: 1if student is Asian, 0 otherwise; Hispanic: 1 if student is Hispanic, o otherwise; White: 1if student is white, 0 otherwise; Male: 1 if the student is male, 0 otherwise; Freelunch: 1 if the student is eligible for free or reduced price lunch, 0 otherwise; Absent_ratio: the ratio of absent days in present days; Less170: 1 if the student's total present days are less than 170, 0 otherwise; Disp1: 1 if the student belongs to group one violation, 0 otherwise; Disp2: 1 if the student belongs to group two violation, 0 otherwise; Disp3: 1 if the student belongs to group three violation, 0 otherwise; Disp4: 1 if the student belongs to group four violation, 0 otherwise; Peer1: peer measurement for group one violation, which is the sum of the number of group one violation for a class in a specific school year. Peer2: peer measurement for group two violation, which is the sum of the number of group two violation for a class in a specific school year. Peer3: peer measurement for group three violation, which is the sum of the number of group three violation for a class in a specific school year. Peer4: peer measurement for group four violation, which is the sum of the number of group four violation for a class in a specific school year.

2.2 The Department of Correction Data in Texas

It is an inclusive data set, and has information of the inmates who were sent to prison during the period of 1997 and 2009. The information includes the demographic information, the crimes they

have committed, the sentence of their crime, the risk level of the inmates, and their education, skills and careers before they went to jail, etc. For this paper, I only care about if the student's social security number is listed in this database, i.e. if they committed a crime and got arrested after graduation. The main purpose is to investigate the relationship between the discipline behavior at school and the criminal outcome after graduation. The difficulty here is that: the time of high school graduation is so far away from the year I observe their discipline behavior, that a large portion of students drop out before they could graduate at grade 12, and some even could not finish their secondary school. In this case, the years of exposure to out-of-school life are different, which might influence the crime outcome differently, if we suppose that in-school education and out-of-school experience have statistically different mechanism in affecting crime outcome. To correct this problem, I will subdivide the cohort into 3 groups: one group who leaves the school before grade 8, one group leaving school before grade 12, and one group who successfully finishes their high school.

3 Empirical Methodologies

The first part of the empirical research is to analyze the peer effect of discipline behavior among students. Because the assignment of students to each class is not random, I employ here the method of Bayer, Hjalmarsson and Pozen (2008) to correct this problem. The general specification that I take to the data can be written as:

$$\text{Disp}_{ijt}^{h} = \beta_0\left(\text{Disp}_{ijt-1}^{h} * \text{Peer}_{ijt-1}^{h}\right) + \beta_1\left[\left(1 - \text{Disp}_{ijt-1}^{h}\right) * \text{Peer}_{ijt-1}^{h}\right]$$

$$+ X_{ijt}\gamma + \lambda_j + \text{Disp}_{ijt-1}^{h} * \mu_j + \varepsilon_{ijt}^{h} \qquad (1)$$

The dependent variable, Disp_{ijt}^{h} indicates whether individual i in class j, violates the discipline of type h, in school year t. Peer_{ijt-1}^{h} describes a student's exposure to peers who violate the discipline of type h in class j and school year t-1. X_{ijt} is a vector of individual demographic variables.

The emphasis of this specification is discipline-specific peer effects, i.e. does the increased exposure to peers with some type of discipline violation make a student more likely to violate the same type of discipline? These crime-specific peer effects are captured by the parameters β_0 and β_1. It should

also be noted that β_0 and β_1 could be different. That is, the peer effect for a student who has the same discipline violation history may be different from the peer effect for a student who has no such violations. As Bayer, Hjalmarsson and Pozen (2008) point out: the existing literature demonstrates that juvenile offenders show tendencies to specialize, i.e. recidivate in the crime category in which they already have a criminal history. This specification allows us to test this phenomenon.

Another important feature of this specification is the inclusion of class-times-prior violation fixed effects. λ_j is the common fixed effect applying to all the students in the same class, and μ_j is an additional fixed effect applying to individuals with a history of discipline violation type h, Disp_{ijt-1}^{h}.

Bayer, Hjalmarsson and Pozen (2008) state that, the inclusion of the additional fixed effect could control for the non-random assignment of individuals to classes, and any unobserved differences correlated across all students in a class.

The second part of the empirical research will relate the discipline behavior, peer effect with the crime outcome after the students leave schools. In theory, the crime outcome after school is a function of discipline behavior in school, the academic scores, the time spent at school, and the time spent off school, the crime rate of the region, the law enforcement of the region, the family background, the demographic information, the psychological condition, the unemployment rate of the region and so on. To be specific, we have the following general function in mind:

$$
\begin{aligned}
R_{it} = f(&\text{discipline behavior, academic score, time spent at school, time spent off school}\\
&\text{the crime rate of the region, law enforcement, family background, demographic,}\\
&\text{psychological condition, unemployment rate of the region})
\end{aligned}
\tag{2}
$$

Where R_{it} refers to whether individual i is in prison at time t. For the explanatory variables, academic score captures the cognitive ability and possible better labor market outcome after graduation; time spent at school, and time spent off school are used to control for possible different mechanisms of in-school and off-school experience in producing crime. Law enforcement controls for the probability of being arrested if a crime is committed. And regional unemployment rate captures the effect of labor market outcome on crime.

Our main interest lies in the effect of discipline behavior of students and its peer effect on crime outcome when they leave school. Because many discipline violations are so similar to crime, I suppose that controlling for other things, the students who are tending to break the disciplines will have such a habit or skill that when they leave school, they will commit crime in the same category. Furthermore, if peer effect exists in the discipline violation, then how to reduce this kind of peer effect, and how to design special programs to reduce students' discipline violation will have positive policy implication in reducing crime.

In this part, I will make the following specification:

$$R_i = \beta_0\left(Disp_{ij}^h * Peer_{ij}^h\right) + \beta_1\left[\left(1 - Disp_{ij}^h\right) * Peer_{ij}^h\right]$$

$$+ X_{ij}\gamma + \lambda_j + Disp_{ij}^h * \mu_j + \varepsilon_{ijt}^h \tag{3}$$

Here, R_i refers to whether the student i is listed in directory of Department of Correction, and

$Disp_{ij}^h$ means if the student i makes a discipline violation of type h in class j, during 2003 to 2004.

$Peer_{ij}^h$ means the peer exposure of students. In this specification, I also control for non-randomness

of students assignment by adding additional fixed effect. We should note that a lot of important control variables are missing here, such as academic scores, law enforcement condition, and unemployment rate of region, etc.

Because there is a relatively long time span between 2004 and 2008, which is the year that the students will graduate from high school, many students drop out in the middle. To control for the time spent in school and off-school, I divide the cohort into 3 groups: the students who drop out before grade 8; the students who drop out when they are in high school; and those who successfully finish their high school.

4 Results

4.1 Peer Effect of Discipline Behavior

Table 3 presents the main results for the peer effects of discipline behaviors. The linear probability model is used here, and estimated by OLS with clustered standard error. The control variables include Less170, Absent_ratio, Male, Freelunch, White, Hispanic, and Black; common fixed effect and individual fixed effect are employed. As mentioned above, it should be better if I include in the model other relevant background information, such as the family background, the academic scores, the IQ of students, the psychological appraisal, and the crime rate in the region where the students live in, etc. However, due to data limitation, these will be left for future research.

As we expect, Less170 has a significant positive coefficient, which means that the students who play truancy regularly tend to violate school disciplines, regardless of which type of discipline. It is possible that the students who play truancy have more habits of breaching the discipline, or it is simply because they learn to breach the law, even commit a crime when they play truancy, for example, in the bar or in the street. In this case, the off-school experience has a role. But the emphasis of this paper is about the role of in-school experience in discipline violating behavior. Thus adding Less170 into the regression could control for the off-school experience to some extent. Freelunch is a variable indicating whether the student is eligible for a free or reduced-price lunch at school. Generally, only students from low income families could get this privilege. The result shows that students from poor families are more tending to breach the discipline, implying that family background has an important role in discipline behavior. Again, black students violate the discipline more often.

The result of peer effect is rather surprising. For a student who has a discipline breaching history, the exposure to peers who also breach the same category of discipline, will increase his/her probability of breaching the same kind of discipline in the next year. The effect is statistically significant for all four categories of discipline, and it is significant economically as well. For a student with a history of past violation, at the mean of $Peer^1_{ijt-1}$, a standard deviation increase of $Peer^1_{ijt-1}$ will increase the probability of recidivism by 93.77*0.0008365=7.84%! For type-three discipline violation, the effect of peers is even higher: 52.39*0.002100=11.01%! However, for those who do not have a history of violation, the exposure to peers who do violate some kind of discipline, will lower their probability of breaching that category of discipline! The effect is statistically and economically significant. For type-one discipline violation, one standard deviation increase of $Peer^1_{ijt-1}$ will lower the probability of violation by 4.97%. For type-three discipline violations, one standard deviation increase of $Peer^3_{ijt-1}$ will lower the probability of violation by 6.93%! But how shall we explain the result? One possible interpretation is that: if a student did not breach the discipline even exposed to more "criminal" peers, he/she might have some different "anti-crime" characteristics which makes him/her less likely to breach the discipline in the future.

To make the results more robust, I re-estimate the model using Probit method. The result is listed in Table 4. The conclusion there has little changes. But the interpretation of the coefficients should be different from above, due to Probit specification.

Table 3: Peer Effects of Discipline Violations

Note: OLS estimation is applied. The lower number is t-value, and the standard error is clustered by classes. Common fixed effect and additional fixed effect are added.

Dependent Variable=	Disp1	Disp2	Disp3	Disp4
Less170	0.08564	0.09012	0.1556	0.09206
	12.04	16.34	16.66	10.34
Absent_ratio	0.7582	0.6002	1.3122	0.6114
	20.14	20.89	15.95	9.56
Male	0.08008	0.07344	0.06521	0.05937
	24.13	18.09	9.77	12.17
Freelunch	0.04671	0.03866	0.05322	0.03583
	10.24	8.33	6.56	4.13
White	0.01989	0.02113	-0.03453	0.02025
	2.34	1.88	-2.40	1.72
Hispanic	0.02882	0.02984	0.006112	-0.0098
	1.76	2.94	0.30	-0.61
Black	0.1122	0.07248	0.1332	0.08900
	11.42	6.53	8.69	7.71
$Disp_{ijt-1}^{h} * Peer_{ijt-1}^{h}$	0.0008365	0.0008447	0.002100	0.000919
	14.91	7.55	9.04	4.75
$(1 - Disp_{ijt-1}^{h}) * Peer_{ijt-1}^{h}$	-0.0005523	-0.0008546	-0.001470	-0.001431
	-10.02	-8.92	-8.64	-5.86
N	98863	98863	98863	98863
R^2	0.076	0.0796	0.2965	0.1054

Table 4: Peer Effects of Discipline Violations (Robust Check)

Dependent Variable=	Disp1	Disp2	Disp3	Disp4
Less170	0.3487	0.3982	0.3407	0.3806
	13.79	18.80	17.07	14.42
Absent_ratio	3.0085	2.3738	2.6522	2.2251
	22.30	28.57	33.56	22.00
Male	0.3354	0.4321	0.2052	0.3620
	20.54	27.08	14.24	17.84
Freelunch	0.2507	0.2071	0.2335	0.1439
	13.81	10.86	13.12	6.10
White	0.2347	0.2005	0.02241	0.1596
	3.37	2.73	0.33	1.79
Hispanic	0.2480	0.2900	0.1149	0.08111
	2.45	2.92	1.21	0.67
Black	0.7301	0.5371	0.4833	0.5575
	10.37	7.29	7.19	6.23
$\text{Disp}^h_{ijt-1} * \text{Peer}^h_{ijt-1}$	0.002613	0.002780	0.002357	0.001911
	12.56	10.12	9.28	4.95
$(1 - \text{Disp}^h_{ijt-1}) * \text{Peer}^h_{ijt-1}$	-0.002408	-0.002824	-0.002669	-0.002567
	-8.63	-10.10	-10.21	-6.56
N	58935	58935	58935	58935

Note: Probit estimation is applied. The lower number is t-value. Common fixed effect and additional fixed effect are added.

4.2 School Discipline and Crime Outcome afterward

Table 5-7 shows the relationship between students' discipline behavior in school and the crime outcome afterward. Crime is a dichotomy variable, which equals 1 if the student is listed in the directory of Department of Correction of Texas by 2009, and equals 0 otherwise. The main interest of this paper is to unveil the role of school discipline behavior and its peer effect in the crime outcome when the students leave schools. As discussed above, crime is a function of various variables, including the labor market condition, the education and skills of the people, the crime rate of the region, and the law enforcement, etc. I could not collect most of these kinds of information at this time being, and will leave it for future research. Furthermore, we should notice that the role of in-school experience and off-school experience in crime outcome could be different in essence. But for the sample in this paper: the cohort of students who were at grade 5 in school year 2001, some will drop out before grade 12, while others could leave as high school graduates. As a result, the cohort of students will be exposed to different length of off-school experience. To control for different off-school experience and different education level, I divide the cohort into 3 groups: one group who leave school before grade 9; one group who leave school before grade 12; and the third group who successfully graduate from high school.

Table 5 lists the result for the group who drop out before high school. Less170 and Absent_ratio have expected coefficients: they are positive and statistically significant, meaning that the students who are playing truancy are more likely to commit crime afterward. Black and Male people are more likely to commit crime. However, Freelunch is negative and insignificant, which is quite different from Table 3. The main result for this table is that, for this group, the discipline behavior and peer effect in 2003 have little explanatory power over their crime outcome by 2009. Maybe this is because from 2004 (the last year they should drop out) to 2009 is such a long period that the off-school experience dominates the determination of crime outcome. However, our specification does not control for off-school experience in every detail.

Table 5: School Discipline and Crime Outcome

Dependent Variable=	Crime[1]	Crime[2]	Crime[3]	Crime[4]
Less170	0.0241114	0.0245176	0.0242229	0.0243684
	5.42	5.49	5.46	5.45
Absent_ratio	0.1228104	0.1264079	0.1236845	0.1255290
	5.13	5.31	5.26	5.30
Male	0.0436168	0.0439646	0.0437078	0.0438246
	10.63	10.60	10.56	10.59
Freelunch	-0.0018846	-0.0017595	-0.0020182	-0.0017539
	-0.47	-0.44	-0.51	-0.44
White	0.0154463	0.0159875	0.0157517	0.0159979
	2.04	2.11	2.08	2.12
Hispanic	0.0112845	0.0116419	0.0114598	0.0116831
	0.91	0.93	0.92	0.94
Asian	0.0125475	0.0128071	0.0125024	0.0128745
	1.19	1.21	1.19	1.22
Black	0.0431221	0.0442525	0.0435526	0.0441276
	5.14	5.28	5.18	5.25
$\text{Disp}_{ij}^{h} * \text{Peer}_{ij}^{h}$	0.0004864	-0.0001062	0.0006518	-0.0002507
	1.12	-0.27	1.46	-0.55
$(1 - \text{Disp}_{ij}^{h}) * \text{Peer}_{ij}^{h}$	0.0000141	-0.0000309	0.0000551	-0.0004640
	0.05	-0.11	0.13	-1.17
N	7881	7881	7881	7881
R^2	0.0998	0.1522	0.1003	0.1696

[1] In this specification, h=1, that is, it relates the crime outcome with the type one discipline violation at school.
[2] In this specification, h=2, that is, it relates the crime outcome with the type two discipline violation at school.
[3] In this specification, h=3, that is, it relates the crime outcome with the type three discipline violation at school.
[4] In this specification, h=4, that is, it relates the crime outcome with the type four discipline violation at school.

Note: Crime =1 if the student is listed in the directory of Department of Correction by 2009, and Crime=0 otherwise. The sample is the cohort of students who were grade 4 in school year 2000, and who drop out before high school. The Disp and Peer are measured in school year 2003. OLS estimation is applied. The lower number is t-value, and the standard error is clustered by classes. Common fixed effect and additional fixed effect are added.

Table 6 presents the result for the group who drop out during high school. Again Less170, Absent_ratio, Male, and Black all have expected coefficients. However, Freelunch has a positive and statistically significant coefficient. So in this case, students from poor families are more likely to commit crime, which is similar to the result for school discipline violation. What surprises us here is that

$\left(1 - \text{Disp}_{ij}^{h}\right) * \text{Peer}_{ij}^{h}$ all have negative coefficients and they are statistically significant! It means that for

those who did not violate the discipline at school, the more exposure to "criminal" peers, the less likely they will commit a crime afterward. For type one discipline violation, one standard deviation increase of "criminal" peer exposure will lower the probability of being arrested by 0.733%! The

coefficients of $\text{Disp}_{ij}^{h} * \text{Peer}_{ij}^{h}$ are all positive, and for type four discipline violation, which is the most

serious, the coefficient is statistically significant! It means that for those who ever breached school disciplines, the more exposure to "criminal" peers, the more likely they will be arrested afterward. For those who breached the most serious disciplines at school, one standard deviation increase of "criminal" peer exposure will increase the probability of being arrested by 15.76*0.0005417=0.85%!

Table 6: School Discipline and Crime Outcome

Dependent Variable=	Crime[5]	Crime[6]	Crime[7]	Crime[8]
Less170	0.01902	0.0200938	0.0198284	0.0202903
	6.37	6.74	6.61	6.76
Absent_ratio	0.1389	0.1480544	0.1448992	0.1499893
	8.21	8.64	8.55	9.03
Male	0.04930	0.0498141	0.0501763	0.0504393
	20.81	20.99	21.11	21.28
Freelunch	0.007656	0.0079891	0.0079823	0.0081818
	3.05	3.16	3.16	3.23
White	0.01030	0.0102308	0.0100017	0.0098795
	1.03	1.03	1.00	1.00
Hispanic	0.001163	0.0016805	0.0013535	0.0017038
	0.10	0.14	0.11	0.14
Asian	0.03066	0.0302345	0.0294344	0.0298494
	1.83	1.81	1.76	1.79
Black	0.03142	0.0334432	0.0327226	0.0335349
	3.00	3.25	3.13	3.28
$\mathrm{Disp}_{ij}^{h} * \mathrm{Peer}_{ij}^{h}$	0.0002321	0.0000846	0.0001723	0.0005417
	1.54	0.50	1.05	2.26
$\left(1 - \mathrm{Disp}_{ij}^{h}\right) * \mathrm{Peer}_{ij}^{h}$	-0.0004969	-0.0004405	-0.0004431	-0.0004233
	-3.45	-2.45	-3.18	-2.17
N	20863	20863	20863	20863
R^2	0.102	0.0833	0.1544	0.1809

Note: Crime =1 if the student is listed in the directory of Department of Correction by 2009, and Crime=0 otherwise. The sample is the cohort of students who were grade 4 in school year 2000, and who drop out during high school. The Disp and Peer are measured in school year 2003. OLS estimation is applied. The lower number is t-value, and the standard error is clustered by classes. Common fixed effect and additional fixed effect are added.

Table 7 shows the result for the group who graduate from high school. Except for Less170, Absent_ratio and Male, other variables are seldom significant. Despite this, the coefficients of $\left(1 - \mathrm{Disp}_{ij}^{h}\right) * \mathrm{Peer}_{ij}^{h}$ and $\mathrm{Disp}_{ij}^{h} * \mathrm{Peer}_{ij}^{h}$ all have the same sign as Table 6. In fact, this result is not difficult to explain: after graduation from high school, a very large part will go to college and leave

---

[5] In this specification, h=1, that is, it relates the crime outcome with the type one discipline violation at school.
[6] In this specification, h=2, that is, it relates the crime outcome with the type two discipline violation at school.
[7] In this specification, h=3, that is, it relates the crime outcome with the type three discipline violation at school.
[8] In this specification, h=4, that is, it relates the crime outcome with the type four discipline violation at school.

little room to commit a crime. Even for those who did not go to college, the time span between 2008, the year they graduate, and 2009 is too short to commit a crime and be arrested! Actually, for the sample of 30191 students, only 98 students were arrested by 2009. This makes the result very difficult to be statistically significant!

Table 7: School Discipline and Crime Outcome

Dependent Variable=	Crime[9]	Crime[10]	Crime[11]	Crime[12]
Less170	0.0034294	0.0034442	0.0035450	0.0034375
	2.17	2.19	2.24	2.18
Absent_ratio	0.0287478	0.0290917	0.0301174	0.0291474
	2.99	3.04	3.09	3.09
Male	0.0044118	0.0044041	0.0044714	0.0044208
	7.00	6.98	7.03	7.03
Freelunch	0.0005825	0.0005958	0.0006267	0.0006071
	0.92	0.94	0.99	0.96
White	-0.0029123	-0.0029278	-0.0028966	-0.0028994
	-0.73	-0.74	-0.73	-0.73
Hispanic	-0.0041797	-0.0042217	-0.0041496	-0.0041846
	-1.05	-1.06	-1.04	-1.05
Asian	-0.0009972	-0.0010282	-0.0009849	-0.0009451
	-0.21	-0.22	-0.21	-0.20
Black	-0.0002508	-0.0002426	-0.0000743	-0.0001745
	-0.06	-0.06	-0.02	-0.04
$\text{Disp}_{ij}^{h} * \text{Peer}_{ij}^{h}$	0.0000411	0.0000890	0.0000036	0.0002142
	0.99	1.38	0.07	1.27
$(1 - \text{Disp}_{ij}^{h}) * \text{Peer}_{ij}^{h}$	-0.0000287	-0.0000099	0.0000067	-0.0000729
	-1.14	-0.44	0.20	-1.96
N	30191	30191	30191	30191
R^2	0.03894	0.03890	0.03888	0.03898

Note: Crime =1 if the student is listed in the directory of Department of Correction by 2009, and Crime=0 otherwise. The sample is the cohort of students who were grade 4 in school year 2000, and who finish high school education. The Disp and Peer are measured in school year 2003. OLS estimation is applied. The lower number is t-value, and the standard error is clustered by classes. Common fixed effect and additional fixed effect are added.

---

[9] In this specification, h=1, that is, it relates the crime outcome with the type one discipline violation at school.
[10] In this specification, h=2, that is, it relates the crime outcome with the type two discipline violation at school.
[11] In this specification, h=3, that is, it relates the crime outcome with the type three discipline violation at school.
[12] In this specification, h=4, that is, it relates the crime outcome with the type four discipline violation at school.

5 The Conclusion

The relationship between education and crime has been studied extensively in economic literature. However, until now, the emphasis of this field of research has mainly dealt with the effect of enhanced labor market outcome, due to education, on crime behavior. The question here is: is there any other micro-mechanism which relates education to crime? Controlling for labor market condition, demographic information, and other neighborhood condition, does education or schooling itself have a role in students' crime behavior afterward?

This paper explores students' discipline behavior at school, and its relationship with their crime behavior afterward. As a first attempt, the results are very preliminary and abounded with problems. However, some interesting results emerge anyway. First, it shows that the exposure to "bad" or "criminal" peers could increase the probability of breaching the discipline for the students who have such kind of breaching history. However, for those who did not breach the discipline in the past, the exposure, on the contrary, decreases the probability of breaching in the future. Second, for those dropping out before high school, the discipline behavior at school has no statistically significant effect on their crime outcome afterward. Maybe this is because the off-school experience dominates the determination of crime behavior in this case. For those dropping out during high school, the "criminal" peer exposure could increase the probability of being arrested for those having a history of breaching disciplines at school. And this effect is salient for the most serious discipline violation. For those who did not have this kind of history, however, the "criminal" peer exposure could decrease the probability of being arrested!

References

Bayer, Patrick, and Pozen, David, 2005. The Effectiveness of Juvenile Correctional Facilities: Public versus Private Management. J. Law and Econ, 48(2): 549-90.

Glaeser, Edward L.; Sacerdote, Bruce; and Scheinkman, Jose A, 1996. Crime and Social Interactions. Quarterly Journal of Economics, Vol.111.

Hanushek, Eric, John Kain, and Steven Rivkin, 2004. Disruption Versus Tiebout Improvement: The Costs and Benefits of Switching Schools. Journal of Public Economics, 88(9-10): 1721- 1746.

Jacob, Brian A., and Lefgren, Lars, 2003. Are Idle Hands the Devil's Workshop? Incapacitation, Concentration and Juvenile Crime. American Economic Review, 93(5).

Kremer, Michael, and Levy, Dan, 2002. Peer Effects and Alcohol Use Among College Students. Cambridge, Mass.: NBER Working Paper No. 9876.

Ladd, Anthony, John Marszalek and Duane Gill, 2008. The Other Diaspora: New Orleans Student Evacuation Impact and Response Surrounding Hurricane Katrina. [http://www.ssrc.msstate.edu/katrina/publications/katrinastudentsummary.pdf].

Lance Lochner and Enrico Moretti, 2004. The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports. American Economic Review, Vol. 94, No.1.

Lavy, Victor and Analia Schlosser, 2007. Mechanisms and Impacts of Gender Peer Effects at School. NBER Working Paper No. 13292.

Manski, Charles F, 1993. Identification of Endogenous Social Effects: The Reflection Problem. Review of Economics and Statistics, Vol. 60: 531-542.

McIntosh, Molly, 2008. Measuring the Labor Market Impacts of Hurricane Katrina Migration: Evidence from Houston, Texas. American Economic Review Papers and Proceedings, 98(2): 54-57.

Naci Mocan and Daniel I. Rees, 2005. Economic Conditions, Deterrence and Juvenile Crime: Evidence from Micro Data. American Law and Economics Review, Vol.7 No.2.

Patrick Bayer, Randi Hjalmarsson and David Pozen, 2008. Building Criminal Capital behind Bars: Peer Effects in Juvenile Corrections. NBER Working Paper.

Sacerdote, Bruce, 2001. Peer Effects with Random Assignment: Results for Dartmouth Roommates. Quarterly Journal of Economics, Vol. 116 : 681-704.