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Editor: Larry R. Dale
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JOURNAL OF ECONOMICS AND ECONOMIC EDUCATION RESEARCH

CONTENTS

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 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 Academy is an affiliate of the Allied Academies, Inc., a non profit association of scholars whose purpose is to encourage and support the advancement and exchange of knowledge, understanding and teaching throughout the world.

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Dr. Larry R. Dale

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ECONOMICS EDUCATION ARTICLES

DISTRICT LEVEL MANDATES AND HIGH SCHOOL STUDENTS' UNDERSTANDING OF ECONOMICS

Paul W. Grimes, Mississippi State University
Meghan J. Millea, Mississippi State University
M. Kathleen Thomas, Mississippi State University

ABSTRACT

This paper investigates the impact of district-level course mandates on students' end-of-course economic understanding. Data were collected from Mississippi high school students studying economics in three different course environments. Students were either enrolled in a one semester economics course required for graduation, enrolled in a one semester course taken as an elective, or studying economics as an infusion subject within a United States history course. A regression-based selection model was estimated to control for students' demographic characteristics, educational attributes, market experiences, and school attributes. The results indicated that student test scores were significantly less for those students studying economics as an infusion subject and when taking a mandated stand-alone course, ceteris paribus. The authors conclude that course mandates may result in teacher and student issues that reduce the overall observed level of test performance.

INTRODUCTION

Mississippi will soon be joining the growing number of states that require students to complete a formal course in economics prior to graduation from high school (Grimes and Millea, 2003). Under the Mississippi Department of Education's (MDE's) new minimum curriculum standards, the freshman class of 2008 must complete a one-semester course in economics to satisfy graduation requirements. Along with civics, history, and geography, economics is one of the four "strands" of Mississippi's social studies curriculum. The economics curriculum standards of the MDE are modeled on the National Council on Economic

Education's (NCEE's) *Voluntary National Content Standards in Economics* (1997). School districts are held accountable for meeting these standards whether economics is offered as a stand-alone course or infused into other courses. Currently, the state's graduation policies require completion of *either* a course in economics or a course in geography. Historically, and for a variety of reasons, some of Mississippi's 153 school districts already have local graduation policies that require high school students to complete an economics course. With the upcoming change in the state's minimum standards, it is expected that more school districts will move to mandate the high school economics course prior to 2012 when all graduating students must have completed the course.

The current situation in Mississippi provides an unusual environmental context to investigate the effects of a mandated high school course in economics on student learning. In this paper we address the following question: *Do high school students in school districts with a local mandate for a stand-alone economics course demonstrate an equivalent understanding of economics relative to their cohorts in districts where an economics course is not mandated but rather is offered as an elective or is infused into other courses?* In addition to addressing the current situation in Mississippi, our empirical results will offer insight into the impact of state-wide course mandates in general.

THE LITERATURE

Only a few previous researchers have examined the effects of economics course mandates. However, all of these studies consistently compare *across* different states – those with a mandate and those without a mandate. For example, Rhine (1989), Marlin (1991), and Soper and Lynn (1994) all used the National Assessment of Economic Education database to examine teacher attitudes and student learning across mandate and non-mandate states, and Belfield and Levin (2004) employed a nation-wide database of more than 600,000 students to examine the effect of state-level mandates on the general scholastic aptitude of students. Interestingly, each of these studies found that economic course mandates at the state level could have undesirable negative effects; Marlin found that teacher attitudes towards economics were lower in mandated states, which could lead to poorer student performance, and Belfield and Levin found that an economic course mandate reduced instructional attention in other subject areas leading to lower student SAT scores. However, to date, no one has examined the effects of local school district mandates *within* a state. Given the natural diversity of educational

environments across states, an *intra-state* examination of local mandates may provide a more accurate measure of the impact of requiring a specific course of study.

THE DATA

During the Fall of 2006, students from ten high schools across the state of Mississippi were tested and surveyed. Five classes of students were taking the one semester stand-alone economics course mandated by their school district. Six classes of students were taking the same course as a social studies elective offered by their school district. An additional two classes were studying economics only as an infusion into their required United States History course. All of the courses were taught by teachers who had participated in a multi-day summer workshop produced by the Mississippi Council on Economic Education (MCEE).

Each of the participating teachers pre- and post-tested their students using the *Test of Economic Literacy (TEL)* (Walstad and Rebeck, 2001a). All of the students also completed a survey that collected their basic demographic characteristics and a limited amount of information about their families and school experiences and activities. The final sample consisted of 211 student observations. All testing and data collection procedures were conducted in accordance with the federal regulations for human subjects research involving minors.

Table 1: Mean Test of Economic Literacy Scores by Group (Paired Sample)

Group	Pre-Test	Post-Test	N	Difference	t-Value
Mandate	18.29 (5.49)	19.27 (7.29)	75	0.98 (6.50)	0.52
Non-Mandate	15.74 (7.64)	19.54 (8.70)	114	3.80 (7.07)	2.50***
Course	17.49 (8.10)	22.71 (8.17)	77	5.22 (6.92)	6.62***
Infused	12.08 (4.92)	12.95 (5.52)	37	0.865 (6.52)	0.807
Full-Sample	16.75 (6.96)	19.43 (8.15)	189	2.68 (6.97)	5.29***

( ) – Standard deviations
*** Statistically significant at the .01 level, two-tailed test.

DESCRIPTIVE ANALYSIS

Table 1 provides the mean pre-course and post-course *TEL* scores for each of the major student groups within the sample. Due to student absences, out of the 211 original observations, there were 189 paired pre-course and post-course scores available for analysis. Overall, the full-sample of students demonstrated a 2.68 item increase in mean score, on the 40-item *TEL*, between the beginning and end of the academic semester. A paired sample t-test revealed that this difference was statistically significant. Likewise, a significant increase in raw *TEL* scores was also found for the non-mandate group of students. In fact, the non-mandate students improved their mean score by 3.80 points – more than a full point greater than for the full-sample. Table 1 shows that this result is due to the large and significant increase observed for the non-mandate students taking a stand-alone economics course as an elective. These students ended the semester with the largest gain of any group – 5.22 points. The non-mandate students receiving economic instruction infused into their history course did not achieve a statistically significant improvement in economic understanding, as reflected in their mean *TEL* scores. And most importantly, the students who were mandated to take a stand-alone economics course improved their mean score by only about one item – a paired sample t-test revealed that this was not a statistically significant difference between pre-course and post-course scores.

Thus, the descriptive analysis indicates that the largest improvements in student understanding of economics occurred in schools which offered economics as an elective course and not as a graduation requirement. The least amount of learning occurred in schools where economic content was infused into another required course. Furthermore, analysis of the mean scores suggest that mandating an economics course does not guarantee that significant learning gains will be observed. However, numerous factors contribute to the performance of students on standardized tests. To account for these factors a multivariate regression analysis was conducted.

THE REGRESSION MODEL

In keeping with the long tradition of regression-based educational production functions (Becker and Walstad, 1987), and echoing Soper and Lynn's (1994) mandate model, the following relationship was postulated:

POST *TEL* = *f* (Student Demographics, Student Educational Attributes, Student Market Experiences, School Attributes) [1]

where, the right hand side is composed of vectors of variables representing each of the factors assumed to determine post-course student performance on the *TEL*. Table 2 lists the individual variables within each vector and reports their empirical specifications. Table 3 provides the means and standard deviations for each variable broken down across mandate or non-mandate status, and for the full-sample. Based on surveys of prior high school-level research (see Walstad (2000) and Walstad and Rebeck (2001b)) the expected sign for each variable's regression coefficient is also reported in Table 3.

Table 2: Specification of Variables Included in the Model

Variable	Empirical Specification
Economic Understanding	
PRE *TEL*	Student's pre-course score, as a percentage, on *Test of Economic Literacy*
POST *TEL*	Student's post-course score, as a percentage, on *Test of Economic Literacy*
Student Demographics	
SEX	Male = 1; Female = 0
AGE	Student's age in years
BLACK	Student is black or other racial minority = 1; student is white = 0
SENIOR	Student is in 12^{th} grade = 1; otherwise = 0
HIGH INCOME	Family income is greater than \$50K = 1; otherwise = 0
MOTHER'S EDUCATION	Mother holds college degree or higher = 1; otherwise = 0
Student Educational Attributes	
CALCULUS	Student has taken pre-calculus course or above = 1; otherwise = 0
STUDY	Student studies everyday = 1; otherwise = 0
CLUBS	Number of extracurricular organizations to which student belongs

Table 2: Specification of Variables Included in the Model	
Variable	Empirical Specification
SPORTS	Participates in varsity or junior varsity sports = 1; otherwise = 0
HIGH GRADES	Student earns mostly A's and B's = 1; otherwise = 0
STOCK MARKET	Student had previously participated in the statewide Stock Market Simulation = 1; otherwise = 0
Student Market Experiences	
BANKING	Student maintains individual bank account and credit card in his or her name = 1; otherwise = 0
WORK	Student currently holds part-time job = 1; otherwise = 0
School Attributes	
PEERS	Student's friends earn mostly A's and B's = 1; otherwise = 0
INFUSED	Economics not taught as a stand-alone course = 1; otherwise = 0
MANDATE	School district requires economics course for graduation = 1; otherwise = 0

Table 3: Means and Standard Deviations of Variables by Sample Group			
Variable	Mandate	Non-Mandate	Full Sample
Economic Understanding			
PRE *TEL* [+]	0.438 (0.144)	0.390 (0.189)	0.410 (0.173)
POST *TEL*	0.479 (0.182)	0.488 (0.217)	0.484 (0.203)
Student Demographics			
SEX [+]	0.453 (0.524)	0.475 (0.501)	0.466 (0.510)
AGE [+]	17.179 (0.519)	16.667 (0.709)	16.874 (0.685)
BLACK [-]	0.500 (0.503)	0.440 (0.498)	0.464 (0.499)

Table 3: Means and Standard Deviations of Variables by Sample Group			
Variable	Mandate	Non-Mandate	Full Sample
SENIOR {+}	0.977 (0.152)	0.472 (0.501)	0.677 (0.468)
HIGH INCOME [+]	0.430 (0.498)	0.544 (0.500)	0.498 (0.502)
MOTHER'S EDUCATION {+}	0.384 (0.489)	0.312 (0.465)	0.341 (0.475)
Student Educational Attributes			
CALCULUS [+]	0.151 (0.360)	0.152 (0.360)	0.152 (0.360)
STUDY {+}	0.186 (0.391)	0.248 (0.434)	0.223 (0.417)
CLUBS [+]	1.738 (1.883)	2.431 (2.797)	2.150 (2.485)
SPORTS [-]	0.393 (0.491)	0.320 (0.468)	0.350 (0.478)
HIGH GRADES [+]	0.570 (0.498)	0.640 (0.482)	0.611 (0.489)
STOCK MARKET [+]	0.060 (0.238)	0.074 (0.262)	0.068 (0.252)
Student Market Experiences			
BANKING [+]	0.116 (0.322)	0.176 (0.382)	0.152 (0.360)
WORK {-}	0.667 (0.474)	0.541 (0.500)	0.592 (0.493)
School Attributes			
PEERS [+]	0.605 (0.492)	0.592 (0.493)	0.597 (0.492)
INFUSED [-]	0.00 (0.00)	0.328 (0.471)	0.194 (0.397)
MANDATE [-]	1.000 (0.000)	0.000 (0.000)	0.408 (0.493)

[ ] – Expected sign of variable's coefficient in regression equation.
{ } – Expected sign of variable's probit coefficient in selection equation.

As noted above, not all students completed both the pre-course and post-course *TEL* due to absence from school on test day. To account for the possibility of selection bias due to this attrition, Equation [1] was estimated using Heckman's (1979) two stage self-selection technique as recommended by Becker and Walstad (1990). The first stage of this approach requires the estimation of a probit equation designed to capture the effect of independent variables on the probability of remaining in the sample. Table 4 reports the results from this first stage. Only two probit coefficients were found to be statistically significant. MOTHER'S EDUCATION and CLUBS were both found to have a positive effect on completing both the pre- and post-course *TEL*. Thus, students from families with relatively strong investments in human capital and students with a demonstrated attachment to academic activities were less likely to be absent on test day.

Table 4: Selection Equation: Probit Estimation

Variable	Probit Coefficient
CONSTANT	0.124 (0.028)
SEX	0.039 (0.126)
AGE	0.049 (0.183)
BLACK	-0.240 (0.797)
SENIOR	0.069 (0.160)
MOTHER'S EDUCATION	0.683** (1.665)
STUDY	0.058 (0.143)
CLUBS	0.543*** (2.891)
SPORTS	-0.192 (0.496)
WORK	-0.377 (1.092)
PEERS	0.163 (0.531)
% Correct Predictions	91.262
Restricted Log-likelihood	-61.065

( ) - Absolute value of t-statistic.
*** Statistically significant at the .01 level, one-tailed test.
** Statistically significant at the .05 level, one-tailed test.

Table 5: Regression Results: The Determinants of Post-Course Economic Understanding (Dependent Variable = POST *TEL*)	
Variable	Regression Coefficient
CONSTANT	0.291 (0.830)
Economic Understanding	
PRE *TEL*	0.456*** (6.022)
Student Demographics	
SEX	0.023 (1.052)
AGE	0.003 (0.163)
BLACK	-0.059*** (2.572)
HIGH INCOME	0.010 (0.415)
Student Educational Attributes	
CALCULUS	0.057** (1.707)
CLUBS	0.010** (1.354)
SPORTS	-0.051** (2.151)
HIGH GRADES	0.046* (1.619)
STOCK MARKET	0.080* (1.895)
Student Market Experiences	
BANKING	0.008 (0.257)
School Attributes	
PEERS	-0.024 (0.908)
INFUSED	-0.177*** (5.085)
MANDATE	-0.082*** (3.310)
Selection Term	
LAMBDA	-0.050 (0.504)
F-Statistic Adjusted R^2	12.280 0.475

( ) - Absolute value of t-statistic.
*** Statistically significant at the .01 level, one-tailed test.
** Statistically significant at the .05 level, one-tailed test.
* Statistically significant at the .10 level, one-tailed test.

Table 5 reports the second stage regression results. The LAMBDA coefficient captures the self-selection effect estimated from the first stage probit results. In this case, it is statistically insignificant indicating that the observed student absences did not structurally affect the overall results. The estimated equation obtained a significant F-statistic and a very reasonable cross-sectional adjusted R^2 of .475.

EMPIRICAL RESULTS

Before turning to the primary results of interest concerning the effect of course mandates on student learning, it is important to note several interesting findings revealed by the estimated coefficients for the control variables. All of the independent variables obtained coefficients with the *a prori* expected sign. As seen in Table 5, a student's prior understanding of economics was an important determinant of end-of-course understanding. The PRE *TEL* coefficient obtained the largest *positive* magnitude of any significant control variable. This is consistent with previous studies that include pre-course measures of understanding on the right hand side (Becker and Walstad, 1987). The variable found to have the largest *negative* effect on POST *TEL* performance was BLACK. Thus, holding all else constant, students who identified themselves as a member of a racial minority had lower end-of-course *TEL* scores, relative to their white cohorts. While this finding is also consistent with previous research, more work needs to be done to determine what underlying factors may be responsible.

A statistically significant coefficient was estimated for each of the student educational attribute variables. Students who had completed a calculus course scored almost six percentage points higher on the POST *TEL*, all else being the same. Although joining an additional extracurricular organization was associated with a one percentage improvement in score, students who participated in organized school sports demonstrated a five percentage point drop in score, holding all else constant. This result was likely due to the significant opportunity costs of the time commitment necessary to play on a high school athletic team.

The STOCK MARKET variable was included to capture the spillover effect of a student's previous participation in an MCEE sponsored program. As in many other states, Mississippi's annual simulated stock market competition serves as an entry-level program offered by the state council on economic education. Only about seven percent of the students in our sample had participated in a previous competition (see Table 3). However, participation was found to have a positive

effect on POST *TEL* scores. The STOCK MARKET coefficient reported in Table 5 indicates that, holding all else the same, prior participation in the stock market competition was associated with an eight percent increase in end-of-course test performance. This result is consistent with results from a state-wide analysis of student achievement in Georgia (Swinton, DeBerry, Scafidi and Woodard, 2007) and findings from the recent National Assessment of Educational Progress (NAEP) in Economics (Walstad and Buckles, 2008).

The BANKING variable was included in our model to capture the potential effects of "real life" participation in the economy on economic understanding. However, students who held a bank account and credit card in their own name did not perform differently from those who did not have such accounts, *ceteris paribus*. Likewise, no peer effect was uncovered for students whose friends earned relatively high grades.

For this study, the two most important coefficients were those estimated for the INFUSED and MANDATE variables. As seen in Table 5, both of these coefficients were estimated to be negative and statistically significant. The magnitude of the INFUSED coefficient indicates that students studying economics through infusion in a history course scored 17.7 percent below their cohorts, holding all else the same. Clearly, this result suggests that the one course infusion approach is not the optimal strategy to implement successful economic education at the high school level. The magnitude of the MANDATE coefficient indicates that students who were required to take economics as a graduation requirement scored 8.2 percent below their cohorts, holding all else constant. This result is consistent with the previously cited inter-state research on economics course mandates. Thus, there appears to be something about implementing a course mandate that results in the observation of significantly lower student performance scores relative to those observed for students when the same course is offered as an elective.

CONCLUSIONS

Our empirical examination revealed that high school student learning of economics varies according to course structure. The least effective structure was the infusion approach whereby students studied economics within the context of a required United States history course. The regression model estimates that, holding all else constant, students taught via infusion scored almost 18 percent below their cohorts who took a stand-alone economics course as an elective. Likewise, students who took a mandated stand-alone economics course scored eight percent below

those same cohorts who took the course as an elective. Apparently, requiring an economics class for graduation is not the most effective course structure to generate high end-of-course standardized test scores.

While our analysis focused on district level course mandates within one state, the results are consistent with previous research on state level mandates. Therefore, to date, the evidence suggests that economics course mandates are not the optimal policy to maximize student learning. What are the causal factors behind these findings? As Marlin (1991) pointed out, when courses are required to be offered, schools may be forced to place teachers lacking the requisite skill base into the classroom. This then may lead to ineffective teaching, poor learning, and frustrated teachers and students. On the other hand, elective courses are more likely to be taught by teachers who "champion" the subject and have the necessary skill base for that discipline.

The empirical results may also reflect student selection processes. When a course is offered only as an elective, it is natural that students with an interest and proclivity in the subject are more likely to enroll. Thus, teachers of elective courses face classrooms of students who have a higher probability of success. On the other hand, when a course is mandated and all students are required to enroll, classrooms reflect the entire distribution of student abilities. Thus, students in elective courses are being drawn from the upper tail of the ability distribution while students in mandated courses are drawn from across the entire distribution. Additional investigations and richer data sources are needed to sort out this particular selection process.

It is important to note that the current results do not suggest that an economics course mandate is always a bad idea. Although student learning in a mandated course may not be optimal, without course mandates many students would never be exposed to any formal economics. What the results do suggest is that economics instructors in a mandated course environment may face tougher teaching challenges relative those who teach elective classes.

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INTERNATIONALIZATION OF THE ECONOMICS MAJOR: A "HOW TO" WITH CASE STUDIES

Nancy J. Burnett, University of Wisconsin-Oshkosh
Ralph O. Gunderson, University of Wisconsin-Oshkosh
M. Ryan Haley, University of Wisconsin-Oshkosh
M. Kevin McGee, University of Wisconsin-Oshkosh

ABSTRACT

Economics, as a discipline, has grown substantially from its early roots of political economy and philosophy. Not only has the discipline itself evolved over time, but nearly everything about it has changed, from the topics we examine, the tools we use, and the way it is taught. Economics, however, has always had a basis in international analysis, though while once presumed goal of that analysis was national enrichment it is now more likely to be global production enhancement, leading to rising standards of living everywhere. This paper analyzes the experience of one University Department of Economics as it makes it way toward internationalization. This article demonstrates how fairly simple changes in even principles courses (the incorporation of case studies) has markedly changed the orientation of our discipline and helped our become a leading force for internationalization at our University. In this world that seems to be ever-decreasing in size, offering our students a strong founding in economic principles by way of group projects that incorporate international aspects aids in their understanding of the truly world-wide applications of these ideas. We offer, then, not only the experiences of one university but a 'road map' that others can follow toward the goal of internationalization.

INTRODUCTION

As is the case at most, if not all, Economics Departments, the University of Wisconsin – Oshkosh (UWO) has long had coursework in International Economics.

Our course, however, was a single semester course that incorporated both international trade and international finance. This was due primarily to the fact that the University has a College of Business that offers coursework in international and domestic finance, distinct from coursework offered by the department of economics. Having this single course in international area studies served as our only international offering for many years. Even though it was very popular among students, no additional coursework in the area was offered until after the turn of the millennium.

The internationalization of the university in general and our department in specific has taken several different paths. One important change has been in the way we teach even non-'international' courses, along with a proliferation of international classroom offerings, a new International Emphasis within the major itself, faculty led study tours, a partnership with a foreign university, a dramatic increase in the internationalization of faculty experiences, additional international hires, and an on-going faculty exchange program. Discussion of each of these areas, as well as the phenomenal growth in the popularity of the economics major, follows.

THE UNIVERSITY AND DEPARTMENT

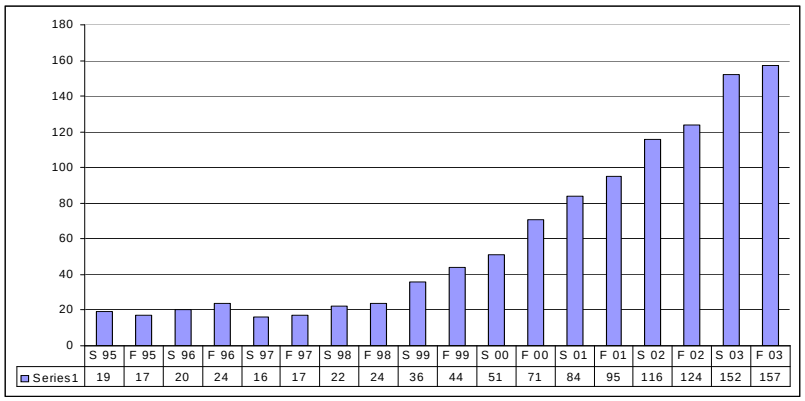
The University of Wisconsin – Oshkosh is a mid sized, comprehensive university located in the upper Midwest. We have approximately 10,000 undergraduates and 2,000 graduate students, organized into four colleges (Letters & Sciences, Business, Nursing, and Education and Human Services). The department of economics is currently housed in the College of Business, which has approximately 1,700 undergraduates, 640 graduate students and 50 faculty members. The department of economics faculty at UWO consists of 10 full time equivalent members, all of whom are either tenured or on tenure track, with an additional course or two of adjunct time per year, depending upon funding and need. Of these ten individuals, we have a good balance by age and gender (four full professors, four associate professors, and two assistant professors comprised of seven males and 3 females). All have PhDs.

There have also been changes in the faculty since 1994. In 1994 we have had six retirements, their replacements bringing in new faculty members with international experience.[1] The internationalization of the major began with these faculty changes and has continued unabated since that time, culminating in the

creation of a new emphasis in the major. These changes are further discussed in the following section.

The economics department has grown markedly in the last dozen years. Chart 1 shows this dramatic growth from 19 declared economics majors in the Spring of 1995 to 162 majors in the Fall of 2006. Before 1994, the College of Business required all majors, in any sub-field, to complete the entire economics core sequence, once that requirement was dropped we experienced a reduction in majors.[2]

Chart 1
Number of Economics Majors[1] at University of Wisconsin – Oshkosh, Spring 1995-Fall 2003



[1] Data from major listings collected by the department.

INTERNATIONALIZATION OF THE FACULTY

The department has long had a strongly international background. Two of our faculty members have formal training in the discipline of International Economics and/or Economic Development, not unlike many faculties of our size. Out of ten faculty members six have extensive international experiences, and three are foreign born. Having foreign born faculty members hardly makes UWO unique, indeed in this we would believe that very many Universities have the same experience. One of those formally trained international economists is from Pakistan, coming to us in 1982 and another is from Belarus, arriving in 2001.

What has set us apart is the development of our international expertise with this faculty composition as our base. Another colleague, hired to guide the Center for Economic Education (affiliated with the National Council of Economic Education, or NCEE) began efforts to spread economic education within the state but eventually became one of the national leaders in the effort to aid post-Soviet Block countries with their conversion to the free market system. His efforts in this regard, many trips to former Soviet countries, leading training seminars for in-country instructors of western economics, leading study tours to examine the economic education in these regions for US instructors of economics, and various other national and international level efforts to enhance the adoption of the free market system led to many personnel contacts within these areas. Indeed, one of these contacts, a university instructor from Belarus in both Marxian and Comparative Economics (meaning, comparison of the free market economy with the command economy) has since become a very valued colleague at UWO, coming to us as a visiting lecturer in 2001 and joining the faculty on a permanent basis the following year.

These faculty members served as the core of the international coursework at UWO and became the driving force behind further internationalization of our program. Other experiences of our faculty sharpened this international focus. Two of the authors of this paper participated in a NCEE sponsored study tour. One of those trips was to Ukraine in 2001, enhancing classroom presentations with first hand knowledge of this area of the world and the economic developments there. Another faculty member was hired in the field of economic history with extensive personal travel experience, including teaching in Sudan and a semester-long Fulbright to Estonia. Another author of this paper became involved with a charitable program through a local chapter of Rotary International in Peru. Through those contacts, he developed a connection with the Universidad del Pacifico in Lima, which has expanded into many opportunities for both our faculty and students alike.

UWO has sponsored several faculty exchanges with Universidad del Pacifico. We have had several of their faculty members visit our campus for both teaching and research opportunities. Our colleague who specializes in natural resource economics traveled to Lima to present work on forestry conservation at the behest of our Lima contacts. Furthermore, we also have a history of faculty exchange programs with other universities, world wide – with visitors from Japan, Afganistan, Uzbekikstan, Russia, Georgia, and other international locations.

INTERNATIONALIZATION OF THE CURRICULUM

The internationalization of our faculty has led to numerous changes of our curriculum, both inside, and outside, the classroom. Some of the changes are subtle – instructor interest guiding topic choice and the relative stress placed on international and development topics, for instance. Several examples of this type of change can be seen in our introductory courses: Those faculty members with experiences with the emerging free market within the post Soviet Block nations, for instance, tend to emphasize the importance of free market principles, ownership rights, and international trade in the principles courses. Other changes have not been so incremental.

Students can choose to major in economics either in the College of Business or in the College of Letters and Science. In the College of Business, students must fulfill the general requirements of that college, including such things as the professional experience requirement, as well as the major requirements. In the College of Letters and Science, students may elect either the general economics major, which requires a second major or minor from another field, or take an additional two courses (Econometrics or Introduction to Mathematical Economics and one elective) for the quantitative emphasis. In 2003, the department introduced an Emphasis in international economics. That course of study requires, over and above the core sequence and field dimension requirements, concentrated study in the area of international economics; we strongly encourage students interested in this emphasis to attend one of the study abroad programs offered by either our own university or any other qualified program. Chart 2 shows these requirements by emphasis.

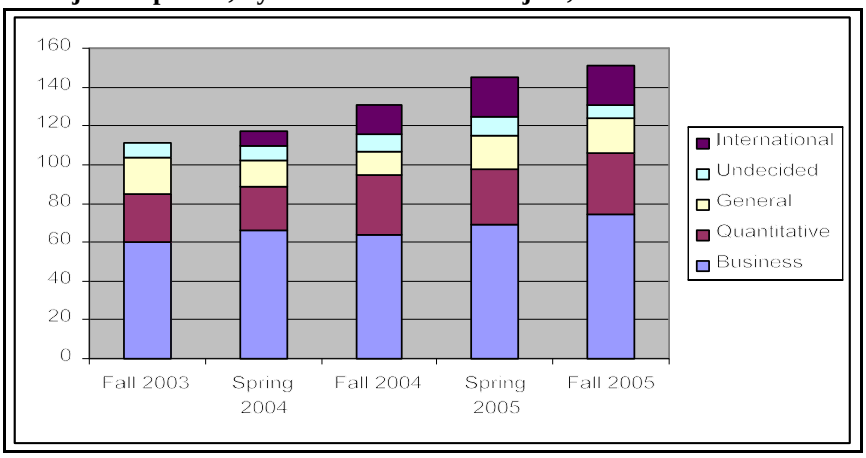
Chart 3 shows the number of declared major in the department, by emphasis, in the College of Letters & Science from Fall 2003 to Fall 2005. It clearly demonstrates the growing popularity of both the department and the international emphasis, in particular. s 4 breaks down this information by percentage of total majors in each semester, making it easier to ascertain the increasing percentage of our majors that are in the international emphasis. To some extent, there is an attenuation in the percentage of our College of Business majors in favor of the international emphasis major in the College of Letters and Science.

Chart 2
Coursework Requirements for the Economics Major
by Major Type in Letters & Science

	General	Quantitative	International
Core[1]	Same	Same	Same
Field Dimension	2 of International, Money & Banking, Public Sector, History of Economic Thought	Same as General	1 of Money & Banking, Public Sector, History of Economic Thought
Electives	3 courses	4 courses	3 courses
Special Requirements	Requires second major or minor in another field	Econometrics or Introduction to Mathematical Economics	International Economics plus 2 of International Capital Markets, Economic Development, Comparative Economic Systems, one of three study abroad courses from department study trips or up to 3 credits of approved study abroad experience
Total Credits	30 credits, plus second field	36 credits	36 credits

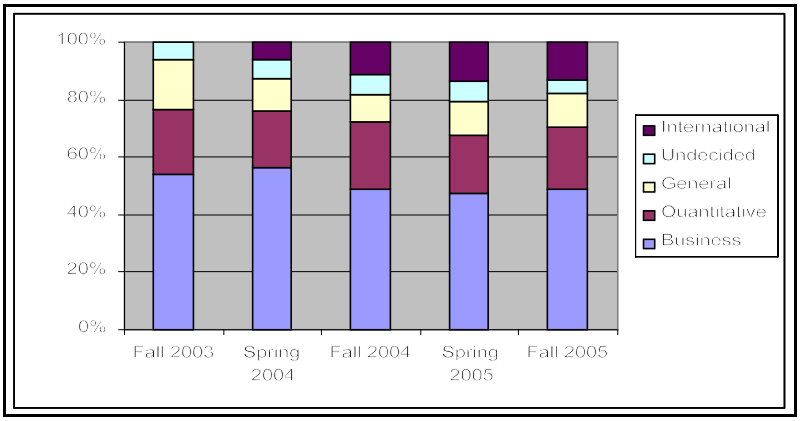
[1] The core requirements for the major include statistics, introductory and intermediate microeconomics and introductory and intermediate macroeconomics and a calculus mathematics requirement (either 2 courses of math for business analysis or 1 semester of calculus).

Chart 3
Major Emphases, by Total Numbers of Majors,[1] Fall 2003 to Fall 2005



[1] Data taken from Office of Institutional Research, University of Wisconsin – Oshkosh.

Chart 4
Major Emphases, by Percentage of Total Majors, Fall 2003 to Fall 2005



Partially in support of the International Emphasis and partially prompted by faculty interest, a new course in international finance was approved in 2005. That course has been offered twice since that time with sufficient student enrollment to

earn it a permanent spot in the course rotation (once every other year, in rotation with Comparative Economic Systems). The course Economics of Lesser Developed Countries is offered every fall and these other two courses rotate so that one is offered each spring, students can complete the specialized requirements for the International Emphasis in two successive semesters.

One of the more unique, and potentially more pedagogically interesting, changes that the internationalization of the curriculum has engendered is the faculty exchange and class cooperation with our sister university in Peru. A pilot program matched intermediate microeconomics courses in the two universities. Through faculty exchange (3 weeks out of 14) and video conferencing, the two sections worked jointly on not only the regular course material but also on topics of joint concern in international topics. Since that time, we have included principles of economics in the cooperative coursework with Peru. Another instructor's principles of Microeconomics classes use s student groups to develop cases with matched student groups at Universidad del Pacificco. Numerous web conferences are held by these groups as they develop their cases and make a final class presentation to the other students. We are currently examining relative student performance in these pilot classes and in traditional courses of this type to determine if there is additional learning value in this type of coursework.

INTERNATIONALIZING PRINCIPLES COURSES THROUGH COURSEWORK

One of the more innovative programs that we have begun to use is the case study approach in our principles courses that use international situations to demonstrate standard economic concepts. Students complete these case studies in a group project type scenario and assimilate both basic economics and the international implications of those concepts (included as an appendix here). We have used these cases with great success in our principles courses, but with little effort they could be adjusted for use in intermediate courses as well.

These cases are assigned along with the regular flow of coursework and demonstrate traditional economic theories. The appendix has eight cases designed around an introductory course. For instance, the first case deals with standard Supply and Demand concepts, but places them in an international setting. As can be seen below, each case is listed with its core concepts that students need to complete it successfully, a situational set up, and then one or more questions that apply

economics to that situation. The full casework package includes suggested answers and potential pedagogical methodologies, such as using them for group work, class presentations, etc.

The 'Going' Rate: Cheap Taxis

Concepts: Perfect Competition (Perfectly Elastic Demand Curve)

Situation: A taxi ride from downtown Pittsburgh to the international airport takes about 30 minutes and costs $30. A taxi ride from downtown Lima, Peru, to the international airport takes about 40 minutes and costs $4. The cost of gasoline, the principal variable cost of a taxi ride, in Pittsburgh is approximately $2.85 per gallon; while gas costs approximately $4.00 per gallon in Lima. The Pittsburgh taxi ride costs $1 per minute and the Lima taxi costs 10 cents per minute.

Question: Assuming that the taxis travel at approximately the same speed, quality of service is similar (both trips are completed), etc. how can such a significantly lower price exist in the Lima taxi service when its largest variable cost is much higher than that in Pittsburgh?

Several of the cases have follow up questions that can be used as either a second assignment or as just a follow on question at the end of the initial assignment. In this first case, it is particularly useful to send the groups back to the 'drawing board' as it were, after they have seen/heard the level of detail and analysis provided by other student groups. The groups that felt they did not compare favorably with their comrades are then able to improve upon their performance by embellishing their work. The form of this additional information and question is as follows for the first case:

Additional Information: The Pittsburgh taxi industry is (probably) characterized by the existence of a city agency responsible for registering taxis and setting their rates. The Lima taxi industry also registers its taxis, but does not set taxi rates. However, the Lima taxi industry is not responsible for setting rates. Rates are negotiated each time a passenger enters a taxi. Experienced taxi riders quickly learn what the 'going rate' is for a particular distance. Furthermore, there are a large number of unregistered taxis that are openly operate without fear of retribution from the police or the registered taxi drivers

> Taxi rates are so cheap in Lima that it seems they hardly cover their variable costs of gasoline and automobile maintenance. If a pedestrian raises a hand next to the street in downtown Lima, three or four taxis will immediately screech to a halt. If the driver of the taxi first in the line thinks the pedestrian is from out of town and insists on a high rate, then the pedestrian simply moves to the second taxi. This driver will realize what he just witnessed and he now has a passenger who expects to pay the going rate. This is a perfect example of perfect competition and the perfectly elastic demand curve for taxi rides.
>
> *Additional Question:* How can the taxi rate in Lima remain so close to the cost of just of the gasoline and minimum necessary car maintenance cost?

The use of these cases has brought a depth of understanding to our principles students regarding the wide applicability of economic analysis that we feel had been previously lacking. Indeed, these students have gone on to demonstrate their broadened thinking in other courses to such an extent that professors in other courses have commented on that new set of abilities.

STUDY TOURS

The relationship with the Universidad del Pacifico has contributed much to the internationalization of the economics major. In January 2004 three of our faculty members traveled to Peru with a small number of students. One of the professors gave a lecture regarding natural resource economics. The rest of the trip was dedicated to planning a future study abroad trip, to be led by a number of our faculty on a rotating basis. The students were there to gauge the experience and make suggestions as to the scheduling and planning of that upcoming rip. The outcome of that trip was a study abroad tour to Peru that following summer. Since then, we have had so much interest in the trip that we now schedule two such study trips per year (one in January and the other in June), each lasting approximately 3 weeks with some 15-25 students and one or two faculty members. That trip offers a variety of courses, from introductory economics to an upper division course in the Economics of Lesser Developed Countries. A specialized course, Economics of Latin America, was approved in 2003 and is now offered during each trip.

July of 2001 saw the first economics study trip to Scotland. That trip comprised 15 students and studied the nexus between Philosophy and Economics,

as uniquely applicable to the area we visited (Edinburgh). That trip is now offered every other year and students take two courses, History of Economic Thought and a new course designed specifically for this trip (Economic and Social Development of Great Britain, approved 2004).

Our Belarussian faculty member spent two years as a visiting faculty member in Germany and is in the process of developing a study tour, to first take place in 2008 (and eventually be offered on a rotating basis with the Scotland trip). That trip will operate in coordination with an existing center for economic education, Sommerhochschule (run by Dr. Frank Neumann). A new course, Economics of European Integration and Growth, was approved in 2005 to be offered to students on that trip.

The student clientele for these trips is primarily economics and/or business majors. The College of Business has an international dimension requirement that is most easily fulfilled by a combination of on-campus coursework and an off campus study tour. Therefore, many business students elect to take our study tours. While many of the College of Business economics majors take our study tours for this reason, more than half of our International Emphasis Economics majors in the College of Letters and Sciences also go on these tours as they can substitute courses taken on these tours for the on-campus coursework required of the emphasis.

One of the additional effects of these tours, and push toward internationalization in general, is the direct personal impact it has on our students' lives and futures. Our university is located in the upper mid-west where most of our students have little worldly sophistication. Indeed, it is not unheard of for one of our students to have never traveled by air or been outside the state of Wisconsin. A case in point would be a particular student who had never been in a plane before becoming an economics major who has since gone on three international study tours and is now planning to attend graduate school in economics out of state, a far cry from his previous goals of returning to the community it which he was raised after obtaining a degree.

CONCLUSION

The University of Wisconsin – Oshkosh economics department has enjoyed surging popularity over the last decade with a nearly ten-fold increase in the number of majors, even though national trends have seen a decrease in economics majors. While not directly responsible for the early part of this increased popularity, we feel

that the increasing internationalization of the major within the past five years along with the broad faculty support of these initiatives has played a part in continuing this trend. Through several means, the internationalization of the economics major has played a major part in the increasing respect and popularity that we are now enjoying and feel that other departments can make use of at least some of our methods to enhance themselves as well.

ENDNOTES

[1] One of these retirements was not replaced, reducing our overall faculty FTE (full time equivalent) from 11 to 10 during this period.

[2] The department has, as its core requirements, two semester courses of introductory economics, two semesters of intermediate economics and a one semester statistics course. The College of Business dropped the requirement for the two semester courses of intermediate economics, while retaining the other three courses for their majors.

APPENDIX

Casework for 'Internationalizing' the Economics Curriculum

The following cases are designed for use in principles courses but can be enriched enough for intermediate courses with only small changes. We have found that these cases employ traditional material covered in most principles courses, but emphasize the international application of that material. These cases can be used as either individual homework or group work. For instance, students can be organized in groups and required to work on the cases outside of class time, turning in a single group 'answer' to each case to reduce the amount of instructor time required to oversee and grade these assignments. We have used them in a class sharing arrangement where two sections of the same course work on the same cases and take turns presenting their results to the other section (one group presenting to the other section for each case, with presenting groups drawn by lot for instance or one group presenting to their entire section in a sort of 'knowledge bowl' like final presentation). The amount of course credit allocated for casework can vary, of course, but we have found that students become interested enough in the subject matter that they end up devoting more time than the credit incentive would necessarily suggest.

These cases can be used with any principles text, in any order. All costs and prices have been converted from foreign currency to US dollars to remove that additional layer of complexity that can deter students from the central issues of each case. Students should be directed toward reliable sources of economic information, such as the White House Briefing Room for US data and such sources as the CIA World Factbook, the US Department of State, Bureau of the Western Hemisphere, or STAT-USA Internet through the US Department of Commerce for foreign data. In cases 1, 3, 4, and 8, there are follow up questions that could either be assigned along with the original case or used as a second assignment.

Case 1: The 'Going' Rate: Cheap Taxis

Concepts: Perfect Competition (Perfectly Elastic Demand Curve)

Situation: A taxi ride from downtown Pittsburgh to the international airport takes about 30 minutes and costs $30. A taxi ride from downtown Lima, Peru, to the international airport takes about 40 minutes and costs $4. The cost of gasoline, the principal variable cost of a taxi ride, in Pittsburgh is approximately $2.85 per gallon; while gas costs approximately $4.00 per gallon in Lima. The Pittsburgh taxi ride costs $1 per minute and the Lima taxi costs 10 cents per minute.

Question: Assuming that the taxis travel at approximately the same speed, quality of service is similar (both trips are completed), etc. how can such a significantly lower price exist in the Lima taxi service when its largest variable cost is much higher than that in Pittsburgh?

Answer: Make note of 1) the competitive environment in each city's taxi industry, and 2) the cost of labor. (Demand differences? The taxi riders to the Lima International Airport are of an income level comparable to those at the Pittsburgh airport.)

Additional Information: The Pittsburgh taxi industry is (probably) characterized by the existence of a city agency responsible for registering taxis and setting their rates. The Lima taxi industry also registers its taxis, but does not set taxi rates. However, the Lima taxi industry is not responsible for setting rates. Rates are negotiated each time a passenger enters a taxi. Experienced taxi riders quickly learn what the 'going rate' is for a particular distance. Furthermore, there are a large number of unregistered taxis that are operate quite openly, apparently without fear of retribution from the police or registered taxi drivers.

Taxi rates are so cheap in Lima that it seems they hardly cover their variable costs of gasoline and automobile maintenance. If a pedestrian raises a hand next to the street in downtown Lima, three or four taxis will immediately screech to a halt. If the driver of the taxi first in the line thinks the pedestrian is from out of town and insists on a high rate, then the pedestrian simply moves to the second taxi. This driver will realize what he just

witnessed and he now has a passenger who expects to pay the going rate. This is a perfect example of perfect competition and the perfectly elastic demand curve for taxi rides.

Additional Question: How can the taxi rate in Lima remain so close to the cost of just of the gasoline and minimum necessary car maintenance cost?

Answer: Most of these taxis are operated by their owner. Perhaps the easiest way to address this question is to treat the total cost as the sum of variable (gasoline, cost of drivers' time) and fixed costs (maintenance, for example). In this case the quality of many (most) Lima taxis is quite poor. Some taxis are in dire need of repair. It seems that the maintenance costs are not being paid. Furthermore, the opportunity cost of the driver's time and appear to be close to zero.

The official unemployment rate in Lima is approximately 10 percent, while the Pittsburgh rate is half of that percentage. The real unemployment rate in Lima is closer to 30 percent, or perhaps even higher. The opportunity cost of a taxi driver's time, then, is ridiculously low because they are unable to find another source of employment. The low level of taxi maintenance is best explained as an effort by the driver-owner to receive some monetary return for his time, by accumulating deferred maintenance.

Case 2: Getting Gas: Bloated Markets for Natural Gas?

Concepts: Marginal Thinking (Costs and Benefits), Externalities

Situation: The level of air pollution in Lima, Peru is very high. The pollution reflects the stagnant air over the city of Lima, which is located on the coast next to a very tall mountain. Its proximity to the equator further reduces the natural wind velocity. These natural conditions are compounded by the tens of thousands of poorly maintained internal combustion engines powering the vehicles on the city's streets.

The Camisea natural gas field was discovered in Peru in 1985. Twenty years later the gas is now reaching the city of Lima. It had been hoped that increased use of natural gas to power vehicle engines would reduce the amount of pollution in the city. Prospects for this substitution dim when the price of natural gas is equal to the price of gasoline, on an energy equivalent basis (cost per 1 million BTU's). The recent increases in gasoline prices have been followed by increases in natural gas prices. So, the incentive for Lima's car owners/taxi owners to modify their cars (a $550 expense) to use natural gas has been reduced.

Another issue faced by drivers of natural gas-fueled cars is finding a vendor of natural gas to fill their cars' fuel tanks. The cost of replacing an in-ground gasoline tank with a new natural gas tank and pump is approximately $70,000, a significant amount for a gasoline station owner.

Question: Outline the economic issues facing the owners of automobiles and gas stations. What policies, if any, would you recommend that the government of Peru use to encourage the widespread adoption of natural gas as a vehicle fuel?

Answer: A car owner should modify the car's engine from gasoline to natural gas capability if the marginal benefit from this modification is greater than the marginal cost. The marginal cost of this action is estimated at approximately $550. In order to make the decision to convert, the car owner must be convinced that the benefits will be at least equal to this cost.

Estimating marginal benefits is more difficult. This estimate is based on two categories of benefit. One is relatively easy to measure and the other is more difficult. One difficulty is that significant positive externalities occur if this private decision is made. A major benefit of the engine conversion is the reduction in air pollution, a benefit that all of the residents of Lima receive. However, the car owner is unable to receive any payment from these beneficiaries so the owner will not be able to include them in the decision to modify/not modify the engine. The important calculation the owner *can* make is that of any savings in fuel costs due to natural gas use. Most of the fuel cost savings come from the fact that the government-set price of natural gas in Lima is less than the world (market) price of natural gas. Assuming $300 annual fuel cost savings would yield an attractive return on a $550 fuel conversion investment in less than two years. This return is tempered somewhat by the inconvenience of a limited number of retailers of natural gas in Lima.

The $70,000 gasoline/natural gas conversion investment by an existing gas station (for one pump) is a significant amount of money. The government is providing loans to encourage natural gas conversions at gas stations. The loans are repaid through a tax collected at the pump. Consequently, the gas station owner incurs little risk from this investment as the tax is only collected if there are sales from that pump. However, even though there is little risk, there is also no way for the station owners to gauge how quickly, if at all, the loan will be repaid before there will be pure profit from this conversion.

Case 3: Joe to Go: The Market for Coffee

Concepts: Supply and Demand. Market structures (oligopoly, monopsony, elasticities)

Situation: In the early 1990s there were fewer than 500 coffee houses in the United States. By 2001 there were approximately 10,000 coffee houses. This number has grown even higher in the last five years. While there has been some recent recovery in coffee prices received by coffee growers around the world, prices have remained at near historic lows, below 40 cents/pound for a number of years. Coffee prices peaked at nearly $3 a pound in the mid-80's but have since fallen to less than 40 cents a pound. This development is having serious consequences for a number of developing countries because coffee is the main source of foreign exchange for several of these countries. It accounts for half of the foreign exchange earnings for Burundi and Uganda, for example, a strangling consequence for these

countries. This is a very unfortunate development that has gone virtually unnoticed in the coffee consuming nations of the world.

Coffee drinkers in the U.S. have not seen any price decreases for either their 2 pound can of Folgers or their iced maccachino. It seems that the plight of coffee growers around the world has been somewhat obscured by the increasing variety and sophistication of specialty coffees that have proliferated in the developed world coffee markets in the last decade.

Question: How is it possible for coffee growers around the world to be suffering from historically low coffee prices while coffee drinkers in developed countries see basically no changes in the price of Joe?

Answer: The simple answer is that supply far exceeds demand.

Supply conditions: The USDA, for example, estimated that for the 2001-02 coffee crop production was 116 million 60 kilo bags and consumption was only 111 million bags. Back in the 1990s, there were a number of frosts that wrecked havoc with the Brazilian coffee growers. Coffee prices increased as a result of these frosts. Those high prices provided incentives to growers (all around the world) to plant new trees. It turns out that coffee trees need at least two years of growth to produce yields sufficient to justify harvesting. The beginning of the 21st Century has now seen the benefits of those plantings as increased harvests are now coming from those newly planted trees. While the high prices of the mid – late 1990s encouraged tree planting, there was no immediate impact on price. In fact there seems to have been an over-planting that took place, whose effect is now to significantly depress world coffee prices. Vietnam, for example, accounted for about 2 percent of world coffee bean sales in 1990. It is now the world's second leading coffee exporter, only behind Brazil, and ahead of Columbia, Indonesia, and other important coffee producing countries.

Another possible explanation is that there is an oligopolistic structure in the coffee industry. The Starbucks and Folgers of the world are the main customers for tens of thousands of coffee growers around the world. Consequently, the major coffee makers serve as a monopsony ("oligopsony") buyer with significant market power to hold the price of coffee since the growers have little market power. At the retail level, the coffee makers serve as oligopolists with potentially significant market power to resist price reductions.

Demand Conditions: Further complicating the picture is the fact that per capita coffee consumption in the U.S., the largest coffee consumer is declining.

Another part of the problem is that the price of coffee beans is a small part of the price of a sophisticated, retail, cup of Joe, in fact, it is only about 10 percent of the cost of a cup of coffee – hard to believe. Consequently, reductions in the price of coffee beans go virtually unnoticed at the latte shop.

An additional issue is the inelastic demand of coffee drinkers. Coffee drinkers often drink one cup of coffee in the morning, for example, whether price has fluctuated by a moderate amount or not. Consequently price reductions by sellers yield few benefits to the sellers' profit situation, prompting reliance on other marketing techniques rather than price competition.

Additional Question: What is the likely impact of the continuing decrease in coffee prices?

Answer: Since coffee consumption continues to be insensitive to price reductions, it becomes inevitable that coffee growers around the world will go out of business and coffee producing nations will find that their export status in the world will continue to sink.

Case 4: Sweet Deals: Sugar Subsidies

Concepts: Subsidies and policies that interfere with markets

Situation: Agricultural subsidies in Europe originated shortly after WWII in response to the European concern over the hunger and rationing experienced in their countries during the war. The result was the Common Agricultural Policy (CAP) that has been designed to keep Europe self sufficient in almost all agricultural areas. The CAP now accounts for approximately half of the EU budget. Subsidies to EU farmers in 2002 totaled $93 billion, compared to about $49 billion in the U.S. for similar agricultural subsidies.

Interestingly, annual aid to developing countries totals approximately $50 billion from the developed countries of the world. Half of this comes from the EU. However, the CAP offsets much of the aid by depressing agricultural prices of products that developing nations sell to the rest of the world.

Question: How do subsidies to European farmers hurt developing countries?

Answer: In the case of South Africa, the EU donates approximately $120 million in aid annually. However, South Africa loses potential export revenues of over $100 million in sugar sales alone because of world prices that are depressed due to the sales of European sugar dumped on the world market.

The U.S. is not a bystander in this game. During the meeting of the WTO (World Trade Organization) held in Doha, Qatar in the fall of 2001, the U.S. stood by the developing countries to put pressure on the EU to cut its massive subsidies to sugar producers. France nearly walked out of the meeting but eventually caved in indicated its willingness to work toward the "substantial reduction" of some subsidies. As a consequence the CAP started working out the details of this.

However, in May 2002, the U.S. Congress passed the 4 year farm bill, which increased its subsidies of sugar. This was a reversal of previous farm bills that had been

gradually reducing payments to many agricultural commodities in the U.S. and turned out to be critical to George Bush's efforts to gain votes from the farm belt in the 2004 presidential election. EU reformers correctly cried foul play claiming the U.S. was undermining their own efforts to stand up to strong farm lobbies in France and other European countries. French President Chirac, a strong supporter of French agricultural subsidies, then announced that he would resist French reforms of farm subsidies which remain virtually unchanged to this day.

It's unfortunate for developing countries that sugar receives such heavy subsidies. It is a product in which they have a strong comparative advantage compared to the EU and U.S. Sugar cane grows like very well in many of the world's poorest countries. It requires little investment, unlike sugar production in more temperate regions of the world such as France or the US. Indeed until the early 1970s, the EU was an importer of sugar. Much of these imports came from former European colonies as the newly independent colonies continued their commercial relationships with their former colonial masters.

The cost of producing sugar in Europe is more than twice the cost in many developing countries. South Africa's growers of cane sugar sell it at the world price, exporting about half of the country's production. In 2002, it was estimated that if the EU held back its production and stopped dumping sugar on the world market, there would be a 20 percent increase in the price and would increase sugar revenues by about $40 million.

Another Question: How do the depressed world prices influence the decisions of producers in developing countries like South Africa?

Answer: Producers typically operate very small farms-ten acres or less. The most frequent response to low market prices is to add more acreage, because they mistakenly believe as though they can increase their net profit by increasing their volume of production. This would work *if* market prices remained constant, however, this additional acreage, taken in total, has the effect of depressing prices further as they struggle to cover their variable costs of production, which are very low.

Yet Another Question: Why do such misguided policies continue to generate political support?

Answer: It was estimated in 2000, by the General Accounting Office, that the U.S. sugar program cost sugar customers about $2 *Billion* per year. Because of large direct payments to sugar producers, the U.S. farm lobby has mushroomed. Sugar is the largest agricultural donor to political campaigns in the U.S. even though it represents only one percent of U.S. agricultural receipts. Similarly, in Europe, the farm lobby has political clout totally out of proportion to its share of the population or contribution to national production. This is explained by the fact that the benefits from market interferences focus on a few beneficiaries. The large costs of the program are spread throughout the entire population, increasing the

cost of sugar-intense items by only a few cents to each consumer. Consequently, there is little incentive for those harmed by these policies to actively lobby against them.

Case 5: Washington Consensus, or Lack Thereof

Concepts: Policies for Economic Development

Situation: The 1950's was the decade of Brady bonds; deregulation in the U.S.; privatization in the U.K., and the demise of the Soviet Union. The 1980s are often referred to as The Lost Decade, especially in Latin America, due to the continent's debt crises, exchange rate difficulties, hyperinflation, rising unemployment, unstable governments, and many other macroeconomic problems. In general, this decade was viewed as the decline of socialism and the ascendancy of conservative economic policy.

Conservative economic policy recommendations for Latin America were "enshrined" in a list of policy recommendations by John Williamson, *Institute for International Economics*, in 1990:

1. Fiscal Deficits – The IMF, especially, made restoration of fiscal discipline the major criteria by which it judged the credit worthiness of its international borrowers. A legacy of the Reagan administration was its clear preference of reduced public spending rather than tax increases as a means of balancing public budgets.
2. Public Expenditure Priorities – In addition to military expenditures, which are regarded as the prerogative of sovereign countries, there are three categories of public expenditures on which strong feelings are held: subsidies, education and health, and public investment. Subsidies were considered prime candidates for reduction or outright elimination. Education and health expenditures were considered to be the perfect examples of the proper role of government. Public investment, too, was considered proper for government, but often subject to corruption.
3. Tax Reform – The basic idea of agreement was that tax rates should be moderate and levied against a broad tax base.
4. Interest Rates – Two principles received general support in Washington. First, interest rates should be market determined and not reflection of policymakers efforts to ration credit. Second, a condition that contradicts the first, is that real interest rates should be positive, but moderate.
5. Exchange Rates – Exchange rates, like interest rates, should be determined by market forces. The "appropriateness" of an exchange rate is whether it is consistent with traditional macroeconomic objectives.
6. Trade Policy - Free trade should be the basis of foreign economic policy. Access to imports of intermediate goods should be regarded with the same importance as the promotion of exports. Policies of protecting domestic

industries were considered costly distortions that punish domestic economies, while rewarding only a selected few.

7. Foreign Direct Investment – While explicit promotion of international capital flows is not considered a priority, restrictive policies that inhibit capital flows were considered to be ill-advised. Inflows of capital often bring needed capital not available from domestic sources. The motivation to restrict FDI is often simply economic nationalism.
8. Privatization – The main rationale for privatization is the belief that private industry is managed more efficiently than government run organizations. Private businesses are threatened by bankruptcy as a means of curbing inefficient resource utilization while no such incentive exists in the public sector.
9. Deregulation – While this was initiated by the Carter Administration, much of the credit for deregulation of American industries was given to the Reagan Administration. It was felt that the benefits of deregulation would be even greater in Latin America, which contained the most heavily regulated market economies.
10. Property Rights – These were not an issue in the United States, but there was a general belief that property rights were not secure in a large number of countries.

These ten points all seem to stem from classical economic theory. Little room is left for most of the development literature as support for ideas to promote growth in the developing world.

Lets evaluate the success of the Washington Consensus in Latin America:

The Latin American decade of the 1990s was unquestionably a success in comparison to the 1980s. Economic growth increased. Inflation and government deficits decreased. In fact, almost all economic indicators improved during the 1990s. However growth was affected by the inconsistent macroeconomic policies throughout the region. Peru exhibited perhaps the most dramatic improvement in macroeconomic performance. For example, its inflation rate in 1990 of more than 7,000 percent fell to 6 percent in 2000. More generally however, the macroeconomic improvements did not translate into widespread public support for the Washington Consensus, because the benefits of the improved economic circumstances that were experienced in most Latin American countries did not translate into widespread improvements in economic welfare throughout Latin American societies.

While economic growth and inflation rates have improved, widespread unemployment remains. Unemployment and underemployment has proven to be an intractable problem. This has translated into diminishing public support for reforms.

Latinamericobarometro reported in 1998 that more than 50 percent of Latin Americans thought that privatization was beneficial for their country. This strong level of support fell to 31 percent in 2000 and 25 percent in 2003. In 1998, 78 percent of Latin Americans thought that a market economy was good for their country, compared to only 25 percent in 2003. This includes an 8 percent level of support in Peru.

An important reason for the continued high unemployment rates is the enclave nature of many Latin American economies. There is limited economic exchange between regions of the country. Regions that are booming do not generate improvements in other parts of the country. The reasons for these disjointed economies reflect poor infrastructure, discrimination, natural barriers, etc.

The result is the impression by much of Latin American that reform is for the rich, and that economic growth aggravates economic inequities that exist in society.

Question: List and discuss specific ways in which acceptance of the Washington Consensus has added fuel to the belief that it aggravates social problems?

Answer: Large fiscal deficits have decreased due to reductions in government expenditures. Unfortunately Latin American governments have been most willing to cut expenditures for services received primarily by low income groups, while maintaining expenditures for programs with special interest support from a small number of people.

Open capital markets have allowed foreign owned businesses the opportunity to exploit economic markets unavailable to domestic firms. These foreign investors often "take the money and run." In the case of mining operations for example, foreign companies, import skilled foreign workers and hire domestic labor only for low skill jobs, while driving up local prices and causing more problems for the local population than they had before.

Deregulation and/or privatization of local enterprises often results in workers losing existing jobs as redundant labor is laid off.

Question: Are there reforms other than the Washington Consensus, that developing nations should consider?

Answer: The Washington Consensus probably is a set of necessary but not sufficient conditions for healthy economies.

A second set of reforms, perhaps even more difficult to achieve, include judicial reform, equity improvements in education access, tax reform, political reform and many others. In fact it seems that many ideas are now crowding the discussion of what Latin American countries should do to improve their economic condition.

Paul Krugman has advocated controls on international capital movements, while Jeff Sachs focuses on the need for improvement in human capital accumulation and micro-credit availability. (Other answers are possible).

Case 6: Adam and Eve/ Money and Inflation: Original Sin

Concepts: Equation of Exchange (M^S and inflation)

Situation: The Equation of Exchange is the basis of the historically observed close (positive) relationship between the money supply and the rate of inflation. That is to say, increases in the money supply, *ceteris paribus*, tend to generate inflation. This phenomenon has been observed for centuries. For example, the Spanish trading ships that returned to Spain loaded with gold caused inflation in the immediate region surrounding the Spanish port because much of the gold became a medium of exchange (money) and served to increase prices with a greater volume of money in circulation. Since the amount of goods, at least in the short run, was fixed this is the equivalent of more money chasing a fixed amount of goods causing prices to be bid upward – hence, inflation.

During the 1970s the U.S. experienced its highest rate of inflation, culminating in annualized inflation rate of 13% for a brief time in 1982. Much of the reason for this inflation has been attributed to the high growth rate of the money supply during the 1970s, which was done as an effort to increase the rate of economic growth and to reduce the national rate of unemployment.

But the most severe modern cases of inflation have appeared in the lesser developed nations of the world. Latin American countries have been especially prone to this problem, which has become known as 'original sin.' Original sin arises from the monetary dilemma a government finds itself in when it is not politically able to increase taxes or to borrow funds in its own currency. This would be the equivalent to the situation that the Bush Administration could find itself in if it were not able to sell US government bonds (denominated in dollars) to finance the current federal budget deficit of over $500 billion. In that case, the U.S. Treasury would need to borrow money (incur debt) by borrowing British pounds or Japanese yen from foreigners. Happily, this has not yet happened in the U.S. or in other developed countries of the world. However, it is quite common in less developed countries, especially in Latin America.

This 'Original Sin' has been experienced in many South American countries within the last fifteen years. The most recent case occurred in Argentina in 2002. The Argentine case had roots similar to most others: Successive years of annual budget deficits were financed by selling government bonds denominated in the national currency. Since the bonds were initially denominated in the national currency the effect of the budget deficit on the amount of money in circulation was minimal, because national bond sales 'soaked up' much of the money put into circulation by the deficit spending of the national government. However, this deficit spending did have the effect of increasing aggregate demand, thus causing some early, but manageable, inflation. As time passed, however, bondholders realize that this inflation was eating away at the value of their assets (bonds). Consequently, they demanded a higher interest rate from the government in order to continue to by bonds (finance government debt). As interest rates rose the government realized that if it didn't

ease credit conditions (lower interest rates), then the economy could be pushed into a recession. Consequently, the national government relaxed credit conditions to deal with recessionary fears. This in turn, fed the inflationary trends in the economy, again causing bondholders to demand even higher interest rates. In Argentina this spiral continued until the Argentine people finally responded by, in essence, saying, "We will no longer buy bonds denominated in our own currency because we are losing too much of our assets to inflation."

The Argentine national government could have responded by balancing its budget so it didn't need to sell bonds to the public. However, government spending in Argentina could not be cut due to political promises made to voters and party members throughout the country. The only way Argentine government spending could be financed was by borrowing money from foreign lenders, who demanded repayment in dollars, euros, and yen. Unfortunately, after this foreign money was borrowed and then spent in the domestic economy, there was a tremendous surge in the domestic money supply. This monetary surge then propelled the inflation rate to extremely high levels.

The cycle was broken in Argentina only when the Argentine government declared bankruptcy by defaulting on its foreign debt. Suddenly the government had no money to pay its bills at all as no borrowers were willing to continue to lend to them. Government expenditures throughout the country dried up. Argentine banks closed. The unemployment rate shot up to 20%, and foreign holders of bonds due to the Argentine government lost all of their money. After more than a year of negotiations, these foreign bondholders have now been paid about 20 percent of their initial investment. As a consequence the country of Argentina is now able to borrow money again on international credit markets, albeit at rather high interest rates.

Questions:

1. Calculate the average annual rate of inflation and the average rate of monetary growth in the U.S. for 1972-82; 1983-1993; and 1994-2004. Does the equation of exchange hold?
2. Draw a set of graphs showing the annual rate of inflation, the short term interest rate, and the annual rate of monetary growth in Argentina, Bolivia, Peru, and Japan (one graph for each country with all three variables on that graph). What is the relationship between these three variables?

Answers: See various websites for data, plot and discuss.

Case 7: Ups and Downs, Ins and Outs, and International Business Cycles

Concepts: Gross Domestic Product, Business Cycles

Situation: National business cycles are the irregular 'ups and downs' of the economy. There are two phases to a business cycle, expansion and recession. The turning points of a recession are called the 'trough' and the 'peak' of the cycle. The cycle is measured by the gross domestic product of the economy, which is the market value of all final goods and services produced in one year. A complete business cycle runs from the peak of one cycle to the peak of another cycle, or, conversely, from trough to trough.

One tricky part of business cycles is determination of whether or not the economy is in a recession, as it is occurring. One commonly accepted definition of a recession is the existence of two consecutive quarters of decreasing gross domestic product. Each expansion and recession have been dated by the National Bureau of Economic Research. Since 1919 there have been 16 recessions and 17 expansions. Recessions, on average, have lasted for slightly more than one year and gross domestic product has decreased, from peak to trough, by more than 6 percent. Expansions during most of the 20th Century have lasted for almost 4 years, on average and gross domestic product has increased from trough to peak by an average of 22 percent.

These averages, however, hide large variations from one business cycle to another. The Great Depression was the worst recession ever experienced, when gross domestic product decreased by 33 percent over a 43 month period. No other recession has come close to the experience of the Great Depression. The second worst recession in the U.S. occurred during 1974-75 when gross domestic product decreased by 5 percent, and lasted for 16 months. The most recent recession, from December, 2000, to October, 2001, was so mild that the measured gross domestic product for 2001 actually increased slightly.

Finally, the record of 20th Century business cycles in the U.S. shows that since World War II, business cycles have become milder, with expansions lasting for longer periods of time.

Questions: [Note: pick several countries of various sizes and level of dependence upon foreign trade for students to analyze as this will give the widest set of experiences to examine. Also, groups could be assigned different countries so that each presents their results to the whole class so that in-class discussion would cover some of the questions below]

1. Which of these countries has had the most/fewest business cycles since 1978?
2. Which of these countries has had the greatest/smallest growth rate since 1978?
3. When was the deepest recession in each of these countries?
4. When was the fastest annual rate of expansion in each of these countries?
5. Do any of these countries exhibit a timing of their deepest recession/strongest expansion that is close to the U.S.? How do you explain this result?

6. Compare the 1978 – 1991 period to the 1992 – 2003 period in each country. Calculate the average annual rate of growth in these two periods and compare the results. How do you explain your findings? Which country surprises you? Why?

Answers: Again, see various websites for data.

Case 8: The Price of Misery: Emissions Permit Trading

Concepts: Creating markets for externalities.

Situation: The Kyoto Protocol was signed by most European nations. In an effort to achieve a significant reduction in greenhouse gas emissions, the EU's Emissions Trading System (ETS) was established in January, 2005. The ETS established a market for trading carbon emission permits which were given to thousands of polluters in Europe. Initially, permits for 2.2 billion tons of carbon dioxide were given to 13,000 industrial polluters who could either use their permit to pollute or sell it to another company if the cost of reducing their own carbon emissions was less than the market value of the tradable permits they were given by ETS. Approximately 10 Billion Euros worth of permits were traded in 2005. The first permits that were traded in early 2005 sold at a price of less than $10, however the price more or less increased continuously until April, 2006, when the price plummeted from approximately 30 Euros per ton of carbon dioxide to 12 Euros in late April, 2006.

Questions:

1. Why did the price of EU emissions permits increase?
2. What caused the price of EU emissions permits to drop in April, 2006?

Answers:

1. A major reason that permit prices increased in Europe is because of the increased difference between gas and coal prices. Electric utilities dominate the emissions permit market because the utilities account for such a large portion of total carbon emissions in Europe. The most important fuels used for electricity generation are gas and coals. As natural gas prices have risen in recent years, utilities attempt to switch to coal, a cheaper fuel. However, coal is a more powerful carbon polluter than natural gas. So as utilities switch to coal fuel, it is necessary for them to buy more emissions permits, which drives up the price. Since January, 2005, when permits began to be traded the price of permits increased consistently until the price plummeted from 30 Euros per ton to approximately 12 Euros in late April, 2006.

2. In late April several EU nations reported the amount of carbon they had emitted in the previous year. The reports indicated that carbon emissions in these countries were

much smaller than had been expected. Suddenly the future demand for permits disappeared and the price dropped sharply, because many polluters realized they had emissions permits for more than they really needed.

Additional Information: This condition did not reflect the ETS trading system's success in reducing pollution. Rather it reflected the fact that these polluters had received more permits in early 2005 than they really needed. Polluters had received these permits free; but they soon found themselves sitting on a fortune of emissions permits, which were an unexpectedly valuable asset. It was estimated that the British electric utilities received 800 million pounds in unexpected profits.

Another Question: Why did emissions permits not encourage a switch to cleaner fuels?

Answer: Part of the reason that natural gas (the clean fuel) did not begin to replace coal energy (the dirty fuel) is that natural gas prices increased faster than coal prices. More importantly though, new natural gas facilities represent investments in very long lived assets. Unfortunately the first phase of the ETS permit system lasts for only 3 years. After 3 years, nobody knew for sure what kind of trading system (if any) will exist. Consequently no one in the private sector will make an investment in natural gas generators when the future, beyond 3 years, is totally "up in the air."

A METHODOLOGICAL ISSUE IN THE MEASUREMENT OF FINANCIAL LITERACY

Robert R. Hill, University of Houston—Clear Lake
Grady Perdue, University of Houston—Clear Lake

ABSTRACT

This study adds to our understanding of financial literacy by examining a methodology issue in how researchers measure financial literacy. Previous studies have failed to allow for the difference between respondents knowing the correct answers to basic knowledge questions and correctly guessing the answers to those questions. Previous studies have also frequently failed to allow respondents to admit not knowing the answer to financial questions posed to them, implicitly not recognizing the difference between one being aware he is lacking in knowledge and one incorrectly thinking that he knows certain information. We address these issues by offering a simple solution to the data collection process that allows for these distinctions to be made.

INTRODUCTION

In order for an individual to function in our increasingly complex modern society, one must develop a basic understanding of investing, insurance, credit and debt management, and other personal finance topics. Knowledge of these topics is often referred to as financial literacy. Unfortunately, the level of financial literacy in modern American society is generally viewed as being unacceptably low. In a press conference on January 22, 2008 President George W. Bush announced that he was responding to the problem with a special presidential advisory group.

> *Earlier today I signed an executive order establishing the President's Advisory Council on Financial Literacy. I have asked people from the business world, the faith world, the non-profit world, to join this council in order to come up with recommendations as to how to better educate*

> *people from all walks of life about matters pertaining to their finances and their future.*
>
> *… if we want America to be as hopeful a place as it can be, we want people owning assets. We want people investing. We want people owning homes. But oftentimes, to be able to do so requires literacy when it comes to financial matters. And sometimes people just simply don't know what they're looking at and reading. And it can lead to personal financial crisis, and that personal financial crisis, if accumulated to too many folks, hurts our country.*

Concern about the level of financial literacy has been developing for many years, and is a topic that has been actively explored by the academic community. Research into this topic has resulted in an extensive body of literature being developed to explain the general public's level of financial literacy. Many of these studies have focused on observed behavior of individuals or have focused on surveys that have allowed researchers to ascertain survey respondents' level of financial knowledge in one or more of the areas of personal finance. A discussion of this literature follows below.

The results of most academic surveys on financial literacy show respondents answering about half of the survey questions correctly, indicating a relatively low level of knowledge on personal finance topics. But does only being right about half the time imply that the respondents are wrong about half the time? Where many researchers have failed to correctly interpret their own results is that they have simply treated responses as being correct or incorrect. Understanding responses on a survey of factual knowledge is much more complex than that.

This study adds to our understanding of financial literacy by examining a methodology issue in how researchers measure financial literacy. Previous studies have failed to allow for the difference between respondents knowing the correct answers to basic knowledge questions and correctly guessing the answers to those questions. Previous studies (see Chen and Volpe, 1998; Volpe, Chen and Liu, 2006; and Worthington, 2006, for example) have also frequently failed to allow respondents to admit not knowing the answer to financial questions posed to them, implicitly not recognizing the difference between one being aware he is lacking in knowledge and one incorrectly thinking that he knows certain information.

These two methodological errors result in previous studies potentially overstating the level of financial literacy and providing an incomplete description of what is contained in "wrong" answers. By correcting for these errors our first

contribution is to broaden the understanding of the level of financial literacy. Our second contribution is to demonstrate that the opportunities for the academic community to educate students and for financial planners to educate clients (and potential clients), are greater than some may have anticipated.

THE FINANCIAL LITERACY LITERATURE

A multitude of studies over the past couple of decades have tried to explain how different personal variables affect (or fail to affect) the financial literacy of individuals. Some of these studies in the current literature focus on general financial literacy, and other studies focus specifically on investing or some other area of personal finance. Many of these studies are based on survey data where respondents address questions of factual knowledge concerning matters of personal financial literacy.

Many studies explore the implication of race and ethnicity on an individual's financial behavior and knowledge, and report significant differences between white and non-white households both in terms of the level of financial literacy and the financial behavior of the households of different ethnic groups. Somewhat echoing the earlier work of Blau and Graham, 1990, both Zhong and Xiao, 1995, and Plath and Stevenson, 2000, observe that the asset mix for African-American households is quite different from that of white households. These researchers assert that this is true even when income levels of white and African-American households are the same. Plath and Stevenson go on to observe that the primary financial asset of black households is life insurance—not stocks or mutual funds. That finding is consistent with Badu, Daniels, and Salandro, 1999, reporting that black households tend to make portfolio choices that involve selecting lower returning assets. These researchers note black households particularly avoid stocks, and that this behavior is unlikely to help close the net worth gap between black and white families. Keister, 2000, comes to a similar conclusion.

In one of the few academic studies to include Hispanics as a separate demographic group, Yao, Gutter, and Hanna, 2005, find that whites have greater financial risk tolerance for taking "some risk" than blacks, who in turn have greater risk tolerance for "some risk" than Hispanics. However, these researchers also find that when considering taking "substantial risk," Hispanics were most likely to accept the higher level of risk and whites were the least likely to do so. These researchers hypothesize that Hispanics forming the two extreme ends of risk tolerance may be

a result of "the large diversity of backgrounds within the Hispanic category" in their study.

However, the significance of ethnicity in financial matters is rejected in some studies. Chen and Volpe, 1998, do not find race to be significant in explaining financial literacy in their study. Coleman, 2003, studies the proportion of net worth held in risky assets and finds that differences between ethnic and racial groups is not major. But Coleman also observes that Hispanics have a smaller proportion of net worth in risky assets.

The connection between gender and financial literacy is another area of interest for many researchers. This connection has become so well known that it is even being discussed in the personal finance section of *The Wall Street Journal* (Clements, 2008). Gender is often argued as being important in two ways. First, gender is thought to be important because some studies have shown a major difference in the overall financial knowledge of men versus women (Worthington, 2006). Second, various studies (see Bajtelsmit and Bernasek, 1996; Bajtelsmit, Bernasek, and Jianakoplos, 1999; Hallahan, Faff, and McKenzie, 2004) often suggest that gender is important in terms of general risk aversion. In particular it is noted that as evidenced by a preference for safer investments, women are less likely to engage in risky investing behavior. This could explain why women have relatively less interest in the stock market than do men, and could also explain why women seem to be less knowledgeable about investing. Even when compared to men who are similar in all other significant characteristics, both Bajtelsmit, Bernasek, and Jianakoplos, 1999, and Hariharan, Chapman, and Domian, 2000, note that women are less likely to invest in risky assets.

Some studies find other variables besides ethnicity and gender to be important in explaining financial literacy. Chen and Volpe, 1998, find the level of income to be important in financial literacy, while Hallahan, Faff, and McKenzie, 2004, find income and wealth to be more important in understanding risk tolerance. Those two studies seem to be consistent with Waggle and Englis, 2000, finding that higher net worth investors invest more in equities than lower net worth groups. Worthington, 2006, discovers significance in the levels of income, savings and mortgage debt in predicting financial literacy.

Employment status is found by some researchers to be important in predicting financial literacy. Chen and Volpe, 1998, find that persons with significant work experience seem more knowledgeable on financial issues than those with little or no work experience. Worthington, 2006, finds that the employed are more knowledgeable about financial issues than the unemployed. Among the

employed he further finds that those who are employed in professional positions or own small businesses are more financially literate than the farm workers he surveyed.

Zhong and Xiao, 1995, Bodie and Crane, 1997, and Waggle and Englis, 2000, conclude that the level of education is a significant variable in explaining the ownership of stocks and bonds by investors. Shaw, 1996, and Hallahan, Faff, and McKenzie, 2004, find a correlation between increased education and increased risk tolerance. However, Yao, Gutter, and Hanna, 2005, believe that education increases awareness of the financial markets, but personal willingness to accept risk is not changed by education. Specifically focusing on financial education, Dolvin and Templeton, 2006, assert that mandatory financial education seminars for workers result in "improved risk management" by those employees.

Based on surveys of university students, two studies, Volpe, Chen, and Pavlicko, 1996; and Chen and Volpe, 1998, show business majors have a higher degree of financial literacy than non-business majors.

Even marital status appears in the literature as an explanatory variable for the level of financial literacy. Hallahan, Faff, and McKenzie, 2004, find marital status to be significant in measuring risk tolerance, with unmarried persons exhibiting a higher level of risk tolerance. Blending gender and marital status, Yao, Gutter, and Hanna, 2005, note that married females exhibit the lowest level of risk tolerance and unmarried males have the highest level of risk tolerance. However, marital status is rejected as being significant in determining asset allocation by Bodie and Crane, 1997, and by Waggle and Englis, 2000.

Age is another variable found by some to be important in explaining financial literacy. Chen and Volpe, 1998, point out that most of the students participating in their study are young and in the early stages of their life cycle. As such they have little or no experience with topics like life insurance or investments. Yet, Worthington, 2006, indicates age is important in terms of financial literacy. Yao, Gutter, and Hanna, 2005, find that risk tolerance is inversely related to age.

THE METHODOLOGICAL ISSUE

When research surveys of factual knowledge are conducted, a series of questions in a polychotomous answer format are commonly used with persons being asked to identify the correct response to each question. Such questions have one correct response and multiple "distractors" that are incorrect answers. The multiple-

choice examination is a familiar format to most people, and it is easy for researchers to grade for results.

Psychometric theory argues that the more distractors one uses in designing a survey or examination, then the greater the reliability of the results from the test. However, the distractors only enhance the reliability of the survey instrument if the distractors are well chosen. Poorly selected distractors that are never selected by respondents, add nothing to the reliability of the results. Research by Wesman (1971) into ascertaining the appropriate number of distractors for a given question indicates that three or four good distractors are about right. This number is what is commonly seen on university multiple-choice examinations. However, Sidick, Barrett and Boverspike (1994) have argued that as few as two distractors may be adequate if they are good distractors.

Assuming that the distractors are credible and are not so obvious that a person without knowledge on the subject can avoid them, respondents who do not know the answer to a question can certainly guess at the answer. If a group of persons with no knowledge on a topic answer a multiple choice examination on that subject, there will be correct answers marked by pure random chance. How many correct answers? If the questions are structured with a polychotomous answer format so that there are five possible answers to each question, the average score on the test by uninformed respondents should be 20 percent. If persons with no knowledge receive a score of 20, this raises the average test score for respondents higher than it would be if the person with no knowledge actually received a score of zero.

Furthermore, for those persons taking a test who do have knowledge of the subject area, it is possible that some of these people will get some answers correct because they know some answers but also guess at other questions where they get lucky and select the correct answer. These persons scores are also overstated and contribute to a higher average score for all respondents.

The problem of persons correctly guessing answers on questions on which they have no knowledge, is what has caused some evaluators to apply an adjustment formula to allow for answers that have been guessed correctly. Students taking examinations such as the SAT and GMAT are warned that there is a penalty for incorrect answers, so random guessing will probably hurt them with a grade penalty. The formula for making such an adjustment is simply

$$\text{Adjusted Score} = C - [\, I / (n-1) \,]$$

where *C* is the number of correct answers, *I* is the number of incorrect answers, and *n* is the number of available answers on each question. On a test with five possible answers on each question, the average random score of test takers with no knowledge of the subject should be 20 percent. However, the adjusted score for these people would be

$$20 - [\ 80 / (5\text{-}1)\ ] = 20 - 20 = 0$$

indicating that zero is the correct score for a person who knows nothing on the topic and is only guessing.

In a multiple choice test it is probable that participants will attempt to answer each question unless there is a penalty for wrong answers. However, for a student completing a voluntary financial literacy survey for an academic researcher, penalizing a score for wrong answers will have no meaning to the survey participant. Therefore, there is no disincentive for a survey participant to reframe from guessing. The students are asked to "complete the survey" and they do exactly that.

There is no indication in the finance literature that previous researchers have been adjusting (penalizing) survey respondent scores for wrong answers. Therefore, respondents who have correctly guessed at answers have been able to raise their individual scores and the average score of the group under study. This implies that the level of financial literacy reported in previous studies is probably somewhat overstated.

However, simply adjusting the scores for wrong answers is not the entire solution to understanding the level of financial literacy. While such an adjustment can more accurately describe the percentage of correct responses coming from actually having knowledge (as opposed to lucky guessing), it does not assist the researcher in understanding the responses viewed as being incorrect. A person may select an incorrect answer either because he does not know the correct answer or because he thinks he knows the answer but is wrong.

The difference between the two cases may be an unimportant subtlety to a person who is only seeking to determine what percentage of respondents select the correct answer. But it is a significant difference to the educators and to the researchers who realize that the first individual (who realizes he does not know the answer) is less likely to make a bad decision based on inaccurate knowledge, because this individual is aware that he does not know the answer. This is also a person who is potentially open to learning because he is aware that he does not know the information. On the other hand the second individual (who incorrectly

thinks he has accurate knowledge) is susceptible to taking actions based on mistakenly believing that he has adequate knowledge. He is also less likely to seek out new knowledge or respond to the opportunity to be taught because he believes he already has the knowledge he needs.

To address this issue we suggest that one of the response options on polychotomous questions examining the level of financial knowledge should be an option that allows the respondent to say "I don't know." This is an approach commonly used in opinion surveys. (For example see Bogart, 1967; Francis and Busch, 1975; Poe, Seeman, McLaughlin, Mehl and Dietz, 1988; Goldsmith, 1989; Sanchez and Morchio, 1992; Mondak, 2001; Krosnick, Holbrook, Berent, Carson, Hanemann, Kopp, Mitchell, Presser, Ruud, Smith, Moody, Green and Conaway, 2002; and Schaeffer and Presser, 2003.) By giving financial literacy survey respondents such an option, researchers can provide a legitimate means to admit not knowing an answer. This eliminates any perceived pressure to guess a randomly selected answer.

We believe that when financial literacy is involved, it is not merely an "academic" exercise to note that there are at least three potential responses to any question. Of course for many questions there is a correct answer and there is an incorrect answer. But the third potential response of "I do not know" is equally valid and equally important.

OUR DATA

In Spring 2007 a group of junior and senior-level undergraduate business students at the University of Houston—Clear Lake were asked to complete a survey on their knowledge of several personal finance topics. Student participation was on a voluntary basis. Participants were asked to provide no personal information that might identify them other than the demographic data discussed below that was needed to describe the overall population participating in the survey. We were able to collect and analyze 170 completed surveys for this study.

The first 18 questions of the 68 question survey seek to obtain demographic information (e.g., gender and ethnicity) and some basic data establishing each individual's use of selected financial services (e.g., checking accounts and credit cards). The other 50 items in the survey are a set of questions seeking to determine each individual's knowledge of a set of selected key areas of personal finance. The survey consists of ten questions on each of the topics of investments, personal

income taxation, credit and debt management, risk management, and retirement planning.

For our survey we allow students to acknowledge that they do not know the answer on 48 of the 50 questions. (Two of the investments questions do not give that option.) We assert that our decision to structure the survey this way impacts both the number of correct and incorrect answers, resulting in a more accurate measure of financial literacy. This response option eliminates the need to guess at an answer, reducing the number of cases where a correct answer is guessed. This approach also allows us to delve more deeply into the non-correct responses.

OUR RESULTS

Data are reported in this table using some of the demographic characteristics reported in the previous literature to establish the similarity of our sample group with those that have been examined in previous studies. A demographic breakdown of the respondents shows 64 males and 106 females. The survey group also includes 12 African-Americans, 28 Hispanics, 102 non-Hispanic whites, and 28 persons who defined themselves as being in other ethnic groups. (All of the other ethnic groups represented in our data had nine or fewer persons and are not reported separately.) Only four percent of the participants are under age 21; 45 percent are ages 21-25; 41 percent are ages 26-40; and 10 percent are over 40.

A descriptive summary of the data presented in Table 1 describes the use of basic financial services by survey respondents. The data indicate that the 170 participants in our survey have a reasonably good level of familiarity with basic financial services, suggesting that they are not all that different from an adult population.

As may be observed from the data provided in Table 1, virtually every student surveyed is the primary account holder on a checking account. Also nearly every student holds an ATM or debit card and about 80 percent of them hold credit cards in their own names. Approximately one-fourth of all survey participants have their own brokerage accounts and about half have some form of retirement accounts. (There was a virtual absence of retirement accounts by persons who did not fit into the three ethnic groups shown in Table 1.) For persons in the three major ethnic groups completing in the survey, the only observable major difference between groups is that Hispanics seem to be less inclined to hold brokerage accounts.

Table 1: Use of Financial Services with Service in Users Name
(stated as percentage)*

	Checking account	Savings account	ATM/ debit card	Credit card	Brokerage account	Retirement account
Females	91.5	86.8	98.1	79.3	23.6	50.9
Males	96.9	82.8	95.3	81.3	29.7	50.0
African-American	100	91.7	100	83.3	33.3	66.7
Hispanic	89.3	82.1	100	85.7	10.7	60.7
White, non-Hispanic	93.1	89.2	96.1	80.4	35.3	53.9

* 28 participants (roughly 16 percent of survey respondents) who fall into non-discussed ethnic groups are included in the total values and in the male and female measurements but not in separate ethnic groupings.

Table 2 presents the summary of the results of our survey indicating for each topic area the average percentage of correct responses, the average incorrect response rate, and the average selection rate of the "I don't know" response. The overall results of the financial literacy questions are reasonably consistent with the data from other studies in the literature that survey the financial literacy of university students. The participants in our survey had an overall average correct response rate of 46.6 percent. This score may be compared to other surveys measuring the financial literacy of university students where Volpe, Chen and Pavlicko, 1996, report an average correct score of 44 percent and Chen and Volpe, 1998, report an average correct score of 53 percent. The consistency of the percentage of correct answers between our survey and previous studies adds to the validity of our results.

We argue it is simplistic to take 100 percent, subtract the 46.6 percent average correct response rate, and then conclude that we have an average incorrect response rate of 53.4 percent. In fact students only choose an incorrect response an average of 37.0 percent of the time. The "I don't know" choice on the various questions is selected an average of 16.4 percent of the time. Failure to have an "I don't know" option would have masked the fact that nearly one-third of the non-correct responses are from people who knew that they had a knowledge deficiency

on the topic at hand. Furthermore, had these students had to guess an answer because of an absence of an "I don't know" option, some would have correctly guessed the correct answers on some questions. This would have falsely raised the "correct" response rate.

In Table 2 when separating the survey questions into personal finance topic areas, more significant differences emerge. Clearly the best topic area for our respondents is credit and debt management. The questions on credit and debt have the highest level of correct responses and the lowest level of incorrect responses and admitted lack of knowledge. This is consistent with about 80 percent of the survey participants indicating that they have a credit card in their own name.

Table 2: Responses by topic area
(stated in percentage)

Section of survey	Correct answers	Incorrect answers	"I don't know"
Overall	46.6	37.0	16.4
Investments	55.7	31.3	13.0
Income tax	30.9	49.9	19.2
Credit/debt	62.0	29.1	8.9
Insurance	49.9	35.7	14.4
Retirement	34.2	38.1	27.7

Income taxation is the weakest area in terms of correct and incorrect responses. We are struck by the student who wrote a note to us that none of our possible answers are correct on Question #35, which asked about the taxation of gains from the sale of an owner-occupied residence. In straightening us out he (incorrectly) informed us that capital gains from the sale of a home must be rolled over into a new home within 18 months or the gains are taxable. About 73.5 percent of the respondents missed this question, with only 11.2 percent getting it correct. 15.3 percent of the respondents admitted that they did not know the answer. As is true for the entire topic area, inaccurate knowledge about taxes is common. Despite a median participant age of over 25 and the majority of these people being employed (as evidenced by their retirement accounts), taxes are a mystery to these 170 people.

Table 3 presents the data based upon responses by gender. Overall the percentage of correct responses by males and females is almost exactly the same, but

we note that the average scores for males shows them to be both right and wrong slightly more often than women.

Table 3: Responses by gender
(stated in percentage)

Section of survey	Correct answers	Incorrect answers	"I don't know"
Overall	46.6	37.0	16.5
Males	47.3	38.3	14.4
Females	46.1	36.1	17.8
Investments	55.7	31.3	13.0
Males	60.9	29.5	9.6
Females	52.5	32.8	15.1
Income tax	30.9	49.9	19.2
Males	29.3	54.4	16.3
Females	33.4	45.7	20.9
Credit/debt	62.0	29.1	8.9
Males	62.3	29.3	8.4
Females	61.9	28.9	9.2
Insurance	49.9	35.7	14.4
Males	47.3	38.7	14.1
Females	51.4	34.1	14.5
Retirement	34.2	38.1	27.7
Males	32.7	43.9	23.4
Females	35.2	34.5	30.3

The strongest area for both genders is in credit and debt management, with both groups getting slightly better than 60 percent of the answers correct. The greatest difference in the correct answers between men and women is in the area of investments, where men score much higher. However, women have a higher percentage of correct answers in three of the five subject areas. These findings are consistent with results previously reported by Chen and Volpe, 1998; 2002, where

they find men to be more knowledgeable about investing, but women to be more knowledgeable in other area of personal finance.

The data in Table 3 indicate females are more likely (though some times only very marginally) than males to indicate they did not know answers in all five area of study. This fact may be related to males having a larger percentage of incorrect responses in every category except investing.

The "I don't know" option is selected more frequently by both genders in the area of retirement planning. This is surprising given that half of the students already have retirement accounts and the majority of the participants in the survey are over age 25.

Table 4 reports the data for each of the three major ethnic groups participating in the survey. Overall non-Hispanic whites had the highest percentage of correct answers and the lowest percentage of incorrect answers. African-Americans stood out as having the best accuracy percentage in three of the five categories, and had the second best rate in the other two categories.

For all three ethnic groups one notes that credit and debt management is their strongest area, and income taxation is their weakest area. Whites are particularly stronger than the other two groups in knowledge about investing.

Among the three reported ethnic groups Hispanics were more likely than either African-Americans or non-Hispanic whites to choose the "I don't know" option in all five categories of financial literacy under study. Overall African-Americans are less likely to choose that option, which may contribute to their having the highest overall percentage of incorrect responses.

Table 4: Responses by ethnicity
(stated in percentage)*

Section of survey	Correct answers	Incorrect answers	"I don't know"
Overall	46.6	37.0	16.5
African-Amer	47.8	40.2	12.0
Hispanic	42.8	38.2	19.0
White, non-Hisp	49.9	33.7	16.4
Investments	55.7	31.3	13.0
African-Amer	48.3	37.1	14.6
Hispanic	43.2	37.2	19.6
White, non-Hisp	63.4	25.2	11.4

Table 4: Responses by ethnicity
(stated in percentage)*

Section of survey	Correct answers	Incorrect answers	"I don't know"
Income tax	30.9	49.9	19.2
African-Amer	28.3	56.7	15.0
Hispanic	23.9	56.1	20.0
White, non-Hisp	34.1	46.1	19.8
Credit/debt	62.0	29.1	8.9
African-Amer	65.8	28.4	5.8
Hispanic	61.1	28.9	10.0
White, non-Hisp	66.2	26.4	7.4
Insurance	49.9	35.7	14.4
African-Amer	52.5	40.8	6.7
Hispanic	50.7	34.3	15.0
White, non-Hisp	51.4	34.2	14.4
Retirement	34.2	38.1	27.7
African-Amer	41.7	40.0	18.3
Hispanic	35.4	34.2	30.4
White, non-Hisp	35.6	36.1	28.3

* 28 participants (roughly 16 percent of survey respondents) who fall into non-discussed ethnic groups are included in the total values and in the male and female measurements but not in separate ethnic groupings.

SUMMARY

Previous research into the area of financial literacy has explored whether or not persons could correctly answer fundamental questions relating to personal finance topics. As a group the studies have reported an unacceptably low level of financial literacy.

This study has explored the methodological issue of giving people the opportunity to admit not knowing the answer to factual questions on a survey rather than forcing them to guess answers. The use of this option helps to more accurately

understand the level of financial literacy by reducing the number of false correct responses and by separating the non-correct responses into those people with inaccurate knowledge and those who admit having no knowledge on a topic. The separation of persons into those with inaccurate knowledge and those with a lack of knowledge should be particularly important to educators concerned with financial literacy.

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ECONOMICS ARTICLES

BREAKING VICIOUS CIRCLE OF LOW PRODUCTIVITY: A NEW THEORETICAL MODEL

Satyanarayana Parayitam,
University of Massachusetts Dartmouth

ABSTRACT

The problem of lagging productivity growth in US has attracted the attention of researchers in the recent past. It is contended that productivity growth is the source of growth in real income per capita (Dew-Becker & Gordon, 2005). Though researches debate about the causes of productivity slow down during the 1970s (Denison, 1979; Norsworthy, Harper and Kunze, 1979) and acceleration during 1990s (Jorgenson & Stiroh, 2000; Oliner & Sichel, 2000; Gordon, 2003), economists try to find ways of increasing total productivity growth. The present paper postulates that 'vicious circle of low productivity' is the basic cause of stagnant growth a model is developed to break this vicious circle. Based on the premise that the employer may have to offer higher 'wage' to attract and retain 'competent and productive workers', and based on efficiency wage models (Solow, 1979, Shapiro & Stiglitz, 1984; and Libenstein, 1963), the present model attempts to break the vicious circle of low productivity.

INTRODUCTION

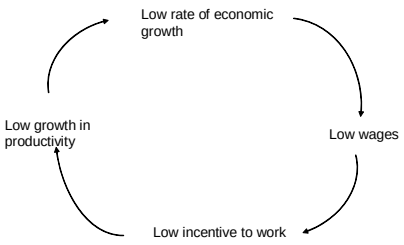
> *"Productivity growth raises our standard of living and plays a central role in our competitiveness in the worldwide economy. Productivity growth will be even more important as new technologies accelerate global economic integration as the American population ages"*
>
> *(Economic Report of the President, 2006: page 3)*

The low rate in productivity growth has been one of the major issues catching the attention of both academicians and administrators alike. The literature is replete with efficiency wage models explaining convincingly the involuntary

unemployment (Solow, 1979), (Shapiro & Stiglitz, 1984), (Salop, 1979), (Weiss, 1980), and a wide baffling variety of models, both interesting and exhaustive which discuss the operational implications of including certain contract forms (Malcomson, 1984). Though these models differ in several respects in terms of content, they have one thing in common. They explain why markets often do not clear; they do not offer any solution to problem of low productivity. For instance, if we recall the Solow (1979)condition that a profit maximizing firm is prepared to hire all the labor at the real wage w* (i.e. the elasticity of effort with respect to the wage is unity) because it minimizes the labor cost per efficiency unit. Each firm therefore optimally hire labor up to the point where marginal product equals real wage. Solow (1979) contends that any decrease in wage would result in decrease in productivity of all the employees on the job (p.13). While this is only one side of the coin, it unfolds the other side quite interestingly. Any increase in wage would automatically increase productivity but it is feared that wages can go up only at the cost of more involuntary unemployment.

Vicious circle of low productivity: It is difficult to offer any precise explanation to low productivity (e.g. of 1970s). However, researchers (Kahn, 1993; Krugman, 1993, Filardo, 1995) attempt to explain low productivity growth in terms of slowdown in labor force growth (Kahn, 1993: p 1). One plausible explanation that can be found is in terms of vicious circle of low productivity. The argument is that low rate of economic growth is caused by low productivity, which in turn is caused by low incentive for the employees to work. Low incentive to work is caused by low wages. Low wages result from low rate of economic growth. The cycle is thus complete. The vicious circle of low productivity is captured in the following figure.

Figure 1. Vicious circle of low productivity



That higher productivity is considered as one of the ingredients of economic growth and low productivity can hamper growth needs no reiteration. If efficiency of inputs rises by 8 percent per year, the real income and standard of living will be doubled every eight years [$(1.08)^8 = 2.000$ app]. A study by the Bureau of Labor Statistics 1988) has categorically pointed out that productivity growth exerts a tremendous impact on key economic parameters or performance indicators. It is felt strongly that (a) productivity growth results in higher incomes and consumption rather than in additional leisure; (b) a slowdown in productivity results in sharp increases in price level; (c) increase in productivity does not result in growing unemployment; (d) with productivity growth, real wage compensation increases; and (e) better productivity growth can provide better education, better environment, medical and health care and would increase the overall standard of living.

According to the Economic Report of the President (1994: p. 44; 2006: p 159), labor productivity in USA has declined from 2.7% in 1960-73 to 0.6% in 1973-79 and then went up mildly to 1.3% during 1979-89. The Economic Report of the President estimated that the average annual rate of growth of GDP during 1947-93 was 3.94% whereas it was only 2.3% during 1973-92. The most significant factor in 1947-73 was technological change, which alone generated about 1.63% of economic growth. The productivity growth averaged around 3.8% between 2001 through 2004 (Yellen, 2005). According to the latest Economic Report of the President (2006: p 159) "Since 1995, the US has enjoyed an acceleration in labor-productivity growth. From 1973 to 1995, output per worker grew at 1.4% per year whereas from 1995 to 2004 this rate accelerated to 2.9% per year, with rates averaging over 3% since 2000. The implication is that at 2.9% rate of growth, to double the standard of living it takes 24 years". While post 1995 has seen the period of acceleration of productivity, it is important to maintain higher productivity through escalated wage which I call 'motivating wage rate'.

Wage-productivity -employment relationship: Wage - productivity relationship is not uniform in all the sectors of the economy. The efficiency wage hypothesis is relevant particularly in primary sector (Akerlof &. Yellen, 1990), whereas it is weak in secondary sector. It is contended that wage differentials are meticulously maintained by different firms to match the workers of identical characteristics. The point is that employers are fully aware that the effort-wage-relationship differs across various groups. The idea that labor productivity depends on real wages paid by the firm is borrowed from one of the more popular micro-foundations of efficiency-wage models of Libenstein (1963).

As regards the productivity and unemployment relationship, the famous Okun's (1970) law can be recapitulated here. According to this law, higher unemployment rates correspond to lower productivity. One of the startling revelations is that even in downturn caused by decline in marginal productivity of labor to a decline in real price of output should lower real wages but leave productivity (effort) unchanged (Shapiro & Stigltz, 1984). Normally it is assumed that higher unemployment rate at higher wages will make employees more productive because of the fear of loss of employment. Therefore, higher wages result in higher productivity, especially when unemployment is high.

(A) *Traditional View:*

PRODUCTIVITY - WAGE RELATIONSHIP

Higher productivity → Higher wages
Lower productivity → Lower wages

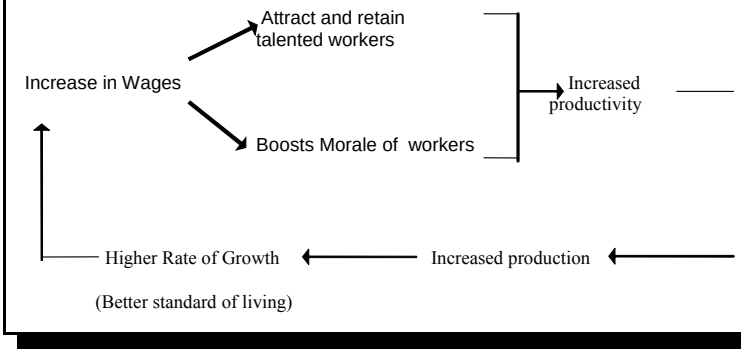
(B) *Contemporary View:* (Motivating Wage Theory)

Higher productivity → Higher wages
Higher wages → Higher productivity

Therefore,

Higher productivity ↔ Higher wages

Figure 1: Mechanism showing how increase in wages result in increased productivity and higher growth.



THE MODEL

Let us take the conventional production function $Q = F\{ L^*, K^*, e(w)\}$, where Q = Total Physical Product; L = Labor; K= Capital; e(w) is effort the labor as a function of wage (w); the after-tax profits (t = tax on profits) are derived as follows:

$$\prod^*_{BT} = p\, f(L^*, w^*, K^*, v^*) - [w(L^*) + \Psi (K^*)] \quad (1)$$

$$\prod^*_{AT} = (\prod^*_{BT} - t \prod^*_{BT}) \quad (2)$$

$$\prod^*_{AT} = \prod^*_{BT} (1 - t) \quad (3)$$

$$\prod^*_{AT} = (1 - t) \{ p\, f(L^*, w^*, K^*, v^*) - [w(L^*) + \Psi (K^*)] \} \quad (4)$$

When $t = 0$, $\prod^*_{BT} = \prod^*_{AT}$ and normally when $t > 0$, $\prod^*_{BT} > \prod^*_{AT}$

Proposition: Motivating wage increases productivity. Let us see what happens when the total tax receipts are spent on enhancing wage, we call it 'motivating wage' as distinct from 'prevailing wage'.

$$\hat{w} > w^* \quad (5)$$

where '$\hat{w}$' is the 'Motivating wage' and 'w^*' is the prevailing wage. When the total tax receipts are redistributed to enhance wage then:

$$\hat{w} = w^* + [t \prod^*_{BT} / L]$$

$$\hat{w} = [L^* w^* + t \prod^*_{BT}] / L^* \quad (6)$$

When the production is (where Ω is the rate of interest):

$$Q = \Psi \{ L^* (w), w^*, K^* (\Omega), \} \quad (7)$$

and when the prevailing wage is w^*, marginal productivity of the factor is given by:

$$MP_L = \delta Q / \delta L^* = f_L [\delta L^* / \delta w] \quad (8)$$

After increase in wage the production function is transformed as:

$$Q_1 = \Psi \{ L^* (w), \hat{w}, K^* (\Omega), \} \quad (9)$$

And, $\hat{w} > w^*$

Therefore, it is logical assume that:

$$MP_{L1} = \delta Q / \delta L^* = f_{L1} [\delta L^* / \delta w] \quad (10)$$

It should be remembered that $MP_{L1} > MP_L$

Proof: If we assume other factor (K*) is constant, when the wage is 'w*'

$P f_L - w = 0$ (by virtue of first order condition for maximizing profit), and

$$f_L = w^* / P \quad (11)$$

By the same token, at the new wage the first order condition specifies

$$P f_{L1} - \hat{w} = 0, \text{ i.e.,} \quad (12)$$

which implies $f_{L1} = \hat{w} / P$ (13)

and since $\hat{w} > w^*$; $f_{L1} > f_L$ (Holding P constant) (14)

It has long been established that when wage rate enters the production function:

$$Q = f \{ L, w^*, K, \Omega \} \quad (15)$$

It is reasonably assumed that

$$\delta Q / \delta L^* > 0 ; \delta Q / \delta \omega > 0 ; \delta_2 Q / \delta L^{*2} < 0 ; \delta_2 Q / \delta^2 \omega < 0$$

From the employer's point of view, since $L = L(Q, w^*)$ holding K* and Ω* constant, L* determines the optimum level of employment and w* is the optimum wage. There will be no incentive for the employer to change from this position. If at all he were to increase the wage rate, this will be at the cost of his total profits (which will not be maximum at this position) and further, he has to lay off some workers.

Thus L* being unalterable, and w* being sticky (rather than rigid and this is a very restrictive assumption) using the Solow's (1979) terminology, the constant (or low) productivity trap is laid. This explains the `vicious circle of low productivity' (see Figure 1).

Now, following Libenstein (1963), an increase in w* will shift the marginal productivity curve upwards (because of physical, economic, and psychological reasons). Hence to increase the productivity an external pressure may be employed by influencing the wage. As Libenstein (1963) contends, the average productivity (and marginal productivity)of a group will depend on their wage. The higher the wage the greater the units of work per laborer and hence up to some point, the higher the wage the higher the per capita productivity of the group (p.31). Figure 2 captures the relationship between wages and worker productivity and Figure 3 shows the marginal product curve shifts upwards with increases in wages.

Figure 2: Positive relationship between wages and worker productivity

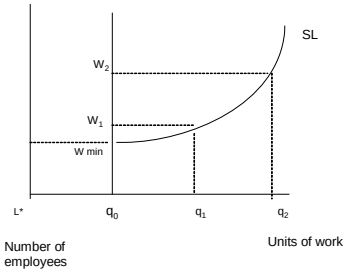


Figure 3: Product curve shifts with increase in wage

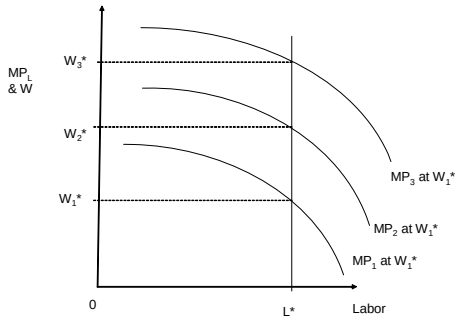
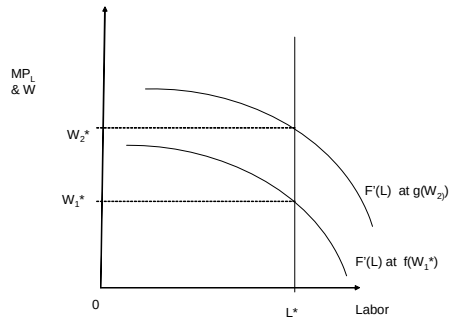


Figure 4 shows how the increased wage rate results in increased productivity.

Figure 4: Increased wage rate resulting in increased productivity



ANALYSIS

$$\Delta \text{ Productivity} = \int_0^{L^*} g(x^*)dx - \int_0^{L^*} f(x^*)dx \tag{16}$$

$$= \int_0^{L^*} F'^{1}(L)dLw_2 - \int_0^{L^*} F''(L)dLw_1 \tag{17}$$

The cost of the increase in productivity is equal to (w_2* w_1*) L*. It follows that if:

$$\int_0^{L^*} g(x^*)dx - \int_0^{L^*} f(x^*)dx > (w_2^* w_1^*) L^* \tag{18}$$

it becomes feasible to increase the wage. That is to say, it will be advantageous to implement a 'motivating wage.'

To break the vicious circle of low productivity, an entrepreneur may take the initiative in identifying the 'motivating wage' and increase productivity. If the entrepreneur is unable to do so, the State may take the initiative to increase wages. It can be argued that State can increase productivity breaking the vicious circle of low or constant productivity. The State can do so by offering a subsidy to the fullest possible extent of the increased wage. If the investment is made initially by the government (i.e. an increase in wage rate is subsidized by the state), the entrepreneur will have least objection. The government can do this conveniently by transferring the tax revenue to the 'Motivating wage fund'. Doing so will be beneficial to both the entrepreneur and the state.

I *Gross benefit to the State:* Increase in production (productive capacity) which is tangible. Other benefits include the increased corporate taxes due to increased profits, and Increased personal income taxes (from the individuals).

II *Employer's Gross Benefit:* If the increased wages are subsidized by the government, the effective wage from the viewpoint of the employer is w whereas the efficiency wage is w*. Therefore, the benefit to the employer can be seen in terms of the increased productivity associated with this new wage w*.

This relationship is:

$$[\int_0^{L^*} g(x^*)dx \; - \; (OL^* \; w_1^*)\;] - [\int_0^{L^*} f(x^*)dx \; - (OL^* \; w_2^*)\;] \qquad (19)$$

$$= \int_0^{L^*} g(x^*)dx \; - \int_0^{L^*} f(x^*)dx \quad = (.) \qquad (20)$$

New profits are therefore inflated because of the increased production as shown above.

Employer's net benefit = (1 – t) (.) (21)

Benefit for the State:

Investment = $(w_2^* - w_1^*) L^*$ (seen in terms of subsidy) (22)

Return = Increased productivity (GSP) + Tax on employer's additional profits + Personal and individual taxes:

$= (.) + t_c (.) + t_p (L^*) (w_2^* - w_1^*)$

$= (1+ t_c) (.) + t_p (L^*) (w_2^* - w_1^*)$ (23)

It can be easily inferred that Equation (23) > Equation (22).

Net benefit to individual workers = Gross Benefit – personal taxes:

$NB = (w_2^* - w_1^*) L^* - t_p$

$NB = (1 - t_p) (w_2^* - w_1^*)$

CONCLUSION

This paper is essentially a theoretical construct. Taking cue from the much illustrated Leibenstein's shifting marginal productivity curve, this paper highlights the fact that higher productivity can be achieved at higher wages, called motivating wages. Increase in wage acts as a primary motivators for increasing productivity and break the vicious circle of low productivity. As President's report (2006) mentions: "studies show that firms that are engaged in the international market place tend to exhibit higher rates of productivity growth and pay higher wages and benefits to their workers" (p.155). The present model explains how paying higher wages further increases productivity and economic growth.

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COMPETITIVE BALANCE AND FAN INTEREST IN THE NATIONAL FOOTBALL LEAGUE

Timothy P. Pivovarnik,
University of North Carolina at Charlotte
Reinhold P. Lamb, University of North Florida
Richard A. Zuber,
University of North Carolina at Charlotte
John M. Gandar, University of North Carolina at Charlotte

ABSTRACT

The purpose of this study is to compare the interest of the National Football League (NFL) to the interest of individual teams. We will determine if structural changes in the NFL, especially the current free agency system, have had their intended impact of increasing fan interest. This study will proceed in two sections. The first section analyzes the impact of structural changes that the NFL implemented in an attempt to either create or increase competitive balance. An example of a structural change at the college level involves scholarships. Sutter and Winkler (2003) find that setting scholarship limits decreases competitive balance in college football.

INTRODUCTION

In sports leagues, pure self-interest on the part of individual teams sometimes conflicts with the overall good of the league. Each team serves its own interest by attempting to win all of its games. Each team's goal is to win enough games to compete in the championship game, and then win that championship game. The league's interest is to profit from entertaining fans. The theory of sports leagues proposes that equal competition across teams yields optimal fan interest in the sport

(Vrooman, 1995). A sustained interest in the sport essentially assures that the league has continued viability to accomplish their profit objective.

The purpose of this study is to compare the interest of the National Football League (NFL) to the interest of individual teams. We will determine if structural changes in the NFL, especially the current free agency system, have had their intended impact of increasing fan interest. This study will proceed in two sections. The first section analyzes the impact of structural changes that the NFL implemented in an attempt to either create or increase competitive balance. An example of a structural change at the college level involves scholarships. Sutter and Winkler (2003) find that setting scholarship limits decreases competitive balance in college football.

The second section examines the impact of competitive balance on fan interest. According to the uncertainty of outcome hypothesis, competitive balance has a positive impact on fan interest (Rottenberg, 1956; El-Hodiri and Quirk, 1971). Intuitively, the interest of a particular team's fans should be positively related to that team's performance. That is, better performance on the field should be linked to greater interest and enthusiasm of the fans. On the other hand, a poorly performing team may be associated with weaker fan interest or support. We will use this premise to determine the impact of a subset of teams acting in their self-interest. Without the intended effect of increased fan interest, the NFL does not benefit from having competitive balance. Humphreys (2002) concludes that competitive balance is a significant determinant in Major League Baseball (MLB) attendance. We modify his methodology to study the impact of competitive balance on fan interest in the NFL.

For typical businesses, profits and survival are enhanced with the reduction or elimination of competition. For professional sports businesses; however, increased competition is desired and is linked to financial stability (Berri, et al, 2005). Professional sports leagues operate similar to business cartels (Fort and Quirk, 1995) and so consequently, many leagues encounter incentive problems among individual teams and enforcement issues. The product that sports leagues offer to consumers is competition; however, their challenge is to create a level of competitive balance that is attractive to fans. Competitive balance implies equal competition, emphasizing uncertainty of the outcome and producing drama. Free agency, for example, is a structural change that allows talent to be reallocated across the league to both strengthen weaker teams and weaken stronger teams and thereby increase both competition among teams and fan interest.

COMPETITIVE BALANCE IN THE NFL

In the NFL, competitive balance incorporates three dimensions - within games, within seasons, and across seasons. We employ four measures of competitive balance, all presented in capital letters throughout the paper in order to easily distinguish them from the other variables we will consider later. The first measure is the average margin of victory in points (MARGIN), which Sutter and Winkler (2003) used. MARGIN measures competitive balance within games. As MARGIN increases (decreases) competitive balance decreases (increases). The second measure is the ratio of actual to ideal standard deviation of winning percentage by year (RATIO), introduced by Sutter and Winkler (2003). RATIO measures competitive balance within seasons. The ideal standard deviation equals 0.5 divided by the square root of the number of NFL games in that year. Higher (lower) values of RATIO indicate more (less) competitive balance. The third measure is the Competitive Balance Ratio (CBR), developed by Humphreys (2002). CBR measures competitive balance across seasons and is calculated as the ratio of the average time variation in winning percentage for teams to the average variation in winning percentage across seasons. A CBR of 1 (0) indicates perfect (no) competitive balance. We modify his measure to reflect a six-year moving average of the associated variations using the prior six years to calculate the current year measure. The final measure is the Hirfindahl-Hirschman Index (HHI), which both Sutter and Winkler (2003) and Humphreys (2002) use. HHI measures competitive balance across seasons by calculating the concentration of championship wins. An HHI of 10,000 (1,666.7) indicates the highest (lowest) concentration. A lower (higher) HHI is associated with greater (less) competitive balance. We modify their measure to reflect a six-year moving average of the index using the prior six years of teams who won the championship game to calculate the current year measure.

The introduction of free agency in 1989 changed the structure of the NFL and produced the potential to equalize the quality of teams within the league. Consequently, 1989 is a pivotal year in measuring if the free agency decision impacted on competitive balance. Table 1 presents the means of the four measures of competitive balance for the periods prior to (1966-1988) and during (1989-2002) free agency. MARGIN is smaller in the free agency period (1989-2002); reflecting a decrease in the margins of victory and indicating that free agency may have produced more competitive balance in the league. In addition, the HHI value is lower in the free agency period, indicating that the concentration of championships is lower and more competitive balance is present. This evidence suggests that

perhaps the structural shift of free agency is associated with the desired increase in competitive balance. On the other hand, essentially no changes in RATIO and CBR are observed, indicating that free agency may have had no impact on these measures of competitive balance. However, CBR is high in both periods indicating an already high level of competitive balance prior to and during free agency. The four measures of competitive balance, therefore, provide some evidence that the structural changes induced by free agency may have contributed to increasing competitive balance where there was still room to move – margins of victory and concentration of championships.

Table 1: Comparison of Means of Competitive Balance Measures Before and During Free Agency

Measure	*1966-1988 (Before)*	*1989-2002 (During)*
MARGIN	12.36	11.39
RATIO	5.72	5.67
CBR	0.76	0.82
HHI	3,043.48	2,817.46

Figures 1 through 3 present time series behavior of the competitive balance measures spanning the entire sample period. Figure 1 shows MARGIN and RATIO. When considering MARGIN, three distinct periods emerge. From 1966 – 1976 the average margin of victory is greater than the average margin of victory for the entire sample period and hence shows a larger winner in contests during this period. During this period, MARGIN ranges from 11 points to 15 points and has a great deal of volatility. The second period, 1977 – 1988, is less volatile with an average margin of victory of around 12 points. During this period the NFL experienced a league expansion and there were also draft rule changes – additional structural shifts that may have contributed to a period of increased competition. The third period, 1988 - 2002 covers the free agency and here MARGIN trends even lower to 11 points and with less volatility. The general direction of MARGIN over the entire period is consistent with greater competitive balance. Similar to Table 1, RATIO does not appear to exhibit any radical changes throughout the period, although the average does drop slightly after the advent of free agency.

Figure 2 shows the competitive balance ratio (CBR) and the general trend of CBR is upward throughout the period, especially from 1977 (0.65) through 2002

(0.91). With perfect competitive balance reflected in a CBR of 1.0, the steady increase in CBR since free agency indicates that an optimal level of competitive balance is almost attained. This trend is not obvious in the summary measures found in Table 1.

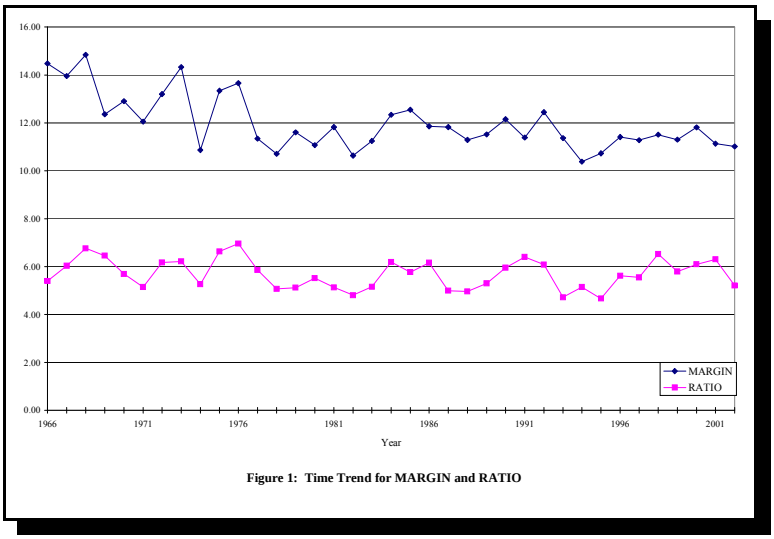

Figure 1: Time Trend for MARGIN and RATIO

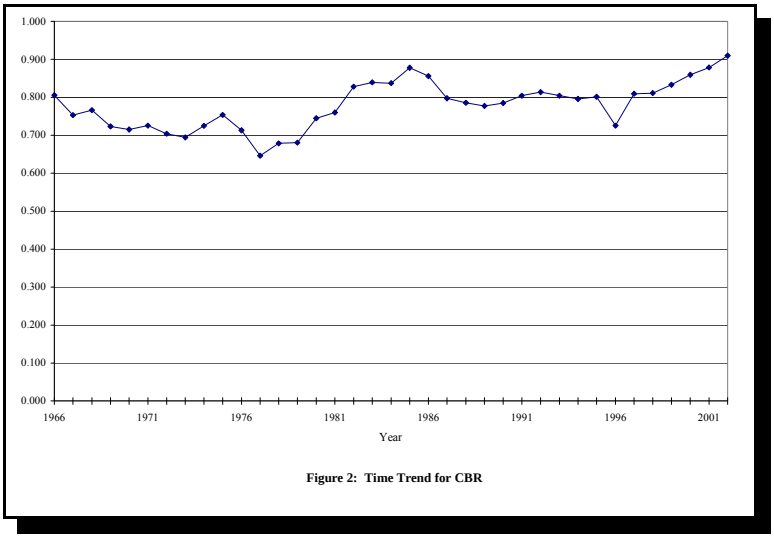

Figure 2: Time Trend for CBR

Figure 3 shows a great deal of volatility in the concentration index (HHI) until 1989-2002, the period of free agency. Evidence indicates that the relative stability may have started in 1983 when other structural shifts not explored in this study were implemented. Nevertheless, the free agency period indicates lower concentration of championship wins throughout the period, which is consistent with greater competitive balance. In summary, all four measures provide evidence that competitive balance was enhanced with the advent of free agency.

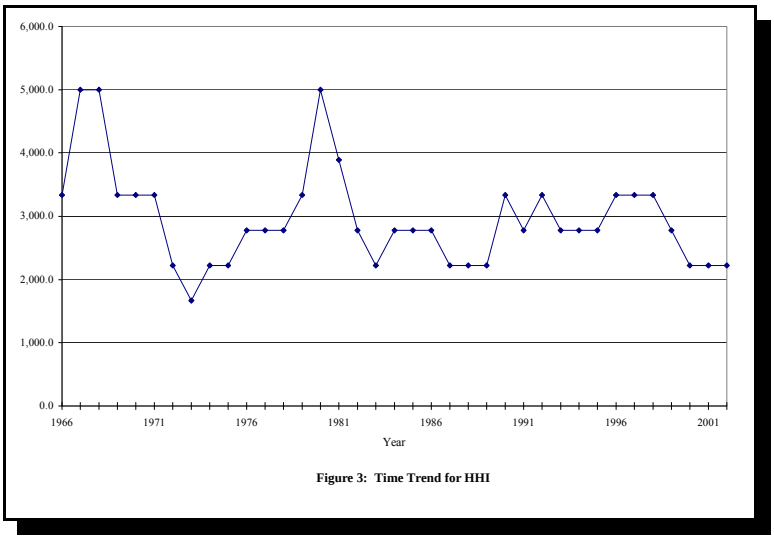

Figure 3: Time Trend for HHI

FAN INTEREST IN THE NFL

The main focus of the remainder of this study is to determine if the increased competitive balance associated with the advent of free agency has lead to higher fan interest. Without fan interest in the NFL, there is no revenue and without revenue, there is no profit. Finally, without profit, the NFL would soon collapse. Consequently, fan interest is critical to the NFL's success. Fan interest is difficult to quantify as it is manifested in expressions of interest such as attendance, merchandise sales and television revenue. Szymanski (2001) does not find a linkage between competitive balance and attendance at English soccer matches. On the other hand, according to Dobson and Goddard (1998), structural changes impact competitive markets, especially in those markets with a smaller fan base. On a more anecdotal level, the signing of free agents in the NFL is often accompanied with a great deal of speculation concerning the impact of the signing. For example, the

signing of Terrell Owens by the Dallas Cowboys in 2006 left fans uneasy speculating about his impact on team chemistry. At the same time, fan interest in the Cowboys was intensified as a result of the signing as measured by sales, marketing and advertising. In fact, Owens' jersey became one of the top sellers of the season.

In this study, we use two variables to measure the level of fan interest. The first variable, Sellout Rate, measures fan interest in attending games. The Sellout Rate is the ratio of the total number of tickets sold to the cumulative number of seats (stadium capacity) for the year. Our variable is a modification of Humphrey's (2002) attendance measure of fan interest. The higher (lower) the Sellout Rate, the greater (lower) the fan interest in the product. The second variable, TV Share, measures fan interest in watching games on TV. TV Share is measured by the average annual percent of television households tuning in to Monday Night Football (MNF) as reported by Nielsen's. The higher (lower) the rating, the greater (smaller) the fan interest in watching football.

Table 2 presents the means of the Sellout Rate and TV Share measures for the period prior to free agency (1966-1988) and the period during free agency (1989-2002). [Due to data limitations furnished by Nielsen's, the data on TV Share does not include the years 1966-1972]. The Sellout Rate during free agency is higher than in the earlier period indicating that fan interest is higher. This is confirmed in Figure 4 as the trend line since 1989 for the Sellout Rate steadily drifts higher to almost 95%. Prior to the free agency period, the Sellout Rate is more erratic ranging from 70% to 93%. As seen in Table 2, TV Share is lower during the free agency period. The trend line for TV Share in Figure 5 shows a consistently erratic behavior both prior to free agency and during free agency. Consequently, changes in overall fan interest are difficult to determine. It appears that fan interest in attending games increased during the free agency period, while fan interest in watching Monday Night Football decreased.

Table 2:
Comparison of Means of Fan Interest Measures Before and During Free Agency

Measure	*1966-1988 (Before)*	*1989-2002 (During)*
SellOutRate	82.39%	87.60%
TV Share	19.61%	17.62%

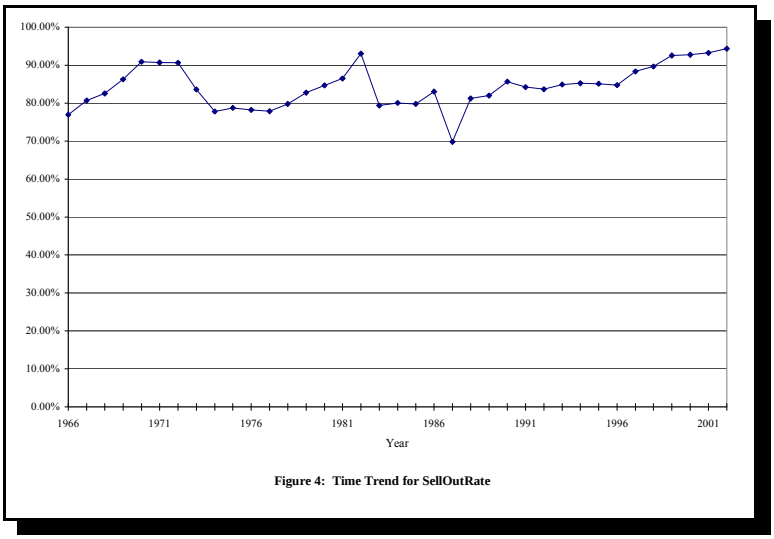

Figure 4: Time Trend for SellOutRate

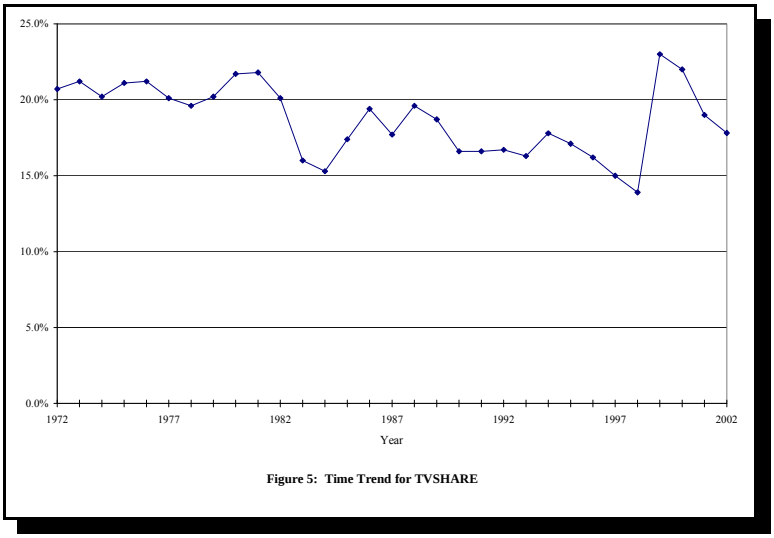

Figure 5: Time Trend for TVSHARE

DATA AND MODEL SPECIFICATIONS

Definitions and data sources of all sixteen variables measuring the different dimensions of competitive balance and fan interest are provided in Appendix 1. Summary statistics for each variable are presented in Appendix 2. Several statistical

tests, whose details are not reported here, were performed in order to establish the characteristics of the data. The Augmented Dickey-Fuller test indicates all data series are stationary. The White test indicates that the data series have the property of homoscedasticity. A correlation matrix shows no multicollinearity issues. A test of means and variances of the four competitive balance measures (RATIO, MARGIN, CBR, HHI), and the two fan interest measures (Sellout Rate, TV Share) indicates some significant differences between the period prior to free agency (1966-1988) and during free agency (1989 – 2002). Though there is no significant difference in the means of these variables and no significant difference in the variances of RATIO and TV Share, there is a significant decrease in the variances of all the other variables. This result indicates that the distributions of Sellout Rate, MARGIN, CBR, and HHI allow for fewer extreme values during free agency than prior to free agency.

There are four models of competitive balance, one for each measure, which were adapted from Sutter and Winkler (2003). Equation 1 presents the generalized model

$$CB_t = \beta_0 + \beta_1 * FreeAgency_t + \beta_2 * Parity\ Schedule_t + \beta_3 * Merged_t + \beta_4 * Teams_t + \varepsilon_t \quad (1)$$

where CB_t is the competitive balance measure in question (MARGIN, RATIO, CBR, or HHI) for time t. $FreeAgency_t$ is a dummy variable that equals 1 for the years in which free agency was in effect (1989-2002) and 0 otherwise. Parity $Schedule_t$ is a dummy variable that equals 1 for the years in which the parity scheduling scheme was in effect (1978-2001) and 0 otherwise. Parity scheduling is an NFL scheduling policy in which the stronger teams from the prior year play each other in the current year while the weaker teams from the prior year play each other in the current year. The intention of this policy is to schedule teams of equal strength against each other in an effort to create (or increase) competitive balance. $Merged_t$ is a dummy variable that equals 1 for the years in which the American Football League (AFL) merged with the old National Football League (NFL) to form the new NFL (1970-2002) and 0 otherwise. $Teams_t$ is the number of teams playing in the NFL for time t. These models, and the others that follow, are all estimated using ordinary least squares regressions.

There are five models explaining the Sellout Rate to gain insight into fan interest – four models adding the competitive balance measures individually as independent variables (CB) and one model adding all four of the competitive

balance measures together as collective independent variables. Equations 2 and 3 present these models:

$$\text{Sellout Rate}_t = \beta_0 + \beta_1 * \text{UPop}_{t-1} + \beta_2 * \text{Strike1}_{t-1} + \beta_3 * \text{Strike7}_{t-1} + \beta_4 * \text{UPI}_{t-1} + \beta_5 * \text{Points}_{t-1} + \beta_6 * \text{CB}_{t-1} + \varepsilon_t \quad (2)$$

$$\text{Sellout Rate}_t = \beta_0 + \beta_1 * \text{UPop}_{t-1} + \beta_2 * \text{Strike1}_{t-1} + \beta_3 * \text{Strike7}_{t-1} + \beta_4 * \text{UPI}_{t-1} + \beta_5 * \text{Points}_{t-1} + \beta_6 * \text{MARGIN}_{t1} + \beta_7 * \text{RATIO}_{t-1} + \beta_8 * \text{CBR}_{t-1} + \beta_9 * \text{HHI}_{t-1} + \varepsilon_t \quad (3)$$

There are also 22 models of individual team Sellout Rate. These models are modified from Humphreys (2002). A generalized version of these models is presented in Equation 4.

$$\text{Sellout Rate}_{t,I} = \beta_0 + \beta_1 * \text{PopUrban}_{t-1,I} + \beta_2 * \text{Strike1}_{t-1} + \beta_3 * \text{Strike7}_{t-1} + \beta_4 * \text{PIUrban}_{t-1,I} + \beta_5 * \text{WP}_{t-1,I} + \varepsilon_{t,I} \quad (4)$$

Sellout Rate_t is the NFL Sellout Rate for time t. $\text{Sellout Rate}_{t,i}$ is the Sellout Rate of team i for time t. UPop_{t-1} is the one-year lag of the relevant total urban population in millions of persons where an NFL team plays. Strike1_{t-1} is a dummy variable that equals 1 for the year 1988 (the year after which the players went on a 1-game strike) and 0 otherwise. Strike7_{t-1} is a dummy variable that equals 1 for the year 1983 (the year after which the players went on a 7-game strike) and 0 otherwise. UPI_{t-1} is the one-year lag of the total relevant urban personal income per capita in thousands of dollars. Points_{t-1} is the one-year lag of the season's average combined points per game. CB_{t-1} is the one-year lag of the individual competitive balance measure in question (MARGIN, RATIO, CBR, or HHI). $\text{PopUrban}_{t-1,i}$ is the one-year lag of team i's relevant urban population in thousands of persons. $\text{PIUrban}_{t-1,i}$ is the one-year lag of the personal income per capita in thousands of dollars for the relevant urban area of team i. $\text{WP}_{t-1,i}$ is the one-year lag of team i's winning percentage. One-year lags are used since most NFL fans purchase tickets for the NFL season before the season starts. Fans would theoretically use last year's variables as a basis for their purchase decision. The twenty-two teams for the individual team Sellout Rate models are the teams that existed in 1965 in order to have a consistent sample without the influence from expansion.

Fan interest is also analyzed through five models explaining TV Share, four models using the competitive balance measures individually as independent variables and one model using all four of the competitive balance measures together

as independent variables. These models are modified from Humphreys (2002) and are presented in Equations 5 and 6.

$$\text{TV Share}_t = \beta_0 + \beta_1 * \text{Pop}_t + \beta_2 * \text{Strike1}_t + \beta_3 * \text{Strike7}_t + \beta_4 * \text{PI}_t + \beta_5 * \text{Points}_t + \beta_6 * \text{CB}_t + \varepsilon_t \quad (5)$$

$$\text{TV Share}_t = \beta_0 + \beta_1 * \text{Pop}_t + \beta_2 * \text{Strike1}_t + \beta_3 * \text{Strike7}_t + \beta_4 * \text{PI}_t + \beta_5 * \text{Points}_t + \beta_6 * \text{MARGIN}_t + \beta_7 * \text{RATIO}_t + \beta_8 * \text{CBR}_t + \beta_9 * \text{HHI}_t + \varepsilon_t \quad (6)$$

TV Share_t is the TV Share for time t. Pop_t is the national population, in millions of persons, for time t. PI_t is the personal income per capita for the United States, in thousands of US dollars, for time t. Points_t is the season's average combined points per game for time t. CB_t is the competitive balance measure in question (MARGIN, RATIO, CBR, or HHI) for time t. Since watching a program on television is a semi-instantaneous decision, these two models do not incorporate lagged variable values like those equations considering fan attendance (Sellout Rate).

RESULTS AND ANALYSIS

Table 3 presents the results of the generalized model incorporating the four possible competitive balance models presented in Equation 1. Parity Schedule is significantly related to both MARGIN and RATIO. For the years that parity scheduling was in place (1978-2001), all else being equal, MARGIN and RATIO are lower than for the other years where scheduling was not based on previous year performance. The significant and negative estimated coefficient on Parity Schedule in the MARGIN regression indicates that the deliberate sorting of team schedules by team strength lowered the margin of victory and enhanced competitive balance. Surprisingly, the significant and negative estimated coefficient on Parity Schedule in the RATIO regression indicates that the deliberate sorting of team schedules by team strength lowered RATIO and decreased competitive balance. None of the other independent variables are significant in the MARGIN or RATIO regressions. In the CBR regression, the positive and significant estimated coefficient on the Teams variable indicates that a larger number of teams is associated with a higher Competitive Balance Ratio as expected. In the HHI regression, the estimated coefficient on Merged is negative and significant. This result tells us that for the years in which the merger was in effect (1970-2002) where the AFL and the NFL

combined into one league, the HHI is lower than in the other years - indicating that the concentration of championships is lower and hence that competitive balance is higher. The F value on three of the four models is significant, with the model for RATIO being the exception. It should be noted that the variable Free Agency was not significant in any of the models, weakening the conclusions from the time series results above which indicated that competitive balance was increased through the introduction of free agency. Consequently, the generalized models provide mixed evidence regarding the relationship between competitive balance and related league decisions.

Table 3: Regression Results for Measures of Competitive Balance

	Dependent Variable			
	MARGIN	*RATIO*	*CBR*	*HHI*
Intercept	18.5633*** (5.60)	5.9765** (2.50)	0.2822 (1.35)	5,647.48** (2.11)
FreeAgency	0.0224 (0.06)	0.1702 (0.60)	0.0081 (0.33)	-59.70 (-0.19)
ParitySchedule	-0.7576** (-2.09)	-0.4642* (-1.78)	0.0349 (1.53)	486.37 (1.66)
Merged	-0.9301 (-1.63)	-0.5541 (-1.35)	-0.0429 (-1.20)	-1,839.23*** (-4.00)
Teams	-0.1885 (-1.47)	0.0172 (0.19)	0.0181** (2.25)	-46.87 (-0.45)
F Value	7.45***	2.01	5.48***	4.88***
R^2	0.49	0.20	0.4143	0.3865
Adjusted R^2	0.42	0.10	0.33	0.30
N	37	37	37	37

Note: t statistics in parentheses. F Value tests combined significance of all independent variables. N is the number of observations.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

Table 4 presents the results of the five models that measure fan interest with the variable Sellout Rate. In all five of the models, the estimated coefficient on per

capita personal income (UPI) is positive and significant indicating that increases in this income measure increase fan interest as measured by the Sellout Rate - perhaps due to game tickets being a discretionary expense. In three of the models, the estimated coefficient on population (UPop) is positive and significant indicating that increases in population would increase fan interest as measured by the Sellout Rate. CBR and HHI are significant independent variables both in the regressions when each is the only measure of competitive balance included and in the regression when all four measures of competitive balance are included. These are unexpected results. The finding of a negative and significant relationship between CBR and the Sellout Rate says that an increase in the competitive balance ratio is associated with lower fan interest as measured by the Sellout Rate. The positive and significant relationship between HHI and the Sellout Rate says that an increase in concentration of championships is associated with higher fan interest as measured by the Sellout Rate. Perhaps, fans do like dynasties. The other two measures of competitive balance (MARGIN and RATIO) are not significant in any of the other regressions with the Sellout Rate as the dependent variable. With one exception, none of the other independent variables (Strike1, Strike7, and Points) are significant in any of the five models. Based on the F-Test, the four competitive balance variables (MARGIN, RATIO, CBR, and HHI) have a combined significance on Sellout Rate.

Table 4: Regression Results for Models of NFL Sellout Rate

	Dependent variable in all models is Sellout Rate				
Intercept	-0.3824 (-0.66)	-0.3166 (-0.55)	-0.2147 (-0.40)	-0.0863 (-0.16)	-0.0327 (-0.06)
UPOP (1-year lag)	0.0340* (2.00)	0.0321* (1.96)	0.0316** (2.07)	0.0249 (1.61)	0.0271 (1.68)
Strike1 (1-year lag)	-0.0343 (-0.68)	-0.0377 (-0.73)	-0.0366 (-0.78)	-0.0091 (-0.19)	-0.0211 (-0.43)
Strike7 (1-year lag)	-0.0262 (-0.50)	-0.0259 (-0.49)	0.0119 (0.24)	-0.0179 (-0.37)	0.0015 (0.03)
UPI (1-year lag)	0.0003** (2.42)	0.00038*** (3.36)	0.0005*** (4.21)	0.0004*** (4.06)	0.0005*** (3.41)
Points (1-year lag)	0.0065 (1.41)	0.0055 (1.34)	0.0104** (2.34)	0.0020 (0.50)	0.0071 (1.35)
MARGIN (1-year lag)	-0.0057 (-0.57)				-0.0010 (-0.08)

Table 4: Regression Results for Models of NFL Sellout Rate					
	Dependent variable in all models is Sellout Rate				
RATIO (1-year lag)		-0.0077 (-0.55)			-0.0050 (-0.29)
CBR (1-year lag)			-0.4542** (-2.22)		-0.3707* (-1.78)
HHI (1-year lag)				0.0001** (2.19)	0.0001* (1.82)
F Value	2.63**	2.62**	3.80***	3.76***	2.96**
R^2	0.3522	0.3515	0.4400	0.4376	0.5062
Adjusted R^2	0.2181	0.2174	0.3241	0.3213	0.3353
N	37	37	37	37	37
F Test					12.44**

Note: t statistics in parentheses. F Value tests combined significance of all independent variables. F Test is the F Value testing the combined significance of 1-year lags of MARGIN, RATIO, CBR, and HHI for the SellOutRate ALL model. N is the number of observations.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

Table 5 presents the regression results of the TV Share models which only include the years 1972-1998 as explained earlier in the paper. Several issues raise a cautionary flag regarding the interpretation of these results. First, Nielsen Media changed its TV share measurement method in 1999, thereby making it difficult to measure fan interest based on TV Share across the entire sample period. Including 1999 and beyond without including an appropriate adjustment would introduce noise. Second, TV Share captures only MNF games, which may not be the most meaningful measure of fan interest in watching all NFL games. The variability of the competitive balance measures specific to MNF games may be different from that for all NFL games in a season. Finally, other explanatory variables may not be captured in the model. For instance, casual fans may prefer a specific group of sports commentators. If the commentators for a particular game are not part of that group, the individual may decide not to watch the game. Also, there have been scheduling changes for MNF games. In the current scheduling format, all NFL

teams play either a Sunday night or a Monday night game. In the past, only the strongest teams were shown on Monday night football. Consequently, the game match ups were probably of similar strength teams and the games may have been crucial to determine who would compete in the playoffs, as well as their seeding in the playoffs (obtaining first-round byes, securing home-field advantage, etc.). However, it is difficult to account for these issues in the models, especially when considering maintaining an appropriate number of degrees of freedom. Nevertheless, we consider TV Share since it is a consistent and reasonable proxy of a sub-dimension of fan interest. Again, Table 5 provides the regression results for TV Share models. Surprisingly, none of the independent variables have a statistically significant relationship with TV Share; however, all of these variables combined have a significant impact on TV Share. Based on the F-Test, the four competitive balance variables (MARGIN, RATIO, CBR, and HHI) have a combined significance on TV Share.

Table 5: Regression Analysis of Determinants of TV Share

	Dependent variable in all models is TV Share				
Intercept	0.18228 (0.24)	0.39876 (0.55)	0.16287 (0.26)	0.35767 (0.54)	0.58464 (0.76)
Population	0.00037645 (0.1)	-0.00060152 (-0.17)	0.00053718 (0.17)	-0.00062025 (-0.19)	-0.00162 (-0.43)
Strike1	-0.00208 (-0.13)	-0.00557 (-0.34)	-0.00368 (-0.24)	0.00275 (0.17)	-0.00369 (-0.23)
Strike7	0.00701 (0.42)	0.00446 (0.28)	0.01523 (0.95)	0.00973 (0.63)	0.01275 (0.76)
PI	-0.00367 (-0.38)	-0.00111 (-0.12)	-0.00367 (-0.45)	-0.0011 (-0.13)	0.00189 (0.19)
Points	-0.0005074 (-0.35)	-0.00058281 (-0.42)	0.00072865 (0.45)	-0.00067986 (-0.5)	-0.0000891 (-0.05)
MARGIN	-0.00109 (-0.26)				0.00426 (0.79)
RATIO		-0.00538 (-0.98)			-0.00925 (-1.27)
CBR			-0.10557 (-1.44)		-0.07214 (-0.94)

Table 5: Regression Analysis of Determinants of TV Share					
	Dependent variable in all models is TV Share				
HHI				0.00000654 (1.33)	0.00000712 (1.36)
F Value	6.19***	6.63***	7.17***	7.02***	5.01***
R^2	0.6615	0.6767	0.6937	0.6892	0.7381
Adjusted R^2	0.5546	0.5746	0.597	0.5911	0.5909
N	27	27	27	27	27
F Test					21.607**

Note: t statistics in parentheses. F Value tests combined significance of all independent variables. F Test is the F Value testing the combined significance of MARGIN, RATIO, CBR, and HHI for the TV Share ALL model. N is the number of observations.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

The regression results of the individual team Sellout Rate models are summarized in Table 6. (Detailed regressions results for each of the 22 teams in the sample will be furnished by the authors upon request). The one-year lagged PopUrban variable has a significant positive relationship with Sellout Rate for the Bills, Browns/Ravens, Chiefs, Eagles, Giants, Jets, and Lions. All else being equal, an increase in population is associated with an increase in Sellout Rate for these seven teams. PopUrban has a significant negative relationship with Sellout Rate for the Bears, Broncos, Oilers/Titans, Raiders, and Steelers, indicating that an increase in population is associated with a decrease in Sellout Rate. That an increase in population would increase the Sellout Rate for certain cities and decrease the Sellout Rate for other cities is a surprising result and might prove to be a topic for future research.

The one-year lagged Strike1 variable has a significant negative relationship with Sellout Rate for the Chargers, Cowboys, and Lions, while it has a significant positive relationship with the Cardinals. The one-year lagged Strike7 variable has a significant positive relationship with Sellout Rate for the Broncos and Steelers while it is negative and significant with only the Raiders. For 15 of the 22 teams, the strikes of 1982 and 1987 did not have a significant relationship with Sellout

Rate. Based on these results, it appears that for the NFL as whole the two strikes really did not adversely impact the Sellout Rate.

Table 6: Regression Results of Models of Individual Team Sellout Rate

	Intercept	PopUrban	Strike 1	Strike 7	PIUrban	WP	F-Val	AdjR^2
49ers	+	-	-	+	+	+	20.65	0.732
	**				***		***	
Bears	+	-	+	-	+	+	10.73	0.575
	***	**					***	
Bills	+	+	+	-	+	+	3.63	0.268
		*			*	***	**	
Broncos	+	-	-	+	+	+	12.23	0.609
	***	**		*	***	***	***	
Browns/ Ravens	+	+	+	+	+	+	2.21	0.144
	***	**			**		**	
Cardinals	+	-	+	-	-	+	6.71	0.442
	***		**		***	**	***	
Chargers	+	+	-	-	+	+	11.00	0.581
			*				***	
Chiefs	-	+	-	-	+	+	10.96	0.580
	*	**			***		***	
Colts	+	+	+	-	+	+	3.92	0.288
					*	***	***	
Cowboys	+	-	-	+	+	+	3.74	0.276
	***		***			**	***	
Eagles	-	+	+	-	+	+	6.68	0.441
	**	***			***	***	***	
Giants	+	+	+	-	+	+	2.21	0.144
		**					*	
Jets	-	+	-	+	-	+	3.37	0.248
		***					**	
Lions	-	+	-	+	+	+	9.85	0.551
	**	***	**		***		***	

Table 6: Regression Results of Models of Individual Team Sellout Rate

	Intercept	PopUrban	Strike 1	Strike 7	PIUrban	WP	F-Val	AdjR^2
Oilers/ Titans	+	-	-	+	+	+	11.54	0.594
	***	**			***	***	***	
Packers	+	-	-	+	+	-	0.52	0.071
	***							
Patriots	+	+	+	-	+	+	1.34	0.046
						**		
Raiders	+	-	+	-	+	+	12.38	0.612
	***	***		**	***	***	***	
Rams	+	-	+	+	+	+	6.37	0.427
	***				***		***	
Redskins	+	+	-	-	+	+	1.89	0.110
	***					*		
Steelers	+	-	-	+	-	+	32.40	0.814
	***	***		**		*	***	
Vikings	+	+	-	-	+	+	1.73	0.092
	***					**		

+ = has a positive estimated coefficient
- = has a negative estimated coefficient
* = significant at 10% level
** = significant at 5% level
*** = significant at 1% level

The one-year lagged PIUrban variable has a significant positive relationship with Sellout Rate for half the teams in the sample - the 49ers, Bills, Broncos, Browns/Ravens, Chiefs, Colts, Eagles, Lions, Oilers/Titans, Raiders, and Rams. An increase in per capita income is associated with an increase in the Sellout Rate in these markets. The only market with a negative and significant relationship between per capita income and Sellout Rate is the Cardinals. The one-year lagged WP variable has a significant positive relationship with Sellout Rate for the Bills, Broncos, Cardinals, Colts, Cowboys, Eagles, Oilers/Titans, Patriots, Raiders, Redskins, Steelers, and Vikings. For these teams, an increase in winning percentage is associated with an increase in Sellout Rate. None of the teams have a significant negative relationship between WP and Sellout Rate. Despite a small number of team exceptions, it appears that the two strikes did not have a significant impact on

the Sellout Rate throughout the NFL. On the other hand, with a few exceptions, population (PopUrban) and per capita income (PIUrban) each have a significant positive relationship with Sellout Rate. Furthermore, for most teams winning percentage (WP) is positively associated with Sellout Rate.

To further examine the impact of competitive balance on fan interest measured by Sellout Rate, we decompose the sample of 22 NFL teams into those with a significant winning percentage (WP) relationship to Sellout Rate and those with no significant WP relationship. The first regressions include only the Bills, Broncos, Cardinals, Colts, Cowboys, Eagles, Oilers/Titans, Patriots, Raiders, Redskins, Steelers, and Vikings, which are the teams whose winning percentage is significant to their respective Sellout Rate. The regression results for these models are found in Table 7.

Table 7: Regression Analysis of Determinants of Average Sellout Rate for Teams Whose Winning Percentage is Significant

	Dependent variable in all models is Sellout Rate				
Intercept	1.22402*** (9.84)	1.18444*** (8.91)	1.21561*** (11.02)	1.1762*** (10.41)	1.20045*** (9.15)
UPop (1-year lag)	-0.01244*** (-2.9)	-0.01238*** (-2.82)	-0.00885* (-1.91)	-0.01189*** (-2.75)	-0.0081 (-1.65)
Strike1 (1-year lag)	0.02919 (0.79)	0.03145 (0.84)	0.02115 (0.59)	0.03699 (1.0)	0.02832 (0.75)
Strike7 (1-year lag)	-0.04641 (-1.23)	-0.03814 (-1.02)	-0.02298 (-0.64)	-0.03727 (-1.03)	-0.02801 (-0.71)
UPI (1-year lag)	.00047753*** (4.35)	.00052651*** (5.89)	.00064989*** (5.82)	.00053881*** (6.03)	.00057034*** (3.85)
Points (1-year lag)	-0.00568** (-2.11)	-0.00641** (-2.53)	-0.00259 (-0.79)	-0.00687** (-2.69)	-0.0019 (-0.5)
MARGIN (1-year lag)	-0.00525 (-0.75)				-0.00831 (-0.9)
RATIO (1-year lag)		0.00004956 (0.0)			0.01007 (0.77)
CBR (1-year lag)			-0.30333* (-1.71)		-0.28329 (-1.5)
HHI (1-year lag)				0.00000697 (0.88)	0.00000486 (0.6)

Table 7: Regression Analysis of Determinants of Average Sellout Rate for Teams Whose Winning Percentage is Significant

	Dependent variable in all models is Sellout Rate				
F Value	7.35***	7.12***	8.31***	7.43***	5.36***
R^2	0.5951	0.5875	0.6242	0.5979	0.6412
Adjusted R^2	0.5142	0.505	0.549	0.5174	0.5217
N	37	37	37	37	37
F Test					19.658**

Note: t statistics in parentheses. F Value tests combined significance of all independent variables. F Test is the F Value testing the combined significance of 1-year lags of MARGIN, RATIO, CBR, and HHI for the SellOutRate ALL model. N is the number of observations.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

In four of the five models, Population (UPop) has a statistically significant negative relationship with Sellout Rate. The exception is the model that includes all four competitive balance measures. Neither the one-game strike (Strike1) nor the seven-game strike (Strike7) is significant in any of the models. In all five models, Per capita personal income (UPI) is statistically significant and positive. In three of the five models, the combined points per game (Points) variable has a statistically significant negative relationship with Sellout Rate. The only competitive balance measure that has a statistically significant impact by itself is CBR; however, F test results show that all four competitive balance measures have a combined significance with the Sellout Rate. For this sample of teams, it appears that an increase in population, and/or an increase in combined points per game are associated with decreases in Sellout Rate, while an increase in per capita personal income generally is related to an increase in Sellout Rate. Finally, an increase in competitive balance generally is related to a decrease in Sellout Rate.

The second regressions include only the 49ers, Bears, Browns/Ravens, Chargers, Chiefs, Giants, Jets, Lions, Packers, and Rams, which are the teams whose winning percentage is not significant to their respective Sellout Rate. The regression results for these models are found in Table 8. Just like our above results for the first sample of teams, per capita income (UPI) has a statistically significant

and positive relationship with Sellout Rate. Generally, for the rest of the non-competitive balance variables we find that most of them are not significant explanators of the Sellout Rate. Just as in our results in Table 4, here CBR and HHI are significant independent variables both in the regressions when each is the only measure of competitive balance included and in the regression when all four measures of competitive balance are included. Again, these are unexpected results. The finding of a negative and significant relationship between CBR and the Sellout Rate says that an increase in the competitive balance ratio is associated with lower fan interest as measured by the Sellout Rate. The positive and significant relationship between HHI and the Sellout Rate says that an increase in concentration of championships is associated with higher fan interest as measured by the Sellout Rate. Perhaps, fans do like dynasties. The other two measures of competitive balance (MARGIN and RATIO) are not significant in any of the other regressions with the Sellout Rate as the dependent variable. Again, F test results show that all four competitive balance measures have a combined significance with the Sellout Rate.

Table 8: Regression Analysis of Determinants of Average Sellout Rate for Teams Whose Winning Percentage is Not Significant

	Dependent variable in all models is Sellout Rate				
Intercept	0.63644** (2.06)	0.63443* (2.0)	0.4033 (1.37)	0.59985** (2.09)	0.40804 (1.33)
UPop (1-year lag)	0.00222 (0.17)	0.00254 (0.2)	0.0209 (1.51)	0.00403 (0.34)	0.01925 (1.36)
Strike1 (1-year lag)	-0.06657 (-1.26)	-0.06683 (-1.26)	-0.08479* (-1.77)	-0.04708 (-0.95)	-0.06583 (-1.33)
Strike7 (1-year lag)	-0.01552 (-0.29)	-0.01683 (-0.32)	0.03118 (0.62)	-0.01169 (-0.24)	0.0291 (0.55)
UPI (1-year lag)	.00099121*** (3.65)	.00098082*** (3.74)	0.00165*** (4.62)	.00107*** (4.33)	.00163*** (4.44)
Points (1-year lag)	0.00147 (0.37)	0.0017 (0.46)	0.01007** (2.14)	0.00016937 (0.05)	0.00752 (1.4)
MARGIN (1-year lag)	0.00142 (0.14)				0.00052764 (0.04)
RATIO (1-year lag)		0.00090688 (0.07)			-0.00050223 (-0.03)

Table 8: Regression Analysis of Determinants of Average Sellout Rate for Teams Whose Winning Percentage is Not Significant

	Dependent variable in all models is Sellout Rate				
CBR (1-year lag)			-0.61783** (-2.51)		-0.52649** (-2.09)
HHI (1-year lag)				0.00002303** (2.2)	0.00001854* (1.75)
F Value	7.32***	7.31***	9.9***	9.29***	6.98***
R^2	0.5942	0.5939	0.6644	0.6502	0.6994
Adjusted R^2	0.513	0.5127	0.5973	0.5802	0.5992
N	37	37	37	37	37
F Test					25.593**

Note: t statistics in parentheses. F Value tests combined significance of all independent variables. F Test is the F Value testing the combined significance of 1-year lags of MARGIN, RATIO, CBR, and HHI for the SellOutRate ALL model. N is the number of observations.
*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

There are only three consistent results when comparing the regressions on the Sellout Rate for each of these two samples of teams. Across both sample's sets of regressions we find that per capita income has a significant and positive impact on Sellout Rate, that the estimated coefficient on CBR is significant and negative in the regression where it is the only competitive balance measure included, and that F test results show that all four competitive balance measures have a combined significance with the Sellout Rate. Future research might look to explain why the many differences in the regression results for these two samples of teams occur.

CONCLUSIONS

The intuitive argument is that free agency in the NFL would increase competitive balance and that increased competitive balance would increase fan interest. It would logically follow that free agency in the NFL would increase fan interest.

Our results, however, do not provide convincing evidence of a statistically significant relationship between free agency and competitive balance (as measured by MARGIN, RATIO, CBR, and HHI). Although free agency has no significant impact on competitive balance, structural changes as a whole do.

Our analysis of the relationship between competitive balance and fan interest show mixed results. Two of our competitive balance measures (MARGIN and RATIO) are never significant to our two fan interest measures (TV Share and Sellout Rate). While neither CBR nor HHI is significant to TV Share, both are significant to Sellout Rate, indicating that only across-seasons competitive balance is significant to fan interest in attending games. The significant negative relationship between CBR and Sellout Rate says that an increase in CBR decreases fan interest as measured by Sellout Rate. The significant positive relationship between HHI and Sellout Rate says that an increase in the concentration of championships increases fan interest as measured by Sellout Rate. These unexpected results may warrant future research.

Individual team model regressions show that winning percentage has a significant positive impact on fan interest for only 12 of 22 teams. These results support the contention that the uncertainty of outcome hypothesis generally does not hold for the NFL. Increased fan interest in attending games is a function of increased absolute performance, increased population, and increased personal income. Periodically, a team will dominate and develop into a dynasty, whereby their superior play diminishes the uncertainty of outcome in related games. Examples include the Packers (1961-1968), Vikings (1969-1973), Cowboys (1970-1978, 1992-1995), Dolphins (1971-1973), Steelers (1974-1979), 49ers (1984-1989), and Bills (1990-1993). Perhaps fans temporarily tolerate dominant teams and "certainty" of outcome, until the competitive balance reverts and a more uncertain outcome returns (until the next dynasty emerges).

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PAYING FOR PUBLIC GOODS: A NOTE ON EFFICIENT REVENUE COLLECTION AND EXPENDITURE

William L. Holahan, University of Wisconsin-Milwaukee
Charles O. Kroncke, University of South Florida-Lakeland

ABSTRACT

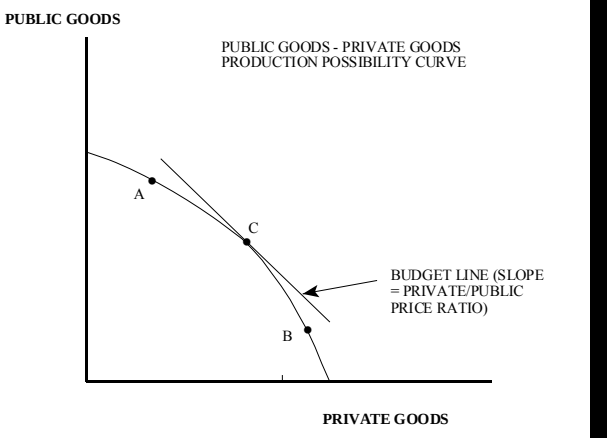
Introductory level diagrams are employed to demonstrate a very important economic principle: public-sector efficiency may require that expenditure decisions and tax revenue collection be separated and performed by different levels of government. Applying the production-possibility curve to illustrate the trade-off between public and private goods, the optimum point is shown where the per-dollar marginal returns are equal. We argue that different levels of government have different efficiencies in taxation, requiring that local expenditures be buttressed by revenue sharing from higher levels of government. Acting without revenue-sharing, local governments will face a marginal cost of public goods that is artificially high and, hence, will under-invest in public goods. This demonstration should not only heighten the student's awareness of public-sector economics, but also the general relevance of their hard-won learning of the principles.

INTRODUCTION

Public goods and services, such as homeland security, freeways, air quality control, disease prevention, and crime abatement must be shared and must be paid for. Such goods are not efficiently allocated by markets but instead are allocated by political means at various levels of government.

To explain a society's choice of public versus private goods, economists rely on a production possibility curve, such as Figure 1, which shows the output combinations that an economy can choose with a given current technology under conditions of full employment. As drawn, Point C (the point of tangency of a hypothetical national budget line with the production possibility curve) represents the best mix of public and private goods and services because at this point the marginal return per dollar of investment is the same for public and private goods and services. Points A and B show, respectively, over and under investment in public goods and services.

Figure 1



In the "real world", there is continuous debate about this tangency point. In general, a liberal politician's bias would favor increasing the size of the public sector. Their critics refer to them as the "tax-and-spend" group. By contrast, conservative politicians are said to belong to the "no-new-taxes" crowd as their bias would favor decreasing the size of the public sector. In other words, liberals are thought of as trying to move towards Point A and conservatives as trying to move towards Point B.

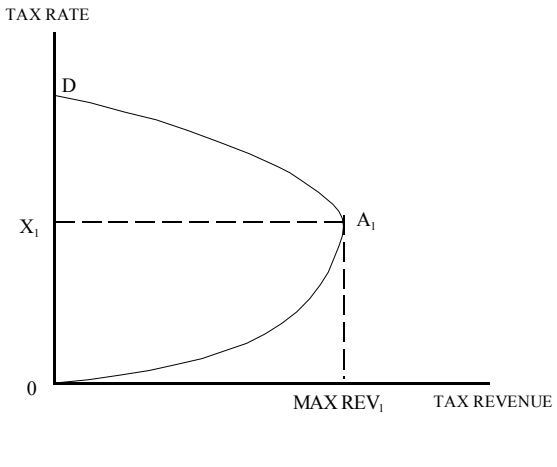
However, the public sector must be paid for. Since the revenue needed to purchase public goods and services must be financed through some sort of taxation, decisions must also be made as to the provider - - local, state, or federal government - - and as to the form of taxation to be utilized- - income, property, sales, or user fees.

This note shows some elementary relationships between levels of government. Each level of government has a different level of efficiency in collecting taxes. Lower levels of government cannot collect taxes as efficiently as higher levels of government. The distribution of tax-collection authority across the different levels of government will have great impact on the amount of revenue collected and on the mix of public goods and services that can be provided. Since efficient provision of public goods and services requires both efficient allocation *and* efficient collection of taxes, some form of revenue sharing is required for overall efficiency.

DECISION ANALYSIS

Policy makers, whatever their political persuasion, wrestle with the issue of public expenditures, taxation, and the proper role for the different levels of government. The relationship between tax rates and tax receipts is often in question. "Supply-side" economists maintain that reducing federal tax rates would stimulate economic growth sufficiently to actually increase tax revenue. The geometry of their prescription is illustrated in Figure 2, which shows the hypothetical amount of revenues the government collects at various income tax rates.

Figure 2



The vertical axis measures federal income tax rates and the horizontal axis measures federal revenues generated by these rates. The curve is anchored at two zero-revenue points: the origin and at point D. At the origin, both the tax rate and tax revenue are zero: the government will receive no tax revenues regardless of how much income people are earning. At point D the tax rate is 100% and once again, the government will receive no revenues since people will refuse to work for money when all their income is taxed away. Between these extremes, the curve is backward bending. It slopes upward between the origin and point A_1: as the tax rate rises towards X_1 percent, tax revenues rise too. Tax revenues are at their maximum at MAX REV_1 when the tax rate is X_1 percent. The curve slopes downward

between point D and point A: at tax rates higher than X_1 percent, tax revenues fall as tax rates rise. In economics, this relationship is known as the "Laffer Curve", after Professor Laffer, who used it to build support for tax cuts (see www.polyconomics.com).

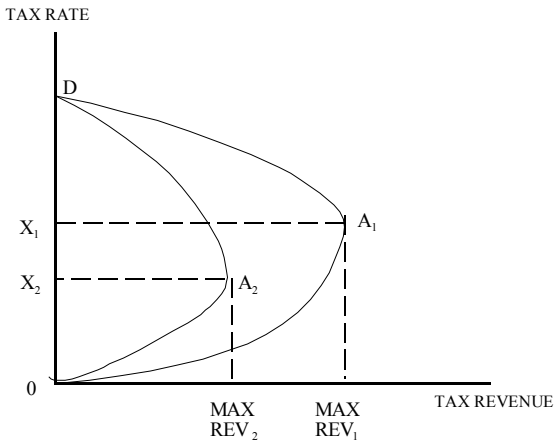
This curve can be drawn for any level of government; but the shapes will differ in essential ways: *the lower the level of government, the lower will be the maximum potential tax revenue and the lower will be the tax rate that maximizes tax revenue.* The shape of the curve and the level at which the revenue-maximizing tax rate occurs depend on how easy it is for people to find ways to avoid paying the taxes imposed by the level of government that levies the taxes. For example, people can avoid paying taxes by moving away from the area in which the taxes are imposed. But, it is far easier to avoid taxation by moving from community to community than it is from state to state or in turn from country to country. More generally, *it is easier to avoid taxes the lower the levels of government imposing the taxes, hence lower levels of government have lower revenue-maximizing tax rates and lower maximum potential tax revenue.*

Figure 3 presents two curves. The curve from Figure 2 is repeated in Figure 3 to provide a benchmark curve for a higher level of government, in this example, "state government". The second curve shows relatively smaller tax rate/tax revenue possibilities for the lower level of government, in this example, "local government". As shown in Figure 3, the tax rate that maximizes tax revenue for the local government is shown as X_2 and the maximum tax revenue is shown as MAX REV_2. Note that $X_2 < X_1$ and MAX $REV_2 <$ MAX REV_1.

Because states compete for high-income wage earners and high-profit businesses, they must keep their tax rates in line with those of other states or risk losing revenue. For example, if the State of Wisconsin were to raise its income tax rates, some people might decide to move to a state where tax rates were lower. In other words, the U.S. federal government finds it easier to collect tax revenue within the state of Wisconsin than does the state government of Wisconsin. That is, unlike state taxes, federal taxes are not escapable by interstate movement.

This relative inability to collect taxes for social programs makes it harder to finance these programs at the local level, even when that is the most efficient place to make such decisions. If the responsibility for health care, schools, welfare, mass transit, and other social services is shifted from the federal government to state and local governments, and this shift is accompanied by reductions in or elimination of revenue sharing, Figure 3 shows the resulting inefficiency. Such a policy transfers the burden of financing those services to governments with lesser ability to levy and collect taxes; hence the quality and quantity of local public services must fall.

Figure 3



This is a variant of the classic "free-rider" problem. Because some beneficiaries of the public good can merely move across the tax boundary, the ability of local decision-makers to achieve efficiency by equating marginal benefits and marginal costs is diminished. This "free-rider" problem, combined with the impulse of communities to compete for residents and firms through lower tax rates, will squeeze public services to an inefficiently low level: a "Race to the Bottom".

A public policy that combines (A) local decision-making on the provision of public services by local and state governments with (B) revenue sharing from higher levels of government will mitigate such a race. A higher level of government can more efficiently generate tax revenue at the local level than the local taxing authority can by itself. That is, the tax imposed by the higher level of government cannot be avoided by moving from the locality, so the tax does not harm the locality by inducing free-rider behaviors.

Moreover, a revenue sharing policy does not necessarily redistribute income. If the tax revenues generated within the local tax base is simply collected more efficiently by the state than the local government could collect it, *and then returned to the local government*, there is no inherent income transfer between levels of government. The state can be thought of as providing a tax-collecting service - - *i.e.*, the higher level of government providing efficient tax collection within the city's tax base - - and the city can be thought of as receiving its own tax revenue from that service-provider to cover its costs of local public goods. However, revenue sharing can run the risk of reducing the perceived marginal cost

of public projects; prudent management requires that cost-benefit analysis be brought to bear to achieve expenditure efficiency.

TAX HARMONIZATION

The problem of the "Race to the Bottom" was foreseen by the framers of the Constitution of the United States and of the Constitution of the European Union. In the "commerce clause" of the U.S. Constitution – the clause that assigns to Congress the power to regulate interstate commerce - the framers made an effort to recognize the United States as "one nation" and not a collection of competing territories, by preventing individual states from providing incentives that harmed the other states in the union. The clause disallows a business firm engaged in interstate commerce from gaining an artificial advantage in one state through a tax break or financing gimmickry. Its enforcement is an effort to prevent a race to the bottom generated by the iterative competitive responses of other states. This is clearly seen in the recent U.S. 6th Circuit Court of Appeals ruling in the case of Cuno v. DaimlerChrysler (Mazerov, 2005). In that case, the Court ruled that the investment tax credit granted against Ohio's corporate income tax violates the commerce clause. It was the latest in a long line of decisions holding that state laws that provide tax advantages to in-state business activity sometimes illegally harm interstate commerce.

Similarly, the EU Constitution calls for "tax harmonization" among member countries, and as a requirement for new members prior to joining. The economic principle is the same as in the U.S. commerce clause: migration of businesses and labor should result from natural comparative advantages and not from artificial inducements that individual countries provide. Absent enforcement of the tax harmonization principle, the temptation to compete on tax incentives will result in member countries being engaged in a race to the bottom with the inevitable result of being unable to raise taxes sufficient to fund their public sector, perhaps even to the detriment of the businesses they are attempting to attract.

CONCLUSIONS

The relationship between tax rates and tax receipts shown in Figures 2 and 3 is an application of a well-known relationship between price, revenue, and quantity along a demand curve: in the inelastic range, price and revenue are directly related; in the elastic range, price and revenue are inversely related; and only when elasticity is unity is revenue maximized. Since tax rates are simply a special type of price, there must be a revenue-maximizing tax rate. The greater the elasticity of the response to taxes, the lower is the revenue-maximizing tax rate. In turn, the smaller the region, the easier is tax avoidance and hence the greater the elasticity with respect to tax rates and the lower the revenue-

maximizing tax rate. While smaller government may be better at matching the government services to local needs, the larger government is better able to collect taxes.

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THE FEDERAL RESERVE INTEREST RATE MANIPULATIONS FROM 2000-2007 AND THE HOUSING MORTGAGE CRISIS OF 2008

Fred M. Carr , University of Akron
Jane A. Beese, Univeristy of Akron

ABSTRACT

The study looks at the period between 2000-2008, with regard to the financial housing mortgage crisis of 2008. The study demonstrates the correlation between the Federal Reserve System's manipulation of interest rates and the rise of oil prices starting in 2004. The confluence of interest rates fluctuations, recessionary pressures, and the rise in the price of oil have been three of the major factors causing the decline of the housing sector and the mortgage market crisis in 2008.

In a correlative movement with the rise in the price of oil, the Federal Reserve moved from a low accommodative interest rate policy to a steady and consistent increase in interest rates between 2004 and 2007. The switch in policy, combined with the corrosive effects of low initial variable interest rates, became a prime cause of the financial mortgage crisis of 2008. The study suggests sustained manipulation of interest rates had a deleterious effect on financial lenders and individual borrowers. The study also indicates that the price per barrel of oil, over which a country has no control, can be a major influence in the direction of interest rates and a product that can affect financial institutions' lending and consumer borrowing ability.

INTRODUCTION

The confluence of Federal Reserve interest rate fluctuations, recessionary pressures, and the rise in the price of oil, between 2000-2008, have been three of the major factors causing the decline of the housing sector and the mortgage market

crisis of 2008. The effect of interest rates has affected other areas such as student loans (Nealy, 2008). The impact of the rise in the price of oil on developed economies has also been inflationary (Lindstrom, 2006; McPherson & Weltzin, 2008).

It has been shown that the relationship between oil and inflation has weakened. In the 1970s there was a strong correlation between the price of oil and the inflation rate as measured by the Consumer Price Index (Investopedia, n.d.). Although the correlation between the rise in the price of oil and the rise in inflation has weakened, the relationship still exists and greatly affects investor and financial expectations (Blas & Mackenzie, 2008; Uren, 2008).

It has been generally accepted that the Federal Reserve has attempted to control inflation. Federal Reserve Chairman Ben S. Bernanke (2003) has, in the past, acknowledged this by stating

> *"the Federal Reserve, though rejecting the inflation-targeting label, has greatly increased its credibility for maintaining low and stable inflation, has become more proactive in heading off inflationary pressures, and has worked hard to improve the transparency of its policymaking process--all hallmarks of the inflation-targeting approach."*

In the same speech the Chairman also drew the connection between the rise in oil price shocks in 1973 and the inability to control inflation leading to the disinflationary recessions of 1973-75 and 1980-82. It is this role of fighting the inflationary effects of rising oil prices and fighting the recession of 2000-2003 that caused the Federal Reserve to manipulate interest rates that lead to the housing mortgage crisis of 2008.

STUDY LIMITATIONS

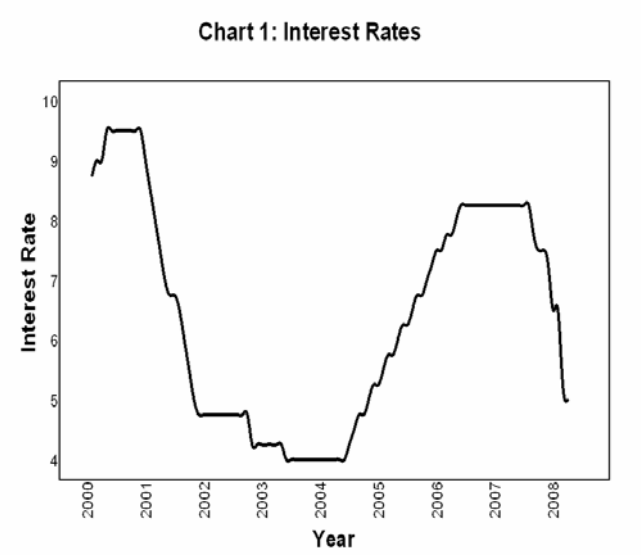
The study focus is on interest rate fluctuations, oil per barrel prices, CPI inflation rates, and recessionary pressures over time as the major stimulators affecting the Federal Reserve interest rate decisions. The study does not attempt to quantify the exchange rate effects of the U.S. dollar on the per barrel price of oil. The study does not take into account other external variables that may have also affected Federal Reserve decision- making on interest rates. In addition, the study does not quantify the effects of bank lending practices. The study does question the

wisdom of using variable rate interest loans versus more stable fixed interest rate loans, especially to low-income borrowers, but the study does not address legal versus ethical lending practices of financial institutions.

The manipulation of interest rates is regarded as a legitimate and necessary function of the Federal Reserve System to fight recessionary and inflationary pressures. The study does not attempt to provide alternative approaches of Federal Reserve action to control these pressures. It is also beyond the scope of this study to determine what anticipatory actions are necessary in timing the raising or lowering interest rates. The study does not address the leveling effect the Federal Reserve interest rate actions have on market cycles of inflation and recessions.

STUDY DATA

After a year of historical prime interest rate fluctuations, 1980 ended the year with a historical prime interest rate high of 21.5%. In June 2003, the prime rate had lowered to 4%. The last time the prime rate was recorded at 4% was in January of 1958. Chart 1 shows the prime interest rate fluctuated from 2000 to 2008, as determined by the Bank Prime Loan Rate over select years recorded by Board of Governors of the Federal Reserve System.



(Board of Governors of the Federal Reserve System, 2008)

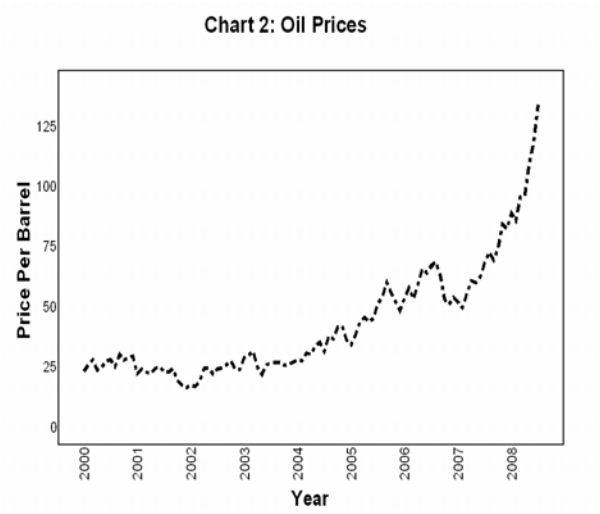
It is reasonable to conclude the Federal Reserve lowered interest rates in 2000-2001, in response to a perceived recession as determined by National Bureau of Economic Research and other Federal Reserve data (Business Cycle Dating Committee, 2001).

Chart 1 shows a 9.5% rate in May of 2000, and the subsequent decline to 4% in June of 2003. At that time, there was reversal of rates and an increase from the June 2004, 4% level to a high of 8.25 % in June of 2006. The rise in interest rates started in July 2004. Prior to the increase in interest rates there existed a trough in which low interest rates existed from 2001 to 2004. The law of demand stipulates the less charge for something, the greater the demand. The low interest rates, as might be expected, attracted a wide range of borrowers and allowed access to credit markets for individuals who, under higher interest rates, would not have sought financing.

Following prime interest rates, Mortgage X historical data show that one-year adjustable rate mortgages (ARM): Initial Interest Rate declined from the 7.25 % in 2001 to below 3.5% in 2004. The decline in ARM rates made mortgages more accessible to borrowers who in higher ARM rate years would not have qualified for a loan. The one-year ARM: Fully Indexed Rate (based on the 1 year Constant Maturity Treasury Index [CMT] plus an assumed 2.75% margin) rose from below 4% in 2003, to 8% in 2006 (Mortgage X-Mortgage Information Services, 2008). Between 2001 and 2004, ARM: initial interest rate borrowers thus found themselves in the situation of increasingly costly loans once their ARM interest rates became ARM index adjusted rate loans. Using example numbers, individuals, who borrowed during the low interest rate trough, within the years 2001-2004, with an initial interest rate ARM of 4-5%, found themselves at the conversion rate, between 2005-2007, of 6-7% plus the 2.75% margin, using the CMT index. Thus, the new fully indexed rate became 8.75-9.75%. It can be assumed that the borrowers who were marginally qualified to obtain their loans found themselves in increasing financial trouble. It would also be valid to assume that these individuals, who could qualify for a loan at a higher fixed rate mortgage, could have avoided such financial trouble by choosing a fixed income mortgage loan. The extent of this financial trouble is still evolving, but the authors look at the interest rate manipulations as the primary cause of the problems when combined with ARM loan conditions. The reason for the interest rate changes will now be explored.

As interest rates and the value of the dollar fell from 2000-2004, the price of oil per barrel increased (Newman, 2008; Yahoo!$_{@}$Finance, 2008). Chart 2 (Energy Information Administration, 2008) illustrates the price of a barrel of oil for the years

2000-2008, from selective data points provided by the Energy Information Administration. The price of oil per barrel went from under 25 dollars in 2000, to levels exceeding 125 dollars in 2008.

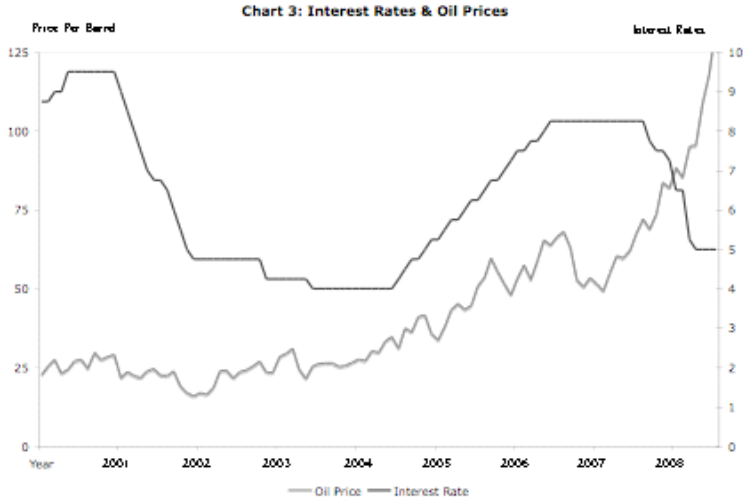


(Energy Information Administration, 2008)

From 2004, the price of a barrel of oil started to climb along with the rise in the prime rate and the one year ARM: Fully Indexed Rate and the prime rate. Chart 3 (Board of Governors of the Federal Reserve System, 2008) depicts the simultaneous rise of the price of oil per barrel and change in the prime rate.

The low interest rate "trough" can be seen in Chart 3, starting in 2001, and continuing into 2004. The Federal Reserve begins the rise in interest rates that correlates with the rise in the price of oil per barrel. This correlative effect continues into 2007.

A Pearson product-moment Correlation was conducted to determine the relationship between price of oil and interest rates. A *p* value of less than .05 was required for statistical significance. The results of the correlation analysis are presented in Table 1.



(Board of Governors of the Federal Reserve System, 2008; Energy Information Administration, 2008)

Table 1: Correlations between the Price of Oil and Interest Rates

	Pearson Correlation Coefficient	*Significance (two-tailed)*
Price of Oil versus Interest Rate	.316	.001**

* $p < .05$
** $p < .01$

The correlation between the price of oil and interest rates was significant, r (101, 97) = .316 at $p < .001$. This signifies a moderate relationship between the price of oil and interest rates. As interest rates increase so does the price of oil.

CONCLUSIONS

The Federal Reserve System lowered interest rates in a proactive effort to be responsive to a slowing economy and the expectation of a possible recession in 2000-2001. The promise of home ownership was extended to an increasing number of borrowers between 2000 and 2004, due to a steady and continual drop in interest rates. The low interest rates signaled, to financial institutions and individual borrowers, that credit was inexpensive and readily available. Low variable initial borrowing rates allowed lower income individuals to obtain a mortgage loan, allowed current home owners to trade up to more expensive homes and allowed individuals the opportunity to purchase a second home The advent of increasing oil prices, starting in 2004, raised the expectation of inflationary pressures. While correlation is not necessarily causation, in a correlative reaction, to raising oil prices and possible economic inflation, the Federal Reserve moved from a low accommodative interest rate policy to one of a steady and consistent increasing of interest rates between 2004 and 2007. The switch in policy, to higher interest rates, combined with the financially corrosive effects of low initial variable interest rates, between 2001 to 2004, converted to much higher indexed variable interest rates, between 2005-2008 and became a prime cause of the financial services mortgage crisis of 2008.

While the Federal Reserve System has maintained a consistent policy to protect the economy of the country, this study would tend to indicate that a "V" style interest rate change, especially one with a attractive "trough" of low interest rates over a period of years, can have a deleterious economic impact, especially on borrowers and financial institutions, as variable interest rates rise and mature to variable indexed interest rates. The effect of the "V" movement in interest rates, in essence, pulled the "rug" out from under financial institutional lenders and individual borrowers. The study suggests that the Federal Reserve sustained manipulation of interest rates between 2000-2008 had a deleterious effect on financial lenders and individual borrowers.

The study also indicates that the price per barrel of oil, over which a country has no control, by design or choice, can be a major dictator in the direction of interest rates and, therefore, a product that can effect financial institutions lending and consumer borrowing ability. It is possible future studies will show that low income individuals lost an opportunity to experience a long held dream of home ownership or move to a more desirable home due to the rise in oil prices between 2004-2008.

Many other factors should also be considered in addition to fully explain the 2008, mortgage crisis. Variable rate mortgage conversion conditions appear to have contributed to the crisis, however, to what extent has yet to be determined. The variable rate mortgage became a gamble, on the part of those least able to afford the gamble, that their initial variable rate would be maintained over time, even though the possibility of a higher indexed variable rate plus the additional margin existed. This, in fact, became the case for many low-income borrowers as a result of being caught over a number of years by the rise in interest rates between 2005-2008. Variable interest rates, subject to sustained interest rate rises, are in the end a bad gamble on the part of borrowers and financial institutions regardless of how attractive the initial terms.

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