Giffen Behavior in Sports

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Abstract
The analysis of Giffen goods in economics has indicated, both theoretically and empirically, that they are a rare occurrence in their purest form. This paper builds a simple theoretical framework to show how standard, non-Giffen goods can display Giffen-like responses when decision makers face multiple binding constraints. We then apply the framework to different sports settings to show how it is possible that bottom-tier teams may increase spending on established players when transfer costs rise, stricter penalties that raise the "price" of performance-enhancing drugs can induce reluctant users to increase usage, and higher injury risk can increase reliance on high-intensity training. These relatively simple examples illustrate some cases where Giffen Behavior can be present in the world of sports.

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Introduction

A Giffen Good is defined as a good that sees an increase in quantity demanded when prices rise and conversely sees a decrease in quantity demanded when prices fall, which contradicts the law of demand. Although the theoretical possibility of a pure Giffen Good is well understood (a good that has a negative income effect larger in absolute value than the substitution effect), additional theoretical work and empirical studies have suggested that such examples are extremely rare (Dougan, 1982; Jensen and Miller, 2008). However, Gilley and Karels (1991) showed how Giffen Behavior can arise if a decision-maker simultaneously faces multiple binding constraints, even if they have standard convex preferences and the goods themselves are not Giffen. The behavior is Giffen-like, consumption moves in the same direction as the change in price, but the change is not driven by having unusual or changing preferences, but rather the consequence of having to simultaneously satisfy more than one constraint. Given that decision-makers frequently face more than one constraint simultaneously, this result suggests that, even if pure Giffen goods are scarce, Giffen Behavior can be ubiquitous.

To our knowledge, no study so far has applied this insight to the domain of sports. This paper takes a step in this direction by demonstrating that this insight is also prevalent in sports and can yield valuable and counterintuitive new insights. We set up a simple framework, with examples, illustrating how Giffen Behavior is observed throughout the world of sports.

The Conditions for Giffen Behavior

As a simple example of Giffen Behavior, consider a baseball fan who enjoys watching live games and has a fixed monthly discretionary budget of $700. Tickets for Major League Baseball (MLB) games cost $200, and tickets for Minor League Baseball (MiLB) games cost $50. This budget constraint is the person's first constraint. Suppose the fan enjoys attending MLB games significantly more than MiLB games, so they try to maximize the number of MLB games they attend (these are the fan's preferences). But let's also assume this person has very strong preferences to attend a minimum of five games (regardless of league) every month, which we model as a second constraint.[2] In this case, they would choose to attend three MLB games and two MiLB games a month.

Now, suppose the price of MiLB tickets increases from $50 to $100. How would this person react to this change? They cannot attend more MLB games than before because they will go over budget. Keeping the allocation constant does not work either, because they will again go over budget. Attending fewer games in both leagues does not work because then the person will be below their minimum monthly target of five games. Given this person's preferences, the only way for this person to satisfy both the budget constraint and the target constraint is to attend 3 MiLB games (one more than before) and 2 MLB games (one fewer than before), even though MiLB tickets are now more expensive.[3]

These results might lead people to explain these actions as finding a Giffen Good, when in fact they are a form of Giffen Behavior, which argues that consumers will change their behavior in the same direction as the change in price not because of their unusual preferences, but because

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[2] While the results and discussion are identical whether we model this as a second constraint or preferences with a discontinuous jump in utility at 5 games, the model is more mathematically tractable and intuitive when these preferences are treated as a second constraint. Caplan (2006) also discusses this duality of interpretations in the context of ADHD which can be modeled as a constraint on attention or as a strong preference for task-switching.

[3] We can think of this in the non-sports world too: Consider a person's commute into the city. They can drive and pay a relatively large toll/gas/parking or take public transportation at a lower cost. Suppose the total driving cost per day is $20 and public transit costs $5. Assume they strongly prefer to drive, have a strict weekly transportation budget of $70, but they are also required to come to work five days a week. In this case, they would drive three days and take public transit two days a week. However, if public transit prices increase to $10 per day, they can no longer afford to drive three days a week. Now they will drive two days a week (their preferred choice) and take public transit three days a week. This price increase did not show an increased demand for public transit, it simply shows a forced consumption shift because of the price change's impact on the consumer's budget, which shows up as an example of Giffen Behavior.

of the presence of multiple binding constraints. In the simple numerical example above, all we stated about the agent's preferences is that they strongly prefer attending MLB games over MiLB games but also will attend at least five games a month (some minimum level of baseball entertainment that they want to achieve per month), nothing else. If the agent only had to satisfy the budget constraint, these goods would never be Giffen. Standard discussions and examples of Giffen Goods are typically thought of in theoretical terms by relying on unique preferences that tend to generate implausibly shaped indifference curves. It is generally considered a relatively rare phenomenon in its purest form (see Stigler, 1947; Nachbar, 1998) or not possible (Dougan, 1982). However, in this study we do not claim to find Giffen Goods. Instead, we present examples of Giffen Behaviors that exist in sports. Specifically, we present a simple general model to illustrate the circumstances under which Giffen Behavior emerges, and then we apply this general insight to a few instances in sports. In the last section, we conclude and encourage future research on how this idea can be extended to other issues related to sports economics.

Model

Let X and Y be the choice variables of agent *i*, where $X, Y \in [0, \infty)$. We assume the agent has strictly convex CES preferences over X and Y, and their utility function is given by

$$U_i = \left[\alpha X^{\beta} + (1-\alpha) Y^{\beta}\right]^{\frac{1}{\beta}}, \text{ where } 0 \leq \alpha \leq 1 \text{and } -\infty < \beta < 1. \quad (1)$$

Equation (1) is the standard CES utility function. Parameter α captures the relative preference for good X versus good Y, and parameter β is related to the degree of substitutability between X and Y.

The agent's first constraint is the agent's opportunity set, which shows all the combinations of X and Y that are attainable to them. This first constraint represents the first tradeoff the agent faces between these two variables. It does not necessarily have to be a budget constraint; we can think of it as any tradeoff faced by decision-makers involving two dimensions, in the sense that if the agent chooses a higher level of one, they will have less of the other. To simplify the analysis, we assume that this constraint is linear and described by the expression $Y = c - dX$, where $c, d > 0$. Parameter c shows the maximum level of Y attainable by the agent, and parameter d captures the opportunity cost of choosing an additional unit of X. Therefore, we can think of d as the relative price of X or the marginal rate of transformation.

If this were the only constraint faced by the decision-maker, we would have a simple maximization problem, and the optimal levels of X and Y would be given by the two expressions below.

$$X^* = \frac{c}{d+\left[\frac{(1-\alpha)d}{\alpha}\right]^{\frac{1}{1-\beta}}} \qquad (2)$$

$$Y^* = \frac{c}{1+\left[\frac{\alpha}{(1-\alpha)d}\right]^{\frac{1}{1-\beta}}} \qquad (3)$$

In this case, the decision-maker always behaves according to the law of demand. Let's focus on variable X, for example. If we vary d, we can see that

$$\frac{\delta X^*}{\delta d} < -c\frac{1+\left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{1-\beta}}\frac{1}{1-\beta}d^{\frac{\beta}{1-\beta}}}{\left\{d+\left[\frac{(1-\alpha)d}{\alpha}\right]^{\frac{1}{1-\beta}}\right\}^2} < 0, \qquad (4)$$

so if Constraint 1 is relaxed in the X dimension (i.e., the relative price of X decreases), the individual chooses a higher level of X, and conversely.

But now let's assume that the agent also faces a second constraint. This constraint is of the "success" or "survival" type; it shows all the combinations of X and Y that meet a certain criterion of "success" to the individual. In our initial numerical example, success for the agent meant attending at least five baseball games a month, or generally a targeted number of nights of entertainment a month. But in other settings, it can mean achieving a certain level of health, ability, points, speed, or performance. This success threshold can be imposed either exogenously (as minimum requirements to qualify for an international tournament, for example) or endogenously by other athletes or the agent themselves (who can set their own personal goal). The main idea is that, out of all the combinations of X and Y available to the agent, some of them allow the agent to achieve this definition of "success," but others do not. The agent now needs to choose the best combination of these two variables that is both attainable and at or above this "success" threshold.

We describe Constraint 2 as $Y + fX \geq e$ where $e, f > 0$. Parameter e captures how demanding/challenging achieving "success" is for the agent. Parameter f indicates the relative efficacy of variable X in helping the agent get to the success threshold or the marginal rate of substitution – a larger value of f means that the agent can give up more units of Y to increase one unit of X and still satisfy the "success" constraint. The inequality indicates the fact that Constraint 2 may or may not be binding for the agent.[4]

[4] This second constraint also assumes that there is a tradeoff between X and Y when it comes to achieving success, so the agent can always sacrifice some amount of one variable to increase the other by a certain amount and still be at or above the success threshold.

As we will see below, it is the potential conflict between the agent's preferences and these two constraints that will cause Giffen Behavior to emerge. Naturally, if Constraint 2 is not binding, the decision-making problem for the agent does not change, and we are back to the results given by equations (2) and (3). For Constraint 2 to be binding then, the agent's preferences must be such that they maximize utility by choosing a combination of X and Y that is on (not above) Constraint 2. And that will happen when the agent's preferences go against the variable that more efficiently helps the agent achieve success. That is the general intuition for when this phenomenon will emerge. Giffen Behavior (let's say in dimension X) will be observed when it is easier for the agent to meet the threshold for success (satisfy Constraint 2) by choosing X than Y (a larger marginal rate of substitution) but the individual has sufficiently strong preferences for the other variable (Y) so that Constraint 2 becomes binding for them. The two constraints will intersect each other in the XY space, and the agent will maximize utility subject to these two constraints by selecting the point of intersection. Given the expressions we used for the two constraints, this means that for Giffen Behavior to occur, $e > c$ and $f > d$. These two conditions guarantee the intersection of the two constraints.

Let's call X_s the value of X where the two constraints meet. We can easily verify that this value is given by

$$X_s = \frac{e-c}{f-d} \qquad (5)$$

How strong should the agent's preferences for Y be so that Constraint 2 becomes binding? We check to see when $X^* \leq X_s$. Solving for α, we observe that this condition is satisfied when

$$\alpha \leq \frac{d}{d+\left[\frac{c(f-d)}{e-c}-d\right]^{1-\beta}} \qquad (6)$$

If equation (6) is satisfied, then the optimal level of X for the agent is not given by equation (2), but by equation (5) (the solution from Equation 2 in this case would not satisfy the second constraint), so $X^* = X_s$.

In this case, how does the agent respond to a change in the relative price of X, assuming *f* > *d* still holds? We observe that

$$\frac{\delta X_s}{\delta d} = \frac{e-c}{(f-d)^2} > 0 \qquad (7)$$

Equation (7) is now positive and has the opposite sign of (4). Therefore, if we raise the relative price of X by increasing d, the agent will end up choosing, counterintuitively, a higher level of X, which characterizes Giffen behavior. Figure 1 illustrates the effect.

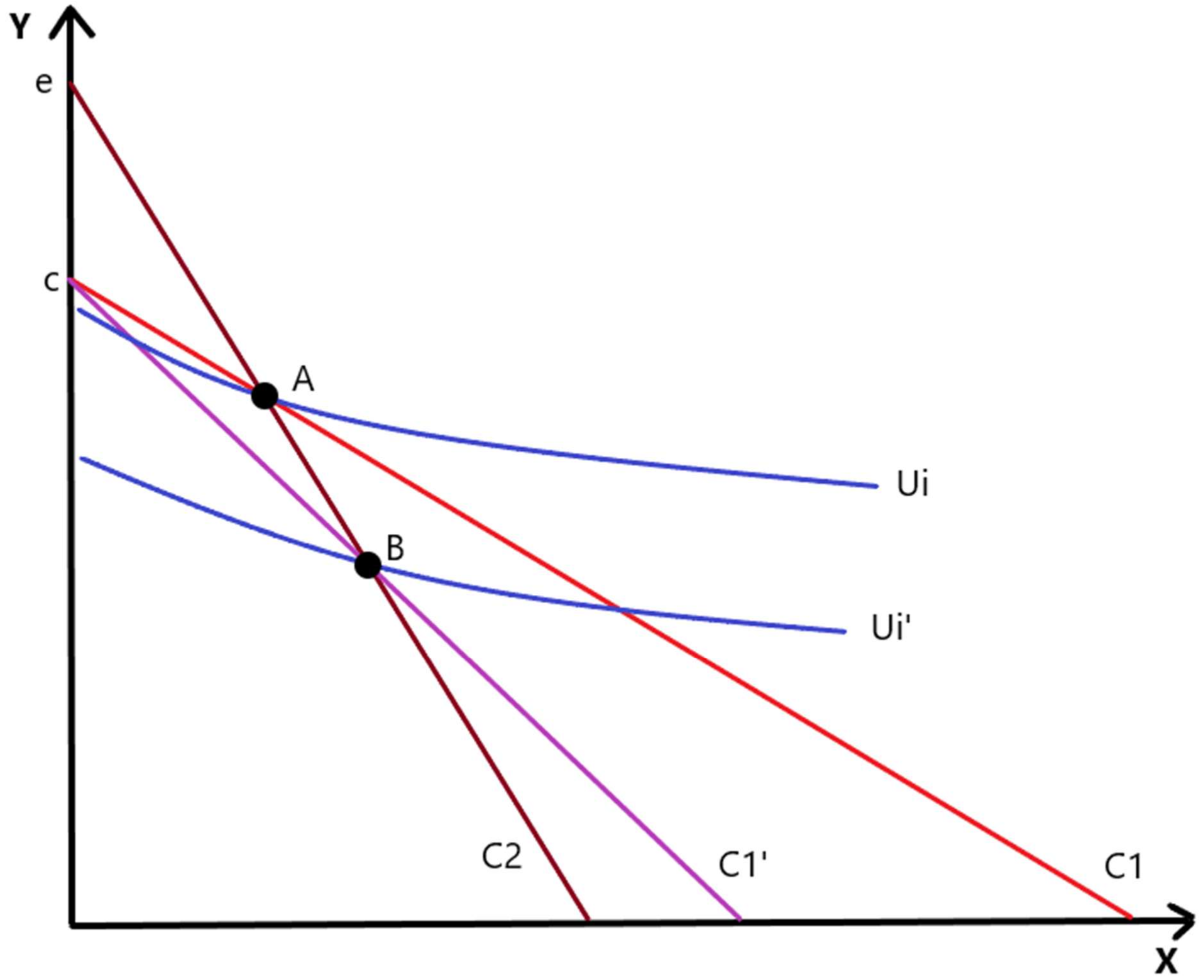

Figure 1: A graphical illustration of Giffen Behavior. Line C1 represents the first constraint faced by the agent, and line C2 the second (success) constraint. The blue curves are two of the agent's indifference curves. Given the sufficiently strong preferences the agent has for Y over X (hence the relatively flat shape of the indifference curves), the agent maximizes utility to satisfy both C1 and C2 by choosing point A. When the relative price of X increases and the first constraint shifts to C1', the best the agent can do now is to increase the level of X by choosing point B.

Applications to Sports

We now discuss a few examples of how Giffen Behavior can generate novel insights into the domain of sports:

Example 1: Soccer Club Spending

Imagine a newly promoted or bottom-tier soccer club that faces a tradeoff between investing in club infrastructure (y-axis good), a long-term investment, such as academy players, training facilities, and ground improvements, and signing established players on the transfer market (x-axis good). Suppose this club also strongly prefers to invest in infrastructure because they believe it will produce more sustainable long-run success; the club would ideally invest in infrastructure, nurture affordable players from their academy and augment their squad with minimal expensive signings. Initially, with moderate player prices and transfer fees, the club might purchase a couple of key signings and fill the rest of the roster with budget options, aiming to build for the long run while keeping expenditures reasonable. Now, suppose the "price" of established players rises – e.g., transfer fees and salaries inflate dramatically, or mid-season desperation means selling clubs demand a premium. Intuition suggests that our cash-conscious club should buy fewer expensive players as they become more expensive.

However, in addition to the budget constraint, this club also faces a relegation threat (second constraint) which is likely to be binding: if the current squad is underperforming, cutting back on transfer spending would almost surely mean failing the survival threshold. The only way to satisfy both constraints (limited budget and avoiding relegation) may be to spend even more on expensive players despite their higher cost. The club reallocates funds away from developmental projects and pours them into emergency signings to secure enough wins to stay afloat. Interestingly, it is the teams that would most prefer to build for the long run who end up increasing spending on expensive players, and less on sustainable infrastructure, as the price of players increases.

Sports economists note that newly promoted teams would do almost anything to stay there, which mainly means spending gaudy sums on players. Indeed, some teams feel they have no choice but to spend big to survive at a higher level. In Giffen-like fashion, an increase in the cost of talent leads the club to demand more of it: the survival constraint forces additional spending on high-priced stars as the only viable route to avoid relegation. This outcome is surprising – instead of investing more in developmental projects in response to costlier signings, the team prioritizes short-term fixes. Additionally, because the relegation battle is a zero-sum game where some clubs will forcibly be relegated, this dynamic is likely to leave a club who tries but fails to avoid relegation in relatively worse shape, with less long-run investment in infrastructure, and potentially facing a threat of cascading relegations for the following seasons.

It is noteworthy to mention that this phenomenon is distinct from the "luxury" goods situation where a newly promoted team chooses to increase the number of established players due to an increase in revenue caused by the promotion.[5] In this case, it would simply show up as a demand shift as revenues from the higher-level league drive increased spending. While income plays an important role in a team's allocation decisions and newly promoted teams will likely experience an increase in revenue, our model shows that, if the "success" constraint remains binding, an increase in the price of established players will lead these teams to purchase more of these players. This occurs regardless of whether there has been an outward shift in the first constraint due to higher revenues. Of course, if the outward shift is large enough to render the "success" constraint non-binding, then the conditions for Giffen behavior would no longer be met.

Consider Figure 1. We can interpret constraint C1 as representing a newly promoted team with higher post-promotion revenues (the outward shift has already happened). If the price of established players increases, shifting the constraint from C1 to C1′, the team will still move from point A to point B, thereby exhibiting Giffen behavior.

[5] We thank a reviewer for pointing out the potential similarity.

Moreover, the presence of a second binding constraint not only gives rise to Giffen behavior but also makes it possible for normal goods to behave as if they were inferior (what we might call "Inferior Behavior"), which reverses the usual income effect. Returning to Figure 1, suppose revenues rise further so that C1 shifts outward, but not enough to make the "success" constraint non-binding. If preferences remain unchanged, the team will choose a new point northwest of A along the second constraint C2, allocating more resources to infrastructure and academy players and fewer to established players. This is the opposite of what we would expect in the case of a luxury good, as established players in this instance behave like an inferior good for a team that satisfies the assumptions of the model.

Example 2: Steroid Use

Anabolic steroids—more precisely, anabolic-androgenic steroids—are performance-enhancing substances, in contrast to corticosteroids, which are used in medical treatments (e.g., as anti-inflammatory drugs for various conditions). When athletes take anabolic steroids, they increase the number of androgen receptors in their bodies, contributing to increased muscle size and strength by mimicking the effects of the male sex hormone testosterone.

It is estimated that non-prescribed steroid users typically consume 10 to 100 times the dosage a physician would prescribe for legitimate medical purposes. However, anabolic steroid use carries significant risks: high blood pressure, blood clots, heart disease or stroke, permanent liver damage, increased aggression and sexual appetite (often referred to as "roid rage," which can result in heightened criminal behavior), brittle bones (osteoporosis), adrenal insufficiency (a potentially life-threatening condition), and an increased risk of diabetes. Prolonged high-dose use can also damage the liver, kidneys, and heart, making users more susceptible to heart attacks and strokes.

Because of these health risks, steroid use is physically, and potentially legally, costly. As a result, governing bodies have implemented rules banning steroid use to protect athlete health. In response to growing concerns, organizations such as Major League Baseball and the World Doping Agency strengthened their ban on performance-enhancing drugs in baseball and cycling. The NBA and WNBA increased penalties in 2005, while the NFL did not begin enforcing penalties until 2007.

Consider an athlete whose performance is determined using a combination of both legal methods (e.g., intense training, improved technology, better coaching) and illegal methods (e.g., performance-enhancing drugs). This tradeoff defines the athlete's choice set and what we might call their first constraint. Suppose the athlete has a stronger preference for using legal methods to improve performance. However, this athlete is likely to face a second constraint: they must reach a minimum performance threshold to qualify for a specific goal, such as competing in the Olympics or turning professional. In this context, performance-enhancing drugs may be more effective than legal methods in helping the athlete reach this target level. Given these two constraints and the athlete's preferences, their optimal strategy is to rely as much as possible on legal methods and use only the smallest amount of performance-enhancing drugs necessary to meet the performance threshold.[6]

Now suppose the relative price of taking performance-enhancing drugs increases. This could result from higher monetary costs, stiffer penalties, more difficult access to the drug, or any other factor that raises the opportunity cost of steroid use. How might athletes respond? Athletes

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[6] An athlete who can achieve the minimum performance target using only legal methods does not fit this discussion, since the second constraint would not be binding for them.

whose preferences show they don't care one way or the other about how to increase performance, as long as performance is raised, will behave in accordance with the law of demand: as the cost of steroids rises, they will reduce their usage. These athletes initially used a relatively high level of steroids and achieved performance levels well above the required minimum, which made the second constraint non-binding. When the cost increases, they can cut back and still stay above the threshold.

Counterintuitively, however, it is precisely the athletes who were trying to minimize steroid use—those who used the bare minimum to meet the required performance level—who will now be forced to increase their steroid use. Why? Because cutting back would cause them to fall short of the required threshold (violating the second constraint), and maintaining the same level of steroid use now violates the first constraint, which weighs more heavily because the cost has increased. The only feasible way to satisfy both constraints is to lean more heavily into steroid use.

The broader insight from this analysis is striking, as there are two separate counterintuitive results. The first one is that policies designed to crack down on steroid use may cause some athletes to increase their usage. The second one is that it is the most reluctant users, the ones trying hardest to avoid drugs, who will have a larger incentive to increase their usage, while the more indifferent users scale back. If this prediction holds empirically, it could have significant implications for designing optimal policy around performance-enhancing drug use in sports.

Although our model specification assumes that the agent likes both X and Y ($0 \leq \alpha \leq 1$), the effect is robust to different specifications. One might argue, for example, that it is a stretch to assume that an athlete enjoys taking steroids in the absence of any performance increases. But we can relax this assumption and still observe Giffen Behavior. Suppose $\alpha < 0$ and the athlete dislikes taking steroids. The athlete's indifference map in this case would become upward-sloping. If the athlete only faced the first constraint, they would maximize utility by choosing no steroids. But if the athlete needs to satisfy both constraints simultaneously and equation (6) is satisfied, the second constraint will still be binding for this athlete, and they will be forced to choose the same allocation as athletes who have a weak preference for steroids. Equation (6) maintains that, as long as the agent has a sufficiently weak preference for steroids, the second constraint will be binding, and Giffen Behavior will be observed. This is true even if we assume the athlete dislikes this good. As we previously mentioned, it will be these athletes who will behave in a Giffen-like manner, and not those who enjoy taking performance-enhancing drugs.

Example 3: High-Intensity versus Low-Intensity Training

In a similar fashion to the previous example, where we look at steroid use, we continue with an example looking at a different way to achieve a given performance level within the bounds of legal training. Our final example suggests a more general insight that can be applied to sports: if an athlete's second constraint stipulates a minimum performance level to achieve success, any tradeoff between two variables related to an athlete's performance has the potential to generate Giffen Behavior.

Consider an athlete who faces a tradeoff between high-intensity versus low-intensity training. Suppose they strongly prefer safer training methods – they would typically engage in moderate workouts with ample recovery time, incorporating just enough high-intensity sessions to improve gradually. This balances performance gains with health. Now, suppose circumstances effectively raise the "price" of high-intensity training. For instance, new information or fatigue increases the risk of injury per intense session (or recovering from an injury changes the risk of any given intense session), or medical staff impose stricter monitoring, limiting access to the performance of such brutal workouts. Under a single-constraint view, one would expect the athlete to substitute away from these costly, high-intensity sessions and engage in more low-intensity work to stay healthy. However, the performance-quota constraint is unforgiving: if the athlete needs to achieve a minimum level of performance, and their current level is below the qualifying standard, reducing intense training would doom their chances of improvement and violate the second constraint.

They cannot simply add low-intensity sessions to make up the gap, because those yield insufficient performance gains. The athlete is thus trapped by both constraints – cutting back on high-intensity sessions to ease the injury risk fails the success criterion, but maintaining the same high-intensity sessions now violates the heightened safety constraint. The only feasible solution may be to conduct more high-risk training to achieve the performance goal. The result is counterintuitive but can occur whenever peak performance is a non-negotiable constraint: the athlete accepts greater risk by consuming more of the "risky good", because any less and they cannot survive competitively. Critics may only see the puzzling outcome (more injury-prone training when injury risk is higher) and call it irrational, but it is a constrained rational response to the dual demands of training capacity and qualifying standards.

In a way, Example 2 could be interpreted as a variation of Example 3, as in both cases the second constraint stipulated the achievement of a minimum level of performance. We described them as separate examples, however, because there are important qualitative differences between them, which can lead to different implications. Presenting both an illicit-input and a modality-of-effort version illustrates that the implications of the model are not due to the idiosyncrasies of doping markets or the banning of any given substance. It shows that the Giffen Behavior logic is structural, since it arises whenever the conditions specified by the model are satisfied. That generality is more transparent with two substantively different domains. The steroid case demonstrates the mechanism when a policy-driven price affects an illicit input. The training case shows the same mechanism when a physiological risk changes within a lawful production technology. Because the competing confounds, data, and welfare margins differ across these domains, seeing both prevents misattribution and clarifies where the effect is likely to appear in practice.

Additional Considerations

There are two considerations we believe are essential to discuss at this point. The first is related to the methodological approach to tackle the "survival" issue. Is "survival", broadly defined by us in this paper as any threshold an agent needs to satisfy, a constraint or a preference? Both are reasonable approaches. We could argue that the minimum performance required for an athlete to qualify for a particular tournament is a constraint the athlete faces, or that the athlete has a very strong preference for qualifying for the tournament. Although a discussion on the correct semantic approach is an interesting one, it is irrelevant for the purposes of this paper, as the results are identical regardless of whether we treat "survival" as a preference or as a constraint. In the soccer example, we argue that Giffen Behavior is observed when "survival" is a binding constraint for the club. But the same result could also be motivated through a multilevel decision-making process where the club first evaluates the difference in utility between surviving in their current league versus being relegated and then invests optimally as a function of this utility differential.

The second consideration is the potential extension of our analysis to accommodate strategic interactions among athletes or teams. In some settings, the second constraint may be endogenously determined by the performance of others. In such cases, a game-theoretic framework becomes appropriate, as each decision-maker's best response depends on the choices of others. It is not difficult to see that Giffen behavior could still emerge as part of a player's best response, since the second constraint can be binding regardless of its source. For simplicity, again consider the soccer example and assume we are analyzing the interaction of two teams battling to avoid the final relegation spot who have the same choice set (C1) and utility function. But now, instead of C2 being a fixed level of performance, it is determined by the performance of the other team (i.e., it is not a fixed points target which ensures safety, but rather one more point than the other team). This means that each team's goal is to maximize utility subject to C1 and to have a performance that is higher than that of the other team.

In the linear case we have considered so far, what should we expect to happen in equilibrium? Let's consider two different cases, based on their preferences. Suppose both teams have sufficiently strong preferences for infrastructure spending (Equation (6) is satisfied). Each team's best-response in this case will be to choose a level of performance ϵ $(epsilon)$ higher than the other team, so they are still affected by the position of the second constraint. In this case, Giffen Behavior still emerges in the comparative statics of their best-response functions: if the relative price of signing first team players increases, both teams will best-respond by choosing to spend more on transfers and less on infrastructure. But given that each team keeps best-responding by choosing a level of performance slightly higher than other team, the second constraint for both keeps shifting out, and they keep chasing progressively more expensive signings. In equilibrium, both teams invest exclusively in transfer signings and forego infrastructure entirely.[7]

[7] This is an example of a Prisoner's Dilemma similar to the one typically discussed in the strategic use of performance-enhancing drugs. Both teams could have higher levels of utility if they both chose a lower level of signings and larger investments in infrastructure. In fact, the current Profitability and Sustainability Rules (PSR) in force in the English Premier League explicitly exempt spending on infrastructure and youth academies when calculating losses, which makes the budget constraint vertical before it intersects with the x-axis. In the context of our model, this feature of PSR could be viewed as a commitment device which would solve this Prisoner's Dilemma, allowing both clubs to reach a higher level of utility.

What if the teams have sufficiently strong preferences for transfer signings and do not want to invest in infrastructure? The results are very similar. Because of each team's strong preferences for transfers, they best respond by choosing a high level of transfers, which implies a level of performance that is not just ϵ-higher than their competitor's, but considerably higher. However, when one team does that, it significantly shifts out the second constraint for the other team, quickly making the second constraint binding for them. The arms race continues, and the equilibrium is identical, with both teams choosing the corner solution with the maximum level of transfers possible. Therefore, in this interaction, the equilibrium is the same regardless of the preferences of the teams.

Although Giffen Behavior is observed in the comparative statics of their best-response functions, the phenomenon does not occur in equilibrium in this straightforward case. Given that the equilibrium is characterized by both teams choosing a corner solution, an increase in the relative price of transfers will reduce their use of transfers in equilibrium due to a pure income effect: the maximum possible level is now lower than it was before.

However, that does not mean that Giffen Behavior will never occur in equilibrium in game-theoretic settings. The simple equilibrium we found above was a by-product of the linearities assumed in the constraints faced by the teams. Once we introduce non-linear constraints, allowing for interior solutions in equilibrium, we can observe the effect as part of a Nash Equilibrium, and we invite future research on this front.

Conclusion

Giffen goods may exist in the pure sense infrequently, but Giffen Behavior can be prevalent. In this paper, we presented several examples in which an increase in the relative cost of a particular variable can lead decision-makers in sports to choose more of that variable. The phenomenon arises when, in addition to a standard choice set, the decision-maker faces a “success” or “survival” constraint, and their preferences are such that this second constraint becomes binding. We illustrated this dynamic in the context of game attendance and ticket prices, spending on infrastructure versus established expensive players in soccer, the use of performance-enhancing drugs, and the choice between high- and low-intensity training. In each case, our analysis yielded two counterintuitive results: first, some agents may choose a higher level of a variable even as it becomes more costly; second, those with stronger preferences against using more of the variable are the ones more likely to behave in a Giffen-like manner. Naturally, this list is far from exhaustive. Once the underlying intuition is understood, it becomes clear that Giffen Behavior is widespread in the domain of sports.

Ultimately, our paper aims to demonstrate that this counterintuitive behavior is not only theoretically plausible in sports but also empirically relevant and significantly more robust than previously thought. It deserves a place in the analytical toolkit of researchers studying decision-making in athletic and competitive environments, as it can generate additional insights to the field and a new direction to future research projects.

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