Does Restriction on Sexual Expression Deter Sexual Offenses?: Evidence of a Long-term Effect

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Abstract

Whether exposure to sexual expression stimulates or deters sexual offenses is a long-disputed issue. While some psychological studies argue that exposure to sexual expression exacerbates sexually aggressive tendencies and thus increases sexual offenses, recent empirical work suggests that such exposure rather deters sexual offenses, at least in the short term. However, the latter mainly focuses on the self-incarceration effect among potential criminals, which is unlikely in the longer term where constraint of time does not matter. In response, we provide novel evidence concerning the long-term effect of exposure to sexual expression.

We employ an exogenous variation on the introduction of a restriction on distribution of pornographic expressions to identify the causal effect of sexual expression regulations on various sexual offenses. We find that regulations increased the number of forcible indecencies (indecent assault) by 16%, but had no effect on rape. This difference is partly caused by the fact that the newly introduced restrictions focus on intermediate pornographic expressions and that the hard-core pornographic expressions are banned throughout the sample period. These findings imply that the catharsis effect of sexual expressions outweighs its arousal or imitation effect and cast doubt on the effectiveness of regulations in deterring sexual offenses in the long term.

Keywords: Sexual expression, sexual offenses, crime deterrence, media regulation, freedom of expression.

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1 Introduction

Children and young people are vulnerable to various external factors. In terms of one such factor, it is believed that the healthy development of children and young people is hindered when they are exposed to 'harmful' information such as violent or sexual expression. Consequently, to ensure their healthy development, many societies have been attempting to control the development of children and young people by restricting their exposure to such harmful external factors. One conventional technique to address this concern is to restrict juvenile access to violent or sexual expression with the aim of reducing external stimuli considered harmful to the development of juveniles.

Restriction of violent or sexual expression often becomes an important political agenda. For example, after a tragic high school shooting in Florida, President Trump argued that violence in video games and movies is responsible for shaping young people's thoughts and suggested some restrictions on what young people are seeing [1].

However, whether restricting the exposure of children and young people to potentially harmful external factors aids their healthy development has recently been called into question. Exposure to violent or sexual expression has been believed to exacerbate aggressive tendencies through arousal or imitation and to increase sexual offenses and other criminal behaviors in the long term. Nonetheless, recent empirical literature has cast doubt on this argument.

The most recent empirical literature stresses the importance of the self-incarceration effect among potential criminals, which argues that exposure to violent or sexual expression deters violent crimes or sexual offenses, at least in the short term, because potential criminals spend their time consuming violent or sexual expression, instead of actually committing criminal behavior. In other words, violent or sexual expression seems to have a substitution effect, or a deterrence effect, in the short term as well as a comple-

[1] https://twitter.com/CNN/status/966742099436752896 (accessed on June 18, 2018). Also see https://edition.cnn.com/2018/03/07/politics/donald-trump-video-games/index.html and http://time.com/5191182/trump-video-games-violence/ (both accessed on June 18, 2018).

mentary effect, or a crime-enhancing effect. In light of the substitution effect of violent or sexual expression, it remains unclear whether restricting exposure to violent or sexual expression decreases the total number of violent or sexual crimes, especially in the long term.

This paper provides novel evidence of the long-term effect of restricting exposure to sexual expression. To identify the causal effect, we investigate the variation among prefectures in Japan in introducing youth protection regulations that restrict exposure to violent, and especially, sexual expression. The introduction of youth protection regulations in Japan took place in two waves, the first around 1960 and the second around 1980, with the second mainly motivated by the proliferation of motorcycle gangs in Japan, which is a development exogenous to the occurrence of sexual crimes. We employ this exogenous variation to identify the causal effect of youth protection regulations.

We find that the introduction of youth protection regulations increased the number of forcible indecencies, which are moderate sexual offenses and include forcible kissings, huggings, touchings, and undressings, among others, but not rapings [2], by 16% in the long term. However, the introduction had no effect on rape, which is an intense sexual offense. Considering the fact that the youth protection regulation restricts the exposure to moderate sexual expressions and that hard-core sexual expressions are already banned across the country, our results support the substitution hypothesis, not the enhancement hypothesis, in the longer term. Our findings thus cast doubt on the effectiveness of the regulation of juvenile exposure to sexual expression.

The rest of the paper is structured as follows. Section 2 reviews the related literature, while Section 3 explains the background to the history of youth protection regulations in Japan. Section 4 describes the data, and Section 5 discusses possible hypotheses and their predictions. Section 6 discusses the empirical strategy used to identify the causal effect of youth protection regulations. Section 7 describes the empirical results, and Section 8

[2] In some other countries, comparable crime of forcible indecencies is called indecent assault. See also footnote 12.

discusses the results.

2 Related Literature

The conventional psychological literature, which are the theoretical foundations for regulation on sexual and violent expressions, employs laboratory experiments and stresses the importance of the complementary effect of violent or sexual expression. According to Anderson and Bushman (2001) and Anderson et al. (2003), which survey the psychological literature, there exist theoretically two conflicting effects caused by violent expressions. While the arousal or imitation hypothesis argues that violent expressions trigger aggressive tendencies, the catharsis hypothesis argues that violent expressions suppress aggressive tendencies. Anderson and Bushman (2001) and Anderson et al. (2003) point out that the laboratory experiments generally support the arousal or imitation hypothesis but do not support the catharsis hypothesis. In contrast, most recently Kühn et al. (2018) show that violent video games do not promote aggression, contrary to President Trump's assertion.

In contrast to the psychological literature, recent empirical studies stress the importance of a substitution effect. One of the earliest empirical approaches to this issue is Dahl and DellaVigna (2009). They analyzed whether media violence affects violent crime in the field by exploiting variation in the violence and the sales of blockbuster movies from 1995 to 2004. They found that violent crime decreases on days with larger theater audiences for violent movies, which is partly due to voluntary incapacitation, and that in the short term, violent movies deter almost 1,000 assaults on an average weekend. These results imply that media exposure affects criminal behavior not only via content but also via changes in time spent for performing alternative activities. Dahl and DellaVigna (2009) also found no evidence of medium-term effects up to three weeks after initial exposure.

While Dahl and DellaVigna (2009) provided evidence of media exposure in the short but not the long term, some other studies have attempted to provide long-term evidence.

For instance, Chiou and Lopez (2010) employed a popular reality show filmed in Laguna Beach, CA, and a difference-in-differences approach to analyze changes in the city's crime rates. They found that the overnight celebrity status of reality-based television cast members and filming locations may result in negative outcomes such as increased crime. Similarly, Ward (2010) exploited the Youth Risk Behavior Survey, which includes questions on video game play and fighting along with basic demographic information. He found that the overall link between video games and fighting is only modest and not statistically significant.

A slightly different strand of literature focuses on the substitution effect of entertainment on criminal behavior. Card and Dahl (2011) examined the link between family violence and the emotional cues associated with wins and losses by local professional football teams. They found that upset losses led to an increased rate of at-home violence by men against their wives or girlfriends, while losses when the game was expected to be close and upset wins had only small and insignificant effects. Similarly, Marie (2016) exploited information on football matches for London teams linked to detailed recorded crime data at the area level to estimate fan concentration, self-incapacitation, and police displacement effects. He found a negative away game attendance effect on crime because of the voluntary incapacitation of potential offenders attending a match. Montolio and Planells-Struse (2016) also analyzed the temporal effect of matches played by Futbol Club Barcelona on crimes in Barcelona and found a displacement effect in the case of thefts, criminal damage, robberies and gender violence. In contrast, Heaton (2012) studied the effects of the legalization of Sunday packaged liquor sales on crime, focusing on the phased introduction of sales in Virginia beginning in 2004, and found that the liberalization of trading hours increased minor crime by 5% and alcohol-related serious crime by 10%.

The closest study to our work is Bhuller et al (2013). They studied the link between Internet use and sex crimes employing unique Norwegian data on crime and Internet adoption. They found that Internet use was associated with a substantial increase in

both types of reports, along with charges and convictions of rape and other sex crimes, and argued that the direct effect on sex crime propensity is positive and nonnegligible, possibly as a result of the increased consumption of pornography. Their findings conflict with other empirical research, emphasizing the importance of the enhancing effect of exposure to sexual expression over its deterrence effect.

However, while the substitution effect basically assumes constraint of time in the short term, it is unlikely that such effect persists in the longer term because constraint of time does not matter in the longer time span. In the longer term, it is not at all clear whether the catharsis effect or the enhancing effect — arousal or imitation — has a critical impact on criminal behavior. This paper tries to fill this gap (see Table 1 for the summary of related literature).

3 Youth Protection Regulations in Japan

In Japan, like most other countries, the protection of children and young people has long been an important political agenda. [3] Children and young people are vulnerable to various stimuli, and no one wishes them to grow into actual criminals and those who would do harm to society, in the worst-case scenario.

One conventional approach to assist the healthy development of children and young people is to restrict their exposure to 'harmful' behavior and expression. For example, many countries have adopted motion picture content regulation systems, which classify films according to their suitability for immature audiences. For example, the U.S. employs a PG, PG-13, and R rating system, and Japan has a PG-12, R-15, and R-18 rating system. For the most part, picture content regulation systems attempt to restrict the exposure of immature audiences to violent or sexual films, because they are believed to exert undesirable effects on the development of children and young people. Similarly, many

[3] In Japan, the Cabinet Office and its predecessor institutions have been tackling this issue for decades by working with teachers, parents, development psychologists, and police to foster an appropriate environment for juveniles. See `http://www8.cao.go.jp/youth/` (accessed on June 18, 2018).

countries place restrictions on the drinking and smoking behavior of children and enforce regulations prohibiting the entrance of young people into red-light districts. These regulations are also intended to avoid undesirable effects on the development of children and young people.

Japan is no exception. Around 1960, the National Police Agency (NPA) tried to introduce regulation on harmful expression at the national level in order to prevent any future increase in sexual and violent crimes, but found that freedom of expression, which is guaranteed by the Constitution (Art. 21), constrained the introduction of further national regulation beyond the existing criminal law concerning distribution of obscene objects. The NPA then turned to the prefectures and requested that they introduce prefecture-level regulation governing sexual expression, albeit milder than the national criminal law concerning distribution of obscene objects (Penal Code Art. 175). [4] Responding to this request from the NPA, about half of prefectures introduced youth protection regulations around 1960.

Following this first wave of youth protection regulations, two social phenomena subsequently brought about the second wave. The first of these was an increase in motorcycle gang activity during the 1970s when many young people who had previously enjoyed riding motorcycles together formed motorcycle gangs [5]. While the growth of motorcycle gangs became a serious social issue after the 1970s, it was difficult to regulate them under the existing national regulations. Typically, motorcycle gangs gathered and rode during the night, which was indeed antisocial behavior, but not necessarily illegal [6]. However,

[4] Under Japanese constitutional law, municipality-level regulation, which is different from national regulation of the same kind, is allowed as long as the former has a different purpose from the latter. In the case of the regulation of sexual expression, the purpose of the national regulation is to protect public morals in general, while the purpose of the prefecture-level regulation is to protect the healthy development of children and young people. For this reason, the prefectures can easily insist that the purpose of their own regulations differs from that of national regulation. See the Supreme Court decision of September 19, 1989 (*Saiko Saibansho Keiji Hanreishu* vol. 43 no. 8 p. 785).

[5] Sato (1984), pp. 10-13.

[6] Road Traffic Act was reformed in 1978 to install "prohibition against acting in concert with another person in a dangerous or annoying manner" (Art. 68). While this reform was also intended to tackle the issue of motorcycle gangs, but its application is not so straightforward. In

the youth protection regulations, which prohibited midnight outings by children and young people, provided the police with a convenient tool to clamp down on motorcycle gangs. When motorcycle gangs would gather and ride bikes during the night, the police were able to arrest them under the youth protection regulations because they were gathering at midnight without reasonable cause.

The second phenomenon that pushed the further introduction of youth protection regulations was the spread of vending machines for pornographic magazines during the 1970s. While purchasing pornographic magazines face-to-face at bookshops is embarrassing, purchasing them through vending machines is not, and thus the mental barriers to purchase such material are reduced. Accordingly, many parents and teachers feared that vending machines would severely increase the exposure of children to sexual expression. Those prefectures that had already enacted youth protection regulations during the first wave were able to address vending machines for pornographic magazines through regulating the selling method. By contrast, other prefectures did not have any suitable tools to regulate the spread of vending machines for pornographic magazines. This was the second, although weaker, motive for the introduction of youth protection regulations [7].

These two social phenomena encouraged the remaining prefectures to enact a second wave of youth protection regulations around 1980. Only one prefecture, Nagano, remained without youth protection regulations until 2016. Table 2 and Figure 1 and 2 detail the timing of the enactment of youth protection regulations across the prefectures.

Importantly, even though the timing of enactment differed across prefectures, most had almost identical regulations, such that there was almost no variation in the content of regulation by prefecture. The common features of these youth protection regulations are threefold.

order to apply this regulation, the driving gang members need to be plural and their driving behavior needs to be 'dangerous'.

[7] The rise and fall of vending machines for pornographic magazines is well documented in Kurosawa (2017).

First, youth protection regulations place restrictions on the selling methods of 'harmful books'. Harmful books are those that include sexual, violent or other undesirable content. Whether a book is harmful is determined by a committee in each prefecture. However, violent expressions had not been the target of regulation until recently, and sexual expression alone had been the target of youth protection regulation for a long time [8].

When a book is designated as harmful, booksellers are subject to various restrictions, including those governing the methods of selling, browsing, and advertisement. In particular, booksellers are required to separate selling spaces for harmful books from those for 'normal' books, and the use of vending machines for selling harmful books is prohibited.

An important characteristic of the restriction on 'harmful books' is that it is an intermediate restriction. Because the hard-core pornographic expressions are already banned by the national law across the country, the target of youth protection regulations is intermediate pornographic expressions [9]. Before the introduction of youth protection regulation, it is free to distribute intermediate pornographic magazines and books. The introduction of youth protection regulations puts restrictions on selling methods for those expressions.

Second, youth protection regulations place restrictions on 'harmful behavior'. For example, sexual conduct with juveniles or sex brokerage involving them is prohibited. In addition, children and young people are prohibited from going out at night and entering sex-related areas.

Third, the coverage of youth protection regulations since the 2000s has expanded to cover the Internet. Because more and more 'harmful expression' is provided through the Internet instead of through books and magazines, it is no longer sufficient to place restrictions on booksellers to promote the healthy development of children and young people. Thus, youth protection regulations now require parents, cell phone businesses,

[8] Yamashita (1991).
[9] Yamashita (1991).

Internet service providers, and net cafes, among others, to install and supply filtering services for 'harmful information'.

Although these three features of youth protection regulations were originally intended to protect children and young people, there are variations in their anticipated effect. First, the restriction on selling methods has an effect not only on juveniles but also on the general public, because it is applicable to general customers as well as juvenile customers. By contrast, the effect of the restrictions on harmful behavior is primarily directed toward juveniles, not the general public. Regardless of any restrictions on harmful behavior, mature adults can still enjoy sexual conduct with each other and go out at night. Finally, the restrictions on the use of the Internet are arguably ineffective because they lack criminal or administrative sanctions. In addition, Internet use is unconstrained by prefectural borders, so any prefectural restriction regarding Internet use is almost meaningless. [10]

4 Data

We constructed a panel data set of 47 prefectures ($N = 47$) from 1948 to 2015 ($T = 68$). [11] However, we were able to obtain the complete set of variables only after 1975, and we can employ only a limited set of variables before then.

As dependent variables, we specified the number of crimes in each prefecture. The crime variables were manually collected from an annual journal, *Hanzai Tokei Sho* [Crime in Japan], as edited by the NPA and its subsidiary organizations. The crimes of interest are sexual crimes listed in the Penal Code, which consist of forcible indecency (art. 176

[10] Additionally, most cell phone businesses and Internet service providers provide filtering services nationwide, regardless of prefectural regulations, and there is no variation among prefectures with respect to the use of the Internet.

[11] Note that Okinawa was returned to Japan in 1972, so the data for Okinawa is only available after 1972.

[12] and 178(1)), public indecency (art. 174 [13]), distribution of obscene objects (art. 175 [14]), rape (arts. 177, 178(2), and 178-2), and robbery-rape (art. 241). [15]

Unfortunately, the data for public indecency and distribution of obscene objects are available only after 1979 (except 1970), with only the sum of public indecency and distribution of obscene objects available until 1978. This feature of crime data is regrettable, because public indecency, which is committed by those who have a particular sexual preference, and distribution of obscene objects, which is committed for more or less ordinary business purposes, have completely different natures. In addition, the occurrence level of robbery-rape is quite small and its prefecture-level data is not suitable for statistical analysis. Thus we focus on forcible indecencies and rape.

The numbers of each crime are measured in three ways: the number of reported cases, the number of arrested cases, and the number of arrested persons. Each measure has its pros and cons. First, the number of reported cases reflects the crime environment in a relatively accurate way but also reflects the development of reporting technology. For example, the dramatic increase in reported crimes around 2000 is explained by the widespread dissemination of cell phones. When a victim has a cell phone on hand, their cost to report the crime to the police is small; thus, we can anticipate an increase in reported crimes. [16] In addition, it is well-known that sexual offenses are significantly under-reported. [17] The tendency to report sexual offenses can change because of various

[12] Art. 176 of the Penal Code defines forcible indecency as "[a] person who, through assault or intimidation, forcibly commits an indecent act upon a male or female of not less than thirteen years of age".

[13] Art. 174 of the Penal Code defines public indecency as "[a] person who commits an indecent act in public".

[14] Art. 175 of the Penal Code defines distribution of obscene objects as "[a] person who distributes, sells or displays in public an obscene document, drawing or other objects".

[15] Although it might sound attractive to employ data on crimes against prefectural regulations, such data had not been available until quite recently. In addition, the number of crimes against prefectural regulations is obviously endogenous with the enactment of youth protection regulations, and not suitable for our analysis.

[16] Hamai et al (2013), pp. 57-59. There exist other factors which can affect the number of reported cases. For example, the change of investigation policy of the police is another factor (Hamai et al 2013, pp. 55-57).

[17] Newburn (2017), p. 479.

factors, such as "#Me too" movement. However, we could control for such changes in reporting technology by including yearly fixed effects in our estimation, because we can assume such changes usually occur nationwide.

Second, the numbers of arrested cases and arrested persons are not biased by the development of reporting technology. However, they are subject not only to the crime environment but also to the investigation efforts by police. Thus, they may not be adequate for directly measuring the change in the crime environment caused by youth protection regulations.

Finally, we recalculated the number of each crime per 100,000 population because sexual assault crimes are relatively uncommon.

With respect to the treatment variables, we employ a dummy variable that takes a value of one after the enactment of youth protection regulations, and zero otherwise [18]. The value of one of the treatment variable means that youth protection regulations are already in force in the prefectures.

In regard to the covariates, we employ the following demographic variables [19]. At the prefectural level, we employ population (in logarithms), the ratio of young adults (aged 15–39 years), and the sex ratio (male/female) to proxy the social environment. In addition, to account for the economic environment of each prefecture, we employ prefectural income per capita, the ratio of job offers to job seekers (yearly average), [20] the university entrance ratio (university enrollments divided by high school graduates),

[18] The timings are acquired through https://skcao.go.jp/downloadOrdinance (accessed on June 18, 2018).

[19] Population data are acquired from http://www.stat.go.jp/data/chouki/02.htm, http://www.e-stat.go.jp/SG1/estat/List.do?bid=000000090004, and http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001039703. Prefectural income data are from http://www.esri.cao.go.jp/jp/sna/data/data_list/kenmin/files/files_kenmin.html. Job offer ratio data are from http://www.e-stat.go.jp/SG1/estat/NewList.do?tid=000001020327. Education, police, and social welfare data are from SSDSJ (http://www.stat.go.jp/english/data/ssds/outline.htm).

[20] While most of the crime literature specifies the unemployment rate to account for the job environment, prefectural-level unemployment rate data are available only every five years, and the job offer ratio is sufficient to proxy the relative change over time of the job environment within each prefecture.

the number of households with any kind of welfare payment per 1,000 population, and the number of households with livelihood assistance per 1,000 population. Finally, we use prefecture police expenditure per capita to account for police activity, and prefecture education expenditure per capita to account for educational activity in each prefecture.

Unfortunately, not all the covariates are available throughout our chosen sample period. While overall population and the sex ratio data are available from the start (1948), prefectural income data are available only after 1955, job offer ratio data after 1963, and the ratios of adult ages after 1970. All other variables are available only after 1975. We show the results of our analysis employing data before 1975 in Appendix.

Table 3 provides summary statistics of the variables. Hereafter, 'pc' stands for per capita (per 100,000 population in case of crimes and per 1,000 population in case of social welfare variables) ; 'young_gen' for the ratio of younger adult age; 'force' for forcible indecency; '_case' for the number of reported cases; '_arrest' for the number of arrested cases; and '_person' for the number of arrested persons.

The national trend in crimes (number of reported cases) is also shown in Figure 3. As already discussed, crime statistics are influenced by several factors prevailing at the time, and there are various trends in the rates of different sexual crimes. If we simply compared the periods before and after the introduction of youth protection regulations, we would end up capturing the difference in the national trends before and after the intervention, not the causal effect of youth protection regulations. To estimate the causal effect of youth protection regulation accurately, it is crucial to account for national trends in crime statistics.

5 Hypotheses and Predictions

As already discussed in Section 2, it is unlikely that the self-incarceration effect of sexual expressions, which is the focus of the recent empirical literature, plays an important role in the longer term, because in the longer term potential criminals have plenty of time and the constraint of time does not matter. In the longer term, we need to focus not on the

physical self-incarceration effect, but rather on the catharsis effect instead. If catharsis effect does exist, those who consume pornographic expressions experience catharsis and will find smaller needs to embark on actual sexual offenses.

Under the catharsis effect hypothesis, we can predict that the introduction of youth protection regulation suppresses the distribution of sexual expressions, weakens the catharsis effect, and increases the number of sexual offenses. However, note that the most hard-core pornographic expressions are already banned by the national law and that the introduction of youth protection regulation only suppresses the distribution of intermediate sexual expressions. It is not plausible that such intermediate pornographic expressions have catharsis effects on hard-core sexual offenses such as rape. Rape is often driven by strong motivation, which is intrinsically different from that of forcible indecencies. Catharsis effect might not work for rape. Thus the catharsis effect hypothesis predicts that the introduction of youth protection regulation may only increase moderate sexual offenses, such as forcible indecencies.

In contrast, if the arousal effect or the imitation effect plays an important role in the longer term, we can predict that the introduction of youth protection regulation decreases the number of sexual offenses both for rape and forcible indecencies. Again, because the youth protection regulations introduced restrictions only on intermediate pornographic expressions, it is not clear whether the arousal or imitation effect has any impact on rape, which is a hard-core sexual offense.

Thus the two competing hypothesis, the crime-enhancing hypothesis and the catharsis effect hypothesis, lead to different predictions as shown in Table 4.

6 Empirical Strategy

To estimate the causal effect of youth protection regulations, we employ a difference-in-differences technique with year fixed effects:

$$Y_{it} = \alpha_i + \lambda_t + \delta D_{it} + X_{it}\beta + \epsilon_{it}$$

where Y is the number of various sexual crimes for prefecture i in year t, α is the prefecture fixed effect, λ is the year fixed effect, D is whether a youth protection regulation is in effect, X is a vector of independent variables, and ϵ is the unobserved error term. As previously discussed in Section 4, the number of sexual crimes exhibits a national trend, and simple fixed effects estimation would capture these differences. To account for national trends, we include the year fixed effects (λ). [21]

A possible concern for this strategy is the endogeneity of treatment D with the outcome variable Y. When a prefecture experiences a higher occurrence of sexual crimes, it is likely to enact youth protection regulations to deter further crimes. However, this concern does not hold both theoretically and empirically.

First, regarding the second wave of youth protection regulations enacted around 1980, the political interventions were mainly driven by the deterrence of motorcycle gangs. As explained in Section 3, the prohibition of vending machines for the selling of pornographic magazines was only a secondary motivation. Because the activity level of motorcycle gangs is orthogonal to the occurrence of sexual crimes [22], we can theoretically reject the endogeneity of the introduction of youth protection regulations during the second wave with the prefectural sexual crime environment.

Second, although it is theoretically possible that (at least) the first wave of youth protection regulations was driven by a higher occurrence of sexual crimes, it is unlikely that there is a causal link. While we could conceive of several possible confounding effects, including regional culture, the ruling political party (conservative or liberal), the level of urbanization, PTA (parents and teachers' association) activities, and the level of union-

[21] We checked the significance of the year fixed effects and found that they were strongly significant.

[22] Sato (1984) describes that typical motorcycle gangs in Japan did not commit typical violent crimes and property crimes. Unlike the motorcycle gangs in other countries, one of the notable characteristics of Japanese motorcycle gangs was that gangs were committing motorcycle-related behavior only as fashion. While Hiraishi (1991) notes that some extreme motorcycle gangs commit property crimes in order to get fund for their riding, there is no evidence that motorcycle gangs (both males and females) are related to sexual offenses.

ization under the Japan Teacher's Union, [23] it is difficult to see whether they accounted for the introduction of the youth protection regulations. When we check for possibly similar prefectures within the same region, such as Tohoku, Northern Kanto, Chugoku, Shikoku, and Kyushu, we find no apparent simultaneity in the timing of the enactment of the youth protection regulations. Even in the same region, prefectures exhibit different timings in this regard. This implies that the timing of the policy intervention can be considered pseudo-random, at least with respect to the factors that may affect the occurrence of sexual crimes. [24]

7 Results

First, we show the results, where the dependent variable is the number of reported crimes and the complete set of covariates is included (Table 5). In column (1), the dependent variable is the number of reported forcible indecencies per 100,000 population and in column (2), the dependent variable is the number of reported rapes per 100,000 population. The coefficient of interest δ is `youth`.

Because most of our covariates are only available after 1975, including the complete set of covariates limits the sample period to the period 1975–2015. This limitation implies that we can only use the second wave of the enactment of youth protection regulations around 1980 to identify their causal effects, not the first wave around 1960. While this limitation reduces the power of our analysis, it also precludes the first wave which may be contaminated potentially by the endogeneity concerns discussed in Section 6, leaving only the second wave presumably free of endogeneity contamination.

Observing columns (1) and (2) reveals that the introduction of youth protection regulations had a statistically significant positive effect on the number of forcible indecencies,

[23] Data on some of the listed possible confounders are unavailable.

[24] Later, we also check whether the occurrence of sexual crimes is a good predictor of the introduction of youth protection regulations. [TBD]

This is because if we identify a correlation between the occurrence of sexual crimes and the introduction of youth protection regulations, we can specify the former as an instrumental variable.

but not on the number of rape. This result is consistent with the catharsis effect hypothesis, but not with the crime-enhancing effect hypothesis. Because the introduction of youth protection regulation reduced the distribution of intermediate pornographic expressions only, the introduction had an impact only on intermediate sexual offenses, such as forcible indecencies, but not on hard-core sexual offenses, such as rape. As the catharsis effect hypothesis predicts, the introduction of regulation reduced the circulation of sexual expressions, weakened the catharsis effect caused by them, and increased the number of forcible indecencies.

Other control variables have effects in a predictable way. First, the logarithm of population has a strong positive impact on the number of forcible indecencies. Forcible indecencies include molestation in overcrowded commuter trains, which is a popular and notorious crime in densely populated metropolitan areas, such as Tokyo metropolitan area. As the population becomes more concentrated in metropolitan areas, such areas will have higher occurrence level of forcible indecencies. The strong positive impact of population reflects this relationship. Second, job offer ratio has a strong positive impact both on the number of forcible indecency and rape. These effects are also predictable because people tend to go out more often under better economic conditions and are exposed to the higher chance of sexual crimes.

Switching the dependent variable from the number of reported cases to the number of arrested cases (Table 6) and the number of arrested persons (Table 7) does not change our observation basically. The causal effect on forcible indecency remains statistically significant and positive, while the causal effect on rape is insignificant.

Next, we check the economic significance of the causal effect of youth protection regulations. The causal effect on the number of reported cases for forcible indecency is 0.4894. Considering that the average occurrence of forcible indecency is 2.9806 per 100,000 population, the effect of 0.4894 amounts to a 16.4% increase, which can be regarded as an economically important effect.

8 Discussion

Our analysis shows that the introduction of youth protection regulations, which place restrictions on selling measures for intermediate pornographic magazines, had never decreased the number of sexual crimes. Rather, it had a positive and serious effect on the number of forcible indecencies, which is a modest sexual crime, in the long term. By contrast, the regulations had no effect on rape, which is a hard-core sexual crime.

In contrast to most previous studies that have focused on the short-term effects of exposure to sexual or violent expression, our empirical setting allowed us to identify the long-term effects of the restriction of exposure to sexual expression. While it is not theoretically clear whether the substitution effect of sexual expression outweighs the complementary effect, our results illuminate the importance of the substitution effect even in the long term. While the mechanism for the substitution effect in the short term is physical self-incarceration effect, the mechanism for the substitution effect in the long term is catharsis effect. It is notable that the catharsis effect hypothesis in the longer term is supported by our data, but that the arousal or imitation effect hypothesis in the longer term is not supported. Our results are opposite to the traditional psychological literature.

One possible concern for our analysis is the endogeneity of police activity. The level of police activity might have increased since the introduction of youth protection regulations because prefectural governments want to demonstrate the effectiveness of youth protection regulation. However, there are three reasons to doubt such endogenous relationship.

First, in order to check this possibility, we check the timing of the causal effect of the introduction of youth protection regulation. Following Wolfers (2006), we decompose the effect of youth protection regulations by introducing yearly dummies following the enforcement of the regulations (Table 8). While the yearly marginal effects by themselves are too small to be statistically significant, we calculate cumulative yearly effects. Figure 4 shows that the cumulative yearly effects rise for seven years after the introduction of

youth protection regulation and become relatively stable after that. If the level of police activity had increased after the introduction of youth protection regulations, we could observe a sharp rise just after the introduction and a decline after that. We do not observe such a pattern and the endogeneity concern of police activity is not supported.

Second, in our setting, this effect is at least partly accounted for by the inclusion of police expenditure as a covariate. Third, if the introduction of youth protection regulations had increased the level of police activity, it is incomprehensible that the substitution effect is concentrated in forcible indecency and not found in other types of sexual offense. We thus can safely assume that the substitution effect is not caused by the intensified police activity after the introduction of regulations, but rather by the catharsis effect.

The policy implications of our analysis are important. While conventional youth protection regulations have attempted to assist the 'healthy' development of juveniles by restricting their exposure to sexual or violent expression, which we are not denying, they also simultaneously increased moderate sexual crime among the general population. Whether we should continue, strengthen or abolish [25] present regulations needs to be reconsidered.

[25] As symbolized by the fact that when the coverage of youth protection regulations was extended to the Internet after the 2000s, the conventional method of regulation of harmful expression became no longer effective, so the supporters of youth protection regulations are considering additional expansion.

Appendix

Because the complete set of our covariates is available only after 1975, we check whether the results change when we extend the sample period before 1975 by dropping some of the covariates. The extension of the sample period comes with two drawbacks. First, when we extend the sample period, we employ not only the second wave of the introduction of youth protection regulations but also the first wave, which is arguably contaminated with the endogeneity issue. Because it is likely that the first wave prefectures had been plagued by their sexual crime environment, the inclusion of the first wave would bias our estimates. Second, the extension of the sample period reduces our covariates and causes omitted variable biases.

Table 9 provides the results employing the subset of the covariates. Columns (1) and (2) employ population, sex ratio, prefectural income, and the job offer ratio and cover up to 1963; columns (3) and (4) employ population, sex ratio, prefectural income, and the job offer ratio and cover up to 1955; and columns (5) and (6) employ population and sex ratio only but cover up to 1948.

Columns (1) and (2), where the last part of the first wave and all of the second wave is covered, show that the statistical significance of the youth protection regulation for public indecency declines from the 5% to the 10% level, but the overall results remain basically unchanged. Columns (3) and (4), where almost all of the first wave (except for Kagawa) and all of the second wave is covered, shows no statistically significant effect of youth protection regulations. Columns (5) and (6), where all of both waves are covered, show the similar results.

These insignificances are explained by the two drawbacks mentioned above. First, because we are only using a subset of the covariates instead of the complete set, we are unable to fully control for all factors, particularly economic and political factors, which can affect the crime environment; consequently, the results suffer from omitted-variable bias. Second, because the first wave of the youth protection regulations, unlike the sec-

ond wave, is not free of endogeneity concerns, the results of the longer panels that include the first wave may be contaminated by the endogeneity biases. The first wave prefectures already had a higher level of sexual crimes and the introduction of youth protection regulations could not exacerbate the sexual crime environment even more.

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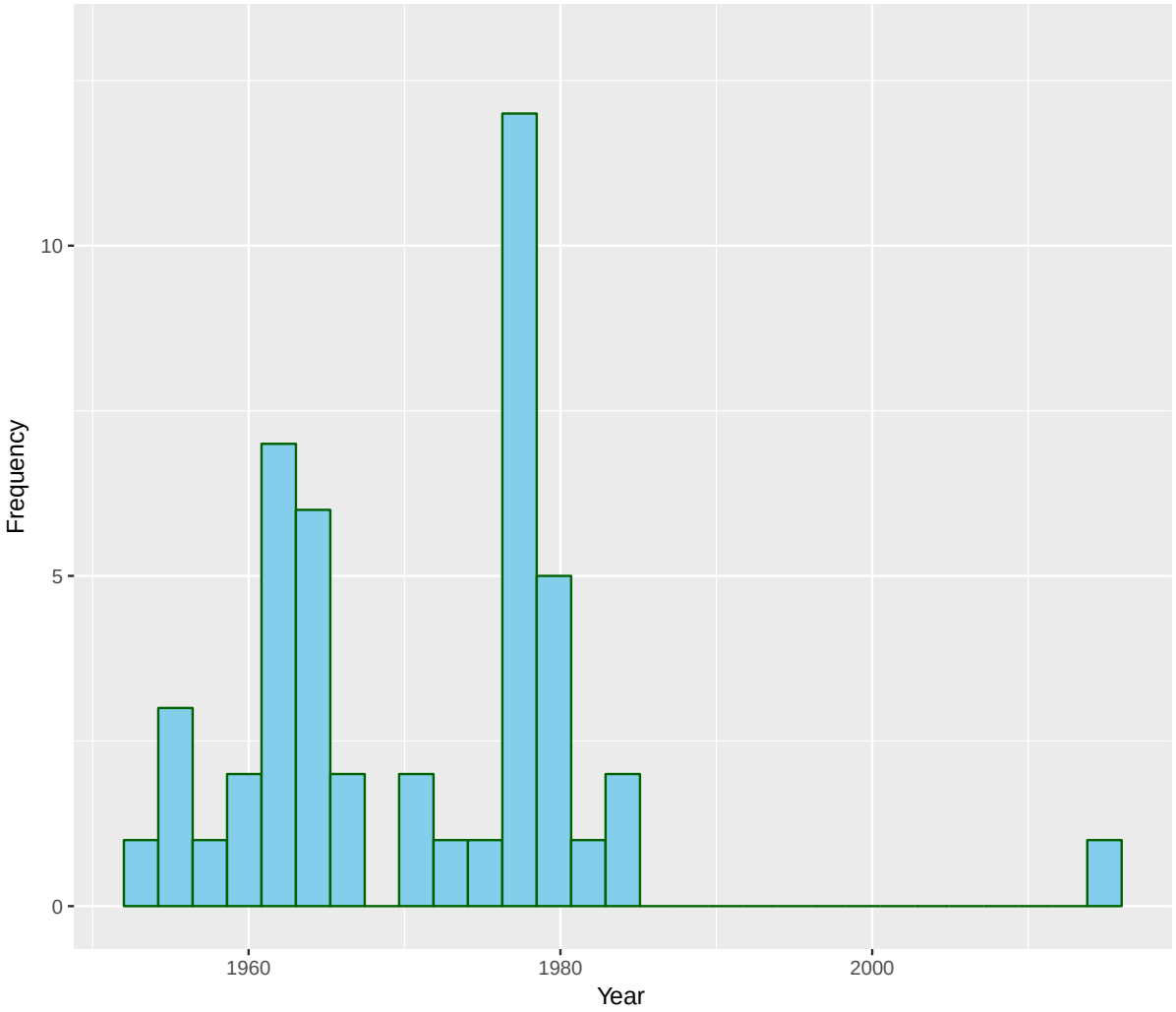

Figure 1: Years of Enactment

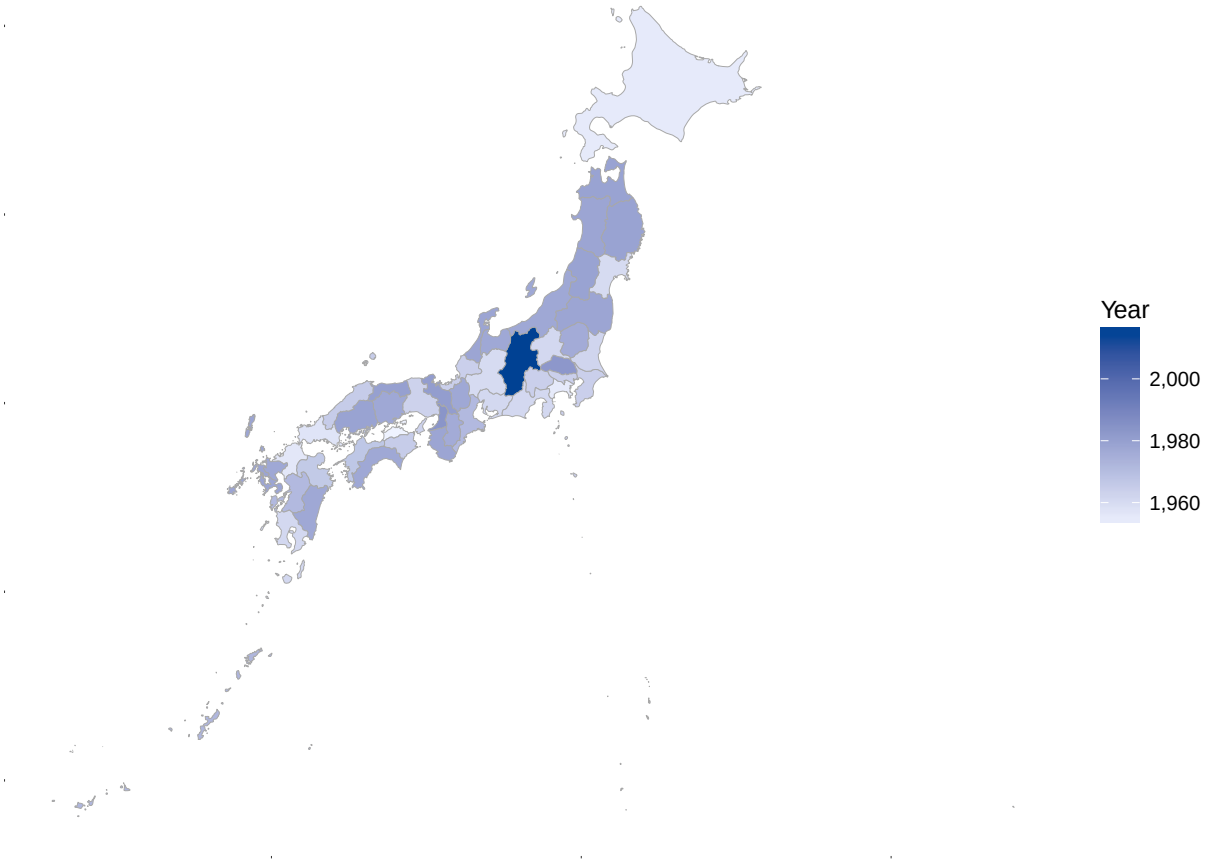

Figure 2: Year of Introduction of Youth Protection Regulation

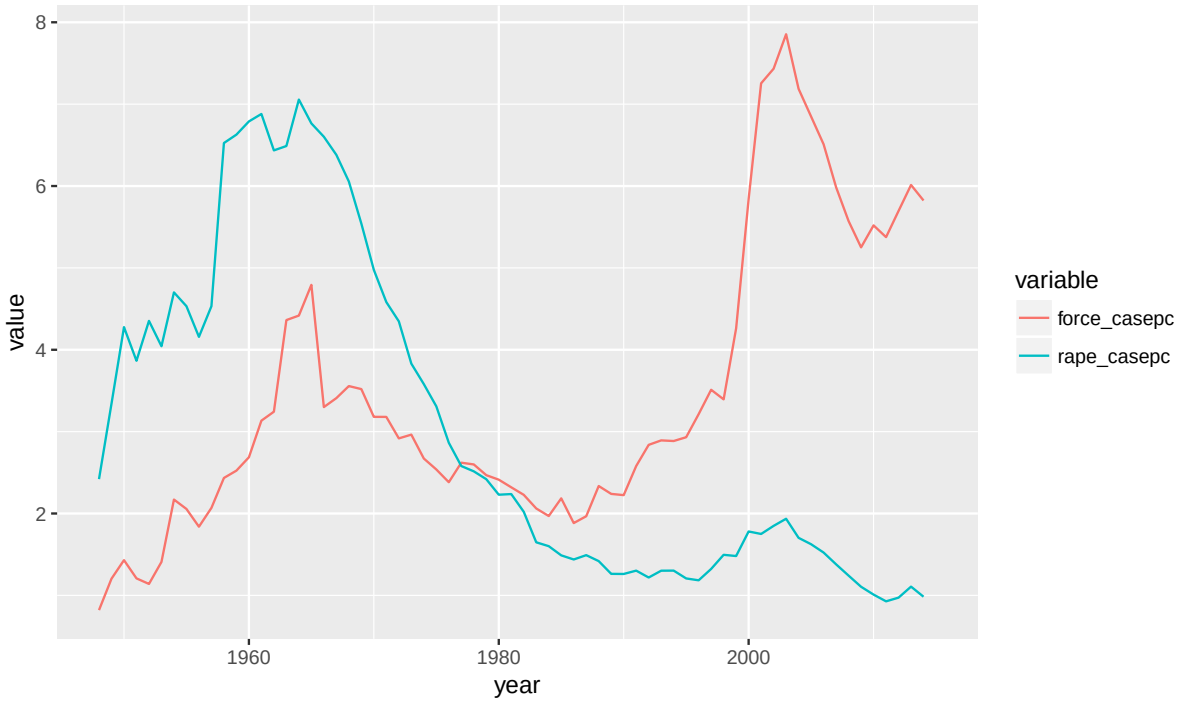

Figure 3: National Trends of Sexual Crimes

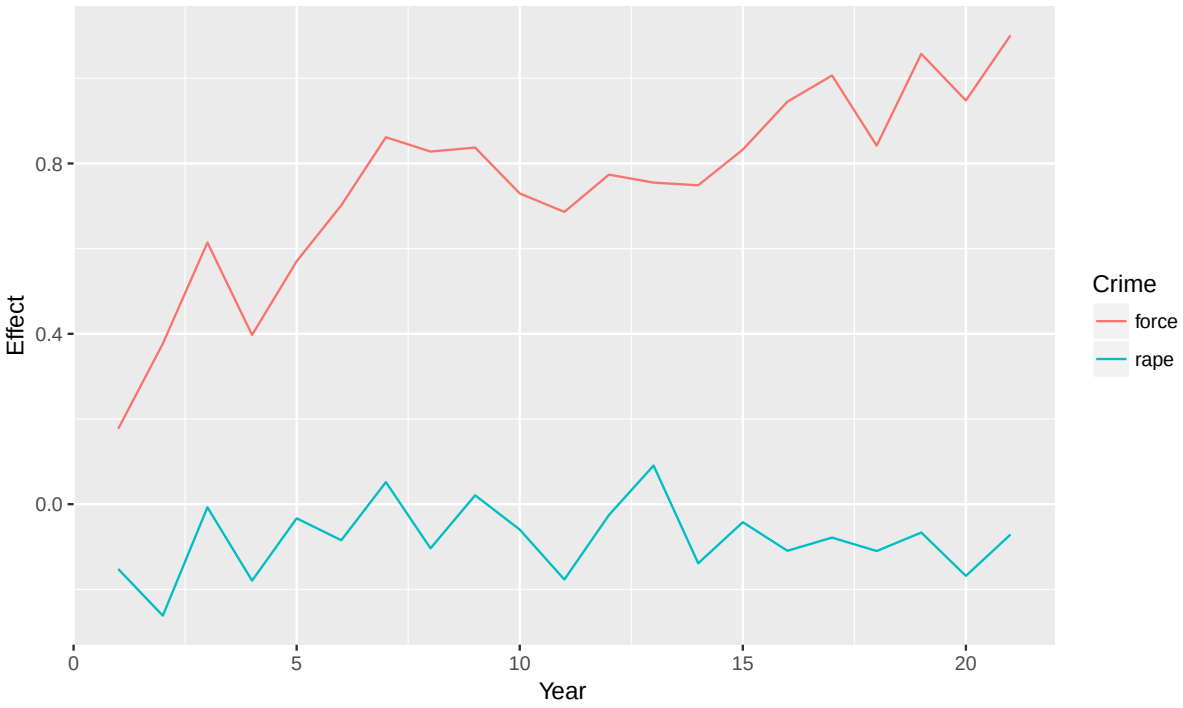

Figure 4: Cumulative Yearly Effect of Youth Protection Regulations

Table 1: Summary of Related Literature

Type of effect	Shorter term	Longer term
Arousal/imitation	Yes	?
Catharsis	Questionable	?
Self-incarceration	Yes	Theoretically no

Table 2: Timing of Introduction of Youth Protection Regulations

Prefecture	Year	Prefecture	Year	Prefecture	Year	Prefecture	Year
Hokkaido	1955	Tokyo	1964	Shiga	1977	Kagawa	1952
Aomori	1979	Kanagawa	1955	Kyoto	1981	Ehime	1967
Iwate	1979	Niigata	1977	Osaka	1984	Kochi	1977
Miyagi	1960	Toyama	1977	Hyogo	1963	Fukuoka	1956
Akita	1978	Ishikawa	1978	Nara	1963	Saga	1977
Yamagata	1979	Fukui	1964	Wakayama	1978	Nagasaki	1978
Fukushima	1978	Yamanashi	1964	Tottori	1980	Kumamoto	1971
Ibaraki	1962	Nagano	2016	Shimane	1965	Oita	1966
Tochigi	1976	Gifu	1960	Okayama	1977	Miyazaki	1977
Gunma	1961	Shizuoka	1961	Hiroshima	1979	Kagoshima	1961
Saitama	1983	Aichi	1961	Yamaguchi	1957	Okinawa	1972
Chiba	1964	Mie	1971	Tokushima	1965		

Table 3: Summary Statistics

Variable	N	Mean	St. Dev.	Min	Max
pop	3,146	2,390,456	2,185,811	568,097	13,390,000
young_gen	2,113	0.3342	0.0464	0.2208	0.5148
incomepc	2,162	1.3771	1.0924	0.0480	4.5082
policepc	1,833	20.2099	6.8053	5.5003	52.1197
educationpc	1,833	89.9224	22.1650	28.5336	171.7502
welfarepc	1,833	6.3857	3.8382	1.4577	25.2064
aidpc	1,833	16.2272	10.7268	3.0907	74.8196
univrate	1,833	0.3230	0.1933	0.0580	1.5195
joboffer	2,491	0.8866	0.5774	0.0900	7.1800
sexratio	3,126	94.1512	3.6650	86.6000	106.6000
force_case	3,172	86.7235	148.1121	0	1,349
force_arrest	3,172	58.7279	80.9765	0	841
force_person	3,172	38.9628	64.1497	0	977
rape_case	3,171	67.2211	79.1096	1	686
rape_arrest	3,172	60.8143	72.5651	1	642
rape_person	3,171	71.1832	97.2600	1	871
force_casepc	3,125	2.9806	2.1350	0	23.5740
force_arrestpc	3,125	2.2476	1.4116	0	23.5740
force_personpc	3,125	1.4325	1.0109	0	20.2103
rape_casepc	3,124	2.9700	2.4982	0.0794	36.6018
rape_arrestpc	3,125	2.7647	2.4278	0.0794	35.6092
rape_personpc	3,124	3.2445	3.1931	0.0749	34.9888

Table 4: Anticipated Effect of Youth Protection Regulation

	Enhancing hypothesis	Catharsis effect hypothesis
hard-core sexual offense (rape)	**0** or **–**?	**0** or **+**?
moderate sexual offense (forcible indecencies)	**–**	**+**

Table 5: Number of Reported Cases

	Dependent variable:	
	force_casepc	rape_casepc
	(1)	(2)
youth	0.4894***	-0.0928
	(0.1836)	(0.1566)
poplog	6.2426***	-1.5502
	(1.5354)	(1.8112)
incomepc	-0.3710	0.7861**
	(0.3091)	(0.4005)
joboffer	0.5143**	0.2667**
	(0.2374)	(0.1303)
univrate	1.1472	-0.3968
	(0.8374)	(0.3182)
young_gen	5.5910	4.4781
	(8.2280)	(7.5180)
policepc	-0.0082	-0.0212
	(0.0354)	(0.0232)
educationpc	0.0080	-0.0055
	(0.0130)	(0.0058)
aidpc	0.1150	-0.0487*
	(0.0793)	(0.0292)
welfarepc	-0.2095	0.1805**
	(0.1411)	(0.0836)
sexratio	-0.0031	-0.1202**
	(0.1142)	(0.0611)
Observations	1,222	1,221
Adjusted R^2	0.0296	-0.0167
Note:	Clustered standard errors in parentheses. *p<0.1; **p<0.05; ***p<0.01	

Table 6: Number of Arrested Cases

	Dependent variable:	
	force_arrestpc	rape_arrestpc
	(1)	(2)
youth	0.4211***	-0.0923
	(0.1549)	(0.1451)
poplog	2.9609**	-1.4087
	(1.1544)	(1.7090)
incomepc	-0.0743	0.7726**
	(0.1920)	(0.3720)
joboffer	0.2802	0.2259*
	(0.2114)	(0.1168)
univrate	0.8789	-0.1882
	(0.6632)	(0.2651)
young_gen	4.5150	2.7786
	(6.4671)	(6.9229)
policepc	-0.0139	-0.0314
	(0.0289)	(0.0206)
educationpc	0.0056	-0.0031
	(0.0105)	(0.0053)
aidpc	0.0388	-0.0533**
	(0.0320)	(0.0261)
welfarepc	-0.0801	0.1873**
	(0.0934)	(0.0768)
sexratio	0.0206	-0.1067**
	(0.0768)	(0.0535)
Observations	1,222	1,222
Adjusted R^2	-0.0260	-0.0197
Note:	Clustered standard errors in parentheses. *p<0.1; **p<0.05; ***p<0.01	

Table 7: Number of Arrested Persons

	Dependent variable:	
	force_personpc	rape_personpc
	(1)	(2)
youth	0.1800***	-0.0068
	(0.0649)	(0.1941)
poplog	1.8478***	-1.0492
	(0.4573)	(1.7029)
incomepc	-0.1436	0.8653**
	(0.0899)	(0.4142)
joboffer	0.2658***	0.1531
	(0.0773)	(0.1227)
univrate	0.4265	-0.2544
	(0.3237)	(0.3437)
young_gen	3.0718	-6.3290
	(2.7865)	(7.8908)
policepc	-0.0065	-0.0662***
	(0.0128)	(0.0248)
educationpc	0.0026	0.0011
	(0.0026)	(0.0065)
aidpc	0.0044	-0.0560*
	(0.0149)	(0.0335)
welfarepc	-0.0078	0.2032**
	(0.0383)	(0.0964)
sexratio	-0.0200	-0.1156*
	(0.0377)	(0.0660)
Observations	1,222	1,222
Adjusted R^2	-0.0079	-0.0061
Note:	Clustered standard errors in parentheses.	
	*p<0.1; **p<0.05; ***p<0.01	

Table 8: Yearly Marginal Effects

	Dependent variable:	
	force_casepc	rape_casepc
	(1)	(2)
youth	0.1770	-0.1522
	(0.1529)	(0.1568)
youth01	0.1999	-0.1096
	(0.2024)	(0.1438)
youth02	0.2375	0.2545
	(0.1798)	(0.2028)
youth03	-0.2170	-0.1722
	(0.1529)	(0.1115)
youth04	0.1730	0.1463
	(0.1463)	(0.1105)
youth05	0.1314	-0.0515
	(0.1691)	(0.1358)
youth06	0.1598	0.1365
	(0.2485)	(0.1558)
youth07	-0.0336	-0.1555
	(0.1779)	(0.1495)
youth08	0.0093	0.1246
	(0.1721)	(0.1297)
youth09	-0.1077	-0.0806
	(0.1758)	(0.1104)
youth10	-0.0433	-0.1172
	(0.2203)	(0.1336)
youth11	0.0875	0.1515
	(0.1724)	(0.1152)
youth12	-0.0188	0.1162
	(0.1559)	(0.1508)
youth13	-0.0062	-0.2296*
	(0.1589)	(0.1243)
youth14	0.0837	0.0965
	(0.1659)	(0.1210)
youth15	0.1126	-0.0671
	(0.1610)	(0.1214)
youth16	0.0615	0.0309
	(0.1480)	(0.0941)
youth17	-0.1648	-0.0315
	(0.1445)	(0.0853)
youth18	0.2156	0.0434
	(0.1598)	(0.0871)
youth19	-0.1095	-0.1018
	(0.2079)	(0.1306)
youth20	0.1530	0.0972
	(0.1698)	(0.0897)
Controls	Yes	Yes
Year FE	Yes	Yes
Observations	1,222	1,221
Adjusted R^2	0.0270	-0.0264
Note:	Clustered standard errors in parentheses.	
	*p<0.1; **p<0.05; ***p<0.01	

Table 9: Robustness Check: Long Panel

	Dependent variable:					
	force_casepc	rape_casepc	force_casepc	rape_casepc	force_casepc	rape_casepc
	(1)	(2)	(3)	(4)	(5)	(6)
youth	0.3420*	-0.0771	0.1938	-0.0257	0.2979	-0.1438
	(0.1993)	(0.2057)	(0.1516)	(0.1889)	(0.2069)	(0.2129)
poplog	2.9647***	-1.8126**	1.7943***	-1.4629**	-0.0281	-2.7208***
	(0.7688)	(0.7433)	(0.6768)	(0.6396)	(0.6679)	(0.7514)
incomepc	-0.4277	1.2267***	-0.7062**	1.1024***		
	(0.2830)	(0.3077)	(0.2958)	(0.3374)		
joboffer	0.0650	-0.2548***				
	(0.0873)	(0.0971)				
sexratio	-0.1223*	-0.1507**	-0.1037**	-0.1112*	-0.0903*	0.0014
	(0.0717)	(0.0726)	(0.0414)	(0.0652)	(0.0486)	(0.0522)
Observations	1,777	1,776	2,145	2,144	3,079	3,078
Adjusted R^2	-0.0070	0.0280	-0.0128	0.0083	-0.0211	0.0773
Note:	Clustered standard errors in parentheses. *p<0.1; **p<0.05; ***p<0.01					