The Impact of Sports Participation on Crime in England between 2012 and 2015

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Abstract

This paper estimates the relationship between sports participation and two broad categories of crimes – property crimes and person crimes- in 323 local authorities in England between 2012 and 2015. The aim of this paper is to assess whether participation in sporting activities influences an individual's decision to engage in crime. Furthermore, the impact of socioeconomic conditions on crime are estimated also. The results of this paper indicate that sport participation reduces crime rates for both property and person crimes in English local authorities between 2012 and 2015. The findings suggest that sports participation has a stronger effect on person crimes as opposed to property crimes. The results show that a 10% increase in sports participation leads to a fall in person crimes of 1.30 and 1.56% while a 10% increase in sports participation rates leads to a fall in property crimes of between 0.64 and 0.73%.

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1. Introduction

Sport participation is generally considered to provide a multitude of positive benefits to individuals and society including but not limited to (i) reductions in crime (ii) increases in social capital and social integration (iii) improvements in health through physical activity and (iv) improvements in education outcomes. Studies examining the impact of sport participation on happiness (Huang & Humphreys, 2012), future income (Dewenter & Giessing, 2015), labour market outcomes (Lechner, 2015) have generally found sport participation to provide societal benefits. However, despite these widely held beliefs regarding the positive impact of sport participation on education, health and social issues, the results of studies investigating the relationship between sports participation and crime tend to be ambiguous. The results of numerous studies (Crabbe, 2000; Nichols, 1997) suggest that very little definitive evidence exists to support the hypothesis that sport participation reduces criminal activities.

This paper contributes to the literature focusing on the relationship between sport participation and crime in many ways. Firstly, this paper fills an important gap in the literature specifically by estimating the impact of sports participation on crime in England between 2012 and 2015. To my knowledge, this is the first paper that has addressed this issue for England. Secondly, this paper utilises sports participation data sourced from the Active People Survey (APS), an annual survey conducted in the United Kingdom concerned with analysing adult participation in sport and active recreation. The survey provides the largest sample size ever established for a sport and recreational survey, providing evidence of differences in sports participation across regions as well as individuals and socioeconomic groups. As such, this paper uses local authority data from England between 2012 and 2015 which provides data at a much more granular level in comparison to previous studies. Finally, this paper addresses some concerns identified in previous studies by moving beyond looking at the impact of sports participation on specific groupings within society and focusing on the impact on sports participation on crime generally.

Most attention in the relationship between sports participation and crime tends to focus on youth crime rather than crime more generally (Coalter, 2005). However, the evidence reviewed also points to the need to differentiate more between the effects of sport and exercise on the general population and young people who are at risk (ibid, p.46). Vermillion (2007) notes that most surveys or studies suffer from focusing on either males or females exclusively, or involve small sample sizes that do not contain highly generalizable results. This paper estimates the impact of sports participation on crime rates of in local authorities in England between 2012 and 2015. Crime is categorised into two broad categories of crime – property crime and person crime. Property crime is composed of thefts, robberies and burglaries while person crime refers to violence against the person, sexual offences and homicides.

The results of this paper indicate that sport participation reduces crime rates for both property and person crimes in 323 English local authorities between 2012 and 2016. The findings suggest that sports

participation has a stronger effect on person crimes as opposed to property crimes. The results indicate that a 10% increase in sports participation leads to a fall in person crimes of 1.30 and 1.56% while a 10% increase in sports participation rates leads to a fall in property crimes of between 0.64 and 0.73%. Also, this paper finds evidence to support previous studies which identify socioeconomic variables tending to have a statistically significant impact on property crime rates as opposed to person crime rates.

The next section sets out the relevant conceptual and empirical literature from which the paper is motivated and from which the paper draws hypotheses to be tested. This is followed by a description of the data and method, the results of the analysis and a brief conclusion.

2. Impact of Sports Participation on Crime

Many studies have examined the impact of sports participation on crime rates. The results of these studies are ambiguous with many studies suggesting that participation in sporting activities reduces crime rates (Caruso, 2011; Hartmann & Depro, 2006; Veliz & Shakib, 2012), whilst other studies indicate that sports participation has very little effect on crime rates (Eitle, Turner, & Eitle, 2003; Mutz & Baur, 2009; Nichols, 1997). Furthermore, the results from other studies (Hartmann & Massoglia, 2007; Kwan, Bobko, Faulkner, Donnelly, & Cairney, 2014) indicate that the impact of sports participation varies by the types of crime.

The majority of studies examining the impact of sports participation on crime tend to focus on youth crimes. Eitle et al (2003) study the impact of youth sports participation on crime rates in South Florida, USA. The results indicate that playing high school sports does not decrease the risk of engaging in drug or alcohol use during young adulthood. However, for black youths the results indicated that sports participation does have a deterring effect on later alcohol and drug use. Similarly, Hartmann and Massoglia (2007) examine the relationship between athletic involvement and crime in Saint Paul, Minnesota, USA. The authors find that the relationship between athletic involvement and crime varies significantly depending upon the types of crime examined. The findings suggest that shop-lifting decreases with sports participation, while drunken driving increases.

Hartman and Depro (2006) survey the impact of Midnight Basketball Leagues on crime rates in cities in the USA. The results show cities that were early adopters of officially sanctioned midnight basketball leagues experienced sharper decreases in property crime rates than other American cities during a period in which there was broad support for midnight basketball programs. For violent crime rates, midnight basketball cities saw a drop of approximately 90 offenses per 100,000 compared to non-midnight basketball counterparts. Veliz and Shakib (2012) find that schools with higher proportions of sports participants report significantly fewer serious crimes (i.e., violent crimes) and suspensions occurring on school grounds. However, the incidence of minor crimes is unrelated to the proportion of students engaging in school sports.

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Much of the literature outlined focuses specifically on the impact of sports participation on youth crime rates. Coalter (2005) suggests that studies need to differentiate more between the effects of sport on the general population. Caruso (2011) examined the impact of sports participation on three types of crime – property crime, violent crime and youth crime- in 20 Italian regions. The findings suggest that there is a statistically significant negative relationship between sport participation and both property crime and youth crime. While a positive relationship exists between sport participation and violent crime, the results are only weakly significant.

This paper focuses on estimating the impact of sports participation on two types of crimes in England – property crimes and violent crimes. Thus, the paper addresses the issues outlined by Coalter (2005) by focusing on the impact of sports participation on crimes for the population in general. Furthermore, the paper contributes further to the work of Caruso (2011) by examining the impact of sports participation on crime in England at the local authority level. Local authority data allows for an analysis at a much more granular level than previous studies. The next section highlights the data for both dependent and independent variables used in the study. The selection of these variables was guided by economic theory and a review of previous studies in the area.

3. Data

3.1. Measure of Sports Participation

This paper uses sports participation data sourced from the Active People Survey (APS), an annual survey conducted in the United Kingdom concerned with analysing adult participation in sport and active recreation. The survey provides the largest sample size ever established for a sport and recreational survey, providing evidence of differences in sports participation across regions as well as individuals and socioeconomic groups. The data is gathered by Sport England, a non-departmental public body sponsored by the Department for Culture, Media and Sport. The sports participation data relates to physical activities undertaken in the last four weeks prior to interview. Interviews are spread evenly across the entire period, which runs from October to October.

This paper utilises sports participation across a five year period from 2012 to 2015. Changes in data collection methods between 2005 and 2011 and 2012 and 2016 makes data across these periods non-comparable. Data from the first period collected information on physical activity that was conducted in 30 min blocks, while in the second period information on physical activity conducted in 10 min blocks. As such, only data from the second period has been used in this paper.

Local authorities are the primary unit of local government, responsible for provision of a range of services, including education, public housing, social services and leisure and recreation services. The number of local authorities in the United Kingdom was reduced to 326 in 2009 following local government reorganisation. Following Janke, Propper, and Shields (2016) a number of cases were

dropped to obtain our working sample. Three local authorities are omitted: the Isles of Scilly and the City of London because of their very small populations, and the London Borough of Westminster because of its very high crime rate, which is due to the difference between the resident and the daytime population, a high proportion of whom are tourists. After eliminating respondents with missing values for our outcome variables, we are left with a sample of 1,296 observation across 323 local authorities over a four year period.

3.2. Socioeconomic Indicators

Income per capita has been used as a measure of both legal and illegal activities in crime studies. Higher levels of income are associated with both higher rewards for criminals due to increased opportunities of lucrative targets. Contrastingly, higher levels of income have also been estimated to reduce crime due to more opportunities to earn a living through legal activities. These interpretations have led to contrasting results for the estimated impact of income on crime levels. This study uses total income per person is used as a measure of income sourced from Office of National Statistics. Ehrlich (1973) proposes that mean family income should be taken as proxy for illegal income opportunities. He argues that a higher income level means higher transferable assets and thus more lucrative targets for potential criminals. Contrastingly, other studies have used mean income as a proxy for legal income opportunities with higher income associated with more rewarding legal jobs. As such, ambiguity exists when interpreting the results of the impact of income on different types of crime.

Baharom and Habibullah (2008) study the relationship between income, unemployment and crime in 11 European countries using panel data analysis between 1993 and 2001 for both aggregated (total crime) and disaggregated (subcategories) crime. Their results show that both income and unemployment have an important relationship with both aggregated and disaggregated crime. Crime displays positive significant relationship with income for all the categories except for domestic burglary. Han, Bandyopadhyay, and Bhattacharya (2013) find real earnings, has a positive and statistically significant effect on all the property crime categories in the United Kingdom. The effect of real earnings on all violent crime sub-categories is positive and statistically significant – a finding similar to what we found for various property crimes.

The unemployment rate is measured by the unemployment count as a percentage of the economically active population aged 16 and over. The National of Office Statistics (NOS) provides data for number of persons unemployed in local authorities in the United Kingdom between 2012 and 2016. The relationship between unemployment and crime has been studied extensively in the literature. R. B. Freeman (1982) and Chiricos (1987) provided early reviews of the relationship between unemployment and crime. These studies generally find small, positive effects of unemployment on crime, but these results are inconsistent across studies and are certainly not major determinants of crime. Results indicate

that unemployment has a greater impact on crimes against property rather than crimes against the person.

Carmichael and Ward (2001) use county level data to investigate the relationship between crime and male adult and youth unemployment in the United Kingdom. The results indicate that there is a systematic positive relationship between most crime and male unemployment regardless of age. Edmark (2005) studies the relationship between unemployment and crime in Sweden between 1988 and 1999, a particularly volatile period in the labour market. The results show that unemployment had a positive and significant effect on some property crimes. Bandyopadhyay, Bhattacharya, and Sensarma (2011) examine the impact of unemployment on six different crime types across 43 police force areas in the United Kingdom using quantile analysis. The results indicate that not only does unemployment increase crime but it does so more in high crime areas. Moreover, they find that the crime-reducing effect of higher detection rates is stronger in low-crime areas. Han et al (2013) examining the socioeconomic determinants of crime in the UK find that higher unemployment leads to a lower level of burglary and fraud and forgery. The effect of unemployment on most of the violent crimes is not statistically significant, with the exception of robbery

The male population between 16 and 24 is included in the study as a sociodemographic estimate of crime. The NOS provides population estimates for local authority regions within the UK. The percentage of population between 16 and 24 was calculated by Studies have shown that this demographic are the most likely to engage in particular crimes. Young male persons as a percentage of the population are included in many studies estimating the effects of deterrence on crime as they are considered the most likely socio-demographic age group to engage in criminal activities. Denny, Harmon, and Lydon (2004) examine the socioeconomic determinants of burglary in Ireland. The authors consider crime detection rates, the size of the prison population, the macro-economy in the form of consumer expenditure and the share of young males in the population. The author's find that the share of young males is associated with higher levels of these crimes. Han et al (2013) find the variable proportion of young people, in general, has no statistically significant effect on most of the property crime categories (with burglary being an exception).

Descriptive statistics for the two categories of crime and the socioeconomic indicators included for the 2012-2015 period, are reported in Table 1.

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[Insert Table 1 here]

Table 1 shows the descriptive statistics for the dependent and independent variables in the model. During the period 2012-2015, the average property crime rate i.e. rate of property crimes was 550 per 10,000 people. Between 2012 and 2015, the property crime rate in England declined on average by 4.84% per annum to 527 crimes per 10,000. In 2015, City of London (5,993 per 10,000), North East Lincolnshire (1,056 per 10,000) and Camden (1,033 per 10,000) recorded the highest rates of property crimes. During the period 2012-2015, the average rate of person crimes per 10,000 is 236. In 2016, the highest rates of person crimes were recorded in Rutland (2,408 per 10,000), Fenland (1,979 per 10,000) and City of London (1,527 per 10,000). While property crime rates declined over the period of the study, person crime rates increased on average by 10.85% per annum.

4. Methodology

The empirical analyses on the effect of labour market opportunities on crime relies typically on four types of data R. Freeman (1995): aggregate time series data, cross-section data, regional panel data and individual level data. Analyses of the first two types confirm the existence of a positive relationship between unemployment and crime. However, results from studies using the latter two methods tend to be more ambiguous. This paper utilises a panel data model with fixed effects to estimate the impact of sports participation on crime in England. Arellano and Bond (1991) note that using panel data methods solves the problems of unobserved heterogeneities that bias conventional cross sectional regressions are controlled for. Furthermore, utilising panel data model with fixed effects also presents more variability and less collinearity, allows for more degrees of freedom, provides more efficient estimates and is more informative than cross sectional data. The model to be estimated is outlined on the next page.

A. Model Specification

$$\ln Crimerate_{i,t} = \beta_0 + \beta lnSportsPart_{i,t} + \beta lnunemprate_{i,t} + \beta lnincome_{i,t} + \beta lnyoungmalerate_{i,t} + \varepsilon_i$$

with i =1... N denoting regions, and t =1...T, denoting time periods.

$lnCrime_{i,t}$ = Natural log of regional crime rates per 100,000 (both property and violent crimes)

$lnSportsPart_{i,t}$ = Natural log of regional sports participation rate

$lnIncome_{i,t}$ = Natural log of average regional income per person

$lnUnemp_{i,t}$ = Natural log of regional unemployment rate

$lnmale16 - 24_{i,t}$ = Natural log of regional percentage of males between ages of 16 to 24.

In the above specification, β are parameters to be estimated. β_0 is time invariant and control for country specific effects not explicitly included in the regression equation.

5. Estimation and Results

This section presents the results of the estimation of the models outlined in section four. The section analyses whether participation in sports has an impact on both property and person crimes. Furthermore, this section estimates whether a selection of socioeconomic indicators has an impact on different types of crime. The paper is concerned with estimating the impact of sports participation on crime rates in local authorities in England and as such a number of hypothesises have been developed in order to estimate the impact of sports participation on crime.

Table 2 presents the results of the estimation of sports participation on property crimes in local authorities in England between 2012 and 2015. In the most general specification, there are 323 different groups, each one corresponding to one of the local authorities included in the study. The total number of observations is 1,105 for the entire sample. The results show that participation in sporting activities significantly reduces the levels of property crime in English local authorities. This finding is consistent across the various specifications. The results indicate that a 10% increase in sports participation leads to a fall in property crimes of approximately 0.65%.

Turning attention to the socioeconomic determinants to property crime, income per capita is estimated to have both a negative and significant impact on property crime rates in English local authorities. Entorf and Spengler (2000) note that the results of studies estimating the impact of income on crime rates tend to be ambiguous as higher levels of income can be considered to both promote and deter crime. Higher levels of income provide more legal opportunities while also providing more lucrative opportunities for criminal activities. The results indicate that a ten percent increase in income per capita is estimated to reduce property crimes rates by between 1.9% and 2.5%, depending on the model estimated.

[Insert Table 2 here]

The unemployment rate is found to have an inverse relationship with property crimes. The relationship between unemployment and crime rates is found to ambiguous at best. Han et al (2013) examining crime rates in the United Kingdom find an increase in unemployment leads to a decrease in burglary and fraud rates while an inverse relationship is evident for theft rates. One possible explanation for this is the unemployment rate captures the net effect of two countervailing forces – while higher unemployment motivates potential offenders to commit crime by reducing the opportunity cost of crime, it also reduces the opportunities available for crime thus presenting different impacts across crimes. The results of the estimation suggest a ten per cent increase in the unemployment rate leads to an increase in property crimes by between 2.2 and 2.3%. The impact of young males in the population is found to have a statistically significant impact on property crimes in models 4 and 5. A 10% increase in the young male rate leads to an increase in the property crime rate of between 2.7 and 4.1%. Young male rate is found to be statistically insignificant for model 3.

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Table 3 presents the results of the estimation of sports participation on person crimes in local authorities in England between 2012 and 2015. The results show that sports participation significantly reduces the levels of person crime in English local authorities. The impact of sport participation is found to have a greater effect on person crimes than property crimes. This finding is consistent across the various specifications. The results indicate that a 10% increase in sports participation leads to a fall in person crimes of 1.30 and 1.56%.

[Insert Table 3 here]

The estimates for the socioeconomic determinants of crimes against the person tend to be ambiguous. The coefficient on the income variable is positive but the results are statistically insignificant. Similarly, the results of the unemployment rates are found to be ambiguous for crimes against the person. A ten percent increase in the unemployment rate is estimated to increase the person crime rate by approximately 6.2%. The results are statistically significant at the 99% confidence level. The percentage of males aged between 15 and 64 are estimated to be insignificant on person crime rates in English local authorities between 2012 and 2015. The results of the estimations are in line with the findings in the literature that socioeconomic indicators tend to be more significant for property crimes rather than person crimes.

6. Conclusion

The results of this paper indicate that sport participation reduces crime rates for both property and person crimes in 323 English local authorities between 2012 and 2016. The findings suggest that sports participation has a stronger effect on person crimes as opposed to property crimes. The results indicate that a 10% increase in sports participation leads to a fall in person crimes of 1.30 and 1.56% while a 10% increase in sports participation rates leads to a fall in property crimes of between 0.64 and 0.73%. The impact of sports participation on crime in England is found to be of a much smaller magnitude to that found by Caruso (2011) when examining the impact of sports participation on crime for 20 Italian regions.

This paper finds evidence to support previous studies which identify socioeconomic variables tending to have a statistically significant impact on property crime rates as opposed to person crime rates. For property crime rates, 10% increase in income per capita is associated with a decline in crime rates by 1.9% - 2.5%, while an increase in unemployment and the percentage of young males in the population are associated with increases in property crime rates. The results suggest a 10% increase in the unemployment rate leads to an increase in property crimes by between 2.2 and 2.3% while a 10% increase in the young male rate leads to an increase in the property crime rate of between 2.7 and 4.1%. These results are consistent with much of the previous literature on social and economic determinants of crime. The impact of socioeconomic variables on person crimes rates tends to be statistically

insignificant with the exception of unemployment. An increase of 10% in the unemployment rate per region is associated with an increase in person crime rates between 6.14 and 6.25%.

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8. Tables

Table 1. Descriptive Statistics for Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Property Crime Rate	1,109	550.5242	390.2279	213.6074	6800.422
Person Crime Rate	1,123	236.606	222.6503	22.35036	2408.708
Participation Rate	1,292	23.96471	3.711478	13.4	36.4
Unemployment Rate	1,292	6.005031	2.379902	1.9	15.7
Income	1,294	26360.85	5120.386	16942	61490
Young Male	1,296	8.875077	1.661265	3.79	16.5

Table 2. The Impact of Sports Participation on Property Crimes

	Model 1	Model 2	Model 3	Model 4
Participation	-0.073***	-0.066***	-0.064***	
	(0.027)	(0.021)	(0.021)	
Income		-0.196**	-0.189**	
		(0.086)	(0.087)	
Unemployment Rate		0.226***	0.221***	0.229***
		(0.014)	(0.015)	(0.0139)
Young Male Rate			0.257	0.272*
			(0.163)	(0.160)
(Participation Rate*Income)				-0.006***
				(0.002)
Constant	6.456***	8.034***	7.404***	5.446***
	(0.086)	(0.902)	1.027)	(0.360)
R-Squared: Within	0.0086	0.3394	0.3421	0.3381
Between	0.1133	0.3448	0.3771	0.4545
Overall	0.0721	0.3469	0.3888	0.4492
Prob > F	0.0072	0.0000	0.0000	0.0000
No. of obs	1,105	1,105	1,105	1,105
No. of Groups	286	286	286	286

Note: * denotes significance at 90% level; ** denotes confidence at 95% level; *** denotes confidence at 99% level. Robust standard errors are included in parenthesis.

Table 3. The Impact of Sports Participation on Person Crimes

	Model 1	Model 2	Model 3	Model 4
Participation	-0.130**	-0.156***	-0.158***	
	(0.056)	(0.043)	(0.043)	
Income		0.165	0.157	
		(0.142)	(0.143)	
Unemployment Rate		-0.620***	-0.614***	-0.625***
		(0.025)	(0.026)	(0.025)
Young Male Rate			-0.257	-0.275
			(0.276)	(0.275)
(Participation Rate*Income)				-0.0151***
				(0.004)
Constant	5.610***	5.095***	5.727***	7.379***
	(0.179)	(1.485)	(1.667)	(0.615)
R-Squared: Within	0.0058	0.5039	0.5045	0.5033
Between	0.0004	0.0240	0.0229	0.0283
Overall	0.0011	0.0459	0.0442	0.0507
Prob > F	0.0226	0.0000	0.0000	0.0000
No. of obs	1,119	1,119	1,119	1,119
No. of Groups	286	286	286	286

Note: * denotes significance at 90% level; ** denotes confidence at 95% level; *** denotes confidence at 99% level