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Pro Sports League Antitrust 'Beliefs': Applied Theory and the Rule of Reason

Rodney Fort*

Sport Management, University of Michigan, Ann Arbor, MI, USA

In antitrust rule of reason cases, courts weigh anticompetitive harm against consumer welfare offsets. In sports cases, the courts appear to accept claims that fans prefer more competitive balance to less, so that a potential welfare offset is any *added* enhanced competitive balance attributable to the anticompetitive activity. In addition, courts often decide that less intrusive alternatives may be available to accomplish the same competitive balance gain. From the applied theory perspective, this is troublesome. Theoretically, whether fans prefer more balance is a hypothesis about preferences that needs to be examined in detail for any particular case. Applied theory also is of aid in assessing whether a particular device under scrutiny, including so-called less intrusive alternatives, should even be predicted to enhance balance. Wading through the foregoing produces food for thought for the courts. Copyright © 2016 John Wiley & Sons, Ltd.

1. INTRODUCTION

In pro sports league antitrust cases, courts in the past have presumed that sports fans prefer more competitive balance to less.[1] The cases involved the draft, free agency restrictions, restrictions on the number of local TV broadcasts, and centralized league marketing of individual franchise intellectual property. This belief allowed defendants to argue that increased competitive balance generated by these impositions is a welfare-offset against their potentially anticompetitive effects. In the context of sports, the harm is to sports fans, the final consumer, as is the point of all antitrust actions.

In such cases, the courts have adopted the rule of reason approach embodied in the question, 'Does the welfare from improved competitive balance offset the harm to fans and/or athletes?' The rule of reason approach involves some well-established steps. Plaintiff must establish the market definition and demonstrate the anticompetitive harm. Defendant must demonstrate the balance-improving offset. The courts also consider whether there is any alternative that could accomplish the same outcome with less harm to fans.

In this paper, I hope to make two points. First, the idea that fans prefer more competitive balance to less is a *hypothesis about preferences*.[2] As such, it must be checked in every instance. An analogy about preferences, from demand theory, is that the same good can be income normal for some people but income inferior for others. Presuming the income effects were the same, qualitatively, for all people would surely lead to unexpected outcomes in policy decisions about such goods.

Second, although courts often take as given that some mechanism has the chance to improve competitive balance, applied theory may predict otherwise. Under fairly general theoretical assumptions, in North American leagues, theory predicts that national television revenue sharing, the draft, and local revenue sharing will not enhance competitive balance. On the other hand, in the same leagues, a payroll cap *may* do so in a

*Correspondence to: Sport Management, University of Michigan, 1402 Washington Heights, Rm. 3150, Ann Arbor, MI 48109-2013, USA. E-mail: rodfort@umich.edu

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particular setting, and a competitive balance tax will do so.

Theory is also useful in pointing out that all mechanisms under scrutiny will result in wealth transfers. In the pro sports context, the transfers can be from owners to players, from some owners to other owners, and/or from some players to other players. On the one hand, this aspect of the theory is important in separating wheat from chaff. Typically, transfers are beside the point because harm done to consumers by inefficiency is the point of antitrust action. But on the other hand, as courts wrestle with fairness, sometimes it is difficult to get past the transfers and focus on competitive balance. Theory helps here.

The foregoing suggests both caution and a simple prescription in rule of reason sports cases. First, the court should ascertain whether and how much fans care about balance in the case at hand. This is no trivial matter because it should be done in comparison to some idea of 'optimal' balance, competitively determined. Second, the court should entertain sound economic theory in deciding whether the mechanism under discussion is predicted to improve balance in the first place. Along the way, theory reveals wealth transfers to the court that tend to weigh into their decision as well.

The paper proceeds as follows. In Section 2, a (surely non-exhaustive) list of court cases is offered to demonstrate the identified problems. Section 3 addresses whether or not sports fans actually do prefer more balance to less along with the observation that the observed level of competitive balance in any particular court case is probably not the one that would be competitively determined. Section 4 uses the latest developments in the theory of sports leagues applied to revenue sharing. A simple episode analysis fails to reject the theoretical prediction that revenue sharing does not improve balance in North American leagues. Conclusions round out the paper, including the summary prescription for rule of reason analysis.

2. EXAMPLE CASES AND IMPLICATIONS

This section is based heavily on McKeown (2011) and Wilken (2014). For pro sports leagues, the relevant chronological list of cases includes the following:[3]

- *Mackey v. NFL, 1976* (*Mackey*)—Challenged the validity of the 'Rozelle Rule' in the National Football League (NFL).[4]
- *Smith v. NFL, 1978* (*Smith*)—Challenged rules of the NFL draft.
- *NCAA v. Board of Regents of the University of Oklahoma, 1984* (*NCAA*)—Challenged centralized broadcasting of regular season college football by the NCAA.
- *Chicago Professional Sports Ltd. Partnership v. NBA, 1996* (*Chicago Pro Sports*)—Challenged restrictions on team TV broadcasting imposed by the NBA.
- *MLB Properties Inc. v. Salvino, 2008* (*Salvino*)—Challenged centralized marketing by Major League Baseball (MLB).
- *American Needle v. NFL, 2010* (*American Needle*)—Challenged centralized marketing by the NFL.

Except for *Mackey*, these were rule of reason cases.[5] Let us just skip over the first steps—defining the market and the arguments about anticompetitive harm and welfare enhancing offsets. The focus in this paper is on the behavior of the court in the subsequent steps—deciding the balance of harm and welfare generated and offering less intrusive alternatives.

First, the courts made known that they believe fans care about competitive balance and so balance becomes an object of management by leagues:

- *Mackey* (McKeown, 2011, p. 534, quote in the *Mackey* decision): '…the NFL has a strong and unique interest in maintaining competitive balance among its teams'.
- *Salvino* (McKeown, 2011, p. 537, quote in the *Salvino* decision): The court conceded 'that competitive balance is a necessary ingredient in the continuing popularity of the MLB Entertainment Product'.
- *American Needle* (McKeown, 2011, p. 520, quote in the *American Needle* decision): 'While that same interest [from *NCAA*: maintaining competitive balance] applies to the teams in the NFL, it does not justify treating them as a single entity for §1 [Section 1 of the Sherman Act] purposes when it comes to the marketing of the teams' individually owned intellectual property'. [Bracket clarifications by yours truly.]

Moving on to beliefs about the validity of revenue sharing, usually as a less intrusive option, we get the following.

- *Smith* (Wilken, 2014, p. 91, quote in the *Smith* decision): 'The least restrictive alternative of all, of course, would be for the NFL to eliminate

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the draft entirely and employ revenue sharing to equalize the teams' financial resources [as] a method of preserving 'competitive balance' nicely in harmony with the league's self-proclaimed 'joint-venture' status'.

- *Chicago Pro Sports* (McKeown, p. 537, his quote): 'The district court noted that the league had other mechanisms, including the college draft, *revenue sharing*, and team salary caps, to more directly promote competitive balance'. *Emphasis by yours truly*.
- *Salvino* (Wilken, 2014, p. 91, quote in the *Salvino* decision): The court noted that 'disproportionate distribution of licensing income would foster a competitive imbalance' among MLB teams.

Thus, the courts proceeded as follows. First, they followed the idea that some league behavior caused fan harm but might improve competitive balance. In doing so, they took as their starting position that fans prefer more balance to less. But what if that simply was not so in the case at hand?

The courts have also found that the league did not provide a convincing argument that the policy was essential to balance. Now, one might simply fault the leagues for a weak argument. However, part of the court consideration could have involved the powerful insight that theory does not predict that the particular mechanism under analysis would improve balance in the first place.

Courts have also offered in their opinion that there were other less intrusive mechanisms that would accomplish balance, most notably, revenue sharing. On this tack, the theory and evidence may suggest that the court simply missed the mark—theory applied to North American sports leagues predicts that revenue sharing will not have any impact on balance at all. The next sections present these criticisms, *seriatim*.

3. THE ISSUE OF COMPETITIVE BALANCE

Rottenberg (1956) was the first to discuss competitive balance using what sports economists now refer to as 'the uncertainty of outcome hypothesis'—fans prefer their team to win, but in close games, and fans want at least occasional hopes of post-season play for their team. Imbalanced game and season outcomes run directly counter to this hypothesized fan preference. As a result, if a league suffers problematic imbalance, fans of perennial losers will lose interest in their teams. This would not matter to the rest of the team owners if these fans kept their same level of enthusiasm for the rest of the league and the league's post-season play. But if fans of perennial losers also fall-off from the league entirely, all owners are worse off. The implication is that leagues have a vested interest in the level of competitive balance.

As mentioned earlier, Rottenberg's is a hypothesis about fan preferences. As preferences vary, just how much (if any) some fans (if any) prefer more competitive balance to less is an empirical question. Early reviews of the work on the impact of competitive balance on demand concluded that the empirical veracity of the uncertainty of outcome hypothesis had been repeatedly called into question.[6] Works that followed examined specific leagues at particular times or the entire historical time series of the impact of competitive balance on attendance for leagues. The former found the hypothesis carried empirical weight only at times, and only for some particular types of outcome uncertainty.[7] The latter found that only some types of outcome uncertainty seem to matter and only for some sports, not all.[8]

At best, the extant work on whether and how much fans care about balance finds mixed results at best. This seems less than a sound foundation for the courts' inherent belief that fans care about balance in general. Instead, the results suggest a case-by-case assessment of the belief, league by league.

But attempting to quantity the relationship between observed competitive balance and demand is not enough. Empirical estimation of whether and how much fans care about balance in any situation can only use data on the levels of competitive balance fans have faced. The added dimension is, of course, whether that level, itself, has the welfare characteristics ascribed to a competitive determination of the level of competitive balance.

At this point in time, for North American leagues, only the theoretical work has been performed on this issue under the economist's heading of 'optimal balance'. Leagues where single-game tickets dominate, like MLB, are the most complex (Fort and Quirk, 2010). The conditions for optimal balance involve the sum of changes in fan and owner surpluses across all opponents and compared between smaller-revenue and larger-revenue markets. Things are decidedly simpler for leagues dominated by season-ticket sales like the NFL (Fort and Quirk, 2011).

According to the usual criterion of maximizing the sum of owner and fan welfare, under competition, it ends up that optimal balance is (i) quite unlikely to

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hold in any actual league, (ii) ultimately an empirical issue, and (iii) completely amenable to the usual analysis had by estimating the characteristics of fan demand and of ticket pricing choices by team owners. It is not unusual in antitrust cases for expert witnesses to do such estimation, especially given the chance to obtain the required data during the discovery phase of trial that are typically otherwise unobtainable.

4. BASIC THEORY AND REVENUE SHARING

The goal of this section is to shed applied theory light on whether the courts' favorite less intrusive alternative, revenue sharing, can alter competitive balance. Generally, in pro sports, geographic variation in fan willingness to pay for team quality determines imbalance in a league. This has weakened a bit over time with the advent of cable/satellite and streaming options for fans but still holds generally true. Willingness to pay varies geographically by income, population, substitute consumption opportunities, and (perhaps more so than for other types of consumption) preferences. In the theory literature on team talent choice, resulting in the distribution of talent in a league that manifests itself in competitive balance, simply including both 'larger' and 'smaller' revenue team owners incorporates this geographical difference.

Presentation of the expected impacts of revenue sharing is easily facilitated without loss of (much) generality for 'closed' North American leagues under the assumption of no scale effects (talent is measured so that a unit increase in talent results in a unit increase in winning percentage). This is easiest to carry out using the two-team theory from Winfree and Fort (2012) (suitably restricted as just stated) and the two-team league diagram popularized by Quirk and Fort (1992).[9]

With subscript L and S for the larger-revenue and smaller-revenue owners, respectively, winning percent depends on the level of talent chosen by each owner, $w_L = w_L(t_L, t_S)$ and $w_S = w_S(t_L, t_S)$. Nash conjectures give $\frac{\partial t_L}{\partial t_S} = 0$. In addition, the assumption of no scale effects gives $\frac{\partial w_L}{\partial t_L} = \frac{\partial w_S}{\partial t_S} = 1$. The adding-up constraint for league play requires $w_L = 1 - w_S$. This last also means that $\frac{\partial w_L}{\partial t_L} = -\frac{\partial w_S}{\partial t_S}$ and, coupled with the assumption of no scale effects, that $\frac{\partial w_S}{\partial t_L} = \frac{\partial w_L}{\partial t_S} = -1$.

Absent any intervention to change the talent distribution, the two owners have the following profits:

$$\pi_L = R_L[w_L(t_L, t_S)] - Pt_L \text{ and}$$
$$\pi_S = R_S[w_S(t_L, t_S)] - Pt_S, \quad (1)$$

where R is revenue and P is the competitively determined price per unit talent.[10] First-order conditions are as follows:

$$\frac{\partial R_L}{\partial w_L}\left(\frac{\partial w_L}{\partial t_L} + \frac{\partial w_L}{\partial t_S}\frac{\partial t_S}{\partial t_L}\right) - P = 0 \text{ and}$$
$$\frac{\partial R_S}{\partial w_S}\left(\frac{\partial w_S}{\partial t_S} + \frac{\partial w_S}{\partial t_L}\frac{\partial t_L}{\partial t_S}\right) - P = 0. \quad (2)$$

However, $\frac{\partial t_L}{\partial t_S} = \frac{\partial t_S}{\partial t_L} = 0$ for Nash conjectures (which also eliminates consideration of the implication of the adding-up constraint), and $\frac{\partial w_L}{\partial t_L} = \frac{\partial w_S}{\partial t_S} = 1$ with no scale effects so that the first-order conditions become

$$MR_L - P = 0 \text{ and } MR_S - P = 0, \quad (3)$$

where $MR_L = \frac{\partial R_L}{\partial w_L}$ and $MR_S = \frac{\partial R_S}{\partial w_S}$.

The Nash equilibrium in the competitive talent market sets the first-order conditions equal to each other (depicted in Figure 1):

$$MR_L = P^* = MR_S. \quad (4)$$

Thus, the equilibrium distribution of talent is $w_L^* = 1 - w_S^*$, with price per unit talent equal to P^*. Clearly, by virtue only of the fact that there is a larger-revenue owner and a smaller-revenue owner, talent imbalance occurs, $w_L^* > w_S^*$. In addition, the remaining symptom due to the presence of different market values occurs, namely, payroll imbalance with $P^* w_L^* > P^* w_S^*$.

Historically, the first form of revenue sharing included only gate revenues from ticket sales.[11] The earliest version involved simple equal-proportion sharing. Under this mechanism, gate revenue proceeds are divided between the home and visitor by the same

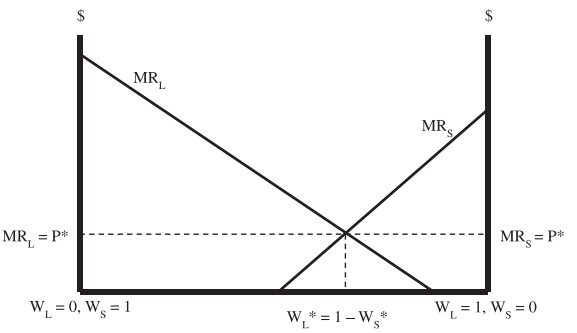

Figure 1. Equilibrium in a closed league.

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proportion for all teams. Let α be the share kept by the home team. Profits for our two team owners are now (suppressing the notation for the elements determining revenues)

$$\pi_L = \alpha R_L + (1-\alpha)R_S - Pt_L \text{ and}$$
$$\pi_L = \alpha R_S + (1-\alpha)R_L - Pt_S. \quad (5)$$

The first-order condition for the larger-revenue owner is

$$\alpha\frac{\partial R_L}{\partial w_L}\left(\frac{\partial w_L}{\partial t_L}+\frac{\partial w_L}{\partial t_S}\frac{\partial t_S}{\partial t_L}\right) + (1-\alpha)\frac{\partial R_S}{\partial w_S}\left(\frac{\partial w_S}{\partial t_L}+\frac{\partial w_S}{\partial t_S}\frac{\partial t_S}{\partial t_L}\right) - P = 0. \quad (6)$$

However, imposing Nash conjectures and no scale effects, and noting that the adding-up constraint gives $\frac{\partial w_S}{\partial t_L} = \frac{\partial w_L}{\partial t_S} = -1$, expression (6) becomes

$$\alpha MR_L - (1-\alpha)MR_S - P = 0. \quad (7)$$

Using the same steps to find the first-order condition for the smaller-revenue owner, and using the expression in (7), the Nash equilibrium is characterized by

$$\alpha MR_L - (1-\alpha)MR_S = P' = \alpha MR_S - (1-\alpha)MR_L. \quad (8)$$

Note that as long as $MR_L > MR_S$ in the neighborhood of P', then $P' < P^*$, as $MR_L > MR_S \Leftrightarrow P^* > P'$. However, a bit of algebra shows that this equilibrium must also satisfy $MR_L = MR_S$. Thus, the distribution of talent must be identical to the case of no revenue sharing, mentioned earlier, namely, $w_L^* = 1 - w_S^*$.[12]

All that happens with equal-proportion revenue sharing is that the price of talent falls and, along with it, payrolls. Indeed, the entire amount of revenue sharing comes out of players' pockets because the shift downward in the marginal value of talent is identical to the decline in the price of talent. A more detailed demonstration is added to the following presentation of modern pooled revenue sharing.

Eventually, leagues adopted pooled sharing, including other attendance-related revenue and, eventually, extended to include local TV revenue. Under this form of sharing, owners keep some percentage β and put the rest into a pool that is shared equally by all owners. For our two-team league, profits for the larger-revenue and smaller-revenue owners, respectively, are (again, suppressing the notation on the determinants of revenue)

$$\pi_L = \beta R_L + \left(\frac{1-\beta}{2}\right)(R_L + R_S) - Pt_L \text{ and}$$
$$\pi_S = \beta R_S + \left(\frac{1-\beta}{2}\right)(R_L + R_S) - Pt_S. \quad (9)$$

Again, with Nash conjectures, no scale effects, and under the adding-up constraint, the first-order condition for the larger-revenue market owner is

$$\beta MR_L + \left(\frac{1-\beta}{2}\right)(MR_L - MR_S) - P = 0. \quad (10)$$

By the same steps for the smaller-revenue owner, and using the result in expression (10), the Nash equilibrium is characterized by

$$\beta MR_L + \left(\frac{1-\beta}{2}\right)(MR_L - MR_S) = P'' = \beta MR_S + \left(\frac{1-\beta}{2}\right)(MR_S - MR_L).$$

Suppose $\alpha = \beta$ so that only the sharing arrangement is different, but not the share kept by the home team. It is easy to see that, again, as long as $MR_L > MR_S$ in the neighborhood of P'', then $P'' < P' < P^*$, as $MR_L > MR_S \Leftrightarrow P^* > P' > P''$.

Again, a bit of algebra shows that this equilibrium must also satisfy $MR_L = MR_S$. Thus, the distribution of talent must be identical to the case of either equal-proportion or no revenue sharing, mentioned earlier, namely, $w_L^* = 1 - w_S^*$. So the price of talent and payroll fall and revenue sharing comes entirely out of players' pockets. The case where $\alpha = \beta$ so that $P'' < P' < P^*$ is assured is also shown in Figure 2.

Tracking the redistribution due to revenue sharing is facilitated by Figure 3, just for pooled revenue sharing. Participation in the pooled sharing scheme alters

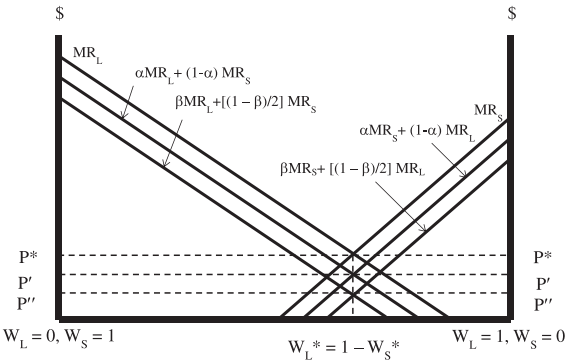

Figure 2. Pooled revenue sharing equilibrium in a closed league.

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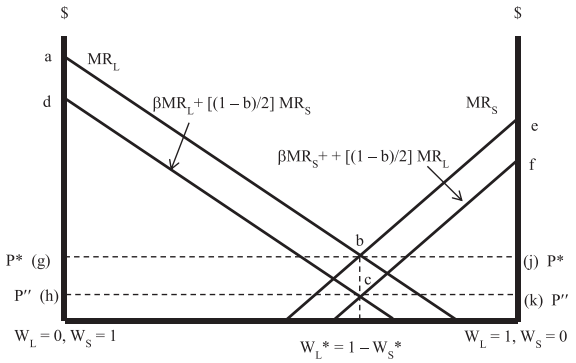

Figure 3. Diagrammatic exposition of payroll redistribution.

the marginal value of talent for the two owners as just shown in Figure 2, repeated in Figure 3. But what are the net impacts on the two owners and on talent?

For the owners, first, the pre-sharing surplus enjoyed from talent is Δabg for the larger-revenue owner and Δebj for the smaller-revenue owner. As the shift in price of talent is $\overline{bc}$, which is identical to $\overline{ad}$ or $\overline{ef}$, the surplus enjoyed in the presence of pooling is the same as before it was implemented! $\Delta dch = \Delta abg$ for the larger-revenue owner and $\Delta fck = \Delta ebj$ for the smaller-revenue owner. Thus, the payroll reductions become the source of the shared revenues, that is, area *abcd* = area *gbch* for the larger-revenue owner and area *ebcf* = area *jbck* for the smaller-revenue owner. So talent surpluses remain the same, and the distribution of talent is the same, so profits from team operation for each owner are the same.

Second, for the owners, each also *in addition* receives an equal share of the revenue sharing pool, namely, half of the area *gjkh*. The 'equal sharing' gives an appearance that the larger-revenue owner transferred money to the smaller-revenue owner; the former put in more than they take out, and the reverse for the latter. But the demonstration makes clear that this pool came completely from players. Presumably, deciding to split the pool evenly fosters league harmony.

Just to tie up the loose end in the coverage, players are clearly worse off. The price per unit talent has fallen. Payrolls are smaller for players on both teams by the amount of the revenue sharing. Pre-sharing payrolls were larger than payrolls under pooled sharing; $P^* w_L^* > P'' w_L^*$ and $P^* w_S^* > P'' w_S^*$ for players on the larger-revenue and smaller-revenue teams, respectively.

To make the basic point in the literature on the impact of revenue sharing on balance, the behavior of one measure of one type of balance is offered. The examination proceeds using a well-known measure of end-of-season balance by Noll (1988), Scully (1989), and the rigor in Quirk and Fort (1992) and Fort and Quirk (1995). The measure is the 'ratio of actual to idealized standard deviation of winning percent', or *RSD*.

Let *ASD* be the actual standard deviation of winning percent outcomes at the end of a league's season. Let *ISD* be the 'idealized' standard deviation for a league where the probability that any team beats any other is literally 0.5. For a league where ties count as one-half a win, from the simple binomial distribution, $ISD = \frac{0.5}{\sqrt{G}}$, where G is the number of games in a season (see Fort, 2007, for more on the issue with ties and with point systems used in the National Hockey League and world sports leagues). Given these definitions, $RSD = \frac{ASD}{ISD}$. Thus, *RSD* contains both the number of teams and the number of games in a season so that either changes over time or differences between leagues are counted. An actual league looks more and more like one form of a balanced league defined by *ISD* as $RSD \to 1$.

The behavior of *RSD* is shown for all four major North American leagues in Figure 4. In what follows, the 5-year average *RSD* before a given policy is compared with the 5-year average after the policy is implemented.[13] Lacking anything about the distribution of these averages, a formal test of means is passed over in favor of simply choosing 10% as a reasonable significant change.

The history of revenue sharing events to be examined is in Table 1. The results in Table 2 show general conformity to the theoretical predictions. There were

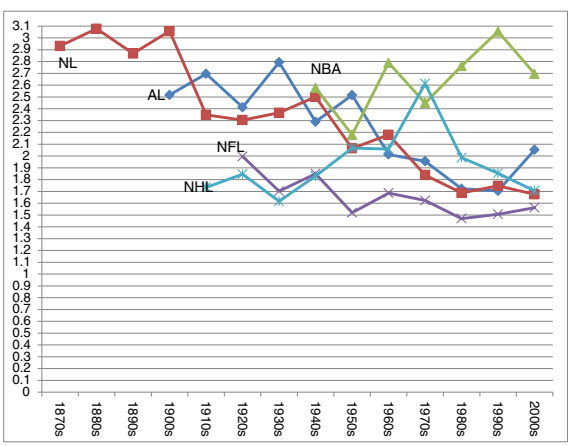

Figure 4. End-of-season competitive balance in the major North American leagues. [Colour figure can be viewed at wileyonlinelibrary.com]

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Table 1. History of Events

League	Revenue sharing
MLB	1996, 2002
NFL	2001
NHL	2005–2006

Notes: Major League Baseball (MLB) pooled revenue sharing first in operation for the 1996 season and extended with higher rates 2002. The National Football League (NFL) version also is pooled sharing. The National Hockey League (NHL) version is difficult to decipher from its collective bargaining agreement.

Table 2. History of Events and Percentage Change in Competitive Balance

	MLB		
Policy	AL	NL	NFL
Revenue sharing			
1996	5.5%	0.7%	
2001			0.1%
Revenue sharing and luxury tax			
2002	20.0%	−5.1%	

AL, American League; MLB, Major League Baseball; NFL, National Football League; NL, National League.

only insignificant impacts on balance in the original pooled sharing approach in both MLB (1996, both leagues) and later in the NFL (2001). While the 20% is 'significant' for the AL in 2002, it is a *decrease* in balance, not an increase, evidence actually counter to any claims of improved balance through revenue sharing.[14]

5. CONCLUSIONS: A BRIEF PRESCRIPTION

What does this mean for the courts? First, the belief that fans care about balance, underpinning defendant arguments that there can be a competitive balance offset that enhances fan welfare, should be assessed in every case. Depending on the league, time period, and type of competitive balance measure, it may not be true. And that assessment should include a comparison relative to the 'optimal' (surplus maximizing, competitively determined) level of balance. In some cases, there may not actually be any foundation supporting defendants' claims that competitive balance offsets increase fan welfare.

Second, both the theory and the data are in congruence about the impacts of revenue sharing on competitive balance—it is not predicted to change competitive balance, and, by one empirical examination, it has not done so. This means that one of the favorite less intrusive alternatives actually does not offer the believed improvement in balance. The courts should be careful in the choice of less intrusive alternatives.

Finally, courts also wrestle with fairness. Theoretical identification of the transfers that can be expected to occur, while not really the meat of the antitrust grinder, does shed light on the motivations of plaintiffs and defendants. Leagues appear to use revenue sharing to transfer from players to owners, and to share the proceeds equally, even though the savings are larger for larger-revenue market owners. Thus, one of the most referenced, less intrusive alternatives poses fairness issues to wrestle with as well.

If the courts keep these three conclusions in mind, the results of rule of reason approaches to sports antitrust issues will be the better for it.

NOTES

1. Rottenberg (1956) originally argued that *if fans care about balance*, then the level of competitive balance is an object of careful management by sports leagues.
2. Indeed, Rottenberg's (1956) original observation on this point was stated just this way and has been taken up in the sports economics literature under the label of the 'uncertainty of outcome *hypothesis*'. See the references in a later section of the paper.
3. I'm no lawyer, so simply repeat the legal references I've seen. *Mackey*: Mackey v. Nat'l Football League, 543 F.2d 606, 609 (8th Cir. 1976). *Smith*: Smith v. Pro Football, Inc., 593 F.2d 1173, 1186 (D.C. Cir. 1978). *NCAA*: Nat'l Collegiate Athletic Ass'n v. Bd. of Regents, 468 U.S. 85, 98, 110–11 n.42 (1984). *Chicago Pro Sports*: Chi. Prof'l Sports Ltd. P'ship. v. Nat'l Basketball Ass'n, 874 F. Supp. 844, 861 (N.D. Ill. 1995), rev'd on other grounds, 95 F.3d 593 (7th Cir. 1996). *Salvino*: *Major League Baseball Props., Inc. v. Salvino, Inc.*, 542 F.3d 290, 340 (2d Cir. 2008). *American Needle*: Am. Needle, Inc. v. Nat'l Football League, 538 F.3d 736, 738 (7th Cir. 2008) and Am. Needle, Inc. v. Nat'l Football League, 130 S. Ct. 2201 (2010).
4. The Rozelle Rule required owners receiving a free agent player to compensate the owner losing that player. If the two teams could not agree on compensation, the NFL Commissioner chose it. Sports economists pretty much agree that the size of the compensation required under the rule effectively precluded meaningful player movement. Teams at the time voiced this was because they feared the size of the compensation that would be set by the Commissioner (Garvey, 1989).
5. Technically, the court struck down the Rozelle Rule as a *per se* violation, rather than under rule of reason, but it is the court's belief about fan preferences for balance that matters for the points in this paper.
6. Szymanski (2003) and Fort (2006).
7. For example, comparing between uncertainty of individual game outcomes, uncertainty of the final season

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standings, uncertainty of access to the playoffs, and uncertainty of outcome across seasons (dynasties). See Meehan *et al.* (2007), Rascher and Solmes (2007), Soebbing (2008), Davis (2009), and Tainsky and Winfree (2010).

8. Lee and Fort (2008) and Mills and Fort (2014).
9. Issues abound with this choice in the broader context of the sports league theory applied to other leagues (e.g., world football), but the choices facilitate a clear statement of the issue. See Szymanski (2004) and Szymanski and Kesenne (2004) for the initial critique of Fort and Quirk (1995), and the subsequent exchange between Eckard (2006) and Szymanski (2006). Fort and Quirk (2007) and Fort and Winfree (2009) further explore the impacts of the restrictions in the North American model vis-à-vis open and closed talent markets and contest success functions. Winfree and Fort (2012) later offer a general theory presentation aimed at bringing all of the previous under a single unified formulation. A later exchange is in Szymanski (2013) and Winfree and Fort (2013). Madden (2015) also entered the fray.
10. The model sidesteps the entire issue of the determination of the price of talent. It would be more correct to consider price determination as the result of a tatonnement process in this model, rather than as an assumption that the price of talent is constant.
11. National TV contracts are between *the league* and media providers rather than between individual owners and media providers. In all cases where there is a national contract, all owners regardless of their choice of talent share the proceeds equally. Thus, these are lump-sum payments to owners, and they cannot impact competitive balance.
12. This result is Rottenberg's (1956) 'invariance principle' that the distribution of talent will not vary based on the rules that determine the distribution of player marginal revenue product between owners and players. The relationship between this invariance principle and the famous straw man theorem in Coase (1959, 1960) is covered by Fort (2005).
13. The revenue sharing rules in the 2005–2006 NHL agreement were inscrutable to me, and I omit analysis of hockey.
14. Caveats abound. Just in baseball, the original imposition of the reserve clause occurred in the year prior to topsy-turvy economic competition among four different leagues from 1882 to 1891. Free agency in 1976 occurred on the heels of expansion in both the American League (AL) and the National League in 1969. The first implementation of expanded local revenue sharing (beyond simple gate sharing) was sandwiched between the expansions of 1993 and 1998. In addition, other dimensions of outcome uncertainty are also interesting, but there is only so much room in a given contribution.

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