Does Female Sports Participation Reduce Crime? New Evidence from Title IX

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Abstract

Youth sports programs have been advanced to enhance human capital acquisition among at-risk youth, but also to generate positive societal externalities via reduced crime. We exploit a natural experiment generated by the introduction of Title IX to estimate the impact of female sports participation on crime. Using county-level crime data from the 1980-2000 Uniform Crime Reports, instrumental variables (IV) estimates show that a 10-percentage point increase in female sports participation induced by Title IX led to a 2 percent decrease in criminal arrests among 25-to-39-year-old females. These findings are driven by reductions in burglary, larceny, robbery, motor vehicle theft, and aggravated assault. We conclude that Title IX-induced crime reductions generated annual external social benefits of approximately $600 million.

Keywords: Title IX; sports participation; crime

JEL Codes: I2, H5

1. Introduction

> *"Sports offer an important opportunity for building life skills of at-risk youth that allow them to better cope with daily life challenges and move away from involvement in violence, crime or drug use."*
>
> *(United Nations Office on Drugs and Crime, 2018)*

More than eight million American high school students participate in some form of school-sponsored athletic program (National Federation of State High School Association, 2017) and an additional 500,000 students participate in college athletics (National College Athletic Association, 2017). Sports participation has been linked to substantial private human capital benefits, including increased educational attainment (Darling et al. 2005; Rees and Sabia, 2010), improved health (Kaestner & Xu, 2010; Sabo et al., 2005), and better labor market outcomes (Perisco et al., 2004; Stevenson, 2010)[1].

In addition to these private benefits, a number of policymakers have argued that there are important external social benefits of sports participation that are generated by the crime-reducing effects of sports. For instance, several branches of the United Nations highlight sports as an important tool in peacekeeping, in fighting the war on drugs, and in violent crime prevention. In the United Nations Declaration of the 2030 Agenda for Sustainable Development, the role of sports in facilitating social progress is highlighted:

> *"Sport is also an important enabler of sustainable development. We recognize the growing contribution of sport to the realization of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives."*
>
> *(The UN 2030 Agenda for Sustainable Development, 2018)*

[1] See also (McCormick & Tinsley, 1987; Long & Caudill, 1991; Silliker & Quirk, 1997; Ewing, 1998; Eccles & Barber, 1999; Barron et al., 2000; Eitle and Eitle, 2002)

In the United States, the Violent Crime Control and Law Enforcement Act of 1994, the crime bill for which Secretary Hillary Clinton came under fire during the 2016 presidential campaign, allocated $50 million in federal funding for "midnight basketball" programs that were designed to provide alternatives to criminal behavior for youths as well as provide legitimate networking channels to enhance youths' social capital accumulation. Despite policymakers' claims that public initiatives to encourage sports participation is an effective anti-crime tool, there is relatively little causal evidence on this subject.

A number of studies have empirically examined the relationship between sports participation and crime, but nearly all have treated participation as exogenous to crime (Nichols, 2007; Crabbe, 2000; Smith & Waddington, 2004; Hartmann & Massoglia, 2007; McGinn et al., 2008; Caruso, 2011; Ekholm;2013; Spruit et al., 2016). If those who engage in sporting activities are positively selected on difficult-to-measure characteristics (such as ability, discipline, and social consciousness), then estimates of the beneficial effect of sports on crime will be biased upward. On the other hand, if sports programs attract those most at risk for delinquent behaviors, then estimates of the crime-reducing effects of sports participation will be biased toward zero.

This study improves upon the prior literature by exploiting a natural experiment to estimate the causal effect of sports participation on crime. We exploit the enactment of Title IX, which mandated that public schools increase their female sports participation proportion to male sports participation levels, to generate plausibly exogenous variation in female sports participation to identify its' effect on criminal activity. Using county-level crime data between 1980 and 2000 from the Uniform Crime Reports (UCR), reduced form and instrumental variables (IV) estimates show that Title IX is associated with a decrease in crime among females. Specifically, we find that a 10-percentage point increase in female

sports participation caused by Title IX is associated with a 2 percent decrease in overall arrests and a 3.6 percent decrease in violent crime arrests. These reductions are driven by burglary, larceny, robbery, motor vehicle theft, and aggravated assault. Our findings are robust to controls for state-level economic conditions, county-specific time trends, and male crime rates, suggesting that the effects we estimate are not driven by spurious corrections. Our estimates suggest that the approximately 25-percentage point increase in sports participation induced by Title IX generated $600 million in benefits of crime avoidance.

2. Background

2.1. Title IX Legislation

Signed by President Richard Nixon in 1972, Title IX was added to the Education Amendments in that year. This legislation required educational institutions to meet requirements that banned gender discrimination within six (6) years. Specifically, Title IX mandates that:

> *''No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving financial assistance.''*
>
> *(20 U.S. Code § 1681 – Sex)*

Title IX applies to institutions that receive federal financial assistance from the Department of Education. These institutions include approximately 16,500 local school districts, 7,000 postsecondary institutions, as well as charter schools, for-profit schools, and education agencies of the 50 states and the District of Columbia (U.S. Department of Education Office for Civil Rights, 2015).

The U.S. Department of Education Office for Civil Rights enforces the legislation by using the three-part test developed by the Department of Education to examine whether an

institution is meeting its Title IX obligations. An institution is in compliance with the legislation if it meets any one of the following parts of the test:

> *"(1) The number of male and female athletes is substantially proportionate to their respective enrollments; or*
>
> *(2) The institution has a history and continuing practice of expanding participation opportunities responsive to the developing interests and abilities of the underrepresented sex; or*
>
> *(3) The institution is fully and effectively accommodating the interests and abilities of the underrepresented sex."*
>
> (U.S. Department of Education, 1979)

While Title IX did not apply only to sports funding, athletics was a funding area with large disparities and, in some cases, official gender segregation. Thus, one of Title IX's largest impacts was on female sports participation.[2] Between 1971 and 1978, the number of females participating in high school sports increased by more than 600 percent (Gavora, 2002).

It is important to note that male sports participation did not fell after the legislation. Stevenson (2007) documented some compositional changes among sports, such as soccer, expanded, while others, like wrestling, became less prevalent; however, overall male sports participation did not decrease after the policy was implemented. Title IX might have influenced compositional shifts in male sports, but these shifts were small, and not systematic.

[2] The Obama administration expanded Title IX's reach to the science, technology, engineering, and mathematics fields. The White House: Office of the Press Secretary (June 20, 2012).

2.2. Impacts of Title IX

A number of studies have examined the impacts of Title IX on female sports participation, human capital acquisition, and labor market outcomes (Stevenson, 2010; Kaestner & Xu, 2010; Clark & Ayres, 2014; Schulkind, 2016). With regard to 'first stage' effects on female sports, Stevenson (2010) exploits heterogeneity across states in the bindingness of Title IX to identify its effects on female high school sports participation. Specifically, she argued that states with higher male sports participation rates prior to the adoption of Title IX saw larger increases in female sports participation. Stevenson's (2010) results show that a 10-percentage point increase in pre-Title IX male sports participation is associated with a 3 to 4-percentage point increase in female sports participation. This finding suggests that Title IX had significant impacts on high school sports participation among women.

Using this approach to identify exogenous variation in high school sports participation, Stevenson (2010) used an instrumental variables (IV) approach to estimate the impact of sports on the educational attainment and employment of women ages 25-to-35. Using data from the U.S. Census from 1980 and 2000, Stevenson (2010) found that a 10-percentage point increase in female sports participation, induced by Title IX, generated an increase in the average educational attainment of 0.039 years, and a 1.3-percentage point increase in the probability that females would attain at least some postsecondary education. In addition, Stevenson (2010) explored whether Title IX increased the subsequent employment of women; she found a 1.9-percentage point increase in the probability of being employed.

There is also evidence that Title IX increased health capital accumulation among women. Kaestner and Xu (2010) revealed that Title IX-induced increases in female sports

participation were associated with diminished body mass index (BMI), reduced rates of obesity, and increased physical activity in adult women. They found that a 20-percentage point increase in female sports participation between 1971 and 1978 (which they attributed to Title IX) led to a 0.586 unit decrease in BMI and a 2.8-percentage point decrease in the probability of their being obese.

Furthermore, Schulkind (2016) linked Title IX-induced female sports participation increase to the intergenerational transmission of health. Using a similar identification strategy as Stevenson (2010), she found that a 10-percentage point increase in female sports participation translated to 1.5 fewer low birthweight births per 1,000 births, 0.34 fewer very low birthweight births per 1,000, and a 0.33 standard deviation improvement in Apgar scores, an indication of the health of a neonate.

Finally, Clarke and Ayres (2014) examined the effect of female sports participation on adult women's social lives. They found that a 10-percentage point increase in state-level female sports participation generated a 5 to 6 percentage point increase in the rate of female secularism[3] and a 5-percentage point increase in fertility rates. Clarke and Ayres (2014) also found that Title IX might have affected marriage rates among new mothers by showing that Title IX resulted in a 6-percentage point increase in the proportion of mothers who were unmarried.

[3] They designed two measures of secularity. The first, church attendance, is a binary variable equal to one for women who attend religious services no more than once a year, and zero for women who attend religious services more than once a year. The second, affiliation, is a binary variable equal to one for women who have no religious affiliation or describe the strength of their affiliation as 'not very strong', and zero for women who report strong, or somewhat strong, affiliations.

2.3. Mechanisms to Explain the Link Between Sports and Crime

There are a number of channels through which sports participation, particularly in high school, can affect crime. Time availability, human capital acquisition (including social capital acquisition), and labor market outcomes (employment and earnings) are three primary channels through which sports might influence criminal activity. For a majority of crimes, we would generally expect sports participation, via the aforementioned channels, to reduce crime. Each of these mechanisms is discussed in more detail below.

Time spent in sports participation could be important, in terms of limiting the time available for participating in criminal activity. More time spent in school, and in extracurricular activities, is associated with reductions in criminal activity (Barron et al., 2000; Jacobs & Lefgren, 2003; Lochner & Moretti, 2004; Machin et al., 2011; Beatton, 2016; Bell, 2016)[4]. For instance, Anderson (2014), using Uniform Crime Reports (UCR), showed that the minimum dropout age requirements have a significant and negative effect on juvenile property and violent crime arrest rates. Similarly, Jacobs and Lefgren (2003) find that property crime increases significantly in areas where teens have days off school. Each of these studies found short-term criminal impacts, but it is possible that short-term effects on youth criminal behavior may have long-term effects on future criminal activity if these incapacitation effects prevent youths from heading down a path to a criminal career.

Second, sports participation could impact human capital acquisition, which could affect future criminal activity. Human capital acquisition may take the form of increased educational attainment, social networking skills, discipline, and better health. Of course, it is

[4] Earlier (non-causal) estimates of incapacitation (time spent in school) effects were presented in Gottfredson (1985), Farrington et al. (1986), and Witte and Tauchen (1994). Hjalmarsson (2008) looked at the opposite relationship, studying the impact of being arrested and incarcerated before finishing school on the probability of graduating high school, reporting a strong negative association.

also possible that social networks formed while participating in organized sports could generate negative peer effects that increase the probability of crime. There is, in fact, strong evidence that educational attainment is negatively related to future crime (Lochner and Moretti 2004; Buonanno & Leonida, 2007; Machin et al. 2011; Hjalmarsson, 2015; Lochner & Urbina, 2017). Lochner and Urbina (2017) used changes in compulsory schooling laws as an instrument for educational attainment and, using data from the 1960 to 1990 Uniform Crime Reports, found that increases in education reduced female arrest rates.

Several studies have explored the impact of sports on academic achievement, educational attainment, and life skills (Eide & Ronan, 2001; Perisco et al., 2004; Pfeifer & Cornelissen, 2010; Rees & Sabia, 2010)[5]. For instance, Eide and Ronan (2001) examined the link between sports participation and educational attainment, accounting for unobservables through the estimation of instrumental variables. They found that the effects of sports participation varied by race and gender. Specifically, they documented that sports participation had a positive effect on the educational attainments of black males and white females. They also found a negative effect on the educational attainment of white males. Similarly, Rees and Sabia (2010) used the height of a student as an instrument and found that sports participation may increase aspirations to attend college; however, they found no effects on academic achievement or attending college. And, as discussed above, Stevenson (2010) found strong evidence that Title IX-induced increases in female sports participation is positively related to educational attainment.

Finally, sports participation may also influence criminal activity through its effects on employment and wages. Many studies document a positive relationship between high school

[5] See also Darling et al. (2005), Lipscomb (2007), Lechner (2009), Felfe et al. (2016), Lechner and Downward (2017), and Ransom and Ransom (2017).

sports participation and better employment opportunities later in life. (Barron et al., 2000; Eccles et al., 2003; Kuhn & Weinberger 2005; Ewing, 2007; Lechner, 2009; Stevenson, 2010). Lechner (2009) found that sports participation has a positive long-term impact on earnings and wages. Kuhn and Weinberger (2005) also documented that higher wages are attributable to the leadership skills developed through athletic participation.

In summary, if sports participation increases human capital acquisition and improves labor market outcomes, sports participation may reduce crime.

2.4. Sports Participation and Crime

Previous studies that have examined the relationship between sports and crime have been largely cross-sectional in nature and have treated sports participation as exogenous to crime (Cameron & MacDougall, 2000; Crabbe, 2000; Smith & Waddington, 2004; Hartmann & Massoglia, 2007; McGinn et al., 2008; Nichols, 2010; Ekholm, 2013; Spruit, 2015). Findings in the literature have been mixed, owed to the identification strategy used (cross-sectional versus panel fixed effects models), as well as the set of controls available to researchers. A meta-analysis by Spruit et al. (2015) analyzed 51 published and unpublished studies, with 48 independent samples, containing 132,366 observations on sports participation and delinquent behavior. Overall, they were unable to find any significant association between sports participation and delinquency. Their findings suggest that adolescent athletes are neither more nor less delinquent than non-athletes. However, this meta-analysis did not differentiate among identification strategies nor did it explore long-run versus short-run impacts on crime.

Hartmann and Massoglia (2007) found that the effect of sports participation on deviant behavior depended on the type of behavior. They find that shoplifting decreases with sports participation, while drunk-driving increases, suggesting both positive and negative social

consequences. Moreover, they highlighted that these effects extended later in life. Using a fixed effects model, Caruso (2011) also documented a robust negative association between sports participation and adult property and juvenile crimes in Italy. A 10 percent increase in sports participation is associated with a reduction in property crimes by approximately 3 percent and a reduction in juvenile crimes by approximately 8 percent.

Furthermore, a number of studies have examined the effects of sports-based program interventions on crime (Winther and Currie, 1987; Hawkins, 1998; Hartmann & Depro, 2006; Carmichael, 2008; Kelly, 2013; Parker et. al., 2017). For instance, Winther and Currie (1987) argued that the sports program (Northern Fly-In Sports Camps) that focused on building teamwork, character and self-esteem among Aboriginal Canadian young offenders and potential young offenders in Manitoba resulted in a reduction in youth crime in the communities that offered the program. Similarly, Hartmann and Depro (2006) examined the effect of midnight basketball programs and found that cities adopted official midnight basketball leagues experienced sharper decreases in property crime rates.

However, these programs were not randomly assigned to youths and studies have taken their placement in communities as exogenous to criminal behavior (as well as treated take-up as exogenous to crime).

3. Data and Methods

3.1. Data

We compile county-level, age-specific arrest counts for females from the Federal Bureau of Investigation's (FBI) Uniform Crime Reports (UCR) from 1980 to 2000. County crime rates are measured as female arrest counts per 1,000 of the age-specific female population, where

county population data is generated using the National Cancer Institute's Survey of Epidemiology and End Results (SEER).

Arrest data is collected via voluntary reports from more than 16,000 city, county, and state agencies. This data may understate actual levels of crime because not every crime is reported to law enforcement (Gould et al. 2002). However, there is a high level of correlation between arrest reports from UCR and actual crimes committed when the latter is measurable (Lochner and Moretti 2004). Moreover, measurement error in UCR is unlikely to be correlated with our measure of Title IX (See below).[6]

To further guard against possible idiosyncratic measurement errors in crime, we follow the method described in Anderson (2014) in which counties that have ten or fewer years of arrest data are removed from our sample. Additionally, age-specific county-year arrest counts greater or less than two standard deviations from the county-specific mean are excluded. Finally, we control for the number of agencies reporting within a county for any given year to address county-specific time-varying changes in reporting behavior.

Our primary analysis measures violent crimes (e.g., murder, rape, robbery, aggravated assault, and simple assault), property crimes (e.g., larceny, burglary, motor vehicle theft, and arson), drug crimes (including sale and possession), and prostitution. In our analysis, we focus on females ages 25 to 39 years old between the years 1980 and 2000. This roughly maps to the ages and years window explored by Stevenson (2010).

In Table 1, we show the weighted means of female arrests per 1,000 population. As expected, rates of property crime arrests were higher than violent crime and drug-related arrests. Property crime arrests were 4.56, violent crime arrests were 2.9 and drug-related arrests were

[6] Underreporting can vary by the type crime or the law enforcement agency. However, empirical techniques described below (county fixed effects) should capture any time-invariant cross-county differences in reporting.

2.49 per-thousand[7]. Figure 1 also reveals crime rates per 1,000 for females ages 25-to-39 between 1980 and 2014. We document an increase in female arrest rates between 1980's and 1990's. Additionally, we observe a decline in female arrest rates beginning from late 1990's.

Next, we obtain data on gender-specific state sports participation from the National Federation of State High School Associations (NFSH). Each state and the District of Columbia have their public high school associations and every year they collect information on sports participation. This state-level information is gathered and compiled by the NFSH. Annual sports participation survey data has been compiled since the 1969-1970 academic year[8].

Following Stevenson (2010), and Schulkind (2016), we measure the gender-specific sports participation rate as the ratio of the number of high school students participating in a high school sport to the gender-specific state population ages 14-to-17.[9] In Figure 2, we present the gender-specific high school sports participation rates from 1970 to 2014. Consistent with prior studies, we observe a sharp increase in female sports participation rate between 1971 and 1978, after which female participation rate approaches the male sports participation rate. This is consistent with the six-year compliance window of Title IX.

3.2. Empirical Strategy

Our empirical approach follows that of Stevenson (2010). First, we draw county-by-month data from the UCR and estimate the following reduced form equation (1):

[7] Number of observations slightly vary across types of crimes. Note that, each cell represents county, crime, age group, and year. Not all crimes reported for every county, year, age group.
[8] Iowa is the only state didn't report female sports participation until 1981. (National Federation of State High School Associations)
[9] Participation rates created with estimated gender specific state-level high school enrollment using 1990 census were quantitatively similar.

$$Arrests_{icst} = \beta_0 + \beta_1(Post\ Title\ IX_{\ t} \times Boys' Participation_s^{1971}) + \kappa_c + \psi_t + \tau_i + \delta' \boldsymbol{X}_{st} + \varepsilon_{icst} \quad (1)$$

where *i*, *c*, *s*, and *t*, indexes birth cohort, county, state, and year respectively. The dependent variable *Arrests* is the number of female arrests per thousand population of 25-to-39-year-olds in birth cohort *i* in a county *c* in state *s* at year *t.* The interaction term (*Post Title IX * Boys' Participation*^{1971}*)* represents boys' sports participation in the academic year 1971 interacted with a dichotomous variable indicating whether the female was born in 1957 or later. This is a strict definition of exposure to treatment; it requires that the female was covered by Title IX at all ages 14-to-18. Alternative definitions of exposure to Title IX yielded a qualitatively similar pattern of results. Next, κ_c, ψ_t and τ_i denote county, year and birth cohort effects respectively. Following Stevenson (2010), the vector $\boldsymbol{X_{cst}}$ includes controls for state-level unemployment, personal income, inflation, and interest rates at the age of 18. We also add these same parsimonious controls at the year of the arrest. Data for state and year specific controls are obtained from Federal Reserve Economic Data (FRED), The Local Area Unemployment Statistics (LAUS), Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA).

An important limitation of our empirical approach is that we cannot measure the arrestee's state of residence during high school. We can only measure the state in which the crime occurred. To the extent that arrestees moved from their states of residence at high school to commit offenses, our estimates of Title IX effects may be biased toward zero.[10]

Following Stevenson (2010), our coefficient of interest,β_1, is identified from cross-state variation in the pre-Title IX (1971) male sports participation rate interacted with whether the

[10] In a future iteration of this paper, we will attempt to bound this bias by looking at mobility patterns among criminal offenders.

female was at least 18 years old in 1975 (and thus fully affected by Title IX). Note that because crime counts are reported for five-year age intervals, we must make a determination of how to code age cohorts who, in a given year, are partially treated (that is, some ages are treated, and some are not). Our approach for the main tables is a conservative one, requiring all members of the five-year age interval to be treated for our indicator to turn on. As a sensitivity check, we also code the variations of the policy variable to capture those "partly covered" by Title IX when they are in high school. Results using this alternate coding are quantitatively similar and available in the Appendix Table 2.

In Figure 2, we show the cross-state distribution of male sports participation rates in 1971 and document large variation in male sports participation among states in the pre-Title IX period. For instance, Rhode Island, North Carolina and District of Columbia had the lowest male sports participation among states. Their participation rates were roughly 20 percent. Whereas, North Dakota, Nebraska and Minnesota had the highest sports participation rates. Almost every male high school student participated in athletics[11].

A key threat to identification would be if crime trends among younger cohorts of 25-to-39-year-old females trended differently in states that were more (or less) bound by Title IX. To address confounding of this form, we take a number of tacks. First, we follow the approach of Kaestner and Xu (2010) and add a control for the crime rate for men ages 25-to-39:

$$Arrests_{icst} = \beta_0 + \beta_1(Post\ Title\ IX_{\ t} \times Boys' Participation_s^{1971}) + \beta_2 Male\ Arrests_{icst} + \kappa_c + \psi_t + \tau_i + \delta' \boldsymbol{X}_{it} + \varepsilon_{icst} \quad (2)$$

[11] Note that, since participation counts all participants and many athletes play more than one team, this number can be greater than one.

where the $Male\ Crime\ Rate_{icst}$ added to the right-hand side of the estimating equation will control for any unmeasured crime trends that are associated with Title IX's implementation across states that are unrelated to Title IX's impact on women. Second, we add controls for county-specific linear time trends to the right-hand side of equation (3):

$$Arrests_{icst} = \beta_0 + \beta_1(Post\ Title\ IX_t \times Boys'Participation_s^{1971}) + \kappa_c + \psi_t + \tau_i + v_c * t + \delta' \boldsymbol{X}_{it} + \varepsilon_{icst} \quad (3)$$

where $v_c * t$ denotes county-specific linear time trends. This approach should control for anything trending linearly at the county-level that could have been correlated with crime rates of the affected cohort. Moreover, we also experiment with controlling for birth cohort-specific linear time trends. Results for those estimates are quantitatively similar and available upon request.

In addition to the reduced form specification outlined above, we also use a two-stage least squares (2SLS) approach to estimate the impact of Title IX-induced changes in female sports participation on female crime. In the first stage, we estimate equation (4):

$$Female\ Participation_{icst} = \propto_0 + \propto_1 (Post\ Title\ IX_t \times Boys'Participation_s^{1971}) + \kappa_c + \psi_t + \tau_i + v_c * t + \partial' \boldsymbol{X}_{st} + \varepsilon_{icst} \quad (4)$$

The instrument for female sports participation is, as above, the interaction of the state level male sports participation in 1971 and an indicator variable equal to one for the post Title IX cohort. Thus, the instrument is set equal to zero for females' that attended high school in a pre-Title IX

world and it is equal to the male sports participation in 1971. The instrument is expected to be correlated with female sports participation due to the nature of the policy, but uncorrelated with unmeasured determinants of female arrests. The second stage equation is then estimated as equation (5):

$$Arrests_{icst} = \varphi_0 + \varphi_1 Female\ \widehat{Participation}_{ist} + \kappa_c + \psi_t + \tau_i + v_c * t + \theta' \boldsymbol{X}_{st} + \varepsilon_{icst} \quad (5)$$

Our 2SLS estimate (φ_1) can then be interpreted as the impact of Title IX-induced increases in female sports participation on female crime rates.

4. Results

For ease of presentation, tables focus on reduced form estimates of β_1 as well as instrumental variables estimates φ_1. Estimated coefficients of the control variables are available in Appendix Table 1. Similar to Stevenson (2010), standard errors are clustered at the state-year level. Estimates are weighted based on county-level age- and gender-specific populations obtained from the SEER. Unweighted estimates are qualitatively similar to those presented and available upon request.

4.1 Reduced Form Estimates

Table 2 presents reduced form estimates of the relationship between Title IX and female arrests. It shows the results for total, violent, property and drug-related arrests for the full sample of 25- to 39-year-old females between 1980 and 2000. The first three columns report estimates with county, year, birth cohort fixed effects, and economic controls. Similar to Stevenson (2010), in the second column, we include macro-economic controls for the age of 18. Furthermore, we

include macro-economic controls at the year of the arrest. Columns (4) and (5) present estimations with male crime rates and county specific linear time trends as additional controls to further account for any trends in crime that should be unaffected by Title IX.

Across specifications, there is strong evidence that Title IX is associated with a reduction in criminal arrest rates. Without any economic controls on the right-hand side of estimating equation, there is evidence of a negative relationship between male sports participation arrests in the pre-Title IX period and criminal arrests. Given that our right-hand side variable ranges from 0 male sports participation to approximately 1, the marginal effects reported in Table 2 represent the effects of moving from zero female sports participation to full (100 percent) participation. Given our descriptive findings in Figures 1 and 2, we discuss the magnitudes of the effects as the more policy relevant impacts of a 10 percentage-point higher male sports participation rate. The results in column (1) show that a 10 percentage-point higher male sports participation rate (in 1971) is associated with a .39 per 1,000 reduction in the total crime rate, a 0.082 per 1,000 reduction in the violent crime rate, a 0.07 per 1,000 reduction in the property crime rate, and a .23 per 1,000 reduction in the drug crime rate. The magnitudes of these effects suggest that each 10 percentage higher male sports participation rate is associated with a 2 to 5 percent reduction in female crime rates. These findings are robust to the inclusion of macroeconomic controls in columns (2) and (3).

As noted above, controlling for male crime rates should capture any unmeasured crime trends that are associated with Title IX's implementation across states that are unrelated to Title IX's impact on women. However, given that it is theoretically possible for male crime rates to be affected by Title IX (for instance, through marriage markets and labor market spillovers), these findings should be interpreted as lower bound estimates. Following Kaestner and Xu (2011),

when we add "male crime rates" on the right-hand side of the estimating equation, estimates of β_1 become smaller but the findings are generally still statistically distinguishable from zero at conventional levels. We find that a 10 percent higher male sports participation rate is associated with a 2 percent decline in total crime, a (statistically insignificant) 1 percent reduction in property crime, a 3 percent reduction in violent crime, and a 4 percent decrease in drug-related crimes.

In column (5), we control for county-level linear time trends which take into account anything trending linearly at the county-level that could correlate with crime rates. The results continue to show that Title IX is associated with reductions in female crime. This suggests potentially important external social benefits of Title IX to those who were not directly affected by the policy change.[12]

In an effort to better understand female crime behavior, we break down the arrests into: larceny, burglary, motor vehicle theft, robbery, arson, aggravated assaults, other assaults, and prostitution. In Table 3, we present reduced form estimates of the relationship between Title IX and specific crime arrests for the full sample of 25- to 39-year-old females between 1980 and 2000. In the first column, we add macro-economic controls for the age of 18 and at the year of the arrest. Controlling for those had a little impact on our estimates. A 10 percent higher male sports participation is associated with a 15 percent decrease in burglary, a 0.5 percent decrease in motor vehicle theft arrests, and a 1.8 percent decrease in other assaults.

In the second column of Table 3, we include county-level linear time trends to the right-hand side of the estimating equation. Controlling for linear time trends has a little impact on our

[12] Additionally, in Appendix Table 3, we present state level estimations for total, property, violent, and drug related arrests. Results are qualitatively similar to those presented above.

estimates. A 10 percent higher male sports participation is still associated with a 9 percent decrease in aggravated assault, a 12 percent decrease in burglary, a 0.5 percent decrease in larceny, a 0.5 percent decrease motor vehicle theft, and a 1.1 percent decrease in other assaults arrests.

4.2 Instrumental Variable Estimates

Estimates of the relationship between state-level female sports participation rates and states' Title IX compliance are presented in Table 4. Consistent with the evidence from Stevenson (2010), our first stage estimates (Equation 3) find that Title IX compliance is associated with a statistically significant 26 - 32 percentage point increase in the state-level female sports participation rates. The F-statistics in the first stage easily satisfy the instrument relevance standards proposed by Stagier and Stock (1997) with values ranging from 22.46 to 31.13.

Table 5 presents 2SLS estimates of the relationship between predicted female sports participation and the female crime arrests. The 2SLS estimates on the relationship between female sports participation and total crimes are substantially more negative than the reduced form estimates using Title IX compliance, implying that the local average treatment effect captured by this estimation is higher than the average effect. This consistent with the hypothesis that Title IX induced sports participation reduces the criminal activity. In other words, exogenous increase in sports participation reduces crime more.

In the first column of Table 5, we include the aforementioned fixed-effects and macro-economic controls. A 10-percentage point increase in female sports participation is associated with a 5.6 percent decrease in total, an 8 percent decrease in violent crime, and a 9.4 percent

decrease in drug-related arrests.

When we include county-specific linear time trends on the right-hand side of the estimating equation, a 10-percentage point increase in female sports participation is associated with a 2 percent decrease in total, a 3.6 percent decrease in violent crime and a 4.5 percent decrease in drug-related arrests. Furthermore, we restrict the arrests to property crimes, a 10-percentage point increase female sports participation is associated with a 0.8 percent decrease in property crime arrests. However, this association is not statistically significant.

In Table 6, we present 2SLS estimation results for specific crime arrests. The first column includes 2SLS in the absence of geographic-specific time trends. We find significant negative associations between female sports participation and burglary, motor vehicle theft, and assaults. A Title IX-induced 10-percentage point increase in female sports participation is associated with a 5.7 percent decrease in assaults, a 49 percent decrease in burglaries, and a 1.3 percent decrease in motor vehicle theft arrests. These findings are somewhat larger than, but consistent with OLS estimates described above.

Finally, in the second column of Table 6, we include county-specific linear time trends on the right-hand side of the estimating equation. Adding linear time trends has a little impact on our estimates. A 10-percentage point increase in female sports participation is associated with a 4.4 percent decrease in assaults, a 46 percent decrease in burglaries and, a 1.7 percent decrease in motor vehicle thefts.

4.3 Event Study Estimates

To ensure that the findings above are not driven by differential county trends of female arrest rates prior to enactment of Title IX, we estimate a set of reduced form models with policy

leads. Additionally, the effect of Title IX may be small initially, and could take time to unfold. To gauge these effects, we also add policy lags. Finally, we analyze the combined effects of policy leads and lags together.

In Tables 6 - 9, we present policy leads, policy lags, and combined estimations for total, violent, property and drug related arrests for the whole sample of 25-39-year-old females between 1980 and 2000. Those estimates include county, year, birth cohort fixed effects, macro-economic controls, county specific time trends and male crime rates.

In Column (1) of Table 6 to 9, we include +7 years of policy leads. We find no evidence on the effect of trends prior to enactment of Title IX for total, violent and property arrests. Drug related arrests have one positive significant policy lead, implying an increase in drug arrests before the enactment of the policy.

In Column (2), estimations with policy lags are presented. These lags enable us to uncover the effects of Title IX on female arrests. Similar to Stevenson (2010), we find that the effect of the policy is immediate with some lagged effects. Lagged effects of the policy is consistent with Title IX's compliance window and it is visible for both violent and drug related arrests.

In the last column, the combined effects of policy lead and lags are presented to uncover the effects of Title IX. Results are consistent with the policy leads and policy lag estimations. Furthermore, Figures 4 - 7 present a visual evidence on the effect of Title IX on female arrests. In addition to the main types of crimes, we again analyze: larceny, burglary, motor vehicle theft, robbery, arson, aggravated assaults, other assaults, and prostitution. Results are consistent with the main estimations and event study figures are attached to the appendix.

5. Mechanisms

Our results suggest that females who had more chances to participate in high school athletics are less likely to get arrested later in life. This section examines the available evidence and analyzes the effect of education, labor market opportunities, earnings, and single motherhood. We reveal that the combination of these channels and especially labor market participation are possible mechanisms that reduce female arrest rates as discussed above. While we cannot look directly at the link between athletic participation and crime at the individual level, it remains likely that given the results supported by the mechanisms. We present results for both with and without linear time trends. We also analyze the mechanisms for violent, property and drug crimes. Estimation results for those arrests are attached to the appendix.

5.1 Education

This section examines whether increased athletic opportunities have an effect on arrests via education. If sports induced educational attainment affects arrest rates, we should observe the changes in the average female treated by Title IX. Previous literature shows that Title IX induced athletic participation leads to higher educational attainment and provides evidence about the reduction in female arrest rates due to the increase in educational attainment. Stevenson (2010) finds that a twenty-five-percentage point increase in athletic opportunities leads to an extra 0.1 years of education. Furthermore, Lochner & Urbina (2017) find that a one-year increase in educational attainment among females reduces arrest rates by 12 to 15 percent. Adding these two papers together we would expect a ten-percentage increase in sports participation induced by Title IX is associated with 1.2 to 1.5 percent decrease in arrests. Our result presented in Table 10 Column (3) is also negative but not statistically significant. In addition to this, we test the effect of having a college degree and results are similar to the educational attainment.

5.2 Earnings

An increase in female earnings is associated with a reduction in overall female arrest rates. A common explanation for the link between the increase in earnings and reduction in arrest rates is that higher income individuals have higher opportunity cost of committing a crime (Lochner & Moretti, 2004). An alternative explanation from behavioral psychology literature (Wisdom & Wilson, 2015; Wade et. al., 2014; Strauss et. al., 2017) is that higher income individuals are calmer and less violent. In Table 10, Column (2) increases in earning reduces the female arrest rates but they are not statistically significant. In addition to that, we do not observe in any magnitude changes in Title IX.

5.3 Labor Market Participation

While there is not a lot of evidence that educational attainment and earnings increase induced by Title IX explain the reduction in female arrest rates, labor market participation is found to contribute in the reduction of it. That is, it could be that female's increasing participation in the labor market and that leads to a reduction in arrest rates. Consistent with the literature (Kuhn & Weinberger, 2005), in Table 10 Colum (4), we present some evidence that the labor market participation among females may be the one channel that reduces overall female arrest rates. Labor market participation reduces the magnitude of the association between Title IX induced sports participation and female arrest rates by approximately 70%. Labor market participation reveals significant evidence that it is one of the channels in how Title IX induced sports participation reduces female arrest rates.

5.4 Single Motherhood

Finally, we analyze the effect of being a single mother. Clark and Ayres (2014) reveal that a 10-percentage point increase in Title IX induced high school sports participation increased the percentage of single mothers by 6-percentage points. As shown in Table 10 Column (5), and we are unable to detect any significant evidence concerning the relationship between single motherhood and female arrest rates.

Adding possible mechanisms together, we show some descriptive evidence that Title IX induced sports participation reduces female arrest rates via those channels. Together, the estimated association between Title IX induced sports participation and female arrest rates fall approximately 80% after controlling for aforementioned fixed effects and county level linear time trends. While we find little evidence to link some of these channels, an alternative explanation may be that it is possible that females who played sports in high school make smarter choices for reasons other than we explored.

6. Other Crimes

In this section, we analyze the effects of Title IX induced sports participation on other nonviolent crime arrests such as, Driving Under Influence (DUI) related arrests, public intoxication and white-collar crime arrests (Fraud, Forgery and Embezzlement). Drinking among college students is more prevalent than the individuals that never attended college (Weschler et al., 2000; Timberlake et al., 2007). Furthermore, educated individuals that are working are more likely to engage in white collar crimes. Lochner and Urbina (2017) reveal an increase in white collar crime among females with the increased education levels. Table 11 and Table 12 present reduced form estimates of the relationship between Title IX and specific non-violent arrests.

In Table 12, we show the results for driving under the influence (DUI) and public intoxication related arrests for the full sample of 25- to 39-year-old females between 1980 and 2000. Similar to the main results, we report estimates with county, year, birth cohort fixed effects, and economic controls. In Column (1), we also add the county level linear time trends and in Column (2), we add male arrest rates to capture any trends in crime that should be unaffected by Title IX. After controlling everything we still find some evidence that the Title IX induced sports participation increases female DUI arrests. One possible explanation is that with the increase in employment and earnings, women are now in a position to be driving more (i.e., commuting and/or work-related travel) and have the disposable income to imbibe alcohol. This would allow for the increases in DUI's among females, with the Title IX induced sports participation increase.

Next, we report fraud, forgery and embezzlement arrests widely known as white collar crimes in Table 12. After controlling for the aforementioned fixed effects and county level linear time trends we are unable to find any effect of Title IX induced sports participation on white collar crimes. This result is consistent with the literature. Lochner and Urbina (2017) find no significant effect of increase in female educational attainment on female white-collar crime arrests. In addition to this, we perform event study analysis for aforementioned crime arrests, and find that the results are consistent with the above results. The event study estimates for those can be found in the appendix.

7. Robustness Checks

In an attempt to further examine pre-existing trends, we perform a number of robustness checks including an event study analysis. In Table 13, we report placebo regressions with alternative enactment years of the policy. We explore and test as if the policy was enacted in

1962, 1982 and, 1987 and interact that with the male sports participation in 1971. After controlling the aforementioned factors including male crime rates and county level time trends, we are unable to detect any reduction in female crime rates. Additionally, in Table 14, we take treated (18-24) and nontreated (45-59) and analyze as if they were treated with Title IX. We are unable to detect any significant reduction in female arrest rates. To further gauge the effects of Title IX and sports participation, in Table 15, we randomize male sports participation in 1971 and we are again unable to detect any significant relationship between randomized male sports participation in 1971 and female arrest rates.

8. Conclusion

Recent research suggests that, Title IX has substantially increased high school female sports participation and may lead to increased educational attainment and improved labor market outcomes. However, little work has explored whether there are positive spillover effects to society that might justify, on welfare grounds, policies, and programs to increase sports participation. In making their case for increased public funding for sports, many prominent national and international organizations, including the United Nations Office on Drugs and Crime, have made the case that increasing sports participation may reduce crime. While several cross-sectional studies have posited a link between sports participation and criminal behavior, most of these studies have failed to adequately account for selection on unobservables or reverse causality.

This study uses the introduction of Title IX to estimate the causal impact of female sports participation on crime. Our results document that Title IX compliance induce 25 to 35 percentage point increase in female sports participation. Turning to crime, using data from Uniform Crime Reports and National Federation of State High School Association, 2SLS estimates provide some evidence that increases in sports participation induced by Title IX

lead to lower arrests in several types of crimes. A 25-percentage-point increase in female sports participation is associated with a 5 percent reduction in total arrests, a 11.25 percent decrease in drug-related arrests, and a 9 percent reduction in violent crime arrests among 25-to-39-year-old females. In addition, our crime-specific estimates provide evidence of heterogeneous effects. Burglary, robbery, larceny, aggravated assault, and drug crimes experience larger statistically significant effects.

Together, our findings suggest important external benefits of Title IX from its crime-reducing effects. Title IX resulted in an approximately 25 percentage-point increase in female high school sports participation. The average per-offense social cost of crime (in 2017 dollars) is approximately $20,500 (Miller, Cohen, and Wiersema, 1996). Therefore, a back-of-the-envelope calculation based on our 2SLS estimates suggests that Title IX generated approximately $600 million per year in external benefits from reduced crime among 25-to-39-year-old females.

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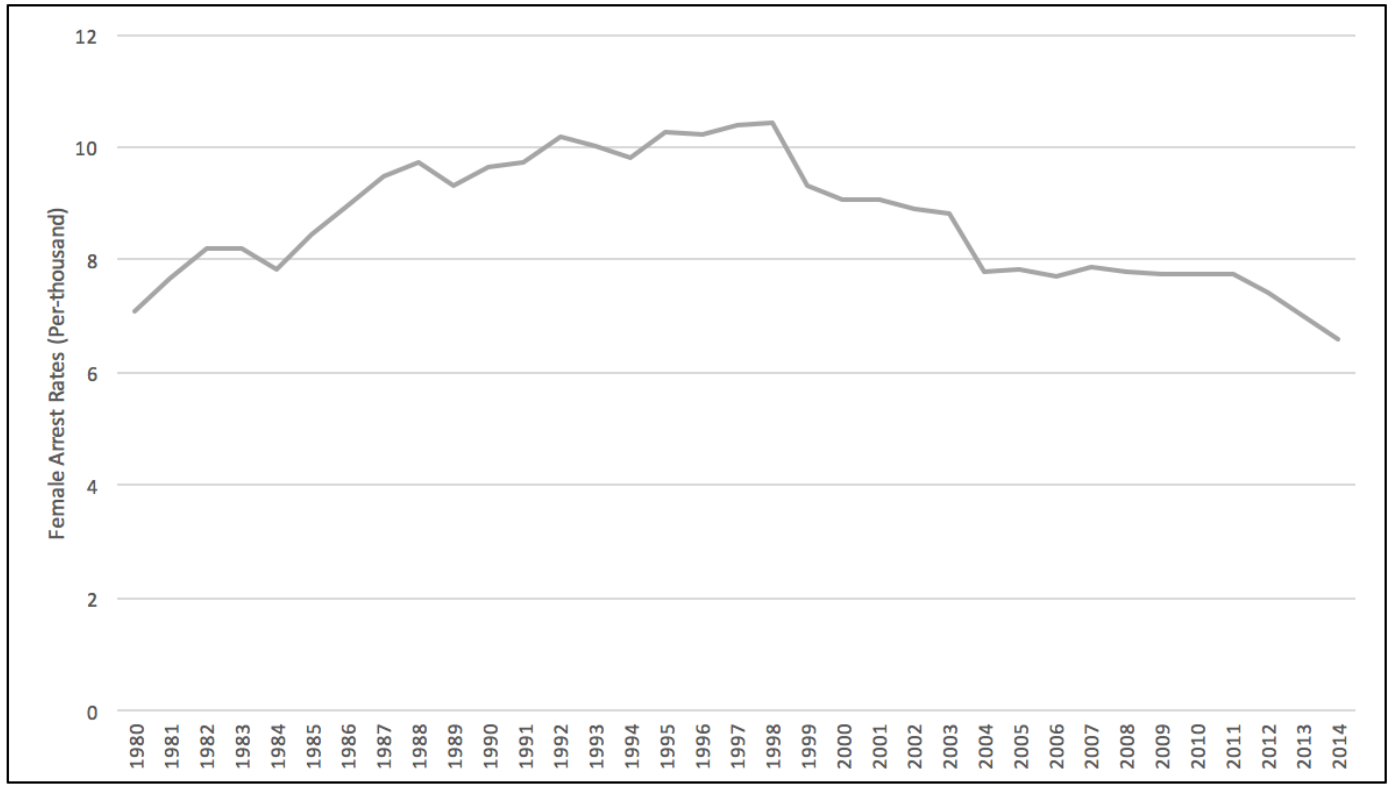
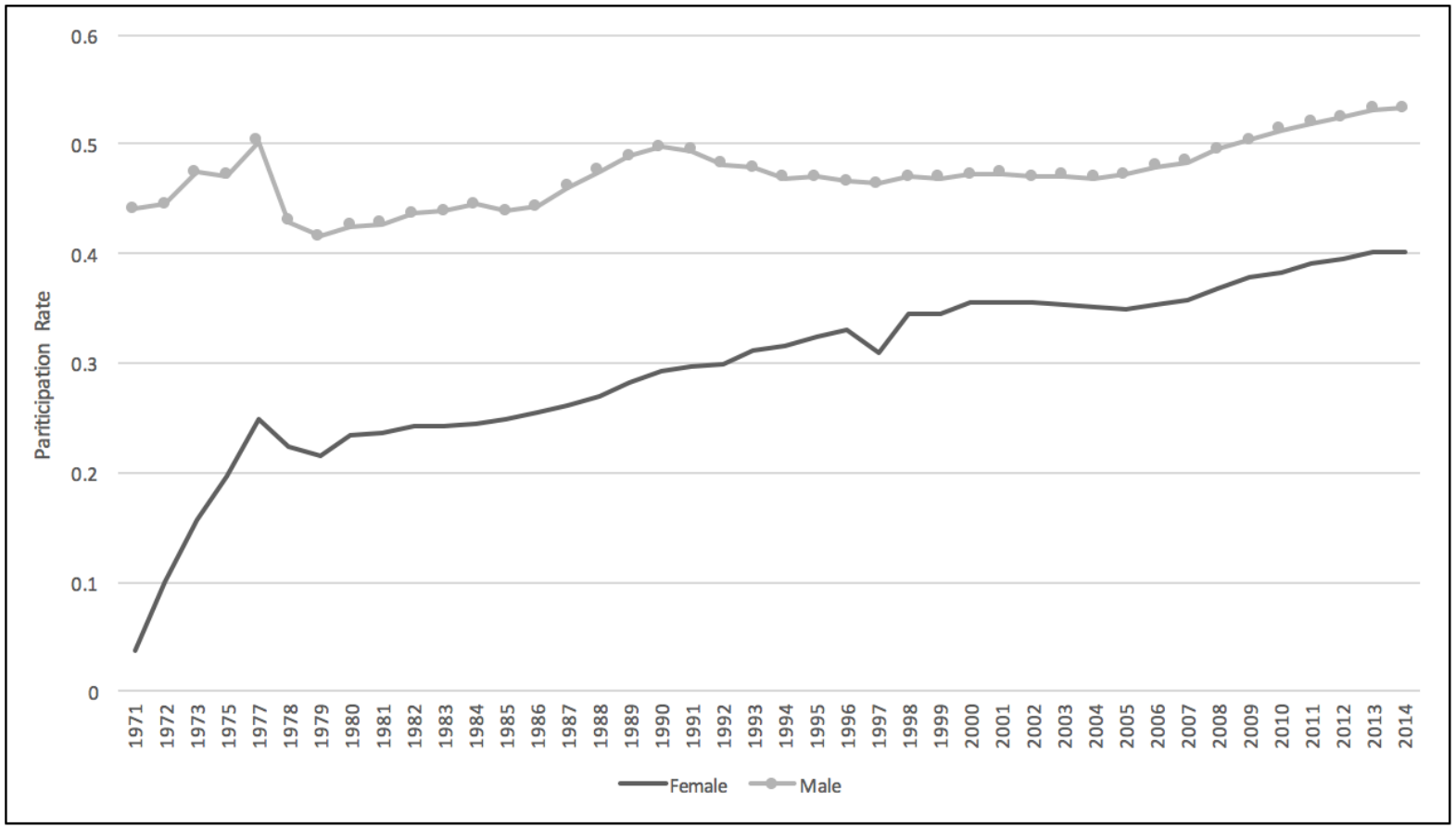
Figure 1. Female Arrest Rates, 1971-2014, Ages 25-39



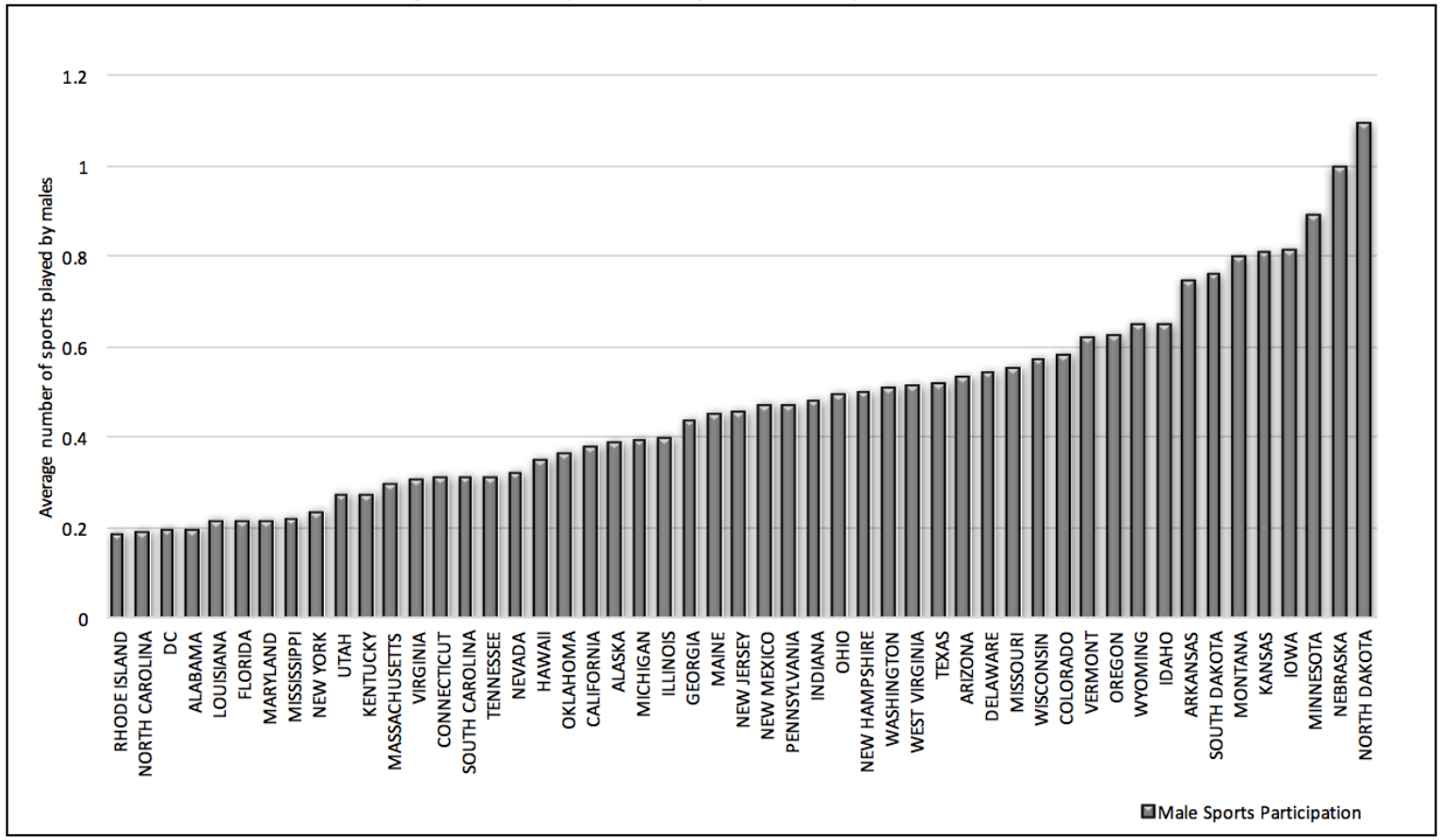
Note: Arrest rates are arrests per 1,000 of the relevant age group population. Arrest counts from UCR (Uniform Crime Reports) divided by age and gender specific population estimate of a county from SEER (Surveillance, Epidemiology and End Results Program).

Figure 2. Sports Participation Rate by Gender, 1971-2014



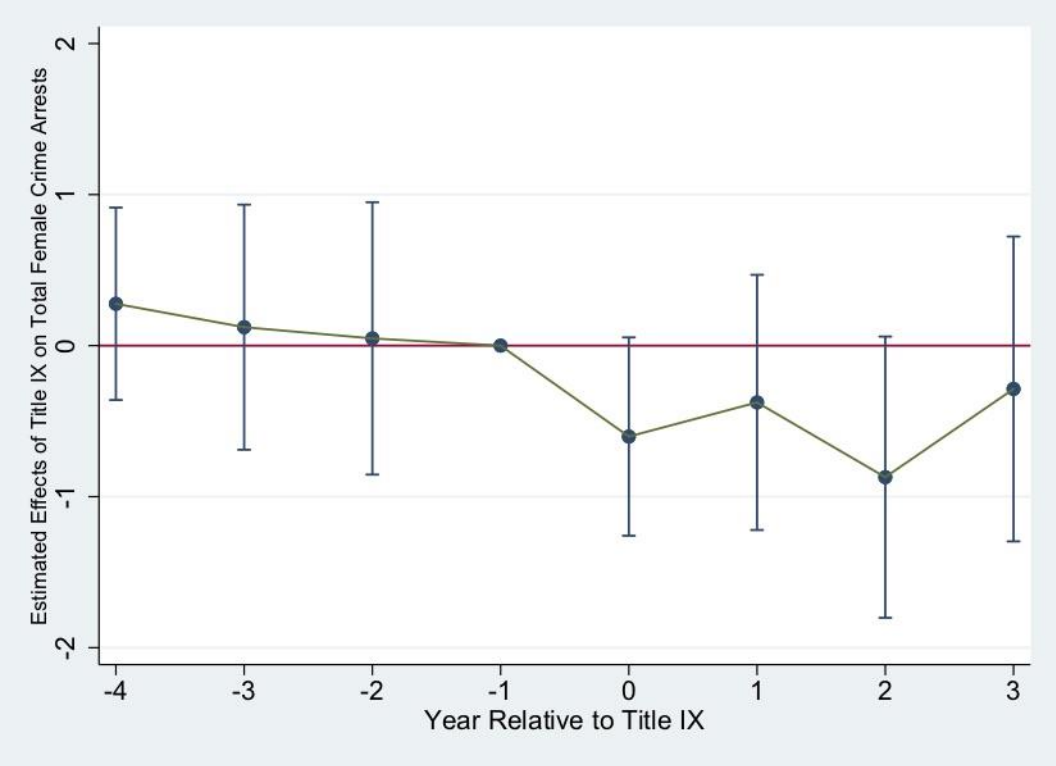
Note: Participation numbers are given by the National Federation of High Schools (Athletic Participation Survey). A participant is a varsity sport team member. Individual students may be counted more than once if they play on multiple teams. Annual data exist for the number of participants for females, in each sport, and by state, for the academic years 1971–72, 1972–73,

Figure 3. Male Sports Participation Rate, By State, 1971-1972



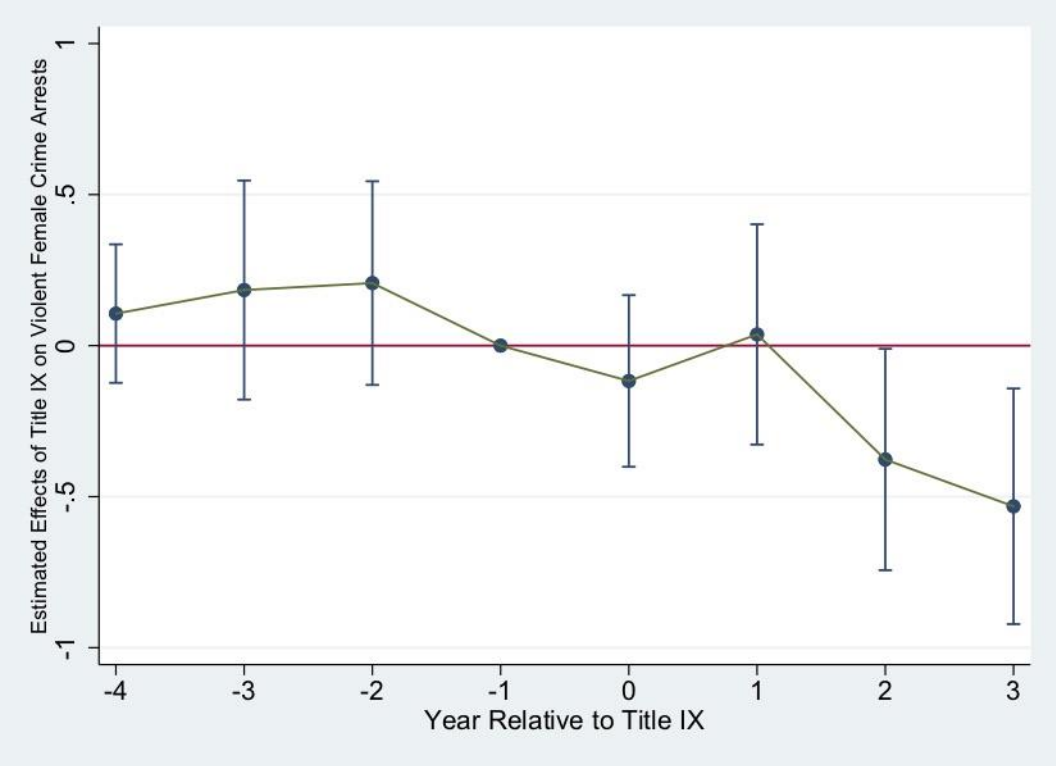
Note: State numbers for 1971 are calculated from state-level participation numbers by sport (provided by the National Federation of High Schools Athletic Participation Survey). The participation numbers are divided by an estimate of the state's gender specific 14-to-17-year-old population taken from SEER (Surveillance, Epidemiology and End Results Program). Note that, since participation counts all participants and many athletes play more than one team, this number can be greater than one

Figure 4. Event Study Analysis of Total Female Arrests



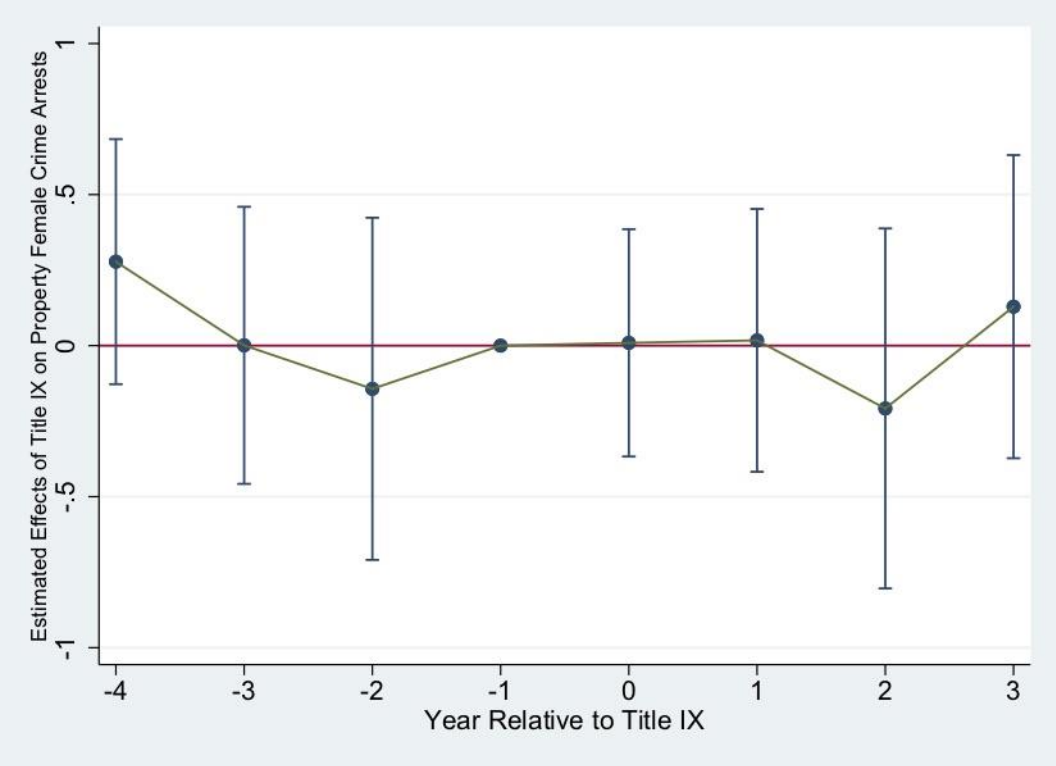
Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970.

Figure 5. Event Study Analysis of Violent Crime Female Arrests



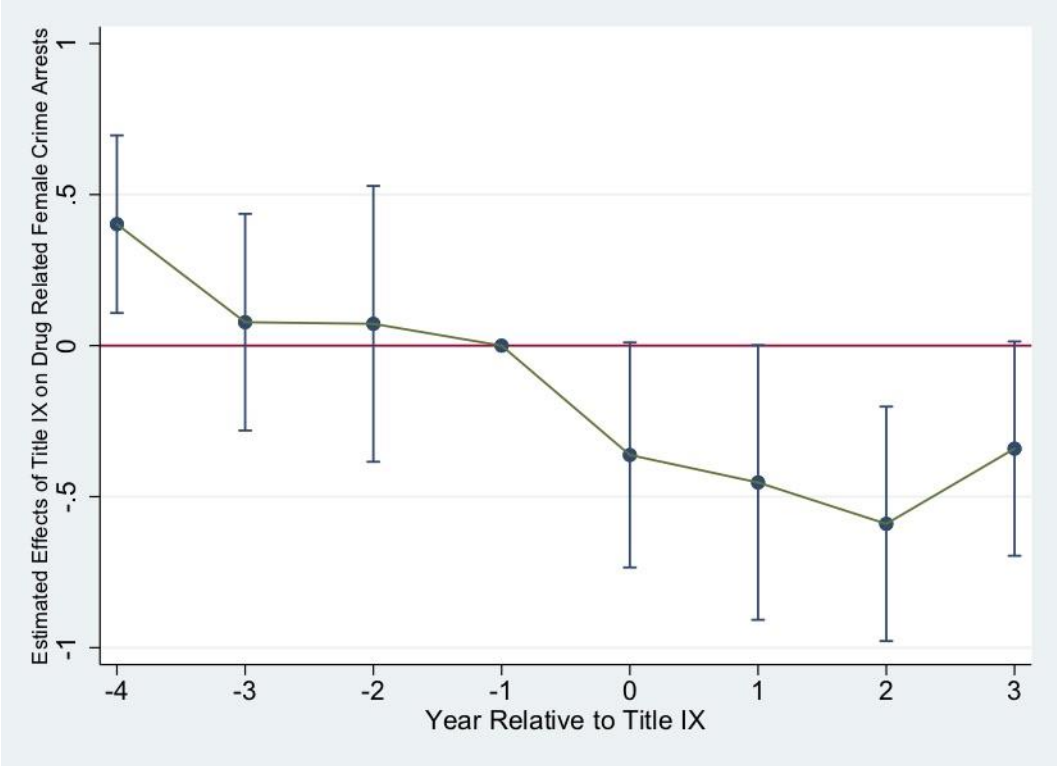
Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970

Figure 6. Event Study Analysis of Property Crime Female Arrests



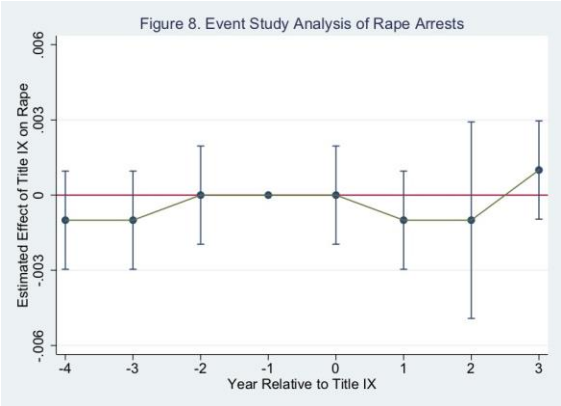
Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970

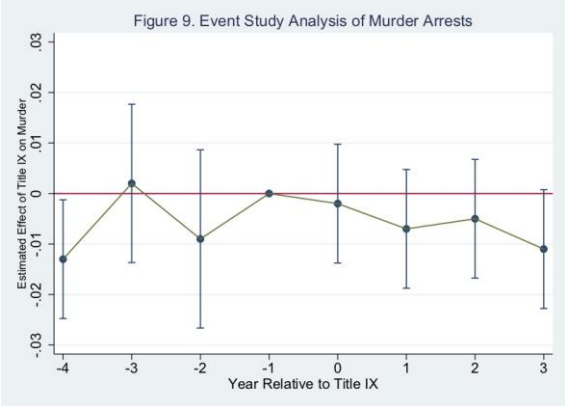
Figure 7. Event Study Analysis of Drug Related Female Arrests

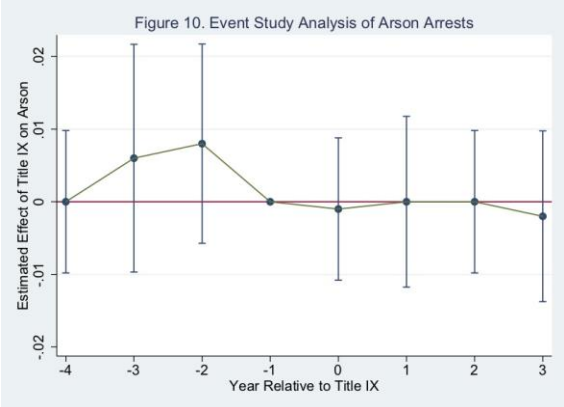


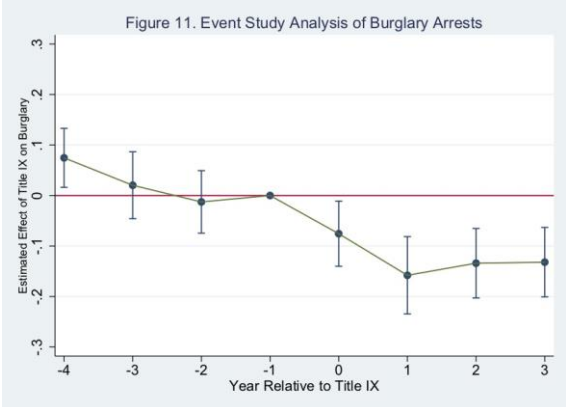
Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970

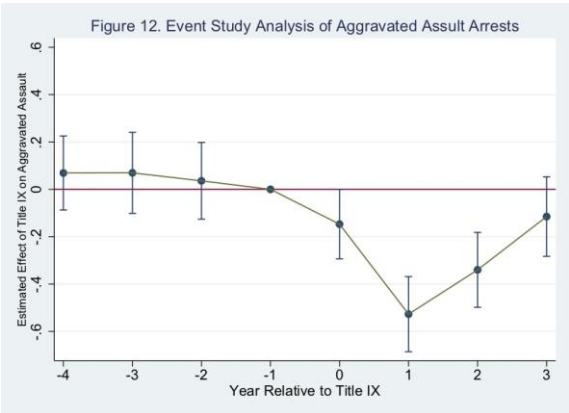
Figure 8-16. Event Study Analysis of Specific Crime Arrests

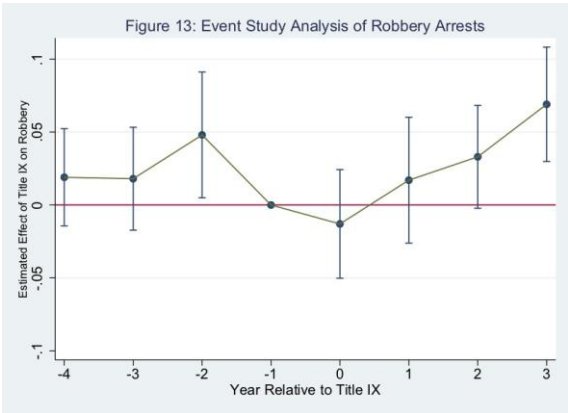






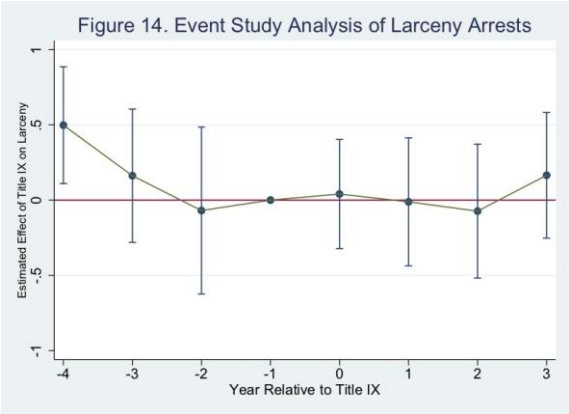


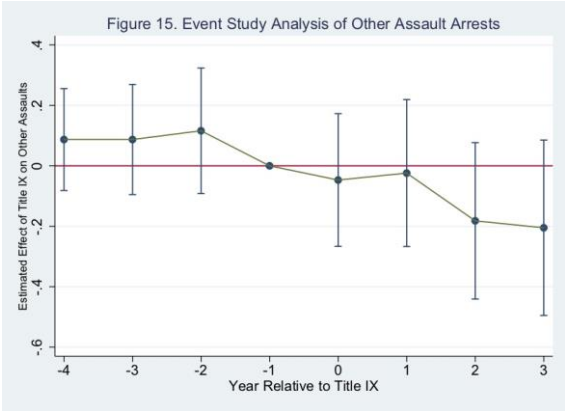


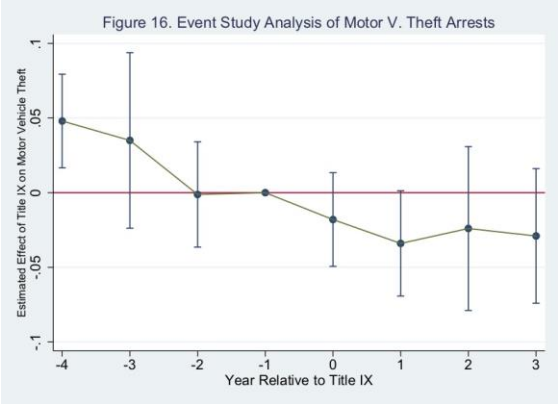


Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970

Figure 8-16. Event Study Analysis of Specific Crime Arrests







Notes: Estimates and 95% confidence intervals from an OLS regression of female arrest rates include controls for birth year effects, year of crime effects, county fixed effects. We also control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970

Table 1. Means of Female Arrests and Controls, Ages 25 to 39

	Mean	***St. Dev***	***Number of Obs.***
Total Crime Arrests	10.17	10.14	166,029
Violent Crime Arrests	2.92	3.32	161,730
Property Crime Arrests	4.58	4.16	163,422
Drug Crime Arrests	2.53	4.02	156,489
Specific Crime Arrest			
Murder			
Rape			
Robbery	0.14	0.42	93,951
Aggravated Assault	0.31	0.49	155,769
Burglary	0.12	0.23	137,469
Larceny	4.10	3.67	158,697
Motor Vehicle Theft	0.82	1.27	150,846
Other Assaults	1.90	2.29	154,437
Arson	0.02	0.06	75,981
Controls			
Inflation	6.29	3.23	166,029
Unemployment	6.56	2.21	166,029
Interest Rate	9.71	3.57	166,029
Income (per-capita)	9556.74	5178.13	166,029
Female Sports Participation	0.14	0.11	166,029
Age	29.92	4.06	166,029
Male Crime Rate	28.57	39.69	166.029

Note: All models include controls for birth year effects, year of crime effects, county fixed effects. Additionally, we control for state level unemployment, personal income, inflation and interest rates at the age of 18 and at the year of the crime. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970.

Table 2. OLS Estimates of the Effect of Title IX on Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)	(4)	(5)
Total Crime Arrests	-3.634***	-3.348***	-3.404***	-1.774***	-0.659**
	(0.442)	(0.411)	(0.412)	(0.283)	(0.293)
Violent Crime Arrests	-0.729***	-0.730***	-0.744***	-0.724***	-0.272***
	(0.186)	(0.182)	(0.182)	(0.140)	(0.101)
Property Crime Arrests	-0.521**	-0.548***	-0.562***	-0.227	-0.0978
	(0.204)	(0.197)	(0.194)	(0.140)	(0.163)
Drug Crime Arrests	-2.347***	-2.017***	-2.043***	-0.791***	-0.600***
	(0.306)	(0.247)	(0.247)	(0.169)	(0.147)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*No*	*No*	*Yes*	*Yes*	*Yes*
Male Arrest Rates	*No*	*No*	*No*	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*No*	*No*	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 3. OLS Estimates of the Effect of Title IX on Specific Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	**(2)**
Murder	0.004	0.001
	(0.003)	(0.004)
Rape	(0.001)	(0.000)
	(0.001)	(0.000)
Robbery	-0.006	0.010
	(0.010)	(0.010)
Aggravated Assault	-0.516***	-0.269***
	(0.051)	(0.039)
Burglary	-0.185***	-0.144***
	(0.020)	(0.027)
Larceny	-0.059	-0.175
	(0.122)	(0.130)
Motor Vehicle Theft	-0.039***	-0.048***
	(0.010)	(0.012)
Other Assaults	-0.295***	-0.152**
	(0.107)	(0.077)
Arson	0.000	-0.002
	(0.002)	(0.004)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 4. First Stage Estimates of the Effect of Title IX on Female Sports Participation Rates

	(1)	(2)
Effect of Title IX on Female Sports Participation		
Total Crime Sample	0.318***	0.260***
	(0.042)	(0.047)
Violent Crime Sample	0.318***	0.261***
	(0.041)	(0.046)
Property Crime Sample	0.318***	0.261***
	(0.042)	(0.046)
Drug Crime Sample	0.319***	0.260***
	(0.043)	(0.047)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 5. 2SLS Estimates of the Effect of Female Sports Participation on Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)
Total Crime Arrests	-5.606***	-2.523**
	(0.893)	(1.115)
Violent Crime Arrests	-2.288***	-1.040***
	(0.438)	(0.376)
Property Crime Arrests	-0.718	-0.358
	(0.444)	(0.514)
Drug Crime Arrests	-2.496***	-2.284***
	(0.524)	(0.555)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment. Sports participation at the age of 14 for each age group.

Table 6. 2SLS Estimates of the Effect of Female Sports Participation on Specific Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)
Murder	0.012	0.002
	(0.010)	(0.015)
Rape	0.002	0.001
	(0.002)	(0.003)
Robbery	-0.021	0.038
	(0.032)	(0.051)
Aggravated Assault	-1.626***	-1.020***
	(0.163)	(0.153)
Burglary	-0.581***	-0.546***
	(0.063)	(0.102)
Larceny	-0.185	-0.666
	(0.384)	(0.498)
Motor Vehicle Theft	-0.123***	-0.180***
	(0.032)	(0.049)
Other Assaults	-0.928***	-0.575**
	(0.335)	(0.285)
Arson	-0.002	-0.008
	(0.008)	(0.014)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 6. Event Study Analysis of the Effect of Female Sports Participation on Total Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.292		0.277
	(0.319)		(0.325)
5-6 Years Prior to Title IX	0.122		0.122
	(0.414)		(0.414)
3-4 Years Prior to Title IX	0.0554		0.0477
	(0.459)		(0.460)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.728**	-0.602*
		(0.313)	(0.335)
1-2 Years After Title IX		-0.495	-0.376
		(0.421)	(0.431)
3-4 Years After Title IX		-0.982**	-0.871*
		(0.487)	(0.475)
5+ Years After Title IX		-0.386	-0.287
		(0.519)	(0.515)
Title IX	-0.528*	-	-
	(0.303)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 7. Event Study Analysis of the Effect of Female Sports Participation on Violent Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.0532		0.106
	(0.116)		(0.117)
5-6 Years Prior to Title IX	0.186		0.184
	(0.189)		(0.185)
3-4 Years Prior to Title IX	0.182		0.207
	(0.175)		(0.172)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.208*	-0.117
		(0.123)	(0.145)
1-2 Years After Title IX		-0.0529	0.0371
		(0.165)	(0.186)
3-4 Years After Title IX		-0.466**	-0.377**
		(0.182)	(0.187)
5+ Years After Title IX		-0.618***	-0.532***
		(0.193)	(0.199)
Title IX	-0.206	-	-
	(0.127)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 8. Event Study Analysis of the Effect of Female Sports Participation on Property Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.295		0.278
	(0.208)		(0.207)
5-6 Years Prior to Title IX	0.001		0.001
	(0.234)		(0.234)
3-4 Years Prior to Title IX	-0.133		-0.143
	(0.289)		(0.289)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.086	0.009
		(0.174)	(0.192)
1-2 Years After Title IX		-0.069	0.017
		(0.211)	(0.222)
3-4 Years After Title IX		-0.286	-0.208
		(0.300)	(0.304)
5+ Years After Title IX		0.067	0.129
		(0.240)	(0.256)
Title IX	-0.005	-	-
	(0.180)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 9. Event Study Analysis of the Effect of Female Sports Participation on Drug Related Female Crime Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.411***		0.402***
	(0.150)		(0.150)
5-6 Years Prior to Title IX	0.0775		0.0776
	(0.184)		(0.183)
3-4 Years Prior to Title IX	0.0773		0.0722
	(0.235)		(0.233)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.547***	-0.362*
		(0.194)	(0.190)
1-2 Years After Title IX		-0.626***	-0.453*
		(0.230)	(0.232)
3-4 Years After Title IX		-0.751***	-0.590***
		(0.215)	(0.198)
5+ Years After Title IX		-0.482***	-0.341*
		(0.182)	(0.181)
Title IX	-0.426***	-	-
	(0.139)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 10. OLS Estimates of the Effect of Title IX and Selected Mechanisms on Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)	(4)	(5)	(6)
Title IX	-0.659**	-0.598*	-0.637**	-0.0241	-0.537*	-0.179
	(0.293)	(0.310)	(0.284)	(0.272)	(0.293)	(0.296)
Earnings		-0.197				0.317***
		(0.554)				(0.004)
Education			-1.378			-5.966***
			(1.571)			(1.906)
Labor Force Participation				-1.330***		-1.903***
				(0.154)		(0.150)
Number of Children					-1.826*	0.464
					(1.006)	(1.004)
County Specific Linear Time Trends	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 11. OLS Estimates of the Effect of Title IX on Selected "White-Collar" Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)
White Collar Crimes (Total)	1.103***	-0.160
	(0.293)	(0.266)
Fraud	0.820***	-0.220
	(0.263)	(0.241)
Forgery	0.176***	0.0105
	(0.0487)	(0.0403)
Embezzlement	-0.125***	-0.0593***
	(0.0201)	(0.0181)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 12.OLS Estimates of the Effect of Title IX on Selected Non-Violent Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)
DUI	0.845***	0.434***
	(0.161)	(0.130)
Drunkenness	0.776***	0.293
	(0.236)	(0.183)
Disorderly Conduct	0.243*	-0.378*
	(0.131)	(0.219)
Gambling	-0.0138	0.0351
	(0.0279)	(0.0392)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*
County Level Linear Time Trends	*No*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Table 13. Placebo Estimates of the Effect of Title IX on Total Female Crimes Arrest Rates per 1,000 Ages 25 to 39

(Different Enactment Dates)

	1962	1982	1987
Title IX	-0.0683	1.156*	2.321**
	(0.434)	(0.590)	(0.945)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment

Table 14. Placebo Estimates of the Effect of Title IX on Total Female Crimes Arrest Rates per 1,000

(Different Age Cohorts)

	18-24	45-59
Title IX	0.214 (0.197)	-2.347 (2.931)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment

Table 15. Placebo Estimates of the Effect of Title IX on Total Female Crimes Arrest Rates per 1,000 Ages 25 to 39

(Random Distribution of Male Sports Participation in 1971)

	Actual	Random
Title IX	-0.659**	-0.204
	(0.293)	(0.260)
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*
Male Arrest Rates	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment

Appendix I

OLS Estimates of the Effect of Title IX on Female Crimes Arrest Rates per 1,000 Ages 25 to 39 with Selected Controls

	Total	Violent	Property	Drugs
Title IX	-0.659**	-0.272***	-0.160	-0.600***
	(0.293)	(0.101)	(0.167)	(0.147)
Agency	0.005	0.003	-0.002	-0.015***
	(0.010)	(0.003)	(0.012)	(0.004)
Unemployment (Age 18)	-0.091***	-0.014*	0.002	-0.082***
	(0.028)	(0.008)	(0.012)	(0.004)
Income (Age 18)	-0.000**	0.000	0.000	-0.000**
	(0.001)	(0.000)	(0.000)	(0.000)
Inflation (Age 18)	4.034***	0.802***	1.453***	1.614***
	(0.853)	(0.268)	(0.367)	(0.504)
Unemployment (Year of Arrest)	0.077**	-0.022*	0.051**	0.017
	(0.034)	(0.012)	(0.020)	(0.020)
Income (Year of Arrest)	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Inflation (Year of Arrest)	0.171	0.229	0.136	0.129
	(0.255)	(0.128)	(0.108)	(0.127)
Male Crime Rate	0.177***	0.113***	0.166***	0.116***
	(0.010)	(0.004)	(0.019)	(0.014)
Year, Birth year, County Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix II
Sensitivity Analysis for OLS Estimates of the Effect of Title IX on Female Crimes Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
Total Crime Arrests	-2.86***	-4.09***	-3.45***
	(0.94)	(1.23)	(0.936)
Violent Crime Arrests	-0.576	-1.44**	-1.38**
	(0.37)	(0.649)	(0.522)
Property Crime Arrests	-0.837*	-0.813*	-0.613**
	(0.49)	(0.424)	(0.300)
Drug Crime Arrests	-1.52***	-2.02***	-1.53***
	(0.535)	(0.664)	(0.491)
Year, Birth year, County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: In the first column, we only include individuals fully treated by Title IX. The legislation implemented before post-Title IX cohort attended to high school. In the second column, we include individuals that are partially treated by Title IX and coded depending on the years of treatment. In the third column, we include everyone that were exposed to Title IX regardless of the number of years they were in high school after the legislation. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970.

Appendix III
OLS and 2SLS Estimates of the Effect of Title IX on State Level Female Crime Arrest Rates per 1,000 Ages 25 to 39

	Mean St. Dev Observation	2SLS	Reduced Form	First Stage
Total Crime Arrests	9.88 (4.61) [3066]	-9.66*** (3.47)	-2.75*** (0.945)	.285*** (0.044)
Violent Crime Arrests	4.43 (1.83) [3066]	-2.39 (1.73)	-0.682 (0.501)	.285*** (0.44)
Property Crime Arrests	2.81 (1.67) [3066]	-1.94* (1.19)	-0.555 (0.373)	.285*** (0.044)
Drug Crime Arrests	2.43 (1.98) [3066]	-5.48*** (2.05)	-1.56*** (0.519)	.285*** (0.044)
Year, Birth year, County Fixed Effects		*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18		*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime		*Yes*	*Yes*	*Yes*
State Level Linear Time Trends		*Yes*	*Yes*	*Yes*

Note: Numbers in brackets [] denote sample sizes. Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970.

Appendix IV

Event Study Analysis of the Effect of Female Sports Participation on Female Murder Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	-0.014**		-0.013**
	(0.006)		(0.006)
5-6 Years Prior to Title IX	0.002		0.002
	(0.008)		(0.008)
3-4 Years Prior to Title IX	-0.009		-0.009
	(0.009)		(0.009)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		0.004	-0.002
		(0.005)	(0.006)
1-2 Years After Title IX		-0.001	-0.007
		(0.005)	(0.006)
3-4 Years After Title IX		0.0006	-0.005
		(0.005)	(0.006)
5+ Years After Title IX		-0.005	-0.011*
		(0.005)	(0.006)
Title IX	-0.006	-	-
	(0.005)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix V

Event Study Analysis of the Effect of Female Sports Participation on Rape Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	-0.001		-0.001
	(0.001)		(0.001)
5-6 Years Prior to Title IX	-0.002		-0.001
	(0.002)		(0.001)
3-4 Years Prior to Title IX	0.000		0.000
	(0.001)		(0.001)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.001	-0.000
		(0.001)	(0.001)
1-2 Years After Title IX		-0.000	-0.001
		(0.001)	(0.001)
3-4 Years After Title IX		-0.000	-0.001
		(0.001)	(0.002)
5+ Years After Title IX		0.001	0.001
		(0.001)	(0.001)
Title IX	-0.000	-	-
	(0.001)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix VI

Event Study Analysis of the Effect of Female Sports Participation on Robbery Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.025		0.019
	(0.017)		(0.017)
5-6 Years Prior to Title IX	0.018		0.018
	(0.018)		(0.018)
3-4 Years Prior to Title IX	0.051**		0.048**
	(0.022)		(0.022)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		-0.003	-0.013
		(0.015)	(0.019)
1-2 Years After Title IX		0.001	0.017
		(0.021)	(0.022)
3-4 Years After Title IX		0.016	0.033*
		(0.019)	(0.018)
5+ Years After Title IX		0.054***	0.069***
		(0.019)	(0.020)
Title IX	-0.029*	-	-
	(0.015)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix VII

Event Study Analysis of the Effect of Female Sports Participation on Aggravated Assault Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.0238		0.0691
	(0.0783)		(0.0797)
5-6 Years Prior to Title IX	0.0710		0.0697
	(0.0886)		(0.0873)
3-4 Years Prior to Title IX	0.0145		0.0358
	(0.0833)		(0.0827)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		-0.187***	-0.147**
		(0.0526)	(0.0747)
1-2 Years After Title IX		-0.562***	-0.527***
		(0.0707)	(0.0809)
3-4 Years After Title IX		-0.377***	-0.340***
		(0.0713)	(0.0807)
5+ Years After Title IX		-0.154**	-0.115
		(0.0671)	(0.0857)
Title IX	-0.250***	-	-
	(0.0622)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix VIII

Event Study Analysis of the Effect of Female Sports Participation on Burglary Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.0675**		0.0746**
	(0.0302)		(0.0298)
5-6 Years Prior to Title IX	0.0205		0.0203
	(0.0337)		(0.0338)
3-4 Years Prior to Title IX	-0.0160		-0.0127
	(0.0316)		(0.0316)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		-0.107***	-0.0756**
		(0.0322)	(0.0329)
1-2 Years After Title IX		-0.181***	-0.158***
		(0.0390)	(0.0391)
3-4 Years After Title IX		-0.161***	-0.134***
		(0.0363)	(0.0351)
5+ Years After Title IX		-0.161***	-0.132***
		(0.0357)	(0.0351)
Title IX	-0.118***	-	-
	(0.0272)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix IX

Event Study Analysis of the Effect of Female Sports Participation on Larceny Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.516***		0.498**
	(0.197)		(0.198)
5-6 Years Prior to Title IX	0.162		0.162
	(0.226)		(0.226)
3-4 Years Prior to Title IX	-0.0597		-0.0694
	(0.283)		(0.283)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		-0.173	0.0405
		(0.154)	(0.185)
1-2 Years After Title IX		-0.211	-0.0115
		(0.189)	(0.217)
3-4 Years After Title IX		-0.259	-0.0733
		(0.226)	(0.227)
5+ Years After Title IX		0.00460	0.165
		(0.191)	(0.213)
Title IX	0.0296	-	-
	(0.159)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix X

Event Study Analysis of the Effect of Female Sports Participation on Other Assault Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.063		0.087
	(0.087)		(0.086)
5-6 Years Prior to Title IX	0.079		0.087
	(0.094)		(0.093)
3-4 Years Prior to Title IX	0.11		0.116
	(0.107)		(0.106)
1-2 Years Prior to Title IX		-	-
		-	-
Year of Title IX		-0.112	-0.047
		(0.092)	(0.112)
1-2 Years After Title IX		-0.0872	-0.024
		(0.113)	(0.124)
3-4 Years After Title IX		-0.243*	-0.182
		(0.127)	(0.132)
5+ Years After Title IX		-0.263*	-0.205
		(0.139)	(0.148)
Title IX	-0.097	-	-
	(0.095)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XI

Event Study Analysis of the Effect of Female Sports Participation on Motor Vehicle Theft Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.048***		0.048***
	(0.016)		(0.016)
5-6 Years Prior to Title IX	0.035		0.035
	(0.030)		(0.030)
3-4 Years Prior to Title IX	-0.001		-0.0012
	(0.018)		(0.018)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.042***	-0.018
		(0.013)	(0.016)
1-2 Years After Title IX		-0.056***	-0.034*
		(0.017)	(0.018)
3-4 Years After Title IX		-0.045	-0.024
		(0.029)	(0.028)
5+ Years After Title IX		-0.048**	-0.029
		(0.021)	(0.023)
Title IX	-0.026*	-	-
	(0.014)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XII

Event Study Analysis of the Effect of Female Sports Participation on Arson Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	-0.001		-0.000
	(0.005)		(0.005)
5-6 Years Prior to Title IX	0.006		0.006
	(0.008)		(0.008)
3-4 Years Prior to Title IX	0.008		0.008
	(0.007)		(0.007)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.002	-0.001
		(0.005)	(0.005)
1-2 Years After Title IX		-0.002	0.000
		(0.005)	(0.006)
3-4 Years After Title IX		-0.001	0.000
		(0.006)	(0.005)
5+ Years After Title IX		-0.004	-0.002
		(0.005)	(0.006)
Title IX	-0.001	-	-
	(0.004)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XIII

Event Study Analysis of the Effect of Female Sports Participation on White Collar Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.569*		0.645**
	(0.310)		(0.317)
5-6 Years Prior to Title IX	-0.059		-0.061
	(0.532)		(0.530)
3-4 Years Prior to Title IX	-0.154		-0.118
	(0.411)		(0.410)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.106	0.350
		(0.281)	(0.299)
1-2 Years After Title IX		-0.015	0.208
		(0.327)	(0.321)
3-4 Years After Title IX		-0.166	0.037
		(0.431)	(0.413)
5+ Years After Title IX		-0.517	-0.350
		(0.491)	(0.457)
Title IX	0.113	-	-
	(0.257)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XIV

Event Study Analysis of the Effect of Female Sports Participation on Forgery Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.097*		0.097*
	(0.052)		(0.051)
5-6 Years Prior to Title IX	0.008		0.008
	(0.099)		(0.100)
3-4 Years Prior to Title IX	0.094		0.094
	(0.069)		(0.069)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.038	0.093
		(0.055)	(0.065)
1-2 Years After Title IX		0.012	0.064
		(0.048)	(0.056)
3-4 Years After Title IX		0.0074	0.056
		(0.053)	(0.058)
5+ Years After Title IX		0.032	0.077
		(0.055)	(0.063)
Title IX	0.075	-	-
	(0.050)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XV

Event Study Analysis of the Effect of Female Sports Participation on Fraud Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.420		0.511
	(0.308)		(0.311)
5-6 Years Prior to Title IX	-0.0808		-0.0836
	(0.521)		(0.518)
3-4 Years Prior to Title IX	-0.0751		-0.0325
	(0.420)		(0.416)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.0451	0.243
		(0.297)	(0.322)
1-2 Years After Title IX		0.0177	0.200
		(0.322)	(0.327)
3-4 Years After Title IX		-0.381	-0.216
		(0.427)	(0.420)
5+ Years After Title IX		-0.691	-0.555
		(0.485)	(0.467)
Title IX	-0.0143	-	-
	(0.277)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XVI

Event Study Analysis of the Effect of Female Sports Participation on Embezzlement Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.027		0.042**
	(0.017)		(0.018)
5-6 Years Prior to Title IX	0.027		0.027
	(0.026)		(0.025)
3-4 Years Prior to Title IX	0.003		0.011
	(0.024)		(0.024)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.032*	-0.009
		(0.017)	(0.022)
1-2 Years After Title IX		-0.043	-0.022
		(0.029)	(0.031)
3-4 Years After Title IX		-0.0468*	-0.026
		(0.027)	(0.028)
5+ Years After Title IX		-0.164***	-0.145***
		(0.032)	(0.032)
Title IX	-0.042**	-	-
	(0.021)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XVII

Event Study Analysis of the Effect of Female Sports Participation on DUI Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.0476		-0.0634
	(0.138)		(0.136)
5-6 Years Prior to Title IX	0.0120		0.0149
	(0.200)		(0.192)
3-4 Years Prior to Title IX	0.0412		-0.0120
	(0.217)		(0.211)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.145	0.118
		(0.141)	(0.169)
1-2 Years After Title IX		0.287	0.263
		(0.182)	(0.192)
3-4 Years After Title IX		0.715***	0.693***
		(0.240)	(0.248)
5+ Years After Title IX		1.142***	1.123***
		(0.222)	(0.232)
Title IX	0.465***	-	-
	(0.156)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XVIII

Event Study Analysis of the Effect of Female Sports Participation on Drunkenness Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	-0.362		-0.363
	(0.253)		(0.259)
5-6 Years Prior to Title IX	-0.612*		-0.612*
	(0.342)		(0.342)
3-4 Years Prior to Title IX	-0.322		-0.322
	(0.297)		(0.298)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		0.307	0.0405
		(0.236)	(0.303)
1-2 Years After Title IX		0.173	-0.0860
		(0.276)	(0.324)
3-4 Years After Title IX		0.576**	0.324
		(0.259)	(0.285)
5+ Years After Title IX		0.274	0.0339
		(0.259)	(0.286)
Title IX	0.0576	-	-
	(0.243)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.

Appendix XIX

Event Study Analysis of the Effect of Female Sports Participation on Disorderly Conduct Arrest Rates per 1,000 Ages 25 to 39

	(1)	(2)	(3)
7+ Years Prior to Title IX	0.159		0.140
	(0.383)		(0.378)
5-6 Years Prior to Title IX	0.149		0.152
	(0.321)		(0.322)
3-4 Years Prior to Title IX	-0.0602		-0.0701
	(0.379)		(0.374)
1-2 Years Prior to Title IX	-	-	-
	-	-	-
Year of Title IX		-0.283**	-0.218
		(0.139)	(0.287)
1-2 Years After Title IX		-0.766	-0.704*
		(0.533)	(0.391)
3-4 Years After Title IX		-0.154	-0.0948
		(0.399)	(0.339)
5+ Years After Title IX		-0.254	-0.200
		(0.217)	(0.241)
Title IX	-0.324**	-	-
	(0.158)	-	-
Year, Birth Cohort, and County Fixed Effects	*Yes*	*Yes*	*Yes*
Economic Controls at the Age of 18	*Yes*	*Yes*	*Yes*
Economic Controls at the Year of Crime	*Yes*	*Yes*	*Yes*
Male Arrest Rate	*Yes*	*Yes*	*Yes*
County Level Linear Time Trends	*Yes*	*Yes*	*Yes*

Note: Sports participation at the age of 14 for each age group. For years prior to the collection of data, girls' participation is set equal to what it was in the first available year: 1969-1970. Economic controls include; inflation, state level personal income and unemployment.