The effects of NFL success on non-violent crime at the city level

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Abstract

Past research has shown that major sports franchises have no noticeable effect on the circumstances of their fans as much as some would like to claim. However, some believe that the presence of a major sports franchise such as the NFL will have can have an indirect positive effect on variables such as crime by offering the citizens entertainment as a substitute for crime. This paper aims to determine whether or not an NFL team's seasonal success can reduce non-violent crime in its city. Unfortunately, this paper found no such evidence. Using the MSA data from 2000-2005, cities that have an NFL team are predicted to have approximately 876.35 more non-violent crimes per 100,000 people, and cities whose NFL teams make it to the playoffs are predicted to have approximately 279.41 more non-violent crimes per 100,000 people.

1 Introduction

Americans love football; it's a fact of life. Very few people would grimace at the proposal to bring an NFL team to their city. It is a common belief that there are significant desirable economic benefits to having a stadium in their city. As of 2020, the lowest revenue generated by an NFL team was $383 million. For any city that has an NFL team, there can be no doubt the city receives a generous amount of tax revenue, which can be given back to taxpayers in the form of public goods, due to the presence of the team. There have been many publications concerning the effect of an NFL team's presence on economic variables such as employment,

personal income or personal income per capita, and tourist arrivals, but none have found evidence to support the claim that an NFL team has a noticeable effect on any of these variables.

Even if there is no evidence to support the claim that an NFL team's presence can improve the economy, it is possible that it could have an indirect social impact on its community. Entertainment has been a tool for governments to keep their populace happy for ages. In 2020, during the COVID pandemic, the one industry that was allowed to return to normalcy almost immediately was European soccer. Some share of crime may best be understood not as a predetermined and calculated activity but rather as recreation (Zimring & Hawkins). Reductions in crime could be interpreted as a substitution of one activity for the other. Some crime is situational and happens by chance, and if prevented today, the crime could be prevented in all future time periods. Property crime in Chicago during the Super Bowl is 26% lower than the average (Copus and Laqueur). However, it is possible that crime still could be displaced to later time periods.

Just as much as the NFL team could positively impact the city, it could adversely affect the city too. The presence of an NFL team does act as an incentive to move to a city, and the desirability of living in a city with an NFL team can lead to increased home and rental prices. It is generally accepted that crime is higher in more populated regions, and cities with NFL teams tend to attract new residents. An NFL game could increase the incidence of crime, many patrons partake in excessive alcohol consumption, and the heightened emotional state of said patrons due to their drinking could make them more likely candidates to commit crimes.

2 Model and Data

The dataset is a cross-section collected from 2000 to 2005. I use crime data from the FBI's Uniform Crime Reports (UCR) to measure crime, and I use property crime as my

dependent variable because violent crime rates are unlikely to be affected by the addition of an NFL team. There are concerns to be had about this data. UCR data is compiled from local police reports meaning they only include reported crime, which is suspect since total crime is found to be underestimated since unreported crime is not measured. Second, counties are added to and removed from cities with moderate frequency. My concern is that cities could be classified differently by either removing crime-ridden counties or adding their better-behaving counterparts to reduce their crime rates. However, UCR data is commonly used in literature and is the best data available at this time. Property crime in my data is measured in rate per 100,000 people.

Income is controlled by using per capita income gathered at the MSA level from the BEA. This variable is denoted in 2022 dollars. Per capita income is then logged, this is standard practice, and I found that the interpretation using its logged form is more useful for someone such as a policymaker. Many papers measure the influence of income on crime. These models suggest that crime acts as a substitute for employment where individuals weigh the costs and returns from crime to foregone wages from employment. It is thought that as income rises, the likelihood of committing a crime falls.

Overall, the dataset is a sample of 19 different MSAs randomly selected from a list of the 50 most populated MSAs. NFL data was collected from a scrape from the NFL website. 63.3% of our sample is made up of NFL teams, and this was not intentional. The MSAs selected were the result of using a random selection function in R. Raw population varies greatly across the sample, and for future papers, it may be wise to use a measure for population density instead by using population per square foot, however, due to time restrictions I did not scrape the data for square footage.

Summary Statistics					
Variable	**n**	**Min**	**Max**	**Median**	**Mean**
Property crime Per 100,000 People	109	1975.7	6,855.8	4,237.6	4,068.377
Population	109	1,012,356	18,741,475	2,356,396	3,358,448
Per capita income	109	26,675	55,307	33,418	35,120.2
Has an NFL team	109	0.0	1.0	1.0	0.633
Made playoffs	109	0.0	1.0	0.0	0.229

My model can be expressed as follows:

$$PCRIME_{it} = \beta_0 + \beta_1 INC_{it} + \beta_2 POP_{it} + \beta_3 NFL_{it} + \beta_4 PLAYOFFS + \beta_5 MSA_i + \lambda_t + u_{it}$$

Previous papers concerning the NFL and its effect on crime have used other proxies for NFL success, such as whether or not a team made it to the Super Bowl. Success in the model I have made is measured by a dummy variable, indicating whether or not the MSA's NFL team made it to the playoffs. Making the playoffs is a better measure of success because many teams would define a successful season as simply making the playoffs. NFL is a dummy variable that indicates if the MSA is home to an NFL team. Past literature has shown that both having an NFL team and athletic success do seem to reduce crime rates, and therefore this is my assumption as well.

MSA controls allow someone to control for factors that affect crime that are time-invariant and are specific to that MSA. There are many factors of crime that do not change much over time but do vary from city to city. Factors such as racial mix, age distribution, and severity of criminal punishment are all important determinants of crime, but these data are rather difficult

for a researcher to find or measure, but by controlling for MSA you can control for these factors as well. In addition, λ represents factors that change over time, but not across cities.

This paper also provides a first-difference model that includes our variable of NFL success, PLAYOFFS. The idea behind the first-difference model is that if factors such as racial mix, age distribution, and severity of criminal punishment do not vary across time, then the difference in property crime in that MSA has to be due to other forces, in our case, NFL success. First-difference controls for the time-invariant factors to reduce the possibility of omitted variable bias. However, the first-difference model is better served for datasets when there are only two time periods. Our data spans 6 years, from 2000-2005, and therefore we use the fixed effects model. The fixed effects model serves the same purpose, eliminating potential omitted variable bias, but does so by creating dummy variables for each MSA. The time-invariant factors will be captured by the dummy variable in the fixed effects model.

Results

The results were perplexing. In Model 1, having an NFL team and making the playoffs was not statistically significant ($p > 0.1$), and the coefficient is negative, which supports mirrors estimates from previous research. However, the rest of the models paint a different picture. In both first-difference models, having an NFL team, and making the NFL playoffs are predicted to increase property crime. In both fixed effects models, having an NFL team and making the NFL playoffs were statistically significant, but their estimated impact on property crime is to dramatically increase it. Due to the dramatic change in coefficient estimates, and the sign flip, there is sufficient evidence that omitted variable bias is present in Model 1.

Regression Results					
	Dependent variable: Property Crime (Per 100,000 People)				
	Pooled Regression	*First Difference*	*First Difference w/o Intercept*	*Fixed Effects*	*Fixed Effects w/ Time*
	(1)	(2)	(3)	(3)	(4)
Pop	-0.0001***			-0.00004	-0.00005*
	(0.00003)			(0.00002)	(0.00003)
ln(Y)	-1,863.235**			-1,818.953***	-2,845.741*
	(757.660)			(517.158)	(1,633.986)
Has NFL Team	-20.676			876.348***	1,025.576***
	(240.787)			(211.869)	(317.393)
Made Playoffs	-201.602	15.952	12.626	279.413***	268.913***
	(270.165)	(55.313)	(56.884)	(91.641)	(96.517)
Constant	23,952.280***	-63.191**		23,407.860***	34,092.460**
	(7,816.681)	(25.415)		(5,403.049)	(17,013.490)
Observations	109	90	90	109	109
R^2	0.273	0.001	0.001	0.949	0.949
Adjusted R^2	0.245	-0.010	0.001	0.937	0.933
Residual Std. Error	1,035.754 (df = 104)			299.735 (df = 87)	307.417 (df = 82)
F Statistic	9.752*** (df = 4; 104)	0.083 (df = 1; 88)	0.049 (df=1:89)	77.174*** (df = 21; 87)	59.284*** (df = 26; 82)
Note:					*p<0.1; **p<0.05; ***p<0.01

The table also provides us with a model that provides the best explanation for variation in property crime at the MSA level; Model 3 has the highest Adjusted R^2 (= 0.937). In Model 3, being home to an NFL team is predicted to increase property crime by approximately 876.35 crimes per 100,000 people. This effect was found to be highly statistically significant ($p < 0.01$). In Model 3, making the NFL playoffs is predicted to increase property crime by approximately 279.42 crimes per 100,000 people. This effect was also found to be highly statistically significant ($p < 0.01$).

Conclusion

Results suggest that there is a significant link between crime and the presence of an NFL team and its success. However, evidence suggests that this relationship is negatively correlated, the presence of an NFL team and its success tend to be associated with considerably higher rates of property crime.

The magnitude and sign change of the sports variable could be explained by a couple of phenomena. Cities that have NFL teams are typically more notable than cities without NFL teams, and this can cause the city to receive more public attention. Due to the pressures of public attention, city officials could be instructing their police forces to be more active, resulting in an increase in reported crime.

The fixed effects model does serve to eliminate omitted variable bias that stems from time-invariant factors that differ from city to city and factors that only change over time, but this does not mean that the model is exempt from omitted variable bias entirely. This model could be

improved further by the addition of unemployment rates at the MSA level, using population density instead of using raw population, and police force expenditures.

References

Baumann, R., Ciavarra, T., Englehardt, B., & Matheson, V. A. (2012). Sports Franchises, Events, and City Livability: An Examination of Spectator Sports and Crime Rates. The Economic and Labour Relations Review, 23(2), 83–98. https://doi.org/10.1177/103530461202300207

Copus, R., & Laqueur, H. (2019). Entertainment as Crime Prevention: Evidence From Chicago Sports Games. *Journal of Sports Economics*, *20*(3), 344–370. https://doi.org/10.1177/1527002518762551

Zimring F. E., Gordon H. (1997). *Crime is not the problem: Lethal violence in America*. New York, NY: Oxford University Press.