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JOURNAL OF ECONOMICS AND ECONOMIC EDUCATION RESEARCH

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LETTER FROM THE EDITOR

We are extremely pleased to present this issue of the *Journal of Economics and Economic Education Research*, an official publication of the 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

ASSESSING GLOBALLY THEMED LEARNING OBJECTIVES USING OBJECTIVE EXAMINATION RESULTS

Laura Fitzpatrick, Rockhurst University

ABSTRACT

In any course the instructor is faced with the need to structure the course material and pedagogy in such a way to promote student learning, and to assess the degree to which learning has happened. The added challenge in the courses of the author is that their courses are heavily laden with authentic learning projects, interventions to develop communication skills, and interventions to increase student motivation, all of which place increased demand on course time over and above what covering the material in a standard lecture format would require. An old standby—the multiple-choice examination—has been retained in the author's courses as a means to conserve on precious time while still assessing student learning beyond simply the level of student recognition of terms to comprehension, application, analysis, and evaluation cognitive levels. These higher cognitive levels indicate increasing student ability and sophistication with material in a course. Assessment of learning at these multiple cognitive levels can be achieved through use of Bloom's taxonomy of the cognitive domain in construction of examinations as well as evaluation of learning patterns with specific foci such as learning of international subject matter within a course. This paper outlines how objective exams can be analyzed to determine the level of cognitive learning attained, how existing exams can be modified or appended to reach higher levels of cognitive learning, and how an instructor can use the information distilled from the project to assess overall learning patterns in a course which in the case of this paper is focused on the attainment of learning goals related to global themes.

INTRODUCTION

As professors we are called to meet multiple goals in every class we teach. These include meeting course content and skill development learning goals, program

level learning goals, and mission and topic specific learning goals established in accordance with accreditation efforts. This is potentially a daunting task given limited class time and an ever-present drive for continuous improvement. The author has had great success in setting, measuring, and assessing attainment of these multiple goals using a combination of objective examinations with explicit cognitive level structuring ala Bloom's Taxonomy (Bloom, 1956) to create assessment opportunities that minimize class time usage, while providing learning goal feedback. These efficiencies in addition to providing needed assessment data, also allow for the use of additional assessment methods to meet goals objective exams cannot achieve, such as demonstration of writing skills. This work begins with examination of the general bias against objective examinations, followed by a methodology that takes objective exams beyond many of these criticisms. This is then used to show how the methodology has allowed the assessment of internationally focused program goals in a Principles of Macroeconomics class. This endeavor begins with the recounting of an experience likely shared by many educators.

While evaluating a multiple-choice exam using Bloom's Taxonomy of the cognitive domain, a colleague looked over the shoulder of the author and commented with a superior tone, "Multiple-choice exams, I used to give those." The author found the comment interesting for a number of reasons. First, she did not start her teaching career using this type of exam. Only with experience did she learn that they can be an integral and meaningful part of an arsenal of assessment methods/techniques. Second, she used to have the same superior attitude. At first she looked down on such assessment, but her attitude resulted from ignorance of the potential that such a method affords. Use of multiple-choice examinations has become an integral part of survey courses because of the flexibility they can offer.

This colleague's attitude as well as the authors' own in early years of teaching has been echoed by Bruce Alberts when president of the National Academy of Sciences. His criticism comes from his years teaching biochemistry to medical students where "he was appalled to find they 'were not learning anything.' The future doctors easily parroted back biochemical terms but failed to grasp the concepts. The culprit? Multiple-choice tests"(Carey, 1997) These are serious allegations from a prominent educator, but even as a novice in the field of biochemistry, one questions whether it is the particular use of the exam and not the multiple-choice exam in general that is lacking. The author has no problem accepting Alberts' claim that the exams show nothing if in fact the examinations are designed in such a way that they only test rote knowledge. "By emphasizing

memorization and word association over conceptual knowledge, these tests are poor judges of students' abilities." (Carey, 1997) But this criticism speaks largely to the construction of the exam. The author does agree that as a sole assessment tool, a multiple-choice exam can be insufficient to meet certain learning objectives, but the author proposes that it comprises a very effective component of a larger assessment architecture. Multiple-choice exams can be used to evaluate student ability on a variety of cognitive levels. The author believes that Alberts' comments and efforts would coincide with the proposal, as the direction he seeks is to get students to "analyze data, not regurgitate facts." (Carey, 1997) One needn't in this case throw the baby out with the bath water, instead, one can systematically evaluate and reconstruct multiple-choice exams to address multiple levels of the cognitive domain and situate these exams in a course assessment strategy.

Like many who came to teaching through content education rather than teaching education, the author has reinvented or attempted to reinvent many a wheel. The author began to use multiple-choice exams in survey courses for a very pragmatic reason—there was a lot of material to be covered and hence a lot of material for exams. While the author does not find it necessary to test on every single point examined in class or readings, relying solely on essay/short answer exams was untenable. When the author began using this testing method, she did not simply want definitions or something parroted back to her. She wanted students to think critically, to apply concepts, to discern among complex answers. This is a challenging goal, yet is still doable.

Just when the author was breathing a contented sigh from having accomplished the goal of testing varying abilities, the wheel invented in 1956 rolled by. Surprisingly enough, that was not a discouraging experience. There, before the author, was a structure for examining exactly what she was doing, not simply based on years of experience and a clear desire to develop critical thinking in students. Here was a framework based on educational research. Bloom's Taxonomy provided a logical and systematic articulation of what she intuitively knew and what she wanted to accomplish in the assessment of student learning, and it was expressed far more clearly and concisely than she could have done. It was akin to a roadmap and has become an indispensable tool in designing assessment for courses. Bloom's Taxonomy provides a great framework for an instructor to use when seeking to create assessments in general and multiple-choice exams in particular.

BLOOM'S TAXONOMY

Bloom's Taxonomy is "a hierarchy of educational objectives…which attempts to divide cognitive objectives into subdivisions ranging from the simplest behaviour to the most complex." (Carneson, Delpierre & Master, 1996) This is a powerful tool for educators for it provides a system for creating assessment tools or evaluating existing assessment tools with an eye to the types of student learning the instructor seeks. The scheme below summarizes the hierarchy and is followed by descriptions of each of the levels.

EVALUATION
↑
SYNTHESIS
↑
ANALYSIS
↑
APPLICATION
↑
COMPREHENSION
↑
KNOWLEDGE

The base of the hierarchy is knowledge. Student ability at this level would require the recollection of material. For the purposes of the author, questions at this level have included definitions, identification of concepts, remembering facts. If an exam were to test only on this cognitive level, the concerns of Alberts identified above would be entirely on the mark. This is truly just parroting back information with no deeper application or use of the information. That is not to say that there is no place for such question on a multiple-choice exam. Ultimately the author's goal is to test at multiple levels of the cognitive domain for a number of reasons. First, the author wants to see how students perform at different cognitive levels. If the author determined that students are not performing at any of these levels up to their expectations, then the author can target teaching methods to address those deficiencies. Second, given the hierarchical nature of the taxonomy, the author wanted to include even the lowest level to measure student performance relative to other levels. Third, the author believed that the best examination has opportunities for all students to succeed at some level. Presenting an examination that is delivered

only at the highest cognitive level can discourage learning and thwart motivation. This is particularly so in the introductory level courses where the authors use multiple-choice exams.

The second level of the hierarchy is Comprehension. "Comprehension is defined as the ability to grasp the meaning of material…These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding." (Carneson, Delpierre & Master, 1996) Comprehension questions require the student to be aware of the context from which a fact or definition or concept is derived. For example, defining price elasticity of demand would be a knowledge level question, while restating this elasticity in mathematical form would represent comprehension. Again, at this level there is not a high cognitive achievement. Students are still recalling information, but at a slightly more sophisticated level since they are expected to translate words into a mathematical form.

Application is the level at which students begin to take what they have from the first two levels and use it in a meaningful way, that is to begin creating something from what they have gained in Knowledge and Comprehension. At this level the student would be able to take the mathematical formula for price elasticity of demand and apply it to new data to calculate what the actual value is.

At the analysis level of the hierarchy students "break down material into its component parts so that its organizational structure may be understood." (Carneson, Delpierre & Master, 1996) Students at this level need to have competence at the previous levels in a topic to perform at the analysis level. In the elasticity example, a student would be required to interpret the meaning of a particular value for the price elasticity of demand and analyze the potential impact of that value in a context.

The fifth level of the hierarchy is synthesis. This level poses a significant obstacle to the instructor seeking to use the various levels of the cognitive domain to structure objective examinations. Synthesis involves the creation of something new from the cognitive achievements of the previous levels. Because objective examinations by their nature are not a venue for "creation," the author has sought to address this cognitive level through alternative assessment methods.

Evaluation is also a challenge in the use of multiple-choice exams, but it is not an impossibility to test for this cognitive level in such exams. In the evaluation level a student is expected to judge that which they are examining. "Learning outcomes in this area are highest in the cognitive hierarchy because they contain elements of all the other categories, plus conscious value judgments based on clearly defined criteria." (Carneson, Delpierre & Master, 1996)

USING BLOOM'S TAXONOMY TO EVALUATE MULTIPLE-CHOICE EXAMINATIONS

The appeal of Bloom's taxonomy lies in the systematic way it allows one to construct assessment for student learning. The author initially used the taxonomy not to create new exams, but to evaluate existing examinations. In the hierarchy, the author saw much of what she was trying to accomplish, that is, assess student learning at many different levels. Their terminology differed from that of Bloom, but she wanted students to know the fundamental concepts, understand what they mean and then use those and understand the importance of those concepts. The author was seeking "real-world" knowledge. The challenge was to find out whether the author was actuality testing the different levels sought, through use of Bloom's taxonomy. Additionally her intent was to examine the cognitive level of student learning in particular with respect to globally themed questions. This would allow the author to establish achievement levels not only for course level program learning objectives, but also those relating to program level goals consistent with AACSB accrediting standards.

Evaluation of exams revealed internationally focused questions ranging from the knowledge through the analysis cognitive levels. The author found that the exams did have a high proportion of application and analysis question (the type of cognition they seek), but there were still questions at the two lower levels of the hierarchy. There were no evaluation level questions, but in the process of research have come across ideas for formulating some of these difficult questions for inclusion in the multiple-choice exam. Student achievement levels were commensurate with expectations for the different cognitive levels, that is, higher percentage correct scores at lower cognitive levels than at higher ones. In this analysis, the average percentages of correct answers for the different cognitive levels were as follows: Knowledge, 89.25%; Comprehension, 72%; Application, 51.1%, and Analysis 25%. This reveals the level of learning at different levels and provides data for determination of whether learning objectives and program level learning goals are being met.

By cross referencing the Bloom's levels with content areas the author was also able to determine areas where questions were bunched in certain areas of the hierarchy, and this allows the author to address this to get a better spread of cognition levels across content areas to track student performance at each level. This additional layer of data, student performance at different cognitive levels and by content, also reveals where students are excelling and where they are faltering.

This allows the author to address areas of concern through teaching interventions. For example, analysis of the Principle of Macroeconomics exams evaluated for international learning objectives revealed also that students were not performing as well in equilibrium analysis as in other areas. The instructor, armed with this information, can then focus teaching to address this deficiency. The analysis also showed that students as a whole were performing very well at the application/analysis levels. This validates many of the techniques used in the course to foster student learning.

STRUCTURING EXAMS USING BLOOM'S TAXONOMY

The author has evaluated a number of exams in different disciplines, but is focusing in particular on the international focus of two exams administered multiple times from a Principles of Macroeconomics course. Working with a colleague to evaluate exams helps not only in categorization of the questions that do not obviously fit into a particular category but also allows for inter-rater reliability in classifications.

The analysis performed on the Principles of Macroeconomics examinations revealed that exam A had 5 comprehension level questions, 3 application questions, and 1 analysis level question. Exam B had 1 knowledge, 2 comprehension, 4 application, and 1 analysis level question(s). Although the author was pleased that the largest single share of questions was at the application/analysis levels, which reflected the objectives set for this introductory level course, there were no evaluation level questions and disproportionately fewer questions from the lower cognitive levels on exam B. The analysis revealed an area to be expanded (more lower level questions) and an area to be developed (evaluation level questions) but was also validating insofar as the other content categories and cognitive levels reflected the distribution of questions mirrored by goals.

Bloom's taxonomy gives an instructor the opportunity for such analysis for the improvement of assessment techniques, but can also be a starting point for the creation of assessment that reflects the desired learning outcomes set by an instructor in a course. To aid in either of these outcomes, examples of multiple-choice questions drawn from the exams at each of the cognitive levels are presented. These can serve both as examples to compare questions for assessing their cognitive level, or to initiate creation of new questions.

Knowledge: The benefits from international trade include:

A. Increased world output of goods and services.
B. Greater efficiency in the use of the world's limited resources.
C. Higher national standards of living throughout the world.
D. All of the above.

Comprehension: When tariffs are imposed, the losers include:

A. Domestic consumers and the domestic government.
B. Foreign consumers and domestic producers of import-competing goods.
C. Domestic consumers and domestic producers of import-competing goods.
D. Domestic consumers and foreign producers.

World output of goods and services increases with specialization because:

A. he world's resources are being used more efficiently.
B. Each country's production possibilities curve is shifted outward.
C. Each country's workers are willing to work harder than they did before specialization.
D. All of the above.

Application: Suppose the United States can produce 2000 cars or 2000 trucks. Japan can produce either 2000 cars or 1000 trucks. In terms of car production we can conclude that:

A. Japan has an absolute advantage.
B. The United States has an absolute advantage.
C. The United States has a comparative advantage
D. Japan has a comparative advantage.

Farmers are most likely to be in favor of:

A. Free trade for fertilizer and crops.
B. Free trade for fertilizer but restricted imports of crops.
C. Restricted imports of fertilizer and crops.
D. Restricted imports of fertilizer and free trade of crops.

Analysis: The elimination of import restrictions will:

A. Alter the mix of output from export industries toward domestic industries.
B. Redistribute income from import-competing industries to export industries.
C. Alter the mix of output from export industries to import-competing industries.
D. Redistribute income from domestic to foreign producers.

These multiple choice questions were used directly or adapted from questions the test banks accompanying Schiller's *The Macro Economy Today*.

Recall that the exams did not include questions at the evaluation level of cognition, but research has shown to me how that can be achieved.

Evaluation: A student was asked to do the following: "Briefly describe the economic rationale and impact of NAFTA in both the United States and Mexico."

As an answer the student wrote the following:

"NAFTA, The North American Free Trade Agreement, was designed and implemented to take advantage of gains from free trade. These gains are increased production in areas of comparative advantage and increased consumption possibilities. It is expected that there are adjustments in economies that go to free trade. The goods and services that are produced without comparative advantage will decline. It was expected that the U.S. would lose manufacturing and agricultural producers and jobs especially with fruits and citrus crops, but it would be made up in other areas. This was the case when the U.S. had its largest economic expansion ever in the 1990's. This was also experienced in Mexico with great growth, decreasing poverty, and diminishing illegal immigration to the United States."

How would you judge the student's answer?

A. EXCELLENT (All statements about policy and outcomes correct, answer is logically consistent, answer is complete)
B. GOOD (All statements about policy and outcomes correct, answer is logically consistent, but is not clearly argued.
C. MEDIOCRE (Some statements about policy or outcomes are incorrect and/or the answer lacks logical consistency and/or is unclear.)
D. UNACCEPTABLE (Policies and outcomes incorrect, not logically consistent, incomplete.)

CONCLUSION

Meeting course learning objectives and program level learning goals certainly involves content acquisition, but professors also seek to determine whether the student in the course can operate at higher cognitive levels. Multiple-choice exams can play a role in measuring both content and cognition in students especially if they are designed to cover a range of skills showing varying cognitive skills. Bloom's taxonomy provides a great framework for evaluating, revising, and creating multiple-choice exams that can assess such student achievement.

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TEACHER CHARACTERISTICS AND STUDENT LEARNING

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ABSTRACT

Establishing the determinants of teacher quality remains a difficult empirical proposition. Prior research suggests that high school teachers' subject knowledge and, separately, teacher attitudes towards their subject affect student learning. Because teacher knowledge and teacher attitudes are highly correlated, we disentangle these two effects. We survey high school economics teachers and their students primarily in South Carolina. Teacher economic knowledge positively and significantly affects student learning; teacher attitude has little or no effect on student learning. However, student test score gains of teachers volunteering to teach economics courses are similar in size to the effect of a comparable increase in teacher knowledge. Our results support interventions targeted towards enhancing teachers' understanding of economics and increased teacher control of course selection.

INTRODUCTION

Teacher quality is an important input in student achievement although identifying quality teachers is difficult without detailed panel data (Rivkin, Hanushek, and Kain, 2005). Research in economic education finds that teacher knowledge is one factor affecting student learning (Allgood and Walstad, 1999). In addition, there is suggestive evidence that teacher attitudes matter (Marlin, 1999).

This paper addresses the question of what makes a high school teacher an effective economics instructor. We consider two main possibilities: subject matter knowledge and attitudes towards teaching economics. The innovative feature is to analyze both possibilities simultaneously with good measures of both teacher knowledge and teacher attitude. We separate the two effects and compare the importance of each.

Attitudes and knowledge are highly correlated. For example, Schober (1984) suggests that teacher achievement affects teacher opinions about economics. Allgood and Walstad (1999), albeit with a small sample of 12 teachers, convincingly demonstrate that a teacher's economic knowledge or a teacher's economic thinking positively affects student performance. Marlin (1991) finds that students with teachers more enthusiastic about teaching economics score higher on measures of economic knowledge. Although Marlin controls for teacher experience in teaching economics, he is unable to control for teacher knowledge. Given the correlation in Schober (1984) between teacher attitudes and achievement, one could easily interpret Marlin's estimates on teacher attitudes as an effect of teacher knowledge on student achievement. Relatedly, Boex (2000) provides evidence that college instructors' presentation skills, which includes enthusiasm for the subject, are more important than their intellectual or scholarly nature in affecting student ratings of teacher effectiveness. Untangling the two effects requires good information on teacher knowledge, teacher attitudes, and student learning.

To test these relationships directly, we survey high school economics teachers and their students. Focusing on high school students is important in two ways. First, seventeen states include economics as part of the high school curriculum (NCEE, 2005). Second, the more economic knowledge students have, the more likely they are to study economics in college (Ashworth and Evans, 2001).

Teachers were assessed on their knowledge of and attitude towards economics. Teachers tested their students at the beginning and end of an economics course to provide a measure of student learning. We then estimate an empirical model of student learning on teacher knowledge and teacher attitudes. We find that better teacher knowledge consistently improves student learning. Teacher attitude, as measured by a survey, has a statistically insignificant effect on student learning. We explore an alternate measure of teacher attitude towards economics: whether the teacher volunteered to teach the class. This revealed preference measure of teacher attitude has a positive and statistically significant effect on student learning. The effect size is similar to that of teacher knowledge.

EMPIRICAL METHOD

We measure teacher knowledge and teacher attitudes towards economics using standard assessments. We then test how teacher attitudes and teacher knowledge affect student learning. We estimate Ordinary Least Squares (OLS) regressions of the following for student *i* in class *j*:

$$\text{post-test}_{ij} - \text{pre-test}_{ij} = \gamma\text{knowledge}_j + \phi\text{attitude}_j + \text{error}_{ij}$$

Our variables of interest are teacher *knowledge* and *attitude*. We expect both γ and ϕ to be positive and are interested in their relative magnitudes. To assess relative magnitudes, we standardize the measures of teacher knowledge and attitude to variables with a zero mean and a variance of one. The coefficients then reflect the effect of a one standard deviation change in that teacher attribute.

Much of the discussion on specification of economic learning models focuses on econometric difficulties in regressing the change in test scores (post-test minus pre-test) on various attributes versus regressing the post-test score on the pre-test score and various attributes (see Becker, et al, 1990 for example). Generally, the change score method is preferred; we follow this preferred approach.

Student gain scores are measured at the student level; teacher characteristics are measured at the teacher level. The regressions thus include a large number of observations for each teacher, exaggerating the amount of variation occurring in the teacher characteristics. To account for the correlation among students in the teacher characteristics, we cluster the standard errors by teacher. These regressions are similar to regressions using teacher-level data, weighted by the number of student observations.

DATA COLLECTION AND VARIABLE MEASUREMENT

We sent information packets to South Carolina teachers. We supplemented a list of economics teachers provided by the South Carolina Council on Economic Education with a search for social studies teachers at every high school in the state. In total, we mailed out 468 surveys to South Carolina teachers in April 2006. A second round of information packets were mailed in late July 2006 to 394 teachers. A total of 52 teachers agreed to participate; 41 of these fully completed their participation. Some teachers participated in more than one quarter or semester of classes. Teachers were compensated $100 upon completion of participation; some teachers were compensated more than once if they participated in more than one quarter or semester.

Teachers completed the Survey of Economic Attitudes (SEA) and the Test of Economic Literacy (TEL) at the beginning of their economics course. The TEL is a nationally-normed high school level assessment that provides a pre- and a post-test. Teachers administered Form A of the TEL to their students at or near the beginning of the course; they administered Form B of the TEL to their students at

or near the end of the course. These two tests provide a measure of student learning during the course. Teachers also completed a demographic survey.

The first part of the SEA, the Attitudes towards Economics (ATE) section, measures teacher attitudes towards economics using fourteen questions with responses on a five-point Likert-type scale. These questions include such items as "Economics is dull" and "I would be willing to attend a lecture by an economist". Respondents note whether they strongly agree, agree, are undecided, disagree, or strongly disagree. Soper and Walstad (1983) provide reliability statistics for the ATE. The Cronbach Alpha of 0.88 for the ATE demonstrates good internal consistency; Soper and Walstad (1983) report a low standard error of measurement of 3.18.

Both assessments, the ATE and the TEL, are designed by the National Council on Economic Education (NCEE). They are used frequently in student and teacher assessment and research into student achievement (see, for example, Dutkowsky, Evensky and Edmonds, 2006; Walstad and Rebeck, 2001; or the summary in Becker, Greene, and Rosen, 1990). The raw scores for the teachers are presented in Table 1.

Table 1: Summary Statistics for Teachers and Students

	Mean	St. Dev.	Min	Max
Teacher Characteristics (N=41)				
TEL	35.02	6.03	16	40
ATE	59.95	7.54	42	70
Students taking economics	47.46	33.09	2	178
Teacher's Age	46.69	10.27	25	60
Years Teaching	18.14	10.77	2	38
Years Teaching Economics	10.31	6.85	0	26
Percent of teachers that:				
chose to teach economics	56.10%			
are male	45.00%			
are white	87.80%			

Table 1: Summary Statistics for Teachers and Students				
	Mean	St. Dev.	Min	Max
have their highest degree as:				
Masters	77.50%			
Doctorate	2.50%			
Student Characteristics (N=1,946)				
DTEL	3.89	5.54	-16.511	23.729
pretest TEL	17.48	6.65	-0.009	36.711
posttest TEL	21.37	7.28	3	40

On average, teachers preformed quite well on the TEL averaging 35 questions right out of forty. There is a large variance in teachers' performance ranging from 16, below the average for students who've taken some economics, to a perfect score. The national average score on the TEL Form A for those without economics is about 19 out of 40; the average score with economics is about 25 out of 40 (Walstad and Rebeck, 2001).

For positive statements about economics the ATE is scored as follows: if a teacher strongly agrees with the statement, we assign that answer a 5; agrees receives a 4; undecided, 3; disagrees, 2; and strongly disagrees, 1. For negative statements, strongly disagrees receives a 5 and so on. Possible scores on the ATE range from 14 to 70. Teachers averaged a score of 60 ranging from a low of 42 to the maximum of 70.

We consider an alternate measure of teacher attitudes: how teachers are assigned to economics classes.[1] About half of the teachers in our sample (56%) report choosing to teach economics. The principal or department head assigned the remaining teachers to the economics course. Teachers' revealed preference in their choice to teach economics may better reflect their enthusiasm in the classroom, as compared to the survey-based measure of their attitude towards economics.

The previous research on teacher attitudes focuses on enthusiasm. Marlin (1991), for example, used a three-choice rating of teacher enthusiasm for teaching economics in his study of teacher attitudes. Patrick, Hisley, and Kempler (2000) discuss how more motivated teachers may be more effective at eliciting student motivation and thus, student learning. In a psychology experiment, they manipulate teacher enthusiasm and show that students lectured by more enthusiastic teachers are more interested in learning more about the topic.

Choosing to teach economics is positively correlated with teacher scores on the ATE. Teachers choosing to teach economics scored 62 on the ATE as compared to a score of 57.4 for those assigned to teach economics. This reflects a little more than one-half of a standard deviation change in the ATE.

Table 1 also presents summary statistics of the sampled teachers' characteristics. On average, each teacher submitted scores for 47 students. Many teachers submitted scores for more than one class during a semester or for more than one class during the school year. The average teacher is aged 46 with 18 years of experience teaching and 10 years of experience teaching economics. Teachers in the sample are 87.8 percent white and 44 percent male. 78 percent of the teachers have a Master's degree; one teacher has earned his doctorate.

The sampled teachers are somewhat comparable to an average social studies teacher in South Carolina (authors' calculations from the Schools and Staffing Survey, 2003-2004). On average, South Carolina social studies teachers have taught in public schools for 13.9 years and are 41 years old. Among these teachers, 88.8 percent are white and 58.3 percent male. 56.5 percent of South Carolina social studies teachers have a Master's degree.

Our sampled teachers are somewhat older, more educated, and more experienced than the relevant average teacher. Also, their high scores on both the ATE and TEL reflect the higher than average interest these teachers expressed by choosing to participate. We keep this revealed preference and sample selection in mind when considering our results.

Among our economics teachers, about 30 percent of them majored or minored in economics. Fully one-third have attended an NCEE or state training session. Again, this high rate of participation likely reflects the sampled teachers' interest in economics and willingness to participate. More than 40 percent use NCEE materials in their classroom.

For the 41 teachers in our sample, we standardize their scores on the ATE and TEL to be mean zero and variance one. This allows us to compare the magnitudes of the effects of these teacher qualities on student learning.

Teachers used Form A of the TEL to assess students at the beginning of the course and Form B at the end of the course. We convert the Form A scores to a scale comparable to Form B as suggested by the TEL Examiner's Manual. The outcome of interest is student learning: the change in students' scores between the post-test and the pre-test. On the pre-test, students, on average, correctly answered 17 of the 40 questions; on the post-test, students, on average, correctly answered 21 of 40 questions. In our sample, both the pre-test and post-test scores are lower than the

national averages. The national average on Form A of the TEL for students without economics is 19.05; the national average on Form B of the TEL for students with economics is 25.74 (Walstad and Rebeck, 2001). The average change in test scores for our sample was 3.89. The difference in the national averages is about 6.7 questions. The gain in test scores is also smaller than the difference between the national averages.

SPECIFICATION ISSUES

Other factors may affect student test scores. Becker, Greene, and Rosen (1990) enumerate the factors that may affect student learning of economics: student ability, teacher ability, course work, technology, demographics, and time usage. Females and blacks tend to perform worse than males and whites in college economics courses (Dynan and Rouse, 1997 and Borg and Stranahan, 2002). Class size may affect student performance (Arias and Walker, 2004). The evidence on the effects of instructor gender is mixed: Robb and Robb (1999) and Dynan and Rouse (1997) find no effect of gender on college student performance while Ashworth and Evans (2001) find that female secondary teachers increase the likelihood of studying economics in high school. Klopfenstein (2005) finds same-race effects for black math achievement.

Our limited sample of teachers precludes including many control variables including teacher characteristics. In addition, data limitations prevent us from including student characteristics such as race or sex.[2] For these exclusions to bias our estimates, the omitted variables must be correlated with teacher knowledge or teacher attitude. For example, if better prepared or more positive instructors are matched with students who learn more quickly, this would bias our estimates upwards.

We check for indications of this bias although the limited sample size makes it difficult to control for those factors. We split the sample at the median of the teachers' TEL scores. The average student's pre-test score for the top half of teachers is 18.62 versus 16.03 for the average student of a teacher from the bottom half. Students with higher pre-test scores tend to be taught by higher scoring teachers. Students with higher pre-test scores also tend to be taught by teachers with higher ATE scores. For a teacher scoring in the top half of teacher's attitudes, the average student pre-test score is 17.80; for a teacher in the bottom half, the average is 16.95.

If students that would have learned more regardless of their teacher are matched with higher quality teachers, this selection would bias the effects of teacher quality upwards. In this case, we observe that students with higher pre-test scores learn less, on average, than students with lower pre-test scores. The above median student experienced test scores gains of 2.6 points; the below median student gained 5.4 points. This difference isn't driven by ceiling effects; less than one percent of students correctly answered 38 or more of the 40 questions on the post-test.

Since high pre-test students are matched with higher knowledge teachers and high pre-test students have smaller growth in their test scores, this suggests that teacher-student matching may bias downwards the estimated teacher knowledge coefficients. This makes it more difficult to find effects of teacher knowledge on student learning. Similarly, teacher-student matching may bias downwards the estimated teacher attitude coefficients.

Higher pre-test scoring students tend to be matched to teachers who did not volunteer to teach economics, although this difference is not statistically significant. The average student pre-test score for a teacher choosing to teach economics is 17.32; the average student pre-test score for a teacher assigned to teach economics is 17.67. As lower pre-test students tend to have higher gain scores and are matched with assigned teachers, this suggests a potential downward bias in the coefficient estimate on whether a teacher choose to teach economics.

RESULTS

Figure 1a presents mean changes in student test scores by teacher scores on the TEL and ATE. Teachers with below median scores on the TEL taught students with smaller gains in test scores; this difference is statistically significant. Among the lower knowledge teachers, having a higher score on the ATE does not correlate with higher student test score gains. Among the higher knowledge teachers, a higher score on the ATE correlates with somewhat high student test score gains.

Figure 1b uses whether a teacher volunteered to teach economics as the measure of teacher attitude. Teachers choosing to teach economics taught students with significantly larger gains in test scores; this difference is statistically significant. This difference is particularly large for the lower knowledge teachers. However, for both the below and above median knowledge teachers, choosing to teach economics corresponds to statistically significantly higher test score gains.

Figure 1a: Mean changes in test scores by teacher characteristics

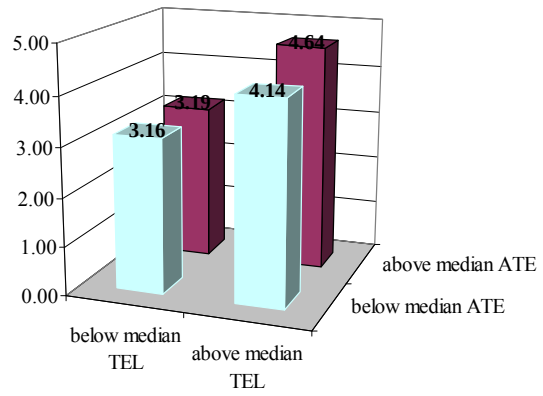
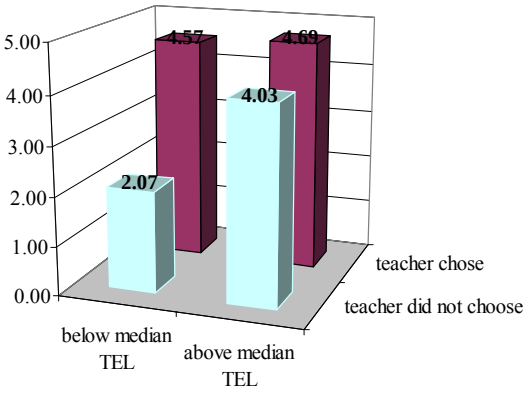


Figure 1b: Mean changes in test scores by teacher characteristics



We estimate a regression of the change in student test scores on the teachers' standardized TEL and ATE scores. Regressions include 1,946 students in 41 teachers' classes. Table 2 presents the results.

Table 2: Regression results of students' change in test scores on teacher ability and attitude toward economics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	students' change in test scores on TEL						
teacher's TEL (z-score)	0.753*	0.655*	0.684*	0.602	0.681*	0.671*	0.645*
	(1.79)	(1.72)	(1.71)	(1.58)	(1.72)	(1.77)	(1.80)
teacher's ATE (z-score)	0.395						
	(0.71)						
teacher chose		1.477**	1.131*	1.110*	1.202*	1.169	0.223
		(2.09)	(1.69)	(1.70)	(1.80)	(1.68)	(0.43)
male teacher			-1.165*	-1.142*	-0.765	-0.645	-0.392
			(-1.78)	(-1.78)	(-1.17)	(-0.85)	(-0.59)
white teacher			0.0681	-0.0203	-0.755	-0.851	-1.013
			(0.070)	(-0.019)	(-0.67)	(-0.76)	(-0.87)
years teaching economics				0.0583	0.0561	0.0548	0.0734**
				(1.30)	(1.30)	(1.28)	(2.03)
economics major or minor?					-0.906	-0.933	-1.264
					(-1.30)	(-1.31)	(-1.56)
Attended NCEE or state training?						0.390	-0.518
						(0.43)	(-0.71)
Use NCEE materials?							2.266***
							(3.17)
Constant	3.713***	2.957***	3.613***	3.039**	3.717***	3.667***	3.530***
	(9.57)	(7.08)	(3.83)	(2.67)	(3.28)	(3.42)	(3.12)
R-squared	0.02	0.03	0.04	0.05	0.05	0.05	0.07

Robust t statistics in parentheses. Standard errors clustered by teacher. * significant at 10%; ** significant at 5%; *** significant at 1%. There are 1,946 students in the sample and 41 teachers.

The first column presents the estimates of changes in test scores on the standardize measures of teacher knowledge and teacher attitude (from the ATE). This column echoes the pattern shown in Figure 1a. Students taught by a teacher with economic knowledge one standard deviation above the mean experience an additional increase in their scores of a little less than one question. This reflects

about a 19 percent increase in their test score growth. Controlling for teacher knowledge, teacher attitude as measured by the ATE has a small and statistically insignificant effect on student test scores. The effect of teacher knowledge is about twice as large as that of teacher attitude. These estimates support previous research showing that teacher knowledge increases student learning. The existing evidence on teacher attitudes is thin; our evidence merely corroborates its thinness. Given the potential upward bias on teacher attitude, there seems to be little effect of teacher attitude, as measured by the ATE, on student learning. We focus on the other measure of teacher attitude in the remaining regressions.

The second column presents the estimates of changes in test scores on the teacher's score on the TEL and an indicator variable for whether the teacher chose to teach economics. The second column echoes the pattern shown in Figure 1b. Teachers with more knowledge correlate with increased student learning; teachers choosing to teach economics also correlates with increased student learning. The effect of a teacher volunteering is large, amounting to about 38 percent of average student test score gains. Both teacher characteristics have a statistically significant and economically relevant effect on student test score gains.

The third column adds two teacher demographic variables to the specification: an indicator for whether the teacher is male and one for whether the teacher is white. Male teachers experience significantly lower gains than female teachers with their students gaining, on average, one less question from pre-test to post-test. The coefficient on the white dummy variable is small, positive, and statistically insignificant. Further, including these demographics has little effect on the estimated coefficients on teacher knowledge or whether the teacher chose to teach economics.

We include teacher experience in column (4). Teachers with one more year of experience teaching economics have students with slightly higher test score gains; the estimate is small, less than a tenth of a question, and statistically insignificant.

The last three columns of Table 3 include controls that may reflect teacher knowledge or teacher interest in economics. In column (5) we include an indicator variable for whether the teacher was an economics major or minor in college. Economics majors or minors instruct students with smaller test score gains, although the difference is not statistically significant. Column (6) adds an indicator variable for whether the teacher has attended a NCEE or state training session. Column (7) includes an indicator for whether the teacher uses NCEE materials in his or her class. The coefficient on the training session is statistically insignificant and changes

sign when we include the materials indicator variable. The students of teachers using NCEE materials experience much greater test score gains.

Including the last set of variables, particularly the use of NCEE materials, reduces both the magnitude and the significance of the estimated coefficient on whether the teacher chose to teach economics. These two variables are highly correlated ($\rho = 0.5342$): teachers who chose to teach economics also typically use NCEE materials in their classroom.[3] Further, including these variables reflecting economics training reduces the magnitude and the significance of the male variable; any effect of teacher gender appears to be driven by their varying backgrounds in economics.

CONCLUSIONS AND POLICY IMPLICATIONS

We find that teacher knowledge of economics is an important determinant of student learning. Teacher attitude towards economics, as measured by the first part of the Survey of Economic Attitudes, has a small and statistically insignificant effect on student learning. However, teachers choosing to teach economics experience greater student test score gains. These volunteering teachers likely exhibit more enthusiasm for the class. The effect of teachers choosing to teach economics and teacher knowledge of economics are similarly sized and statistically significant.

These results suggest two things. First, that much emphasis, correctly, has been placed on improving teacher economic knowledge and providing teachers with materials for their economics courses. We encourage the continued development of materials and interventions focused on improving teacher understanding of economics. In fact, the use of NCEE's materials appears to improve student learning. Second, reconsidering how teachers are assigned to economics classes may alleviate some of their anecdotal distress and improve student learning in the process. To the extent allowed by resource constraints, our results suggest that allowing teachers increased control over the classes taught could improve student outcomes.

ACKNOWLEDGMENTS

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ENDNOTES

[1] We thank Andrew I. Kohen for this suggestion.

[2] To satisfy the Institutional Review Board's Exemption category for human subjects research, we opted not to collect student-specific demographic information. A full IRB review outside the exempt categorization would require parental permission for each student, likely further limiting our sample size.

[3] Results are qualitatively similar when using the teachers' ATE scores instead of the teacher chose variable.

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STADIUM ATTENDANCE FOR BASEBALL: A CASE STUDY

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Lee Van Scyoc, University of Wisconsin

ABSTRACT

We examine stadium attendance for the Mallards baseball team, a non-professional, summer collegiate baseball team in the Northwoods League in Madison, Wisconsin. Not only can this analysis be used in a principles course as a case study to explain demand shifts in a perfectly elastic supply situation, it also highlights this team's unique experience of having game attendance at a rate far exceeding any other team in their league, even surpassing that of some major league baseball teams.

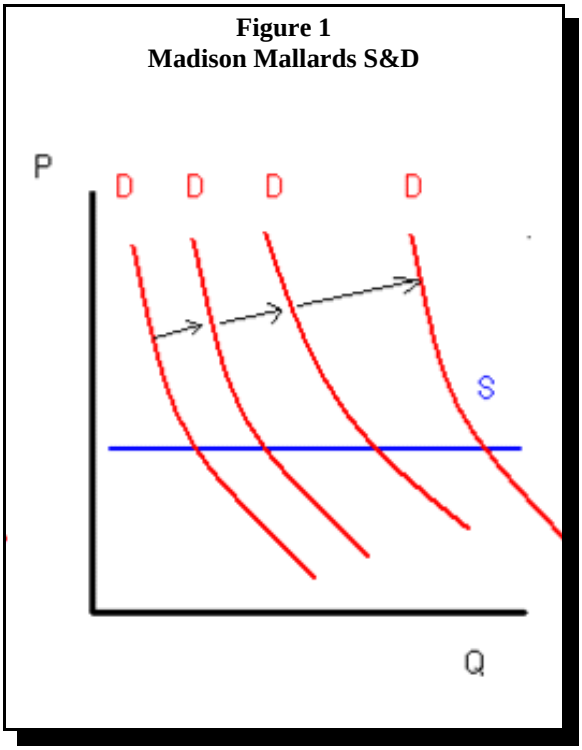
INTRODUCTION

Teaching a principles of economics course leads inevitably to an exposition of Supply and Demand curves and their elasticities. Many of us struggle to find real world examples of the polar cases (perfectly elastic demand or supply) to present to our students. In this paper, we have developed a model using perfectly elastic supply in stadium attendance for a local non-professional baseball team. The team under consideration here is the Madison Mallards, which played for the first time in 2001. Since that time, it has never raised seating prices and does not sell out games, leading to a situation of perfectly elastic supply (see Figure 1).

This example becomes one in which we examine Demand shifts to determine the increases in attendance. Among the demand factors that could be pushing demand, the traditional factors of area population, area income, alternative choices, and 'tastes' need to be considered. As the prices of alternative entertainment choices did not vary in any significant way in this area during the time period in question (we looked at movie ticket prices, etc), that option was discarded. When we look at 'tastes' for entertainment, a class discussion regarding why a person (or family) might choose an amateur league baseball outing over other

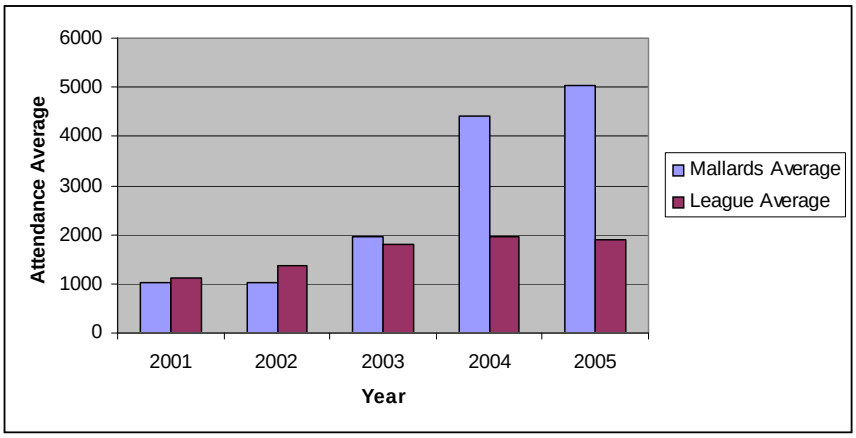
choices can be quite illustrative. For example, choosing an outdoor entertainment choice over, say, going to a museum or library, the weather could play a role. Sports economics would suggest that the team's performance record should matter, as most people prefer to witness a 'win' by the home team rather than otherwise, so team stats should have some explanatory power here. Though if that were the only factor pulling fans, one would expect that higher levels of play in the Major leagues would draw substantially larger crowds. Our analysis of their attendance explores not only the traditionally accepted explanatory variables of performance outcome and environmental concerns common in Sports Economics (see Rasher, 1999 among others) but also the various types of promotions used by the Mallards' ownership to attract patrons. It is this last set of variables that prove to be highly instrumental in explaining attendance – providing a lesson perhaps for other teams.

Figure 1
Madison Mallards S&D



We examine the attendance record of this team since its inception in 2001 and covering the subsequent 153 home games. We note that this team's experience is unique in that it attracts fans far in excess of what would be expected given the league in which it plays. Indeed, Figure 2 shows the Mallards attendance figures compared to the league average.

Figure 2: Madison Mallards vs. League Average Attendance, by year



Source: Northwoods League, Media Guide, Johnson Printing, 2006.

It is clear that there is something unusual about the Mallards as a team and their ability to draw fans. Therefore, this paper examines the Mallards Stadium attendance not only as a stand-alone example of Supply and Demand, but through the precepts of Sports Economics, a fast-growing sub-discipline of economics that has set precedent for studies of this type.

The Mallards play in the Northwoods League of non-professional Spring season baseball using college level players seeking to gain league experience without losing their collegiate eligibility. This team plays in its own stadium near the community of Madison, WI, a community far from bereft of entertainment possibilities. Indeed, there are even two local farm teams (the Beloit Snappers and the Wisconsin Timber Rattlers) that play within a reasonable driving distance of the Mallards, as well as the Milwaukee Brewers major league team. In 2001, the Northwoods League consisted of seven teams besides the Mallards. Since then, the league has expanded twice, for a total of twelve teams. Within this league, the

Mallards are something of an attendance phenomenon. During their first year in the league, they had their smallest total attendance, placing them at the midway point in the entire league. By their second season they were the top drawing team, and continue to rank with the highest overall attendance in their league (Figure 1, above). Compared to professional teams, the Mallards' attendance is not insignificant either. For example, out of the more than 175 affiliated farm teams that played in 2005, the average attendance of the Mallards was higher than that at all but the top 35 teams, putting them in the top 20% of those teams. Further, the Montreal Expos' (National League, professional team) average attendance was 9,356, while the Mallards actually had a few games with higher attendance. Indeed, there were several games played by the Montreal Expos with lower attendance than the Mallards in 2004.[1]

LITERATURE

We investigate the demand for home games using attendance figures for a team that has, by all measures, defied the standard wisdom that would predict low fan turnout, as its win/loss record is hardly anything unusual. Indeed, the team we are studying regularly has stadium attendance that has occasionally topped that of Major League Baseball Teams. How they manage to achieve such a feat, is the goal of this paper beyond just estimating just another stadium attendance model. We follow the existing literature for such models before widening our approach to the inclusion of other variables.

Current work in the field of Sports Economics includes primarily econometric studies that examine the 'usual suspects' to explain fan turnout: age of stadium, quality of play, price of ticket, and so on tend to be the factors in question. For instance, Rascher (1999) shows such a model using winning percentages as well as environmental components (day of the week, temperature, area economic data, etc.) and finds that he is able to explain between 60% and 75% of attendance for Major League baseball during a single season (1996). This study, being league-wide, means that regional variances in fan tastes had to be taken into consideration, done mainly by Rascher using racial composition of the various localities. This is somewhat troublesome as there can be wide differences in fan loyalty in any particular location due to other effects than race. Indeed, in our study we find that game attendance rises from an average of just over 1,500 fans per game in 2001 to over 5,700 fans per game in 2005 with essentially no change in racial composition of the area.

Butler (2002) estimates baseball demand using more definitive environmental data than Rascher. We follow Butler's precedent using precipitation as well as temperature and day of the week rather than just 'weekend' or 'night' game dummy variables.

Clapp and Hakes (2005) concentrate their analysis on stadium amenities, age in particular to explain fan demand. They find, using data over more than a half century, that new stadium effect wane quickly, on average diminishing to nearly zero in as little as two years. Our data demonstrates such dramatic increases in attendance, in a continuing upward direction over the entire sample period, that we feel fairly confident in omitting stadium age from our model as Clapp and Hakes suggest that any affect from stadium age would be long gone by the time our sample concludes.

Coates and Harrison (2005) examine the effects of an outcome based quality assessment on the part of fans for baseball stadium seat demand. They find that team success is a large factor in attendance, regardless of such extraneous negative influences (such as the strike in Major League Ball) or stadium age.

For some time, authors have sought to explain game attendance with the 'star' factor or with the potential for a closely played game by looking at probability of winning a given game or stats on a particular player or on the game starters. For instance, Scully (1989) finds that games that have a high probability of either team winning *even when the* ***home*** *team was likely to win* had lower attendance than those games that were thought to be more closely contested, prompting leagues to institute rules that had the outcomes of 'leveling the playing field' as it were. Several authors, studying the demand for sports attendance, use team quality in one way or another for analyses of this sort. We follow many of these by looking at quality with an outcomes based assessment method such as that used by Scully (1989) or Coates and Harrison (2005).

Leventhal (2000), attempts an overview of generalized factors of fan loyalty. For instance, the quality of play comes into question when the winning percentage or existence of 'stars' in such studies as Butler (2002) and Zimbalist (2003). Other studies look at ticket pricing such as those by Noll (1974) and Salant (1992), though in our study ticket pricing did not vary over the period and, given rather low levels of inflation, alternative entertainment pricing also didn't vary enough to warrant inclusion in our model. Research in the field has a long standing tradition of assuming some unmeasurable motivation behind fan loyalty determined by locality or tradition that makes comparisons across teams less empirically satisfying than theory might suggest (see particularly Porter (1992) and Owen

(2003)). Because of that, we feel that our case study approach is justified rather than attempting to examine the disparities across teams within the relatively small league within which the Mallards play.

From our initial perspective, we realized that many of the standard explanations of fan turnout would not prove particularly satisfactory with the team we are studying. The Mallards are a member of the Northwoods League that uses only college players: In order to maintain NCAA (college) eligibility, these players cannot receive pay of any kind. Hence, the level of play is not the same as one would expect out of a professional league. Indeed, there are few if any with name recognition of any sort (they recruit players nationwide, rarely relying on local teams for players so that the fans are not previously acquainted with 'stars' or even 'personalities' of the players). They play at Warner Park, a stadium that is neither new nor luxurious by any standard.

Furthermore, the entire roster changes from year to year so that there is little 'carry-over' due to any particular player or line-up. Ticket prices for the Mallards are very near to those charged by any other team of similar caliber and exceed those of local college or high school teams that would provide 'home town heroes.' Indeed, we have ascertained that the Mallards do very little direct advertising other than having a web presence and hosting local radio personalities in order to gain word of mouth excitement. Therefore, we realize that several of the standard measures of player or team quality are likely to even be recognized much less act as impetus for attendance.

So, what is different about the Mallards? Why do they so far exceed the attendance figures of every other team in their league and of teams in leagues far and away superior to them? We decided to investigate all of the standard variables so often at the center of studies of this type, but also to add in several other environmental factors.

DATA

Our data comes from the all home games of this team, since its inception in 2001 through 2005 (about half of all games played by this team). Game attendance, box scores, and other game data were provided to us directly from the head office of the Madison Mallards. Table I shows the area data on population and median income, along with game day average for weather.

After speaking at length with the management of the team, we came to believe that the Mallards offered something rather special, perhaps even unique, in

baseball. One of the most eye-popping examples of this difference was demonstrated by a picture found on their website. In this picture, the game was in progress (a game they ultimately lost by the way) and the aerial photograph showed an area of the 'picnic' lawn (an area where fans can lounge in the grass) full of fans – *but the area has absolutely NO view of the ongoing game*. Given that there is free admission to nearby community parks, why would these people pay to sit on the grass in a baseball stadium where they can't even view the game? The Mallards have made a mission of providing family oriented entertainment at reasonable prices. They make a practice of offering different promotions (give-aways or other attractions like autograph signing by visiting celebrities, fireworks etc.) at *every* game, quite unlike the standard practice of occasional promotions practiced by their competition.

The management is extremely sensitive of the family environment of their stadium and offers several areas for families to enjoy their time during the game. They even offer a family special area with a one price admission to a play area. The owner suggests:

> Here you come in, have a playground, (free) bounce house, speed pitch, chase foul balls and get a free hot dog, sit on the hill to talk and run - not to watch baseball. So your 4 year old has something to do. So why go here instead of a park? Take an inning off or so? Yes, especially for the standing room only nights. Watch for a while and then run around on the hill. 50-100 kids chasing foul balls behind 1st base, so it is a social thing, more than at a park. Have a tail gate area – 2 tents behind first base with up to 1,500 people, reserved seats, pregame food and some groups never left the tent – stayed and talked rather than go to seats - - can hear the game/announcer who is funny. Just people watching is fantastic – coeds to families, to little kids to retired people… my wife loves to watch people. No better place to do it than right here.

Clearly, this team offers something special, something other than ordinary baseball viewing. We delved into this difference during a series of interviews with the owner and other head office personnel. Even during the first such interview, it became clear that the Mallard's approach to team promotion was different from other teams. Though there was, and is, emphasis placed on winning games and the division, management is highly cognizant of their fan base. They have a very strong belief that many of their fans come out to the park for family entertainment, all inclusive of the game as well as all entertainment during, before, and after the players take the field. To quote:

> Baseball is number one, family atmosphere, affordable tickets, giveaways…one not more important than anything else. If it was just baseball, we would only have 1,000 a night, but we do other things while keeping baseball important.

Indeed, management has a very clear idea of which promotions are most successful. They believe that the family oriented promotions, such as fireworks, give-aways exclusively for children (such as bats, hats, or dolls, for instance) draw more fans than those more adult oriented promotions. When asked about the most popular forms of non-baseball entertainment, the immediate response was

> Fireworks… everyone else says so too and they are right. First show in June for Fireworks, looking at Friday and Saturday (first fireworks) had twice as many as Friday when usually we do better than Friday…

The more adult oriented promotions include some of the standard adult fan oriented give-aways (such as calendars, schedules, beer steins, etc.) as well some very creative schemes that may well have been unique to the Mallards. One such promotion was the give-away of one free nose job, though management was quick to assure the authors that this particular give-away was actually quite well received, there were other promotions that did not work as well. According to the owner, the worst promotion was "Singles night. Sell seats to opposite sexes every other seat. Didn't work…" In that particular scheme, all of the single seat sales for that game were doled out on the basis of the gender of the purchaser (not only a logistical nightmare, there were too few women buying individual seats, making many male purchasers end up with less desirable seats). Perhaps because of these opinions, the team has been offering more family oriented promotions in recent years. Our model tests whether this bias toward family promotions does indeed draw more fans than the more adult oriented promotions.

Management also provided information on the cost of promotions, the most expensive single 'item' being fireworks at approximately $2,000 for one event. Fireworks, as well as other promotions that act as localized 'public goods' (such as musical acts), were valued simply as their total cost. Individual give-aways were valued individually, with the number of items given, to determine the total cost. For instance Bobble-head dolls being the priciest per item (at approximately $4 each), but they were only awarded to the first 250 fans, making the total cost of the give-away for that game $1,000. Several of the give-aways were free to the team, as they were provided by sponsoring entities, those too were valued at the price to the *sponsor* rather than to the team. Our study includes both the type of promotion offered at each game (family oriented or not) and the value of these promotions. Season summaries of these variables can be found in Table II.

Table I: Environmental Data – by Season, 2001 to 2005				
Season	Median Income	CMSA Population	Weather (Rainfall, gameday average)	Temp (gameday, average)
2001	50,776	212,099	.19	68.5
2002	51,230	215,414	.03	71.4
2003	52,216	217,815	.11	68.7
2004	52,918	220,332	.10	67
2005	53,582	223,131	.03	70.4
Source: Weather and Temperature from National Weather Service Forecast Office, www.crh.noaa.gov/mkx/climate. Population and Income data from the US Census Bureau, County QuickFacts, www.quickfacts.census.gov/qfd/states				

Table II: Promotion Characteristics by Season – 2001-2005					
Promotion Characteristic	2001	2002	2003	2004	2005
Average Promotion Cost	215.59	384.39	1172.48	1906.47	1372.06
% Family Centered Promotion (KID PROMOTION)	.41	.48	.57	.4	.53
Source: Madison Mallards home office.					

METHODOLOGY

Following past research in this field, we first look at a model of attendance very like those done previously: One assuming the demand for a particular game has the form

$$ATT = aT_h + bT_a + other$$

Where ATT is the attendance of home games, T is a vector of talent variables, h being the home team and a being the away (or visiting) team. We expect that a>b as fans are more likely to both be more aware of the home team's talent and be more likely to attend based on the quality of the home team than the visitor, all else being equal. Rather than using a sort of 'past predicts the present' sort of talent analysis, we employ an outcomes based fan analysis. For instance, rather than looking at a composite variable of earned errors over the

past several games, we look at the string of wins over the most recent games and the current game outcomes. In that way, we are presuming that fans are capable of gathering and assimilating information in a more accurate way than impressing, say, a Koyck distributed lag on the data. We also look at the square of the difference between the talent variables across teams, as is also common in the literature. The other variables included in our work include those common in the literature, such as game and environment characteristics such as day of the week, temperature (deviation from expected norm), precipitation, area population and area median income. This leads to Model 1.

Model 1:

$$ATT = CONSTANT + a\,AB_h + b\,R_h + c\,H_h + d\,BI_h + e\,E_h + f\,IP_h + g\,ER_h + h\,AB_a + i\,R_a + j\,H_a + k\,BI_a + l\,E_a + m\,IP_a + n\,ER_a + o\,(AB_h-AB_a)^2 + p\,(R_h-R_a)^2 + q\,(H_h-H_a)^2 + r\,(BI_h-BI_a)^2 + s\,(E_h - E_a)^2 + t\,(ER_h-ER_a)^2 + u\,(IP_h-IP_a)^2 + v\,WINSTRING + w\,WIN + x\,WTR + y\,DEPARTURE + z\,AVERAGE + aa\,POPULATION + ab\,INCOME + (error)$$

Where lower case letters are coefficients, subscripts refer to either the Mallard (h) or visiting team (a). Table III summarizes the variables.

Table III: Variables

Variable Name	Definition	Variable Name	Definition
ATT	Stadium Attendance	CONSTANT	Constant term
AB	At bats	WINSTRING	Length of winning string do date (if last game lost, =0)
R	Runs	WIN	=1 if Mallards win
H	hits	WTR	Weather: Precipitation amount
BI	Runs batted in	DEPARTURE	Departure from expected temp
E	Errors	AVERAGE	Average temp. expected
IP	Innings Pitched	POPULATION	Area population
ER	Earned runs	INCOME	Area income
KidPromo	=1 if promotion family oriented	DBL	=1 if game double header
Day	=1 if Monday, =2 if Tuesday, etc.	NETSCORE	=Mallard Runs – Visitor Runs
WINLASTGAME	=1 if last game won		

In our second model, we include variables that further define the game environment – in particular those identified by management as being important to attendance (as specified during the interview process). Far from being such variables as those already identified in the literature, such as 'star power' of various players, or team history, management highlighted game promotions. These promotions are broken down into those oriented specifically for family/child entertainment versus adult oriented promotions. Family or child oriented promotions were such things as bats for kids under 14, bobble-head dolls for kids under 14, or fireworks shows at the game's conclusion. Adult oriented entertainment, included such events as live music performed in the stadium, or 'singles night' (where seats were sold to opposite sexes in alternating order), or even 'nose job night' (winner gets all expense paid nose job). Furthermore, we identified the approximate cost of each promotion, from the point of view of the fan.[2] Hence, we come to model 2.

Model 2:

$$ATT = CONSTANT + a\,AB_h + b\,R_h + c\,H_h + d\,BI_h + e\,E_h + f\,IP_h + g\,ER_h + h\,AB_a + i\,R_a + j\,H_a + k\,BI_a + l\,E_a + m\,IP_a + n\,ER_a + o\,(AB_h - AB_a)^2 + p\,(R_h - R_a)^2 + q\,(H_h - H_a)^2 + r\,(BI_h - BI_a)^2 + s\,(E_h - E_a)^2 + t\,(ER_h - ER_a)^2 + u\,(IP_h - IP_a)^2 + v\,WINSTRING + w\,WIN + x\,WTR + y\,DEPARTURE + z\,AVERAGE + aa\,POPULATION + ab\,INCOME + ac\,KIDPROMO + ad\,PROMOCOST + ae\,DBL + a\,f\,DAY + (error)$$

Where variables are as described in Table III.

To determine just how important the stadium specific promotions are, we develop Model 3. It is designed around the casual fan who may know little about baseball and is only looking for an outing. Hence, we limit the explanatory variables to those that might be easily discovered to a non- aficionado, removing all of the talent variables but including the environmental and promotional variables as well as the 'winning string' (based on the concept that even casual fans love a winner). This brings us to Model 3.

Model 3:

ATT = CONSTANT + a WINSTRING + b WIN + c WTR +d DEPARTURE + e AVERAGE + f POPULATION +g INCOME + h KIDPROMO + i PROMOCOST + j DBL+ k DAY + l NETSCORE + m WINLASTGAME + (error)

Where variables are as described in Table III.

RESULTS

Our three models' results are shown in Table IV. Of particular interest is the fact that Model 3, without any talent variables at all, can show significance stunningly close either of the other two models, bearing out the Mallard's own perceptions of the importance of the environmental variables in determining fan attendance. Model 1, using the traditional variables dealing with team performance meets the explanatory power suggested by Rasher (1999) of 60-75%, and the inclusion of data on team promotions pushed the explanatory power significantly higher to nearly 80% in Model 2. A brief look a the F statistic of these models suggests that eliminating the vast preponderance of the performance variables does little damage to the resulting explanatory power of the regression, flying the face of traditional Sports Economics analysis but fully supporting the team's management perspective of the importance of promotions to attendance.

Table IV: Empirical Results
Dependent = ATTENDANCE

Variable	Model 1	Model 2	Model 3
Constant	-87741 (t=12.1)	-82056 (t=12.31)	-81710 (t=-12.84)**
AB_h	-56.38 (t=.11)	-60.04 (t=1.14)	
R_h	276.18 (t=1.69)	197.89 (t=1.34)	
H_h	-48.09 (t=.78)	-32.61 (t=.582)	

Table IV: Empirical Results Dependent = ATTENDANCE			
Variable	Model 1	Model 2	Model 3
BI_h	26.14 (t=.14)	81.07 (t=.47)	
E_h	-95.59 (t=.97)	-90.10 (t=.941)	
IP_h	697.11 (t=2.19)**	665.88 (t=2.34)**	
ER_h	.712 (t=.006)	7.70 (t=.072)	
ABa	-19.13 (t=.325)	-3.16 (t=.060)	
R_a	-64.06 (t=.423)	-50.11 (t=.37)	
H_a	75.52 (t=1.11)	56.05 (t=.91)	
BI_a	15.37 (t=.098)	38.84 (t=.28)	
E_a	-10.11 (t=.098)	-19.18 (t=.206)	
IP_a	-342.25 (t=1.097)	-306.73 (t=1.27)	
ER_a	-188.90 (t=1.377)	-186.19 (t=1.51)	
$(AB_h\text{-}AB_a)^2$	-1.14 (t=.22)	-3.39 (t=.723)	
$(R_h\text{-}R_a)^2$	23.75 (t=1.86)	21.47 (t=1.87)	
$(H_h - H_a)^2$	-4.30 (t=.681)	-3.95 (t=.684)	
$(BI_h\text{-}BI_a)^2$	-18.22 (t=1.22)	-15.05 (t=1.14)	

Table IV: Empirical Results Dependent = ATTENDANCE			
Variable	Model 1	Model 2	Model 3
$(E_h-E_a)^2$	17.438 (t=.586)	31.89 (t=1.19)	
$(ER_h-ER_a)^2$	-3.864 (t=.368)	-.221 (t=.023)	
$(IP_h-IP_a)^2$	102.05 (t=2.09)**	95.424 (t=2.18)**	
WinLastGame			55.06 (t=.313)
WIN	-715.62 (t=1.566)	-574.21 (t=1.402)	76.41 (t=.281)
NetScore			23.01 (t=.69)
Population	-.249 (t=1.332)	-.262 (t=1.56)	-.160 (t=1.01)
Income	2.582 (t=3.55)**	2.53 (t=3.87)**	2.10 (t=3.47)**
KidPromotion		-279.33 (t=1.54)	-298.94 (t=1.79)
PromoCost		.298 (t=5.35)**	.293 (t=5.53)**
DBL		-138.442 (t=.417)	-245.49 (t=.74)
Day		51.27 (t=.974)	73.8 (t=1.57)
AVG	144.74 (t=3.85)**	141.81 (t=4.196)**	143.62 (t=4.44)**
DEP	-187.88 (t=4.69)**	-169.72 (t=4.72)**	-171.11 (t=5.1)**
WTR	-167.96 (t=.669)	-131.55 (t=.587)	-175.52 (t=.805)

Table IV: Empirical Results
Dependent = ATTENDANCE

Variable	Model 1	Model 2	Model 3
WinString	-39.91 (t=.592)	-70.78 (t=1.17)	-40.78 (t=-.705)
Adj R^2	.746	.799	.793
F	16.851**	19.786**	45.833**

Absolute value of T score of unstandardized coefficients reported
** implies significance at 95%.

Closer inspection of model results clearly shows that the only performance variable that mattered here was IP (innings pitched) – with longer games showing more attendance. We can infer that fans were able to riddle out which games would be close even before the game was played so that they would attend those longer, more closely contested games (just as Scully, 1989 predicted). Not even winning the game or the most recent winning streak was significant.

What was significant in all three models was the average expected temperature at game time, with higher temperatures bringing in more fans (this may indicate that baseball attendance is simply higher in July when temperatures are likely to be higher than during other months). The departure from average (DEP) on specific game days was also significant, meaning that especially hot or especially cold temperatures (as a departure from expected average) did drive attendance, suggesting the conclusion that when temperatures were over-warm attendance lagged (as there is a positive coefficient on DEP). Oddly, the advent of rain did little to deter fans from attending games.

Just as management suggested, the cost of the promotions mattered with higher cost events brining in more fans. Contrary to what management thought, however, our research suggests that "kid" promotions were no better received than those aimed at adults. In sum, Model 3, using only the barest of the performance data (winning streak, score, and wining the most recent game) but including promotion data actually outperformed Model 1 (the traditional model using the largest array of performance data but no data on promotions). It is clear that for this team, the value of the entertainment provided by attending a game is not limited to the level of skill of the baseball players or even how the team fares against other teams. Fans appear to value this experience for what it can bring to them as an entertainment package.

The final lesson this could bring home to students in an introductory course is that demand for this type of entertainment is driven by such traditional factors like area income but also that elusive 'taste' variable. In this particular case, warm weather games (that were not hotter than expected) and the closely contested games (more innings pitched) were more likely to be those attended by fans along with those games with the best promotions (fireworks being the most expensive, so the biggest draw).

ENDNOTES

[1] From mtlexpos.tripod.com/attendance.htm, the official home web site for the Montreal Expos.

[2] Data was gathered as to whether promotions were sponsored by corporations or not, but this did not affect fan response.

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THE USE OF ECONOMIC HISTORY IN INTRODUCTORY ECONOMICS TEXTBOOKS

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ABSTRACT

Incorporating historical examples into introductory economics courses benefits students by providing them with interesting real-world applications and an understanding of the modern economy's development over time. We therefore review almost two dozen standard introductory-level economics texts to determine the number, depth and variety of economic history references they employ. The presentations of economic history vary greatly in both depth and coverage across textbooks. We categorize historical references in several ways of potential use to faculty attempting to find substantial historical examples or choose a textbook with a historical perspective: by time period, subject matter and amount of detail provided.

INTRODUCTION

As noted by John Ise more than eight decades ago, "… a good knowledge of economic history is absolutely essential to clear economic thinking." (Ise, 1922, p. 622) The passage of time has neither belied nor diminished Ise's argument. For students to fully appreciate current and future economic conditions, they need to understand the economy's development over time. Further, motivating and helping students to understand the wide applicability of economics to their everyday lives can be bolstered by showing how these concepts and theories have applied throughout history.

Unfortunately, evidence suggests that many incoming college students lack the substantive knowledge of history that would enable them to have a more complete understanding of economic issues. A 2006 National Assessment of Educational Progress survey found that the overwhelming majority of

twelfth-graders tested had only basic or below-basic knowledge of US History. Only 13 percent of twelfth-graders were found to have proficient history knowledge and a mere 1 percent performed at the advanced level (U.S. Department of Education, 2007). One potential remedy to address this dearth of historical familiarity and understanding would be for students to take at least one course in economic history. Another, and perhaps complimentary, option that likely would affect a larger number of students is to present historical examples in other courses, especially introductory economics courses.

One way that history can be introduced in economics courses is through textbook references to historical material and events. In this paper, we evaluate almost two dozen prominent introductory economics textbooks to determine their use of historical references to motivate economic subject matter. The textbooks were chosen because the authors offer both macro- and micro-economics introductory texts, large circulation, and availability of recent versions from publishing companies. Twelve macroeconomics texts are included, while only eleven of the twelve microeconomics texts were available (the twelfth being available only as a "selected chapters" preview version). We categorize the textbooks' historical references in several ways of use to economics instructors: by historical period, economic subject matter and the amount of historical detail provided in each example.

Our paper joins a small literature that examines how introductory-level economics textbooks treat particular topics or subjects. Our work is somewhat similar to a series of articles that evaluate economics textbooks to determine the extent to which they discuss women's and minorities' issues (Feiner & Morgan, 1987; Feiner, 1993; Robson, 2001). This research measures topic coverage by the number of pages which mention the topic of interest, either by checking the index of each textbook or searching visually for terms and counting pages containing those terms. This research is also related to research that assesses textbooks treatment of entrepreneurship (Kent, 1989; Kent & Rushing, 1999). This second set of papers uses a similar technique to ours, in which a word count was used to assess topic coverage. We are aware, however, of no other research that has examined the presentation of history in introductory-level economics textbooks.

METHODOLOGY

In this paper we examine introductory-level economics textbooks to determine the extent to which they incorporate meaningful historical references and

examples. To achieve our objective, we first had to determine what exactly constituted a meaningful historical reference. Our decision for including or excluding a reference or example among our list of meaningful historical references is based on two primary dimensions. First is the question of when history begins and ends or, perhaps more correctly, the boundary between the end of history and the beginning of current events. We choose to make the distinction between historical events and current events so that our findings truly reflect the historical focus of our paper and are not skewed by a textbook's inclusion of references to current events. The second dimension we must consider is the depth to which each textbook must present a historical topic before it is worthy of being considered a historical reference. Does the mere mention of something that happened in the past or someone who lived in the past constitute a historical reference? Since there are no clear and obvious answers to these questions, we present our findings based upon several different definitions of a "historical reference."

We initially categorize references into three broad historical eras. The first era includes all time periods prior to the end of the American Civil War in 1865. The second era begins in 1866 and continues through the end of the Second World War in 1945. The post-war period through 1985 is the third era. Although these time periods are arbitrary, we hope that this classification will be useful for instructors who desire a broad overview of the time periods from which the historical references were chosen for each textbook. The choice of 1985 as history's endpoint was motivated by the point of view of current traditional college students. We suggest that students may view events that happened prior to their births as historical and consider events that occurred during their lifetimes as recent or current events. Our definition of history therefore uses 1985 as the breakpoint between historical and current events.

The second question, concerning which references warrant being considered "history" and which ones do not, is more difficult to address. For example, a discussion of Adam Smith's pin-making example, a graph showing government spending over the course of the twentieth century, a brief note of the Kennedy tax-cuts, and a trivial mention that Mick Jagger of The Rolling Stones dropped out of the London School of Economics in 1961 are all possibly "historical". They are, however, clearly of different value when trying to help students gain a historical perspective on the economy or economic theory.

In an effort to evaluate the wide variety of potentially useful historical references, we chose to sort historical references into three categories. The first category ("mention") is quite broad and includes even passing accounts of historical

events, topics or issues. A mention gives little context or detail on the event, policy or fact. While length of the discussion is not the defining characteristic of a mention, they are typically very short, often less than three sentences. The second measure ("moderate") is stricter, requiring that the textbook provides context or depth. Unlike references in the mention category (which might merely be capable of serving as a stepping-off point for professors to discuss the underlying historical topic in class), moderate references provide enough information so that a student can garner at least some historical knowledge or perspective solely from reading the reference in the textbook. The final measure ("intensive") includes only references with substantial historical content. Again, while length was not a defining characteristic, intensive references were frequently more than ten sentences in length. (A complete list of all of the intensive historical references from the macroeconomics and microeconomics textbooks may be found in Appendices I and II, respectively.)

Despite our best efforts to create a precise rubric, discretion and subjectivity was required. For example, the aforementioned brief note on the Kennedy tax-cut example was classified as a mention, while the single sentence concerning Mick Jagger's career choice was not included at all. Graphs and tables presenting time-series data were typically classified as a mention unless they were sufficiently annotated or discussed in the text to warrant their inclusion in another category. Finally, we did not count biographies or references to the development of economic thought as historical unless there was also some connection to specific historical events or conditions. For example, references to Adam Smith's pin-making factory were not considered to be historical unless they made at least some passing reference to, say, the Industrial Revolution.

To more clearly illustrate the distinction between our three classifications of historical references, consider the three following references to the Great Depression from McConnell and Brue's macroeconomics textbook (2008). We classified the reference: "In the depths of the Great Depression of the 1930s, one-quarter of U.S. workers were unemployed and one-third of U.S. production capacity was idle." (p. 14) as a mention. The more substantial discussion:

The Smoot-Hawley Tariff Act of 1930 is a classic example. Although the act was meant to reduce imports and stimulate U.S. production, the high tariffs it authorized promptly adversely affected nations to retaliate with tariffs equally high. International trade fell, lowering the output and income of all nations. Economic historians generally agree that the Smoot-Hawley Tariff Act was a contributing cause of the Great Depression. (p. 96)

was included as a moderate reference. Finally, we determined that a thirty-three sentence, full-page discussion of the bank panics of 1930 to 1933 (p. 255) should be considered an intensive historical reference.

FINDINGS FROM MACROECONOMICS TEXTBOOKS

There is a wide variety in the number and intensity of historical references among the twelve introductory macroeconomics textbooks surveyed, which are listed in Table One. As can be seen from Figure One, no textbook stands out as clearly superior or inferior to the others across all three levels of historical references. The total number of all historical references ranges from fifty-three (Mankiw, 2007) to one hundred (both Shiller, 2006 and Ekelund, Ressler & Tollison, 2006) with an overall average of 71.0 references and a standard deviation of 16.7. If we limit the definition of historical references to include only moderate and intensive references, the average number falls to 19.5 with a standard deviation of 5.0. Hubbard and O'Brien (2006) has the most moderate and intensive references with thirty-one, while Mankiw (2007) has the least with thirteen. If we examine only the intensive historical references, the average falls to 4.4, Mankiw (2007) having the most (eight) while Parkin (2008) has the least (none).

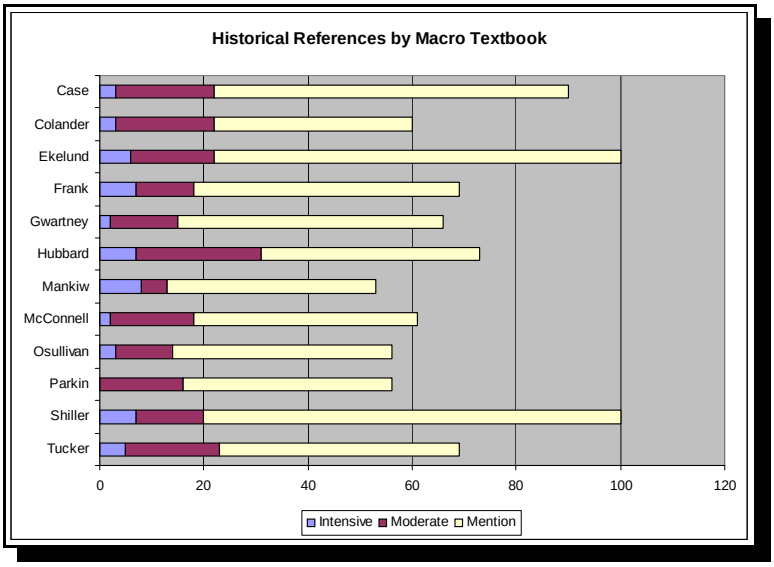
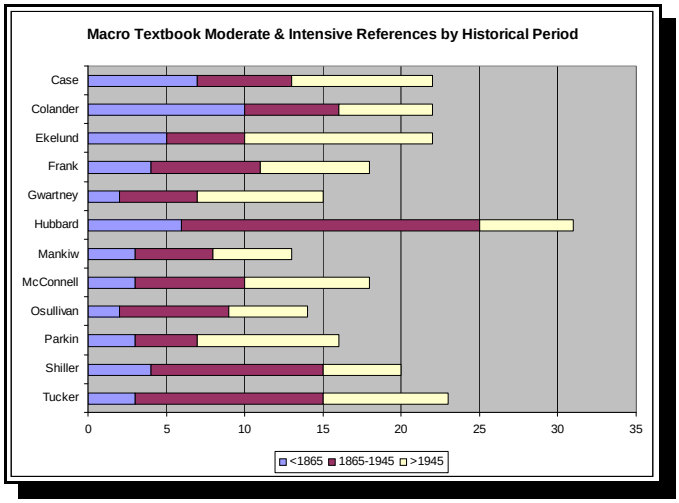


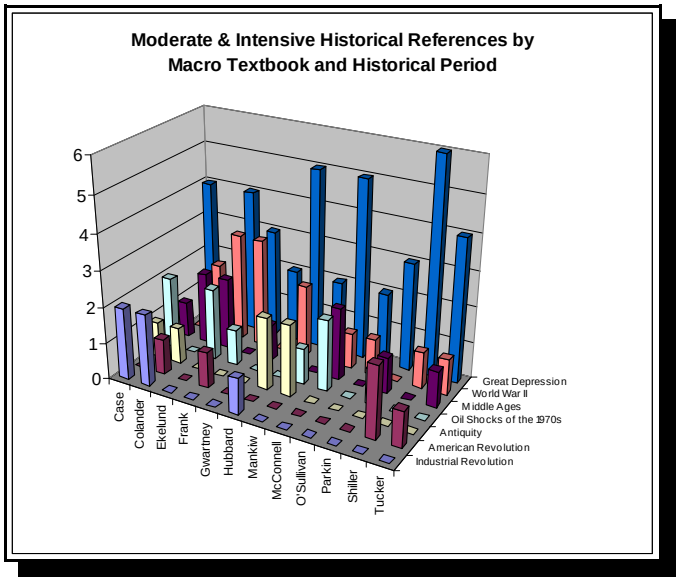
Table 1: Macroeconomics Textbooks Analyzed			
Authors	Textbook Name	Edition	Year
Case and Fair	Principles of Macroeconomics	8th	2007
Colander	Macroeconomics	6th	2006
Ekelund, Ressler, and Tollison	Macroeconomics: Private Markets and Public Choice	7th	2006
Frank and Bernanke	Principles of Macroeconomics	3rd	2007
Gwartney, Stroup, Sobel, and Macpherson	Macroeconomics: Private and Public Choice	11th	2006
Hubbard and O'Brien	Macroeconomics	1st	2006
Mankiw	Principles of Macroeconomics	4th	2007
McConnell and Brue	Macroeconomics	17th	2008
O'Sullivan, Sheffrin, and Perez	Macroeconomics: Principles, Applications, and Tools	5th	2008
Parkin	Macroeconomics	8th	2008
Schiller	The Macro Economy Today	10th	2006
Tucker	Macroeconomics for Today	5th	2008

To present a richer picture of the scope of the historical references we analyze the textbooks' moderate and intensive historical references in several ways. Figure Two shows the breakdown of moderate and intensive historical references according to the broad time period in which the reference begins. Hubbard and O'Brien (2006), Shiller (2006) and Colander (2006) have the greatest number of references from World War II or earlier, while Parkin (2008), Ekelund, Ressler and Tollison (2006) and Gwartney, et al. (2006) all have more than 50 percent of their references from the post-war period.

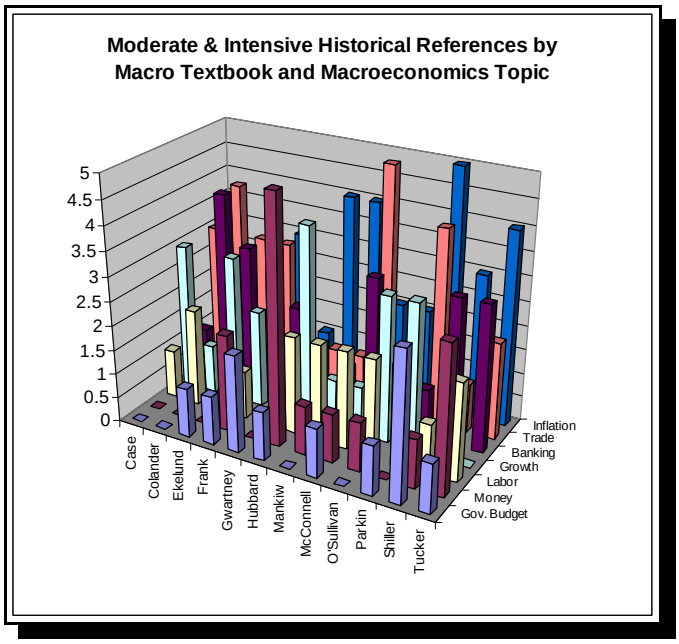
We further separate the historical references by major historical events and eras. Figure Three shows this breakdown by seven selected historical eras: Antiquity, the Middle Ages, the Industrial Revolution, the American Revolution (including Colonial times), the Great Depression, World War II and the Oil Shocks of the 1970s. Not all of the historical references fit into these seven categories, but these were the historical events/eras for which historical references were most often provided. As would likely be expected, the Great Depression is the most commonly referenced historical event in macroeconomics textbooks and is the only historical

event discussed in detail by all of the macroeconomic textbooks reviewed. World War II is the only other historical period that is at least mentioned by all of the textbooks and is discussed in some detail by nine of the twelve books. (Exact numerical data on historical references for these major historical events and era classifications, including data for all historical references, may be found in Appendix III.)





Additionally, we classify examples by broad macroeconomic topic. Figure Four shows the breakdown by seven major macroeconomic subjects: Banking Issues (including central banking), Economic Growth and Development, Government Budget Issues, Inflation (including deflation, disinflation and hyperinflation), Labor Issues (including unemployment), Money (including the gold standard), and Trade. These are certainly not the only macroeconomic topics for which historical references were given, but they were the topics for which historical references were most commonly provided. Inflation is the only macroeconomic subject for which historical details are discussed by all of the textbooks, but all seven of the subjects are at least mentioned in some historical context by all of the books. (Exact numerical data on historical references for these broad macroeconomic topics, including data for all historical references, are given in Appendix IV.)



FINDINGS FROM MICROECONOMICS TEXTBOOKS

There is also a wide variety in the number and intensity of historical references among the eleven introductory microeconomics textbooks surveyed, which are listed in Table Two. Overall, there were fewer historical references in the

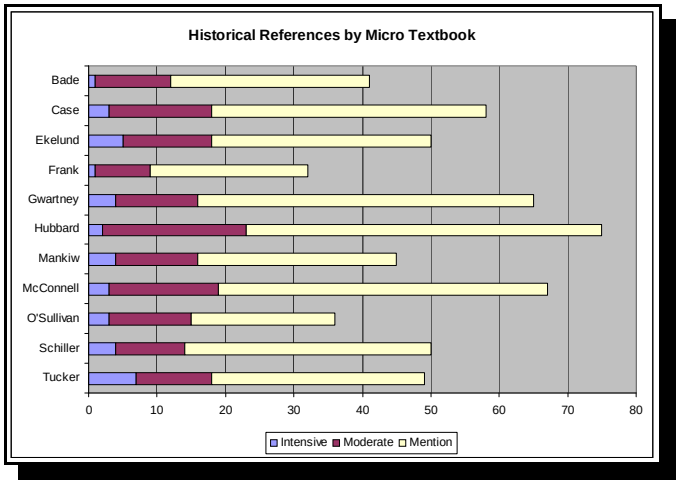
microeconomics texts than the macroeconomics texts. Figure Five summarizes the breakdown of references in microeconomics textbooks. The total number of historical references ranges from thirty-two (for Frank & Bernanke, 2007) to seventy-five (for Hubbard & O'Brien, 2006) with an overall average of 51.6 references and a standard deviation of 13.4. If we limit the definition of historical references to include only moderate and intensive references, the average number falls to 16.2 with a standard deviation of 3.7. Hubbard and O'Brien (2006) has the most moderate and intensive references with twenty-three, while Frank and Bernanke (2007) has the least with nine. If we examine only the intensive historical references, the average falls to 3.4, Tucker (2008) having the most (seven) while Frank and Bernanke (2007) has the least (one).

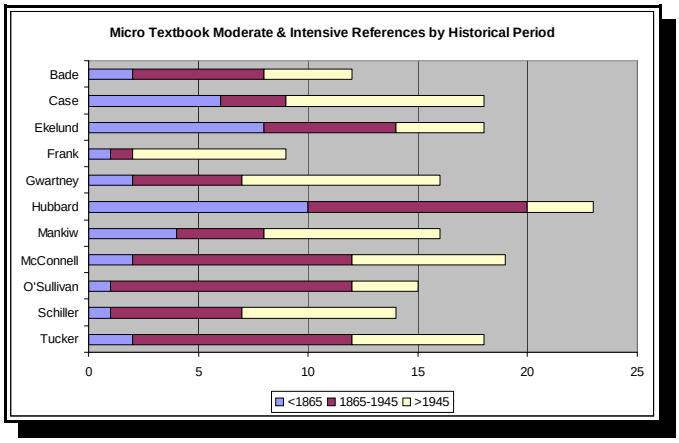
Table 2: Microeconomics Textbooks Analyzed

Authors	Textbook Name	Edition	Year
Bade and Parkin	Foundations of Microeconomics	3rd	2007
Case and Fair	Principles of Microeconomics	8th	2007
Ekelund, Ressler, and Tollison	Microeconomics: Private Markets and Public Choice	7th	2006
Frank and Bernanke	Principles of Microeconomics	3rd	2007
Gwartney, Stroup, Sobel, and Macpherson	Microeconomics: Private and Public Choice	11th	2006
Hubbard and O'Brien	Microeconomics	1st	2006
Mankiw	Principles of Microeconomics	4th	2007
McConnell and Brue	Microeconomics	17th	2008
O'Sullivan and Sheffrin	Microeconomics: Principles, Applications, and Tools	4th	2005
Schiller	The Micro Economy Today	9th	2003
Tucker	Microeconomics for Today	5th	2008

We again analyze the textbooks' moderate and intensive historical references more closely. Figure Six parallels Figure Two, containing the breakdown of moderate and intensive historical references by the time period in which the reference begins. Hubbard and O'Brien (2006) and Ekelund, Ressler and Tollison

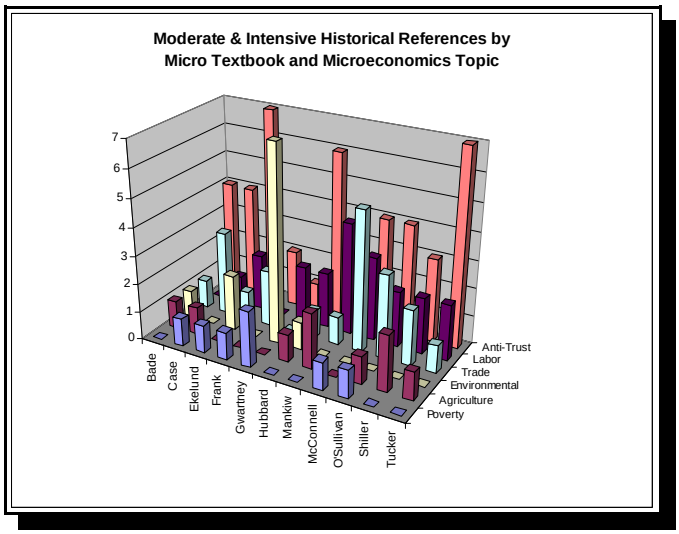
(2006) have the greatest number of references from World War II or earlier, while Case and Fair (2007), Frank and Bernanke (2007), Gwartney, et al. (2006), Mankiw (2007), and Schiller (2003) all have about 50 percent or more of their references from the post-war period.





We classify historical references in microeconomics textbooks somewhat differently than in macroeconomics texts. In particular, we do not classify these references by narrow historical events/eras because the references in the microeconomics texts were much less concentrated in specific time periods. Additionally, the interaction of individual and firm incentives, market and industry structure, public policy, and market failures are intertwined in many examples in

such a way as to make separating them difficult. Thus, we chose six microeconomic topics: Anti-Trust and (De)Regulation, Labor (including unemployment, pay differences and unions), Trade (international trade and exchange rates but omitting the Bretton Woods System), Environmental (including pollution, permit trading, and property rights over land), Agriculture, and Poverty (including income distribution, public policy, and wealth). As with macroeconomic topics, these categories were chosen based on coverage across the texts, and other categorizations are also possible. Anti-trust and (de)regulation was the only microeconomic subject with moderate or intensive discussions by all of the textbooks; almost all six of the subjects are mentioned in some historical context by each of the books. (Exact numerical data on historical references for these broad microeconomic topics, including data for all historical references, are given in Appendix V.)



CONCLUSION

This paper examines the use of historical references by introductory-level economics textbooks. In particular, we detail how textbooks employ historical references across various economic topics and historical periods. In doing so, we distinguish between three categories of historical references based upon the depth to which the textbook presents the references. Overall, we find substantial differences across textbooks in the amount of historical information provided.

While textbooks face opportunity costs when choosing examples and content for their texts, we believe a concerted effort to provide additional historical perspective on the economy, policy, and economic theory will make the concepts covered more convincing to students. Although contemporary examples excite and motivate discussion, a number of topics in the list of intensely covered historically-grounded topics are likely to be intriguing to faculty and students alike. In particular, the opportunity to show students that economic reasoning works across time, and that current policy and conditions have understandable, reasonable foundations is, in our opinion, a ripe area for improvement in introductory economics textbooks.

The primary benefits of motivating students, helping them understand discipline-specific content, and helping them see the connections between disciplines may not necessarily require team teaching, costly curriculum redevelopment, or a re-thinking of testing strategies. Instead, we provide a simple starting point from which faculty can begin to cross boundaries between two interconnected disciplines. We hope that our findings will be useful to instructors desiring to incorporate historical material into their economics courses or economic material into their history courses.

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Appendix I: List of all Intensive Historical References from Macroeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Case	OPEC Oil Embargo and Price Controls for Gasoline	1970s	23	80
Case	Macroeconomic History since World War II	1945-Present	20	96
Case	World Monetary Systems	1900-Present	114	438
Colander	Appendix on the History of Economic Systems	1000-1980s	201	84
Colander	History of US Banking	1790s-1930s	27	317
Colander	Appendix on the History of Exchange Rate Systems	1860s-Present	89	481
Ekelund	Did Keynesian Policies during WWII end the Great Depression?	1940s	19	590
Ekelund	Irish Pubs Operating as Banks	1960s-70s	40	646
Ekelund	Banking Regulation since the Great Depression	1930s-Present	51	663
Ekelund	Japanese Growth since World War II	1945-Present	24	735
Ekelund	Tariffs in the US	1820-Present	27	781
Ekelund	Bretton-Woods	1940s-1970s	58	808
Frank	Great Depression	1930s	36	97
Frank	Germany & Japan after WWII	1940s-1980s	20	189
Frank	Banking Panics & Fed Policy during the Great Depression	1907-1930s	27	283
Frank	Inflation during the Vietnam War	1960s	18	438
Frank	Volcker Disinflation	1979-1980s	36	455
Frank	Blockade during US Civil War	1860s	9	487
Frank	Policy mistakes during the Great Depression	1930s	31	546
Gwartney	Perverse Macro Policies in the Great Depression	1930s	42	340
Gwartney	Government Spending	1790s-Present	37	420
Hubbard	Henry Ford & the $5 day	1910s	15	243
Hubbard	England's Industrial Revolution	1760-1830	25	295

Appendix I: List of all Intensive Historical References from Macroeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Hubbard	Great Depression (multiplier in reverse)	1930s	18	354
Hubbard	German Hyperinflation	1920s	19	430
Hubbard	Fiscal Policy in Great Depression (Did it fail?)	1930s	14	492
Hubbard	Volcker Disinflation	1979-1980s	25	531
Hubbard	History of Gold Standard & Bretton Woods	1810s-1970s	90	596
Mankiw	Homo Sapiens vs. Homo Neanderthalensis	40,000-30,000 BC	31	56
Mankiw	Henry Ford and the $5 day	1910s	22	218
Mankiw	History of Money	600s BC-1500s	38	228
Mankiw	German Hyperinflation	1920s	45	256
Mankiw	Wizard of Oz / Late 19th-Century Free-Silver Debate	1880s-1910s	31	265
Mankiw	Great Depression & WWII (shifts in AD)	1930s-1940s	27	348
Mankiw	Oil Shocks of the 1970s (shifts in AS)	1970s	19	353
Mankiw	Volcker Disinflation	1979-1980s	27	400
McConnell	Banking Panics during the Great Depression	1930s	33	255
McConnell	Collapse of the Bretton Woods System	1940s-1970s	22	372
Osullivan	Markets in POW camps in World War II	1940s	14	57
Osullivan	Fiscal Policy in US History	1930s	54	223
Osullivan	Bretton Woods	1940s-1970s	28	410
Shiller	Unemployment since the Great Depression	1930s-Present	20	125
Shiller	Great Depression	1920s-1930s	42	154
Shiller	Business Cycle since the Great Depression	1920s-Present	25	159
Shiller	History of the US Debt since the American Revolution	1770s-Present	49	253
Shiller	Bank Panics and Failures since the Great Depression	1930s-1990s	30	281

Appendix I: List of all Intensive Historical References from Macroeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Shiller	Inflation during the American Revolution	1770s	16	316
Shiller	Protectionist Policies in the Great Depression	1930s	14	429
Tucker	Currency during the American Revolution	1770s-1790s	32	346
Tucker	Monetary Policy during the Great Depression	1930s	24	397
Tucker	Wage and Price Guidelines since World War II	1940s-1970s	24	424
Tucker	Inflation and Ford's WIN Button	1970s	23	425
Tucker	Gold Standard & Bretton Woods	1870s-1970s	34	458

Appendix II: List of all Intensive Historical References from Microeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Bade	San Francisco earthquakes, rent controls, and housing shortages	1906-1946	27	171
Case	OPEC oil embargo and price controls	1973-present	29	80
Case	Development of calculator technology	1950s-present	47	253
Case	Antitrust regulations, examples, and enforcement	1860s-present	111	289
Ekelund	DeBeers cartel	1800s-present	25	279
Ekelund	Anti-trust policies and examples	1880s-present	73	380
Ekelund	Franchising funerals in England and France	1800s	22	394
Ekelund	Tariffs in the US	1800s	27	781
Ekelund	Bretton-Woods system and its end	1940s-1970s	58	808
Frank	Effects of blockade on South's cotton trade during Civil War	1860s	9	245
Gwartney	Government spending and taxation	1790s-present	29	357
Gwartney	Women in the labor force	1960-present	36	416
Gwartney	CAFE fuel economy standards	1970s-present	32	440

Appendix II: List of all Intensive Historical References from Microeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Gwartney	Rainey Preserve: National Audubon Society and natural gas deposits	1940s-present	22	444
Hubbard	Effects of Clean Air Act on infant mortality	1970s-present	12	136
Hubbard	US Antitrust Laws and surrounding environment	1890s-present	21	459
Mankiw	Trade: neanderthal vs. homo sapiens	40,000-30,000 BC	32	56
Mankiw	Laffer curve and the impact on presidential platforms	1970s-present	21	170
Mankiw	Enclosure movement in England in the 17th century (public goods)	1600s	26	231
Mankiw	Luddite revolt	1810s	14	400
McConnell	Antitrust Law and cases	1860s-present	67	349
McConnell	Women in orchestras and discrimination	1960s-1990s	25	436
McConnell	Bretton Woods System (and collapse) and the IMF	1940s-1970s	50	474
O'Sullivan	WW2 POW camp: cigarette economies	1940s	14	54
O'Sullivan	US Government antitrust laws	1890-1980	13	368
O'Sullivan	History of unions, laws and working conditions	1860s-1940s	15	406
Schiller	Calculators, computers, and VCRs	1970s-1990s	47	176
Schiller	Civil Aeronautics Board: Airline Deregulation	1930s-1970s	68	264
Schiller	The Second Farm Depression	1980s	55	304
Schiller	Smoot-Hawley Tariff Act	1930s	12	423
Tucker	Monopoly example: Standard Oil	1850s-1910s	19	230
Tucker	Growth of trusts and antitrust laws and examples	1870s-1950s	58	320
Tucker	Regulation example: Utah Pie	1950s-1960s	19	324
Tucker	Regulation examples: Standard Oil, Alcoa, IBM, AT&T, MIT, Microsoft	1910s-present	53	325
Tucker	Phases of US regulation and agencies	1880s-present	29	330

Appendix II: List of all Intensive Historical References from Microeconomic Textbooks				
Textbook	Example	Years	Sentences	Page
Tucker	Airline regulation, Civil Aeronautics Board	1930s-present	25	336
Tucker	Exchange rates: gold standard, fixed, floating	1870s-1970s	17	394

Appendix III: Historical References in Macroeconomic Textbooks by Topic							
Textbook	Banking	Growth	Gov. Budget	Inflation	Labor	Money	Trade
Case	1/2	3/7	0/1	1/10	1/11	0/2	3/7
Colander	4/6	1/3	0/3	2/5	2/7	0/1	4/11
Ekelund	3/7	3/12	1/8	1/11	0/12	0/5	3/6
Frank	1/2	2/5	1/1	3/12	1/9	2/3	3/8
Gwartney	2/2	1/5	2/8	1/5	0/7	0/3	0/8
Hubbard	0/3	4/10	1/6	4/5	2/4	5/7	1/9
Mankiw	1/3	1/3	0/2	4/18	2/8	1/2	1/3
McConnell	3/8	1/2	1/2	2/11	2/7	1/1	5/9
O'Sullivan	1/3	3/8	0/3	2/7	2/6	1/3	0/7
Parkin	1/3	3/8	1/2	5/10	2/7	0/1	4/9
Shiller	3/6	0/2	3/5	3/13	1/12	1/7	1/5
Tucker	3/8	0/2	1/7	4/5	2/7	3/5	2/4

Note: The number listed to the left of the slash is the sum of moderate and intensive references, while the number following the slash is all references (which includes mentions).

Appendix IV: Historical References in Macroeconomic Textbooks by Event or Era							
Textbook	Antiquity	Middle Ages	Industrial Revolution	American Revolution	Great Depression	World War II	1970s Oil Shocks
Case	1/1	1/1	2/2	0/0	4/9	0/1	2/3
Colander	1/2	2/4	2/3	1/1	1/5	2/2	0/0
Ekelund	0/3	2/3	0/0	0/0	4/10	3/9	2/4
Frank	0/0	0/0	0/1	1/1	3/7	3/4	1/4
Gwartney	0/0	1/1	0/0	0/1	2/8	0/3	0/0

Appendix IV: Historical References in Macroeconomic Textbooks by Event or Era

Textbook	Antiquity	Middle Ages	Industrial Revolution	American Revolution	Great Depression	World War II	1970s Oil Shocks
Hubbard	2/3	0/0	1/1	0/2	5/8	2/2	0/1
Mankiw	2/2	0/0	0/0	0/2	2/4	1/2	1/2
McConnell	0/0	2/2	0/0	0/0	5/13	1/2	2/4
O'Sullivan	0/0	0/0	0/0	0/0	2/13	1/5	0/3
Parkin	0/2	1/3	0/3	0/0	3/7	0/2	1/1
Shiller	0/1	0/0	0/0	2/5	6/21	1/5	0/1
Tucker	0/0	1/1	0/0	1/1	4/10	1/4	0/2

Note: The number listed to the left of the slash is the sum of moderate and intensive references, while the number following the slash is all references (which includes mentions).

Appendix V: Historical References in Microeconomic Textbooks by Topic

Textbook	Trade	Anti-Trust	Labor	Poverty	Agriculture	Environmental
Bade	1/7	4/7	0/4	0/3	1/2	1/2
Case	3/7	4/12	1/4	1/4	1/5	0/1
Ekelund	1/6	7/9	2/5	1/6	0/2	2/2
Frank	2/2	2/3	0/5	1/5	0/0	0/0
Gwartney	0/9	1/7	2/6	2/6	0/1	7/9
Hubbard	1/11	6/10	2/8	0/6	1/6	1/3
Mankiw	1/4	4/9	4/7	0/3	2/3	0/2
McConnell	5/10	4/8	3/12	1/4	0/6	0/1
O'Sullivan	3/5	4/7	2/5	1/2	1/2	0/2
Shiller	2/12	3/8	2/7	0/3	2/4	0/1
Tucker	1/6	7/8	2/3	0/5	1/4	0/0

Note: The number listed to the left of the slash is the sum of moderate and intensive references, while the number following the slash is all references (which includes mentions).

THE CASE OF SIMULATING THE CHOICES OF MONEY MANGERS BY APPLYING MODERN PORTFOLIO THEORY USING REAL STOCK PRICE DATA

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ABSTRACT

Time constraints, as well as ignorance of other business disciplines, often preclude instructors from properly incorporating illustrations from outside their area of expertise into their courses. This can result in students having difficulty in applying skills learned in one course to other courses. We address this student learning issue by showing how the skills and concepts students are learning in an introductory Excel spreadsheet class can be applied to modern portfolio theory using real data from Yahoo! Finance without mathematical and statistical complexity. By using a finance illustration in an information systems course, students are better able to understand the value of the skills they are acquiring now and how these skills will help them solve real-life problems. Moreover, business students who subsequently take an introductory finance course will be familiar with one of finance's most important theories.

INTRODUCTION

Many business students have difficulty applying knowledge learned in one class to other classes, especially if the class is not in their major discipline. Professors often hear statements like the following from students, "I'm a finance major, why do I need to know something about information systems." For these students there is a no connection of how the concepts and skills learned in one class can help them solve problems in another class. In 2002 the Association of American

Colleges and Universities published a report entitled *Greater Expectations: A New Vision for Learning as a Nation Goes to College* that addresses this student learning issue. The report states the following "Once enrolled in College, students face … barriers to excellence. The fragmentation of the curriculum into a collection of independently "owned" courses is itself an impediment to student accomplishment, because the different courses students take, even on the same campus, are not expected to engage or build on one another. Few maps exist to help students plan or integrate their learning as they move in and out of separately organized courses, programs, and campuses. In the absence of shared learning goals and clear expectations, a college degree more frequently certifies completion of disconnected fragments than of a coherent plan for student accomplishment." The Association of Advance Collegiate Schools of Business (AACSB International) expresses similar student learning concerns in their 2003 *Eligibility Procedures and Standards for Business Accreditation*. This AACSB publication promotes cross-functional integration within business programs. We address this student learning issue by showing how students can apply finance's modern portfolio theory using real data in an introductory Excel spreadsheet class.

1990 Nobel Prize winner in economics, Harry Markowitz (1952), is credited with developing modern portfolio theory. His work shows that the adage "don't put all your eggs in one basket" is sound advice. In financial terms he shows that it is possible for investors to combine financial assets (stocks) in such a way that it increases their return while also decreasing their risk. We show that students taking an introductory Excel spreadsheet course can apply his work using real stock price data from Yahoo! Finance. By using a finance application in an information systems class, students will understand how the skills and concepts they are learning in an introductory Excel spreadsheet course can help them in other classes that are often taken years later. It also introduces students to the risk-return trade-off in finance that investment and introductory finance courses cover in detail. Moreover, a number of finance textbooks use Excel to solve and illustrate problems.[iii] Finally, there are a growing number of financial modeling courses at universities and a growing number of financial modeling textbooks that use Excel extensively.[iv]

The purpose of this paper is to show students how simple Excel functions that they commonly learn in an introductory Excel spreadsheet class can help them understand modern portfolio theory without mathematical and statistical complexity. Having students simulate the process of portfolio construction will help them better understand the decision process that money managers use in making their asset allocation decisions. Using Excel's *solver* and *scenario manager* students can

perform a risk-return analysis in little time by developing an efficient frontier and capital market line.[v] First, Excel's *solver* is a tool that optimizes a dependent (output) variable by changing the values of independent (input) variable(s) subject to some constraint(s). *Solver* finds a new solution to the problem each time you change the value of the dependent variable or the value of a constraint. The *solver* function is a part of Excel's *Solver* add-in. If this function is not currently available under the *Tools* menu, it can be installed by loading the *Solver* add-in. To do this, go to the *Tools* menu and click *Add-ins*. In the *Add-Ins* available list, select the *Solver* box, and then click *OK*. Second, *scenario manager* is a tool that can store the solutions from *solver*. Moreover, it provides a convenient way to summarize the solutions that *solver* produces. In addition to *solver* and *scenario manager*, students will learn about naming cells and/or ranges, absolute and relative cell referencing, basic functions such as *average*, *stdev*, and *correl*, *paste special* with several optional features, and *array* formulas.

DOWNLOADING DATA AND COMPUTING RETURNS

To get free historical stock price data go to the following link http://finance.yahoo.com/. This is the home page for Yahoo! Finance. In the *Market Summary* section there are a number of stock indices listed, click on *Dow* and a new page will appear. On this page go to the *More On* section, click on *components*. This page contains an alphabetical listing of the 30 firms that comprise the Dow Jones Industrial Index with their ticker symbols.[vi] As of December 14, 2005, Alcoa Inc. (symbol: AA) was the first firm. The screen should look similar to figure 1.

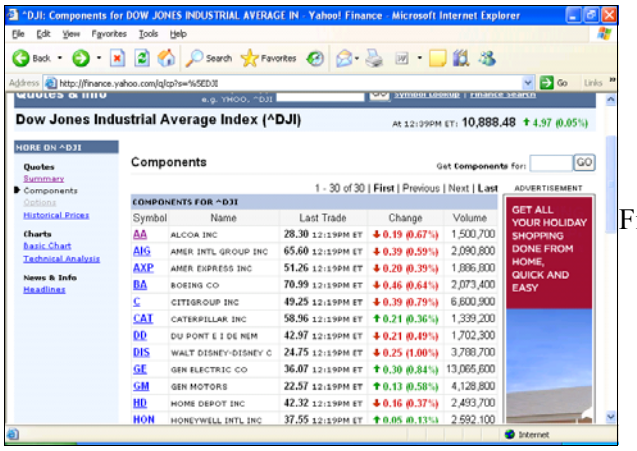
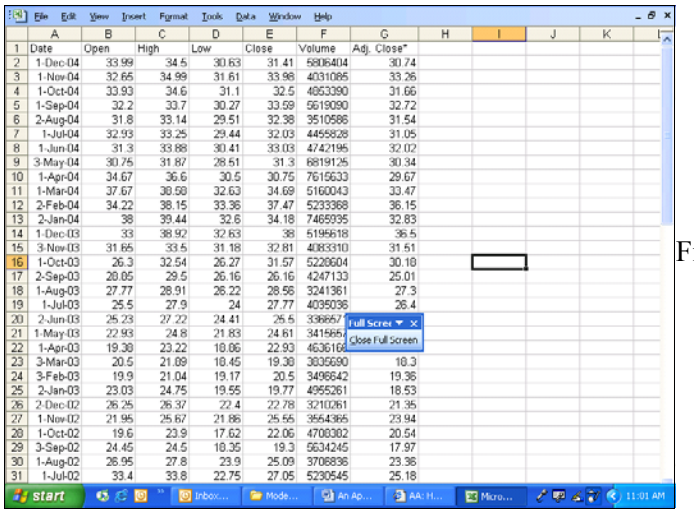


Figure 1

Clicking on the first ticker symbol, *AA*, opens AA's Yahoo! Finance home page. In the section *More on AA* click on *historical prices*. In the set date range select *monthly*. In the *start date* select *December 31, 2001*. In the *end date* select *December 31, 2004*. Now click on *Get Prices*. Scroll down the page and select *Download to Spreadsheet*. Click on *Save* and in this case the ticker symbol is AA so name the file *AA*. By default the file will be saved as comma separated with the file extension *.csv*. Now select *Open* and an Excel worksheet that looks like figure 2 will appear.

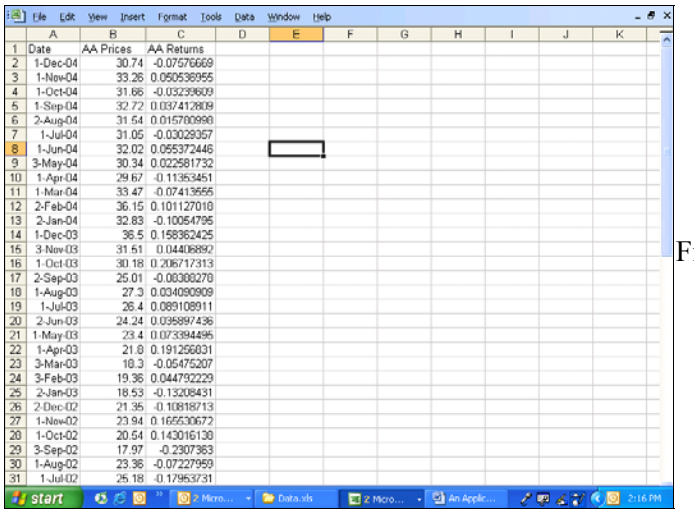


	Date	Open	High	Low	Close	Volume	Adj. Close*
2	1-Dec-04	33.99	34.5	30.63	31.41	5806404	30.74
3	1-Nov-04	32.65	34.99	31.61	33.98	4031085	33.26
4	1-Oct-04	33.93	34.6	31.1	32.5	4853390	31.66
5	1-Sep-04	32.2	33.7	30.27	33.59	5619090	32.72
6	2-Aug-04	31.8	33.14	29.51	32.38	3510586	31.54
7	1-Jul-04	32.93	33.25	29.44	32.03	4455828	31.05
8	1-Jun-04	31.3	33.88	30.41	33.03	4742195	32.02
9	3-May-04	30.75	31.87	28.51	31.3	6819125	30.34
10	1-Apr-04	34.67	36.6	30.5	30.75	7615633	29.67
11	1-Mar-04	37.67	38.58	32.63	34.69	5160043	33.47
12	2-Feb-04	34.22	38.15	33.36	37.47	5233368	36.15
13	2-Jan-04	38	39.44	32.6	34.18	7465935	32.83
14	1-Dec-03	33	38.92	32.63	38	5195618	36.5
15	3-Nov-03	31.65	33.5	31.18	32.81	4083310	31.51
16	1-Oct-03	26.3	32.54	26.27	31.57	5220604	30.18
17	2-Sep-03	28.05	29.5	26.16	26.16	4247133	25.01
18	1-Aug-03	27.77	28.91	26.22	28.56	3241361	27.3
19	1-Jul-03	25.5	27.9	24	27.77	4035036	26.4
20	2-Jun-03	25.23	27.22	24.41	25.5	336857	
21	1-May-03	22.93	24.8	21.83	24.61	341665	
22	1-Apr-03	19.38	23.22	18.86	22.93	4636166	
23	3-Mar-03	20.5	21.09	18.45	19.38	3835690	18.3
24	3-Feb-03	19.9	21.04	19.17	20.5	3496642	19.36
25	2-Jan-03	23.03	24.75	19.55	19.77	4965261	18.53
26	2-Dec-02	26.25	26.37	22.4	22.78	3210261	21.35
27	1-Nov-02	21.95	25.67	21.86	25.55	3564365	23.94
28	1-Oct-02	19.6	23.9	17.62	22.06	4700302	20.54
29	3-Sep-02	24.45	24.5	18.35	19.3	5634245	17.97
30	1-Aug-02	26.95	27.8	23.9	25.09	3708836	23.36
31	1-Jul-02	33.4	33.8	22.75	27.05	5230545	25.18

Figure 2

Now select columns B:F by hovering the mouse over column B and holding down the left mouse button while moving the mouse over to column F. Release the left mouse button and delete these columns by right clicking the mouse and selecting *delete*. Next, in cell B1 enter *AA Prices* and in cell C1 enter *AA returns*.

To compute monthly stock price changes in decimals for AA select cell *C2* and enter the formula *=B2/B3-1*. Copy this formula down to cell *C37* by selecting cell *C2* and hovering the pointer over the lower right corner of cell C2 until it turns into a black plus sign. Hold down the left mouse button and drag to cell *C37*, then release. To save your file go to *File>Save As*. In the *file name enter AA* and in the *Save as Type* select *Microsoft Excel Workbook* by scrolling up. The saved file will look like figure 3.



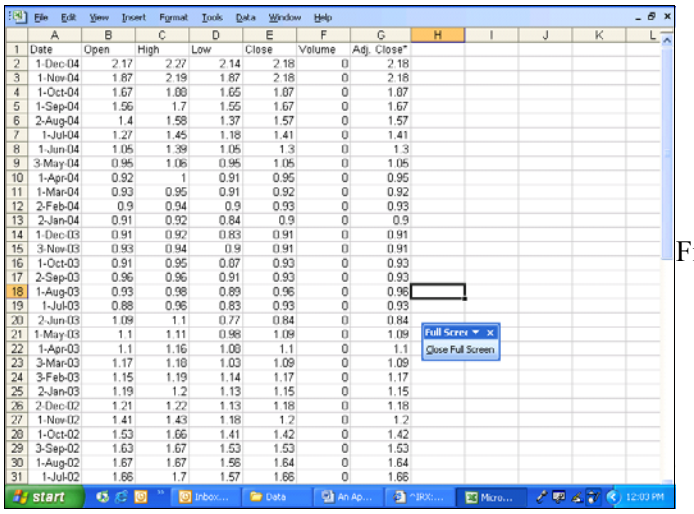
	A	B	C
1	Date	AA Prices	AA Returns
2	1-Dec-04	30.74	-0.07576669
3	1-Nov-04	33.26	0.050536955
4	1-Oct-04	31.66	-0.03239609
5	1-Sep-04	32.72	0.037412809
6	2-Aug-04	31.54	0.015760990
7	1-Jul-04	31.05	-0.03029357
8	1-Jun-04	32.02	0.055372446
9	3-May-04	30.34	0.022581732
10	1-Apr-04	29.67	-0.11353451
11	1-Mar-04	33.47	-0.07413655
12	2-Feb-04	36.15	0.101127010
13	2-Jan-04	32.83	-0.10054795
14	1-Dec-03	36.5	0.158362425
15	3-Nov-03	31.51	0.04406892
16	1-Oct-03	30.18	0.206717313
17	2-Sep-03	25.01	-0.08388278
18	1-Aug-03	27.3	0.034090909
19	1-Jul-03	26.4	0.089108911
20	2-Jun-03	24.24	0.035897436
21	1-May-03	23.4	0.073394495
22	1-Apr-03	21.8	0.191256831
23	3-Mar-03	18.3	-0.05475207
24	3-Feb-03	19.36	0.044792229
25	2-Jan-03	18.53	-0.13208431
26	2-Dec-02	21.35	-0.10818713
27	1-Nov-02	23.94	0.165530672
28	1-Oct-02	20.54	0.143016130
29	3-Sep-02	17.97	-0.2307363
30	1-Aug-02	23.36	-0.07227959
31	1-Jul-02	25.18	-0.17953731

Figure 3

Repeat this process for the remaining 29 stocks left in the Dow index. Remember to use the appropriate ticker symbols to name the files and for naming price and return columns within each file. To help organize the files it is probably best to create two new folders. One folder will contain *.csv* files with price data downloaded from Yahoo! Finance and the other folder will contain *.xls* files that have just dates, prices, and computed monthly stock returns.

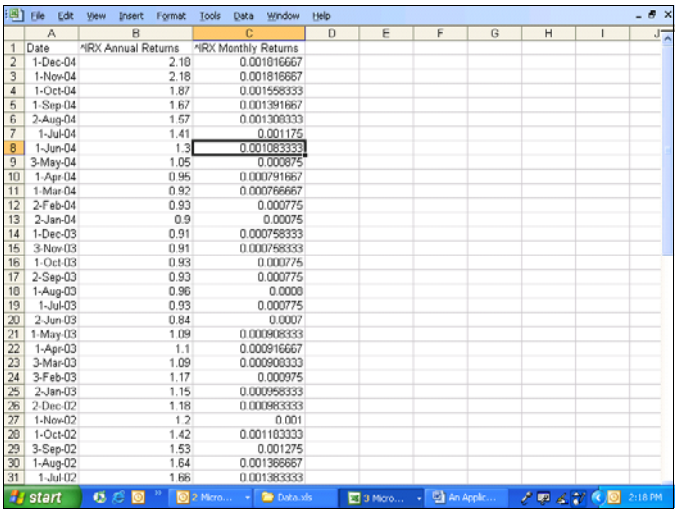
Finally, to get a risk-free rate of return go to http://finance.yahoo.com/, enter *^IRX* in the *Enter Symbol(s)* area and click on *GO*. ^IRX is the ticker symbol for the 13-week U.S. treasury bill. Use the same start dates and end dates as before and name the *.csv* file using the ticker symbol when downloading the information. Now select *Open* and an Excel worksheet that looks like figure 4 will appear.

Delete columns B:F like before. Next, in cell B1 enter *^IRX Annual Returns* and in cell C1 enter *^IRX Monthly Returns*. To compute monthly returns for ^IRX select cell *C2* and enter the formula *=B2/(12*100)*.[vii] *Copy* this formula down to cell *C37*. To save the file go to *File>Save As*. In the *file name* enter *^IRX* and in the *Save as Type* select *Microsoft Excel Workbook* by scrolling up. The saved file will look like figure 5.



	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Adj. Close*
2	1-Dec-04	2.17	2.27	2.14	2.18	0	2.18
3	1-Nov-04	1.87	2.19	1.87	2.18	0	2.18
4	1-Oct-04	1.67	1.88	1.65	1.87	0	1.87
5	1-Sep-04	1.56	1.7	1.55	1.67	0	1.67
6	2-Aug-04	1.4	1.58	1.37	1.57	0	1.57
7	1-Jul-04	1.27	1.45	1.18	1.41	0	1.41
8	1-Jun-04	1.05	1.39	1.05	1.3	0	1.3
9	3-May-04	0.95	1.06	0.95	1.05	0	1.05
10	1-Apr-04	0.92	1	0.91	0.95	0	0.95
11	1-Mar-04	0.93	0.95	0.91	0.92	0	0.92
12	2-Feb-04	0.9	0.94	0.9	0.93	0	0.93
13	2-Jan-04	0.91	0.92	0.84	0.9	0	0.9
14	1-Dec-03	0.91	0.92	0.83	0.91	0	0.91
15	3-Nov-03	0.93	0.94	0.9	0.91	0	0.91
16	1-Oct-03	0.91	0.95	0.87	0.93	0	0.93
17	2-Sep-03	0.96	0.96	0.91	0.93	0	0.93
18	1-Aug-03	0.93	0.98	0.89	0.96	0	0.96
19	1-Jul-03	0.88	0.96	0.83	0.93	0	0.93
20	2-Jun-03	1.09	1.1	0.77	0.84	0	0.84
21	1-May-03	1.1	1.11	0.98	1.09	0	1.09
22	1-Apr-03	1.1	1.16	1.09	1.1	0	1.1
23	3-Mar-03	1.17	1.18	1.03	1.09	0	1.09
24	3-Feb-03	1.15	1.19	1.14	1.17	0	1.17
25	2-Jan-03	1.19	1.2	1.13	1.15	0	1.15
26	2-Dec-02	1.21	1.22	1.13	1.18	0	1.18
27	1-Nov-02	1.41	1.43	1.18	1.2	0	1.2
28	1-Oct-02	1.53	1.66	1.41	1.42	0	1.42
29	3-Sep-02	1.63	1.67	1.53	1.53	0	1.53
30	1-Aug-02	1.67	1.67	1.56	1.64	0	1.64
31	1-Jul-02	1.66	1.7	1.57	1.66	0	1.66

Figure 4



	A	B	C
1	Date	^IRX Annual Returns	^IRX Monthly Returns
2	1-Dec-04	2.18	0.001816667
3	1-Nov-04	2.18	0.001816667
4	1-Oct-04	1.87	0.001558333
5	1-Sep-04	1.67	0.001391667
6	2-Aug-04	1.57	0.001308333
7	1-Jul-04	1.41	0.001175
8	1-Jun-04	1.3	0.001083333
9	3-May-04	1.05	0.000875
10	1-Apr-04	0.95	0.000791667
11	1-Mar-04	0.92	0.000766667
12	2-Feb-04	0.93	0.000775
13	2-Jan-04	0.9	0.00075
14	1-Dec-03	0.91	0.000758333
15	3-Nov-03	0.91	0.000758333
16	1-Oct-03	0.93	0.000775
17	2-Sep-03	0.93	0.000775
18	1-Aug-03	0.96	0.0008
19	1-Jul-03	0.93	0.000775
20	2-Jun-03	0.84	0.0007
21	1-May-03	1.09	0.000908333
22	1-Apr-03	1.1	0.000916667
23	3-Mar-03	1.09	0.000908333
24	3-Feb-03	1.17	0.000975
25	2-Jan-03	1.15	0.000958333
26	2-Dec-02	1.18	0.000983333
27	1-Nov-02	1.2	0.001
28	1-Oct-02	1.42	0.001183333
29	3-Sep-02	1.53	0.001275
30	1-Aug-02	1.64	0.001366667
31	1-Jul-02	1.66	0.001383333

Figure 5

CREATING THE MASTER RETURN FILE

Currently there are 31 Excel files and we need to create one file that contains the returns for all 30 firms in the Dow Jones and the 13-week U.S. treasury security. Start by opening Excel and select *File>Save As*. In the *file name* enter *master* and select *save*. Second, *open* the *AA* file with the *.xls* extension and select column A. *Copy* column A in the AA file to the master file by selecting *Edit>Copy* from the menu bar and then select column A in the master Excel workbook and

paste the column by selecting *Edit>Paste*. Third, *copy* column C in the AA file to the master file by selecting *Edit>Copy* from the menu bar and then select column B in the master Excel workbook and paste the column by selecting *Edit>Paste Special>Values*. Pasting *values* changes the formulas in this cell range to numbers. Fourth, close the AA file by going to the AA file and selecting *File>Close*.

For the remaining *.xls* files containing returns do not repeat the copy process for the dates. However, repeat the copy process for the returns of the other 29 firms and the 13-week U.S. treasury security. For example, open the AIG file and select column C. This is the column that contains the returns for AIG. *Copy* column C in the AIG file to the master file by selecting *Edit>Copy* from the menu bar and then select column C in the master Excel workbook and paste the column by selecting *Edit>Paste Special>Values*. Close the AIG file by going to the AIG file and selecting *File>Close*. Copy the returns of the remaining 28 firms and the 13-week U.S. treasury security. After copying the returns, the master Excel file will look like figure 6.

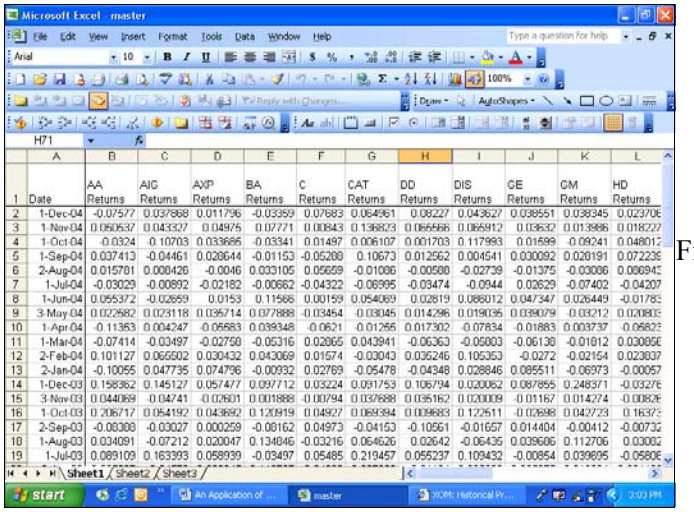


Figure 6

RETURN STATISTICS

To create the efficient frontier and capital market line we need to compute some summary statistics. In cell *A38* type the label *Total Return*, in cell *A39* type the label *Annualized Return*, in cell *A40* type the label *Std Dev of Monthly Returns*, and in cell *A41* type the label *Annualized Std Dev*.[viii] To compute the *total return*,

select cell *B38* and enter *=PRODUCT(1+B2:B37)-1* while holding down the *ctrl* and *shift* buttons on the keyboard. Holding these two buttons down while hitting enter will put brackets *{}* around the formula and this creates an *array formula*. *Copy* this formula across row 38 to cell *AF38.* To compute the *annualized return,* select cell *B39* and enter *=(1+B69)^(1/3)-1*. *Copy* this formula across row 39 to cell *AF39*. To compute the *std dev of monthly returns*, select cell *B40* and type *=stdev(b2:b37).* *Copy* this formula across row 40 to cell *AF40*. Finally, to compute the *annualized std. dev*, select cell *B41* and type *=B40*SQRT(12).* *Copy* this formula across row 41 to cell *AF41*.

To help organize the workbook, *rename Sheet1* by moving the pointer over Sheet1 and right clicking the mouse. A pop-up menu will appear and select *rename*. Rename this worksheet by entering *Returns.* Likewise, rename sheet2 to *Portfolio*.

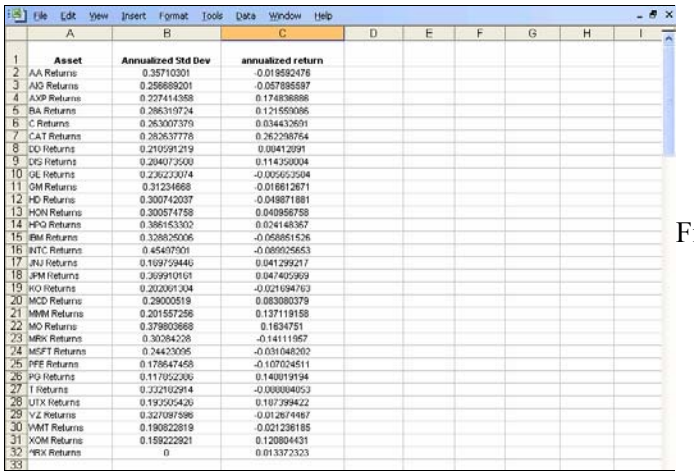
EFFICIENT FRONTIER WORKSHEET-FORMATTING

To create the efficient frontier we need to enter some cell labels on *the Portfolio worksheet* and compute some additional statistics. Much of the work in this section involves moving between the *Returns worksheet* and *Portfolio worksheet*. We begin by entering cell labels on the *Portfolio worksheet* and copying statistics from the *Returns worksheet* to the *Portfolio worksheet*.

Go to the *Portfolio worksheet* and in cell *A1* enter *Asset,* in cell *B1* enter *Annualized Std Dev*, and in cell *C1* enter *Annualized Return*. Now select the *Returns worksheet* and highlight cells *B1:AF1* and select *Edit>Copy*. Go back to the *Portfolio worksheet*, highlight cell *A2* and paste this information by selecting *Edit>Paste Special*. Be sure to *transpose* the cell range and copy *values*. Transposing a row of cells changes it into a column of cells. Repeat this process for the annualized standard deviation and annualized return. For example, go to the *Returns worksheet*, highlight the cell range *B41:AF41*, and select *Edit>Copy*. Return to the *Portfolio worksheet*, select cell *B2* and paste this information by selecting *Edit>Paste Special*. Be sure to *transpose* the cell range and copy *values*. After copying the annualized return information, the *Portfolio worksheet* will look like figure 7.

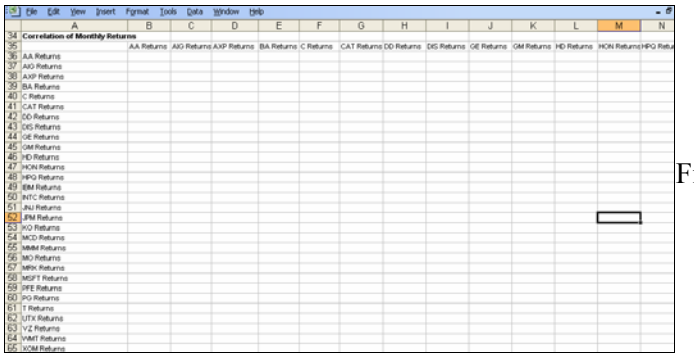
Next, we need to create three matrices on the *Portfolio worksheet*.[ix] The first matrix is for stock return correlations. In cell *A34* enter *Correlation of Monthly Stock Returns*. We first create labels for the 30 stocks in range *A36:A65* by entering a formula *=A2* in cell *A36* and then copy this formula to cell *A65*. Be sure that you don't copy the 13-week treasury bill returns. It is not needed for this matrix. Next,

we paste the labels we just created in the range *A36:A65*, a range aligned in a column, to the range *C35:AE35*, a range aligned in a row. We do this by selecting the range *A36:A65* and then go to *Edit>Copy*. Next, move the cursor to cell *B35*, and then go to *Edit>Paste Special* checking two options: *Values* and *Transpose*. Figure 8 shows the results.



	A	B	C
1	**Asset**	**Annualized Std Dev**	**annualized return**
2	AA Returns	0.35710301	-0.019592476
3	AIG Returns	0.256889201	-0.057895597
4	AXP Returns	0.227414368	0.174836886
5	BA Returns	0.286319724	0.121559086
6	C Returns	0.263007379	0.034432601
7	CAT Returns	0.282637778	0.262298764
8	DD Returns	0.210591219	0.00412091
9	DIS Returns	0.284073500	0.114358004
10	GE Returns	0.236233074	-0.005653504
11	GM Returns	0.31234668	-0.016812671
12	HD Returns	0.300742037	-0.049871881
13	HON Returns	0.300574758	0.040956758
14	HPQ Returns	0.386163302	0.024148367
15	IBM Returns	0.326825006	-0.058851526
16	INTC Returns	0.45497901	-0.089925653
17	JNJ Returns	0.169759446	0.041299217
18	JPM Returns	0.369910161	0.047405969
19	KO Returns	0.202061304	-0.021694763
20	MCD Returns	0.29000519	0.083080379
21	MMM Returns	0.201557256	0.137119158
22	MO Returns	0.379803668	0.1634751
23	MRK Returns	0.30284208	-0.14111957
24	MSFT Returns	0.24423006	-0.031048202
25	PFE Returns	0.178647458	-0.107024511
26	PG Returns	0.117052306	0.140819194
27	T Returns	0.232102914	-0.000884053
28	UTX Returns	0.193505426	0.187399422
29	VZ Returns	0.327087586	-0.012674487
30	WMT Returns	0.190822819	-0.021236185
31	XOM Returns	0.159222921	0.120804431
32	^IRX Returns	0	0.013372323

Figure 7



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
34	**Correlation of Monthly Returns**													
35		AA Returns	AIG Returns	AXP Returns	BA Returns	C Returns	CAT Returns	DD Returns	DIS Returns	GE Returns	GM Returns	HD Returns	HON Returns	HPQ Retu
36	AA Returns													
37	AIG Returns													
38	AXP Returns													
39	BA Returns													
40	C Returns													
41	CAT Returns													
42	DD Returns													
43	DIS Returns													
44	GE Returns													
45	GM Returns													
46	HD Returns													
47	HON Returns													
48	HPQ Returns													
49	IBM Returns													
50	INTC Returns													
51	JNJ Returns													
52	JPM Returns													
53	KO Returns													
54	MCD Returns													
55	MMM Returns													
56	MO Returns													
57	MRK Returns													
58	MSFT Returns													
59	PFE Returns													
60	PG Returns													
61	T Returns													
62	UTX Returns													
63	VZ Returns													
64	WMT Returns													
65	XOM Returns													

Figure 8

The second matrix is for stock return variances and covariances. In cell *A67* enter *Variance-Covariance of Monthly Stock Returns*. Similar to the correlation matrix, two identical sets of labels for the 30 stocks need to be created in range *A69:A98* and range *B68:AE68*, respectively. Note, the 13-week treasury bill data is not needed in this matrix either. Figure 9 shows the results.

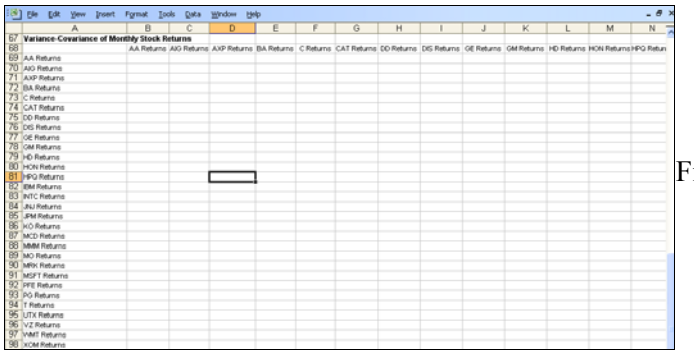


Figure 9

The third matrix is needed to compute statistics for the portfolio of 30 stocks. First create labels for the 30 stocks in ranges *A69:A133* and *C102:AF102*, respectively, using similar techniques. Next, we create weights for each of the 30 stocks in a portfolio. In cell *B103* enter the label *Weight*. In cell *B104* enter *=1/30* and *copy* this formula to cell *B133*. The original portfolio is going to be equally weighted. Since there are 30 stocks in the portfolio, we will invest 1/30 in each stock. To change the for*m*ulas in this cell range to values highlight the cell range *B104:B133,* select *Edit>Copy>Edit>Paste Special,* and select *values*. We need to change the formulas to values so that solver can find solutions in the following section. Next, we need to transpose the weights we just created in range *B04:B133* to range *C103:AF103*. However, this time we use another technique instead of the *Edit>Paste Special* used for the other two matrices. Again, the reason for this is that it is necessary step for solver to find solutions in the next section. The new technique uses the *offset* function in Excel. First, create auxiliary labels 1, 2, 3, through 30, in range *C100:AF100* as follows: in cell *C100* enter 1, in cell *D100* enter 2, then select both cells *C100* and *D100* and hover the pointer over the lower right corner of cell *D100* until it turns into a black plus sign, hold down the left mouse button and drag to cell *AF100*. Next, enter the formula *=offset($B$103,C100,0)* in cell *C103,* and then *copy* the formula to *AF103*. You can check your formulas in the range C103:AF103 by changing a weight in the cell range B104:B133. For example, select cell *B119*. This is the weight for JNJ and it is currently set equal to 0.033333. Change this value by entering *0.10*. Now go to cell *R103* and the value should be *0.10*.

To finish labeling the *Portfolio worksheet* select cell *A134* and enter *Sum of Weights*; *A135*, enter *Portfolio Variance*; *A136*, enter *Portfolio Standard Deviation*; *A137*, enter *Portfolio Return*; and *A138*, enter *Capital Market Line*. Now

that the cell labeling is finished we can proceed to computing statistics for the three matrices. Figure 10 shows the results.

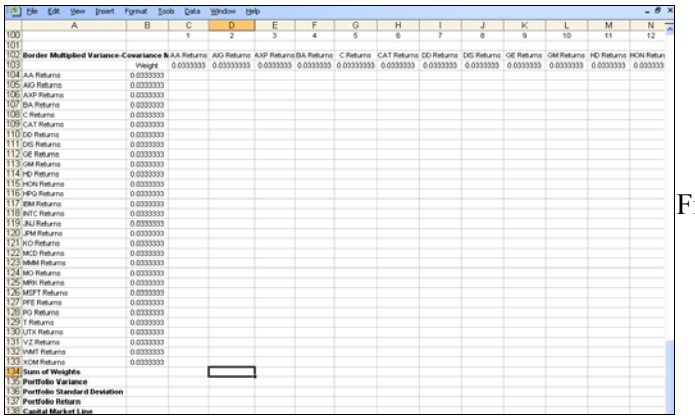


Figure 10

EFFICIENT FRONTIER WORKSHEET-FORMULAS

On the *Portfolio worksheet* select cell *B36* in the correlation matrix. To enter correlations select *Insert>Function*. In the *search for a function* area type *correl,* select *Go*, then *OK*. This brings-up Excel's correlation function, which is named *correl*. Select *Array1* by moving the pointer to the spreadsheet symbol to the right of the text box and right clicking the mouse. Now select the *Returns worksheet*, highlight the cell range *B2:B37* and hit *enter*. The following should appear in the *Array1* text box *Returns!B2:B37*. Next, select *Array2*. Now select the *Returns worksheet*, highlight the cell range *B2:B37*, hit *enter* and click *OK*. This computes the correlation between AA and AA. To increase efficiency change the formula in cell B36 by entering *dollar signs ($)*. To do this, select cell *B36* on the *Portfolio worksheet* and go to the formula. Currently the formula should read =CORREL(Returns!B2:B37,Returns!B2:B37). Change the formula so that it reads *=CORREL(Returns!$B2:$B37,Returns!B2:B37)* and hit *enter*. *Copy* the formula in cell *B36* to the cell range *C36:AE36*. Repeat this process for the remaining cells. For example, select cell *B37* and go to *Insert>Function*. The Correl function should be highlighted under the section *select a function* so click *OK*. If not, repeat the process above. Select *Array1*. Now select the *Returns worksheet*, highlight the cell range *C2:C37* and hit *enter*. The following should appear in the *Array1* text box *Returns!C2:C37*. Next, select *Array2*. Now select the *Returns worksheet*, highlight

the cell range *B2:B37*, hit *enter*, and click *OK*. Currently the formula should read =CORREL(Returns!C2:C37,Returns!B2:B37). Change it so that it reads *=CORREL(Returns!$C2:$C37,Returns!B2:B37)*. *Copy* the formula in cell *B37* to the cell range *C37:AE37*. Repeat this process for the remaining cells.[x] The cell formulas for the correlation matrix are in appendix A.

To enter the variances and covariances go to the *Portfolio worksheet*, select cell *B69*, enter the formula *=B36*B2*$B$2*, and *copy* it down column B to cell *B98*. Next, select cell *C69* on the *Portfolio worksheet*, enter the formula *=C36*B2*$B$3* and *copy* it down column C to cell *C98*. Continue entering formulas in this manner for columns D to AE. In column AE, select cell *AE69*, enter the formula *=AE36*B2*$B$31*, and *copy* it down column AE to cell *AE98*. The cell formulas for the variance-covariance matrix are in appendix B.

The last matrix is the border multiplied variance-covariance matrix. We need to compute values in this matrix so that we can compute the variance and standard deviation for the portfolio. Go to the *Portfolio worksheet*, select cell *C104* and enter *=$B104*C$103*B69*. *Copy* the formula in *C104* to the range *C104:AF133*.

To finish entering formulas into the Portfolio worksheet select cell *B134* and enter *=SUM(B104:B133)*. *Copy* this formula across row 134 to cell *AF134*. The sum of weights should equal 1 in cell B134. Continue computing portfolio statistics by selecting cell *B135* and entering *=SUM(C134:AF134)*. Third, select cell *B136* and enter *=B135^(1/2)*. Fourth, select cell *B137* and enter *=sum(B104:B133*C2:C31)* while holding down the *ctrl* and *shift* buttons. Again, holding these two buttons down while entering a formula will put brackets *{}* around the formula and this creates an *array formula*. Fifth, select cell *B138* and enter *=(B137-C32)/B136*. The cell formulas for the border multiplied variance-covariance matrix are in appendix C.

Finally, we will change the names of some cells. Changing the names of these cells will make it easier to interpret results later on. Go to the *Portfolio worksheet* and select cell *B134*. Just to the left of the formula bar where the formula =SUM(B104:B133) appears is the cell reference *B134*. Select this area, type *weights,* and hit *enter*. The name of this cell is now *weights* instead of B134. Repeat this process for the following cells: name B135 variance, B136 std_dev, B137 return, B138 CML, B32 rf_std, and C32 RF_return.

ORIGINAL PORTFOLIO

The original portfolio is equally weighted and we will save this information for this portfolio by saving it as a *scenario*. To do this go to *Tools>Scenarios* and select *Add.* Name the scenario *original portfolio* and in the *changing cells* text box enter *B104:B133*. Select *OK* and a pop-up menu named *scenario values* will appear. Make sure that all values in these cells are set equal to 0.033333 and select *OK*. The *scenario manager* will now have a new scenario named *original portfolio*. Click *close*.

EFFICIENT FRONTIER

To use solver go to *Tools>Solver*. In the *select target cell* input *$B$135* and in the *Equal to:* click *Min*. Cell B135 is the output (dependent) variable. In the *By Changing Cells* enter *$B$104:$B$133*. The cell range B104:B133 contain the input (independent) variables that solver will change to minimize the variance of the portfolio. Next, we need to add constraints.

To add the constraints, select *Add*. For the first constraint do the following. In the *cell reference* input *$B$134*, select =, and in the *Constraint* input *1.* Click *Add*. For the second constraint, enter *$B$137* in the *cell reference*, select =, and in the C*onstraint* input *-0.10*. Click *OK*. The *solver parameters* will look like figure 11.

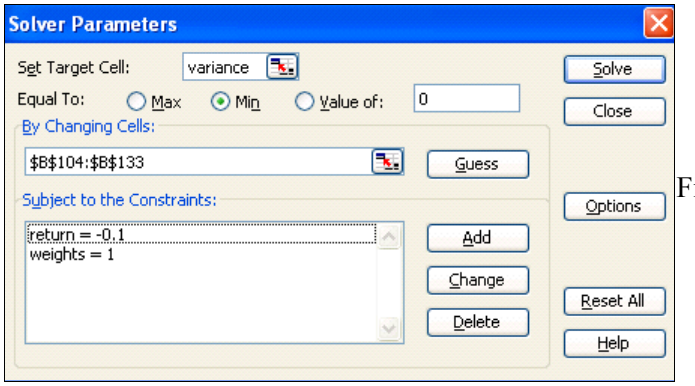


Figure 11

To run solver click *Solve*. If solver successfully finds a solution it will return a screen similar to figure 12.

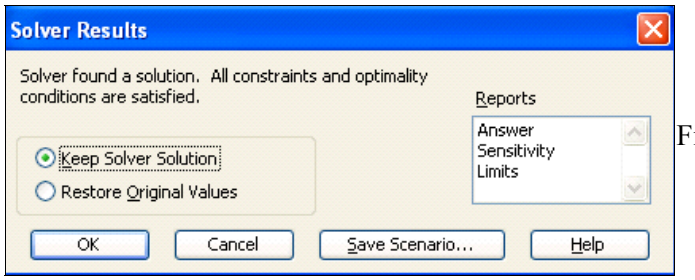


Figure 12

To keep the solution, select *Save Scenario* and name the scenario *r=-10%*. The save scenario screen will look like figure 13.

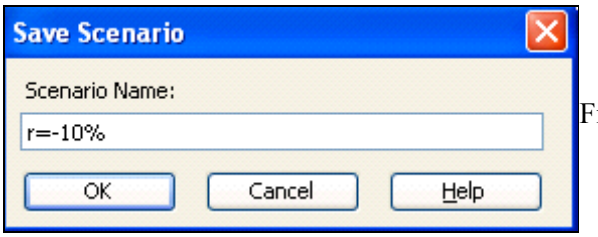


Figure 13

Click *OK*. We have just saved our first *scenario*!

To create more scenarios go to *Tools>Solver* and in the *Subject to the constraints* section select *return=-0.10* and click *Change*. In the *Constraint* section enter a new return value equal to *-0.075* and click *OK*. This will take you back to the *Solver Parameters* screen. Click *Solve*. Solver will find a solution and just like before select *Save Scenario*. Name the scenario *r=-7.5%* and click *OK*. Repeat this process using the following return values: -0.05, -0.025, 0.00, 0.025, 0.05, 0.075, 0.10, 015, 0.20, 0.25, 0.30, 0.325, 0.35, 0.375, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90 and 1.00. We will graph these scenarios later.

CAPITAL MARKET LINE

To create the efficient frontier we specified a return and had solver minimize the portfolio variance by changing the weight invested in each stock. To find the best capital market line we will have solver maximize the trade-off between risk and return. To do this we need to change some inputs in the *solver parameters*. Go to the *Portfolio worksheet* and select *Tools>Solver*. In the *Set Target Cell* section select cell *B138,* and in the *equal to* section select *Max*. Do not change the *By Changing Cells* section. The following should be entered in this section

$B$104:$B$133. Finally, in the *subject to the Constraints* section *delete* the *return*= constraint. The *Solver Parameters* screen will now look like figure 14.

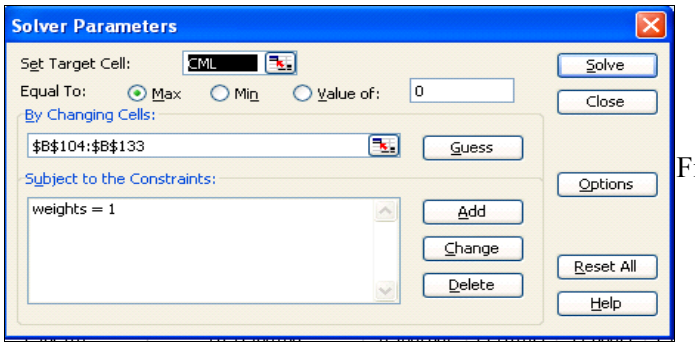


Figure 14

Click *Solve* and select *save scenario*. Name the scenario *MAX CML*.

MINIMUM VARIANCE PORTFOLIO

To compute the minimum variance portfolio select the *Portfolio worksheet* and go to *Tools>Solver*. In the *Set Target Cell* section select cell B135 and in the *equal to* section select *min*. The *Solver Parameters* screen will now look like figure 15.

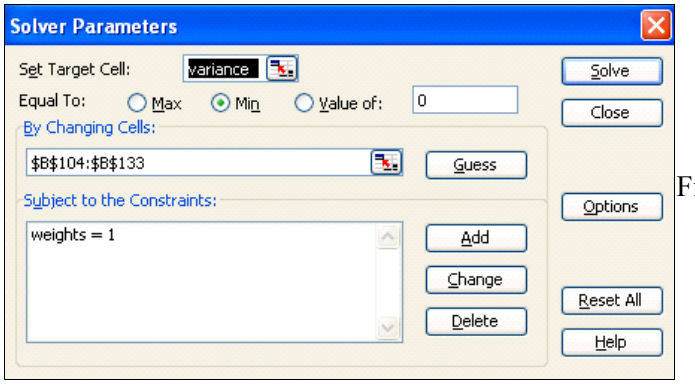


Figure 15

Click *Solve* and select *Save Scenario*. Name the scenario *minimum variance*.

SCENARIO MANAGER

Scenario manager stores all saved scenarios. To access these scenarios go to *Tools>Scenarios* and a screen that looks like figure 16 will appear.

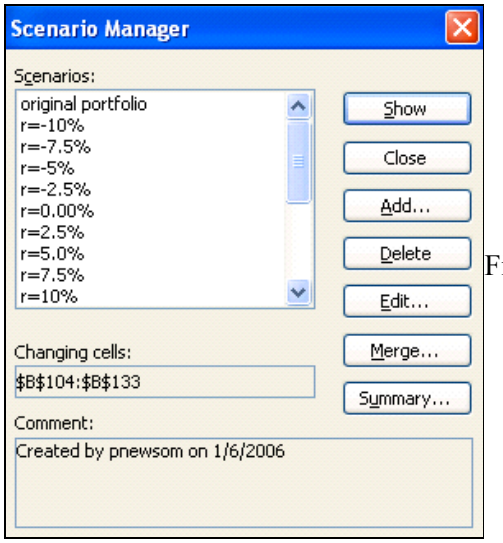


Figure 16

Scrolling down the *Scenarios* section shows additional scenarios including the *MAX CML* and *minimum variance* scenarios. To graph these scenarios *select Summary* and in the *Results cells* input the cell range *B136:B138* and the cell range *B32:C32*. The S*cenario Summary* screen will look like figure 17.

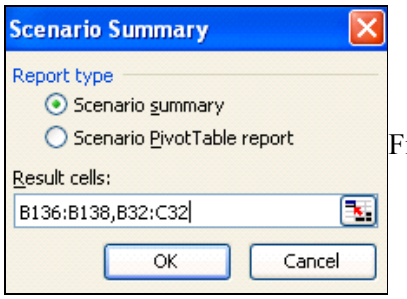
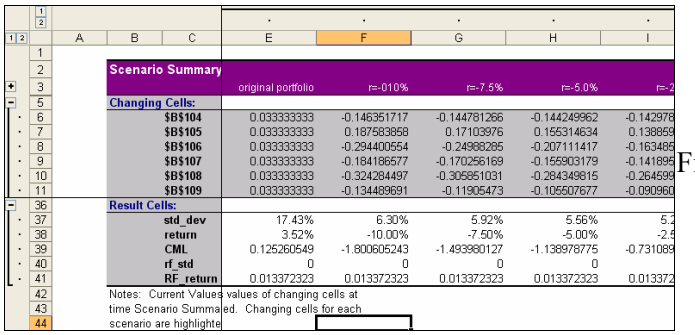


Figure 17

Click *OK* and a new worksheet named *Scenario Summary* that looks like figure 18 will appear. This worksheet contains the information to graph the efficient

frontier, capital market line, original portfolio, and minimum variance portfolio. Positive weights are long positions and negative weights are short positions.[xi]



Scenario Summary						
		original portfolio	r=-010%	r=-7.5%	r=-5.0%	r=-2
Changing Cells:						
	$B$104	0.033333333	-0.146351717	-0.144781266	-0.144249962	-0.142978
	$B$105	0.033333333	0.187583858	0.17103976	0.155314634	0.138859
	$B$106	0.033333333	-0.294400554	-0.24988285	-0.207111417	-0.163485
	$B$107	0.033333333	-0.184186577	-0.170256169	-0.155903179	-0.141895
	$B$108	0.033333333	-0.324284497	-0.305851031	-0.284349815	-0.264599
	$B$109	0.033333333	-0.134489691	-0.11905473	-0.105507677	-0.090960
Result Cells:						
	std_dev	17.43%	6.30%	5.92%	5.56%	5.2
	return	3.52%	-10.00%	-7.50%	-5.00%	-2.5
	CML	0.125260549	-1.800605243	-1.493980127	-1.138978775	-0.731089
	rf_std	0	0	0	0	
	RF_return	0.013372323	0.013372323	0.013372323	0.013372323	0.013372

Notes: Current Values values of changing cells at time Scenario Summaed. Changing cells for each scenario are highlighte

Figure 18

GRAPHING

To graph the *efficient frontier* go to *Insert>Chart*. In the *Chart type* section select *XY (scatter)*. In the *Chart sub-type* section select *Scatter with data points connected by smooth lines*. Click *Next* and select the *Series* tab. In the *series* section click *Remove* until this section is blank. Now click *Add*. Select *X Values*, highlight the cell range *F37:AB37* on the *scenario summary* worksheet and hit *enter*. Next, select *Y Values*, highlight the cell range *F38:AB38* on the *scenario summary* worksheet and hit *enter*. Name the series by entering *Efficient Frontier* in the *Name* section.

To graph the *capital market line* click *Add*. Select *X Values* and while holding down the *CTRL* button, select cell *AC40*, then cell *AC37* on the *Scenario summary* worksheet and hit *enter*. Select *Y Values* and while holding down the *CTRL* button select cell *AC41*, then cell *AC38* on the *Scenario summary* worksheet and hit *enter*. *Name* the series *Capital Market Line*.

To graph the *minimum variance portfolio* click *Add*. Select *X Values*, then select cell *AD37* on the *Scenario summary* worksheet and hit *enter*. Next, select *Y Values*, then select cell *AD38* on the *Scenario summary* worksheet and hit enter. *Name* the series *Minimum Variance Portfolio*.

To graph the *original portfolio* click *Add*. Select *X Values* by selecting cell *E37* on the *Scenario summary* worksheet and hit *enter*. Next, select *Y Values* by selecting cell *E38* on the *Scenario summary* worksheet and hit *enter*. *Name* the series *original portfolio*. Click Next.

Finish the graph by selecting the *Titles* tab. In the *Chart Title* section enter Efficient Frontier, CML, and Min Var Portfolio, in the *Value (x) axis* section enter *Standard Deviation*, and in the *Value (Y) axis* section enter *Return*. Click *Next* and select *as new sheet*. Name the new sheet *Graph* and select *Finish*.

To extend the capital market line left click on the line to highlight it. Now right click and a screen like figure 19 will appear.

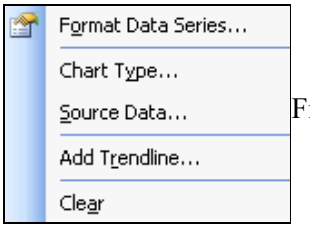


Figure 19

Select *Add Trendline*. Select the *Type* tab and in the *Trend/Regression Type* highlight *Linear*. Now select the *Options* tab. In the *Trendline name* section select *Automatic*, and enter *0.10* for forward under the *Forecast* section. Click *OK*. The graph should look similar to figure 20.

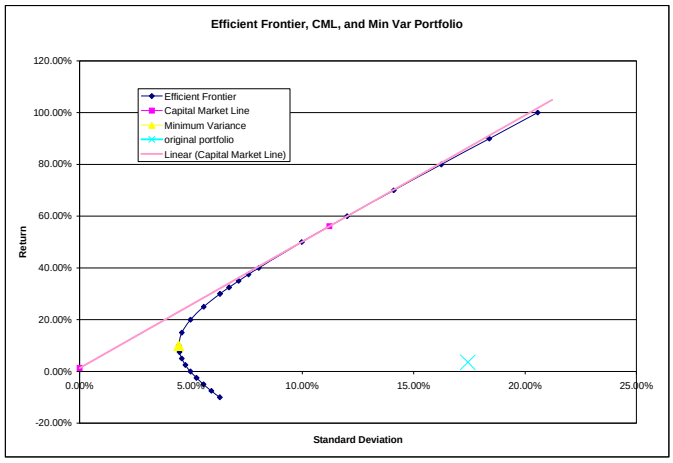


Figure 20

INTERPRETING THE GRAPH

The minimum variance portfolio is the mixture of risky stocks that reduces risk (standard deviation) to its lowest possible level. Every portfolio at and above the minimum variance portfolio is said to be on the *efficient frontier* and every

portfolio below the minimum variance portfolio is said to be on the *inefficient frontier*. Notice that any investor choosing a portfolio on the inefficient frontier can increase return without increasing risk (standard deviation) by moving to a portfolio that lies directly above on the efficient frontier.

The original portfolio, even though it is well diversified, is not efficiently diversified. By changing the weights invested in each stock we can significantly increase the return of the portfolio while decreasing risk.

The capital market line is the line that begins at the risk-free rate of return and "just touches" the efficient frontier. The point where the capital market line touches the efficient frontier is a special portfolio called the *market portfolio*. Investors at this point, have 100 percent of their funds invested in the Dow Jones index and 0 percent invested in the risk-free treasury bill. Other investors might be more risk averse and want to invest a portion of their funds in the risk-free treasury bill. They can accomplish this by lending (investing) some funds at the risk-free rate. Some investors might be so risk averse that they invest 100 percent in the risk-free treasury bill and 0 percent in the market portfolio. In this case, these investors will be at the point on the capital market line that intersects the y-axis.

Finally, notice that all investors will invest in some combination of the market portfolio and risk-free treasury bill. To illustrate this, suppose that some investor chose to invest in the minimum variance portfolio. Interestingly, this investor can increase return without increasing risk by alternatively investing *X* percent in the market portfolio and *(1-X)* percent in the risk-free treasury bill, and reach a point on the capital market line that is directly above the minimum variance portfolio.

WHAT IF

Suppose the risk-free rate of return changes. For example, suppose the United States Federal Reserve performs some open market operations over a period of time that causes the current risk-free rate of 0.0133…in cell C32 of the *Portfolio worksheet* to change to 0.075. Input the new risk-free rate in cell C32 and use *solver* to maximize the capital market line in cell B138 just like before. Excel will find a new solution. Save the scenario as before and give it the name *NEW MAX CML* to differentiate it from the original *MAX CML* scenario. Finally, perform a scenario summary like before. All of the original scenarios will appear plus the new one. Graph the *NEW MAX CML* with all of the other original information to see how the line changes.

CONCLUSION

We show that the skills students learn while in an introductory Excel spreadsheet class can be applied to modern portfolio theory without mathematical and statistical complexity. By showing students how the skills and concepts they are learning in a spreadsheet class can help them to understand concepts and theories in other business disciplines (e.g. finance) we address a common student learning issue. Namely, we help students overcome a disconnect of how the concepts and skills learned in one course can help them solve problems in another course. Furthermore, it introduces business students to the fundamental risk-return trade-off in finance that investment and introductory finance courses cover in more detail. Introducing students to portfolio theory prior to taking the finance course that most colleges of business require will help them better understand this important concept. Finally, this example helps instructors of introductory Excel spreadsheet classes illustrate the value of the skills they are teaching to non-information systems students.

TEACHING NOTES FOR THE CASE OF SIMULATING THE CHOICES OF MONEY MANAGERS BY APPLYING MODERN PORTFOLIO THEORY USING REAL STOCK PRICE DATA

CASE DESCRIPTION

As written, the audience for this case is business students who are taking an introductory Excel spreadsheet class. Nonetheless, this case can be adapted to other courses in finance and investments at the undergraduate level. Moreover, we use this case at the M.B.A. level for students who are taking a pre-requisite spreadsheet or finance course. Most of these students have non-business undergraduate degrees and have little or no spreadsheet skills or knowledge of finance theory.

This case is a 'how to' case and it simulates the process that a money manager uses in selecting assets during portfolio construction. In the introductory Excel class we cover the case over multiple weeks as topics are covered in the course. This case becomes a major student project at this level and it illustrates how the skills students learn in the course can be applied to another business discipline. In undergraduate investment and finance courses we use this case as a part of a semester project where students pick their own portfolio of stocks and get to decide their weights individually. We assign this part of the project as portfolio theory is

discussed in class. At the pre-requisite M.B.A. level we give students the case as written and have them complete the case prior to discussing portfolio theory. Since these students have little or no spreadsheet skills or knowledge of finance theory, it is helpful for these students to learn by doing.

This case has two specific learning objectives: (1) show students how the skills they learn in one course can be applied to another course, and (2) increase student spreadsheet skills and understanding of finance theory by simulating the process that money managers use in putting together a portfolio of assets.

CASE SYNOPSIS

This case places students in the role of a money manager who has the task of putting together a portfolio of stocks that will minimize risk and maximize return. Brinson, Singer, and Beebower (1991) show that asset allocation accounts for over 90 percent of the variation in portfolio returns. Thus, portfolio construction and management is one of the most important financial concepts. This case shows students how to construct a portfolio of stocks using real data from Yahoo! Finance.

ENDNOTES

[iii] Examples include *Investments* by Bodie, Kane, and Marcus, *Essentials of Investments* by Bodie, Kane, and Marcus, *Fundamentals of Financial Management* by Brigham and Houston, and *Intermediate Financial Management* by Brigham and Daves.

[iv] Examples include *Spreadsheet Modeling in Corporate Finance* by Holden, *Spreadsheet Modeling in Investments* by Holden, *Financial Analysis with Microsoft Excel 2002* by Mayes and Shank, and *Financial Modeling Using Excel and VBA* by Sengupta.

[v] We will explain these terms later in the paper.

[vi] Excel's scenario manager can handle up to 32 stocks in a portfolio. Beyond 32 stocks, Excel issues an error message.

[vii] The Adj. Close* column for stocks is a stock price whereas the Adj. Close* column for the 13-week U.S. Treasury bill is an annualized return in percent, not a bond price. One method to compute a monthly return for the bond is to divide the Adj. Close* column by 12 and to change the return from percent to decimal by dividing by 100.

[viii] Students should be familiar with arithmetic averages and standard deviations from a math course in high school or a finite math or business statistics course in college. This further emphasizes how skills learned in one class are used in another.

[ix] Students should be familiar with matrices from their finite math course. The use of matrices in this project further emphasizes how skills learned in one class are used in another.

[x] Adding a dollar sign in front of a row or column index makes the reference to that row or column absolute instead of relative. In this case, without using dollar signs in the formulas for the correlation matrix, we would have to go through this process 900 times (30x30). Using dollar signs reduces this number to only 30!

[xi] Shorting is a process where investors sell stock by borrowing it from another investor, then replace the borrowed stock at a later date by buying it in the market, hopefully at a lower price.

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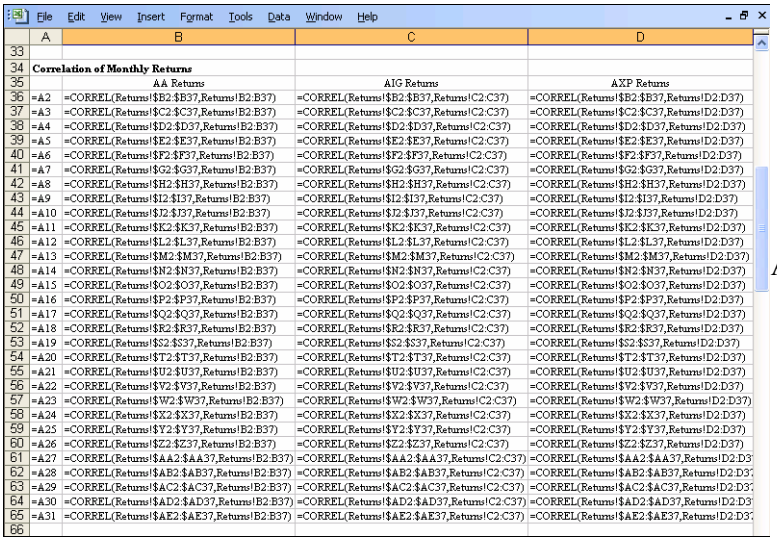
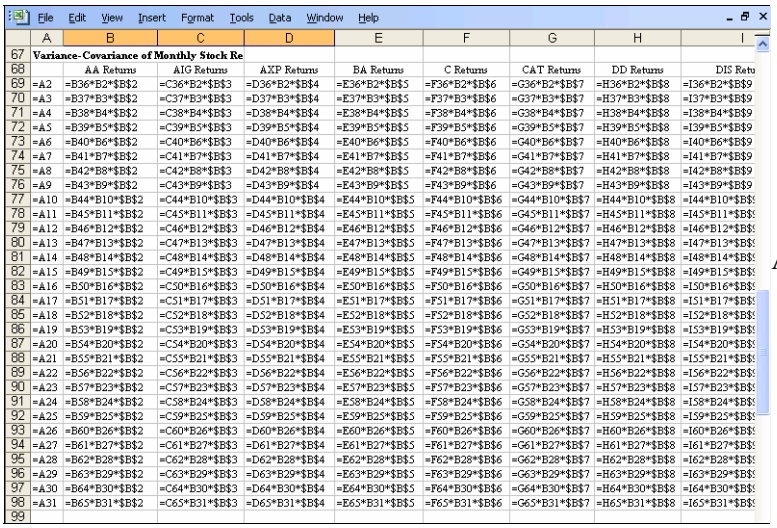


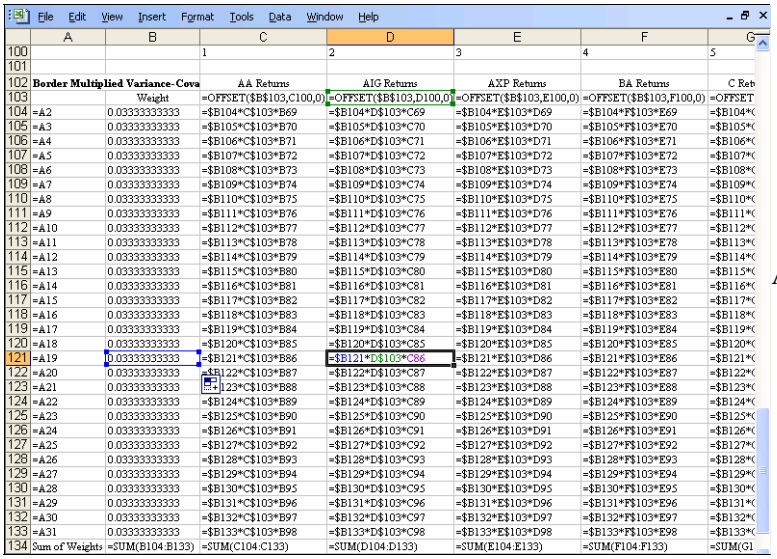
	A	B	C	D
33				
34	**Correlation of Monthly Returns**			
35		AA Returns	AIG Returns	AXP Returns
36	=A2	=CORREL(Returns!$B2:$B37,Returns!B2:B37)	=CORREL(Returns!$B2:$B37,Returns!C2:C37)	=CORREL(Returns!$B2:$B37,Returns!D2:D37)
37	=A3	=CORREL(Returns!$C2:$C37,Returns!B2:B37)	=CORREL(Returns!$C2:$C37,Returns!C2:C37)	=CORREL(Returns!$C2:$C37,Returns!D2:D37)
38	=A4	=CORREL(Returns!$D2:$D37,Returns!B2:B37)	=CORREL(Returns!$D2:$D37,Returns!C2:C37)	=CORREL(Returns!$D2:$D37,Returns!D2:D37)
39	=A5	=CORREL(Returns!$E2:$E37,Returns!B2:B37)	=CORREL(Returns!$E2:$E37,Returns!C2:C37)	=CORREL(Returns!$E2:$E37,Returns!D2:D37)
40	=A6	=CORREL(Returns!$F2:$F37,Returns!B2:B37)	=CORREL(Returns!$F2:$F37,Returns!C2:C37)	=CORREL(Returns!$F2:$F37,Returns!D2:D37)
41	=A7	=CORREL(Returns!$G2:$G37,Returns!B2:B37)	=CORREL(Returns!$G2:$G37,Returns!C2:C37)	=CORREL(Returns!$G2:$G37,Returns!D2:D37)
42	=A8	=CORREL(Returns!$H2:$H37,Returns!B2:B37)	=CORREL(Returns!$H2:$H37,Returns!C2:C37)	=CORREL(Returns!$H2:$H37,Returns!D2:D37)
43	=A9	=CORREL(Returns!$I2:$I37,Returns!B2:B37)	=CORREL(Returns!$I2:$I37,Returns!C2:C37)	=CORREL(Returns!$I2:$I37,Returns!D2:D37)
44	=A10	=CORREL(Returns!$J2:$J37,Returns!B2:B37)	=CORREL(Returns!$J2:$J37,Returns!C2:C37)	=CORREL(Returns!$J2:$J37,Returns!D2:D37)
45	=A11	=CORREL(Returns!$K2:$K37,Returns!B2:B37)	=CORREL(Returns!$K2:$K37,Returns!C2:C37)	=CORREL(Returns!$K2:$K37,Returns!D2:D37)
46	=A12	=CORREL(Returns!$L2:$L37,Returns!B2:B37)	=CORREL(Returns!$L2:$L37,Returns!C2:C37)	=CORREL(Returns!$L2:$L37,Returns!D2:D37)
47	=A13	=CORREL(Returns!$M2:$M37,Returns!B2:B37)	=CORREL(Returns!$M2:$M37,Returns!C2:C37)	=CORREL(Returns!$M2:$M37,Returns!D2:D37)
48	=A14	=CORREL(Returns!$N2:$N37,Returns!B2:B37)	=CORREL(Returns!$N2:$N37,Returns!C2:C37)	=CORREL(Returns!$N2:$N37,Returns!D2:D37)
49	=A15	=CORREL(Returns!$O2:$O37,Returns!B2:B37)	=CORREL(Returns!$O2:$O37,Returns!C2:C37)	=CORREL(Returns!$O2:$O37,Returns!D2:D37)
50	=A16	=CORREL(Returns!$P2:$P37,Returns!B2:B37)	=CORREL(Returns!$P2:$P37,Returns!C2:C37)	=CORREL(Returns!$P2:$P37,Returns!D2:D37)
51	=A17	=CORREL(Returns!$Q2:$Q37,Returns!B2:B37)	=CORREL(Returns!$Q2:$Q37,Returns!C2:C37)	=CORREL(Returns!$Q2:$Q37,Returns!D2:D37)
52	=A18	=CORREL(Returns!$R2:$R37,Returns!B2:B37)	=CORREL(Returns!$R2:$R37,Returns!C2:C37)	=CORREL(Returns!$R2:$R37,Returns!D2:D37)
53	=A19	=CORREL(Returns!$S2:$S37,Returns!B2:B37)	=CORREL(Returns!$S2:$S37,Returns!C2:C37)	=CORREL(Returns!$S2:$S37,Returns!D2:D37)
54	=A20	=CORREL(Returns!$T2:$T37,Returns!B2:B37)	=CORREL(Returns!$T2:$T37,Returns!C2:C37)	=CORREL(Returns!$T2:$T37,Returns!D2:D37)
55	=A21	=CORREL(Returns!$U2:$U37,Returns!B2:B37)	=CORREL(Returns!$U2:$U37,Returns!C2:C37)	=CORREL(Returns!$U2:$U37,Returns!D2:D37)
56	=A22	=CORREL(Returns!$V2:$V37,Returns!B2:B37)	=CORREL(Returns!$V2:$V37,Returns!C2:C37)	=CORREL(Returns!$V2:$V37,Returns!D2:D37)
57	=A23	=CORREL(Returns!$W2:$W37,Returns!B2:B37)	=CORREL(Returns!$W2:$W37,Returns!C2:C37)	=CORREL(Returns!$W2:$W37,Returns!D2:D37)
58	=A24	=CORREL(Returns!$X2:$X37,Returns!B2:B37)	=CORREL(Returns!$X2:$X37,Returns!C2:C37)	=CORREL(Returns!$X2:$X37,Returns!D2:D37)
59	=A25	=CORREL(Returns!$Y2:$Y37,Returns!B2:B37)	=CORREL(Returns!$Y2:$Y37,Returns!C2:C37)	=CORREL(Returns!$Y2:$Y37,Returns!D2:D37)
60	=A26	=CORREL(Returns!$Z2:$Z37,Returns!B2:B37)	=CORREL(Returns!$Z2:$Z37,Returns!C2:C37)	=CORREL(Returns!$Z2:$Z37,Returns!D2:D37)
61	=A27	=CORREL(Returns!$AA2:$AA37,Returns!B2:B37)	=CORREL(Returns!$AA2:$AA37,Returns!C2:C37)	=CORREL(Returns!$AA2:$AA37,Returns!D2:D3
62	=A28	=CORREL(Returns!$AB2:$AB37,Returns!B2:B37)	=CORREL(Returns!$AB2:$AB37,Returns!C2:C37)	=CORREL(Returns!$AB2:$AB37,Returns!D2:D3
63	=A29	=CORREL(Returns!$AC2:$AC37,Returns!B2:B37)	=CORREL(Returns!$AC2:$AC37,Returns!C2:C37)	=CORREL(Returns!$AC2:$AC37,Returns!D2:D3
64	=A30	=CORREL(Returns!$AD2:$AD37,Returns!B2:B37)	=CORREL(Returns!$AD2:$AD37,Returns!C2:C37)	=CORREL(Returns!$AD2:$AD37,Returns!D2:D3
65	=A31	=CORREL(Returns!$AE2:$AE37,Returns!B2:B37)	=CORREL(Returns!$AE2:$AE37,Returns!C2:C37)	=CORREL(Returns!$AE2:$AE37,Returns!D2:D3
66				

Appendix A



	A	B	C	D	E	F	G	H	I
67	**Variance-Covariance of Monthly Stock Re**								
68		AA Returns	AIG Returns	AXP Returns	BA Returns	C Returns	CAT Returns	DD Returns	DIS Retu
69	=A2	=B36*B2*$B$2	=C36*B2*$B$3	=D36*B2*$B$4	=E36*B2*$B$5	=F36*B2*$B$6	=G36*B2*$B$7	=H36*B2*$B$8	=I36*B2*$B$9
70	=A3	=B37*B3*$B$2	=C37*B3*$B$3	=D37*B3*$B$4	=E37*B3*$B$5	=F37*B3*$B$6	=G37*B3*$B$7	=H37*B3*$B$8	=I37*B3*$B$9
71	=A4	=B38*B4*$B$2	=C38*B4*$B$3	=D38*B4*$B$4	=E38*B4*$B$5	=F38*B4*$B$6	=G38*B4*$B$7	=H38*B4*$B$8	=I38*B4*$B$9
72	=A5	=B39*B5*$B$2	=C39*B5*$B$3	=D39*B5*$B$4	=E39*B5*$B$5	=F39*B5*$B$6	=G39*B5*$B$7	=H39*B5*$B$8	=I39*B5*$B$9
73	=A6	=B40*B6*$B$2	=C40*B6*$B$3	=D40*B6*$B$4	=E40*B6*$B$5	=F40*B6*$B$6	=G40*B6*$B$7	=H40*B6*$B$8	=I40*B6*$B$9
74	=A7	=B41*B7*$B$2	=C41*B7*$B$3	=D41*B7*$B$4	=E41*B7*$B$5	=F41*B7*$B$6	=G41*B7*$B$7	=H41*B7*$B$8	=I41*B7*$B$9
75	=A8	=B42*B8*$B$2	=C42*B8*$B$3	=D42*B8*$B$4	=E42*B8*$B$5	=F42*B8*$B$6	=G42*B8*$B$7	=H42*B8*$B$8	=I42*B8*$B$9
76	=A9	=B43*B9*$B$2	=C43*B9*$B$3	=D43*B9*$B$4	=E43*B9*$B$5	=F43*B9*$B$6	=G43*B9*$B$7	=H43*B9*$B$8	=I43*B9*$B$9
77	=A10	=B44*B10*$B$2	=C44*B10*$B$3	=D44*B10*$B$4	=E44*B10*$B$5	=F44*B10*$B$6	=G44*B10*$B$7	=H44*B10*$B$8	=I44*B10*B
78	=A11	=B45*B11*$B$2	=C45*B11*$B$3	=D45*B11*$B$4	=E45*B11*$B$5	=F45*B11*$B$6	=G45*B11*$B$7	=H45*B11*$B$8	=I45*B11*B
79	=A12	=B46*B12*$B$2	=C46*B12*$B$3	=D46*B12*$B$4	=E46*B12*$B$5	=F46*B12*$B$6	=G46*B12*$B$7	=H46*B12*$B$8	=I46*B12*B
80	=A13	=B47*B13*$B$2	=C47*B13*$B$3	=D47*B13*$B$4	=E47*B13*$B$5	=F47*B13*$B$6	=G47*B13*$B$7	=H47*B13*$B$8	=I47*B13*B
81	=A14	=B48*B14*$B$2	=C48*B14*$B$3	=D48*B14*$B$4	=E48*B14*$B$5	=F48*B14*$B$6	=G48*B14*$B$7	=H48*B14*$B$8	=I48*B14*B
82	=A15	=B49*B15*$B$2	=C49*B15*$B$3	=D49*B15*$B$4	=E49*B15*$B$5	=F49*B15*$B$6	=G49*B15*$B$7	=H49*B15*$B$8	=I49*B15*B
83	=A16	=B50*B16*$B$2	=C50*B16*$B$3	=D50*B16*$B$4	=E50*B16*$B$5	=F50*B16*$B$6	=G50*B16*$B$7	=H50*B16*$B$8	=I50*B16*B
84	=A17	=B51*B17*$B$2	=C51*B17*$B$3	=D51*B17*$B$4	=E51*B17*$B$5	=F51*B17*$B$6	=G51*B17*$B$7	=H51*B17*$B$8	=I51*B17*B
85	=A18	=B52*B18*$B$2	=C52*B18*$B$3	=D52*B18*$B$4	=E52*B18*$B$5	=F52*B18*$B$6	=G52*B18*$B$7	=H52*B18*$B$8	=I52*B18*B
86	=A19	=B53*B19*$B$2	=C53*B19*$B$3	=D53*B19*$B$4	=E53*B19*$B$5	=F53*B19*$B$6	=G53*B19*$B$7	=H53*B19*$B$8	=I53*B19*B
87	=A20	=B54*B20*$B$2	=C54*B20*$B$3	=D54*B20*$B$4	=E54*B20*$B$5	=F54*B20*$B$6	=G54*B20*$B$7	=H54*B20*$B$8	=I54*B20*B
88	=A21	=B55*B21*$B$2	=C55*B21*$B$3	=D55*B21*$B$4	=E55*B21*$B$5	=F55*B21*$B$6	=G55*B21*$B$7	=H55*B21*$B$8	=I55*B21*B
89	=A22	=B56*B22*$B$2	=C56*B22*$B$3	=D56*B22*$B$4	=E56*B22*$B$5	=F56*B22*$B$6	=G56*B22*$B$7	=H56*B22*$B$8	=I56*B22*B
90	=A23	=B57*B23*$B$2	=C57*B23*$B$3	=D57*B23*$B$4	=E57*B23*$B$5	=F57*B23*$B$6	=G57*B23*$B$7	=H57*B23*$B$8	=I57*B23*B
91	=A24	=B58*B24*$B$2	=C58*B24*$B$3	=D58*B24*$B$4	=E58*B24*$B$5	=F58*B24*$B$6	=G58*B24*$B$7	=H58*B24*$B$8	=I58*B24*B
92	=A25	=B59*B25*$B$2	=C59*B25*$B$3	=D59*B25*$B$4	=E59*B25*$B$5	=F59*B25*$B$6	=G59*B25*$B$7	=H59*B25*$B$8	=I59*B25*B
93	=A26	=B60*B26*$B$2	=C60*B26*$B$3	=D60*B26*$B$4	=E60*B26*$B$5	=F60*B26*$B$6	=G60*B26*$B$7	=H60*B26*$B$8	=I60*B26*B
94	=A27	=B61*B27*$B$2	=C61*B27*$B$3	=D61*B27*$B$4	=E61*B27*$B$5	=F61*B27*$B$6	=G61*B27*$B$7	=H61*B27*$B$8	=I61*B27*B
95	=A28	=B62*B28*$B$2	=C62*B28*$B$3	=D62*B28*$B$4	=E62*B28*$B$5	=F62*B28*$B$6	=G62*B28*$B$7	=H62*B28*$B$8	=I62*B28*B
96	=A29	=B63*B29*$B$2	=C63*B29*$B$3	=D63*B29*$B$4	=E63*B29*$B$5	=F63*B29*$B$6	=G63*B29*$B$7	=H63*B29*$B$8	=I63*B29*B
97	=A30	=B64*B30*$B$2	=C64*B30*$B$3	=D64*B30*$B$4	=E64*B30*$B$5	=F64*B30*$B$6	=G64*B30*$B$7	=H64*B30*$B$8	=I64*B30*B
98	=A31	=B65*B31*$B$2	=C65*B31*$B$3	=D65*B31*$B$4	=E65*B31*$B$5	=F65*B31*$B$6	=G65*B31*$B$7	=H65*B31*$B$8	=I65*B31*B
99									

Appendix B



	A	B	C	D	E	F	G
100			1	2	3	4	5
101							
102	**Border Multiplied Variance-Cova**		AA Returns	AIG Returns	AXP Returns	BA Returns	C Retu
103		Weight	=OFFSET($B$103,C100,0)	=OFFSET($B$103,D100,0)	=OFFSET($B$103,E100,0)	=OFFSET($B$103,F100,0)	=OFFSET
104	=A2	0.03333333333	=$B104*C$103*B69	=$B104*D$103*C69	=$B104*E$103*D69	=$B104*F$103*E69	=$B104*(
105	=A3	0.03333333333	=$B105*C$103*B70	=$B105*D$103*C70	=$B105*E$103*D70	=$B105*F$103*E70	=$B105*(
106	=A4	0.03333333333	=$B106*C$103*B71	=$B106*D$103*C71	=$B106*E$103*D71	=$B106*F$103*E71	=$B106*(
107	=A5	0.03333333333	=$B107*C$103*B72	=$B107*D$103*C72	=$B107*E$103*D72	=$B107*F$103*E72	=$B107*(
108	=A6	0.03333333333	=$B108*C$103*B73	=$B108*D$103*C73	=$B108*E$103*D73	=$B108*F$103*E73	=$B108*(
109	=A7	0.03333333333	=$B109*C$103*B74	=$B109*D$103*C74	=$B109*E$103*D74	=$B109*F$103*E74	=$B109*(
110	=A8	0.03333333333	=$B110*C$103*B75	=$B110*D$103*C75	=$B110*E$103*D75	=$B110*F$103*E75	=$B110*(
111	=A9	0.03333333333	=$B111*C$103*B76	=$B111*D$103*C76	=$B111*E$103*D76	=$B111*F$103*E76	=$B111*(
112	=A10	0.03333333333	=$B112*C$103*B77	=$B112*D$103*C77	=$B112*E$103*D77	=$B112*F$103*E77	=$B112*(
113	=A11	0.03333333333	=$B113*C$103*B78	=$B113*D$103*C78	=$B113*E$103*D78	=$B113*F$103*E78	=$B113*(
114	=A12	0.03333333333	=$B114*C$103*B79	=$B114*D$103*C79	=$B114*E$103*D79	=$B114*F$103*E79	=$B114*(
115	=A13	0.03333333333	=$B115*C$103*B80	=$B115*D$103*C80	=$B115*E$103*D80	=$B115*F$103*E80	=$B115*(
116	=A14	0.03333333333	=$B116*C$103*B81	=$B116*D$103*C81	=$B116*E$103*D81	=$B116*F$103*E81	=$B116*(
117	=A15	0.03333333333	=$B117*C$103*B82	=$B117*D$103*C82	=$B117*E$103*D82	=$B117*F$103*E82	=$B117*(
118	=A16	0.03333333333	=$B118*C$103*B83	=$B118*D$103*C83	=$B118*E$103*D83	=$B118*F$103*E83	=$B118*(
119	=A17	0.03333333333	=$B119*C$103*B84	=$B119*D$103*C84	=$B119*E$103*D84	=$B119*F$103*E84	=$B119*(
120	=A18	0.03333333333	=$B120*C$103*B85	=$B120*D$103*C85	=$B120*E$103*D85	=$B120*F$103*E85	=$B120*(
121	=A19	0.03333333333	=$B121*C$103*B86	=$B121*D$103*C86	=$B121*E$103*D86	=$B121*F$103*E86	=$B121*(
122	=A20	0.03333333333	=$B122*C$103*B87	=$B122*D$103*C87	=$B122*E$103*D87	=$B122*F$103*E87	=$B122*(
123	=A21	0.03333333333	=$B123*C$103*B88	=$B123*D$103*C88	=$B123*E$103*D88	=$B123*F$103*E88	=$B123*(
124	=A22	0.03333333333	=$B124*C$103*B89	=$B124*D$103*C89	=$B124*E$103*D89	=$B124*F$103*E89	=$B124*(
125	=A23	0.03333333333	=$B125*C$103*B90	=$B125*D$103*C90	=$B125*E$103*D90	=$B125*F$103*E90	=$B125*(
126	=A24	0.03333333333	=$B126*C$103*B91	=$B126*D$103*C91	=$B126*E$103*D91	=$B126*F$103*E91	=$B126*(
127	=A25	0.03333333333	=$B127*C$103*B92	=$B127*D$103*C92	=$B127*E$103*D92	=$B127*F$103*E92	=$B127*(
128	=A26	0.03333333333	=$B128*C$103*B93	=$B128*D$103*C93	=$B128*E$103*D93	=$B128*F$103*E93	=$B128*(
129	=A27	0.03333333333	=$B129*C$103*B94	=$B129*D$103*C94	=$B129*E$103*D94	=$B129*F$103*E94	=$B129*(
130	=A28	0.03333333333	=$B130*C$103*B95	=$B130*D$103*C95	=$B130*E$103*D95	=$B130*F$103*E95	=$B130*(
131	=A29	0.03333333333	=$B131*C$103*B96	=$B131*D$103*C96	=$B131*E$103*D96	=$B131*F$103*E96	=$B131*(
132	=A30	0.03333333333	=$B132*C$103*B97	=$B132*D$103*C97	=$B132*E$103*D97	=$B132*F$103*E97	=$B132*(
133	=A31	0.03333333333	=$B133*C$103*B98	=$B133*D$103*C98	=$B133*E$103*D98	=$B133*F$103*E98	=$B133*(
134	Sum of Weights	=SUM(B104:B133)	=SUM(C104:C133)	=SUM(D104:D133)	=SUM(E104:E133)	=SUM(F104:F133)	=SUM(G1

Appendix C

ECONOMICS ARTICLES

DIVERSITY AND SCHOOL DISTRICT SPENDING

Peter M. Mitias, American University of Sharjah

ABSTRACT

This paper is an empirical investigation of the hypothesis that the degree of homogeneity within a school district affects the mix of funding that the school district receives. The changing mix of school district finance has received a great deal of attention recently (Murray et al 1998, Hoxby 1998,1996, Hanushek 1986, Card and Krueger 1996). While there has been a great deal of work on the equity and efficiency of funding types, there has been little inquiry into the nature of the variance in the mix of school district financing. In this paper we develop a framework that investigates the variance in the mix of output based on the relative homogeneity of the school district population. More specifically we hypothesize that the more homogeneous the population, the more likely the funding will come from local property tax base while the more heterogeneous populations will receive more financing from higher level governments.

INTRODUCTION

There is an extensive body of literature in economics regarding the relationship between school district resources and outcomes, the interdependence between income and education, equalization spending, and demographic effects on school outcomes and finance. However, only recently has attention been turned to the issue of the mix and source of school district financing as both an efficiency issue.

Hoxby (1996) notes that changes in the financing affects the fundamental incentives that schools face, and thus changes the long term goals that they pursue, regardless of a consensus on a "preferred" system of school finance. It is these incentives that support our hypothesis and are explored in Section three. Pointing out the many 'reforms' that attempt to either reduce local control or extend it with regards to school finances reinforces the relevance of this issue. Hoxby also points

out that one of the most important trends in school finance funding is the decreased reliance on local property tax-based financing in favor of higher-level government finance, specifically state level equalization aid.[1] However, the primary focus of her work is on the efficiency-equity problem of school finance, and contends that local finance resolves much of this problem. Hoxby (1996) argues that the level of Public Schooling is allocatively efficient when the primary source of funding is local property taxed based financing because of the Tiebout process. More importantly, Hoxby notes that in these districts that there was a high degree of homogeneity among households. We contend that it is the degree of homogeneity in the district that leads to more local property tax based finance, thus leading to allocative efficiency. It also begs the question: when the primary source of funding is not reliant on the local property tax base is allocative inefficiency the necessary outcome?

The issue of the source and mix of school finance is also addressed by Murray et al. (1998). They investigate the impact of school finance equalization reform on the distribution of resources and find that these reforms have increased the aggregate level of spending on education and reduced the within-state inequalities in school districts by 19 to 34 percent. This is accomplished primarily through state funding by means of higher state taxes. Also, they find that from 1972-1992 that the share of local spending was rising while the federal shares were dwindling. They attribute the increased percentage in state and local spending shares to recent legislation and the resulting change in behavior. However, this work does not address why there were differences in the mix of these shares to start with.

Hanushek (1986) extensively reviews the economics of education and schooling and focuses on the production and efficiency aspects of schooling. This deviates from the traditional inquiries into the ultimate uses of education. Hanushek also points out that federal funding jumped during the 60's and then slowed in growth during in the 70's and declined during the 80's. Hanushek, like Murray et. al., attribute much of the changing trend in the financing of local to the extensive legislation that restricted the use of local property tax on education funding. One key issue that this paper addresses is why these restrictions were put into place to begin with.

We posit that there need not be a "preferred" system of finance for all school districts. We believe that the "preferred" system or mix of finance by the school district is influenced by the relative homogeneity of the jurisdiction. The hypothesis is that school districts are more likely to seek more federal or state funding when the

locality is more heterogeneous. The combination of the notion that agents for the school districts engage in rent seeking behavior and the increased costs for heterogeneous groups to engage in collective decision making (reflecting a more diverse set of preferences) support this hypothesis. The question then becomes: Is the locality "financing with the feet?" In other words, do Public Schools behave like club goods and if so, does it hold to the standards of the Tiebout model?

We begin by assuming that the agents for school district are utility maximizing bureaucrats whose ultimate goal is to stay elected (Romer and Rosenthal 1978). If so, then the agent(s) would stay elected by maximizing the utility of the median voter in the jurisdiction. We assume that the distribution of preferences in the heterogeneous community will more uniform and the distribution of preferences in the homogeneous distribution to be more centralized around the mean.

Given the above assumptions, we can now examine the dilemma that the agents of the districts face. When the agent is faced with a heterogeneous distribution of tastes and preferences, it becomes more difficult for the agents to provide a bundle of services that will satisfy the desires of the local constituency. In attempting to satisfy a more diverse group, the bundle of services that must be offered will be more costly. This will make some of the constituents less willing to pay for the bundle of services. The Tiebout model suggests that those people who are not satisfied with the services or price will vote with their feet. This means that exiting individuals either change public schools (leaving the tax base) or move to a private school (reducing the perceived benefits of local taxes). This implies that we would likely see more private schools in the more heterogeneous jurisdictions than we would in the more homogeneous districts. These relationships assume that the primary source of funding is from the traditional property tax base. The model changes when the agent can seek alternative sources of funding.

With the existence of alternative sources of funding, the agent does not have to be as sensitive to the taste and preferences of the local population. The agent can substitute away from local property tax based financing to state and federal sources. The introduction of intergovernmental aid also provides the agent with the incentive to create fiscal illusion. The existence of intergovernmental aid can alter the perceived price of the bundle of services by the median voter. By controlling the amount of information the voters have about the level and type of aid, the median voter's perceived price of public schools would be less than the true marginal cost of provision (Mitias and Turnbull 2001). This lower perceived price, caused by fiscal illusion, will allow for more schooling to be provided and satisfy more of the

diverse community, thereby providing an incentive for the agent to seek alternative sources of financing.

When examining the situation faced by voters in a heterogeneous district, we adhere to the notion that the job of school finance is to create an environment that induces people to invest for schooling that is socially optimal (Hoxby 1996). Also, we accept that allocative efficiency arises in those districts that are primarily financed by a local property tax because of the Tiebout process capitalizing the value of local schools into local housing prices. However, this does not imply that allocative efficiency does not exist when the school district is not financed primarily through the local property tax base. The reason for this is that the voters have the option not only to vote with their feet (leave the Club) but also 'finance' with their feet.

If constituents are not happy with the bundle of services provided some will leave and some will end up substituting away from public to private schooling. Those who are paying for private schooling are not likely to vote for any increases in the local property tax base to finance public schools, since they are paying twice. It is the notion that 'I am only willing to pay the Public Schools if I can get what I want'. If this alienated segment of the population is disenchanted then this leaves the tastes and preferences of the remainder of the local population for the agent to satisfy. The constituents of the school district are more likely to demand that the agents seek state and federal funding sources in order to provide a bundle of services that will satisfy them.

Our empirical task is to investigate the relationship between measures of the heterogeneity of the population and different types of funding by school districts within those counties. At the county-level of analysis, we were able to obtain data on several characteristics of the population for which measures of heterogeneity could be constructed: income, education, race, and age. To do so, we generated Herfindahl-type index numbers for each variable by summing the squares of the percentage of the population that fell into each category. For example, there were six categories for income. A perfectly homogeneous population with respect to income would be obtained when everyone in the population reported income in the same category. The Herfindahl index would achieve a value of 1. A completely heterogeneous population would consist of 1/6 of the population falling into each of the six income categories, which would give the Herfindahl index a value of 0.167. There were three education categories: (1) over 25 years of age without a high school diploma, (2) over 25 years of age with a HS degree, and (3) over 25 years of age with a college degree. Again, a perfectly homogeneous population

would be characterized by Herfindahl index of 1; a perfectly heterogeneous population would have a value of 0.33. Race was calculated using 5 categories: white, black, native American, Asian/Pacific Islander, and Other. This gives a range of Herfindahl values between 0.2 and 1. Finally, the age variable contained 9 categories, with a Herfindahl Index between 0.11 and 1.

School district information was obtained from the Digest of Education Statistics 2000. From this source, revenues by source and expenditures by type were obtained and the school district data is for school districts with 15,000 or more students. The remaining data were obtained from the U.S. Census.

The specific model we estimated is:

$$FUNDING_j = \alpha_0 + \alpha_1 INC_{ij} + \alpha_2 EDUC_{ij} + \alpha_3 RACE_{ij} + \alpha_4 AGE_{ij} + \varepsilon_{ij}$$

Where

$FUNDNG_j$	=	the level of funding by type, j= federal, state, and local.
INC_i	=	the Herfindahl-based measure of the dispersion in per capita income in 1992.
$EDUC_i$	=	the Herfindahl-based measure of the dispersion in educational attainment in 1992.
$RACE_i$	=	the Herfindahl-based measure of racial diversity across a county in 1992.
AGE_i	=	the Herfindahl-based measure of the dispersion in age groups in 1992.

We expect dispersion in per capita income, education, race, and age to be positively correlated with a greater demand for federal funding in a school district. Since the Herfindahl measures achieve higher values with homogeneous populations and lower values with heterogeneous ones, the measured relationships are expected to be negative.

How sensitive are education expenditures to Federal State and Local government funding. Which is more elastic? Does the elasticity change with respect to whether the jurisdiction is more or less homogenous?

Our estimation procedure was Ordinary Least Squares regression. Our results for the 179 coterminous school districts and counties across the U.S. are presented in Table 1 and discussed below.

Table 1: Federal Funding				
	Coefficients	Standard Error	t stat	P-value
Intercept	274613.30	59621.81	4.61	8.2E-06
Age	-71.83	37.08	-1.94	5.4E-02
Educ	-11.60	11.30	-1.03	3.1E-01
Income	-24.82	14.65	-1.69	9.2E-02
Race	-10.03	3.02	-3.32	1.1E-03

We observe that the income, race, and age measures of population homogeneity all exert a significant impact on the level of federal funding received by the school district.[2] As the measure of dispersion increases (indicating greater homogeneity), the estimated level of federal funding declines, ceteris paribus. The effect is most pronounced with respect to race. The f-statistic of 8.64 is also significant and suggests the coefficients jointly explain the changes in federal funding. As a school district's heterogeneity increases in these categories we see a pronounced move towards more federal funding. This may be the result or rent-seeking behavior by school officials, or a way for the school to reduce the price local price while still increasing the bundles of services offered. Given the previous assumption that schools are club goods, greater heterogeneity will lead to a more diverse bundle to be offered. Consequently, if the necessary conditions for voting-with-the-feet exist, federal funding is a way to finance the current bundle, when the median voter may prohibit an increase in local taxes (an increase in the club fees). The education variable is not significantly different than 0. This may result from the lack of variation associated with only three categories of dispersion.

A second model was run to estimate if the effects of dispersion hold on the level of state funding demanded by a county. The results are presented in Table 2. As the table demonstrates, state funding is equally explained by changes in dispersion. The magnitudes are smaller, which corresponds to the smaller contributions given by states. Further, the dispersion on the income variable is much more pronounced at the state-level. This suggests that state legislators where revenue is generated by an income tax are much more likely to seek financing control when the chance of redistribution locally is greater (as would be the case with increased levels of heterogeneity).

Table 2: State Funding				
	Coefficients	Standard Error	t Stat	P-value
Intercept	1321315.50	330660.48	4.00	0.00
Age	-334.63	205.62	-1.63	0.11
Educ	-3.97	62.67	-0.06	0.95
Income	-193.84	81.25	-2.39	0.02
Race	-57.60	16.73	-3.44	0.00

In this paper we demonstrate that there is evidence to suggest that dispersion among groups in a school district leads to greater levels of external funding. This further suggests that schools behave like 'clubs' and where heterogeneity exists in communities, the school system has to offer an increasingly diverse bundle of goods. This investigation has given rise to several new testable hypotheses. The evidence implies that further theoretical and empirical investigation of these relationships is warranted.

ENDNOTES

1. Equalization aid is revenue aid that is directed toward districts with low property value per student (Hoxby, 1996).
2. The education variable is not significantly different than 0. This may result from the lack of variation associated with only three categories of dispersion.

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AN ANALYSIS OF ATTITUDES TOWARD FOREIGN TRADE

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ABSTRACT

Recent developments in communications technology have made the world a global work place. This changed business environment has created immense opportunities and challenges for businesses as well as universities which need to increase the supply of graduates who are capable of handling international business responsibilities. Using a questionnaire administered to undergraduate International Trade students at the beginning (pre-sample) and at the end (post-sample) of the semester, this paper analyzes differences in attitudes of students toward foreign trade based on age, major, gender, knowledge, and citizenship.

INTRODUCTION

Advancements in technologies continue to bring countries ever closer. It is not surprising that the share of imports of goods and services in world GDP has increased from 12 percent in 1965 to 24.8 percent in 2000 and has stayed constant since then. Not only are countries purchasing relatively more goods and services from outside, but significant developments in telecommunications have brought different parts of the world much closer to one another. A remarkable development of the past decade is that the world is truly becoming a global work place. The outsourcing of white-collar jobs from Europe and the U.S. to other countries attests to this phenomena. As countries become more interdependent, it is essential to train the labor force to have a better understanding of the international business environment. This need to have a globally conscious workforce has created pressures on colleges and universities to internationalize their curriculum (see, for example, Webb, Mayer, Pioche & Allen, 1999). Responding to this need, the U.S. Department of Education introduced a number of initiatives to promote international

education and research. Many institutions have received funding to develop specific international programs emphasizing business techniques, foreign languages, and an understanding of diverse cultures and customs (see, for example, Cant, 2004). Moreover, the American Assembly of Collegiate Schools of Business (AACSB) changed its accreditation standard in 1974 to require the internationalization of the business curriculum.

A major objective and challenge of business schools is to prepare students for the rapidly changing business environment. Ahlawat (2006) notes that this is particularly difficult for smaller schools which primarily serve students who come from neighboring areas and who have little exposure and sensitivity to cross-cultural differences. The biggest hurdle in internationalizing the curriculum often stems from a lack of desire on the part of students to appreciate the international business environment or to think globally. Given the importance of understanding the international aspects of business and the difficulties faced by smaller schools, it will be interesting to examine the attitudes and basic international trade knowledge of students at Pittsburg State University (PSU)[1].

In their 2005 study, Mayda and Rodrik analyze differences in attitudes towards foreign trade using two cross-country data sets. They find that pro-trade preferences are significantly related to an individual's level of human capital, in the manner predicted by the factor endowment model. Thus, highly educated individuals tend to be pro-trade in countries that are well-endowed in human capital (for example, U.S. and Germany), but are anti-trade in countries that are poorly endowed with human capital (for example, Philippines and Bangladesh). They also find empirical support for the specific factors model. A person's trade preferences are partly related to the trade exposure of the sector in which an individual is employed: individuals in non-trade sectors tend to be more pro- trade, while individuals in import-competing sectors are more protectionist. They also show that non-economic determinants play a very important role in preferences towards trade. For example, a high degree of neighborhood attachment and nationalism is associated with protectionist tendencies, while cosmopolitanism is correlated with pro-trade attitudes. Other things constant, individuals who have greater confidence in the workings of domestic political and economic institutions are less likely to be protectionist. Other studies of individual preferences regarding international trade also indicate that individuals are guided primarily by self-interest and the environment.

The purpose of this paper is to examine the differences in attitudes towards foreign trade among a sample of students enrolled in an undergraduate class in

international trade. Specifically, using responses of students to a questionnaire administered at the beginning and end of the semester, this paper seeks to explain differences in attitudes (when students are classified according to some characteristics) and whether these attitudes change after exposure to international trade issues. Section II of this paper outlines the survey methodology and summarizes the results. Section III explains the differences in attitudes based on regression analysis. The final section summarizes the main findings and conclusions.

SURVEY, METHODOLOGY AND RESULTS

In the fall 2006 term, a questionnaire was administered to an undergraduate International Trade (ECON 640) class on the first and last day of classes. This survey consisted of three parts: (1) questions regarding demographics and other student information; (2) questions about student attitudes toward foreign trade, and; (3) questions about students' basic knowledge of foreign trade. Participation in this survey was voluntary and 57 out of 77 students participated. Table 1 below summarizes the characteristics of the sample.

Table 1: Personal Information

S. No.	Characteristic/Sub-Group/Variable	Number of Students
(1)	(2)	(3)
A	SAMPLE SIZE	
A.1	Total Number of Students	77
A.2	Total Number of Respondents	57
B	CITIZENSHIP	
B.1	U. S. Citizens	45
B.2	Non U. S. Citizens	12
C	POLITICAL AFFILIATION	
C.1	Democrats	10
C.2	Republicans	22
C.3	Independent/Undecided	25
D	GENDER	
D.1	Females	25

Table 1: Personal Information		
S. No.	Characteristic/Sub-Group/Variable	Number of Students
D.2	Males	32
E	AGE DISTRIBUTION	
E.1	Younger Students (below 25 years of age)	50
E.2	Older Students (over 25 years of age)	7
F	MAJOR	
F.1	Management/Marketing	47
F.2	Others	17

Table 1 shows that 50 of the 57 respondents are younger students, 32 are male, 45 are U.S. citizens, and 47 are management/marketing majors[2]. Moreover, 22 students identify themselves as Republican, 10 Democrats, and 25 independent or undecided voters.

Analysis of Attitudes

The second part of the survey on attitudes consists of five questions designed to reflect student attitudes toward foreign trade. The student's response to each question is assigned a score in the following manner: "1" if the choice reflects a pro-trade preference and "0" otherwise. The scores are added for each student and the overall attitude score ranges from 0 to 5, with higher scores reflecting more pro-trade attitudes. These attitude scores are compiled for each respondent in the pre- and post-sample surveys. Table 2 outlines mean attitude scores for each category (sub-group) based on responses to the questionnaire, on a pre- and post-sample basis. Table 3 outlines the results for a null hypothesis of means equality between different categories in the pre- and post-samples.

> *Hypothesis 1: Do mean attitude scores vary across different sub-groups, when sub-groups are characterized by personal characteristics or attributes?*

The average attitude score for all 57 respondents is 3.63 in the pre-sample phase and 3.86 in the post-sample phase. In the pre-sample phase, the average attitude score of US citizens, Republicans, females, below 25 years of age, and

management/marketing majors is higher than the overall class average. In the post-sample phase, the average attitude score of US citizens, Democrats, males, and management/marketing majors is higher than the class average.

Table 2: Mean Attitude Scores

S. No.	Characteristic/ Sub-Group/Variable	Sample Size	Pre - Sample Mean Attitude Score (Standard Errors)	Post - Sample Mean Attitude Score (Standard Errors)	Test of Differences in Mean Attitude Scores in Pre - and Post Samples: t statistic (Probability)
(1)	(2)	(3)	(4)	(5)	(6)
A	All Respondents	57	3.63 (0.13)	3.86 (0.09)	1.44 (0.15)
B.1	U. S. Citizens	45	3.76 (0.15)	3.98(0.09)	1.26 (0.21)
B.2	Non U. S. Citizens	12	3.17 (0.21)	3.42 (0.23)	0.81 (0.33)
C.1	Democrats	10	3.20 (0.25)	3.90 (0.18)	2.28 (0.04)
C.2	Republicans	22	3.77 (0.22)	3.77 (0.16)	1.95 (0.06)
D.1	Females	25	3.76 (0.21)	3.80 (0.14)	0.16 (0.88)
D.2	Males	32	3.53 (0.16)	3.91 (0.12)	1.85 (0.07)
E.1	Younger Students (below 25 years of age)	50	3.72 (0.14)	3.42 (0.19)	1.06 (0.29)
E.2	Older Students (over 25 years of age)	7	3.00 (0.31)	3.75 (0.20)	1.55 (0.15)
F.1	Management/Marketing	47	3.74 (0.90)	3.96 (0.62)	1.34 (0.18)
F.2	Others	10	3.10 (1.19)	3.40 (0.84)	0.64 (0.53)

We find that US citizens have a higher average attitude score compared to non-US citizens in both pre- and post-samples (Table 2). The null hypothesis of equality between mean attitude scores of US and non-US citizens is rejected at the 90% level of confidence in samples (Table 3). Thus, US citizens are consistently more pro-trade. This result is contrary to Mayda and Rodrik who find that US

citizens are protectionist. We also test whether attitudes toward foreign trade differ because of party affiliations and/or beliefs. Our results show that Democrats, who tend to have a lower mean pre-attitude score, are statistically different (at the 80% confidence level) from Republicans. Thus, Republicans are more pro-trade, a finding that corresponds with our initial expectations. However, we could not reject the null hypothesis of difference in means between Democrats and Republicans in the post-sample phase. This suggests that the attitudes of Democrats are no different than those of Republicans after taking a course in international trade.

Table 3: Equality of Mean Attitude Scores between different sub - groups in Pre - and Post - samples

S. No.	Characteristic/ Sub-Group/Variable	Test of Differences in Mean Attitude Scores in Pre - Sample: t - statistics (probability)	Test of Differences in Mean Attitude Scores in Post - Sample: t - statistics (probability)
(1)	(2)	(3)	(4)
A.	U. S. versus Non - U. S. Citizens	1.90 (0.06)	2.62 (0.01)
B.	Democrats versus Republicans	1.57 (0.13)	0.48 (0.64)
C.	Males versus Females	0.88 (0.38)	0.57 (0.57)
D.	Younger versus Older Students	1.87 (0.07)	0.27 (0.79)
E.	Management/Marketing versus Other Majors	1.94 (0.06)	2.41 (0.02)

Though female students have a relatively higher pre-sample mean attitude score as compared to male students, the null hypothesis of test of equality of pre-attitude mean scores could not be rejected even at the 80% level of confidence. The same result is confirmed in the post-sample phase. Thus, we find no differences in attitudes based on gender. Table 2 shows that the younger students had a higher pre-sample mean attitude score than the older students. Null hypothesis of tests of equality of means between these two categories was rejected at 90% level of confidence, and thus the younger students were more open to trade relative to the

older students in the pre-sample phase. However, we could not reject the null hypothesis of no difference in mean attitudes scores between the two age groups in the post-sample phase. Finally, the mean attitude score of management/marketing majors is higher than that of other majors in both the pre- and post-samples. Tests of equality of means between these two sub-categories show that management/marketing majors are more open to foreign trade and this difference does not change with a course in international trade.

Thus, our results show that attitudes toward foreign trade can be different based on citizenship, political affiliation, age, and major area of study. However, we detect no difference in attitudes based on gender. We also find that some sub-groups are more likely to change their attitudes towards foreign trade as compared to others.

Hypothesis 2: Do attitudes change after a basic course in international trade?

Column (6) in Table 2 provides the test results of a null hypothesis of no statistical difference in mean attitude scores of different sub-groups in the pre- and post-samples. We find that the overall mean attitude score of the class is higher in the post-sample relative to the pre-sample. The raw mean scores for different sub-groups are also greater (except for younger students) in the post-sample relative to the pre-sample. Statistically, Democrats, males, students over 25 years of age, and management/marketing majors tend to raise their scores after undergoing a course in international trade. There are no changes in attitudes in the other sub-groups. It is important to note that no category tended to become less pro-trade after the trade course.

Analysis of Knowledge

The third part of the questionnaire consists of ten questions designed to assess the students' basic knowledge of foreign trade. Each correct response receives a score of 1 and an incorrect response receives a score of 0. These scores are added for each student, with the knowledge score ranging from 0 to 10 in the pre- and post-samples. Table 4 outlines the mean knowledge scores of different categories in the pre- and post-samples. Table 5 outlines the test results for a null hypothesis of equality of mean knowledge between different categories in the pre- and post-samples.

Table 4: Mean Knowledge Scores

S. No.	Characteristic/ Sub-Group/ Variable	Sample Size	Pre - Sample Mean Knowledge Score (Standard Errors)	Post - Sample Mean Knowledge Score (Standard Errors)	Test of Differences in Mean Knowledge Scores in Pre - and Post Samples: t statistic (Probability)
(1)	(2)	(3)	(4)	(5)	(6)
A	All Respondents	57	4.81 (0.24)	4.96 (0.23)	0.48 (0.63)
B.1	U. S. Citizens	45	4.29 (0.22)	4.56 (0.24)	0.83 (0.41)
B.2	Non U. S. Citizens	12	6.75 (0.43)	6.50 (0.44)	0.41 (0.69)
C.1	Democrats	10	4.80 (0.33)	4.60 (0.69)	0.26 (0.80)
C.2	Republicans	22	4.64 (0.44)	5.18 (0.40)	0.94 (0.35)
D.1	Females	25	4.40 (0.36)	4.44 (0.34)	0.08 (0.94)
D.2	Males	32	5..13 (0.31)	5.38 (0.30)	0.58 (0.56)
E.1	Younger Students (below 25 years of age)	50	4.72 (0.26)	4.88 (0.25)	0.44 (0.66)
E.2	Older Students (over 25 years of age)	7	5.43 (0.37)	4.96 (0.61)	0.20 (0.84)
F.1	Management/ Marketing	47	4.51 (1.74)	4.79 (1.73)	0.77 (0.44)
F.2	Others	10	6.20 (1.23)	5.80 (1.69)	0.61 (0.55)

Table5: Equality of Mean Knowledge Scores between different sub - groups in Pre - and Post - samples

S. No.	Characteristic/ Sub-Group/ Variable	Test of Differences in Mean Knowledge Scores in Pre - Sample: t - statistics (probability)	Test of Differences in Mean Knowledge Scores in Post - Sample: t - statistics (probability)
(1)	(2)	(3)	(4)
A.	U. S. versus Non - U. S. Citizens	5.14 (0.00)	3.80 (0.00)
B.	Democrats versus Republicans	0.25 (0.80)	0.77 (0.45)
C.	Males versus Females	1.55 (0.13)	2.06 (0.04)
D.	Younger versus Older Students	0.99 (0.33)	0.98 (0.33)
E.	Management/Marketing versus Other Majors	2.91 (0.01)	1.69 (0.09)

Hypothesis 3: Does basic knowledge vary across different sub-samples when sub-samples are characterized by personal characteristics or attributes?

The average knowledge score for all 57 respondents is 4.81 in the pre-sample phase and 4.96 in the post-sample phase. In the pre-sample phase, the average knowledge scores of non-US citizens, males, younger students, and other majors exceed the overall class average. In the post-sample phase, the average knowledge scores of non-US citizens, Republicans, males, older students, and other majors are higher than the overall class average.

Non-US citizens have a higher knowledge score than US citizens in both the pre-and post-samples. The null hypothesis of equality of mean knowledge scores between US and non-US citizens is rejected at the 90% confidence level of confidence in both samples. Although the score of Democrats is higher than that of Republicans in the pre-sample phase, the situation is reversed in the post-sample phase. However, results show that there is no statistical difference in mean attitudes scores of Republicans and Democrats in either sample.

Male students have a higher average knowledge score than females in both samples. The null hypothesis of equality of mean scores between males and females

is rejected (at the 80% level) in the pre-sample and likewise (at the 90% level) in the post-sample. Thus, the knowledge score of male students is statistically higher than that of female students in both sample phases. When respondents are classified according to age, older students are found to have a higher mean knowledge score than younger students in both samples. However, Table 5 shows that there is no statistical difference in mean scores based on the age of the respondents. Finally, management/marketing majors consistently have a lower mean score compared to other majors. The null hypothesis of equality is rejected (at the 90% level) in both samples. Thus, the basic knowledge of other majors is statistically greater than that of management/marketing majors in both pre- and post-samples.

Hypothesis 4: Does basic knowledge change with an undergraduate course in international trade?

Column (6) in Table 4 also outlines the t-statistics and probability of not rejecting the null hypothesis. Figures in column (6) reveal that there is no statistical difference in means scores of different categories in the pre- and post-sample phases, and thus the null hypothesis of equality of means cannot be rejected at 80 or 90% level of confidence.

Several results are worth noting. First, the mean knowledge scores of non-US citizens, male students, and other majors are greater in both sub-samples. Second, there is no difference in mean knowledge scores based on age and party affiliations. Finally, the knowledge score for each category of students did not change with a course in international trade.

Analysis of Scores

Table 6 below outlines the average percent scores received by different groups of students in the international trade course (based on quizzes, exams, homework, and class work assignments). The overall average score for all respondents (57) is 80.52. The average score for US citizens is 77.8 while for non-US citizens it is a high 90.61. The average scores for Democrats and Republicans are close (81.2). The average score for females is marginally lower at 79.30 relative to male score of 81.5. The score for younger students is 80.9, higher than that for older students at 77.5. Similarly, the average score for management/marketing majors is slightly lower at 80.3 as compared to other majors at 81.7.

Table 6: Mean Scores (percent)			
S. No.	Characteristic/Sub-Group/ Variable	Sample Size	Mean Scores (Standard Errors)
(1)	(2)	(3)	(4)
A	All Respondents	57	80.52 (2.76)
B.1	U. S. Citizens	45	77.83 (1.82)
B.2	Non U. S. Citizens	12	90.61 (4.16)
C.1	Democrats	10	81.17 (5.07)
C.2	Republicans	22	81.18 (2.47)
D.1	Females	25	79.30 (2.50)
D.2	Males	32	81.48 (2.57)
E.1	Younger Students (below 25 years of age)	50	80.94 (1.79)
E.2	Older Students (over 25 years of age)	7	77.54 (7.63)
F.1	Management/Marketing	47	80.27 (12.25)
F.2	Others	10	81.71 (19.64)

Table7: Equality of Mean Scores between different sub - groups in Pre - and Post - samples		
S. No.	Characteristic/Sub-Group/Variable	Test of Differences in Mean Knowledge Scores in Pre - Sample: t - statistics (probability)
(1)	(2)	(3)
A.	U. S. versus Non - U. S. Citizens	3.10 (0.00)
B.	Democrats versus Republicans	0.002 (0.99)
C.	Males versus Females	0.59 (0.56)
D.	Younger versus Older Students	0.61 (0.54)
E.	Management/Marketing versus Other Majors	0.30 (0.76)

Table 7 provides the results of equality tests of mean scores between different categories. We find a statistical difference only between US and non-US citizens in terms of average test scores.

REGRESSION RESULTS

The following regression model is used to analyze attitudes towards foreign trade in the post sample:

$$ATT = f(DVy, DVr, DVus, DVf, DVm, KNOW, SCORE)$$

where
ATT: attitude score for all respondents in the post-sample.
DVy: 1 if student is below 25 years of age, 0 otherwise.
DVr: 1 if student considers oneself a Republican, 0 otherwise.
DVus: 1 if student is a US citizen, 0 otherwise.
DVf: 1 if student is a female, 0 otherwise.
DVm: 1 if student is a management/marketing major, 0 otherwise.
KNOW: knowledge score for all respondents on test in the post-sample.
SCORE: Raw scores in International Trade course.

We apply the standard ordinary least squares procedure to estimate the model. The interpretation of the constant term is important as it represents the average for older students, non-Republicans, non-US citizens, and males. Thus all comparisons are made to this typical student.

Our results show that the coefficient for younger students is positive, but statistically insignificant. In this case, the sign of the coefficient is inconsistent with our earlier findings (although the statistical (in)significance is consistent with our earlier finding). Respondents who identify themselves as Republicans have a mean attitude score lower than non-Republicans (i.e., Democrats and independent/undecided); however, this estimated coefficient is not statistically significant. Female students have a lower mean attitude score than male students and this coefficient is statistically different from zero at the 90% level. In our earlier survey findings, we observe a higher raw attitude score for male students relative to female students, but do not find statistical difference between the two genders.

In the case of US citizens, we find that the mean attitude score is greater than that of non-US citizens and these mean scores are significant at the 95% confidence level. Finally, the mean attitude score of management/marketing majors

is higher than that of other majors, and this difference is statistically significant at the 95% level. Both these results (sign as well as the level of significance) are consistent with our earlier findings.

Table 8: Regression Results

S. No.	Variable	Coefficient (t - statistic)
(1)	(2)	(3)
A.	Constant	2.57 * (3.74)
B.	DVy	0.20 (0.81)
C.	DVr	-0.19 (-1.11)
D.	Dvus	0.48* (2.07)
E.	DVf	-0.29** (-1.73)
F.	DVm	0.44 * (1.95)
G.	KNOW	-0.13* (-2.17)
H.	SCORE	0.02* (2.17)
I.	R2	0.34
J.	Adj R2	0.24
K.	F- Statistic	3.59

Note:
* represents significant at 90 % level of confidence.
** represents significant at 80 % level of confidence.

The coefficient associated with knowledge is negative and significant at the 95% level, indicating that more knowledge about international trade issues has a negative impact on attitudes towards foreign trade. Finally, the coefficient associated with scores (performance) in international trade class is positive and significant, indicating that better understanding of international trade issues has a positive impact on attitudes towards trade.

SUMMARY AND CONCLUSIONS

This study is based on the expectation that a basic course in international trade, which exposes students to the concepts of foreign trade and its consequences (both positive and negative), would result in a positive change in overall attitudes. We also posit that attitudes depend on the characteristics and attributes of the respondents. Our results confirm the expectation that a course in international trade results in a positive or favorable change in attitudes. At a disaggregated level, our results confirm that attitudes toward trade are related to various attributes and demographics of the students.

We initially expected that better information (or basic knowledge) about the world and issues related to foreign trade would lead to higher mean attitude score. However, our results show that basic knowledge regarding global issues leads to a lower mean attitude score. Thus, increased knowledge about trade does not necessarily imply a better understanding of trade issues.

We expected that better performance in international trade course (as reflected by raw scores on exams, quizzes, etc.), reflecting better understanding of issues relating to foreign trade, would have a positive impact on attitudes towards foreign trade. Our results indicate that strong performance in an international trade course leads to a more positive change in attitudes toward foreign trade.

This study is based on responses of students to a questionnaire administered to a class at a small regional university. It will be interesting to extend this study to other institutions, both in the US and overseas.

ENDNOTES

1. PSU is a regional university in the state of Kansas and offers bachelors and masters degrees, with an overall enrollment of about 6,700 students. The bachelors and masters degree programs from the College of Business, which has 1700 students, are accredited by the AACSB International. More important, the College of Business has been the recipient of a Title VIB Business and International Education (BIE) grant from the Department of Education three consecutive terms beginning in 2001. Among other activities, the BIE grant has resulted in the development and implementation of a new International Business major and an International Business concentration in the MBA program, provision of outreach activities to local businesses, and the development of study abroad programs and sister-school ties in various countries in Central Asia, Central America, South America, and Asia.

2. Includes seven double majors and so the total number of majors may be greater than the total number of respondents.

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