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JOURNAL OF ECONOMICS AND ECONOMIC EDUCATION RESEARCH

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LETTER FROM THE EDITOR

We are extremely pleased to present this issue of the *Journal of Economics and Economic Education Research*, an official publication of the Allied Academies' Academy of Economics and Economic Education Research, dedicated to the study, research and dissemination of information pertinent to the improvement of methodologies and effective teaching in the discipline of economics with a special emphasis on the process of economic education. The editorial board is composed primarily of directors of councils and centers for economic education affiliated with the National Council on Economic Education. This journal attempts to bridge the gap between the theoretical discipline of economics and the applied excellence relative to the teaching arts.

The Editorial Board considers two types of manuscripts for publication. First is empirical research related to the discipline of economics. The other is research oriented toward effective teaching methods and technologies in economics designed for grades kindergarten through twelve. These manuscripts are blind reviewed by the Editorial Board members with only the top programs in each category selected for publication, with an acceptance rate of less than 25%.

We are inviting papers for future editions of the *Journal for Economics and Economic Education Research* and encourage you to submit your manuscripts according to the guidelines found on the Allied Academies webpage at www.alliedacademies.org.

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ECONOMICS EDUCATION ARTICLES

GRADE EXPECTATIONS

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ABSTRACT

Students perceive economics principles courses to be difficult, yet they expect to do relatively well in these courses. For example, a majority of students responding to a survey administered in economics principles courses believed economics to be relatively difficult. In spite of this, these students expected to receive a grade of at least 3.0 in these courses. Two sources - overly optimistic expectations and signaling – may explain these unrealistic expectations.

This paper uses survey data in an attempt to establish whether over-optimism or signaling can help explain the aforementioned student behavior. This is important because the underlying cause of grade overestimation has implications for professor response to this behavior and for student performance in the course.

The results of an ordered probit model indicate that student grade prediction in these courses is driven by overly optimistic expectations and by signaling. Thus, we conclude that policies designed to bring student perceptions into line with reasonable performance expectations should be coupled with efforts to provide instructors with more information about individual student ability. This will help maximize student performance in the course and will also prevent lowering of grading standards on the basis of false signals.

INTRODUCTION

Behavioral economics departs from the typical assumption of unbounded rational behavior on the part of economic agents. Instead it allows for the fact that people often behave irrationally both in terms of the beliefs they hold and the judgments they make. Although psychology literature has long discussed this attribute of behavior, Simon (1955) was one of the first to introduce the idea to the field of economics.

Psychology literature argues that individuals in Western culture tend to be overly optimistic when stating their aspirations and expectations. Lewin et al (1944,

p. 337) argues that people in Western culture typically express aspiration levels above their previous performance levels when first exposed to a situation and, under most conditions, continue to express positive goal discrepancy. While cultural pressures for improvement can stimulate people to greater effort, such pressures can have negative impacts. March and Simon (1958, p. 263) argue that not only are aspirations revised downward in the face of positive goal discrepancy, but such discrepancy may result in feelings of apathy and trigger search behavior as individuals look for alternative ways to fulfill their goals. Cross (1969) went on to postulate that individuals who are overly optimistic in their demands may actually end up with a lower payoff than those whose initial demands are more realistic.

These ideas can be applied to student behavior. Students who are overly optimistic with regards to their grade expectations and set their goals too high may become discouraged and put forth less effort in a class. In this case, over-optimism may result in a relatively worse course grade. In addition, the search behavior described by Simon may result in signaling on the part of poorer students. Such activity may make it more difficult for an instructor to award grades that accurately reflect student knowledge and ability. Thus, overly optimistic grade expectations on the part of students can have implications for the grades ultimately awarded in a course and can therefore have implications for instructor response to this behavior.

Our paper uses data collected from students enrolled in economics principles courses to examine the question of over-optimism on the part of students. The following section discusses the responses to a survey administered to students enrolled in beginning macroeconomics and microeconomics courses at a Midwestern university. These responses are related to the behavioral economic postulate of unbounded rationality and to signaling behavior. This is followed by the results of statistical analysis of the survey data. Finally, we conclude with thoughts on how instructors might respond when student over-optimism and signaling occur.

BACKGROUND

We use data from a survey administered to over 400 students enrolled in principles of economics classes at a Midwestern university and data from one of the University's databases to collect information on student grade aspirations, expectations, and abilities. Our data indicate that the students enrolled in these principles courses not only aspired to, but expected to earn a grade between an A and a B for the course. In fact, only one of the students surveyed expected to earn

below a C in the class. Considering that as a group these students had an undergraduate GPA of 2.80, there appears to be evidence for the hypothesis of over-optimism on the part of students. This hypothesis is further supported by the fact that nearly sixty percent of the students surveyed believed that economics was harder than a typical class, data consistent with previous research that has shown economics to be a "low-grading" class (Sabot and Wakeman-Linn, 1991).

As previously stated, over-optimism can affect a student's grade in two ways. First, when performance is well below what is expected, a student may become discouraged and decrease his effort to such an extent that his course grade falls below what would have been earned in the face of more realistic expectations. Secondly, poorer students may engage in signaling behavior that can make it difficult for the instructor to distinguish better students from poorer students. Assigning grades that accurately reflect student ability and mastery of course knowledge can become problematic for an instructor.

Following earlier psychology literature, March and Simon (1958) discussed the fact that aspirations are adjusted downward when goals are not attained. Under certain circumstances apathy (or aggression) may ensue. Building on the earlier behavioral theory, Cross (1969) discussed inflated demands and the impact they may have on the bargaining process and its final outcome.

While it is obvious that instructors and students are not bargaining over grades, Cross's argument as to how overly optimistic expectations can impact the outcome of a situation can certainly be applied to the classroom. Cross reaches the conclusion that, in general, overstating demands or expectations will not improve the payoff of the final outcome of a situation. In fact, inflating initial demands or expectations may worsen the final outcome. This is because Cross views the final outcome as a positive function of the rate at which the opponent concedes (makes downward revisions in demands or expectations). If a high initial demand or expectation causes one of the parties to concede at a greater rate, their final outcomes will be worse than what it would have been if more realistic goals had been set.

Note how the outcome of Cross's model can be applied to students. If students are initially overly optimistic in their expectations, they could end up in a worse position than if their expectations more closely matched the actual outcome. If students' aspirations exceed their performance, motivation and effort may fall. As effort decreases, students' academic performance will deteriorate.

High initial expectations can also be linked to signaling theory developed by Akerlof (1970) and Spence (1973). In this instance students may deliberately

misrepresent their expectations as part of a strategy to improve the grade they are assigned by the instructor. Consider the following: A professor has just completed grading a midterm or final exam and is puzzled by the results. Several of her "better" students did not do well on the exam. These are students who regularly attend class, take notes, appear interested in the material, ask clarifying questions, participate in group projects, and turn in homework assignments on time. She asks herself the following: Did she present the material in a way accessible to her students? Was the exam too difficult? Should she grade the exam on a curve?

What may not occur to the professor is that the last question is exactly what these "better" students are hoping for. If a college student is enrolled in a class in which he believes that, despite his best efforts, it will be difficult to earn a good grade, the student can accept a poor grade, drop the course, or perhaps attempt to convince the instructor that he is a good student. If this later strategy is successful, the instructor may question the efficacy of her teaching methods and lower grading standards. Thus, expressing high grade expectations may be part of a strategy designed to convince an instructor that the student is capable of doing well in the course. In this instance, mimicking better students may allow a less able student to obtain a higher grade in the course. Alvarez and Adelman (1986) take up this theme when they argue that students tend to inaccurately predict grades because of "self-protective" behavior. In other words, students may over estimate their performance in order to present what they call a "facade of competence."

The ability of a student to signal requires the existence of asymmetric information. Students enter college with a variety of abilities. The mean and variance of these abilities are a function of several things including the selection criteria of the college or university. Students, based on their prior academic experience, are likely quite aware of their abilities. While several indicators of ability (e.g. SAT/ACT scores, high school grade point average, etc.) are often available to college or university officials, individual instructors do not typically avail themselves of this information. Thus, the usual case is that the student is aware of his/her abilities while the instructor may know only about the probability distribution of the students in the university. We used a variation of Gardner's (1995) Caveat Emptor game to model this situation. In an appendix available from the authors, we show that both pure strategy and mixed strategy equilibriums are consistent with instructors assigning higher grades to weaker students than would otherwise be assigned.

The following section begins by discussing the survey and University data used to estimate an ordered probit model of student grade aspirations and

expectations. We conclude with a discussion of the empirical results of the model and explain how these results may be indicative of student signaling.

EMPIRICAL RESULTS

In this study we are trying to understand why a majority of students enrolled in introductory economics classes expect to receive a higher grade in the course than the one they eventually earn. Survey responses from over 400 students enrolled in these courses (both macroeconomics principles and microeconomics principles) during the 2005 fall semester were collected. The surveys were administered on the first day of class prior to any discussion regarding the class, instructor expectations of students, or the distribution of course syllabi. The survey provided us with information regarding students' grade predictions for the class as well as self-reported data designed to control for student quality and student perceptions of economics relative to other disciplines. Data from the University database provided us with students' actual course grades and other university-reported data which we used to control for student quality and student college experience. Some observations were dropped because the student did not earn a grade in the class or did not answer one or more of the relevant questions. Our final data set consisted of 416 observations.

The dependent variable for our regression model is EXPECTED GRADE – ACTUAL GRADE. Because the dependent variable is the result of choices made by the students which are ordered and discrete, we estimate an ordered probit model. Since the model requires using non-negative numbers for the dependent variable, EXPECTED GRADE – ACTUAL GRADE is expressed as follows: 0 if the student underestimates or if the student's actual grade equals his/her expected grade, 1 if the student overestimates his/her grade by one grade point, 2 if the student overestimates his/her grade by two grade points, 3 if the student overestimates his/her grade by three grade points, and 4 if the student overestimates his/her grade by four grade points. This latter case occurs if the student expects that they will receive an A in the class, but instead earns a course grade of an F. Table 1 shows the descriptive statistics for the variables used in this study. While the mean expected grade was a 3.38, the mean of the actual grade was nearly one grade-point lower, at 2.43.

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
ACTUAL GRADE	2.4279	1.2261	0	4
EXPECTED GRADE	3.3774	0.6581	1	4
TGPA>B	0.2115	0.4089	0	1
LIKEGRDE	3.8365	0.3702	3	4
SIGNAL	0.5192	.5002	0	1
WRKEC>6	0.2043	0.4037	0	1
WRK>12	0.3870	0.4877	0	1
HSTUD>6	0.1514	0.3589	0	1
HXMST>3	0.3389	0.4739	0	1
ACT>25	0.2692	.4441	0	1
CUMGPA	2.8026	0.6928	0	4
COLECON	0.2981	0.4580	0	1
ERNDHRS	55.2644	30.6758	0	170
MALE	0.4688	0.4996	0	1
AGE	20.8062	3.7059	16.5	47.78
MINORITY	0.1154	0.3199	0	1
BUSMAJ	0.5361	0.4993	0	1
FEMINSTR	0.5313	0.4996	0	1

Two of our explanatory variables measure student aspirations. The first is a categorical variable, TGPA>B, that equals one if the student reports their target grade point average for the upcoming semester to be 3.5 or greater. As the descriptive statistics show, a little more than 21 percent of the students fit this category. A second aspirational variable is LIKEGRDE which is the class grade

students report they would like to earn. The mean for this grade was 3.84, with no student reporting their desired grade below a 3.0.

The independent variable, SIGNAL, was designed to provide a general sense of a student's willingness to engage in signaling behavior and asked the student to consider the following hypothetical situation:

> Jack is enrolled in a college course in which he believes it will be difficult to earn an acceptable grade. In an attempt to influence his grade he plans on appearing interested during lecture, asking questions over the material, participating in class discussion, and visiting the professor's office to ask for additional clarification of the material. These actions are done **primarily** to get a better grade, not to better learn the material.

The survey question asks if the student ever has engaged or ever would engage in this behavior. If the student responded affirmatively to this question, SIGNAL was equal to one. As the descriptive statistics show, over one-half of the students reported that they either have engaged or would engage in this behavior.

We have included several variables to control for academic effort, academic ability or success, academic experience, student demographics, student major, and instructor gender. WRKEC>6 and WRK>12, are categorical variables measuring the expected study goals of the students. WRKEC>6 equals one if the student expects to spend more than six hours per week studying for this course while WRK>12 equals one if the student expects to study more than 12 hours per week for all courses in order to obtain their target GPA. Slightly more than 20 percent of the students planned to study more than six hours for their economics course while almost 39 percent planned to study more than 12 hours per week for all their courses.

Two categorical variables measuring past academic effort are HSTUD>6 which equals one if the student studied more than six hours per week in high school, and HXMST>3 which equals one if the student studied more than three hours for a major high school exam. Only slightly more than 15 percent of the students reported studying more than 6 hours per week in high school, while nearly 34 percent studied more than three hours for a major high school exam.

A categorical variable, ACT>25, is included to control for academic ability. This variable equals one if the student scored above 25 on the ACT test. Almost 27 percent of the students reported that they fit this category. For the 340 students for

which the University had ACT score records, the average was 22. The estimated average score from the self-reported category was also 22. The variable CUMGPA was the actual cumulative grade-point average that was obtained from the University records. The typical student entered these principles classes having earned a high C average.

Controls for prior academic experience are COLECON, a categorical variable that equals one if the student reported having taken any college economics course in a prior semester, and ERNDHRS which measures how may college credit hours the student had compiled prior to the semester of the survey as reported by the University. Just less than 30 percent of the students reported taking at least one economics course prior to this principles course, and the typical student had previously earned over 55 credit hours.

Almost 47 percent of the students in these principles classes were male, the average age of the students was nearly 21 years, about 11.5 percent were reported as being a minority by the University, and almost 54 percent were enrolled as business majors (BUSMAJ). Just over 53 percent of the students were in a class with a female instructor (FEMINSTR).

The results of the ordered probit estimation are reported in Table 2. The chi-squared test that all parameters except the intercept are equal to zero is rejected at the one percent level. The pseudo R-squared measure, calculated as 1 minus the ratio of the unrestricted log-likelihood to the restricted log-likelihood (McFadden 1974), shows that the model explains nearly 20 percent of the variation in the dependent variable. Further, none of the estimated threshold variables, Mu_j (j = 1, 2, 3), significantly differ from the threshold values (Mu_j = j) at the one percent level of significance.

Table 2: Ordered Probit Results

Variable	Coefficient
Constant	2.0098***
	(0.7506)
TGPA>B	0.3062**
	(0.1506)
LIKEGRDE	0.5320***
	(0.1619)

Table 2: Ordered Probit Results	
Variable	Coefficient
SIGNAL	0.2004*
	(0.1146)
WRKEC>6	0.1050
	(0.1542)
WRK>12	0.0669
	(0.1276)
HSTUD>6	-0.0712
	(0.1750)
HXMST>3	-0.0961
	(0.1302)
ACT>25	-0.5101***
	(0.1455)
CUMGPA	-1.2120***
	(0.0987)
COLECON	-0.3826***
	(0.1477)
ERNDHRS	-0.0045**
	(0.0023)
MALE	0.1150
	(0.1153)
AGE	0.0093
	(0.0186)
MINORITY	0.1717
	(0.1789)
BUSMAJ	-0.1134
	(0.1230)
FEMINSTR	-0.2447*
	(0.1277)

Table 2: Ordered Probit Results	
Variable	Coefficient
MU_1	0.9748***
	(0.0698)
MU_2	2.1105***
	(0.1023)
MU_3	3.0293***
	(0.1580)
Sample Size	416
Log Likelihood	-456.7402
Chi Squared	221.9894***
Pseudo *R*-squared	0.1955
Standard errors in parentheses * Significant at the 10% level of significance in a two-tailed test ** Significant at the 5% level of significance in a two-tailed test *** Significant at the 1% level of significance in a two-tailed test	

The signs on the aspiration and signaling variables tend to support the idea that both over-optimism and signaling theories are useful in explaining students' grade expectations in principles of economics courses at the University. First, consider the variables measuring student aspiration. The aspiration variables TGPA>B and LIKEGRDE have positive signs and are significant at the five percent and one percent levels, respectively, in two-tailed tests. The sign on these variables is supportive of the idea that, given their ability and past academic performance, students with greater grade aspirations are overly optimistic with respect to their grade expectations. The variable SIGNAL is also positive and significant at the 10 percent level in a two-tailed test. This indicates that students willing to mimic the activities of good students, even if those activities do not cause them to learn more, also have a higher probability of overestimating their actual grade.

Neither expected work effort as measured by WRKEC>6 and WRK>12 nor past work effort as measured by HSTUD>6 and HXMST>3 were significant at even the 10 percent level. Thus it appears that neither students' past work effort nor his expected future work effort have any impact on their grade expectations for the principles of economics courses.

The control variables for academic ability, ACT>25, and academic success, CUMGPA, were negative and significant at the one percent level in a two-tailed test. This is consistent with the idea that better students are less likely to overestimate their grades in this class. Prior academic experience, both in an economics class (COLECON) and overall (ERNDHRS), were also negative and significant at the one percent level and five percent level, respectively. Thus, students with more academic experience were also less likely to overestimate their grades in these classes.

None of the demographic variables were significant. However, the variable measuring the gender of the instructor, FEMINSTR, was negative and significant at the 10 percent level in a two-tailed test. For some reason, students are less likely to overestimate their grades if they have a female instructor.

We also investigated the marginal effects of the independent variables at each possible value of the dependent variable: 0, 1, 2, 3, and 4. The marginal effect for a continuous independent variable is the partial derivative of the probability that the dependent variable attains a specific value given a "small" change in the independent variable. The marginal effect for a categorical variable is [Prob (Y| x = 1) – Prob (Y| x = 0)] where Y is the level of the dependent variable and x is the level of the categorical variable (Green 2003).

Table 3 summarizes the coefficients of the variables for the marginal effects of the ordered probit model. Reading from left to right, this table shows the coefficients from accurate prediction of class grade (Y = 0) to over-estimation of the class grade by 4 points (Y = 4). The coefficients provide information as to the probability of accurate or inaccurate grade predictions on the part of the students. Note that when Y = 0, a significant, positive sign on a coefficient indicates there is a higher probability that a student's grade expectations are accurate, and that he will accurately predict his grade. When Y > 0, a significant, positive sign on a coefficient indicates there is a higher probability that a student's grade expectations are inaccurate, and that he will over-predict his grade.

Note that all of the marginal effects are consistent. If the coefficient is significantly different than zero and has a positive sign when Y = 0 it becomes negative when Y > 0 if it is significantly different from zero. Likewise, coefficients that are significant and have a negative sign when Y = 0 become positive when Y > 0 if they are significant. Statistically, we get the intuitive result that variables increasing the probability of accurate prediction of a student's course grade also decrease the probability of over-prediction of course grade on the part of the student.

Table 3: Summary of Marginal Effects					
Variable	Y = 0	Y = 1	Y = 2	Y = 3	Y = 4
TGPA>B	-0.1080***	-0.0002	0.0752	0.0281	0.0050***
	(0.0262)	(0.0063)	(0.2611)	(0.0249)	(0.0016)
LIKEGRDE	-0.1958***	0.0158	0.1308***	0.0425	0.0067*
	(0.0599)	(0.0122)	(0.0315)	(0.1231)	(0.0040)
SIGNAL	-0.0738*	0.0062	0.0491	0.0160	0.0025***
	(0.0251)	(0.0063)	(0.2268)	(0.0326)	(0.0009)
WRKEC>6	-0.0381	0.0020	0.0259	0.0088	0.0014*
	(0.0237)	(0.0035)	(0.2090)	(0.0484)	(0.0008)
WRK>12	-0.0246	0.0018	0.0165	0.0054	0.0009
	(0.0233)	(0.0031)	(0.1991)	(0.0517)	(0.0008)
HSTUD>6	0.0264	-0.0027***	-0.0174	-0.0055	-0.0008
	(0.0218)	(0.0007)	(0.1678)	(0.0678)	(0.0012)
HXMST>3	0.0356*	-0.0034***	-0.0235	-0.0075	-0.0012
	(0.0213)	(0.0000)	(0.0623)	(0.0722)	(0.0013)
ACT>25	0.1936***	-0.0342***	-0.1200	-0.0343	-0.0050*
	(0.0178)	(0.0077)	(0.0796)	(0.1161)	(0.0028)
CUMGPA	0.4461***	-0.0360	-0.2980	-0.0969	-0.0153**
	(0.0384)	(0.0256)	(0.1194)	(0.2554)	(0.0076)
COLECON	0.1440***	-0.0210***	-0.0917	-0.0273	-0.0041*
	(0.0185)	(0.0054)	(0.1022)	(0.1045)	(0.0024)
ERNDHRS	0.0017	-0.0001	-0.0011*	-0.0004	-0.0001
	(0.0008)	(0.0001)	(0.0007)	(0.0010)	(0.0000)
MALE	-0.0422*	0.0033	0.0283	0.0092	0.0015**
	(0.0240)	(0.0043)	(0.2094)	(0.0447)	(0.0007)
AGE	-0.0034	0.0003	0.0023	0.0007	0.0001
	(0.0068)	(0.0006)	(0.0042)	(0.0030)	(0.0003)
MINORITY	-0.0614**	0.0012	0.0424	0.0152	0.0026***
	(0.0244)	(0.0041)	(0.2270)	(0.0419)	(0.0010)

Table 3: Summary of Marginal Effects

Variable	Y = 0	Y = 1	Y = 2	Y = 3	Y = 4
BUSMAJ	0.0416**	-0.0032***	-0.0279	-0.0091	-0.0015
	(0.0209)	(0.0008)	(0.1580)	(0.0767)	(0.0014)
FEMINSTR	0.0896***	-0.0066*	-0.0600	-0.0199	-0.0032
	(0.0189)	(0.0038)	(0.1263)	(0.0959)	(0.0022)

Standard errors in parentheses
* Significant at the 10% level of significance in a two-tailed test
** Significant at the 5% level of significance in a two-tailed test
*** Significant at the 1% level of significance in a two-tailed test

Both aspirational variables, TGPA>B and LIKEGRDE, are negative and statistically significant for the students in the sample who did not over-predict their grade in these economic classes (Y = 0). The LIKEGRDE variable is positive and significant at the one percent level for Y = 2, and both aspirational variables are significant and positive in the most extreme case of over-prediction, Y = 4. These results could be capturing the overly optimistic expectations of students previously discussed.

The signal variable is negative and significant at Y = 0 and positive and significant at Y = 4. This supports the claim that those who are willing to mimic better students are less likely to correctly predict their course grades and are more likely to over-predict their grade. As stated previously, this indicates that students may be engaged in signaling behavior in an attempt to earn a higher course grade than they are able to obtain through their own efforts.

The variables controlling for academic ability and academic experience behave as we would expect in explaining marginal effects of grade prediction. In general, students with greater ability and experience, as indicated by ACT>25, CUMGPA, and COLECON, are more likely to correctly predict their course grade and less likely to over-predict their course grade. ERNDHRS is only significant at the margin when we examine the probability of over-predicting the course grade by 2 letter grades. In this instance, ERNDHRS is negatively correlated to over-prediction.

Finally, we examine the marginal effects of student gender, student minority status, student major, and instructor gender. Both males and minorities are less

likely to make accurate grade predictions for the course at the margin. Likewise, both groups are more likely to over-predict their grade in the most extreme case of Y = 4. Business majors are more likely to predict their grade accurately and, at the margin, are less likely to over-predict their grade by one point. For the other marginal cases, being a business major is not significant. The same is true if students have a female instructor.

The results of the overall effects and the marginal effects seem to provide support for both hypotheses of student behavior as it applies to course grade prediction. This is not surprising as student behavior is extremely complex and likely to be simultaneously motivated by several factors. These results lead to different recommendations with regards to instructor response to student overestimation of grades and are discussed in the final section of our paper.

CONCLUSION

Sabot and Wakeman-Linn (1991) show that economics tends to be a "low-grading" subject. Our data are consistent with this result in that students responding to our survey indicated they perceived economics to be more difficult than other courses. In spite of this perception and regardless of academic ability or past performance (as indicated by variables such as high school study experiences, ACT scores, and college grade point average), these students expected to receive a grade of at least 3.0 in their principles of economics classes. These seemingly unrealistic expectations may result from two sources: over-optimism and signaling. In the first instance, students may not have a clear understanding of their abilities or may face cultural pressures to express aspirations exceeding their abilities. In the second instance, students may be attempting to signal instructors in order to receive higher grades than they are capable of obtaining through their academic effort.

If expectations are the result of the former, there are implications for students' academic performance. Literature shows that individuals who have overly optimistic expectations can end up in a worse position than individuals who have more realistic expectations. Hartman (1983) finds that individuals who do not have their expectations met tend to decrease effort. In terms of students, this implies that when grade expectations are not achieved, effort falls, and ultimately their academic performance deteriorates. In this case, steps to bring about a closer match between performance and expectations should be taken. Educating students about the demands of college-level work, enhancing study skills, and providing non-

threatening feedback could bring about more realistic expectations and thereby improve academic performance.

In the case of signaling, students are simply attempting to have instructors engage in less stringent grading practices. In this case, over-prediction will not have a negative impact on effort and student performance. Instead, it will result in confounding information that can affect instructor ability to accurately assign a grade based on student mastery of course knowledge and skills. In this instance, steps should be taken to provide instructors with student information. Such information could assist instructors in interpreting student signals and thereby enhance the process of differentiating between high-ability and low-ability students. In this case, instructors may be less likely to lower standards on the basis of false information.

Our empirical results indicate that students are driven by both of the aforementioned forces. Policies designed to bring student perceptions more into line with reasonable performance expectations should be coupled with efforts to provide instructors with more information about individual student ability. This will not only help to maximize student performance in the course but will also benefit instructors' efforts to differentiate between high-ability and low-ability students and prevent the lowering of grading standards on the basis of false signals.

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ECONOMICS ARTICLES

THE U.S. CURRENT ACCOUNT: THE IMPACT OF HOUSEHOLD WEALTH

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ABSTRACT

Household wealth is shown to have a substantial impact on the current account through the wealth effect on savings. Private savings and wealth are estimated to share a negative relationship in the long run. Further, the impact of wealth changes on private savings takes several years, given an adjustment half-life of nearly 2 years. The reductions in private savings, due to changes in household wealth, reduce domestic savings. The increased inflow of foreign savings from the reduction in domestic savings is shown to have a negative effect on the current account balance.

Two simulations demonstrate that small changes in the growth rate of wealth can have sizeable impacts on current account movements, altering the current account as a percent of GDP by as much as two percentage points. For the period 1998:Q3 through 2005:Q3, the difference in the actual and simulated current account deficit as a percent of GDP is 6.47 percent versus 8.83 percent, respectively. This difference is attributed to a difference between the actual growth rate of wealth over this period (0.82 percent) and the simulated growth rate (one percent). During the large increase in wealth, 1995:Q1 through 1999:Q4 (average actual wealth growth rate of 2.3 percent versus the simulated one percent growth rate), the actual current account deficit was 2.87 percent and the simulated deficit was 0.86 percent. Therefore, policies that impact wealth or saving can potentially affect the current account balance.

INTRODUCTION AND LITERATURE REVIEW

The current account deficit stood around 800 billion dollars, or approximately 6.5 percent of GDP, in 2005. "The United States current account records exports and imports of goods and services, unilateral transfers (gifts), U.S. earnings on investment abroad, and income payments to foreigners from their U.S.

assets" (Humpage, 1998). But many analysts see the current account more broadly as the measure of international trade, because net exports contribute the largest portion. The current account has been steadily falling, creating a deficit, since an upswing in the early 1990's. This lasting current account deficit would seem to indicate that the United States has not exported enough to cover the amount of goods imported. A trade deficit is not an inherently bad thing, so the creation of such a large deficit would seem to speak of something more. It begs the question: is the lack of exports or the large amount of imports the only contributor to the current account deficit?

One contributing factor to the large trade deficit may be the decreased private household savings relative to foreign savings, since the current account balance is the difference between domestic savings and domestic investment. "In the United States, national savings is currently quite low and falls considerably short of U.S. capital investment. Of necessity, this shortfall is made up by net foreign borrowing…" (Bernanke, 2005). Therefore, the reduction in private savings, holding all else constant, leads to a decrease in the current account (an increase in the current account deficit).[1] The private savings rate is the amount of income left after households have paid their bills, as a percentage of income this savings rate declined until in January 2006 it reached 0.7 percent. Given the large current account deficit, a substantial increase in private savings is one means to reduce this imbalance (Lansing, 2005).

Others look beyond the diminished savings rate into the calculation of private household savings. The reported private savings rate in the United States does not take into account increases in assets such as equities and homes (Marquis, 2002). Many see the increases in the value of these equities as a substitute for savings, i.e. the wealth effect. Marquis notes that one reason for the declining savings rate in the U.S. may be due to large increases in wealth. Lansing (2005) suggests that the decline in personal savings rates are attributed to the rising equity and housing prices.

From the end of the second quarter of 1994 to the beginning of the third quarter of 1997 the value of household wealth increased to about 5.2 trillion dollars, roughly doubling in the process. Ludvigson and Steindel (1999) examine a possible link between wealth and savings. By increasing consumption the individual is automatically choosing to reduce the amount of their savings by that same amount, holding all else constant. Further, Ludvigson and Steindel show graphically that with the dramatic increases in the wealth-to-disposable-income ratio there has been

a marked decline in the private savings rate. Therefore, falling private savings and rising private consumption has a direct correlation to the rise in household wealth.

The recent research suggests this increase in household wealth may cause a decrease in the private savings rate, and thus contribute to the current account deficit experienced by the U.S. With the rise in household wealth there has been a large decline in private savings to a point where the average private savings rate was negative for all 2005 in the United States.

Therefore, the large increase in wealth may lead to reductions in private savings. A decrease in private savings will create a subsequent decrease in domestic savings, holding government savings constant. It is this reduction in domestic savings that can lead to a fall in the current account, since it creates an inflow of foreign savings to fund domestic investment. This research provides the link between wealth and the current account. The results here demonstrate that small changes in the growth rate of wealth can lead to large swings in the current account due to the wealth effect on private savings.

DATA AND EMPIRICAL METHODS

The data used comes primarily from the Bureau of Economic Analysis (BEA, 2006). Gross private savings, disposable personal income, gross government savings, and gross domestic investment come from Table 5.1 ("Savings and Investment"). Wealth is collected from the Federal Reserve's Balance Sheet of the United States (Table B.100) (Board of Governors of the Federal Reserve System, 2006). All series are deflated using the personal consumption deflator, which is also available from the BEA.[2] The data range is 1952:Q1 through 2005:Q3.[3]

The method used to measure the current account follows that of Humpage (2001). Equation (1) is derived from the National Income and Products Accounts identity. In equation (1), SP is gross private savings, SG is gross government savings, I is gross domestic investment, and CA is the current account.[4] In any period, t, the current account is the sum of private and government savings less domestic investment.

$$SP_t + SG_t - I_t = {}_{Cat} \qquad \textit{Formula (1)}$$

The U.S. current account deficit has been negative in every quarter since 1982:Q2 except for one (1991:Q1). Therefore, since 1982:Q2, investment has exceeded national savings.[5] This persistent current account deficit can be attributed,

in part, to the decline in savings. Private savings reached a high of 21.6 percent (percent of GDP) in 1982:Q2. Since that time, private savings as a share of total income has steadily declined to sample lows of thirteen to fifteen percent from 2001 through 2005. Government savings, as a percent of GDP, jumps around zero in the latter part of the sample (although it is negative in most periods). Therefore, this steady decline in the current account, on the savings side, can be directly attributed to the decline in private savings, given the minute changes in government savings.

As shown in recent research concerning the wealth effect, changes in aggregate household wealth can have an impact on household consumption and savings behavior. A one dollar change in wealth is estimated to increase consumption around four cents in the long run.[6] Marquis (2002) suggests that wealth may also play an important role in determining household savings behavior. The sharp increase in wealth during the latter part of the 1990s coincides with a steep reduction in private savings. Thus, it appears that a negative relationship exists between private, household savings and accumulated wealth.

Examining the data used here, the great increase in wealth starting in the 1980s and ending in 2000 is associated with falling private savings over the same period. Further, this decline in personal savings temporarily stops (and actually increases) during the large decrease in wealth from 2000 through 2003. Thus, the circumstantial evidence supports the notion that personal savings and wealth are negatively related. Therefore, increases in wealth that reduce private savings may also reduce national savings (holding all else constant). This decrease in national savings may potentially lead to a decrease in the current account balance (i.e., an increase in the current account deficit).

The next section investigates the relationship between wealth, private savings, and disposable personal income in the long-run and the short-run. This research employs time-series econometric methods to empirically estimate the relationship between private savings and investment. First, the long run relationship between private savings, disposable income, and wealth is estimated using the method of Johansen (1995). Then, the short-run dynamics of private savings is estimated using an error-correction model. These techniques will allow the simulation of wealth changes on private savings and the current account. More importantly, it permits the construction of scenarios to demonstrate the potential effect of alterations in the growth of household wealth on the current account.

Cointegration is tested between personal savings, wealth, and disposable personal income. All three variables were tested for the presence of a unit root,

which the tests fail to reject.[7] The Johansen test suggests one long run relationship. The test results are provided in Table 1a, and are normalized on personal savings.[8]

Table 1a: Cointegration Test Results, 1954:Q2 – 2005:Q3		
Number of Cointegrating Vectors	Trace Statistic	95% Critical Value
Zero	41.18	29.80
Less than One	11.65	15.49
Less than Two	1.52	3.84

Table 1b: Cointegration Vector			
Private Savings	Disposable Income	Wealth	Constant
1.000	-0.526	0.065	-94.295
	(0.027)	(0.005)	
Standard errors in parentheses. Eight lags used in the cointegration test.			

The results in Table 1b suggest that personal (household) savings and wealth share a negative relationship over the sample period. The effect of a one dollar increase in wealth is a 6.5 cent reduction in personal savings in the long run. This is similar to previous research examining the wealth effect on consumption where a one dollar increase in wealth creates a four cent increase in consumption in the long run. Finally, increases in disposable income leads to greater savings in the long run, as expected.

The results in Table 1b are used to construct the error-correction term (ECT). An error-correction model is estimated to uncover the short-run dynamics of personal savings and its adjustment to the long run equilibrium relationship given in Table 1b. The error-correction model estimated is given in Equation (2). Included in the error-correction model is the previous period change both government savings and domestic investment. The results from Equation (2) are provided in Table 2.

$$dSP_t = a_0 + a_1 dSP_{t-1} + a_2 dY_{t-1} + a_3 dW_{t-1} + a_4 ECT_{t-1} + a_5 dSG_{t-1} + a_6 dI_{t-1} + e_t \quad (2)$$

where:

$ECT_{t-1} = SP_{t-1} - 0.526Y_{t-1} + 0.065W_{t-1}$

d denotes the first-difference ,

The results in Table 2 suggest a slow dynamic adjustment of private savings to changes in wealth. The ECT parameter of -0.105 (or adjustment parameter) implies that 10.5 percent of the disequilibrium created from a change in wealth or income is eliminated in each period. Therefore, a one dollar increase in wealth creates a 6.5 cent reduction in private savings in the long run, so in the following period private savings falls 0.68 cents.[9] The slow adjustment of private savings means that a one-time change in wealth can have a lasting impact on private savings. Further, this change in private savings affect national savings (holding government savings constant) and the current account balance. The next section of this paper uses these estimates of the relationship between private savings and wealth to simulate how small shocks to wealth can impact the current account.

Table 2: ECM Results

Variable	Parameter Estimate	Standard Error	P-Value
Lagged Change in SP	-0.197	0.116	0.091
Lagged Change in Y	-0.065	0.118	0.583
Lagged Change in W	0.016	0.008	0.058
ECT	-0.105	0.034	0.002
Lagged Change in SG	0.102	0.118	0.388
Lagged Change in I	-0.044	0.116	0.705
Constant	7.31	4.47	0.104
Adjusted R-Squared	0.147		

Standard errors are adjusted using the method of Newey-West (1987).

CURRENT ACCOUNT CHANGES AND HOUSEHOLD WEALTH

Two lines of data are created for each simulation, one in which wealth grew at the constant growth rate of one percent, and the other uses actual growth rate of

wealth. The simulated movement in wealth is used to construct simulated private savings and current account using the results in Tables 1 and 2 and Equation (1). All other variables are held at their historical level; therefore the difference between the two current account series (historical and simulated) is the difference in aggregate wealth.[10] Two time periods were chosen to highlight the impact that wealth may have on the current account, 1998:Q1 through 2005:Q3 and 1995:Q1 through 1999:Q4.

From the first quarter of 1998 to the third quarter of 2005 the actual growth rate of wealth was 0.82 percent on average, an amount lower than our simulated (constant) increase in wealth of one percent. Using the model developed in the previous section, simulated private savings is 15.8 percent lower than actual ($1,409.3 billion versus $1,674.1 billion in 2005:Q3). The result is a simulated current account deficit that is larger than the actual current account deficit. The simulated current account deficit equaled $988.9 billion dollars during this period while the actual current account deficit totaled $724.1 billion dollars in the third quarter of 2005. The 0.18 percent difference in the growth rates between actual wealth and simulated wealth causes a difference in the total current account deficit of 36.6 percent [(difference in current account deficit in 2005:Q3 as percentage of GDP of 8.83 percent (simulated) versus 6.47 percent (actual)].

The second simulation covers the period between the first quarter of 1995 through the fourth quarter of 1999. The actual growth rate of wealth averaged 2.3 percent (versus the simulated, constant growth rate of one percent). The result is a simulated level of private savings that is 14.3 percent larger than actual ($1,547.9 versus $1,354.2 in 1999:Q4). The larger growth rate of actual wealth (and the smaller level of simulated savings) leads to a current account deficit that is larger than the simulated current account balance. The actual current account deficit equaled $276.9 billion dollars while the simulated deficit was $82.3 billion dollars in the fourth quarter of 2004. The 1.267 percentage point difference in wealth's actual growth rate resulted in a difference of 69.94 percent between the actual and simulated current account deficits [difference in current account deficit in 1999:Q4 as percentage of GDP of 0.86 percent (simulated) versus 2.87 percent (actual)].

CONCLUSION

Results suggest that wealth and the current account share a negative relationship, which works through the negative relationship between private savings and wealth. The decline in the private savings can be partially attributed to the rise

in household wealth, and this decline in private savings may reduce the current account balance. For example, during the large decrease in wealth from 2000 through 2003 the private savings rate stopped its decline and actually had a slight increase during the same time, following the trend we expected. This decrease in national savings may have lead to a decrease in the current account balance (an increase in the current account deficit). The subsequent rise in wealth since may have had the opposite and, as a result, drive the current account balance downward. Therefore, policies designed to increase the current account should consider the impacts of these policies on wealth. Also, policies that impact household wealth or saving can potentially affect the current account.

ENDNOTES

1. There is a vast literature concerning the implications of current account deficits. One often cited concern is the "sustainability" of the deficit. Humpage (2001) suggest that the relative growth between real output and the current account deficit determines the sustainability of these imbalances. Higgins and Klitgaard (1998) view the current account deficit in a more positive light. The inflows of saving into the U.S. support domestic investment and employment in those industries. It may also have substantial indirect effects in the macroeconomy.

2. This is common in the wealth effect literature. For example, see Ludvigson and Steindel (1999), Lettau and Ludvigson (2004), or Mehra (2001).

3. During the sample period, there were substantial tax code changes, which altered the return on saving and wealth. The effect of these changes on the savings-wealth relationship is not considered here.

4. Government savings is the difference between revenues and expenditures at all levels of government (federal, state, and local).

5. Here, the sum of private and government savings is referred to as "national savings".

6. For more recent research into the relationship between wealth and consumption see Ludvgison and Steindel (1999), Davis and Palumbo (2001), Mehra (2001), and Lettau and Ludvigson (2004).

7. Unit root tests results are provided in the Appendix. The Augmented Dickey-Fuller (Dickey and Fuller 1981) and KPSS (Kwiatkowski, et. al. 1992) tests include both a constant and a time trend.

8. Table 1 presents the long run relationship in error-correction form. Therefore, a positive parameter suggests a negative long-run relationship, and a negative parameter suggests a positive long-run relationship.

9. This amount is equal to the product of 0.105 and -6.5 cents. The half-life of a change in wealth is 6.9 quarters. In other words, it takes nearly 1.75 years for half of the 6.5 cent reduction in private savings to be realized from a one dollar increase in wealth.

10. Equation (1) gives the current account identity, which gives the traditional determinants of the current account balance. There are other potentially important determinants of the current account, such as the exchange rate, domestic income, or foreign income. These are not included in this study.

APPENDIX

Appendix Table A

Unit Root Tests Variables in Levels		
Variable	ADF Test Statistic	KPSS Test Statistic
Private Savings	-3.17	0.25
Disposable Personal Income	-0.59	0.41
Wealth	-0.43	0.41

Constant and time trend used in both tests. The ADF tests the null of a unit root, while KPSS tests the null of a stationary series. Ninety-five percent critical values for the ADF and KPSS tests, respectively, are -3.43 and 0.15.

Appendix Table B		
Unit Root Tests Variables in First Differences		
Variable	ADF Test Statistic	KPSS Test Statistic
Private Savings	-19.49	0.06
Disposable Personal Income	-17.21	0.04
Wealth	-14.49	0.04
Constant and time trend used in both tests. The ADF tests the null of a unit root, while KPSS tests the null of a stationary series. Ninety-five percent critical values for the ADF and KPSS tests, respectively, are -3.43 and 0.15.		

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THE ECONOMIC EFFECTS OF HARRAH'S CHEROKEE CASINO AND HOTEL ON THE REGIONAL ECONOMY OF WESTERN NORTH CAROLINA

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ABSTRACT

The Eastern Band of Cherokee Indians opened their casino in 1995, and entered into a management agreement with Harrah's in 1997 to manage the casino operation. This paper explores the major components of spending and their impact on a seven county region in Western North Carolina. The payment streams include wages and salaries paid to Harrah's Cherokee Casino and Hotel employees, operational spending paid to businesses who supply the Harrah's Cherokee and Hotel with food, beverages, and services, revenue distribution for Tribal government services, revenue distribution to adult Tribal members from the per-capita account, and distributions from the minors-account to Tribal members who have recently come of age. We deviate from existing research in two ways: First, we use existing commuting patterns to define the relevant region. Second, we estimate the economic impact of payments to minors when they reach majority age. The transference of this wealth to current disposable income is significant. This "wealth effect," which has not been appropriately incorporated in any economic impact studies of the gaming industry, is included in our research.

INTRODUCTION

On October 17, 1988, Congress passed the Indian Gaming Regulatory Act (IGRA), 25 U.S.C. § 2710, for the purpose of establishing and regulating Indian gaming on Native American Reservations (See Federal Register, 2001). IGRA classifies gaming into three separate categories: Class I gaming is defined as traditional Indian gaming that is part and parcel of tribal ceremonies and celebrations. Class II gaming covers several types of gambling including lotto, pull-

tabs, bingo and some types of card games. Class III gaming includes black jack, slot machines and all other types of gaming that are not included in either Class I or Class II. Since the passage of IGRA, twenty-three states have approved Class III gaming, five states have adopted Class II gaming and two states offer Class I gaming (Meister, 2002). Of the 562 federally recognized Indian Tribes in the U.S., 224 offer Class II or Class III gaming (National Indian Gaming Resource Library, 2004).

Several researchers have attempted to estimate the economic effects of Indian gaming, as well as private sector commercial casinos, on the regional economies in which they are located. For example, it has been estimated that estimated that Missouri casinos created more than 12,000 new jobs in that State (Leven & Phares, 1997). A comprehensive analysis of the economic impact of Indian gaming in Arizona was published (Cornell & Taylor, 2001). The economic impact on the surrounding community of a newly established commercial casino in Omaha, Nebraska has been estimated (Goss, 2002). A similar analysis was employed in calculating the economic impact of the tribal gaming of the Kalispel Tribe on the regional economy of Eastern Washington (Peterson & Taylor, 2002). Finally, it was found that Native American casinos in Colorado were responsible for the creation of more than 6,000 new jobs (Center for Business and Economic Forecasting, 2004).

These studies relied on an input-output approach within the context of a general equilibrium framework. The IMPLAN (Impact Planning) model developed by the Forest Service of the US Department of Agriculture and the Regional Economic Models (REMI) developed by Regional Economic Models, Inc. are the two most commonly used models of this type. Two researchers (Rickman & Schwer, 1993) have systematically compared the REMI and IMPLAN models and have found IMPLAN to produce reliable multiplier estimates. Moreover, while both models are dependable, it has been found that the estimated multiplier effects from IMPLAN are on the whole more reliable than those generated by REMI (Crihfield & Campbell, 1991). Consequently, the IMPLAN model was employed in this analysis.

The purpose of this paper is to estimate the economic impact of Harrah's Cherokee Casino and Hotel on the seven counties of Western North Carolina that were identified by commuting patterns as being influenced by Casino activity. This study begins with a brief description of Indian gaming, especially as it is encountered on the Cherokee Reservation. Then, empirical considerations are described and the methods employed in our study are subsequently presented.

Finally, the results generated by the input-output model are offered along with some concluding observations and recommendations for further research.

GAMING ON THE CHEROKEE RESERVATION

In 1838, the Federal Government forcibly removed most Cherokees west to the Oklahoma Territory, a forced migration that is known historically as the infamous "trail of tears." Approximately 1,000 Cherokees—members of the Qualla Band—avoided this forced migration by hiding in the Southern Appalachian Mountains. The Eastern Band of Cherokee Indians (EBCI) traces their ancestry to these stoic Native Americans. Today, the EBCI Reservation encompasses 56,688 acres nestled next to the Great Smoky Mountain National Park. The present enrollment of the Tribe is 13,265 members with a Reservation population of 7,542 (NC Cherokee Reservation Genealogy, 2004).

Class III gaming (described above) involves comprehensive regulation that includes an agreement between the tribe and the state in which that particular tribe is located. In 1995, the National Indian Gaming Commission (NIGC)—the commission established by IGRA to regulate Indian gaming—published final regulations for all forms of gambling defined as Class III gaming. They are listed as follows: 1) The particular form of Class III gaming that the tribe wants must be permitted in the state in which that tribe is located; 2) The tribe and the state must have negotiated a compact that has been approved by the Secretary of the Interior, or the Secretary must have approved regulatory procedures; and 3) The tribe must have adopted a tribal gaming ordinance that has been approved by the Chairman of the Commission (Indian Gaming Regulatory Act Overview and National Indian Gaming Commission, 2003).

In 1994, the State of North Carolina and the Eastern Band of Cherokee Indians (EBCI) entered into such a compact for the purposes of allowing Class III Indian gaming on the Cherokee Reservation. In 1997, the Eastern Band of Cherokee Indians entered into a management contract with Harrah's to run the casino operation, an agreement which is still in force at the present time. The EBCI was obligated—as is the case with all such compacts—to abide by the restrictions stated in the compact between the State of North Carolina and the Tribe. According to the compact, the EBCI would be allowed to offer Class III video gaming partially because it required "skill and dexterity" to operate. In compliance with the agreement, the EBCI offered traditional video gambling, such as slot machines,

video poker, video craps and video blackjack. In 2003, digital blackjack with dealers arrayed in the traditional Las Vegas style was provided.

The IGRA provides very detailed and specific purposes for the allocation of gaming revenue. This legislation, (25 U.S.C. § 2710 [Sec. 11]), specifies that revenues are not to be used for purposes other than 1) to fund tribal government operations or programs; 2) to provide for the general welfare of the Indian tribe and its members; 3) to promote tribal economic development; 4) to donate to charitable organizations; or 5) to help fund operations of local government agencies (National Indian Gaming Resource Library, 2004).

EMPIRICAL CONSIDERATIONS

In consideration of the IGRA provisions concerning the distribution of gambling revenue, the EBCI allocates its gaming revenue in the following manner. First, there is a fifty-fifty split between what is known as the “per-capita fund” and the "general fund." The per-capita payments are taxable payments from gaming revenue that are made to enrolled members of the EBCI. To be considered a Tribal member of the EBCI, one must possess at least one-sixteenth degree Eastern Cherokee blood and be a direct lineal descendant of someone on the Baker Roll—a census of the EBCI undertaken in 1924 (NC Cherokee Reservation Genealogy, 2004). Recently, a third requirement was added in response to the recent influx of tribal enrollment requests that occurred largely as a result of the per-capita payments. Now, new requests for tribal membership must be received within three years of the applicant's birth. Only about one-fourth of all Indian tribes in the United States (seventy-three) distribute per-capita payments to their tribal members¾the EBCI has had a per-capita fund since 1998. A history of the per-capita payments to EBCI members from 1998 through 2003 is shown below.

The per-capita contributions to minors (enrolled Tribal members under eighteen years of age) are put into a trust. Contributions to the minors-account are made to qualified EBCI members until they reach the age of eighteen. Once minors turn eighteen and have received their high school diploma, they are eligible to withdraw partially or fully from their account. In the absence of a high school diploma, they can still withdraw from their account if they have passed the GED; otherwise, they have to wait until they reach the age of twenty-one to withdraw from their accrual.

TABLE 1
CHEROKEE CASINO & HOTEL PER CAPITA DISTRIBUTION from 1998-2003

Date	Per Capita Distribution to Date
7/1/1998	$1,073
12/1/1998	$1,447
6/1/1999	$1,465
12/1/1999	$1,951
6/1/2000	$2,200
12/1/2000	$2,665
6/1/2001	$2,485
12/1/2001	$3,200
6/1/2002	$2,935
12/1/2002	$3,445
6/1/2003	$3,100
12/1/2003	$3,546

Source: Harrah's Cherokee Casino & Hotel 2003 Community Report

The other half of gaming revenue is placed in the general fund and is used for various tribal programs as needed. This is the type of public sector spending that is incurred typically by all local government entities. The percentage of EBCI spending appropriated for various Tribal programs varies slightly from year to year as needs change. The allocations from the general fund for fiscal year 2003 are shown in Table 2 below.

The Cherokee Casino & Hotel complex generates five streams of spending that affect the regional economy of Western North Carolina. First, there are the wages and salaries paid to casino employees. Second, there is the operational spending paid to firms who furnish the casino complex with food, beverages and services. Third, there are payments made to the per-capita account for Tribal adults. Fourth, there are payments to the general fund for Tribal government services. Finally, there are contributions to the per-capita account for minors. The secondary data for these income flows was obtained from the 2003 annual report (Harrah's Cherokee Casino and Hotel 2003 Community Report, 2004). Regional data describing the inter-industry relationships in the seven county study area was obtained from the IMPLAN input-output software (Minnesota IMPLAN Group, 2000).

TABLE 2
GAMING REVENUE DISTRIBUTION FY 2003

Programs and Services	Share
Tribal Finance	1%
In-House Legal	3%
Other	3%
Education and Training	4%
Tribal Council	5%
Community Services	6%
Economic and Community Dev	9%
Health and Medical	9%
Administrative Operations	12%
Reserves	13%
Social Services	15%
Public Works	20%

Source: Harrah's Cherokee Casino & Hotel 2003 Community Report

METHOD

The relevant region was defined using the commuter driving patterns of Harrah's employees. In order for a county to be considered part of the study area, at least one per cent of the employees of the Cherokee Casino & Hotel had to be from that particular county. There were seven contiguous counties in Western North Carolina that met this criterion. They were Buncombe, Cherokee, Graham, Haywood, Jackson, Macon and Swain counties—coincidentally, these are the same counties that the EBCI considers to be in their economic sphere of influence. Refer to table 3 for commuter information.

The multipliers used in this study separate the economic effects on the region from the economic activity generated by Harrah's Cherokee Casino and Hotel into three separate components: First, direct effects measure the changes in output and employment that result from direct final demand changes in the industry being studied—in this case the casino industry. Secondly, indirect effects measure the changes in inter-industry purchases that occur in the region as the directly affected industry expands. These acquisitions consist of raw materials, intermediate goods, transportation services, etc. Thirdly, induced effects reflect the changes in consumer spending as household income increases due to the direct and indirect effects of industry expansion in the region.

TABLE 3
CHEROKEE CASINO EMPLOYEE COMMUTING

County	Employee	
	Person	Percent
Buncombe County	26	1.47%
Cherokee County	28	1.58%
Graham County	46	2.60%
Haywood County	287	16.20%
Jackson County	739	41.70%
Macon County	95	5.36%
Swain County	518	29.23%
Other Counties	33	1.86%
Total	1,772	100.00%

Source: Harrah's Cherokee Casino & Hotel 2003 Community Report

RESULTS

As mentioned above, the analysis employed in this study identified five spending streams generated by the economic activity at the casino and hotel complex in Cherokee. They include: (1) the wages and salaries of Harrah's Cherokee Casino and Hotel employees, (2) operational spending by the casino and hotel complex, (3) the revenue distribution to adult Tribal members (the per-capita account), (4) revenue distribution to the general account for Tribal services, and (5) the distribution of accumulated revenue to Tribal members who became eligible for payments from the minors' account in 2003—the "wealth effect" component of our study.

First, as previously noted, the amount of direct regional output attributable to Harrah's Cherokee Casino and Hotel Complex was obtained from Harrah's 2003 annual report. They are contained in column one of Table 4. Wages and salaries were $56, 944507. Operational spending firms who serviced Harrah's Cherokee Hotel and Casino complex with amenities such as food, beverages and cleaning services, etc. was $9,139,444. Revenue distribution to adult Tribal members from the per-capita account was $32,950,880. The revenue distribution for Tribal government services was $88,159,190.

A word is in order about the calculation of the wealth effect, the fifth spending stream identified in this study The portion of the per-capita account that

is distributed to minors represents an increase in wealth for those individuals to whom the fund accrues. In this study, a unique attempt is made to capture the effect of the disbursal of these funds—what we've termed the "wealth effect"—to EBCI members when they become eligible. The per-capita distribution that accrued to Tribal members from 1998 through 2003 was $30,440 (Cherokee Casino & Hotel 2003 Community Report, 2004). The number of Cherokee minors receiving a high school diploma or GED was considered proprietary information by the Tribe and was therefore unavailable. Consequently, the authors assumed that graduation rates were fairly stable, so that the number of minors reaching the age of twenty-one, who had not graduated or received a GED, would approximately off-set the eighteen year olds who did not receive their high school diploma or GED in 2003. Accordingly, the number of minors reaching the age of 18 in 2003 was 139, and was multiplied by $30,440. Thus, the estimated amount of wealth released from the minors' account was $4,231,160 in 2003. This estimation of the "wealth effect" then represented an addition to current disposable income in 2003 for Tribal members who received these disbursements.

TABLE 4
REGIONAL OUTPUT IMPACT OF CHEROKEE CASINO & HOTEL

	Output Impact			
	Direct	Indirect	Induced	Total
Wages and Salaries	$56,944,507	$10,444,311	$16,864,994	$84,253,812
Operational Spending	$9,139,444	$1,472,101	$2,807,789	$13,419,334
Revenue Distribution to Adult Tribal Members	$32,950,880	$4,263,022	$5,054,741	$42,268,643
Revenue Distribution for Tribal Gov't Services	$88,159,190	$8,914,535	$25,764,317	$122,838,042
Wealth Effect	$4,231,160	$547,407	$649,070	$5,427,637
Grand Total	$191,425,211	$25,641,376	$51,140,911	$268,207,468

Sources: Harrah's Cherokee Casino & Hotel 2003 Community Report and IMPLAN Version 2.0.

The indirect effects of inter-industry expansion that resulted from direct economic activity from Harrah's Hotel and Casino complex is estimated by the IMPLAN Program and presented in Table 4. Also, the induced effects from increases in household income, as estimated by the IMPLAN Program and is shown

in Table 4. In the Table 4 summary, direct, indirect, induced and total effects are shown for all five identified spending flows, including the wealth effect. The change in regional domestic product that resulted from direct final demand changes at Harrah's in 2003 was $191,425,211. The indirect effects were $25,641,376 and the induced effects from household spending were $52,140,911 for an overall effect of $268,207,468.

The estimated employment generated by Harrah's Hotel and Casino complex is generated by The IMPLAN Program from the output data and is displayed in Table 5. Direct employment creation for the seven counties in the study area from the five spending streams at Harrah's Cherokee Casino and Hotel was 3,518 jobs in 2003. Indirect and induced job creation was 430 and 873 jobs, respectively. Thus, Harrah's was responsible for approximately 4,823 overall jobs in 2003 in the seven counties encompassed by this study

TABLE 5
REGIONAL EMPLOYMENT IMPACT OF CHEROKEE CASINO & HOTEL

	Employment Impact			
	Direct	Indirect	Induced	Total
Wages and Salaries	1,772.0	226.4	364.6	2,363.0
Operational Spending	214.4	21.3	40.9	276.6
Revenue Distribution to Members	271.9	53.1	82.4	407.4
Revenue Distribution for Tribal Gov't Services	1,225.5	122.3	375.4	1,723.2
Wealth Effect	34.9	6.8	10.6	52.3
Grand Total	3,518.7	429.9	873.9	4,822.7

Sources: Harrah's Cherokee Casino & Hotel 2003 Community Report and IMPLAN Version 2.0.

The inter-industry impacts from Harrah's Cherokee Casino and Hotel complex on the various industries in the region are captured above in Table 6. Not surprisingly, the service sector of the economy was most heavily impacted by the presence of Harrah's Casino and Hotel. More than 55% of the output growth and over two-thirds of the job growth occurred in that sector of the economy. The reasons for this are two-fold. First, the casino industry itself is dominated by service

employment. Secondly, a significant component of the economy of Western North Carolina is tourism, which is dominated by employment in the service sector of the economy. Other sectors of the economy that experienced substantial increases in economic activity due to Harrah's were the government and construction sectors of the economy.

TABLE 6
INTER-INDUSTRY IMPACT OF CHEROKEE CASINO & HOTEL

Sector	Output Impact		Employment Impact	
	Value	Share	Value	Share
Agriculture	$657,527	0.25%	12.7	0.26%
Mining	$3,393,651	1.27%	18.2	0.38%
Construction	$16,750,328	6.25%	276.4	5.73%
Manufacturing	$8,020,553	2.99%	59.2	1.23%
Trade	$9,147,488	3.41%	203.8	4.23%
TCPU	$7,253,101	2.70%	60.0	1.24%
FIRE	$12,101,433	4.51%	157.3	3.26%
Services	$149,895,714	55.89%	3,313.7	68.71%
Government	$25,721,282	9.59%	721.4	14.96%
Other	$35,284,393	13.16%	0.0	0.00%
Total	$268,207,468	100.00%	4,822.7	100.00%

Sources: Harrah's Cherokee Casino & Hotel 2003 Community Report and IMPLAN Version 2.0.
Note: TCPU stands for Transportation, Communication, and Public Utilities.
FIRE stands for Finance, Insurance, and Real Estate.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

While it is evident that Harrah's Cherokee Casino and Hotel complex has had a substantial economic impact on the seven county region that surrounds the Reservation, it is less clear as to whether or not this additional economic activity is resulting in an increase in the economic well-being of the region's poorest citizens. Two questions come to mind in this regard. First, are the poverty rates of the Eastern Band of Cherokee Indians declining as a result of Harrah's Cherokee and

Hotel? Secondly, are overall poverty rates in the seven county region declining as a result of the economic activity generated by Harrah's? An inspection of the first inquiry seems affirmative according to a recent study (Costello, Compton, Keller & Angold, 2003). In an eight year longitudinal study beginning in 1993 that included our seven county region and four additional contiguous counties in North Carolina, the researchers found that the percentage of Native American families living in poverty, after increasing slightly in the early years of their study, decreased by 5 % between 1997 and 1998, 6 % between 1998 and 1999, and 18 % between 1990 and 2000. They attribute this reduction in EBCI poverty to the economic activity generated by Harrah's Cherokee Casino and Hotel complex—a conclusion shared by the authors of this article.

The answer to the second inquiry posed above also appears affirmative. Below, in Table 7, there is some evidence that the economic activity generated by Harrah's Cherokee Hotel and Casino is benefiting the populace by lowering the number of citizens living below the poverty line as measured by the Census Bureau (U. S. Bureau of the Census, 2006). While the percentage of those living below the poverty line in the United States was flat from 1998-2004, it increased almost one per-cent in North Carolina. However, in the seven county region of our study, five counties had the percentage of people living below the poverty line decline during the same period, and in some cases substantially.

In a comprehensive study of the socioeconomic impact of Native American Gaming, researchers have discovered that most Native American tribes that have opened Vegas-style casinos—i.e., those that have adopted Class III gaming—have seen the economic climate on their reservations improve dramatically (Evans & Topelski, 2002). In another comprehensive piece of research that synthesizes over 100 papers and reports, it was noted that a casino appears to yield positive economic results to a region where the market is not already saturated (Rose, 2001). The above findings appear to be the case with the Eastern Band of Cherokee Indians as well. This research indicates that Harrah's Cherokee Casino and Hotel complex has had such an impact on the seven county region of Western North Carolina identified in this research. The estimated gross regional product attributable to the Cherokee enterprise for 2003 was $268,207,468 with a concomitant employment impact on the region of 4,288 jobs—the estimated impact from the wealth effect was $5,427,637 of gross regional product and 52 jobs.

Table 7: Percentage of People of All Ages below the Poverty Line		
Jurisdiction	Year 1998	Year 2004
Buncombe County	12.9%	13.8%
Cherokee County	16.6%	15.1%
Graham County	17.9%	16.7%
Hayward County	14.0%	13.8%
Jackson County	15.5%	15.8%
Macon County	13.7%	13.3%
Swain County	21.8%	15.4%
North Carolina	13.0%	13.8%
United States	12.7%	12.7%
Source: U.S. Bureau of the Census		

There are limitations to this study which deserve comment. First, this research measures the gross economic impacts of Harrah's Cherokee Casino and Hotel on the regional economy rather than the net impact. Here, the major concern is that resident patrons may substitute casino gambling for other retail spending on restaurants, bars, lodging, and other forms of entertainment. In cases where tourists are the dominant patrons, this substitution effect appears minimized. For example, there was found only a 30% substitution rate for Wisconsin gaming operations in small urban areas, regions similar to our study area of Cherokee, North Carolina (Thompson, Gazel & Rickman, 1995). Furthermore, other research indicated that in mostly rural areas, the casino effect of attracting visitors may even dominate the substitution effect (Taylor, Krepps & Wang, 2000). It has been discovered (Blois, Cunningham & Lott, 1995) that Native American gaming can undercut local hospitality enterprises if the casino subsidizes on-site restaurants, bars, and lodging. Consequently, despite the above indications that only a small substitution effect probably exists in the region, an exploration of this phenomenon may be warranted.

Travel and tourism are crucial to the economy of the seven county region of North Carolina defined in our study. Despite the limitations cited and the recommendations for further research, all indications are that Harrah's Casino and Hotel complex has complemented the tourism industry, and thus, has spurred growth in regional gross domestic product and regional employment. Moreover, there is

cursory evidence that it may be helping somewhat to alleviate poverty, although that question needs more investigation.

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RISK TAKING IN NASCAR: AN EXAMINATION OF COMPENSATING BEHAVIOR AND TOURNAMENT THEORY IN RACING

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ABSTRACT

NASCAR racing provides an interesting backdrop to test two theories about incentives and behavior. The compensating behavior theory predicts that if drivers race under safer conditions, they are likely to undertake riskier behavior. Using data from the NEXTEL Cup Series, the paper finds that once drivers were required to wear a new safety device, there was a change in the percentage of miles run under caution. That is, racers drove more aggressive and riskier after October 2001. Tournament theory predicts that non-linear rewards promote more competitive behavior. Starting in 2004, the method for deciding the NEXTEL season champion was changed to encourage racing throughout the season. To compete for the season championship, drivers are motivated to drive safely and stay in each of the first 26 races. After that point only the top ten drivers compete for the series championship, racing to win the non-linear season-ending awards. As a result, we expect racers to drive riskier in the second part of the season. The paper compares NEXTEL driving behavior across three NASCAR series (the other two not competing under the new structure). The results support the theory that NEXTEL Cup Series racers do drive riskier over the last portion of the season. There is not a similar change in the behavior of drivers in the other two series.

INTRODUCTION

In 2001, Dale Earnhardt, seven-time NASCAR driving champion, was killed in a wreck in NASCAR's Daytona 500. The sport of stock car racing has changed in several ways since that date, including improved driver safety and winning strategy. Eleven months after Earnhardt's death, all NASCAR drivers were required to wear a new safety device.[1] Beginning in 2004, NEXTEL became the title sponsor of NASCAR's premier racing series and instituted a "Chase for the

Champion" tournament format for the last 10 races of the season. This paper uses a proxy for risk taking (the percentage of miles run under caution due to accidents) and examines whether NASCAR drivers have responded to the higher level of safety (as predicted by "compensating behavior" models) combined with higher incentives for risk-taking (based on "tournament theory.")

To examine the first question, data for only one NASCAR series are used. The paper asks, "Did racers drive riskier when the new safety requirements were mandated?" To answer the second question, this research takes a unique approach utilizing NASCAR's product structure to examine predictions of driver behavior under rank-order tournaments. In addition to the NEXTEL Cup series, NASCAR sponsors two other racing series, the Busch racing series and the Craftsman Truck Series. Competing with similar equipment (including cars and tracks) and with some common drivers, these second-tier series do not race under the new championship tournament structure. As a result, the difference in risk taking in these two series versus the NEXTEL Cup Series should reflect the impact of the tournament risk-taking behavior - do drivers approach winning differently with more money and prestige up for grabs?

This paper is divided into several sections. First, a short history of NASCAR racing is provided. Next, a literature review addresses previous research regarding compensating behavior and tournament theory. A discussion of the data set follows. Finally, regressions and results are provided.

NASCAR BACKGROUND[2]

The National Association of Stock Car Auto Racing (NASCAR) was founded in 1948 to provide a sanctioning body for several types of car and truck racing. NASCAR is responsible for creating and enforcing the rules under which these races are run, scheduling the races and also for assuring that the winners are paid.[3] This paper focuses on three race series under the NASCAR umbrella: the NEXTEL Cup Series (the premier level of stock car racing); the Busch Series; these cars have lower horsepower and slightly different specifications compared to the NEXTEL series cars; and the Craftsman Truck Series (this series races modified pickup trucks). Many drivers in the NEXTEL Cup Series gain experience by racing in these second-tier classes early in their careers; some drivers continue to race in several series even throughout their careers.

NEXTEL Cup races have been taking place since 1949, while the other two series have been racing since 1982 (Busch Series) and 1993 (Craftsman Truck

Series). NEXTEL refers to the major sponsor of the series. J.R. Reynolds sponsored the series prior to 2004, and the series was called the WINSTON Cup.

In recent years, the NEXTEL Cup Series has scheduled 36 races, the Busch Series has 35 races and the Craftsman Truck series has 25 races. The number of races and locations has varied over the years, although some tracks (like Martinsville, Daytona and Darlington) have been hosting races since the 1940s and 1950s. The races last for different lengths, some 250 miles, others 500, still others are 600 mile races run for over four hours. Depending on the length of the tracks, some races are 50 laps while others are 400. In order to be able to race in a certain race each weekend, cars must "qualify." (The Daytona 500 uses its own system for determining which cars are allowed to race, but it still has a qualifying speed.) Usually the day before the race, the cars race against the clock, with the 43 fastest cars (or 36 trucks) being awarded starting positions, the fastest being awarded "the pole," or the pole position. Over the past 50 years, these pole qualifying speeds have increased. For example, at Darlington, the qualifying speed has risen from 85 miles per hour in the 1950s to 190 miles per hour today. At other courses, the qualifying speed has remained constant; for example Talladega (outside Birmingham, Alabama) has been hosting races for about 35 years and its qualifying speeds have remained about 190 miles per hour. Qualifying speeds for the other series are slightly slower. Average speeds (and changes in average speeds) for all three series are affected by several factors: technology, track design[4], track conditions and risk taking by drivers.

Track conditions and rules can change from season to season due to factors like track paving, the size of restrictor plates, and the installation of safety features like padded walls. These all affect the number of accidents and the number of laps "run under caution." Whenever dangerous conditions occur on the track, an official notifies the cars that the safety car is coming on the track and will set the speed for racing while the conditions are remedied.[5] The safety car slows the speeds and all of the cars must stay behind the safety car and cannot advance their position in the race. These laps "run under caution" are counted as laps in the race. The dangerous condition can arise from cars crashing into one another and leaving crash debris on the track (that is dangerous for other cars to run over) or from cars merely bumping into one another. Non-race related factors can sometimes cause the caution flag to be thrown. The track's paving may produce pebbles or tires may lose their rubber; oil or liquid may be seen on the track; or sometimes cars may stall on the track. While NASCAR races are not run in heavier rain conditions, sometimes laps are run under caution while slight rainfall occurs. In fact, NASCAR cars do not even have

headlights or brake lights for driving in rain (glass is a safety concern) – the "lights" on the cars are just stickers (Elliott, 2006). NASCAR provides statistics that note whether a caution lap is due to an accident or due to other track conditions.

To make racing safer, NASCAR requires the following basic safety devices for drivers and/or cars: fire-retardant suit and gloves; helmet and restraint system; a five-point harness system; roll cage; and fuel cell. Most tracks (except road courses) have concrete walls surrounding the track.

Since 1971, sixteen drivers have been killed in the three racing series. Earnhardt was killed when his car slammed into the wall during the Daytona 500. Experts speculated that his death (and some others throughout the years) was caused when his neck was fractured at the base of skull. In essence, the car violently and abruptly stops, while the driver's body is still accelerating. To help address this problem, developers designed a restraint system that attaches a harness to the racer's body and straps the helmet to a collar. It prevents the neck and head from being snapped too violently and causing a similar injury.[6] In October 2001, NASCAR required drivers in these series to use the HANS device or similar ones. No one has died in any NASCAR events since then.[7] In the first half of this paper, we examine whether this change promotes riskier driving.

In 1949, Red Byron won two races and $5800 and was named the NASCAR champion.[8] In 1975, a point system was instituted to reward drivers for winning a race, leading a lap during the race, or leading the most laps. At the end of the season, racers' points were added, and the winner was decided. For example, in 1975 champion Richard Petty won 10 races and $379,000. In 2003, the champion was Matt Kenseth. He won only one race, but still took home over $4 million in winnings. This point system was in place through 2003. One drawback (at least from the spectator viewpoint) of this point system was that by the last few races in the season, the winner had already been decided.

In 2004, NASCAR decided to the change the points system to encourage racing throughout the season.[9] During the season's first 26 races, drivers accumulate points that will qualify them for "the Chase for the Championship" using the existing point system. For the last 10 races of the season, only 10 racers with the most points are actually in a position to win the championship. (The top 10 drivers have their points "reset" higher by 5000 points so that none of the other drivers can catch them. These other drivers are racing to acquire other perks including lower prize money and automatic qualifying for the next season). As result of this new tournament structure, racers are encouraged to stay in the race for the first 26 races, racing safely to accumulate win and lap points. Getting in a wreck

during these races and losing the chance to acquire any points, is very costly. The driver may lose the chance to qualify for "the Chase." The other two series (Busch and Craftsman) are still using the regular point system where no subset of drivers competes for a special award. This feature – two different tournament structures – provides the experiment for the second-half of this paper. We should expect to see the level of risk-taking vary over the three series.

LITERATURE REVIEW

Two different theories and their impact on risk-taking behavior are addressed in this paper. Both theories, compensating behavior and tournament schemes, predict that agents will engage in more risky behavior the lower the cost of errors and the higher the payoff.

Addressing the compensating behavior literature, Peltzman (1975) initiated discussion in this arena by predicting that increased safety devices in automobiles should lead drivers to undertake riskier behavior. Eponymously called the Peltzman Effect, his results showed that the number of injuries and fatalities increased after the federal government required manufacturers to install seat belts in cars. Subsequent research highlighted the problems of trying to isolate the effects of driving conditions, driver ability and preferences, law enforcement, road conditions, etc. from the effects of drivers' using seat belts. For example, Singh and Thayer (1992) examine individual behavior and find that the predictions of compensating behavior hold only when drivers are "not strongly risk averse" – quite an understatement of NASCAR drivers' personalities. When analyzing responses to auto safety features, Lave and Weber (1970) and Blomquist (1991), specify a cost/benefit analysis and find that people do respond to "changes in the net benefit" by undertaking more risk. Blomquist also included child seats and motorcycle helmets in his analysis. Traynor (2003) notes the difference between regulations to reduce the losses caused by accidents (i.e. death) versus regulations to actually reduce the number of accidents. As expected, he finds that there are increases in "externalities" or accidents as a result of the former. Analogous to this result, we expect to find that NEXTEL Series drivers engaging in more risky behavior, exhibited by closer and faster driving that results in more miles run under caution due to accidents.

That might be the end of the story except for the fact that NASCAR changed risk-taking incentives again in 2004. Lazear and Rosen (1981) introduce the idea that rank-order tournaments are an efficient way to promote optimal behavior

especially when differences in ability are hard to determine or luck is involved. In addition to using tournament theory to explain executive compensation, the theory has been applied to sports as well. Given that the prize money is determined prior to the tournament (or race or championship) and that the purse is not evenly split among participants (a non-linear reward system), there is motivation to be more competitive. For example, Ehrenberg and Boganno (1990) find that golfers played better as prize money increased. Von Allmen (2001) questioned the efficiency of NASCAR's point system using data from 1998-1999. He noted that the *point* system used for individual races was linear. Given that a rank-order tournament would have been more appropriate, he rationalized that NASCAR's point system supported the profit-maximizing function of teams and the need to control "excessively aggressive behavior."[11] In changing the structure of the point system, the new "Chase" keeps the linear point system in each race, but changes the motivation for risk-taking after the twenty-sixth race. At that point, drivers face a different environment. Results from only 10 races matter – the need to acquire points becomes immediate and drivers cannot afford to fall behind.

To summarize, the two questions this paper examines are: 1) given the compensation behavior theory, do we see NEXTEL Cup drivers driving riskier as a result of using the HANS device; and 2) given tournament theory, do we see NEXTEL Cup racers driving safer over the first 26 races, but more risky over the last 10 when the champion is decided. Given data constraints, we consider only NEXTEL Cup data to answer the first question. We use data for all NEXTEL, Busch and Craftsman Truck series to answer the second question

DATA

This paper uses NASCAR data using race reports that include (among others) pole speeds, average speeds, cars in accidents, and laps run under caution.[12] The paper uses 10 years of NEXTEL Cup data (1997-2006) and three years of data for the Busch and Craftsman Truck Series (2004-2006). We chose these years for the NEXTEL Cup data because changes in cars and technology were fairly consistent and comparable. Specific data for laps under caution (i.e. numbers of cars and reason for the cautions) were only available from 2004 forward for the Busch and Craftsman Truck Series.

To proxy for risk-taking[13], this paper uses the ratio (ACCMILES):

$$\frac{\text{miles run under caution due to accidents}}{\text{total miles in the race.}}$$

By considering the miles under caution due to accidents, we capture drivers' risk taking. We assume the more aggressive and risky drivers race, the closer they race, the more accidents occur and the more caution laps run. According to the compensating behavior story, we should see NEXTEL drivers taking more risk from October 2001 forward. If drivers believe there is a smaller risk of dying while wearing the HANS device, there should be more evidence of riskier driving (a change in the percentage of miles under caution).

We use the same proxy for risk taking when examining all three series and whether the new tournament structure affects the NEXTEL drivers but not drivers from the other two series.

In all cases, we use other variables to explain the number of miles under caution. These include the length of the track. "Short tracks" (less than a mile in length) compress the cars into tighter racing packs. Restrictor-plate races encourage cars to also run in packs to enjoy the benefits of aerodynamics and drafting.[14] Pole speeds provide an idea of how fast cars can go on the track. Average race speeds reflect the track design and also the number of crashes – the more miles under caution, the lower the average speed. Data for the total race purse is also provided. This data is deflated using the Consumer Price Index. To capture the fact that less experienced drivers may cause accidents, the number of rookie drivers finishing NEXTEL Series Cup races is used. Rookie classification is determined using NASCAR rules. Another factor that can impact the number of miles under caution is the number of cars on the track. NASCAR race reports provide the reasons that cars do not finish each race, the main reasons being accidents or engine trouble.

REGRESSIONS AND RESULTS

To examine whether NASCAR drivers respond as these theories predict, we estimate two sets of regressions. In one set, we use 10 years of NEXTEL Cup Series data to determine whether drivers compensate in response to wearing the HANS devices. In another set, we rearrange the data and use three years of NEXTEL Cup, Busch and Craftsman Truck Series data and examine whether changes in the tournament prize money structure elicit a change in driving behavior.

Using ACCMILES as a proxy for risk taking, a Chow test is used to determine whether there is a change in coefficients after the new safety rule was imposed. With data from 1997 through 2006, we estimate:

$$ACCMILES_t = c + \beta LEFT_t + \gamma SPEED_t + \delta ROOKIE_t + \eta PLATE_t + \theta SHORT_t + \rho POLE_t + \lambda RPURSE_t + e_t \quad (1)$$

for 328 races. To explain why the number of accident miles may vary by race, we consider:

- the percentage of cars (that started the race) LEFT racing by the race's end. It's assumed the more cars on the track, the greater the chance for accidents;
- the log of the average SPEED of the race. The faster the cars go, the more accidents they should get in or cause;
- the number of ROOKIES that finish the race. A greater number of inexperienced drivers should cause more accidents;
- PLATE is a dummy variable that is 1 when cars are required to use restrictor plates and 0 otherwise. Tighter racing conditions in restrictor plate races increase the chance for accidents;
- SHORT is dummy variable that is 1 when the track is shorter than one mile (causing tight racing conditions) and 0 otherwise;
- the log of POLE is the winning qualifying speed for the pole position and reflects the true speed attainable on the track. It makes sense that the faster the cars go, the greater the chance is for an accident;
- RPURSE is the log of the total race's purse converted into natural logs. It is assumes that drivers are motivated by winning more prize money; and
- an error term that is assumed to be normally distributed with mean 0.

The race data were divided into two segments:[15]
No HANS required - race one in 1997 through the race 28 in 2001; and
HANS required – race 29 in 2001 through the last race in 2006.

Results from this initial regression indicated two adjustments needed to be made. White's test for heteroskedasticity is significant, and the coefficient on SPEED is negative. As cars get in accidents due to high speeds, ACCMILES increases, but when the pace car comes out to slow the race so the track can be cleaned, SPEED decreases. That is, an increase in ACCMILES can cause a decrease in SPEED. To correct for both of these problems, the regression is re-estimated using instrumental variables and MAC2 (a TSP-version of a Chow Test that corrects for heteroskedasticity based on Thursby (1993)).

Results for a corrected equation 1 appear in Table 1. Focusing on the Chow test result, note that the p-value of 0.49 shows that drivers are not driving riskier – there doesn't appear to be compensating behavior in response to the new HANS safety device required in October 2001.

Table 1: NEXTEL Cup Series Chow Test for Compensating Behavior, 1997-2006
Dependent Variable: $ACCMILES_t$

	1997-2006	HANS not required	HANS required
C	.81 (0.00)**	.61 (0.00)**	.61 (0.00)**
LEFT	-.0006 (0.55)	-.005 (0.00)**	-.003 (0.02)*
SPEED	-.59 (0.00)**	-.25 (0.00)**	-.35 (0.00)**
ROOKIE	-.002 (0.17)	-.002 (0.26)	.00 (0.99)
PLATE	.06 (0.00)**	.008 (0.49)	.03 (0.00)**
SHORT	-.02 (0.12)	.01 (0.28)	.009 (0.30)
POLE	.44 (0.00)**	.16 (0.01)**	.23 (0.00)**
RPURSE	-.005 (0.74)	.002 (0.50)	.002 (0.65)
	R^2 = 0.55 Chow (p-value)= 0.49	R^2 = 0.64	R^2 = 0.68

** indicates a p-value significant at the 1% level; * indicates significant at the 5% level.

However, this result could be clouded due to the introduction of 2004's "Chase for the Champion." We suspect that drivers' motivation to compete over the season changed. Therefore, there are conflicting incentives facing drivers: drive riskier because it's safer versus drive safer to accumulate points throughout the season and compete in the "Chase."

To disentangle these effects, we re-estimate equation 1 using data through 2003. These results are presented in Table 2. The Chow test results show that drivers are driving riskier. The p-value (0.00) for the Chow test is significant; the coefficients over the two periods differ. As predicted by the compensating behavior theory, racers drive riskier in response to the HANS device being required. That is, when the penalty for taking risks falls, racers compensate by driving more aggressively.

Table 2: NEXTEL Cup Series Chow Test for Compensating Behavior, 1997-2003
Dependent Variable: $ACCMILES_t$

	1997-2003	HANS not required	HANS required
c	.69 (0.00)**	.61 (0.00)**	.39 (0.00)**
LEFT	.0005 (0.99)	.06 (0.51)	-.07 (0.43)
SPEED	-.66 (0.00)**	-.77 (0.00)**	-.47 (0.00)**
ROOKIE	-.003 (0.11)	-.004 (0.12)	-.0005 (0.83)
PLATE	.07 (0.00)**	.08 (0.00)**	.05 (0.00)**
SHORT	-.02 (0.12)	-.04 (0.09)	.007 (0.69)
POLE	.50 (0.00)**	.58 (0.00)**	.36 (0.00)**
RPURSE	-.00006 (0.98)	.005 (0.32)	.006 (0.49)
	R^2 = 0.51 Chow (p-value)= 0.00	R^2 = 0.42	R^2 = 0.68

** indicates a p-value significant at the 1% level; * indicates significant at the 5% level.

The next section of this paper focuses on the tournament theory. We propose that NEXTEL Cup drivers will behave differently over the race season. During the first 26 races, drivers have an incentive to stay in the race, accumulate points and be one of the top-ten drivers. For the last ten races, only these drivers are competing to be named the series champion and collect the monetary award. Given the non-linearity of this tournament reward, we expect drivers to take on more risk over this period. That is, for NEXTEL Cup Series there should a difference between the miles run under caution over the first 26 races versus the last ten (or 28 percent of the season). Because the Busch Series and the Craftsman Truck Series did not compete using a similar re-structuring, we don't expect the number of miles run under caution to change over the season. (These series are still racing under the tournament structure described by von Allmen (2001) that promotes less aggressive driving.)

We re-organize the NEXTEL data stacking the first 26 races for each year for 2004, 2005 and 2006; and then stack the last 10 of each year (108 races). We organize the data for the other two series (Busch and CTS) using the same format save one difference. Because the other two series have fewer races, we divide the season based on the same ratio of races that NEXTEL uses: Busch Series (72/28) and Craftsman Truck (55/20). We estimate a similar regression as in the first part of the paper:

$$ACCMILES_t = c + \beta LEFT_t + \gamma SPEED_t + \eta PLATE_t + \theta SHORT_t + \rho POLE_t + \lambda RPURSE_t + e_t . \qquad (2)$$

The only difference is the omission of the ROOKIE variable. The two second-tier series are expected to have less-experienced drivers, and the definition of "rookie" in those series is harder to pinpoint. Because we want to compare the three series on the same basis, we omit ROOKIE from the NEXTEL regression. Given that its coefficient was insignificant in the earlier regression, we do not feel that meaningful information has been lost. The results from these regressions are presented in Tables 3, 4 and 5. (The estimates have also been made using the MAC2 program and instrumental variables.)

These results tend to confirm the predictions of tournament theory. Using the NEXTEL data set results shown in Table 3, the Chow test (with a p-value of 0.08) provides evidence that a change occurs in ACCMILES across the two periods. Drivers took more risks and drove more aggressively once the "Chase" started. A

telling change occurs in the RPURSE; it becomes positive and significant over the "Chase" period. It appears that drivers take more risk to win these races.

Table 3: NEXTEL Cup Series Chow Test for Tournament Theory, 2004-2006
Dependent Variable: $ACCMILES_t$

	2004-2006	First 26 Races	Last 10 Races
c	.69 (0.01)**	.73 (0.02)*	-1.49 (0.07)
LEFT	.06 (0.39)	.12 (0.21)	-.12 (0.24)
SPEED	-.71 (0.00)**	-.71 (0.00)**	-.69 (0.00)**
ROOKIE	.0008 (0.72)	.002 (0.41)	-.008 (0.11)
PLATE	.07 (0.00)**	.07 (0.00)**	.09 (0.02)*
SHORT	-.02 (0.21)	-.03 (0.19)	-.02 (0.55)
POLE	.54 (0.00)**	.53 (0.00)**	.43 (0.00)**
RPURSE	-.002 (0.85)	.002 (0.81)	.10 (0.01)**
	R^2 = 0.60 Chow (p-value)= 0.08	R^2 = 0.59	R^2 = 0.74

** indicates a p-value significant at the 1% level; * indicates significant at the 5% level.

Table 4: Busch Series Chow Test for Tournament Theory, 2004-2006 Dependent Variable: $ACCMILES_t$			
	2004-2006	72 races	28 races
c	1.12 (0.02)*	1.42 (0.01)**	-3.85 (0.32)
LEFT	.01 (0.89)	.18 (0.21)	-.10 (0.45)
SPEED	-.75 (0.00)**	-.89 (0.00)**	-.48 (0.00)**
LENGTH[a]	.09 (0.00)**	.11 (0.00)**	-.16 (0.41)
SHORT	-.02 (0.22)	-.07 (0.03)*	.05 (0.20)
POLE	.43 (0.00)**	.48 (0.00)**	.73 (0.05)*
RPURSE	.02 (0.44)	.01 (0.72)	.21 (0.19)
	R^2 = 0.69 Chow (p-value)= 0.24	R^2 = 0.61	R^2 = 0.78

a = the variable LENGTH is used in place of PLATE in this set of regressions. There are no races using restrictor plates in the second half of the series. Because the restrictor plate races are on the longer tracks, LENGTH of track is used.

Table 5: Craftsman Truck Series – Chow Test for Tournament Theory; 2004-2006			
Dependent Variable: $ACCMILES_t$			
	2004-2006	55 races	20 races
c	.11 (0.77)	.34 (0.47)	.90 (0.29)
LEFT	.20 (0.07)	.27 (0.03)*	-.22 (0.35)
SPEED	-.82 (0.00)**	-.81 (0.00)**	-.50 (0.00)**
PLATE	.13 (0.00)**	.17 (0.00)**	.05 (0.35)
SHORT	-.04 (0.01)**	-.07 (0.02)*	.003 (0.88)
POLE	.67 (0.00)**	.65 (0.00)**	.34 (0.05)*
RPURSE	.04 (0.42)	.009 (0.87)	.006 (0.98)
	R^2 = 0.65 Chow (p-value)= 0.31	R^2 = 0.67	R^2 = 0.74
** indicates a p-value significant at the 1% level; * indicates significant at the 5% level.			

Results for the Busch and Craftsman Truck series show that there is not a significant change in the coefficients. The p-values for the Chow tests are 0.24 and 0.31. Drivers do not appear to change their risk taking during the season. The existing tournament structure does not promote more aggressive driving over the season-ending races.

CONCLUSIONS

The compensating behavior theory predicts that if drivers race under safer conditions, they should undertake riskier behavior. Regression analysis lends evidence in support of this theory. Starting in October 2001, drivers were required to wear a HANS device. Using NEXTEL Cup Series from 1997 through 2003, there

is a change in the number of miles run under caution due to accidents. A Chow test verifies that a break occurs in October 2001.

Von Allmen (2001) asserts that the rank-order tournament used during the NASCAR season prior to 2004 is linear and does not promote appropriate competitive behavior. Starting in 2004, the structure was changed to encourage racing throughout the season. To compete for the season championship, drivers now have a motivation to drive safely and stay in each of the first 26 races. After that point only the top ten drivers compete for the series championship, racing to win the non-linear season-ending awards. As a result, we expect drivers to drive riskier in the second part of the season Neither of the other two NASCAR series, Busch and Craftsman Truck race under the new structure. Therefore, we would not expect their driving behavior to change over the race season. Results support the theory. A Chow test shows a change in the percent of miles run under caution for the NEXTEL Cup Series, while the Chow test does not show any evidence of a break in the ACCMILES variable for the other two series.

ENDNOTES

[1] In their *New York Times*' article "How Many Lives Did Dale Earnhardt Save?," Dubner and Levitt (2006) discuss evidence showing that drivers are responding by driving more safely – there has been a decrease in the number of predicted crashes.

[2] Several sources are used for this material including www.nascar.com, www.nascarmedia.com and www.racing-reference.info.

[3] One problem in the early days of car racing was that promoters organized the race, but had left town by the time the race was over, taking the entrance fee money for himself. While the cars are referred to as "stock" (i.e., off the dealership floor), there is actually very little in common today with any car that you might buy from your Ford, Chevrolet or Toyota dealer and a NEXTEL car.

[4] Some speedway tracks are ovals (with four turns), and some are tri-ovals (three turns); other tracks are road courses. Due to the track design at Daytona and Talladega superspeedways, cars are required to use "restrictor plates" that purposely slow down the cars. We omit data from road courses in this study because these tracks are substantially different from the speedways.

[5] In early years of racing, a race official "threw out the yellow flag," the signal that the track was under caution and the safety car entered the track. While the yellow caution flag is still used, teams also notify their drivers that they are racing under caution using radios.

[6] The HANS (head and neck support) is the most popular restraint product, but not the only one. Drivers were allowed to wear one of several models, but starting in 2005 only the HANS was approved.

[7] One other safety development has also taken place during the same period. To soften the blow on impact, developers have designed padded walls to replace small sections of the concrete walls that surround the tracks. These walls have only been installed at a few turns at Lowe's Motor Speedway and Indianapolis. While several other safety features have been added over the years, it was only after the addition of the HANS device that deaths have (so far) ended.

[8] The following information deals with the NEXTEL Cup series and its predecessors.

[9] It is no coincidence that "The Chase" starts at the same time as the NFL season begins. The NFL is considered NASCAR's biggest competitor for fans and viewership.

[10] Answering Traynor's second question is not something as important to NASCAR. Race fans like the accidents. No research has been undertaken to discover the "optimal" number of accidents in a race...yet.

[11] A Washington Post article (2007) cited data from Joyce Julius Associates (a firm that collects advertising statistics) claiming that "Home Depot's logo received 29 minutes and 51 seconds of airtime" when Tony Stewart drove the Home Depot car to a fifth-place finish in the 2006 Daytona 500. The firm calculated that this exposure plus Home Depot's name being said during the race's broadcast was worth $8.3 million. Joyce Julius estimates that the Home Depot's NASCAR media exposure for the entire season was worth $98.6 million.

[12] I appreciate the access to NASCAR's media website for this data.

[13] Dubner and Levitt (2006) use the number of crashes to measure risk-taking. The number of crashes though doesn't reflect the severity of the wrecks or the number of cars involved. The number of miles run under better represents the risk-taking by drivers. The riskier the driving, the more complicated the wrecks and the more clean-up time required all lead to more miles run under caution.

[14] David Ronfeldt (2002) notes the game theory tactics that drivers must use under these conditions. Given the aerodynamics, drivers must race in columns to benefit from lower air resistance. This "drafting" allows the cars to go faster, but also provokes crashes.

[15] Given that some drivers might have started wearing the HANS device sooner after Earnhardt's death, a Chow test was performed at several earlier points in the 2001 season. None were significant.

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CAPITALISM FOR THE COOPERATIVE: THE NCAA AND NFL MODEL OF PARITY AND PROFIT

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ABSTRACT

Economists have long recognized the cartel behavior of the NCAA. Previous research has addressed the cartel characteristics of monopsony behavior, cheating, member cooperation, and supply limits of the NCAA and its members. Where this paper adds to the literature is the conceptual link between the NCAA and the NFL. Previously, these two sport-focused entities have been viewed separately. Here, the cartel behavior of the NCAA and the NFL are brought to light by identifying the similarities in corporate structure that have led to their stability. It is concluded that in each organization, utility is generated from parity. The governing boards of each entity endorse parity through their agreed upon policies.

INTRODUCTION

Professional and amateur sports have long held an important position in our society. Millions of children and adults participate in a variety of sports and many more enjoy watching teams and individuals compete in athletic venues. There is an intriguing economic aspect to professional and amateur sports that illustrates how both competition and cooperation are required for amateur and professional sports leagues to survive and prosper. This study analyzes the foundation of two important sports leagues by exploring the economic structures that have evolved in the National Football League (NFL) and the National Collegiate Athletic Association (NCAA). Competition and cooperation on the playing field and in the marketplace play key roles in these two highly successful organizations.

This paper provides the conceptual link in philosophy between the NCAA and the NFL: each organization seeks to maximize its total utility by increasing the parity among its members. The cooperation among members leads each of these sports league to more success in terms of its own goals. After a brief introduction

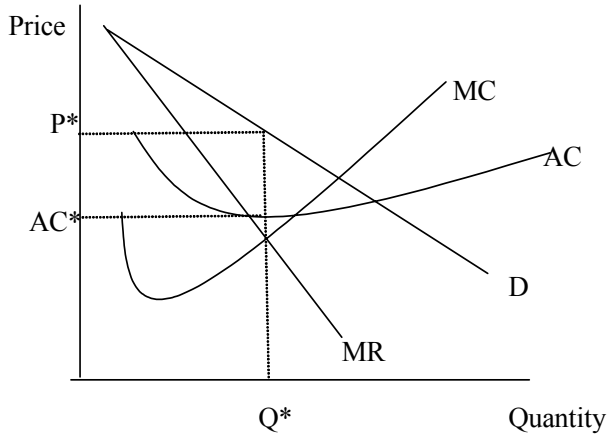
to the nature of competitive and imperfectly competitive markets for goods and labor, we present the NFL as a cartel with a synopsis of the financial impact of its cooperative league policies. We next address the NCAA as a cartel, focusing on the monopsony power of the universities which is formalized by the NCAA. Evidence from the NFL and NCAA is presented to illustrate the link between on-the-field parity and accomplishing organizational objectives. A conclusion brings together the essential points of the study.

THE IMPERFECT COMPETITION MODEL

A basic look at how competition among businesses affects price, output, and employment is helpful in understanding the economic structures of the NFL and the NCAA. Competition among firms can produce a wide variety of quality products at lower prices. A firm's objective is to increase its profit by making a better quality product at a lower cost than its competition. To reach this goal, a firm tries to increase its share of the market while reducing the shares held by other firms. In a highly competitive market, the forces of demand and supply set the price of the good or service and determine how many units of the item will be exchanged between buyers and sellers**.**

When there are many small buyers and sellers of an identical product, each firm will charge the market price for the product. To maximize its profit, a perfectly competitive firm will produce the output level where price is equal to its marginal cost of production. While a firm in this market structure can earn a positive profit in the short-run, over time the entry of new firms into the market will eliminate the economic profit of all firms.

At the other extreme, a monopolistic firm services the entire market demand for the good. Being the only supplier of the good, the monopoly is provided an opportunity to restrict output and charge a higher price. Since a monopoly faces the downward-sloping market demand curve for the product, it must reduce its price to sell additional units of its product. To maximize its profit, the monopoly will produce the output level at which its marginal revenue is equal to its marginal cost of production. At this output level the firm's price will be greater than its marginal cost. As long as the firm can keep its price above its average total cost, it can earn a positive economic profit. In the graph below, the monopoly would produce output Q*, charge price P*, and earn the profit shown by the P*, AC*, Q* rectangle.



When there are a small number of competing firms in a market, the desire of each firm to increase their profit can result in the firms joining together to form a cartel. In a cartel, the firms decide to work together rather than compete aggressively against each other. They create a set of rules by which they agree to restrict their combined output in order to drive up the price and increase their collective profit. If the cartel is successful in including all the firms in the industry, then it is able to act as a monopoly. The result is an industry price and quantity comparable to the monopoly, P* and Q*.

Under the cartel, multiple firms must work together to maintain the optimal level of output, Q*, that maximizes industry profit. Barriers to entry must be established to prevent potential challengers from coming into the industry. Such barriers could be legal, technical, ownership of key resources, or a productivity advantage.

In our model, the prices charged by individual firms (teams) in the cartel, P*, can vary based on demand differences, and imperfect customer mobility. For example, the Washington Redskins have a different demand for their product than the Buffalo Bills. They offer a slightly different product to a different cliental, which allows them the opportunity to charge a higher price for their good. While, customers in Washington may squabble over the higher ticket prices, it is unlikely they will attend games in Buffalo (or even Baltimore) to avoid the admission fee charged in Washington. In short, while the cartel members are locked into the

quantity of games, Q*, they have some power in the determination of ticket prices to attend a game.

The desire to maximize profit motivates the cartel member to minimize its production costs by paying the lowest prices possible for its resources. If the firm is competing with many other firms for labor, wages paid to workers will be driven up. If, on the other hand, the firm is a single employer of labor, or colludes collectively with their competition on wage ceilings, then the workers face a monopsonist. When employers (buyers) unify they have the power to limit the number of jobs available and pay a lower than market wage. On the supply side of the labor market, if the workers organize themselves into a body that can negotiate collectively with employers, their wages will be higher.

While cartels are illegal in the United States because they prevent competition, it can be argued that the structural frameworks of the NFL and the NCAA are, in fact, cartels in nature. Their member "firms" both compete and cooperate to be successful.

JUSTIFICATION FOR THE STUDY:

The NCAA, a non-profit organization originally designed to promote a safe environment for students participating in intercollegiate athletics, has evolved into a multi-million dollar a year enterprise. The NFL is a for-profit industry that seeks to maximize its profit by providing top quality entertainment for its fans. In effect, both entities operate as monopsonists in the market for players. Because the athletes have limited options as to where they can supply their services, there is a transfer of wage bargaining power to the buyer of labor. The NCAA controls its input market of athletes by restricting the number of scholarships available per sport and prohibiting financial compensation to student athletes. The NFL enforces a salary cap on each team's total outlay on players to standardize player costs throughout the league. The NCAA restricts output by mandating official start dates and season-ending tournaments. Similarly, the NFL sanctions a formal league schedule and a well-defined playoff structure. Both organizations employ programs of revenue redistribution and sharing. They both adhere to formal codes of conduct and monitor cartel behavior to prevent cheating by observing the output of their members. Both organizations allow their members independence in setting ticket prices and negotiating local sponsorship deals as an additional source of income, thus allowing demand to determine the prices of their games and profits to be maximized in the long-run.

Among the NCAA universities, increased parity in athletic competition improves the opportunity of member institutions to compete on a level playing field, while in the NFL increased parity leads to increased market capitalization for team franchises. In each industry the owners, be they universities or professional franchises, secure a larger share of the profit from consumers and workers than would otherwise occur if their goods and labor markets were perfectly competitive.

The structures of the NFL and the NCAA determine the quality of their products, the prices paid by their consumers, and the employment conditions of the individuals supplying those products. To provide insight into these two interesting models of sports economics, we explore the framework of the NFL and the NCAA, presenting evidence of the balance they seek between cooperation and competition.

REVIEW OF THE NATIONAL FOOTBALL LEAGUE

The American Professional Football Association was formed in 1920 with eleven teams; two years later the association changed its name to the National Football League. Although the league had a shaky beginning with teams entering and leaving at will, as the popularity of the sport increased, team owners were able to develop a set of rules and regulations that gave stability to an increasingly profitable enterprise. Since its inception the league has seen changes in its member cities, occasional competition from other professional football leagues, and the development of a strong union representing the athletes who perform in the NFL. Today the NFL has thirty-two teams and is considered by many to be the most successful sports league in the world.

The structure of the National Football League has evolved over the years by agreements among team owners on a number of important factors that promote a balanced competition on the field. Having competitive games is essential to maintaining a strong level of fan interest in NFL games. In essence, the owners are uniting to produce a joint product of entertaining and profitable games. The desire of each individual club owner to have a team that outperforms all others must be constrained in the context of rules that provide for increased profit for the entire league. Several times each year, the NFL owners gather to discuss rule changes, schedules, player issues, expansion team proposals, revenue sharing, and other league-related issues. It appears that "this structure is becoming the prototype approach to operate a sports league in the United States."[1] In the market for sports entertainment, it is parity and cooperation among clubs, as opposed to cutthroat

business competition, that result in the best product for the customers and the greatest profit for the producers.

Former NFL Commissioner Paul Tagliabue described his league's organizational structure as a prototypical capitalistic market that favors "the little guy." Tagliabue supports the concept that capitalism in its purest sense results in parity. [2] However, it is not the free market principles that have led to the increased parity among NFL teams. Instead it is the organizational structure embraced by their governing board that keeps the playing field even. The following policies and regulations are most effective in a cartel structure, where decisions are made at an aggregate level in an effort to maximize the collective profits of the participating members.

Parity Adjustments

It is important that all teams abide by the league rules. There are methods used by the NFL owners' association to provide side payments to satisfy all members and maintain cooperation. One way to improve on-the-field performance parity is to adjust team schedules based on relative quality. Each season the NFL teams play a carefully designed schedule of 16 games based on their previous year's performance. To improve the level of competition across the league, teams that finished near the bottom of the standings the previous year have a relatively softer schedule while teams that finished near the top have a stronger schedule. Another way to appease the weaker members is to give them the first choice of players from the incoming talent pool. In its annual draft of amateur players, the NFL teams select the top college football players in reverse order of their league standings the previous year. This means the weaker teams are able to draft the better players, thus improving their chance of being competitive on the field.

Revenue Sharing

Another approach used to promote on-the-field parity is preventing the wealthiest teams from buying all the top players. Through negotiations with the NFL Players Association the NFL developed a revenue sharing plan. Under the terms of the latest collective bargaining agreement which runs through the 2011 season, the top fifteen revenue-producing teams will be required to contribute funds to a pool which will be shared with the lowest seventeen revenue-producing teams. These side payments allow the lower revenue clubs to be more competitive in hiring

quality players. "Before this settlement, the players received about 65 percent of a smaller revenue pool known as defined gross revenue. The new, larger revenue pool is called total football revenue, and the players are to receive approximately 59.5 percent of it."[3] The contributions to the pool by the wealthiest fifteen NFL clubs are based on revenue from sources other than television contracts. Television revenue is already shared equally by all 32 clubs.

Barriers to Entry

The number of teams in the NFL is determined by the owners of the existing teams. Decisions to change the number of teams are based on how such a change will impact the overall profit picture of the NFL. Controlling the number of teams also means controlling the number of jobs for players in the league. The owners have monopoly power over the broadcasting of professional football games and monopsony power over the hiring of the best players.

Monopoly Behavior

Another structural feature of the NFL aimed at giving all teams more equal resources to compete for players is a salary cap which limits the total outlay of each team on player salaries. Under the new collective bargaining agreement signed by the NFL team owners and the NFL Players Association in March 2006, the salary cap for each team, which was $85.5 million for the 2005 season, will increase to $102 million for 2006 and $109 million for 2007. There is also a floor below which salaries cannot fall.

The Market for the NFL Players

In the first several decades of its existence, the NFL was the only professional football league and its teams had total control over players. There was no players' union and there were no viable employment alternatives for the players. They either accepted the salaries offered to them or did not play professional football. Two opposing factors have affected the labor market monopsony of owners.

There have been several other professional leagues that tried to compete with the NFL for players, fans, and profits. The only one that significantly impacted the NFL was the American Football League (AFL) which survived ten years until

it merged with the NFL for the 1970 season. During the decade before the NFL-AFL merger, both leagues competed for college players and player salaries increased. The World Football League lasted only two seasons (1974-1975). Even though it had strong financing from its investors, the United States Football League (USFL) collapsed after only three seasons of games played in the spring and summer months of 1983-1985. Two current leagues, the Arena Football League, formed in 1987, and the Canadian Football League (CFL), have never been serious threats to hire many top players away from the NFL.

As the popularity and profit of the NFL increased, players recognized the potential to obtain higher salaries and improved benefits. When their requests were ignored by team owners, the players formed the NFL Players' Association in 1956. After some tumultuous times, including a month-long strike in 1987, the NFLPA has increased its bargaining stature in its representation of players in negotiations with the owners. In March 2006 the owners and the NFLPA agreed on a new collective bargaining agreement that will extend through the 2011 season.

One might argue that the NFL owners' association cannot be viewed as a cartel since typical cartel members would obtain greater profits if their competitors did not exist. In the NFL there is a synergy of profit between the owners. In fact, one could view the NFL owners as agents representing different divisions of the same enterprise. By acting together the owners establish monopoly power with regard to supplying professional football games. The NFL owners collectively negotiate injury clauses, release policies, retirement plans, performance incentives, and other player issues. Their objective is to minimize expenses. The NFL behaves as a cartel with its shared revenue, capped salary expenses, cooperation of owners, and control of its input market.

Even though the owners implement policies to promote equality on the playing field, some teams perennially perform at a sub-par level. It has been suggested that the owners of these teams choose to pocket much of their profit rather than reinvest it in their franchise. The NFL owners' association monitors each team to insure its allegiance to the league's objectives. League profit is negatively affected by owners who circumvent the rules to help (or hurt) their teams on the field. Any shift away from parity reduces the value of the product created by the NFL. Teams caught violating the league rules are liable to pay fines, lose draft picks, face reductions in their salary cap, or suffer other penalties sanctioned by the league.[4] The policies set by the owners' association serve to improve the parity among competing programs, while reducing the incentive to cheat. This dependence

on each other to maintain a high quality product is not typical for cartels, most cartels are not bothered when members dissolve, but it works for the NFL.

NFL LITERATURE REVIEW

Literature regarding the NFL as a cartel has been sparse. The escalation in players' salaries and the league's collective bargaining agreement with the players' association have steered researchers away from identifying the NFL as a typical cartel. However, the limited options for premium football players, the cooperation between NFL owners, and the requirement of a super majority vote of existing owners for approval of new entrants suggests there is cartel behavior in professional football.

In 1993, the NFL owners and the NFL Players Association penned an agreement that promoted cooperation among labor and owners. Even though the settlement did not help all players equally, it did increase the rewards for players in general and improved the competitive balance among teams.[5] The agreement also led to a standardization of costs and a less volatile stream of revenue by teams. Einolf (2004) presented data examining the parity in spending among NFL teams since 1981. Since the agreement clauses were invoked in 1994, team salaries have increased for all teams, benefiting players and owners. Franchises have worked cooperatively to "increase consumer interest in their collective product." (Einolf, 2004, p.128). This cooperation between the players and the owners has led to a better product and increased the fan base for the NFL. Vrooman refers to the payroll cap as "cost sharing collusion." (1995, p. 971) He contends that revenue sharing in the NFL leads to a competitive balance and parity.

EMPIRICAL ANALYSIS

An interesting comparison can be made between the NFL and Major League Baseball (MLB). Parity is not stressed in MLB with the same vigor as it is in the NFL. The MLB salary caps are softer since owners who break the cap simply pay a luxury tax on the spillover salary. Paying the additional tax is not always a disincentive for MLB owners to purchase players. The benefits some teams earn from media contracts and gate receipts outweigh the costs of high player salaries and tax penalties. The spending disparity allowed in MLB implies that team parity is not as critical a league objective as it is in the NFL.

Although there is no perfect method of determining the impact of parity on collective league profit, the comparison of the NFL to MLB provides an example of a league that stresses parity versus a league that provides a framework for individual teams to maximize their own profit. The NFL parity may be evidenced through measurable variables such as attendance, operating profit, market values, and rates of return on investment. Compared to MLB, the NFL teams have higher capacity levels (attendance as a percent of stadium capacity), operating profit (earnings before interest and tax), rates of return, and market capitalization. The parity within the NFL is a key component to the financial strength of the league.

NFL teams have the highest capacity level of any professional sport in the United States. MLB attendance has been slipping since 2001 and in 2004 the average MLB team operated at 68.1% capacity. NBA attendance has also fallen off in the past few years since the departure of Michael Jordan. But during 2003 - 2004 season, the typical NBA team still operated at 88.5% capacity. The National Hockey League (NHL) attendance-to-capacity ratio was 90.5% in the 2003-2004 season before the strike of 2004-2005 resulted in the suspension of league play. Meanwhile, twelve NFL teams sold over 99% of their seats in 2003 and the league overall operated at 94.7% capacity (see Table 1). Only four NFL teams averaged less than 90% capacity for the 2003 season. In the NHL, thirteen teams were below 90% capacity in the 2003-2004 season. Twelve of 30 teams in the NBA, and 26 of 30 teams in MLB, were below 90% capacity in 2004.[6] Although the low number of homes games per season is a positive contributor to the NFL attendance success, there are, however, other areas that demonstrate the financial success of the NFL and the benefits of parity.

In 2004, the average NFL team earned $26.6 million in profit, with the league overall bringing in total profit of over $850 million. (See Table 1.) Only the Arizona Cardinals showed a loss from its NFL operations that season. In MLB, 11 teams showed a loss during the 2000 season, with the average team in baseball losing $1.9 million. (See Table 3.) In 2005, the number of MLB earning a loss decreased to five teams. As a whole, MLB reported a combined loss of $57 million in 2000, and profit of $330 million in 2005.[7] The accounting procedures of MLB owners have been a topic of much discussion, but regardless of their methods of reporting income and shifting money from team to media operations, it is clear that the NFL is a more profitable league for owners. NFL owners have earned greater annual profits and have witnessed larger increases in team valuations.

Table 1: NFL Operating Profit and Attendance		
(in millions $)	Operating Profit	Capacity
NFL Teams	2004	2003
Washington Redskins[2]	53.8	94.2%
Dallas Cowboys	54.3	97.1%
Houston Texans	41.3	100.6%
New England Patriots	50.5	100.6%
Philadelphia Eagles	24.5	99.9%
Denver Broncos	49.4	99.3%
Cleveland Browns	41.1	100.1%
Chicago Bears	40.1	86.0%
Tampa Bay Buccaneers	45.4	101.0%
Baltimore Ravens	32.7	100.4%
Miami Dolphins	15.8	96.5%
Carolina Panthers	24.3	97.6%
Green Bay Packers	35.4	97.4%
Detroit Lions	15.4	94.2%
Tennessee Titans	35.1	100.4%
Pittsburgh Steelers	36.5	94.3%
Seattle Seahawks	14.4	94.1%
Kansas City Chiefs	31	98.4%
St Louis Rams	39.8	100.1%
New York Giants	26.7	98.2%
Jacksonville Jaguars	34.6	77.1%
New York Jets	12	98.2%
Cincinnati Bengals	45.6	80.5%
Buffalo Bills	36.1	92.6%
San Francisco 49ers	43.6	97.1%
New Orleans Saints	42.6	99.2%
Oakland Raiders	7.8	96.0%
San Diego Chargers	32.8	88.4%

Table 1: NFL Operating Profit and Attendance		
(in millions $)	Operating Profit	Capacity
NFL Teams	2004	2003
Indianapolis Colts	16.4	101.0%
Minnesota Vikings	15.6	99.9%
Atlanta Falcons	26.8	96.7%
Arizona Cardinals	16.2	56.0%
National Football League		94.7%

1. Earnings before interest and taxes
2. Teams are listed by market value highest to lowest.
Data Sources: Street & Smith's Sports Business Journal "By the Numbers 2004" Vol. 6, Issue 36
NFL profit data were found at www.forbes.com/lists/results

In the United States, 30 NFL teams rank in the 37 top-valued sports franchises.[8] Table 2 displays the market value of NFL teams. Over the period from1998 to 2004, the market values increased over 180 percent among the established franchises (excluding the newly formed Cleveland and Houston clubs). The Philadelphia Eagles (+644%) and Kansas City Chiefs (+476%) have enjoyed the greatest increases in market value over this period. This breadth of growth has not been observed in MLB. Table 3 reveals that since 1998 five baseball franchises have decreased in value. From 2003 to 2004, thirteen baseball teams experienced reductions in their market value. The average rate of growth in market value for MLB clubs during the 1998 to 2004 period was 54%, less than a third of the rate of growth in the NFL.

Table 2 NFL Team Valuations (in $millions)								
NFL Teams	1998	1999	2000	2001	2002	2003	2004	Growth[1]
Washington Redskins	403	607	741	796	845	952	1100	173%
Dallas Cowboys	413	663	713	743	784	851	923	123%
Houston Texans						791	905	14%
New England Patriots	252	460	464	524	571	756	861	242%
Philadelphia Eagles	112	318	329	405	518	617	833	644%
Denver Broncos	320	427	471	540	604	683	815	155%

Table 2 NFL Team Valuations (in $millions)								
NFL Teams	1998	1999	2000	2001	2002	2003	2004	Growth[1]
Cleveland Browns			557	598	618	695	798	43%
Chicago Bears	237	313	319	362	540	621	785	231%
Tampa Bay Bucs.	346	502	532	582	606	671	779	125%
Baltimore Ravens	329	408	479	544	607	649	776	136%
Miami Dolphins	340	446	472	508	553	638	765	125%
Carolina Panthers	365	488	513	574	609	642	760	108%
Green Bay Packers	244	320	337	392	474	609	756	210%
Detroit Lions	312	293	378	423	509	635	747	139%
Tennessee Titans	322	369	506	536	551	620	736	129%
Pittsburgh Steelers	300	397	414	468	557	608	717	139%
Seattle Seahawks	324	399	407	440	534	610	712	120%
Kansas City Chiefs	123	353	367	412	462	601	709	476%
St Louis Rams	322	390	418	448	544	602	708	120%
New York Giants	288	376	387	419	514	573	692	140%
Jacksonville Jaguars	294	419	460	500	522	569	688	134%
New York Jets	259	363	384	423	512	567	685	164%
Cincinnati Bengals	311	394	423	479	507	562	675	117%
Buffalo Bills	252	326	365	393	458	564	637	153%
San Francisco 49ers	254	371	379	419	463	568	636	150%
New Orleans Saints	243	315	324	371	481	585	627	158%
Oakland Raiders	235	299	315	351	421	576	624	166%
San Diego Chargers	248	323	393	416	447	561	622	151%
Indianapolis Colts	227	305	332	367	419	547	609	168%
Minnesota Vikings	233	309	322	346	437	542	604	159%
Atlanta Falcons	233	306	321	338	407	534	603	159%
Arizona Cardinals	231	301	305	342	374	505	552	139%
average growth								181%

1. Growth rates were calculated for the seven year period.
Data Source: Team Valuation data were found at www.forbes.com/lists/results

Table 3 Major League Baseball Team Valuations (in $millions)									
MLB Team	1998	1999	2000	2001	2002	2003	2004	Growth[2]	EBIT[3]2005
New York Yankees	362	491	548	635	752	849	832	130%	-50
Boston Red Sox[1]	230	256	284	339	426	488	533	132%	-18.5
New York Mets	193	249	314	454	482	498	442	129%	-16.1
LA Dodgers	236	270	325	381	435	449	399	69%	13.4
Seattle Mariners	251	236	290	332	373	385	396	58%	7.3
Atlanta Braves	299	357	388	407	424	423	374	25%	27.6
San Fran Giants	188	213	237	333	355	382	368	96%	11.2
Chicago Cubs	204	224	242	247	287	335	358	75%	7.9
Houston Astros	190	239	280	318	337	327	320	68%	30.2
St. Louis Cardinals	174	205	219	243	271	308	314	80%	7.9
Texas Rangers	254	281	294	342	356	332	306	20%	24.7
Baltimore Orioles	323	351	347	335	319	310	296	-8%	21
Cleveland Indians	322	359	364	372	360	331	292	-9%	34.6
Colorado Rockies	303	311	305	334	347	304	285	-6%	16.3
Philadelphia Phillies	131	145	150	158	231	239	281	115%	14.8
AZ Diamondbacks	NA	291	268	245	271	269	276	-5%	21.8
San Diego Padres	161	205	197	176	207	226	265	65%	13
Chicago White Sox	214	178	166	213	223	233	248	16%	21.7
Cincinnati Reds	136	163	175	187	204	223	245	80%	17.9
Anaheim Angels	157	195	195	198	195	225	241	54%	-2.6
Detroit Tigers	137	152	200	290	262	237	235	72%	3.5
Pittsburgh Pirates	133	145	161	211	242	224	217	63%	21.9
Oakland Athletics	118	125	134	149	157	172	186	58%	16
Milwaukee Brewers	127	155	167	209	238	206	174	37%	22.4
Florida Marlins	159	153	125	128	137	136	172	8%	-11.9
Kansas City Royals	108	96	122	138	152	153	171	58%	20.8
Toronto Blue Jays	141	162	162	161	182	166	169	20%	29.7
Minnesota Twins	94	89	91	99	127	148	168	79%	7

Table 3 Major League Baseball Team Valuations (in $millions)									
MLB Team	1998	1999	2000	2001	2002	2003	2004	Growth[2]	EBIT[3]2005
Tampa Bay Devil Rays	NA	225	163	150	142	145	152	-32%	20.3
Montreal Expos	87	84	89	92	108	113	145	67%	N/A
average								54%	

1. Bolded teams showed an operating loss for the 2000 season.
2. Growth rates were calculated for the seven year period.
3. Earnings Before Interest and Taxes
Data Source: Team Valuation data were found at www.forbes.com/lists/results

Table 4 NFL Owners' Rate of Return on Investment				
NFL Team	Date of Purchase	Purchase Price	2004 Market Value	Annual Rate of Return
		($ millions)	($ millions)	(%)
Arizona Cardinals	1932	0.5	552	13.6
Atlanta Falcons	2001	545	603	2.66
Baltimore Ravens	1999	275	776	18.9
Buffalo Bills	1959	0.03	637	24.8
Carolina Panthers	1993	206	760	12.6
Chicago Bears	1920	0.0001	785	20.8
Cincinnati Bengals	1967	7.5	675	12.9
Cleveland Browns	1998	530	798	7.1
Dallas Cowboys	1989	150	923	12.9
Denver Broncos	1984	78	815	12.4
Detroit Lions	1963	4.5	747	13.3
Green Bay Packers	1921	0.25	756	10.1
Houston Texans	1999	700	905	5.3
Indianapolis Colts	1972	15	609	12.3
Jacksonville Jaguars	1993	208	688	11.5
Kansas City Chiefs	1959	0.03	709	25.1

Table 4 NFL Owners' Rate of Return on Investment				
NFL Team	Date of Purchase	Purchase Price	2004 Market Value	Annual Rate of Return
		($ millions)	($ millions)	(%)
Miami Dolphins	1994	138	765	18.7
Minnesota Vikings	1998	250	604	15.8
New England Patriots	1994	158	861	18.5
New Orleans Saints	1985	71	627	12.1
New York Giants	1989	75	692	16
New York Jets	2000	635	685	1.9
Oakland Raiders	1972	0.18	624	29
Philadelphia Eagles	1994	185	833	16.2
Pittsburgh Steelers	1933	0.0025	717	19.4
San Diego Chargers	1984	70	622	11.5
San Francisco 49ers	1977	13	636	15.5
Seattle Seahawks	1997	194	712	20.4
St Louis Rams	1972	19	708	12
Tampa Bay Buccaneers	1995	192	779	16.8
Tennessee Titans	1959	0.03	736	25.2
Washington Redskins	1999	750	1100	8
average rate of return				14.8
length of ownership (years)				26.2
Data Sources: Street & Smith's Sports Business Journal "by the Numbers 2004" Vol. 6 (36) NFL market valuation data were found at www.forbes.com/lists/results				

Tables 4 and 5 present the purchase prices of the current NFL and MLB franchises. Based on information gathered from the club owners, the data show that NFL owners earned a higher rate of return on their investment than did MLB owners. The typical NFL owner has held the team for over 26 years and earned a 14.8% annual rate of return. In comparison, the average MLB owner has held the team for less than 10 years, with only a 10.7% annual rate of return.

The evidence presented in the tables is not conclusive proof by itself that promoting team parity is a profitable strategy. However, it does show that a league which emphasizes parity and cooperation (NFL) has been more profitable than a league which allows wide disparities in spending based on market sizes and owner attitude (MLB). The general health of the NFL is stronger than that of MLB for a variety of reasons, one of which is the NFL policies that more strongly promote parity among the teams.

Table 5. Major League Baseball Owners' Rate of Return on Investment

MLB Team	Date of Purchase	Purchase Price	2004 Market Value	Annual Rate of Return
		($ millions)	($ millions)	(%)
Anaheim Angels	2003	180	241	33.9
Arizona Diamondbacks	1995	130	276	8.7
Atlanta Braves	1993	173	374	7.3
Baltimore Orioles	1993	173	296	5
Boston Red Sox	2002	660	533	N/A[1]
Chicago Cubs	1981	20.5	358	13.2
Chicago White Sox	1981	20	248	11.6
Cincinnati Reds	1999	67	245	29.6
Cleveland Indians	1999	323	292	-1.8
Colorado Rockies	1991	95	285	8.8
Detroit Tigers	1992	82	235	9.2
Florida Marlins	2002	158.8	172	4.1
Houston Astros	1992	115	320	8.9
Kansas City Royals	2000	96	171	15.5
Los Angeles Dodgers	2004	430	399	N/A
Milwaukee Brewers	2005	180	174	N/A
Minnesota Twins	1984	36	168	8
New York Mets	1986	80.75	442	9.9
New York Yankees	1973	10	832	15.3
Oakland Athletics	2005	180	186	N/A
Philadelphia Phillies	1981	30	281	10.2

Table 5. Major League Baseball Owners' Rate of Return on Investment

MLB Team	Date of Purchase	Purchase Price	2004 Market Value	Annual Rate of Return
		($ millions)	($ millions)	(%)
Pittsburgh Pirates	1996	90	217	11.6
San Diego Padres	1994	106	265	9.6
San Francisco Giants	1992	100	368	11.5
Seattle Mariners	1992	106	396	11.6
St. Louis Cardinals	1996	150	314	9.7
Tampa Bay Devil Rays	1995	130	152	1.8
Texas Rangers	1998	250	306	3.4
Toronto Blue Jays	2000	112	169	10.8
Washington Nationals	2002	120	145	9.9
average rate of return				10.7
length of ownership (years)				9.7

N/A represents a decrease in value, or insufficient time to calculate a value.
Data Sources: Street & Smith's Sports Business Journal April 3-9, 2000 Vol. 2, Issue 50
MLB market valuation data were found at www.forbes.com/lists/results
Recent MLB franchise sales found at various websites (available on request).

REVIEW OF THE NATIONAL COLLEGIATE ATHLETIC ASSOCIATION

Alarmed by deaths and injuries of students playing collegiate football, President Theodore Roosevelt encouraged colleges and universities to take steps to improve the safety of the game. As a result, the Intercollegiate Athletic Association of the United States was created in 1906. This private, not-for-profit organization changed its name to the National Collegiate Athletic Association in 1910. In 1973, the NCAA organized its members into three divisions: Division I, Division II, and Division III. Schools in each division are subject to the regulations created for that division by the NCAA. Violation of these regulations by any of the 1024 active member institutions can result in severe fines and punishment by the NCAA.

The NCAA is the largest organization of its type in the world. Its core purpose is "to govern competition in a fair, safe, equitable and sportsmanlike manner, and to integrate intercollegiate athletics into higher education so that the educational experience of the student-athlete is paramount."[9]

Incidents like the University of Kentucky's point shaving scandal in 1951 forced the NCAA to expand its mission from exclusively player safety to including the oversight of academic standards, the promotion of student athletics, the enforcement of rules for gender equity, and the negotiation of multi-million dollar media contracts for member institutions.[10] To accomplish these objectives, the NCAA has implemented policies to standardize student and university behavior among member institutions.

The attributes of a typical cartel are formal agreements between firms in the same industry, side payments, limiting supply, monopsony behavior, monitoring of cheating, and barriers to entry. How well do these characteristics apply to the NCAA?

The Formal Agreements between Suppliers

At the top of the NCAA organizational structure is its Board of Directors made up of college and university presidents. The Board of Directors receives legislation from the Management Council that consists of representatives (e.g., athletic directors and faculty advisors) from the schools. At its annual conferences, the athletic directors of competing NCAA institutions meet with NCAA officials to set policies for player behavior, game scheduling, and institutional ethics. The meetings allow university representatives the opportunity to discuss issues and formulate decisions on issues that could divide them during the season. Colleges and universities that violate the rules established by the governing board are in danger of forfeiting their membership privileges and being placed on probation. Probation could inhibit the schools' ability to participate in NCAA-sponsored championship tournaments, or disqualify them from revenue distribution.[11] Potential athletes steer away from schools on probation for the fear of being associated with a scandalous program, or a program that has limited exposure to television audiences. The NCAA has also established financial incentives to members who maintain good standing and abide by the rules established by the Board.

Although "money" is not mentioned in the NCAA Statement of Purpose, in 2005 cash and marketable securities accounted for 70% of the NCAA's assets, totaling over $248 million.[12] While the NCAA claims that its plan for the

distribution of revenue enables it to accomplish its goals of fairness, student athlete public awareness, and leadership,[13] this cash also motivates schools to conform to the standards established by the NCAA and encourages major conference allegiance to the NCAA.

Revenue Sharing

Cartels must formalize an arrangement that encourages their most prominent members to abide by the cartel's rules. The approach the NCAA adapts to instill this commitment is revenue distribution. Major conferences have the potential to withdraw from the NCAA and unite together in some alternative association. Since the NCAA needs these powerful conferences to maintain its control over intercollegiate sports, it distributes the majority of its generated funds to the largest conferences. The conferences then pass on their money to their member schools.

In 2003 the Big Ten, the largest revenue-producing conference, received $26.1 million from the NCAA, while at the other end the less imposing Big South Conference was granted only $2.6 million. In total, nearly $264 million in side payments were distributed to member conferences and universities that year.[14] Of the thirty one conferences in Division I, the top six receive nearly half of the revenue distribution. Much of this revenue comes from football bowl games in which the major conferences are guaranteed the opportunity to participate. The four Bowl Championship Series (BCS) games dwarf the other bowl games in terms of revenues and are dominated by the six "power conferences."[15] The NCAA argues that even though the institutions in major conferences obtain a greater share of the revenue distribution, all institutions, regardless of their conference affiliation, have a more equal playing field because of its sanctions established by the Board.

Limiting Supply

The NCAA's cartel power extends to its product market through schedule restrictions. Each NCAA sport is given specified starting and ending dates for regular season games, and every season concludes with a tournament or championship. During the specified period, NCAA teams can only play a limited number of games. The limited schedule established by the NCAA and endorsed by its member institutions results in the maximization of collective profit for the participating schools. Similar to other cartels that limit supply, the schedule restrictions are in place to benefit the universities as a whole rather than allow a

particular university to maximize its own profit. On the demand side, schools are given freedom to set their own prices for tickets and build stadiums to add to their profit base. During the 2006 college football season, student prices per game ranged from $1 at University of Arkansas to $29.50 per game at Notre Dame. General public ticket prices ranged from $6 per game at New Mexico State to $59.00 per game at Ohio State.[16]

Monopsony Behavior

Clearly, the revenue generated from NCAA football tilts the playing field in favor of successful Division IA football universities. Even with uniform scheduling some schools have the financial ability, fan base, and endowments to provide greater fringe benefits (e.g., better facilities and more recognition) to players than do other schools. That means some universities have the ability to attract talent in a manner comparable to the New York Yankees. Fortunately for the minor universities, the NCAA provides some restrictions on the more successful schools by enforcing policies that promote a level playing field for all universities. For example, participating institutions are limited to a specific number of scholarships per sport, players cannot be paid by the school or receive outside endorsements, players cannot receive money for their sport as a professional athlete, and former professional players are ineligible to participate in intercollegiate sports. Without such policies there would be bidding wars for players in terms of salaries, scholarships, and other forms of benefits.

Using data from 1985 through 1987, Brown (1993) estimated the market value of an NFL-bound college football player to be $538,760 per season. Adjusting for inflation, that value of this professional bound player would exceed $1.2 million in 2004. The difference between the cost of a scholarship and Brown's estimated market value provides an indicator of the monopsony power of the NCAA over high-level players. Scholarship limits and other restrictions make it possible for a school with 6,000 students and limited resources to compete more effectively with a university with 40,000 students and multi-million dollar endowment funds. These restrictions give the smaller schools a better chance of competing than would be the case in the absence of such controls.

Monitoring Cheating

For parity to be achieved, all participating NCAA universities must buy into the concept of equity. If one school dominates a sport or disgraces the image of that sport, particularly a revenue-producing sport, the entire NCAA membership loses. Fans will lose interest and advertisers will spend their dollars elsewhere. To insure survival, the NCAA has established a loyalty within its group. Schools are so concerned with maintaining a positive image (and avoiding heavy penalties for violations) that they monitor themselves and other schools voluntarily. In fact, there are only about 350 NCAA staff members monitoring the 1024 active NCAA member schools, with multiple athletic teams.

Many institutions contact the NCAA when a violation at their school has been brought to their attention. The NCAA appears to assign a lighter sentence to universities that acknowledge their own negligence. Member institutions also monitor each other by evaluating the outcomes of competing schools. Schools that experience sudden success can attract attention and be identified as potential cheaters (see Fleisher, Goff, Shughart, and Tollison, 1988). Convicted cheaters can be placed on probation by the NCAA, and subsequently lose millions of dollars by being banned from tournaments or championship play.

Barriers to Entry

In football there are no leagues other than the NCAA for professional scouts to view potential players. The NFL does not allow its team to employ players under 20 years old. This policy leaves attending college as the only viable choice of the top high school football players. Since no other competitive outlets exist for young athletes to showcase their talent, the NCAA is able to maintain a long-run profit in football. In basketball, the NCAA's monopsony power is a bit weaker since the NBA's age minimum is 19 years of age. In baseball, many players are drafted from high schools and minor league teams, thus reducing the monopsony power of the NCAA in that sport.

NCAA LITERATURE REVIEW

Economists have long recognized the cartel behavior of the NCAA.[17] Previous research has addressed the cartel characteristics of monopsony behavior, cheating, member cooperation, and supply limits of the NCAA and its members.

This research has provided evidence supporting the claim that the NCAA embodies cartel attributes.

Perhaps the most referenced cartel attribute of the NCAA is its monopsony power in the market for athletes. As mentioned above, Brown (1993) estimated the significant magnitude of this monopsony power by computing the economic rent (that portion of an athlete's pay that is greater than the amount needed to keep the athlete in his/her current occupation) generated by a "premium" college football player.

Another strand of research emphasizes cheating among member institutions. After noting the financial benefits of attracting better quality players, Fleisher, Goff, Shughart, and Tollison (1988) concluded that the NCAA has a built-in enforcement mechanism by which members assume that sudden improvements in on-the-field performance by some other member are positively correlated with cheating. Humphreys and Ruseski (2000) support this hypothesis. Their model, which incorporates game theory analysis, predicts the probability of an institution being placed on probation for violating the NCAA's code of conduct. The greater the possibility of being caught and the greater the punishment, the less likely is it that cheating will take place.

Eckard (1998) calls to attention the efforts of the NCAA to limit the supply of its product. Since 1952, the NCAA has restricted output by capping the number of games a member institution could play in a season. At that time, the NCAA also limited the number of a school's games which can be broadcast. But since 1982 conferences have had the freedom to negotiate television and media contracts on their own. Independent schools, such as Notre Dame in football, also are free to negotiate their media packages.

A key objective of the NCAA is to enforce the cooperative agreements established by its Rules Committee. Eckard (1998) analyzed the collusion between the NCAA and its member institutions. His study investigated the dichotomy between the competitive balance propagated by the NCAA and the inevitable inequality among cartel members with the strongest members faring better over time. His findings indicated that since the NCAA formally implemented its cartel-enhancing policies in 1952, the competitive balance objective of the NCAA has not been achieved. (The 1952 policies provided regulation of player eligibility, recruiting, and financial aid. It also created an enforcement mechanism.) In other words, Eckard found the introduction of cartel-like policies, implemented to promote parity, actually discouraged a competitive balance within each sport. His findings highlight the unbalanced impact of cartels on their affiliates. We feel the

imbalance recognized by Eckard would have been even greater without the NCAA regulations and cooperative policies.

THE GOAL OF PARITY FOR THE NCAA AND THE NFL

The cartel qualities of revenue sharing, collusive behavior of governing boards, standardized rules among competitors, and monopsonistic control of labor encourage parity among the teams. The benefits of parity are recognized by NFL players and owners. Gene Upshaw, Executive Director of the NFL Players Association stated that in terms of teams' won-lost records, "everyone was close enough to keep it fair."[18] His statement reveals the preference of the players to have parity among the teams. There is evidence of improvements in parity among NFL teams. From 1993 to 2006, on average 23 of the 32 NFL teams still had an opportunity to win the Super Bowl with three weeks left in the season. Furthermore, 17 different teams have played for the Super Bowl and 9 different teams have won it over that time frame. From the players' perspective, the parity increases the pool of funds available for salaries. From an owners' perspective, team parity enlarges the fan base and increases profit. With both sides recognizing the benefits of parity, the owners and players are united in their purpose.

On the college level, assuming that competing universities have comparable facilities, academic standards, and access to professional leagues, every school should have equal access to the top high school players. Under such assumptions, the on-the-field parity of college teams should be improved.

There is evidence that the policies implemented by the NCAA have promoted equity among member institutions. In Division I basketball, 17 different universities won the National Championship in the 22 years from 1983 to 2004, while 38 different schools advanced to the Final Four. This balance among teams has heightened fan interest, increased gate receipts, and promoted media contracts with the major networks. Television revenue increased by 62 percent over the period from 2000 to 2004**.** It is in the best interest of the NCAA and its member institutions to stand behind the cartel and enforce the policies that encourage parity.

CONCLUSION AND RECOMMENDATIONS:

One of the NCAA's primary objectives is parity among its member universities in athletic events. This parity is embedded in the fabric of the NCAA through its enforced policy restrictions on player recruitment and compensation,

revenue distribution, and standardized scheduling. But parity is a difficult concept to quantify. The NFL owners' association uses similar cooperative policies to create an environment of parity and profit. The owners mandate salary caps on teams, negotiate league media contracts, govern player legislation, control schedules, and share revenue. The NFL's soaring capacity percentages, increasing profits, substantial market capitalization growth, and high rates of return are due, at least partly, to the league's parity policies.

Both the NCAA and the NFL have constructed regulations to promote parity that might appear contrary to the "beat out your competition" principles of pure capitalism. Their interesting approaches to "level-the-playing-field" have proven successful for two organizations that appear to have completely different objectives.

This model of cooperation has been adopted by Major League Soccer. Recently, the league bought an internationally recognized player in an effort to enhance league recognition. The team owners selected Los Angeles as the most lucrative venue for this world renowned player. They understood that the best platform to market him, and essentially the MLS was LA. Other professional and amateur leagues should consider implementing cooperative policies. This parity objective appears to attract fans and improve the prospects for success regardless of how success is measured.

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ENDNOTES

[1] Doug Hamilton, former President of the Los Angeles Galaxy, personal interview, January 18, 2005

[2] Dean's List, amusing musings on sports September 12, 2004. http://deans-list.net/articles_details.php?ID=9

[3] "NFL Owners Approve Labor Pact, Raising Salary Cap", Washington Post, March 9, 2006, page E01.

[4] This information was obtained from an interview with Richard Thigpen, General Council of Carolina Panthers.

[5] See Kowalewski and Leeds (1999)

[6] Street & Smith's Sports Business Journal Vol. 8, Issue 21, 2005, p.20

[7] All MLB and NFL profit data was found at www.forbes.com/lists/results

[8] Ibid 21, data from 2004

[9] www.ncaa.org

[10] According to the NCAA, in 2004-2005 their Television and Marketing Rights fee produced $436,609,819

[11] Depken and Wilson (2004) provide an aggregate study on the Cost of Probation.

[12] http://www.ncaa.org

[13] http://www.ncaa.org

[14] http://www1.ncaa.org/finance/revenue_distribution_plan

[15] Atlantic Coast Conference, Big East, Big Ten, Big Twelve, Pac Ten, South Eastern Conference

[16] Data was acquired from their respective ticket offices.

[17] See Becker (1987)

[18] www.phillyburbs.com/pb-dyn/articlePrint.cfm?id=390655

FACTORS IMPACTING PRICE FOR RETAIL SPACE IN HOUSTON

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ABSTRACT

This paper investigates the demand for retail space in the Houston area from 1981 to 2006. Economic factors such as the employment level, new retail space constructed, vacancy rate, and average price per square foot are presented. Relationships between these variables are studied to determine which variables might be most helpful in forecasting future price for retail space.

INTRODUCTION

This paper investigates the demand for retail space in the Houston area from 1981 to 2006. Data is presented on economic factors such as the employment level, new retail space constructed, change in retail space absorbed into the market, vacancy rate, and average price per square foot. Relationships between these variables are studied to determine which variables might be most helpful in forecasting future price for retail space.

LITERATURE REVIEW

Estimating future price for retail space has historically presented problems to practitioners in the field. Supply and demand are constantly at work in the market place. The creation of new jobs in an area increases the demand for retail space, which would normally result in higher prices for the space. This higher price spurs additional construction of retail space, which increases the supply of retail space. The increased supply would normally provide downward pressure on the price. There is a constantly changing dynamic economy.

Malizia (1991) recognized that long-term demand-side forecasting models needed to include economic development variables in forecasting demand for retail space. Wheaton and Torto (1990) linked job growth to industrial supply and demand. There is a plethora of empirical data linking employment to various factors influencing demand for real estate, or methods and models to forecast one aspect of real estate or another. Valente, Wu, Gelfand and Sirmans' (2005) present a spatial model for predicting apartment rents. Lentz and Tse (1999) present models to relate the performance and needs of the goods market to the demand for commercial real estate.

To effectively forecast retail space demand and the price for that space, a relationship needs to be established between readily available employment information and retail demand forecasts. Lentz and Tse (p. 231) noted, "The commercial real estate market is frequently observed to be in an extended state of disequilibrium." Since there is a time lag between the beginning of the construction cycle and the time when the finished space is available for rent, it can be difficult to make an accurate estimate of future space demands. It is common to overbuild or fail to build enough space simply because the market changed at some point during the construction cycle. The decision to build new retail space should be made after weighing expectations of future demand, retail space under construction, absorption rates and the amount of vacant space already in the market. Lentz and Tse (p. 248) observed," With future demand uncertain, the supply (quantity) of space and the realized demand for space may not match. If the supply is less than the realized demand, the space producer will be able to lease out all the new space. On the other hand, if the supply is greater than the realized demand, the excess supply will cost the space producer holding costs on the vacant units." With this background, we investigate the market for retail space in the Houston area from 1981 to 2006.

THE DATA

Employment data for the Houston area was collected from the Texas Employment Commission, and retail space market data was provided by REVAC, Inc. All data was located either online or in print form. The Texas Workforce Commission publishes quarterly and annual economic statistics on their website, separated by city and type of employment. This information was used to determine overall Houston non-agricultural employment, changes in the Consumer Purchasing Index, and the percentages of goods producing and manufacturing jobs. These data provide a record of historical growth, and are helpful in making estimates of future

economic growth. Data relating to the retail space market was also collected. The most critical for our purposes is the absorption of retail space - the difference between space built and space leased. Additional variables include market vacancy rates, average rent per square foot and the amount of new space constructed.

Table 1 contains historical employment data for the Houston metropolitan area. These data are available online, and similar data are available in most major cities. These data are usually updated several times per year. A practitioner in the field can use these to analyze and draw relationships between the variables. Table 1 presents employment data for the Houston area from 1975 to the present. While total employment over the years has fluctuated, there has been a trend of overall growth in the economy since the recession of the 1980's. Since 1988, the Houston economy has grown at a rate of 2.47% per year. This is an average increase of almost 45,000 new jobs per year. While overall employment is up, employment in goods producing and manufacturing jobs has seen a decline over the last decade. A similar pattern has existed for the rest of the United States because of a shift to a more service oriented and knowledge-based economy.

Table 1. Houston Employment Data (In 1,000s)

Year	Total Wage & Salary Jobs	Goods Prod. Jobs	Goods Prod. As %	Mfg Jobs	Mfg As % of Goods	Change in CPI
1975	993	309	31.1%	170	55.1%	
1976	1,057	332	31.4%	176	53.0%	
1977	1,126	351	31.2%	182	51.8%	
1978	1,229	387	31.5%	199	51.6%	9.4%
1979	1,318	415	31.5%	214	51.7%	13.2%
1980	1,399	440	31.5%	225	51.2%	12.5%
1981	1,517	496	32.7%	249	50.3%	10.0%
1982	1,541	482	31.3%	230	47.7%	6.9%
1983	1,444	402	27.9%	181	45.1%	2.8%
1984	1,476	390	26.5%	178	45.5%	2.7%
1985	1,479	368	24.9%	173	47.0%	2.1%
1986	1,410	320	22.7%	153	48.0%	-1.0%

Table 1. Houston Employment Data (In 1,000s)						
Year	Total Wage & Salary Jobs	Goods Prod. Jobs	Goods Prod. As %	Mfg Jobs	Mfg As % of Goods	Change in CPI
1987	1,386	294	21.2%	146	49.8%	2.5%
1988	1,448	310	21.4%	156	50.5%	2.8%
1989	1,515	328	21.7%	164	50.0%	4.1%
1990	1,605	397	22.2%	201	49.4%	5.7%
1991	1,630	401	22.5%	206	49.7%	3.7%
1992	1,631	389	22.1%	202	50.0%	3.2%
1993	1,659	385	21.1%	202	51.2%	3.3%
1994	1,704	397	21.0%	207	50.2%	3.4%
1995	1,756	411	21.1%	216	50.4%	1.4%
1996	1,981	427	21.6%	225	52.7%	2.1%
1997	2,064	443	21.5%	235	53.0%	1.9%
1998	2,167	467	21.6%	243	52.2%	1.0%
1999	2,202	457	20.8%	235	51.5%	1.3%
2000	2,254	465	20.7%	231	49.7%	3.7%
2001	2,293	477	20.8%	233	48.9%	3.0%
2002	2,288	465	20.3%	221	47.6%	0.3%
2003	2,274	448	19.7%	210	46.8%	2.8%
2004	2,289	440	19.3%	207	47.2%	3.5%
2005	2,350	453	19.3%	212	46.9%	3.7%
2006	2,477	480	19.4%	217	45.3%	0.7%

Table 1 indicates moderate to strong economic growth in the Houston job market. This employment growth should cause demand for existing retail space to increase. The question is - by how much? Table 2 contains retail space market data which can be used to determine the connection between job growth and retail space demand. Some relationships become obvious once the data are assimilated. For instance, there is a relationship between vacancy rate and the percentage change in

the market rent. Table 2 also shows that overbuilding has occurred in the last several years, since construction has outpaced absorption. The excess retail space in the market has begun to cause a slow down in the increase in average market rent. Meanwhile, the vacancy rate has been increasing yearly despite substantial job growth in the market.

Table 2. Houston Retail Market Data

Year	Total Wage & Salary Jobs	Emplymnt Change	% Change	Absorption in Square Feet	New Square Footage	Vacancy Rate	Rent/Sq.Ft.	% Change
1975	993							
1976	1057	64	6.5%					
1977	1126	68	6.4%					
1978	1229	103	9.2%					
1979	1318	89	7.2%					
1980	1399	80	6.1%		3621			
1981	1517	118	8.5%	4808	5402	9.5%	$9.96	
1982	1541	24	1.6%	6314	2317	6.0%	$11.40	14.5%
1983	1444	-97	-6.3%	4261	5524	2.5%	$12.60	10.5%
1984	1476	31	2.2%	5075	11887	12.8%	$13.10	4.0%
1985	1479	2	0.2%	3267	8756	16.7%	$13.14	0.3%
1986	1410	-69	-4.6%	-1565	3404	19.4%	$12.59	-4.2%
1987	1386	-25	-1.7%	-1363	388	22.5%	$11.06	-12.2%
1988	1448	61	4.5%	1228	1324	22.5%	$11.30	2.2%
1989	1515	67	4.7%	1978	884	21.6%	$11.92	5.5%
1990	1764	90	5.9%	967	1110	21.6%	$13.19	10.7%
1991	1793	24	1.5%	2883	1025	10.3%	$13.70	3.9%
1992	1795	1	0.1%	4251	2836	17.4%	$13.87	1.2%
1993	1827	27	1.7%	2670	2069	15.9%	$14.30	3.1%
1994	1815	45	2.7%	4835	4520	15.1%	$14.59	2.0%
1995	1934	52	3.1%	2751	3383	14.8%	$15.50	6.2%
1996	1981	39	2.3%	1945	2451	15.0%	$15.52	0.1%

Table 2. Houston Retail Market Data

Year	Total Wage & Salary Jobs	Emplymnt Change	% Change	Absorption in Square Feet	New Square Footage	Vacancy Rate	Rent/Sq.Ft.	% Change
1997	2064	82	4.2%	4091	1836	13.8%	$17.13	10.4%
1998	2167	103	5.0%	4090	1470	11.5%	$17.68	3.2%
1999	2202	34	1.6%	6701	3871	7.5%	$18.45	4.4%
2000	2254	52	2.4%	4845	3934	6.0%	$18.33	-0.7%
2001	2293	39	1.7%	6294	9218	7.0%	$19.07	4.0%
2002	2288	-6	-0.2%	-2975	4394	11.5%	$18.33	-3.9%
2003	2274	-15	-0.6%	1976	5430	13.3%	$19.10	4.2%
2004	2289	15	0.7%	3568	4813	13.5%	$19.15	0.3%
2005	2350	61	2.7%	722	3211	14.7%	$19.38	1.2%
2006	2477	73	3.1%	1890	3045	15.2%	$19.52	0.7%

There will always be some vacant space in the market. This is sometimes called the natural vacancy rate. A vacancy rate of about 14 percent in the Houston area since the mid-80s is observed in the data. The average annual retail space constructed per year in Houston has averaged 3.2 million square feet, while the absorption rate has averaged only 2.9 million square feet per year.

As can be seen in Figure 1, construction lags behind absorption, and it seems to react to changes in absorption. Perhaps a better understanding of forecasting retail space demand would benefit the market as a whole. This might bring about a decrease in the market vacancy rate, and the average rents may increase.

Figure 2 provide the changes in price per square foot and the retail space vacancy rate for the years 1982-2006. The 1980s were difficult years for the Houston economy. Employment fell, the vacancy rate increase, and prices dropped as providers of retail space offered price incentives to keep their space occupied.

Figure 1. Absorption and Construction of Retail Space in Houston Market

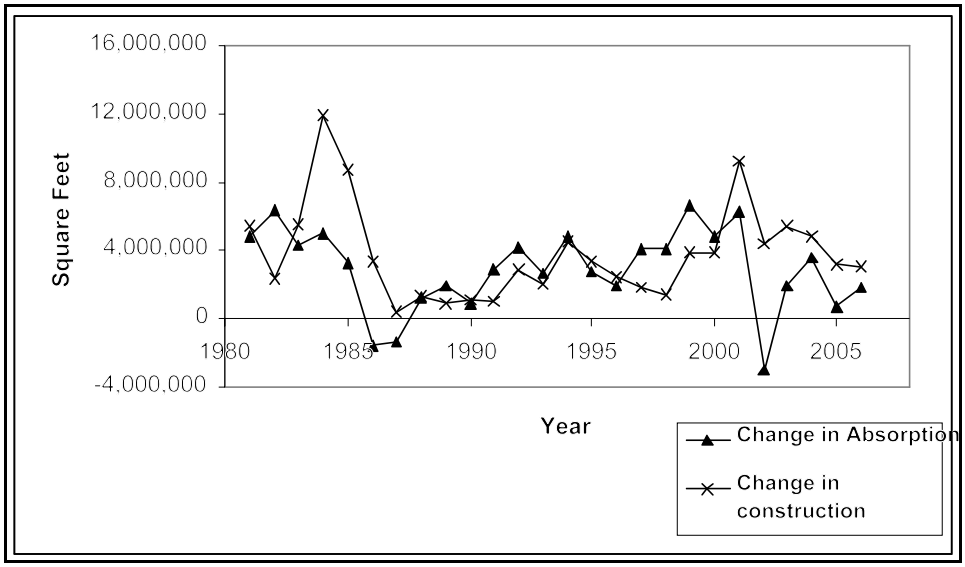
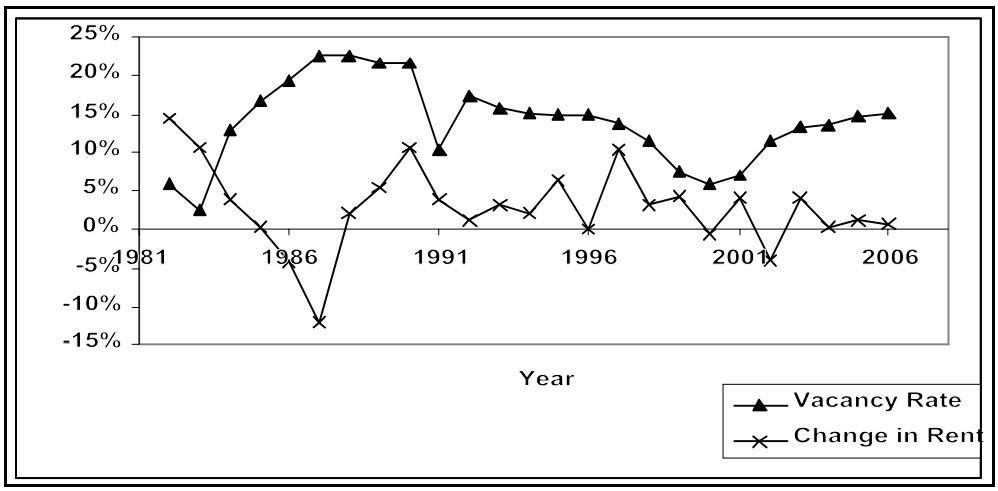


Figure 2. Change in Rent and Vacancy Rate



THE MODEL

To predict the price of commercial retail space, the use of a regression model was investigated. The following variables which are candidates for predicting the price include the change in employment, the change in square footage of space absorbed, the vacancy rate, and the change in space available each year. These same variables are also lagged one year to see if there is a lag in the impact. The variables are defined as follows:

P = Price per square foot
E = Change in employment
E_1 = Change in employment lagged 1 year
F = Change in square footage of space absorbed
F_1 = Change in square footage of space absorbed lagged one year (F_1)
V = Vacancy rate (V)
V_1 = Vacancy rate lagged one year (V_1)
S = Change in retail space available (S)
S_1 = Change in retail space available lagged 1 year (S_1)

With these variables, we have

$$P = f(E, E_1, F, F_1, V, V_1, S, S_1)$$

While price is a function of all of these variables, several of these independent variables are correlated with other independent variables. Minitab was used to analyze the data, and a Best Subsets stepwise regression model was run on these data to determine which of these variables were significantly contributing to the price of retail space. The overall best model included E, F, F_1, V, and V_1. The equation is

$$P = 26.2 + 0.0414\,E - 0.631\,F - 0.435\,F_1 - 0.375\,V - 0.276\,V_1$$

The coefficient of determination is 0.53. The positive coefficient for E is expected as additional jobs would typically result in an increase in demand for retail space. The negative coefficients for the other variables are also to be expected. As a decrease in price is usually associated with an increase in absorption (number of square feet occupied), we would expect the coefficients for F and F_1 to be negative.

Similarly, as the vacancy rate (V, and V_1) increases, the price would normally decrease.

SUMMARY AND CONCLUSIONS

If the relationship between the economic variables in the Houston real estate market can be better understood, perhaps overbuilding could be avoided. This reduction in overbuilding will have positive effects on the retail space market as a whole, as the surplus of vacant retail space will be absorbed and the vacancy rate will decline, raising the average rent commanded by the market. However, some builders may still choose to overbuild, as vacant land generates no revenue. These builders feel that they are better served by building the retail space and having it partially vacant as opposed to building less space or holding vacant land. While this could be a profitable choice by the individual producers of retail space, the overall market may be hurt as rents may drop and vacancy rates may rise.

There are many factors that impact the price of retail space in the Houston market. The most important variables found in this study are change in employment for the current year, change in square footage of space absorbed for the current and previous year, and change in vacancy rate for the current and previous year. However, this model should not be expected to forecast with complete accuracy. With a coefficient of determination of 53%, the unexplained variability in price for retail space is 47%. While this model should help in predicting the price for retail space, further study needs to be performed to identify other variables that would generate better predictions.

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