

Article

# Positive Externalities from Professional Football Clubs in the Metropolitan Rhine-Ruhr, Germany: Trickle-Down Effects Associated with Promotion and Relegation

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**Abstract:** Hosting sport events is costly, but the positive impact of hosting sport events has not been studied well. We consider the promotion of physical activity, known as the trickle-down effect, to be a new dimension of this kind of impact. Using exogenous variations in promotion and relegation in the Bundesliga 1, we test the effect of the presence of a Bundesliga 1 club on local non-profit football club membership. Using German city-level annual non-profit sport club membership data from the metropolitan Rhine-Ruhr, we group cities with experience of either promotion or relegation as treatment cities and other cities as the comparison group. Difference-in-difference analyses show that promotion (using a strict definition of promotion) of local professional football clubs increases non-profit football club membership by 14% while relegation does not affect membership. The presence of Bundesliga 1 clubs in a city increases non-profit football club membership by 11%. Falsification tests support the idea that the impact of promotion on membership results in a net increase in membership.

**Keywords:** trickle-down effect; German sport club; promotion and relegation; Bundesliga

## 1. Introduction

Hosting a professional sport club can be costly for a city. Evidence indicates that professional sporting events cause negative externalities, such as crime, traffic congestion and adverse impacts on newborns through environmental damage [1–4], resulting in substantial costs for the host city. In many cases, cities subsidize the funds for stadiums; for example, Duesseldorf financed the Merkeu Spiel Arena for 240 million Euros. These costs are borne with the expectation that the positive externalities of the professional sport club will outweigh the costs. While the economic impact has been discussed as a major positive externality, previous studies have found little to no direct impact [5]. Cities should pay attention to new, positive externalities to justify the costs and negative externalities of hosting a professional sport club.

One positive externality is that exposure to athletes competing at the elite level is expected to inspire people to participate in the respective sport at the grassroots level [6]. This phenomenon is termed the “trickle-down effect” in sport management and physical activity literature. The effect can bring positive externalities to the host cities, as population health is a key topic for governments and sport participation is known to be associated with physical [7,8], social [9,10] and psychological [11,12]

health benefits. Identifying the determinants of the trickle-down effect can be informative for attaining sport participation goals and justifying the costs of hosting professional sport clubs [13].

In European professional sport, the promotion and relegation of a professional football club can be an important factor in the trickle-down effect. Promotion and relegation are associated with spectator attendance and the amount of media attention received by a professional club [14] and affect the degree to which a professional club can inspire people with its level of play and on-field success [15]. As both exposure and inspiration are prerequisites for the trickle-down effect [16], the promotion and relegation of a club could be a critical element that could significantly change the extent of a professional club's stimulation of sport participation. Investigating this would be informative for learning about promotion and relegation as an opportunity and/or risk in terms of achieving a trickle-down effect. However, not much is known about this topic.

Therefore, this study tests the effect of the promotion and relegation of a professional sport club on mass sport participation based on membership numbers in local non-profit sport clubs. We focus on football clubs in the metropolitan Rhine-Ruhr, which is one of the largest multicultural urban agglomerations in the world, located in the federal state of North Rhine Westphalia in Germany. We examine the effect of the promotion and relegation of professional clubs in Bundesliga 1 (e.g., Dusseldorf, Cologne) on regional non-profit football club membership. Football is the most important sport in the metropolitan Rhine-Ruhr and is an integral part of how people identify with their region. Secondary data from 2007 to 2016 obtained from the Landessportbund North Rhine Westphalia were analyzed using the difference-in-difference approach and falsification tests. For a more rigorous validation of the trickle-down effect of the Bundesliga clubs, we assess (1) the non-profit football club membership in cities without either promotion and relegation experience and (2) the non-profit club membership in other sports (e.g., handball, basketball, tennis) for comparison. This approach allows us to isolate the trickle-down effect of Bundesliga clubs; i.e., whether the membership changes in non-profit football clubs are due to new participants in the sport or from members of other sports switching to football.

## 2. Literature Review

### 2.1. Trickle-Down Effect

The trickle-down effect, also known as the demonstration effect or Boris Becker effect [13], is based on the assumption that exposure to elite sport performance inspires people to participate in grassroots-level sport [6]. Exposure and inspiration are essential factors for increased sport participation.

Exposure to elite sport increases sport participation through the cultivation theory [17], which posits that frequent exposure to media (e.g., watching football matches) influences one's perception of a relevant subject (football) and induces one to emulate what is shown in the media (participation in football). Inspiration to participate in an elite sport to which one has been exposed can be explained using the concept of role models. A role model is "an individual perceived as exemplary or worthy of imitation" [18] (p. 254) who influences one's perception or behavior [19]. Professional sport players become role models in their respective sport by virtue of their on-field excellence [15,20], inspiring people to imitate their excellence by playing the sport themselves. Grounded in cultivation theory and the concept of role models, more frequent exposure to sport and the promotion of more widespread inspiration by exposing people to higher levels of sport excellence can be helpful in facilitating the trickle-down effect.

### 2.2. Studies on the Trickle-Down Effect

The trickle-down effect can result from hosting elite sport events or elite sport performances [6,13]. Many studies have been conducted on the trickle-down effect from hosting elite sport events, such as the Olympics, World Cup, and World Championships, by viewing these events as platforms to increase exposure and as catalysts for improving accessibility to sport. Their findings have been controversial,

with positive [21], mixed (i.e., both positive and negative) [22], insignificant [23], minimal [24] and conditional (should be combined with community events) [25] effects being found.

Such controversy raises questions regarding the substantial public investment and the presumed positive externalities that arise from hosting these events. Researchers have discussed the unsuccessful trickle-down effect of a sporting event as a missed opportunity caused by supply-side failure [26]. They emphasize the importance of understanding and strategically managing the factors of the trickle-down effect [16] and utilizing tactics that can facilitate the effect (e.g., amplified media exposure, educational campaigns about the sport, better demonstration of sporting talent) [27].

Elite sport performance can stimulate the trickle-down effect by showcasing sporting excellence and attracting attention from the media and public. Studies have been conducted on the effect of the on-field success of national or professional teams on mass sport participation [6,15]; more studies have focused on the national team context. Weimar et al. [13] found 1 to 4-year lagged effects of Olympic medals won by national teams positively influencing the growth rate of non-profit sport club membership. Frick and Wicker [28] found that the World Cup victory of the German men's national football team had a positive impact on non-profit sport club membership in Germany, whereas the women's World Cup title and men's and women's World Championship titles had no impact. Hogan and Norton [29] reported that national teams' Olympic success was not correlated with the levels of sedentary behavior in Australia. Assessing cross-country data from 34 countries, Humphreys, Maresova and Ruseski [7] found a negative association between the number of medals won in previous Olympics and mass sport participation. These contradictory results can be explained by differing study contexts (e.g., sport, country, event), varying methodological approaches (e.g., primary or secondary data) or other factors affecting the trickle-down process (e.g., emotional engagement in the sport, event, or player/team, media coverage amount) [6,15].

Understanding the trickle-down effect of professional sport is important, as the negative externalities (e.g., traffic, pollution) and public investments (e.g., subsidized stadium constructions, covering of match-day operational costs) are justified with the expectation that professional clubs/events will contribute to a population's health by stimulating mass sport participation. However, there are very few studies on professional sport compared to those on national team successes. One such study was by Dawson and Downward [30], in which sport attendance and sport media viewing were found to be positively correlated with the frequency of sport participation among those already active in sport. In a market research study by the USA Triathlon Association [31], 47% of amateur triathletes reported watching professional triathletes compete as an inspiration for their own participation. Weed [6] assessed the demonstration effect of professional sport and found meaningful positive effects on those who were already active or rarely participated in sport but almost no effects on those who never participated. Feddersen, Jacobsen and Maenning [32] reported the success of German professional tennis players (e.g., Boris Becker, Stefanie Graf) to be associated with a decline in tennis membership in Germany.

Many of the previous studies on the effect of professional sport on mass sport participation have been based on primary data and simple descriptive analysis [15,31]. More empirical examination of the trickle-down effect of professional sport is necessary. For a more rigorous assessment, it is recommended that (1) secondary data are utilized to diversify the data, and data should be assessed that are free from the risk of subjective perceptions; (2) advanced statistical approaches and comparison groups are employed to better isolate the trickle-down effect of professional sport; (3) whether the effect impacts new or existing participants should be investigated; and (4) factors that influence the effect should be identified or controlled for [6,13,15]. A study that adopts these approaches would help advance our knowledge on the trickle-down effect of professional sport.

### *2.3. Promotion and Relegation*

As discussed above, exposure and inspiration are the essential processes of the trickle-down effect. In European professional sport, the promotion and relegation of a professional club have

significant impacts on the amount of exposure received by a club through attendance and the media [14]. Promotion and relegation can also affect the degree of inspiration stimulated by a club [15], as that depends on the quality of performance by the club/players and its opponents. Moreover, the presence of a club in an upper-tier division leads to and indicates higher performance. In this sense, promotion and relegation can be considered to be factors affecting the relationship between professional sport and mass sport participation. However, not much is known about this relationship, as previous studies on promotion and relegation have mainly focused on club efficiency [33], competitive balance [34,35], player spending [36] or fan emotions and loyalty [37,38]. Examining promotion and relegation as an opportunity and/or risk for boosting mass sport participation provides insights into the trickle-down effect of professional sport and strategies to better achieve the effect.

### 3. Method

This study examines the effect of the promotion and relegation of Bundesliga clubs on the membership of non-profit football clubs and other non-profit sport clubs (e.g., handball, basketball, tennis) in the Rhine-Ruhr metropolitan area, Germany.

#### 3.1. Data

For sport participation, the city-level membership of non-profit football and other sport clubs in 50 mid to large-sized cities in the German metropolitan Rhine-Ruhr region was collected from 2007 to 2016 (i.e., 50 cities in 10 years, or 500 observations in total); the data were retrieved from the Landessportbund NRW (<https://www.lsb-nrw-service.de/bsd/auswertung>). From these data, non-profit football club membership was employed as the main dependent variable. The variable for other non-profit sport club membership was formulated by combining the membership of handball, rugby, volleyball, basketball, ice hockey, field hockey, American football, baseball, floorball, tennis, table tennis, badminton and golf clubs. We also collected the promotion and relegation cases of Bundesliga 1 and 2 over 10 seasons to test the effect of promotion and relegation on non-profit football and other sport club membership. To control for city-level demographics and economic variables, annual city population and unemployment rates were obtained from the Statistische Ämter des Bundes und der Länder (<https://www.regionalstatistik.de/genesis/online>).

Note that we exclude Aachen from our sample cities although it hosts a successful professional football club (Alemannia Aachen) in Bundesliga 2. In 2009, there was a merging of Aachen and several neighboring cities, including Alsdorf, Baesweiler, Eschweiler, Herzogenrath, Monschau, Stolberg and Wuerselen, under the name of StaedteRegion Aachen. After this merging, city-level data for Aachen cover the whole Aachen region instead of Aachen city itself; for example, the population in Aachen was reported as 309,251 in 2008, but 566,347 in 2009. This inconsistency occurs in Aachen only in the sample period.

Table 1 shows the summary statistics of the variables. The non-profit football club membership is 26,745 on average, varying from 3366 (Remscheid in 2010) to 149,597 (Gelsenkirchen in 2016). The average membership of other non-profit sport clubs is 15,546, ranging from 4732 (Bottrop in 2014) to 35,606 (Cologne in 2016). The population of a host city is around 329,276 on average. The average unemployment rate of a host city is 9.55%, with the lowest being 3.4% (Coesfeld in 2013 and 2016) and the highest being 21.6% (Gelsenkirchen, 2007). In the sample period, promotion and relegation occurred in 1.1% and 1.6% of cases, respectively. FC Cologne showed the most frequent promotion and relegation, being promoted twice and relegated twice.

**Table 1.** Summary statistics.

Variable	Mean	Std. Dev.	Min.	Max.
Football club membership	26,745.8	22,912.4	3366	149,597
Other sport club membership	15,546.1	7329.5	4732	35,606
Population	329,276.9	164,730.7	108,955	1,060,582
Unemployment rates	9.55	3.14	3.4	21.6
Promotion	0.011	0.109	0	1
Relegation	0.016	0.126	0	1
N	50			
T	10			

### 3.2. Analysis

We applied the difference-in-difference approach to estimate the effects of a professional football club's promotion to and relegation from Bundesliga 1 on the membership of local non-profit football clubs. We argue that promotion and relegation drive an exogenous variation that allows us to assess the impact on non-profit football club membership. Promotion and relegation are not easy to predict: even a strong (weak) professional football club cannot win (lose) every time they play, and therefore a team cannot guarantee that it will be promoted (relegated) in the next season as the outcomes of games always contain uncertain and random factors. We assume that this exogeneity generates an ideal condition for testing the effects of the presence of a professional football club in Bundesliga 1 on mass sport participation.

We also argue that promotion and relegation represent the only medium for testing the trickle-down effects of having a professional football club in a city. Each club has a long history in a city, is strongly rooted in that region and therefore does not relocate to another city, as occurs in some American sport franchises. Therefore, it is difficult to find the case of a city that has recently begun to host a professional club and compare its sport participation before and after the club's existence. Given this limitation, we argue that exogenous variations from promotion and relegation cases will generate the most accurate estimates of the causal impact of a city hosting a professional football club on mass sport participation.

We construct several difference-in-difference analyses to test the effects of promotion and relegation on non-profit football club membership. First, we focus on non-profit football club membership in cities with promoted/relegated professional football clubs in comparison to the membership in other cities:

$$y_{it} = \beta_0 + \beta_1 TGroup_i * Prom_{it} + \beta_2 TGroup_i * Rele_{it} + \gamma' X_{it} + \alpha_i + \lambda_t + u_{it} \quad (1)$$

where  $y_{it}$  is the non-profit football club membership for city  $i$  and year  $t$ .  $TGroup_i$  is equal to 1 for a city whose professional football club undergoes either promotion or relegation in the sample period, which includes Bielefeld, Bochum, Cologne, Duesseldorf, Duisburg, Moenchengladbach and Paderborn.  $Prom_{it}$  is equal to 1 when a professional football club in city  $i$  is promoted, and  $Rele_{it}$  is equal to 1 when a professional football club in city  $i$  is relegated in year  $t$ . The non-profit club membership data are reported every March, and the Bundesliga season is from August to May. Therefore, if a professional football club in city  $i$  is promoted (relegated) after  $t - 1$  to  $t$  season (e.g., 2005–2006 season), that club will join Bundesliga 1 (or 2, for a relegated club) in  $t$  to  $t + 1$  season (2006–2007 season), and the non-profit football club membership data in March in year  $t + 1$  (2007) will reflect the effects of promotion (relegation) on membership.

$X_{it}$  is a vector of control variables, including the city population and unemployment rate. We include these variables to control for city size and city-level economic status.  $\alpha_i$  indicates the city-fixed effects, and  $\lambda_t$  captures the year-fixed effects.  $u_{it}$  is an idiosyncratic error. We cluster the standard errors at city level.

From Equation (1), the interaction term between  $TGroup_i$  and  $Prom_{it}$  and the interaction term between  $TGroup_i$  and  $Rele_{it}$  capture the causal effect of promotion and relegation on non-profit football club membership in the host city, when compared to the situation before promotion and relegation and to other cities with no promotion and relegation experience. Thus, we expect a positive  $\beta_1$  and a negative  $\beta_2$ .

We apply two different definitions for both promotion and relegation in Equation (1). Within the sample period, there were cases in which a professional football club was consecutively promoted and relegated (or vice versa) across seasons. For example, MSV Duisburg was promoted after the 2006–2007 season but relegated during the 2007–2008 season. When we apply an exogenous shock from promotion and relegation, it can be expected that the shock reduces as local residents are exposed to promotion and relegation consecutively. Thus, promotion and relegation are defined in two ways: first, every promotion and relegation case is considered (general definition) and, second, only the first-year promotion or relegation cases in consecutive years of promotion and relegation are considered (strict definition).

While Equation (1) tests the impact of promotion and relegation on non-profit football club membership, we also examine the impact of the presence of Bundesliga 1 clubs (after promotion and before relegation) on membership:

$$y_{it} = \delta_0 + \delta_1 TGroup_i * Bundes1_{it} + \gamma' X_{it} + \alpha_i + \lambda_t + u_{it}. \quad (2)$$

Equation (2) applies the same settings to Equation (1) except  $Bundes1_{it}$ ;  $Bundes1_{it}$  is equal to 1 when the professional football club stays in Bundesliga 1. The interaction term between  $TGroup_i$  and  $Bundes1_{it}$  captures the causal effect of the presence of a Bundesliga 1 club on the non-profit football club membership in the host city, as compared to the situation before and after having Bundesliga 1 club and to other cities with no experience of a Bundesliga 1 club. Thus, we expect a positive  $\delta_1$ .

$X_{it}$  is a vector of control variables, including the city population and unemployment rate.  $\alpha_i$  indicates the city-fixed effects, and  $\lambda_t$  captures the year-fixed effects.  $u_{it}$  is an idiosyncratic error. We cluster the standard errors at the city level.

Lastly, we perform a falsification test. We estimate Equations (1) and (2) with other non-profit sport club membership to see whether promotion and relegation in Bundesliga football affect the membership of other non-profit sport clubs. If the difference-in-difference models in Equations (1) and (2) capture the football-specific variations successfully, the results from the falsification test should show no changes in the membership of other non-profit sport clubs. Further, if there is a substitution of membership from other non-profit sport clubs to non-profit football clubs after promotion (relegation), the falsification test should report negative (positive) changes in the membership of other non-profit sport clubs. We expect promotion and relegation or the presence of a Bundesliga 1 football club to have no impact on the membership of other non-profit sport clubs.

#### 4. Results

The results of Equation (1) are shown in Table 2. Model (1) includes the results of using the general definition of promotion and relegation, while Model (2) reports the results of using the strict definition (i.e., excluding consecutive promotion/relegation cases). For both models, the effect of city population on the membership of non-profit football clubs is positive and significant, whereas that of the unemployment rate is insignificant.

In Model (1), the coefficients for promotion and relegation are not statistically significant. With the general definition, neither promotion nor relegation affect non-profit football club membership. However, in Model (2), the coefficient for promotion is positive and significant, as expected when the strict definition is applied. In this case, promotion to the first division of the Bundesliga increases non-profit football club membership in the host city by 5711, or 14%, on average in cities hosting the promoted professional football club. Relegation has no effect on non-profit football club membership.

The different results for promotion in Models (1) and (2) were expected. Consecutive promotion and relegation are expected to generate weak to no exogenous shocks for locals, as their attention and inspiration might reduce if they are repeatedly exposed to promotion and relegation. As expected, the evidence of a trickle-down effect is found only in Model (2); the effect is witnessed mainly in the first-year promotion cases when there are consecutive years of promotion and relegation. That is, the first year of promotion can be a great opportunity to obtain and promote the trickle-down effect caused by professional clubs.

Relegation does not change non-profit football club membership in Models (1) and (2). We expected the presence of a professional club in the upper-tier division to be associated with greater attendance and media attention and higher performance [14,15], and thus relegation was expected to negatively affect mass sport participation. However, this was not the case in this study, as relegation had an insignificant effect on non-profit football club membership; that is, relegation may not be a risk/threat to the trickle-down effect.

**Table 2.** Difference-in-difference results for promotion and relegation.

<i>Model</i>	(1)	(2)
<i>Dependent Variable: Football Membership</i>		
TGroup * Promotion	719.68 (3252.61)	5711.56 *** (1621.68)
TGroup * Relegation	−2111.61 (2389.69)	−2344.09 (2552.64)
Population	0.2611 ** (0.1043)	0.2589 ** (0.1075)
Unemployment rates	−3900.86 (2748.73)	−3916.39 (2744.46)
City-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
N	50	50
T	10	10

Notes: \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Model (1) applies a general definition of promotion and relegation and Model (2) applies a strict definition of promotion and relegation. Cluster-corrected standard errors at the city level are in parentheses. City-fixed effects and year-fixed effects are included.

Next, we test whether the presence of a Bundesliga 1 club (i.e., after promotion and before relegation) generates more non-profit football club membership, and the results are shown in Table 3. Model (1) assesses the non-profit football club membership data and uses cities without promotion and relegation experiences as a comparison group with Equation (2).

The estimated coefficients for the presence of Bundesliga 1 clubs are positive and statistically significant. These coefficients are lower than the estimated effects of promotion reported in previous models. The presence of a Bundesliga 1 club after promotion and before relegation increases non-profit football club membership in host cities by 4382, or 10.8% on average. These results could indicate that promotion drives local non-profit football club membership dramatically in the first year of promotion, but that fans fail to stay in non-profit football clubs afterwards. However, a significant portion of new club members (around 77%) remain in the local non-profit football club as long as the professional football club stays in Bundesliga 1.

**Table 3.** Difference-in-difference results with the presence of Bundesliga 1 club.

<i>Model</i>	<b>(1)</b>
<i>Dependent Variable: Football Membership</i>	
TGroup*Bundesliga 1 club	4382.76 *** (1489.99)
Population	0.2528 ** (0.1033)
Unemployment rates	−3841.5 (2729.92)
City-fixed effects	Yes
Year-fixed effects	Yes
N	50
T	10

Notes: \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Cluster-corrected standard errors at city level are in parentheses. City-fixed effects and year-fixed effects are included.

The results of falsification tests are shown in Table 4. Models (1) and (2) test the effects of promotion and relegation, and Model (3) tests the impact of a Bundesliga 1 club on other non-profit sport club membership. The estimated coefficients of promotion and relegation in Model (1) and (2) and the estimated coefficient of Bundesliga 1 presence in Model (3) are not statistically significant. Promotion and relegation and the presence of a Bundesliga 1 club do not change the membership of other non-profit sport clubs. These findings indicate that the increase in non-profit football club membership reported in the analyses of Equations (1) and (2) captures the variation caused by Bundesliga football clubs rather than any unobserved heterogeneity. Further, it can be concluded that the increase in non-profit football club membership does not come from other sport clubs; if the increase in non-profit football club membership represented individuals switching from other sport clubs to football clubs, a negative impact on other non-profit sport club membership would have been shown. Non-profit football clubs obtain new members after promotion.

**Table 4.** Falsification test results.

<i>Model</i>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<i>Dependent Variable: Other Sport Club Membership</i>			
TGroup * Promotion	−194.81 (311.99)	140.67 (104.69)	
TGroup*Relegation	−35.83 (206.03)	−189.95 (134.89)	
TGroup *Bundesliga 1 club			−168.63 (227.79)
Population	0.0615 *** (0.0119)	0.0612 *** (0.0119)	0.476 *** (0.0022)
Unemployment rates	−91.57 (95.22)	−93.26 (95.20)	−235.23 *** (50.95)
City-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
N	50	50	50
T	10	10	10

Notes: \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Model (1) applies a general definition of promotion and relegation, Model (2) applies a strict definition of promotion and relegation, and Model (3) applies the presence of a Bundesliga 1 club as a treatment effect estimator. Cluster-corrected standard errors at the city level are in parentheses. City-fixed effects and year-fixed effects are included.

## 5. Discussion and Conclusions

In this study, we test whether the presence of a professional football club in Bundesliga 1 increases mass sport participation. Using the exogenous variations from promotion and relegation, this study sheds light on the unseen positive externalities of the trickle-down effect of Bundesliga 1 football clubs. We found a 14% increase in non-profit football club membership immediately after promotion using the strict definition, whereas relegation had no effect. The presence of a Bundesliga 1 club in a city (i.e., after promotion and before relegation) increases non-profit football club membership by 11%. This is the first evidence of the trickle-down effect with exogenous variations due to the promotion and relegation system of the Bundesliga, and the falsification tests show that the increase in non-profit football membership is not from other sport club membership, which can be interpreted as a net increase.

As football is a vigorous physical activity [39], the reported increase in non-profit club membership is more likely to be from young people. There are several advantages of an increase in sport participation among the youth on physical health (e.g., on bone density, blood pressure, cholesterol, injury prevention, metabolic syndrome) [40] and mental health (e.g., enhanced self-esteem, reduced anxiety, resilience to stress, improved sleep) [41]. Sport participation at an earlier age is highly correlated with an active lifestyle in adulthood, as habits or attitudes towards sport and physical activity formed during youth or adolescence have an enduring effect. The increase in physical activity among the youth can lead to long-term health benefits [42].

Germany spent around 4712 Euros per capita on health care in 2018 [43], and a sedentary lifestyle (i.e., no physical activity) is responsible for 2.4% to 5% of total health care expenses [44,45], or 113–236 Euros per capita. Applying these numbers to our study and assuming that the new club membership reported here indicates more people participating in sport on a regular basis, the value of having a promoted Bundesliga club in a city is estimated to be 645,406–1,347,928 Euros annually, which comes from the cost of promoting physical activity and averting sedentary behavior. These estimates represent the upper bound of benefits, since it is assumed that the new members did not participate in any sporting activity before joining a non-profit football club. While our results prove that new members do not come from other sports, they may have participated in other physical activity, such as jogging or weightlifting.

Further, we can also expect a reduction in government spending to promote physical activity. Wu, Cohen, Shi, Pearson and Sturm [46] found that a community-based physical activity program costs 2,255,000 Euros per 10,000 people annually; that is, the increase in non-profit club membership by 4382 to 5711 in our study can be interpreted as a reduction in government spending on physical activity programs by 988,141–1,287,830 Euros annually. These estimated numbers highlight the value of the positive externality of the trickle-down effect associated with hosting professional sport clubs. Note that these benefits from a reduction in the costs of promoting medical and physical activity are short-term, annual effects.

Although we argue that city-level and German sport club membership data are ideal for the examination of the trickle-down effect of the presence and promotion/relegation of Bundesliga 1 clubs, the data have limitations. First, we do not know whether the new members continue to regularly participate in sport and physical activity after joining the clubs. Second, although members of German sport clubs might include passive members (i.e., those who do not actively participate in physical activity), there is no differentiation between active and passive members in our data, which limits the generalizability of our findings. Lastly, our study is focused on the short-term trickle-down effect delivered the year after promotion or relegation.

Future studies are clearly needed to address the limitations of this work. To determine whether new members have previously led an inactive lifestyle or not, more detailed data from a survey or in-depth interview of new members are required. To test whether new members participate in physical activity regularly after joining a club, a further investigation regarding the frequency and continuity of

new members' use of clubs would be informative. After gaining access to better data over a longer period, the long-term trickle-down effect could be tested in the future.

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## References

1. Pyun, H.; Hall, J.C. Does the presence of professional football cause crime in a city? Evidence from Pontiac, Michigan. *Appl. Econ.* **2019**, *51*, 3958–3970. [CrossRef]
2. Humphreys, B.R.; Pyun, H. Professional sporting events and traffic: Evidence from US cities. *J. Reg. Sci.* **2018**, *58*, 869–886. [CrossRef]
3. Locke, S.L. Estimating the impact of Major League Baseball games on local air pollution. *Contemp. Econ. Policy* **2019**, *37*, 236–244. [CrossRef]
4. Humphreys, B.R.; Ruseski, J.E. Geographic determinants of infant health: The impact of sports facility construction projects. *SSRN* **2019**. [CrossRef]
5. Humphreys, B.R. Should the construction of new professional sports facilities be subsidized. *J. Policy Anal. Manag.* **2019**, *38*, 264–270. [CrossRef]
6. Weed, M. *The Potential of the Demonstration Effect to Grow and Sustain Participation in Sport*; Canterbury Christ Church University, Centre for Sport, Physical Education & Activity Research (SPEAR): Canterbury, UK, 2009.
7. Ruseski, J.E.; Maresova, K. Economic freedom, sport policy, and individual participation in physical activity: An international comparison. *Contemp. Econ. Policy* **2014**, *32*, 42–55. [CrossRef]
8. Santos, D.A.; Marques, A.; Minderico, C.S.; Ekelund, U.; Sardinha, L.B. A cross-sectional and prospective analyse of reallocating sedentary time to physical activity on children's cardiorespiratory fitness. *J. Sport. Sci.* **2018**, *36*, 1720–1726. [CrossRef] [PubMed]
9. Eime, R.M.; Young, J.A.; Harvey, J.T.; Charity, M.J.; Payne, W.R. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *Int. J. Behav. Nutr. Phys. Act.* **2013**, *10*, 98. [CrossRef] [PubMed]
10. Findlay, L.C.; Coplan, R.J. Come out and play: Shyness in childhood and the benefits of organized sports participation. *Can. J. Behav. Sci./Rev. Can. Des Sci. Comport.* **2008**, *40*, 153–161. [CrossRef]
11. Downward, P.; Rasciute, S. Does sport make you happy? An analysis of the well-being derived from sports participation. *Int. Rev. Appl. Econ.* **2011**, *25*, 331–348. [CrossRef]
12. Kim, J.; James, J.D. Sport and Happiness: Understanding the Relations Among Sport Consumption Activities, Long-and Short-Term Subjective Well-Being, and Psychological Need Fulfillment. *J. Sport Manag.* **2019**, *33*, 119–132. [CrossRef]
13. Weimar, D.; Wicker, P.; Prinz, J. Membership in nonprofit sport clubs: A dynamic panel analysis of external organizational factors. *Nonprofit Volunt. Sect. Q.* **2015**, *44*, 417–436. [CrossRef]
14. Wheeler, D. *The Cost of Relegation: Five Reasons to Stay in the English Premier League*; 2013. Available online: <https://bleacherreport.com/articles/1591059-the-cost-of-relegation-5-reasons-to-stay-in-the-epl> (accessed on 3 April 2013)
15. Mutter, F.; Pawlowski, T. Role models in sports—Can success in professional sports increase the demand for amateur sport participation? *Sport Manag. Rev.* **2014**, *17*, 324–336. [CrossRef]
16. Kim, J.J.; Kang, J.H.; Kim, Y.K. *Building a Sport Participation Legacy Through the 2018 Winter Olympic Games: Negotiation of Motives and Constraints for Younger Generations to Watch and Play Sports*; IOC Advanced Olympic Research Grant Final Report, The Olympic Studies Centre: Lausanne, Switzerland, 2018.
17. Gerbner, G. Cultural indicators: The third voice. *Commun. Technol. Soc. Policy* **1973**, *11*, 555–573.
18. Yancey, A. Self-image building in adolescents in foster care: The use of group process interactions with role models. *Adolescence* **1998**, *33*, 253–267.
19. Clark, P.W.; Martin, C.A.; Bush, A.J. The effect of role model influence on adolescents' materialism and marketplace knowledge. *J. Mark. Theory Pract.* **2001**, *9*, 27–36. [CrossRef]

20. Addis, A. Role models and the politics of recognition. *Univ. Pa. Law Rev.* **1996**, *144*, 1377–1468. [CrossRef]
21. Frawley, S.; Cush, A. Major sport events and participation legacy: The case of the 2003 Rugby World Cup. *Manag. Leis.* **2011**, *16*, 65–76. [CrossRef]
22. Veal, A.J.; Toohey, K.; Frawley, S. The sport participation legacy of the Sydney 2000 Olympic Games and other international sporting events hosted in Australia. *J. Policy Res. Tour. Leis. Events* **2012**, *4*, 155–184. [CrossRef]
23. Weed, M.; Coren, E.; Fiore, J.; Mansfield, L.; Wellard, I.; Chatziefstathiou, D.; Dowse, S. *A Systematic Review of the Evidence Base for Developing a Physical Activity, Sport and Health Legacy From the London 2012 Olympic and Paralympic Games: Report to Funders*; Technical report; Centre for Sport, Physical Education and Activity Research, Canterbury Christ Church University: Canterbury, UK, 2008.
24. Hindson, A.; Gidlow, B.; Peebles, C. The ‘trickle-down’ effect of top level sport: myth or reality? A case study of the Olympics. *Aust. J. Leis. Recreat.* **1994**, *4*, 16–24.
25. Weed, M.; Coren, E.; Fiore, J.; Wellard, I.; Mansfield, L.; Chatziefstathiou, D.; Dowse, S. Developing a physical activity legacy from the London 2012 Olympic and Paralympic Games: A policy-led systematic review. *Perspect. Public Health* **2012**, *132*, 75–80. [CrossRef] [PubMed]
26. Reis, A.C.; de Sousa-Mast, F.R.; Gurgel, L.A. Rio 2016 and the sport participation legacies. *Leis. Stud.* **2014**, *33*, 437–453. [CrossRef]
27. Misener, L.; Taks, M.; Chalip, L.; Green, B.C. The elusive “trickle-down effect” of sport events: Assumptions and missed opportunities. *Manag. Sport Leis.* **2015**, *20*, 135–156.
28. Frick, B.; Wicker, P. The trickle-down effect: how elite sporting success affects amateur participation in German football. *Appl. Econ. Lett.* **2016**, *23*, 259–263. [CrossRef]
29. Hogan, K.; Norton, K. The ‘price’ of Olympic gold. *J. Sci. Med. Sport* **2000**, *3*, 203–218. [CrossRef]
30. Dawson, P.; Downward, P. Participation, spectatorship and media coverage in sport: Some initial insights. In *Contemporary Issues in Sports Economics. Participation and Professional Team Sports*, Edward Elgar Publishing: Cheltenham, UK; 2011 pp. 15–42.
31. Tribe Group. *The Mind of the Triathlete: Market Research Report*; Technical report; Tribe Group LLC: New York, NY, USA, 2009.
32. Feddersen, A.; Maennig, W. Sports heroes and mass sports Participation—the (double) paradox of the ‘German tennis boom’. *Hambg. Contemp. Econ. Discuss.* **2009**, *29*. [CrossRef]
33. Dietl, H.M.; Franck, E.; Lang, M. Overinvestment in team sports leagues: A contest theory model. *Scott. J. Political Econ.* **2008**, *55*, 353–368. [CrossRef]
34. Szymanski, S.; Ross, S. Promotion and relegation. *World Econ.* **2001**, *2*, 179–189.
35. Zimbalist, A.S. Competitive balance in sports leagues: An introduction. *J. Sport. Econ.* **2002**. [CrossRef]
36. Jasina, J.; Rothhoff, K. A model of promotion and relegation in league sports. *J. Econ. Financ.* **2012**, *36*, 303–318. [CrossRef]
37. Königstorfer, J.; Uhrich, S. Riding a rollercoaster: The dynamics of sports fans’ loyalty after promotion and relegation. *Mark. ZFP* **2009**, *31*, 71–84. [CrossRef]
38. Koenigstorfer, J.; Groeppel-Klein, A.; Schmitt, M. “You’ll never walk alone”—How loyal are soccer fans to their clubs when they are struggling against relegation? *J. Sport Manag.* **2010**, *24*, 649–675. [CrossRef]
39. Beato, M.; Impellizzeri, F.M.; Coratella, G.; Schena, F. Quantification of energy expenditure of recreational football. *J. Sport. Sci.* **2016**, *34*, 2185–2188. [CrossRef] [PubMed]
40. Janssen, I.; LeBlanc, A.G. Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *Int. J. Behav. Nutr. Phys. Act.* **2010**, *7*, 40. [CrossRef]
41. Fox, K.R. The influence of physical activity on mental well-being. *Public Health Nutr.* **1999**, *2*, 411–418. [CrossRef]
42. Hallal, P.C.; Victora, C.G.; Azevedo, M.R.; Wells, J.C. Adolescent physical activity and health. *Sport. Med.* **2006**, *36*, 1019–1030. [CrossRef]
43. Statistisches Bundesamt. Gesundheitsausgaben. 2019. Available online: [https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Gesundheitsausgaben/\\_inhalt.html](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Gesundheitsausgaben/_inhalt.html) (accessed on 1 December 2019).
44. Warburton, D.E.; Nicol, C.W.; Bredin, S.S. Health benefits of physical activity: The evidence. *Cmaj* **2006**, *174*, 801–809. [CrossRef] [PubMed]

45. Colditz, G.A. Economic costs of obesity and inactivity. *Med. Sci. Sport. Exerc.* **1999**, *31*, S663–S667. [[CrossRef](#)]
46. Wu, S.; Cohen, D.; Shi, Y.; Pearson, M.; Sturm, R. Economic analysis of physical activity interventions. *Am. J. Prev. Med.* **2011**, *40*, 149–158. [[CrossRef](#)]

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