JBAM

Creating a Successful League of Their Own:
An Empirical Exploration of the All-American Girls Professional Baseball League

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The All-American Girls Professional Baseball League (AAGPBL) was created during World War II, when many male major and minor league baseball players became soldiers. While the league achieved some success from various perspectives, the question remains: Was the AAGPBL able to create "a league of their own" with competitive balance comparable to the men's leagues of Major League Baseball (MLB)? We analyzed performance team data to determine whether the league had competitive balance comparable to MLB-American League (MLB-AL) and MLB-National League (MLB-NL), on three measures of within-season, three measures of across-seasons, and one measure of inter-seasonal competitive balance, for the 12 seasons of the AAGPBL. The results showed that AAGPBL created a league with competitive balance comparable to both MLB-AL and MLB-NL on all seven measures.

When the United States entered World War II in 1941, it was a time of tremendous change and upheaval for the country. The draft and subsequent deployments had a considerable impact on the lives of average Americans. One of the biggest impacts of men joining the military and leaving the U.S. to travel overseas was the gap left in the labor force across all industries, including the sports industry (Graves et al., 2008; Weiller & Higgs, 1992). In the case of baseball, the outflow of major and minor league players into the military from 1942 onward posed a significant threat to the short-term viability of this popular sport (Whitlock, n.d.). In response to fans' continued interest in the game of baseball and the reduced number of male players, Philip Wrigley (of the Wrigley Company) and Brooklyn Dodgers General Manager Branch Rickey, created the All-American Girls Professional Baseball League (AAGPBL) in 1943 (Cahn, 1989; Heaphy, 2007; Jenkins, 2018; Johnson, 1994; Morgan & Nitz, 1995; Vignola, 2004; Weiller & Higgs, 1992). While having the option to watch a professional baseball game may have seemed attractive to many, this newly formed all-female league faced multiple immediate and important challenges that would impact its ability to be successful, in both the short-term and in the long-term.

Among the greatest challenges facing this new league were the societal biases associated with the 1940's American concept of femininity in terms of where and under what circumstances women should be given space to express themselves, personally and professionally (Cahn, 1989; Johnson, 1994; Orrock, 2020; Vignola, 2004). Another sizable challenge faced by this newly formed sports league, and all sports leagues (even today), was whether it could create and sustain competitive balance. Competitive balance is a sports phenomenon wherein a league is able to create, through policy or other interventions, uncertainty in the outcome of games between teams in the league (Sanderson, 2002). Balanced competition is an important characteristic of a sports league to maintain fan interest and economic viability in both major league sports and specialized leagues (Levin & McDonald, 2009; York & Miree, 2020).

The purpose of this paper is to examine how the AAGPBL responded to its unique set of competitive circumstances with a particular focus on exploring competitive balance within the league. In addition to briefly reviewing the literature to identify the specific strategies employed by the AAGPBL to maintain fan interest, we will also empirically investigate whether the league, through its strategies, policies or other activities was able to achieve competitive balance comparable to that of Major League Baseball (MLB). This study builds on the work of other researchers who have also empirically explored other niche baseball leagues, such as the Negro Leagues, to determine whether they were able to achieve competitive balance during their history (e.g., Foster, 2016; Heaphy, 2003; York & Miree, 2020).

The Launch and Establishment of the AAGPBL

During the 1940s, athletic ability was not perceived by the general public as a desirable feminine trait when women played sports that were typically dominated by men (Cahn, 1989; Vignola, 2004). Orrock (2020) shares the following quotes from former league members (Lois Youngen and Mary Lou Studnicka) that capture prevailing sentiments at the time:

The boys came down to my house and told me they didn't want me on the team anymore because the other town's teams and kids were laughing at us because we

had a girl on the team. It took them about a week before they came trudging back down and asked me to join 'em again because they had lost two games and they wanted me back on the team. (p. 17)

Even though I was of age, you still waited for your parent's permission to do these crazy things because a girl playing baseball was crazy. (p. 25)

Further, the league's ability to engage parental support and secure permission for unaccompanied single females to leave home was yet another hurdle. These social norms, while not insurmountable, placed an enormous burden on the league's ability to engage truly talented players. Consequently, any hopes of viability demanded that the newly launched AAGPBL immediately and effectively respond these challenges if it was to be successful and perceived as a legitimate entertainment substitute for MLB (Cahn, 1989; Graves et al., 2008; Jenkins, 2018; Porter, 1980; Weiller & Higgs, 1992). To overcome these challenges, Philip Wrigley intentionally, and with great foresight, developed a marketing strategy with the juxtaposition of American femininity and athletic prowess as its cornerstone. Vignola (2004) and Cahn (1989) identified the following key elements of this strategy as: patriotism (e.g., players were required to line up on the field in the shape of a V as a signal for victory, and service men and women were given free admission); femininity (e.g., during the initial years, players were required to attend a charm school to acquire important "feminine" information as appropriate and accepted during the 1940's in the U.S. about makeup application, posture, etiquette, etc.); chastity (e.g., players were supervised and "protected" by chaperones); uniforms (e.g., player uniforms were designed with a feminine tunic style and differed from typical female athletic attire of shorts/pants); athletic ability and athletic pedigree (e.g., the league hired former major league managers, and players were required to play baseball and not softball, which was common among female athletes at the time).

Wrigley's commitment to leveraging these elements to build the AAGPBL brand resulted in hiring and retention decisions that were based on both beauty and ability to play (Weiller & Higgs, 1992). The AAGPBL's expectations were that players would approach the game with a similar vigor as men, carry themselves with the highest standards of morality, and present themselves as the American ideal of "girl next door" in terms of beauty and femininity (Dancer & Holway, 2000; Weiller & Higgs, 1992). By adhering to these standards, Wrigley believed the league would be able to maintain fan interest, by providing baseball fans a viable substitute to MLB (with a comparable display of athleticism), and without offending societal sensibilities. While each of these components contributed to the league's success, ultimately, all sports leagues sell entertainment, with their games as the foundational product. Therefore, to be successful, a sports league must engage current and potential customers by putting on a show fans want to watch (Borland & MacDonald, 2003).

The sports economics literature has consistently demonstrated that the creation of compelling sports competition is the intention as opposed to simply the by-product of raw talent and chance (Sanderson & Siegfried, 2003). Few people are entertained by watching a game when the outcome is predictable; a league where one team consistently wins (or loses) most of its games will not attract fans. To this end, sports leagues work to ensure (to the extent possible) that each game has evenly matched teams, such that the outcome of each match-up is uncertain and creating uncertainty across seasons of games. In other words, one team should not be so strong that they win the championship nearly every year. A team may not win many games this season, but next season may be different (there is always hope, even for Cubs fans). Consequently, and counterintuitively, at the same time that teams compete against each other on the field, they must cooperate with each other off the field to maintain a successful league through the creation of competitive balance.

The Importance of Competitive Balance

Competitive balance (Neale, 1964; Rottenberg, 1956; Zimbalist, 2002) is created by the league's use of rules, policies, and processes of acquiring and maintaining team talent through drafts, salary caps, free agency, scheduling, etc., which are intended to create opponents of comparable competitive ability, a necessary condition to maintain fan interest and economic viability (Sanderson, 2002). A conceptual overview of this series of relationships is presented in Figure 1.

Johnson (1994) identified a set of administrative policies that, if successfully implemented, would have created balance within the AAGPBL. In particular, these policies were:

i. players were not free agents or "owned by the teams;" they all worked for the league,

ii. the league was responsible for recruiting, training, and evaluating all players and assigning them to teams, and

iii. players signed one-year contracts with the league itself and at the end of each year they could be reassigned.

The purpose of these policies was to create teams of equal strength at the beginning of each season (Johnson, 1994). Competitive balance and its precursors have been widely studied within the field of sports economics and has been variously described as a theoretical framework (Vrooman, 2009) or simply a type of economic analysis (Owen & King, 2015). While there can be much debate on the best ways to measure the presence of competitive balance within sports leagues (Fort & Maxcy, 2003), it is generally agreed that competitive balance is a real and important phenomenon which impacts the fan experience (Sanderson, 2002). In sports, the core product is the game itself, the contest between two teams, and what takes place on the field of play (Borland & MacDonald, 2003; Sutton & Parrett, 1992). Rottenberg's (1956) view of sports was that for a game to be interesting enough to

Figure 1

Competitive Balance – Precursors and Results
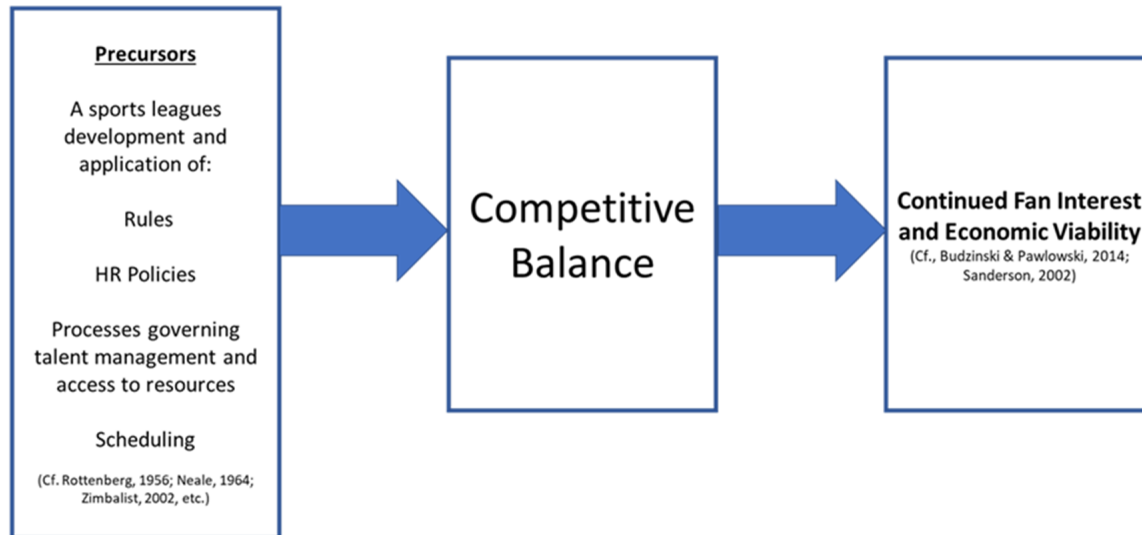
create customers (i.e., fans) who want to watch it, there needs to be "uncertainty of outcome," that is, the game is interesting if there is uncertainty about the eventual winner. As Budzinski and Pawlowski (2017) noted, the uncertainty of outcome increases the marginal utility for consumers and consequently, drives the willingness-to-pay for attending or watching sports events. Therefore, a league made up of teams that are evenly matched is necessary for a sports league's success.

It is important to note that the intention to create competitive balance does not guarantee that the new league would actually be able to achieve it. Thus, the focus of the current study is to examine the fundamental question of whether the AAGPBL was able to create a league with competitive balance comparable to the two major leagues of men's baseball, Major League Baseball-American League (MLB-AL) and Major League Baseball-National League (MLB-NL). Both leagues of MLB had a long history before the AAGPBL was formed; the National League was formed in 1876 and the American League in 1901, so these leagues provide a useful comparison. Although the success of a sports league can be judged in multiple ways, competitive balance is a way to measure whether the newly formed AAGPBL was able to create games that were interesting for fans to watch, as interesting as MLB games. While there is no definitive test for whether competitive balance was present in the AAGPBL, an examination of the patterns of outcomes for games that are played can illuminate the presence of this phenomenon. We therefore propose the following hypothesis:

H1. The AAGPBL had a comparable level of competitive balance to the American League and National League of Major League Baseball.

To empirically investigate our hypotheses, an analysis of the outcomes of games played within each season and over multiple seasons is an appropriate basis for the judgment of the presence of competitive balance in the league. Our approach to this question is similar to that used by Braudel (1992), who used quantitative measures such as the ratio of market to inhabitants to track the development of markets in England and Wales during the Renaissance. In essence, we tested whether the AAGPBL was able to create a viable league, using multiple quantitative measures of competitive balance. Some measures of competitive balance are for all the games played by the teams in a season (i.e., "within-season" uncertainty), and others focus across a league's teams in multiple seasons (i.e., "across-seasons" uncertainty) because fans are typically also interested both in how the teams in the league are doing compared to the other teams this season, and in how the teams have performed over multiple seasons (Eckard, 2019). In short, a league with competitive balance this season should have small variability in the winning percentages of the teams in a league; a league with competitive balance across seasons should have teams that do better or worse each season and one team does not consistently win (or lose) most of its games each season; and the teams' winning percentages should fluctuate from year to year. All of these indicate uncertainty or indeterminacy of outcomes for the teams in the league.

Because there are multiple measures of competitive balance, a league may have a high level of competitive balance in each season when measured by a within-season measure, but a low level of competitive balance when measured by an across-seasons measure. The current study considers the fans' perspective and concludes that for a league to have competitive balance, there must be evidence of both within-season and across-seasons competitive balance.

The remainder of the paper will proceed as follows: (a) The data analyses that were done and the results of the analyses, (b) Discussion, and (c) Conclusions and comments on the AAGPBL's accomplishments within the world of sports history.

Method

Data

The data on team winning percentages were obtained from two websites. For the All-American Girls Professional Baseball League (AAGPBL) the data were obtained from the "Seasons" web page of All-American Girls Professional Baseball League (https://www.aagpbl.org/seasons), and for Major League Baseball-American League (MLB-AL) and Major League Baseball-National League (MLB-NL), the data were obtained from the "Seasons, Standings" web page of Baseball Reference (https://www.baseball-reference.com/). Twelve seasons of data were used, 1943-1954, the years that the AAGPBL existed. A description of the leagues is given in the Appendix.

Measures

The most often used measure in studies of competitive balance in North American sports leagues (such as baseball), is the standard deviation of team winning percentage (PCT equals number of games won divided by number of games played) within a season (Plumley et al., 2018). The standard deviation in PCT indicates the degree of dispersal in PCT for the teams in the league. A low standard deviation in PCT means the distribution of PCT within the league is clustered near 500 rather than having some teams win most or all their games and some teams lose most or all their games; a low standard deviation indicates greater competitive balance.

However, this and other within-season measures of competitive balance do not capture another facet of competitive balance, namely the changing fortunes of teams across multiple seasons or what Eckard (2001) called year-to-year fluctuation in team performance. Just as a league with a high degree of competitive balance should have a low standard deviation in PCT within each season, each team's PCT should converge on .500 over multiple seasons. In other words, there should be few teams that win all or most of their games every season, and few teams that lose all or most of their games, across multiple seasons.

To measure within-season competitive balance, we calculated three within-season measures of competitive balance: (a) Standard Deviation of Winning Percentage (PCT), (b) Ratio of the Standard Deviation in PCT to the "Idealized" Standard Deviation in PCT, and (c) Gini Coefficient for each of the 12 seasons of the AAGPBL. To measure across-seasons competitive balance, we calculated three across-seasons measures of competitive balance: (a) Competitive Balance Ratio (CBR), (b) Standard Deviation Ratio (SDR), and (c) Herfindahl-Hirschman Index (HHI), across the 12 seasons of the AAGPBL. To measure inter-seasonal competitive balance (combining the within-season and across-season measures), the Person Correlation and the Spearman Rank Correlation Coefficient (SRCC) were calculated on PCT across seasons. Each of these measures is described in more detail below.

Standard Deviation of PCT

The degree of dispersal in PCT for the teams in the league in a one season's games is a commonly used within-season measure of competitive balance. If each team in the league is of equal strength, then all teams would win half of their games and have a PCT of .500, and therefore a standard deviation in PCT across all the teams in the league of 0.0. A low standard deviation in PCT indicates greater competitive balance within a season, and there are close races for the championship among several teams. This measure of competitive balance was used by Butler (1995) for Major League Baseball (MLB), and by Quirk and Fort (1992) for MLB, National Basketball Association (NBA), National Hockey League (NHL), and the National Football League (NFL).

Ratio of the Standard Deviation in PCT to the "Idealized" Standard Deviation in PCT

Another within-season measure of competitive balance is the ratio of the standard deviation in PCT to the "idealized" standard deviation in PCT (Ratio) where each team is assumed to be of equal strength and the probability of a team winning any game is 0.5. The idealized standard deviation in winning percentage is equal to 0.500 divided by the square root of the number of games in a season. A league with a higher degree of competitive balance will have a low Ratio (near 1.0), and a league with a lower degree of competitive balance will have a higher Ratio. This measure was used by Soebbing (2008) for MLB, and by Fort and Quirk (1995) for MLB, NBA, NHL, and NFL.

Gini Coefficient

The Gini Coefficient is a measure of statistical dispersion and is commonly used to measure the inequality among a set of values. It has been used as a measure of inequality of income or wealth for a set of countries by the World Bank (referred to as the Gini Index) and has been used as a within-season measure of competitive balance. A league with a higher degree of competitive balance will have a lower Gini Coefficient (the PCT's for the league's teams are similar) for the season analyzed, and a league with a lower degree of competitive balance will have a higher Gini Coefficient (the PCT's for the league's teams are more dispersed). This measure was used by Schmidt (2001) for MLB, and by Larsen et al. (2006) for the NFL.

Competitive Balance Ratio

This is an across-seasons measure of competitive balance which compares each team's variation in PCT across multiple seasons. Just as a league with a high degree of competitive balance should have a low standard deviation

in PCT within each season, each team's PCT should converge on 0.500 over multiple seasons. The Competitive Balance Ratio (CBR) ranges from 0.0 (no competitive balance: the teams have the same winning percentage season after season) to 1.0 (high competitive balance: every team has winning and losing seasons). This measure was used by Humphreys (2002) for MLB, and by Maxcy and Mondello (2006) for the NBA, NHL, and NFL.

Standard Deviation Ratio

Another across-seasons measure of competitive balance is a simple ratio of the teams' average across-seasons standard deviation to the average across-teams standard deviation, for multiple seasons. The Standard Deviation Ratio (SDR) ranges from 0.0 (no competitive balance: the teams have the same winning percentage season after season) to 1.0 (high competitive balance: every team has winning and losing seasons). This is a different measure of across-seasons competitive balance than the CBR because it compares the average standard deviation of each team's PCT across multiple seasons to the average standard deviation of the league's teams in PCT across multiple seasons. This measure was used by Scully (1989) for MLB, and by York and Miree (2018) for the NHL.

Herfindahl-Hirschman Index

The Herfindahl-Hirschman Index (HHI) is another across-seasons measure of competitive balance which measures the level of concentration in league championships. The HHI has been widely used as a measure of inequality or concentration of income distribution. Owen et al. (2007) have shown that variation in the number of teams in the league affects both the lower and upper bounds of the HHI, so the dHHI (adjusted for the means number of teams in the league over the period of analysis) was used here. If one team wins the championship every season in a ten-year span (a low competitive balance league), the HHI will be 1.0; that team had a "monopoly" on the championship. If ten different teams win the championship in a ten-year span (a high competitive balance league) the HHI will be 0.1. This measure has been used by Depken (1999) for MLB, and by Eckard (2019) for NCAA college football.

Pearson Correlation and Spearman Rank Correlation Coefficient

A measure of inter-seasonal competitive balance in a sports league is the correlation of a set of teams' PCT from season to season, using a Pearson Correlation calculated on the teams' PCT's and a Spearman Rank Correlation Coefficient (SRCC) calculated on the rank order of teams according to their PCT. A league with a high degree of competitive balance will have teams with shifting fortunes from year to year, i.e., teams with a poor season this year may have a good season next year, and teams with a good season this year may have a poor season next year. In a high competitive balance league, there should be a pattern in the correlations, i.e., how well a team does

this season should be only a moderate predictor of how well the team does next season, and a poorer predictor in subsequent seasons. Therefore, a low correlation of PCT with PCT in subsequent seasons is an indicator of competitive balance. To measure the variability in PCT from one season to the next, each team's PCT was correlated with their PCT one season later (i.e., correlation with PCT lagged one year) and two, and three seasons after the reference season. Butler (1995) and Balfour and Porter (1991) used the Pearson correlation of team PCT across seasons to measure competitive balance in MLB, and Lee (2010) used the SRCC in the NFL.

Results

Within-Season Measures of Competitive Balance

The Standard Deviation of PCT was calculated for each of the 12 seasons (1943-1954) of the AAGPBL, and the same seasons for MLB-AL and MLB-NL. The Mean Standard Deviation in PCT was .10 for the AAGPBL, compared to .10 for the MLB-AL, and .10 for the MLB-NL. The Ratio was calculated for the three leagues in each of the 12 seasons. The mean Ratio was 2.11 for AAGPBL, compared to 2.56 for MLB-AL, and 2.36 for MLB-NL. The mean Gini Coefficient was .10 for AAGPBL, compared to .11 for MLB-AL, and .10 for MLB-NL. The results of these analyses are reported in Table 1 and shown in Figure 2.

For each of the three measures of within-season competitive balance, the AAGPBL had similar levels of competitive balance to both the MLB-AL and MLB-NL. For all three leagues the Standard Deviation in PCTs were identical, the Ratios were lower (indicating more competitive balance) for AAGPL than the MLB-AL and MLB-NL, and the Gini Coefficients were similar, with .10 for AAGPBL, compared to .11 for MLB-AL and .10 for MLB-NL.

Analyses of Variance (ANOVA) were calculated on each of the three within-season measures of competitive balance to determine whether the differences between AAGPBL and MLB-AL, and between AAGPBL and MLB-NL, were statistically significant differences across the 12 seasons. There was no significant difference among the three leagues on the three within-season measures of competitive balance, the Standard Deviation in PCT, $F(2, 33) = 0.37$, $p = .696$, the Ratio, $F(2, 33) = 1.97$, $p = .156$, nor the Gini Coefficient, $F(2, 33) = 0.26$, $p = .770$, indicating no difference among the leagues on these measures. Post hoc tests were done on each of the pairwise comparisons using Tukey's Honestly Significant Difference Test, and none were statistically significant, indicating that on these three measures of competitive balance the AAGPBL and the MLB-AL, and the AAGPBL and the MLB-NL, were comparable.

These results support the hypothesis that the women's league of baseball AAGPBL had comparable competitive balance to the men's leagues of baseball, the MLB-AL and MLB-NL, within each of the same twelve seasons.

Table 1

Within-Season and Across-Seasons Measures of Competitive Balance for All-American Girls Professional Baseball League and Major League Baseball, 1943-1954

			Within-Season Measure of Competitive Balance		
League	Mean Number of Teams	Mean Number of Games	Mean SD in PCT	Mean Ratio of SD in PCT to Idealized	Mean Gini Coefficient
AAGPBL	6.9	109.6	0.10	2.11	0.10
MLB-AL	8.0	153.6	0.10	2.56	0.11
MLB-NL	8.0	153.8	0.10	2.36	0.10
			Across-Seasons Measure of Competitive Balance		
League	Mean Number of Teams	Mean Number of Games	Competitive Balance Ratio	Standard Deviation Ratio	HHI-Adjusted
AAGPBL	6.9	109.6	0.65	0.93	0.06
MLB-AL	8.0	153.6	0.67	0.73	0.26
MLB-NL	8.0	153.8	0.72	0.78	0.10

Note. The analyses are based on 12 seasons, 1943-1954. HHI-Adjusted is Herfindahl-Hirschman Index adjusted for the number of teams in the league. PCT is equals number of games won divided by number of games played.
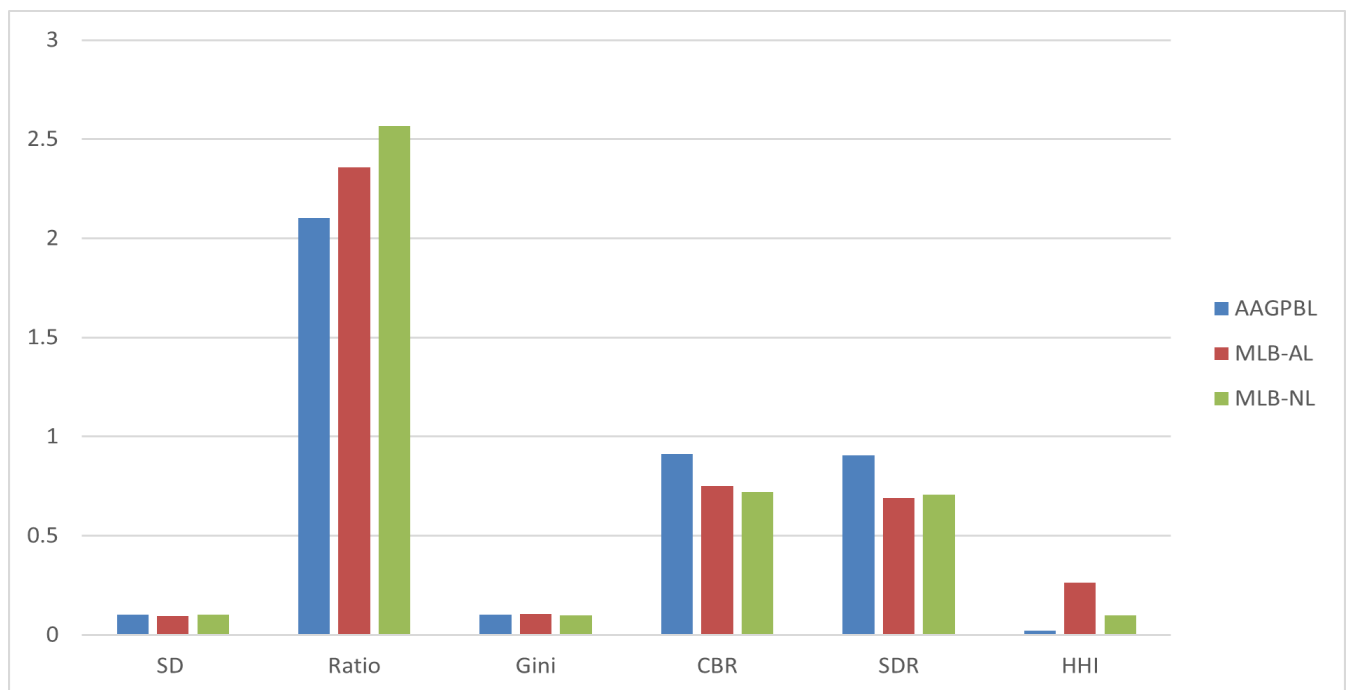
Across-Seasons Measures of Competitive Balance

The CBR for the AAGPBL was .65, compared to .67 for MLB-AL, and .72 for MLB-NL. The SDR for the AAGPBL was .93, compared to .73 for MLB-NL and .78 for MLB-NL. The HHI-Adjusted for the AAGPBL was .06, compared to .26 for MLB-AL and .10 for MLB-NL. The results of these analyses are reported in Table 1 and shown in Figure 2.

Figure 2

Competitive Balance for AAPGBL, MLB-AL, and MLB-NL, on Standard Deviation in Winning Percentage, Ratio of Standard Deviation to Ideal, Gini Coefficient, Competitive Balance Ratio, Standard Deviation Ratio, and Herfindahl-Hirschman Index, 1943-1954

By these across-seasons measures of competitive balance, the AAGPBL had similar competitive balance as the two leagues of MLB. Although the CBR was lower (indicating less competitive balance) for AAPGBL compared to MLB-AL and MLB-NL, the Ratio was higher (indicating more competitive balance) for AAGPBL compared to MLB-AL and MLB-NL, and the HHI was lower (indicating more competitive balance) for AAGPBL compared to MLB-NL and MLB-AL.

Each of the across-season measures of competitive balance produce an index number for the seasons analyzed (rather than one number for each season as with the within-season measures), so to test for significant differences between the AAAGPBL and MLB-AL and MLB-NL a simple ratio of each across-season measure for AAGPBL compared to MLB was calculated. We used an 80% Rule: if the value for the AAGPBL on CBR and SDR was at least 80% of the value for MLB-AL or MLB-NL, we would conclude that the AAGPBL had comparable competitive balance. If the value for the AAGPBL on HHI was not greater than 125% of the value for MLB-AL or MLB-NL, then the women's league had comparable competitive balance to the men's leagues (a lesser HHI indicates greater competitive balance, so the reciprocal of .80 was used). This rule of thumb is similar to the 80% Rule used in the Uniform Guidelines on Selection Procedures (Equal Employment Opportunity Commission, 1978) to test for adverse impact (i.e., evidence of discrimination in hiring decisions), testing whether the selection ratio of the minority group is significantly less than the selection ratio of the majority group. For the CBR, the ratios were 97.0% for the AAGPBL compared to MLB-AL and 90.0% compared to MLB-N; for the SDR, the ratios were 127.4% for MLB-AL and 119.2% for MLB-NL; and for the HHI, the ratios were 23.1% and 60.0%.

These results support the hypothesis that the women's league of baseball, the AAGPBL, had comparable competitive balance to the men's leagues of baseball, the MLB-AL and MLB-NL, across the same twelve seasons.

Inter-seasonal Measure of Competitive Balance

The mean Pearson Correlation of PCT from the reference season to the next season was .30 for the AAGPBL, .62 for MLB-AL, and .66 for MLB-NL; the mean correlations for the reference season to two seasons later were -.06 for the AGPBL, .53 for MLB-AL, and 0.51 for MLB-NL; and the mean correlations for three seasons later were .02 for AAGPBL, .43 for MLB-AL, and .52 for MLB-NL. The mean SRCC of the rank order of the teams in PCT from the reference season to the next season was .25 for the AAGPBL, .56 for MLB-AL, and .65 for MLB-NL; the mean SRCC for the reference season to two seasons later was .05 for the AAGPBL, .47 for MLB-AL, and .47 for MLB-NL; and the mean SRCC for three seasons later was -.02 for the AAGPBL, .45 for MLB-AL, and .48 for MLB-NL. These results follow the expected pattern for a league with competitive balance, the mean correlation between the reference season and the subsequent seasons is low and were two and three seasons later. By this inter-seasonal measure of competitive balance, the AAGPBL had comparable competitive balance to the two leagues of MLB. The AAGPBL had smaller Pearson Correlations and SRCC's with subsequent seasons than MLB-AL and MLB-AL, at one, two, and three seasons from the reference season.

These results further support the hypothesis that the women's league of baseball AAAGPBL had comparable competitive balance to the men's leagues of baseball, the MLB-Al and MLB-NL, within each of the same twelve seasons. The results of these analyses are shown in Table 2 and shown in Figure 3.

Discussion

To be successful, a sports league must create an arena where high-quality athleticism and skill are displayed, and

Table 2

Mean Correlation of PCT with PCT of Subsequent Seasons, AAGPBL, MLB-AL, and MLB-NL, 1943-1954

Mean Pearson Correlation Coefficient			
League	Season+1	Season+2	Season+3
AAGPBL	.30	-.06	.02
MLB-AL	.62	.53	.43
MLB-NL	.66	.51	.52
Mean Spearman Rank Correlation Coefficient			
League	Season+1	Season+2	Season+3
AAGPBL	.25	.05	-.02
MLB-AL	.56	.47	.45
MLB-NL	.65	.47	.48

Note. The Pearson Correlation is based on PCT, and the Spearman Rank Order Correlation is based on the rank order of the teams on PCT. "Season+1" is the mean correlation of PCT for 1943&1944 to 1953&1954. "Season+2" is the mean correlation of PCT for 1943&1945 to 1952&1954. "Season+3" is the mean correlation of PCT for 1943&1946 to 1951&1954. PCT is equals number of games won divided by number of games played.

Figure 3

Mean Pearson Correlations of PCT with PCT for Subsequent Seasons
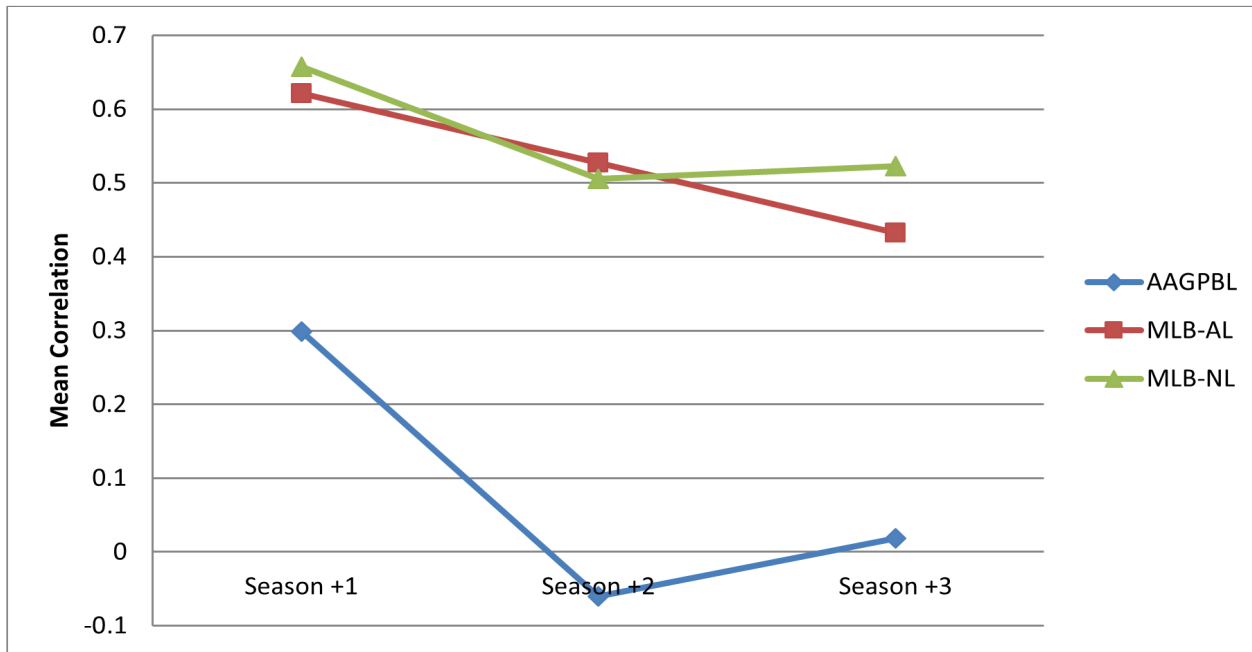
they must also develop an entertainment product that fans will want to watch. In other words, sports leagues create customers by creating fans. Sports research suggests that when there is competitive balance in the league, fans have an interest in the outcome of games, and fan interest generates revenues for teams in ticket sales and in league-related commercial activity, including sales of team-themed merchandise (Budzinski & Pawlowski, 2014; Michie & Oughton, 2004; O'Reilly et al., 2008; O'Reilly et al., 2015; Sanderson & Siegfried, 2003).

We examined competitive balance in the AAGPBL compared MLB-AL and MLB-NL, using three within-season measures, three across-seasons measures, and one inter-seasonal measure of competitive balance. Our results supported the hypothesis, there was a comparable level of competitive balance in the women's league to both men's leagues of professional baseball, on seven measures of competitive balance: all three of the within-season measures, all three of the across seasons measures, and the inter-seasonal measure of competitive balance.

Conclusion

In addition to the acceptance of the all-female baseball league within society and its popularity among fans, the data provide evidence that the women's league was comparable to the men's leagues regarding competitive balance, another important indicator of success. While on the surface, these results may seem to hold only historic significance, it is important to note that this innovative professional sports league's ability to produce competitive balance comparable to both men's leagues indicated that

in the future other women's professional sports leagues could likewise establish and maintain the conditions necessary for viability and success. The Women's National Basketball Association was founded in 1997 and has had more than 20 seasons. More recently, the National Women's Soccer League was founded in 2013 and the Premier Hockey Federation in 2015. To some extent, each of these women's professional sports leagues may have been inspired by the success of the AAGPBL.

Given their achievement in creating a league with competitive balance comparable to the two leagues of MLB, one may wonder why the AAGPBL ultimateliguy folded. Although the AAGPBL had comparable competitive balance to both men's leagues, it folded in 1954, likewise, the Negro Leagues also achieved comparable competitive balance during their existence but also folded due to new opportunities for players that resulted from increased integration (Heaphy, 2003; Zeiler, 2014). In short, sports leagues discontinue operations for reasons other than a lack of competitive balance (e.g., financial) and competitive balance is only one, very important, factor in the success of a league.

Whether the ultimate demise of AAGPBL was based on the return of male troops and players' reentry into MLB (and consequent competition for fans) or the societal pressure women faced to return to their traditional roles (outside of the labor force and professional sports) once the men returned, it is still worth noting that during its lifetime the AAGPBL was able to achieve the same important measure of success as the two league of MLB, namely competitive balance. As the exploration of com-

petitive balance continues to evolve within management literature, future research might compare women's and men's collegiate sports leagues, as well as women's and men's professional basketball, hockey, and soccer leagues, to determine whether the women's leagues were able to create comparable levels of competitive balance to the men's leagues. As additional empirical evidence of competitive balance as an "administrative solution" or strategic response to external conditions is revealed, future researchers may also consider consolidating the management-related empirical work on competitive balance into an independent management theory.

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