Are we getting better or are they getting worse?

Draft position, strength of schedule, and competitive balance in the National Football League

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Abstract

In his influential paper on the "peculiar" economics of professional sports, Neale (1964) explains that profit maximization for sports leagues depends (in part) on competitive balance since consumers (fans) prefer close competition to unbalanced dominance by large market clubs. Monopsonistic labor market institutions, such as amateur drafts and free agency restrictions, are thus often justified by their competitive balance generating properties. A counter to these claims is provided by Rottenberg's (1956) *invariance proposition,* an early version of the Coase (1960) theorem, which implies that these labor market restrictions should have no effect on talent distribution or competitive balance.

In this paper we reexamine the balancing effect of the amateur draft for the National Football League. We extend an earlier treatment of this issue by Grier and Tollison (1994) by incorporating the unbalanced scheduling policy of the league into our empirical model. We find that the college draft has a quantitatively strong and statistically significant effect on team performance, while a team's ex ante strength of schedule has no statistically significant impact on team performance.

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I. INTRODUCTION

The concept of competitive balance is considered to play an important role in the demand for professional sports. Scholarly activity on the subject dates back to Rottenberg (1956), but became much more frequent in recent years. This research tackles competitive balance in a number of ways: some of the work analyzes whether or not competitive balance truly impacts consumer demand (see e.g. Knowles at al. (1992), Rascher (1999), and Meehan, Nelson, and Richardson (2007)), while other research looks at the impact of rules changes on competitive balance (see e.g. Depken (1999), Leeds and Kowaleski (1999), Richardson (2000), and Larsen, Fenn, and Spenner (2006)). Schmidt (2001), Schmidt and Berri (2001a, 2001b, 2003, 2004), Lee and Fort (2005), Fort and Lee (2006), and Vrooman (2008) all utilize time series analysis, seeking to determine if competitive balance has changed in certain leagues over time. Rottenberg (1956), El-Hodiri and Quirk (1971) and Noll (1974) all present theoretical arguments that players in professional sports leagues with the highest marginal products will matriculate to larger market teams, regardless of the team to which they are initially allocated. These theoretical arguments suggest that the way in which most professional sports leagues allocate their draft selections will not impact competitive balance.

Given these theories, it may surprise some that most North American sport leagues allocate their draft selections in reverse order, meaning that teams finishing at the bottom of the league receive the better draft selections. In fact, there is some evidence that professional sports teams deliberately lose games in order to receive better selections in their amateur draft. Price, Soebbing, Berri, and Humphries (2010) find evidence that National Basketball Association (NBA) teams respond to changes in the format of the draft lottery, with stronger evidence of "tanking" under certain years, with specific draft designs. Taylor and Trogdon (2002) find similar results for earlier years in the NBA. This sort of behavior is not consistent with the Rottenberg invariance proposition. However, Borland, Chicu and Macdonald (2009) perform a similar analysis of the Australian Football League, finding no evidence of teams deliberately attempting to lose matches, although they note that the benefits of such choices are minimal in this league. Thus, the incentives to participate in this type of behavior may be league dependent.

In contrast to the Rottenberg view, Grier and Tollison (1994) present empirical evidence that the reverse order nature of the National Football League (NFL) rookie draft improves the performance of bad teams in later years. In particular, they find that average lagged draft order has a negative impact on teams' winning percentages (meaning that earlier draft picks are associated with better a winning percentage). The draft, however, is not the only mechanism by which the NFL attempts to maintain competitive balance. The NFL employs revenue sharing, salary caps, and parity scheduling. The last factor, parity scheduling, is enacted by scheduling each NFL team to play against two same conference, non-division teams, that finished the previous season in the same position within their respective division[1]. As noted in Grier and Tollison (1994), strength of schedule could also impact team winning percentage.

This paper collects the most recent data in the 21st century in order to see (i) if the Grier and Tollison (1994) draft result is consistent with the modern day NFL, (ii) if strength of schedule adjustments actually impact competitive balance, and (iii) if the draft result changes when also controlling for strength of schedule.

II. DATA

To investigate whether the amateur draft has a significant impact on NFL team performance we collected data on winning percentages from Yahoo Sports and data on the teams' first round draft position from ESPN's NFL draft tracker http://insider.espn.go.com/nfl/draft. Following Grier and Tollison (1994) we measured the draft position as what was assigned by the league and not necessarily that year's actual draft selection.[2] To illustrate, the Kansas City Chiefs chose Ryan Sims with the sixth selection in the first round of the 2002 draft, whereas the Dallas Cowboys selected Roy Williams with the 8th pick in that year's draft. However, these are not the draft positions that were assigned to these teams by the league. The Cowboys were assigned the 6th pick and the Chiefs the 8th pick for that year, but the Cowboys "traded down" with the Chiefs. In return for the 6th pick, the Cowboys received not only the Chief's first round draft selection (8th overall), but also the Chief's third round pick in 2002 (75th overall) and their sixth round pick in 2003. Clearly, the assigned draft selection of number 6 was more valuable to the Cowboys than their actual draft selection in the eighth position. Our data uses the draft position assigned by the league, so the Dallas Cowboys have a 6 and the Kansas City Chiefs have an 8 for our draft variable in 2002.

We also control for the possible impact of the league's unbalanced scheduling by computing a variable that measures each team's (ex-ante) strength of schedule. This is computed by looking at team j's opponents for season t and calculating their opponents' winning percentage in season t-1. This measure has the advantage of being most related to draft selection. In addition, an ex-post measure would be troublesome since every team's season t record would also partially determine its own strength of schedule.

Table 1 displays the following for each team in 2006: winning percentage, lagged winning percentage, average draft order and strength of schedule. From this table one can see that lagged winning percentage is positively correlated with average draft order; however, this correlation is only 0.46. This is because the draft order is averaged over the previous 5 drafts. The correlation between lagged winning percentage and strength of schedule is -0.02. This is not very strong and is likely due to the fact that only two games out of the 16 game schedule are determined based on the standings from the end of the previous season.

III. EMPIRICAL RESULTS

Similar to Grier and Tollison (1994), we estimate the following equation:

$$Winpct_{j,t} = \alpha_0 + \alpha_j + \beta_1 (Winpct_{j,t-1}) + \beta_2(Draft\ Order_{j,t}) + \beta_3(SOS_{j,t}) + \varepsilon_{j,t.} \quad (1)$$

This is a standard fixed effects model, where α_j is essentially a dummy variable for each team; $Winpct_{j,t}$ is the winning percentage of team j in season t; $Winpct_{j,t-1}$ is the winning percentage of team j in the season prior to season t; $Draft\ Order_{j,t}$ is the average of team j's draft order over the 5 seasons prior to season t; $SOS_{j,t}$ is the difficulty of team j's schedule in season t based on their opponents' winning percentages in the season prior to season t.

We utilize additional statistical methods that were not used in Grier and Tollison (1984) to ensure the robustness of our estimates. First, we perform a Hausman (1978) specification test of the appropriateness of using the fixed effects or random effects models. The Hausman test rejects the Null hypothesis that the random effects model is efficient at the one-percent level. Hence, we proceed with the fixed effects model. Additionally, we cluster our standard errors at the team level. This relaxes the standard assumption of independence across observations; we allow dependence of observations within a team and only require independence of observations across teams. See Rogers (1993) for a more detailed explanation.

Table 2 displays the results from estimating this equation using our data from 2006-2010.[3] We find that a 1 place improvement in average draft position increases a team's winning percentage by 1.5-percent, and this finding is statistically significant at the one-percent level[4]. However, the coefficient estimate on our strength of schedule variable is not statistically significant at any meaningful level. Additionally, the coefficient estimate on average lagged draft order is virtually unchanged when we drop strength of schedule from our equation. This means that the scheduling used by the NFL has virtually no impact on a team's ability to win games, after controlling for average lagged draft order. However, as found in Grier and Tollison (1994), the reverse order nature of the NFL draft does significantly improve the winning percentage of low performing teams in later seasons.

Interestingly, the coefficient estimate on lagged winning percentage, while not statistically significant, is actually negative. Grier and Tollison (1994) found a positive and statistically significant coefficient estimate on lagged winning percentage. Vrooman (2008) models season-to-season continuity with a simple auto-regressive function:

$$\text{Winpct}_t = \alpha + \beta\,(\text{Winpct}_{t-1}). \qquad (2)$$

He likens a finding of $\beta = 0$ to finding that "the league is a random walk from season to season." This is not true of our data. However, our result suggests that the NFL is a random walk from one season to the next *after controlling for draft position and team specific fixed effects*.

To ensure the validity of our estimates on lagged draft order and strength of schedule we repeat the above analysis, using the changes in the dependent and independent variables. Thus, we also estimate the following equation:

$$\Delta Winpct_{j,t} = \alpha_j + \beta_1(\Delta Draft\ Order_{j,t}) + \beta_2(\Delta SOS_{j,t}) + \varepsilon_{j,t,} \qquad (3)$$

Where $\Delta Winpct_{j,t}$ is the change in the winning percentage of team j between season t-1 and season t, $\Delta Draft\ Order_{j,t}$ is the change in team j's lagged average draft order from season t-1 to season t, and $\Delta SOS_{j,t}$ is the change is team j's strength of schedule between season t-1 and season t. One can see in Table 3 that the only difference in the results is an increase in the magnitude of the coefficient estimate on lagged draft order. A 1-place improvement in lagged average draft position from one year to the next increases a team's winning percentage from one year to the next by 5.75 percent. The coefficient estimate on the change in strength of schedule is again statistically insignificant.

IV. CONCLUSION

We find, after controlling for past performance and strength of schedule, that the amateur draft has a significant balancing effect for National Football League teams. This supports the previous empirical findings of Grier and Tollison (1994) and is inconsistent with the Coase (1960) theorem prediction that the draft allotment of property rights to teams should have no effect on the allocation of playing talent, and thus on team on the field performance.

These results are consistent with the existence of non-trivial transactions costs in exchanging draft rights and engaging in player trades. The league ban on cash trades in particular can be seen as purposely designed to make the transfer of value between higher to lower revenue clubs more cumbersome. These league bylaws, along with the existence of some "sportsmen owners" that care about winning rather than simply profit maximization, help explain our strong and robust statistical result that higher draft choices raise winning percentages significantly over time. This reinforces the importance of institutional design and rules in a world without frictionless trade.

Additionally, we find no statistically significant relationship between teams' ex-ante strength of schedule and winning percentage. Although the NFL attempts to implement parity scheduling, only using two games for this purpose does not appear to have the intended outcome. Thus, the reverse order nature of the NFL's amateur draft is a more effective mechanism for maintaining competitive balance.

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TABLE 1

Descriptive Statistics by Team for the 2006 Season

Team	Win Percentage	Win Percentage (t-1)	Strength of Schedule	Draft Order 5-YR Average
Arizona Cardinals	31.3	31.3	50	7.8
Atlanta Falcons	43.8	50	50.8	18
Baltimore Ravens	81.3	37.5	52.3	18
Buffalo Bills	43.8	31.3	47.7	11.8
Carolina Panthers	50	68.8	50.4	16.4
Chicago Bears	81.3	68.8	44.5	15.4
Cincinnati Bengals	50	68.8	54.3	13.8
Cleveland Browns	25	37.5	51.2	11.8
Dallas Cowboys	56.3	56.3	50.4	12.4
Denver Broncos	56.3	81.3	51.6	23.4
Detroit Lions	18.8	31.3	47.3	6
Green Bay Packers	50	25	44.9	22.2
Houston Texans	37.5	12.5	52.3	5.6
Indianapolis Colts	75	87.5	48.4	24.6
Jacksonville Jaguars	50	75	48.8	14.8
Kansas City Chiefs	56.3	62.5	52.7	17.8
Miami Dolphins	37.5	56.3	46.9	16.2
Minnesota Vikings	37.5	56.3	45.7	14
New England Patriots	75	62.5	47.3	27.2
New Orleans Saints	62.5	18.8	53.9	13.2
New York Giants	50	68.8	54.3	16.2
New York Jets	62.5	25	46.5	17.2
Oakland Raiders	12.5	25	51.6	14
Philadelphia Eagles	62.5	37.5	52	25.8
Pittsburgh Steelers	50	68.8	53.1	26
San Diego Chargers	87.5	56.3	48.8	13.6
San Francisco 49ers	43.8	25	47.7	15.2
Seattle Seahawks	56.3	81.3	45.7	21.6
St. Louis Rams	50	37.5	50.8	19.8
Tampa Buccaneers	25	68.8	53.9	19.2
Tennessee Titans	50	25	52.7	15.6
Washington Redskins	31.3	62.5	51.6	13.4

TABLE 2

Fixed Effects Panel Regression of Team Win Percentage (Eq. 1)

	5-Year Average without SOS		5-Year Average with SOS	
	Coefficient	t-stat	Coefficient	t-stat
WINPERC-1	-0.114	-1.410	-0.113	-1.420
Draft Order	-1.502*	-3.250	-1.500*	-3.220
SOS	-	-	-0.033	-0.120

Note: The data are restricted to 2006 - 2010 in order to maintain a balanced panel (Houston does not have draft pick data prior to 2002). WINPERC-1 is the team's winning percentage in the prior season, Draft Order is the average draft position over the previous five seasons, SOS is strength of schedule. Robust standard errors are clustered at the team level. *-denotes statistical significance at the .01 level.

TABLE 3

Fixed Effects Panel Regression of the Change in Team Win Percentage (Eq. 3)

	5-Year Average without SOS		5-Year Average with SOS	
	Coefficient	t-stat	Coefficient	t-stat
ΔDraft Order	-5.813*	-6.910	-5.746*	-6.970
ΔSOS	-	-	-0.206	-0.630

Note: The data are restricted to 2006 - 2010 in order to maintain a balanced panel (Houston does not have draft pick data prior to 2002). ΔDraft Order is the change in the average draft position (of the previous five seasons) from the previous season to the current season, ΔSOS is the change in strength of schedule from the previous season to the current season. Robust standard errors are clustered at the team level. *-denotes statistical significance at the .01 level.

[1] See www.nfl.com for more information on NFL schedule determination.

[2] New England was forced to forfeit their first round draft selection in 2008 because of violations of league videotaping rules in what became known as "Spygate" (Battista 2008). We code their draft selection for this year as 33. We also estimated the model with their draft selection coded as 62, which is their first overall draft selection (second round) that year, and obtained virtually identical results.

[3] Houston is an expansion team that first participated in the draft prior to the 2002 season. Since we are using the five year average lagged draft position, 2006 is the first year that includes all 32 teams.

[4] Estimating this equation using a four year average lagged draft position (which allows us to add 2005 data to the sample) also results in a negative and statistically significant coefficient estimate, although it is somewhat smaller in magnitude than the estimate using a five year lag. The coefficient estimate on a three year average lagged draft position (adding 2004 and 2005 data to the sample) is negative, but not statistically significant at any meaningful level. We focus on the five year lag because (i) it is the focus in Grier and Tollison (1984) and (ii) it appears that the longer time period incorporates more information.