A STUDY OF PRINCIPLES STUDENTS' OPINIONS ABOUT THE NATURE OF ECONOMICS AND ECONOMIC METHODOLOGY

by

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INTRODUCTION

Introduction

In a democracy such as the United States, public opinion is very important for the adoption and implementation of economic policies. But this also places a large responsibility upon the public to be informed about the issues that affect the affairs of the nation.

Economic policies are important to the welfare of the nation. But economic policies are not used unless they are part of a government policy or government program for which there is public support. Public opinion about the need for and desirability of a proposed economic program is a major factor in determining if a program is used or discarded. Any decision about the merit or disadvantages of a proposed economic program requires that the person making the decision has some knowledge about economics and about the way the American economy works. A literate public about economics and economic behavior is very important in a democracy, as a wrong decision made by the public can have unfortunate consequences for many people.

Unfortunately a large part of the public in this country have never had any, or at best have had little, formal instruction in economics. However these people have opinions about proposed economic programs.

Some people have had some formal training in economics, either at the high school or have taken principles courses at the college

level. Few have had more formal instruction in economics. This study is of students who have had only the principles courses. Do the principles courses provide college students with the degree of economic literacy that they need to be intelligent citizens?

The responsibility of providing the principles student with a sufficient degree of economic literacy to be an intelligent citizen places a very heavy burden on the principles course. A correct understanding of economic theory and its usefulness should be helpful in correcting the existing prejudices of the student. Blum comments on the importance of this part of teaching economics.

> Many students will have in "Principles" their only exposure to formal training in Economics. Others will be exposed to additional training. In any event, we can not hope to make economists out of our "Principles" students. This means we must indeed concentrate upon "Principles", indicating the nature of the economic problem and the methods by which it is solved.[1]
>
> Perhaps the most we can do in the "Principles" course is to create a different "attitude" on the part of the student towards Economics. The typical student comes to college with certain prejudices obtained from his parents or from his community.....But whatever their nature, these beliefs are strictly prejudices arrived at without adequate analysis. The student needs to be encouraged to examine these beliefs and expose them to whatever economic analysis we can provide in the "Principles" course.[2]

The responsibility of providing the principles student with a sufficient degree of economic literacy is furthur complicated because economists often disagree about policy issues and about the

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[1] L. Blum, "The Elementary Course," The Journal of Farm Economics, XXIX (February, 1947), p. 279.

[2] Ibid., p. 279.

nature of economics as a science. The principles student, and in some cases the general public, is often exposed to these disagreements. The controversy about raising taxes and the gold outflow during the last few months is a vivid illustration of this.

The students is also, to a certain extent, exposed to the controversies among economists about what is the proper nature of economics and what is the proper role that economists should have. The student will probably form some opinions about what he thinks is the proper solution for these controversies. These opinions will probably be based upon the material that has been presented by his instructor and the textbook. The student may remember these opinions about the nature, role, and usefulness of economics long after he has forgotten the economic theories taught in the principles course.

But these controversies are of such complexity that it often takes many years and much discussion for economists to satisfactorily resolve them. How capable are principles students of evaluating a controversy among economists about the role and nature of economics? Does the material presented in the principles course supply the student with sufficient information to form a valid opinion about a controversy among economists?

These controversies do not necessarily indicate that economists are incapable of performing a useful service. These controversies are a part of the open discussion method that scientists use to resolve difficult issues. It is hoped that economics will benefit by this process, which is certainly not limited to economics. Other sciences have their controversial issues also, but these issues are seldom exposed to the public to the degree as

are economic issues. This is probably because economic policy issues more often confront the public then issues involving other sciences. This results in economic policy issues being subjected to greater discussion and examination by the public.

This study is not considering the principles' students opinions about what are the proper economic programs that the government should adopt. The study is considering what the principles students' opinions are about the nature of economics and the proper role for economists.

The nature of economics can be thought of in several ways; as a positive or a normative science, and as a natural or a social science. The positive economist, having completed his analysis of the facts, does not make any value judgments about what is the best policy alternative. If he has to make some value judgments; he wants to limit them to the smallest number possible. The normative economist is concerned with what ought to be. He will also make an analysis of the facts, and he may use exactly the same procedure as used by the positive economist. But the normative economist will make a value judgment about what is the most desirable policy alternative.[3]

Economics can also be thought of as being a social science because it studies human problems and human behavior.[4] Others think of economics as a positive objective science in precisely

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[3]Richard G. Lipsey & Peter O. Steiner, Economics, (New York: Harper & Row, 1966), p. 13.

[4]Ibid., p. 12.

the same sense as any of the physical sciences.[5] Others claim that economics is neither a natural nor a social science, but that economics combines some of the more desirable features of the natural and of the social sciences.[6]

The term "methodology" is defined in Webster's Dictionary as "the system of methods of a science; the branch of logic concerned with the application of the principles of reasoning to scientific and philisophical inquiry".[7] The methodlogy of economics includes the methods of analysis used to perform economic analyses. Economic methodology also includes deductive and inductive reasoning which are used for solving economic problems. But economic methodology is not an unchanging concept. Its contents are decided by discussion among economists. The presently used methods of analysis and types of reasoning have been included in economic methodology only after they have been thoroughly discussed and evaluated by economists to determine the proper use of these methods and the validity and usefulness of the results obtained from using them. New methods of analysis and types of reasoning may be added

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[5]Milton Friedman, Essays in Positive Economics, (Chicago: The University of Chicago Press, 1953), p.4.

[6]Donald F. Gordon, "Operational Propositions in Economic Theory," The Journal of Political Economy, LXIII, (February, 1955), p. 157.

[7]Webster's New World Dictionary, (Cleveland & New York: The World Publishing Company), p. 927.

to economic methodology to replace older methods which are no longer considered suitable for use.

Many of the efforts of economists are for discovery of new theories and for the development and improvement of existing theories. Because of the importance of the theory in economics, this study evaluates the student's opinions about the development and usefulness of economic theories.

This study evaluates the student's opinions about these issues in economics that are formed after taking a principles course. These opinions may be partially or entirely based upon the information that is presented in the principles course; or the opinions may be based upon prejudices which the student had before taking the principles course. These opinions may have been formed after being exposed to incomplete or even false information, but they are the opinions that the student will probably remember for a long time after completing the principles course. And the student may base the decisions he makes in the future about economic issues on these opinions which he acquired before or during the principles course.

It should be useful for the principles instructor to know what the student's opinions about the nature and usefulness of economics, the usefulness of an economic theory, and the composition of economic methodology are. If the instructor is not satisfied with the opinions that his students have formed; it may be desirable for the instructor to change the type of material that he has presented in his class lectures to provide the student with more adequate information about these subjects.

Objectives of the Study

The purpose of this study is (1) to evaluate what Economics I and Economics II students think the nature of economics is, (2) to evaluate if Economics I and Economics II students have some understanding of economic methodology, (3) to evaluate, as a guide for future study, if the student's year in school, sex, grades, area of major study, and instructor have had an effect on the student's opinions about the nature and usefulness of economics and the composition of economic methodology, and (4) to determine if the different textbooks used by the Economics I and Economics II classes have had effect on the student's opinions.

Several factors which might influence the student's opinions about economics are considered in the study. These are factors that are considered to influence the learning ability of the student. The study does not try to determine the exact role played by these factors in the opinion forming process of the student. The study is only a preliminary effort to determine which of these factors appear to be important and should be more thoroughly analyzed in future studies. Thus, the following six hypotheses are the basis for analyzing the results.

1: It is thought that the student's year in college may have had an influence on his responses. Economics I classes were composed mainly of Freshmen, Sophomores, and Juniors. Economics II classes were composed mainly of Sophomores, Juniors, and Seniors. It is thought that upperclassmen should be more prepared to understand the nature of the economics.

2: It is commonly thought that men tend to perform better in a course then women do. This is based on the belief that men can understand the material studied in a course better than women can understand the material.

3: The measurement that is most commonly used to determine a student's ability is his grade point average. This study used the student's overall grade point average to evaluate his understanding of the nature of economics and of economic methodology.

4: It is possible that the type of methodology used in the student's area of major study, as defined in that discipline, may have an influence on the student's interpretation of economic methodology.

5: The responses are divided into the different sections of Economics I and Economics II. This is done to evaluate how much influence that the student's instructor has on the student's opinions. Each section had a different instructor. Some instructors, particularly in the Economics II sections, stressed economic methodology in their class. Other instructors placed very little emphasis on economic methodology.

6: Different textbooks are used in Economics I and in Economics II. The text used in Economics I places very little emphasis on the nature of economics and on economic methodology. The text used in Economics II devotes almost 60 pages to a discussion of cconomic methodology. This study attempts to determine how much the text influences the students' opinions.

7: It is sometimes recommended that the Economics I student should take Economics II immediately after taking Economics I

because the material covered in Economics I will still be well remembered. This will allow the student to do better in the Economics II course. The study considers the length of time that has passed since the Economics I course was taken.

A Review of Related Studies

A study by Meinhold, in 1961, was designed to gain some measure of the knowledge and understanding of the methodology and philosophy of science possessed by represenative secondary school science teachers. A test on the methodology of science was used. The test was first submitted to ten experts in the fields being studied for comment and criticism and then revised in accordance with their recommendations.[8]

The test was then given to a group of teachers to determine its reliability. It was also given to a group of 57 undergraduate students taking a philosophy of science course; and to 117 graduate students in education.[9]

The experimental group was a group of 1,268 secondary school teachers who taught science courses. The results indicated that the secondary school science teachers possessed no greater understanding of the methodology and philosophy of science then do teachers of other subjects. They had a mean score of 15.95 out of

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[8]Dissertation Abstracts, XXII, No. 8 (Ann Arbor, Michigan: University Microfilms, Inc., 1961), p. 2708.

[9]Ibid., p. 2708.

a total possible of 55. This compared to a score of 15.21 for the graduate students and a score of 28.95 for the undergraduate students.[10]

The study indicated that undergraduate students gain an understanding of the methodology of science if it is emphasized in the course they are taking.

Studies in the teaching of economics have dealt with the results of teaching principles courses with the use of different techniques. Other studies have measured the change of the student's attitude towards economic issues after taking an economics principles course.

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[10] Dissertation Abstracts, XXII, No. 8 (Ann Arbor, Michigan: University Microfilms, Inc., 1961), p. 2708.

CHAPTER II

PROCEDURE

Source of Data

A questionaire is used for determining what the principles student's opinions are about the nature and usefulness of economics and economic methodology. The questionaire consists of sixteen multiple choice questions. Students selected the alternative that agreed most closely with their opinion about the question.

The questionaire was reviewed by several economics graduate students and faculty and was extensively revised according to their comments and criticisms.

The questionaire was administered to 294 students who were enrolled in Economics I and in Economics II during the 16th week of the fall semester of 1967. Of this sample, 92 students were enrolled in three sections of Economics II and 202 students were enrolled in two sections of Economics I. Each section was taught by a different instructor.

Choice of the sections used in this study was made in this manner. From the corrected mid-term class enrollment lists, the number of Freshmen (men & women), Sophomores (men & women), Juniors (men & women), Seniors (men & women), and others (men & women) in each class were calculated. These statistics were also calculated for the total enrollment in Economics I, and for the total enrollment in Economics II, and converted into percentages.

The following percentage statistics were calculated for the number of students enrolled in each class, for the total number of students enrolled in Economics I, and for the total number of students enrolled in Economics II: percent Freshmen Male, percent Freshmen Female, percent Sophomore Male, percent Sophomore Female, percent Junior Male, percent Junior Female, percent Senior Male, percent Senior Female, percent other Male, and percent other Female. These values were then calculated for all possible combinations of Economics II classes taken three at a time, and for all possible combinations of Economics I classes taken two at a time. These values were used in the following formula to determine which of these combinations of classes came closest to approximating the percentage distribution of the total enrollment.

$$\frac{\left(\%\ \text{Fr. Male}_{\text{class}} - \%\ \text{Fr. Male}_{\text{total}}\right)^2 + \ldots + \left(\%\ \text{Other Fe.}_{\text{class}} - \%\ \text{Other Fe.}_{\text{total}}\right)^2}{\text{total number enrolled in the combination of classes under consideration}} = X$$

The combination of classes with the minimum X value was chosen. These classes were given the questionaire. This procedure of selecting classes is believed to determine the combinations of classes that were closest to being similar to the population under consideration.

Instructors did not announce to the students in their class the date the questionaire would be given. The number of students, in the previously chosen sections, who actually took the questionaire was dependent on the student's decision to attend or not to attend class on the day the questionaire was given.

Each student was given one copy of the questionaire, one mark sense card, one graphite pencil, and he was instructed on the proper way to indicate his responses on the card. He was also informed that the questionaire was not a test and that it would in no way affect his final grade for the course. He was requested to answer the questionaire according to his own ideas about the subjects covered; not with what he thought his instructor would want as the answer if the questions were given on a class exam. The student was also instructed on how to use the proper code on his card to indicated his (1) Year in College, (2) Sex, (3) Overall grade point average, (4) Area of major study, (5) Class section of Economics I or Economics II, and (6) for Economics II students to indicate how long it had been since they had taken Economics I.

The instructors of the classes and their graduate assistants filled out a separate questionaire listing the percentages of their class they anticipated would choose each of the alternatives for each question. The instructors were to list the percentage that applied to the entire class as a whole. They did not list percentages based on dividing their class into the above six groupings. Each question was considered as a separate entity, so the sum of the estimated percentages for each question was 100. For example, question 1 has four alternatives and one instructor responded that 80 percent of his class would choose alternative 0, 5 percent would choose alternative 1, 10 percent would choose alternative 2, and 5 percent would choose alternative 3.

This procedure is used for two reasons. First, the instructor's response is used as the expected value for a chi-square evaluation of the data obtained from the instructor's class. Second, it was assummed that the instructor's own opinions would influence the instructor's predictions about the way he anticipated his class would answer the questionaire.

Several other principles instructors were also asked to fill out identical questionaires. The answers of the Economics I instructors were averaged together to provide the expected values used in a chi-square evaluation of the pooled data from both Economics I sections. The answers of the Economics II instructors were averaged together to provide the expected values used in a chi-square evaluation of the pooled data from all three Economics II sections. The responses of all the instructors and graduate assistants were averaged together to provide the expected values used in a chi-square evaluation of the pooled data from all Economics Principles sections. The chi-square test was used to evaluate how well the instructors anticipated the students' answers.

The results anticipated by the instructors were used because some standard was needed to evaluate the students' answers to the questions. It is assummed that the instructors' predicted responses by their students is the most suitable basis for this standard.

Method of Evaluating the Influence of the Factors

To evaluate the effect of the previously mentioned factors on the student's opinions, the data are combined into the following

groups. A detailed statistical analysis of the effect of these factors on the students' responses for each question has not been made.

(1). Classification: Freshman, Sophomore, Junior, Senior, Other. This group was also subdivided into all Economics I sections and all Economics II sections.

(2). Sex: Male, Female.
This group was also subdivided into all Economics I sections and all Economics II sections.

(3). Overall Grade Point Average: 0 - .49, .50 - .99, 1.00 - 1.49, 1.50 - 1.99, 2.00 - 2.49, 2.50 - 2.99, 3.00 - 3.49, 3.50 - 4.00. This group was also subdivided into all Economics I sections and all Economics II sections.

(4). Area of Major Study: Humanity, Social Science, Natural Science, Economics, Undecided.
This group was also subdivided into all Economics I sections and all Economics II sections.

(5). Class section: two sections of Economics I, three sections of Economics II, all Economics I sections, all Economics II sections, and all Economics sections.

(6). Economics II students were asked to state how many years before that they had taken Economics I: one, two, three, or more than three years.

A series of chi-square tests is used to evaluate the effect of the six factors. A Row X^2 is used to evaluate the effects of the subgroups mentioned for each of the above groups. A Summed X^2 and a Pooled X^2 are used as two alternative ways of evaluating the effects of the above mentioned groups. A Heterogenity X^2 is used to evaluate the difference in the Summed X^2 and the Pooled X^2.

A Summed, Heterogenity, and Row X^2's are calculated for each chi-square test. The following formula is used.[11]

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[11] H. C. Fryer, Concepts and Methods of Experimental Statistics, (Boston: Allyn and Bacon, Inc., 1966), pp. 108-112.

$$\frac{\left(\begin{matrix}\text{observed} \\ \text{results}\end{matrix} - \begin{matrix}\text{expected} \\ \text{results}\end{matrix}\right)^2}{\text{expected results}} = X^2$$

where: observed results is the number of students choosing a particular alternative to a particular question.

expected results is the number of students that the instructor predicted would choose the particular alternative to a particular question.

The X^2 values computed by the above formula are the X_{ij} values used in the following. This general form is used for computing the Row X^2 values, the Pooled X^2, the Summed X^2, and the Heterogenity X^2. [12]

$$\begin{array}{llll}
X_{11} & X_{12} & X_{13}\cdots\cdots\cdots X_{1j} & \text{Row 1 } X^2 = \Sigma X_{1j}\text{: } [j = (1,\cdots\cdots,j)] \\
X_{21} & X_{22} & X_{23}\cdots\cdots\cdots X_{2j} & \text{Row 2 } X^2 = \Sigma X_{2j}\text{: } [j = (1,\cdots\cdots,j)] \\
X_{31} & X_{32} & X_{33}\cdots\cdots\cdots X_{3j} & \text{Row 3 } X^2 = \Sigma X_{3j}\text{: } [j = (1,\cdots\cdots,j)] \\
\vdots & \vdots & \vdots \qquad\qquad \vdots & \\
X_{i1} & X_{i2} & X_{i3}\cdots\cdots\cdots X_{ij} & \text{Row i } X^2 = \Sigma X_{ij}\text{: } [j = (1,\cdots\cdots,j)] \\
\hline
X_{p1} & X_{p2} & X_{p3}\cdots\cdots\cdots X_{pj} & \text{Pooled } X^2 = \Sigma X_{pj}\text{: } [j = (1,\cdots\cdots,j)]
\end{array}$$

where: the Summed X^2 is computed by summing all of the Row X^2 values over 1 to i.

the Heterogenity X^2 is computed by subtracting the Pooled X^2 from the Summed X^2.

The Row X^2, Pooled X^2, Summed X^2, and Heterogenity X^2 calculated values are checked for statistical significance. These values are compared for all questions and evaluated to determine which of

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[12] Fryer, op. cit., pp. 108-112.

the six factors had an effect on the student responses to many of the questions on the questionaire. Factors that are significant should be important and evaluated in a future study.

A correlation coefficient was calculated to measure the relationship between the actual values and the expected values for each of the Economics I sections, for each of the Economics II sections, for both Economics I sections, for the three Economics II sections, and for all five Economics sections. This was done to determine how well the instructor's expected values were correlated with the actual values. The following correlation equation was used.[13]

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

where: r is the correlation coefficient.

X is the expected results which is the number of students that the instructor predicted would choose the particular alternative to a particular question.

Y is the observed results which is the number of students choosing a particular alternative to a particular question.

The Limititations of the Study

It is difficult to determine when students form opinions about economics and about economic methodology. Their opinions may have been formed when they took the principles course, or may have been present before they took the principles course. The study is concerned with the opinions of the students after completing the Economics I or Economics II course.

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[13]Fryer, op. cit., pp. 224-227.

It is difficult to determine if the students actually understand the material that was covered on the questionaire. The material presented on the questionaire was designed to be information of the type and level that is presented in the principles course. It must be assummed that most of the students based their chosen answers, for some of the questions, on the information presented in the questionaire. The evaluation of the results can only be based on the material presented on the questionaire. For several of the questions, the students' responses may not indicate that they actually understand the issues covered in the question.

The results of the questionaire are only as valid as the students answering the questionaire decided to make them. There is no way of determining if the students made an honest effort to answer the questionaire to the best of their abilities or if they failed to make such an effort. However this difficulty is no unique to this study.

The sample size for some of the subgroups is rather small and reduces the possibility of showing statistically significant results. But most of the samples are large enough to provide reliable results. However because this study is only concerned with making preliminary evaluation of the importance of these factors, the results of the small subgroups should be evaluated.

CHAPTER III

THE COMPOSITION AND RESULTS OF THE QUESTIONAIRE

Each of the questions included in the questionaire is designed to find out the student's opinion about an issue in economics or in economic methodology. Because economists do not agree on some of these issues, some questions have more than one alternative that could be considered correct.

The alternatives presented in each question are phrased in terms that the principles student should be able to understand. This presentation is considered necessary because the principles student is not prepared to understand many of the finer points that divide economists in the discussion of these issues.

The following section presents the questions used, an explanation of the purpose of including the question, and a short summary stating how the students answered the question.

Question 1: Economics is

0 a social science because it deals with the same type of facts and it uses the same methods as psychology, sociology, criminology, etc. Its theories are only tentative and subject to being changed at any time.

1 a natural science because it deals with the same type of positive facts and uses the same type of methods as biology, chemistry, physics, geology, etc. Its theories are very concise and definite. They are seldom changed because of their conciseness and accepted truth.

2 somewhere between a social science and a natural science; but economists are still uncertain about what the exact nature of economics is. There is a large controversy among economists today about the nature of economics.

3 I do not know.

The issue of whether economics is a natural science, a social science, or a mixture of the two types of sciences is still controversial among economists. Some economists insist that economics is or should be treated as a natural science. Friedman, in his book Essays in Positive Economics, stresses that positive economics can be an objective science in the same sense as the natural sciences have become objective sciences.[14]

Other economists insist, just as strongly, that economics is a social science and should be treated as one. McConnell[15] and Lipsey & Steiner,[16] in their principles textbooks, write that economics is a social science and has been successful using the methods of the social sciences.

Other economists state that economics is not entirely a natural science and not entirely a social science, but that it is somewhere between the two. It uses the procedures of these sciences that work the best for economics. Buchanan writes that economics is not independent from its scientific neighbors and that it can learn important things from its neighbors and can in turn contribute important things to them.[17]

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[14]Friedman, op. cit., p. 4.

[15]Campbell R. McConnell, Economics, Principles, Problems, and Policies, third edition, (New York, St. Louis, San Francisco, Toronto, London: McGraw Hill Book Company, 1966), p. 6.

[16]Lipsey & Steiner, op. cit., p. 12.

[17]James M. Buchanan, "Economics and its Scientific Neighbors," The Structure of Economic Science, edited by Sherman Roy Krupp, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966) pp. 166-183.

TABLE I

STUDENT RESPONSES TO QUESTION 1
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	3	Total
Classification						
Econ I	Freshmen	28	0	21	3	52
	Sophomores	53	0	39	3	95
	Juniors	27	0	19	2	48
	Seniors	2	1	3	0	6
	Others	0	0	0	0	0
Econ II	Freshmen	2	0	0	0	2
	Sophomores	18	1	18	0	37
	Juniors	21	0	15	0	36
	Seniors	4	2	6	0	12
	Others	1	0	4	0	5
Sex						
Econ I	Male	76	1	61	7	145
	Female	34	0	21	1	56
Econ II	Male	40	3	38	0	81
	Female	6	0	5	0	11
Overall Grade Point						
Econ I	0.0 - .49	1	0	0	0	1
	.50 - .99	0	0	0	1	1
	1.00 - 1.49	3	0	4	1	8
	1.50 - 1.99	20	0	12	1	33
	2.00 - 2.49	39	1	25	3	68
	2.50 - 2.99	26	0	23	2	51
	3.00 - 3.49	13	0	12	0	25
	3.50 - 4.00	8	0	5	0	13
Econ II	0.0 - .49	1	0	0	0	1
	.50 - .99	0	0	0	0	0
	1.00 - 1.49	2	0	1	0	3
	1.50 - 1.99	10	1	7	0	18

TABLE I

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	15	1	14	0	30
	2.50 - 2.99	13	1	12	0	26
	3.00 - 3.49	2	0	7	0	9
	3.50 - 4.00	3	0	2	0	5
Major						
Econ I	Humanities	6	0	2	1	0
	Social Sciences	30	0	31	2	63
	Natural Sciences	59	1	46	4	110
	Undecided	10	0	3	1	14
	Economics	5	0	0	0	5
Econ II	Humanities	3	0	0	0	3
	Social Sciences	23	1	18	0	42
	Natural Sciences	13	1	17	0	31
	Undecided	1	0	1	0	2
	Economics	6	1	7	0	14
Class Section						
Econ I	Section A	57	1	33	5	96
	Section B	53	0	49	3	105
Econ II	Section C	12	1	13	0	26
	Section D	26	1	21	0	48
	Section E	8	1	9	0	18
Years Passed After Taking Economics I						
	One year	32	0	25	0	57
	Two years	10	2	9	0	21
	Three years	1	1	1	0	3
	More than three	3	0	8	0	11

Half of the students stated that economics is a social science and half stated that economics is somewhere between a social and a natural science. The instructors had anticipated that fewer students would consider economics a social science and that more students would consider economics a natural science.

Students' responses were probably influenced by the textbook by McConnell, used in Economics I, and the textbook by Lipsey and Steiner, used in Economics II, as both books stress that economics is a social science.

Question 2: An economic problem exists in a country. Ten economists are given the important facts and are asked to develop a possible solution. Keeping in mind your impression about the preciseness of economic reasoning and its ability to solve problems, how would you expect the ten economists' solutions to the problem to be related?

0 All ten should come up with approximately the same solutions and their recommendations should be about the same.

1 There would probably be ten different solutions. Each economist would attempt to solve the problem by using the methods that he considers to be the best. He would also try to achieve the results that he considers to be the most desirable. This difference in opinion about the best method and the most desirable results is the reason for the difference in opinion.

2 There would probably be ten different solutions. This is because of the complexity of an economic problem and the difficulty of determining a solution for it.

This question attempts to determine how much agreement principles students expect would exist among economists working on a common problem. If they anticipate that there will be little agreement; do they attribute this to the complexity of an economic analysis, or to the different results obtained by the methods used for analysis by each of the economists.

TABLE II

STUDENT RESPONSES TO QUESTION 2
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	Total
Classification					
Econ I	Freshmen	5	36	11	52
	Sophomores	13	67	15	95
	Juniors	5	36	7	48
	Seniors	0	4	2	6
	Others	0	0	0	0
Econ II	Freshmen	1	1	0	2
	Sophomores	7	28	2	37
	Juniors	8	26	2	36
	Seniors	6	6	0	12
	Others	1	3	1	5
Sex					
Econ I	Male	16	100	29	145
	Female	7	28	2	37
Econ II	Male	22	54	5	81
	Female	1	10	0	11
Overall Grade Point					
Econ I	0.0 - .49	0	1	0	1
	.50 - .99	0	0	1	1
	1.00 - 1.49	2	3	3	8
	1.50 - 1.99	4	24	5	33
	2.00 - 2.49	4	50	14	68
	2.50 - 2.99	9	38	4	51
	3.00 - 3.49	3	15	7	25
	3.50 - 4.00	1	11	1	13
Econ II	0.0 - .49	0	2	0	2
	.50 - .99	0	0	0	0
	1.00 - 1.49	2	1	0	3
	1.50 - 1.99	4	13	1	18

TABLE II

CONTINUED

Groups		Alternatives 0	1	2	Total
Overall Grade Point					
Econ II	2.00 - 2.49	9	19	2	30
	2.50 - 2.99	6	18	2	26
	3.00 - 3.49	2	7	0	9
	3.50 - 4.00	0	5	0	5
Major					
Econ I	Humanities	0	8	1	9
	Social Sciences	9	43	11	63
	Natural Sciences	9	80	21	110
	Undecided	0	1	1	2
	Economics	4	9	1	14
Econ II	Humanities	1	2	0	3
	Social Sciences	9	31	2	42
	Natural Sciences	9	21	1	31
	Undecided	0	1	1	2
	Economics	4	9	1	14
Class Section					
Econ I	Section A	15	65	16	96
	Section B	8	78	19	105
Econ II	Section C	9	14	3	26
	Section D	8	38	2	48
	Section E	6	12	0	18
Years Passed After Taking Economics I					
	One year	12	43	2	57
	Two years	6	13	2	21
	Three years	2	1	9	3
	More than three	3	7	1	11

Approximately 70 percent of all the students stated that the economists would come up with different solutions because of the results from different methods used by the economists. The response of the other 30 percent indicated a difference between Economics I and Economics II students. Most of the Economics II students stated that the economists should come up with the same solution, whereas about 20 percent of the remaining Economics I students selected alternative 2. The instructors anticipated few students would select alternative 0.

Question 3: Now assume that you are given the job of selecting one of the economists who is to solve the economic problem. Several political policies have been suggested as possible solutions for the economic problem. You are given the following information to guide you in making your choice.

A normative economist will study all of the policies to determine their results if they are used in the most efficient way. He will then choose the policy that seems to be the best according to his interpretation of economic theory. He makes a value judgment. He will then recommend that this is the policy that should be used because it will produce the most desirable results.

A positive economist will study each policy to determine its results if it is used in the most efficient way. With his advice as a guide, someone else will choose which policy is actually used. The economist does not make a value judgment.

Which economist will you select for the job?

0 a positive economist.

1 a normative economist.

2 neither type of economist because the policies that can be used are political policies and are not proper subject matter for economists, even though the problem is an economic one.

The division of economists into positive and normative schools has existed for many years. The positive school concerns itself about the probable consequences of given lines of action but does not pass moral judgments about the rightness or wrongness of them. The normative or ethical school regards political economy as having a high ethical task and being concerned with the most important motives of human life. To them, economics is not merely to classify the motives that prompt economic activity, but also to weigh and compare their moral merits.[18]

Question three considers what principles students feel is the proper role of an economist. Should the economist make decisions about the rightness or wrongness of an economic policy, or should the economist just develop the economic policies and let someone else make the moral or value judgments about the use of the economic policies?

Approximately 50 percent of the Economics I students would select a positive economist, 37 percent would select a normative economist, and 13 percent would not select an economist. Approximately 65 percent of the Economics II students would select a positive economist, 25 percent would select a normative economist, and 10 percent would not select an economist. The instructors anticipated fewer students would select a normative economist, and that more students would not select an economist.

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[18]John Neville Keynes, The Scope and Method of Political Economy, (London, New York: Macmillan and Co., 1891), pp. 9-23.

TABLE III

STUDENT RESPONSES TO QUESTION 3
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	Total
Classification					
Econ I	Freshmen	23	22	7	52
	Sophomores	49	32	14	95
	Juniors	24	19	6	49
	Seniors	3	3	0	6
	Others	0	0	0	0
Econ II	Freshmen	0	1	1	2
	Sophomores	30	4	2	36
	Juniors	18	13	4	35
	Seniors	6	4	2	12
	Others	3	1	1	5
Sex					
Econ I	Male	68	55	23	146
	Female	31	21	4	56
Econ II	Male	51	18	10	79
	Female	6	5	0	11
Overall Grade Point					
Econ I	0.0 - .49	0	1	0	1
	.50 - .99	1	0	0	1
	1.00 - 1.49	4	3	1	8
	1.50 - 1.99	7	18	8	33
	2.00 - 2.49	33	26	9	68
	2.50 - 2.99	25	23	3	51
	3.00 - 3.49	18	3	4	25
	3.50 - 4.00	11	2	1	14
Econ II	0.0 - .49	1	0	0	1
	.50 - .99	0	0	0	0
	1.00 - 1.49	2	1	0	3
	1.50 - 1.99	10	3	5	18

TABLE III

CONTINUED

Groups		Alternatives 0	1	2	Total
Overall Grade Point					
Econ II	2.00 - 2.49	13	13	3	29
	2.50 - 2.99	21	3	2	26
	3.00 - 3.49	7	1	0	8
	3.50 - 4.00	3	2	0	5
Major					
Econ I	Humanities	4	4	1	9
	Social Sciences	33	23	7	63
	Natural Sciences	55	42	14	111
	Undecided	3	7	4	14
	Economics	4	0	1	5
Econ II	Humanities	2	0	1	3
	Social Sciences	28	13	1	42
	Natural Sciences	19	8	3	30
	Undecided	1	0	1	2
	Economics	7	2	4	13
Class Section					
Econ I	Section A	46	38	12	96
	Section B	53	38	15	106
Econ II	Section C	15	9	2	26
	Section D	29	11	6	46
	Section E	13	3	2	18
Years Passed After Taking Economics I					
	One year	36	17	3	56
	Two years	13	2	5	20
	Three years	2	1	0	3
	More than three	6	3	2	11

Question 4: You read that a well-known economist is proposing a policy that is supposed to increase the welfare (utility) of everyone. But his reasons, which you do not really understand, are totally different from the utility theory that you were taught in college economics. Which of the following would be your most probable reaction to his proposal:

0 Your decision would be to reject his policy because it is different and does not agree with the economics you studied in college.

1 You would try to decide if this economist's reasoning is correct before deciding if you will support his policy (even though his ideas are not the same as your ideas) or reject it.

2 You would accept the policy completely because he is an economist and would know more about economics than you do.

This question is an attempt to determine if the student tends to accept the economics taught in his principles courses as an absolute unchanging truth, if the student is willing to accept any ideas stated by a person who has convinced the student that he is an economist, or if the student is open-minded enough to consider new economic ideas and base his acceptance or non-acceptance of the new ideas upon what knowledge of economics that he does possess. This might influence the student's actions in the future when new economic ideas are developed and placed before the public in an attempt to get a government policy changed.

Almost all of the students stated that they would try to decide if the economist's policy was correct before deciding whether to accept or reject it. Economics II students placed more emphasis on using their college economics courses as a basis for making a decision about the correctness of the new policy, but only about 4 percent of them indicated this. The instructors had not

TABLE IV

STUDENT RESPONSES TO QUESTION 4
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	Total
Classification					
Econ I	Freshmen	2	47	2	51
	Sophomores	2	85	8	95
	Juniors	2	46	1	49
	Seniors	1	5	0	6
	Others	0	0	0	0
Econ II	Freshmen	0	2	0	2
	Sophomores	1	36	0	37
	Juniors	2	32	1	35
	Seniors	1	11	0	12
	Others	0	5	0	5
Sex					
Econ I	Male	6	136	4	146
	Female	1	47	7	55
Econ II	Male	3	77	0	80
	Female	1	9	1	11
Overall Grade Point					
Econ I	0.0 - .49	0	1	0	1
	.50 - .99	0	1	0	1
	1.00 - 1.49	0	6	2	8
	1.50 - 1.99	1	31	1	33
	2.00 - 2.49	3	60	4	67
	2.50 - 2.99	3	44	4	51
	3.00 - 3.49	0	25	0	25
	3.50 - 4.00	0	14	0	14
Econ II	0.0 - .49	0	1	0	1
	.50 - .99	0	0	0	0
	1.00 - 1.49	0	3	0	3
	1.50 - 1.99	1	16	1	18

TABLE IV

CONTINUED

Groups		Alternatives 0	1	2	Total
Overall Grade Point					
Econ II	2.00 - 2.49	2	27	0	29
	2.50 - 2.99	0	26	0	26
	3.00 - 3.49	0	9	0	9
	3.50 - 4.00	1	4	0	5
Major					
Econ I	Humanities	0	9	0	9
	Social Sciences	3	54	6	63
	Natural Sciences	4	102	4	110
	Undecided	0	13	1	14
	Economics	0	5	0	5
Econ II	Humanities	0	3	0	3
	Social Sciences	1	39	1	41
	Natural Sciences	1	30	0	31
	Undecided	0	2	0	2
	Economics	2	12	0	14
Class Section					
Econ I	Section A	3	88	4	95
	Section B	4	95	7	106
Econ II	Section C	0	26	0	26
	Section D	1	45	1	47
	Section E	3	15	0	18
Years Passed After Taking Economics I					
	One year	3	53	1	57
	Two years	1	19	0	20
	Three years	0	3	0	3
	More than three	0	11	0	11

anticipated that such a large percentage of their class would try to make a fair and impartial decision about the new policy.

Question 5: The methodology of a science is

0 something that does not exist because sciences do not use methodology.

1 an opinion that is contrary to established beliefs or opinions in a science; and the science is harmed by the existance of this opinion.

2 specifically, the system of methods of a science; the branch of logic concerned with the application of the principles of reasoning to scientific and philosophical inquiry.

3 I do not know.

This question evaluates students' concepts of methodology after they have completed one or two courses of principles. Is exposure to the term methodology adequate for an understanding of what methodology is? Alternative 1 is Websters definition for heresey.[19] Alternative 2 is Webster's definition for methodology,[20] which is almost identical to the definition stated by several economists. Dictionary definitions are used on this questionaire because it is assumed that, if the student is exposed to the word methodology and wants to know its meaning, he would consult a dictionary if he was not satisfied with the definition given in the textbook or stated by his instructor. This procedure is recommended often by English instructors in Freshmen English classes.

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[19] Webster's New World Dictionary, op. cit., p. 679.

[20] Ibid., p. 927.

TABLE V

STUDENT RESPONSES TO QUESTION 5
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives				
		0	1	2	3	Total
Classification						
Econ I	Freshmen	1	2	36	13	52
	Sophomores	3	0	73	19	95
	Juniors	0	1	35	13	49
	Seniors	0	0	5	1	6
	Others	0	0	0	0	0
Econ II	Freshmen	0	0	1	1	2
	Sophomores	0	1	31	5	37
	Juniors	3	0	23	10	36
	Seniors	0	0	10	2	12
	Others	1	0	4	0	5
Sex						
Econ I	Male	4	3	108	31	146
	Female	0	0	41	15	56
Econ II	Male	4	1	59	17	81
	Female	0	0	10	1	11
Overall Grade Point						
Econ I	0.0 - .49	0	0	1	0	1
	.50 - .99	0	0	1	0	1
	1.00 - 1.49	0	0	4	4	8
	1.50 - 1.99	0	1	20	12	33
	2.00 - 2.49	3	0	47	18	68
	2.50 - 2.99	0	2	40	9	51
	3.00 - 3.49	1	0	21	3	25
	3.50 - 4.00	0	0	14	0	14
Econ II	0.0 - .49	0	0	1	1	2
	.50 - .99	0	0	1	0	1
	1.00 - 1.49	0	0	6	5	11
	1.50 - 1.99	2	2	31	16	51

TABLE V

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	3	0	71	24	98
	2.50 - 2.99	0	2	40	9	51
	3.00 - 3.49	1	0	21	3	25
	3.50 - 4.00	0	0	14	0	14
Major						
Econ I	Humanities	0	0	7	2	9
	Social Sciences	0	0	52	11	63
	Natural Sciences	2	2	79	28	111
	Undecided	0	1	8	5	14
	Economics	2	0	3	0	5
Econ II	Humanities	0	0	3	0	3
	Social Sciences	3	0	33	6	42
	Natural Sciences	1	0	23	7	31
	Undecided	0	0	0	2	2
	Economics	0	1	10	3	14
Class Section						
Econ I	Section A	3	0	65	28	96
	Section B	1	3	84	18	106
Econ II	Section C	1	0	18	7	26
	Section D	2	0	38	8	48
	Section E	1	1	13	3	18
Years Passed After Taking Economics I						
	One year	2	0	45	10	57
	Two years	1	1	13	6	21
	Three years	0	0	3	0	3
	More than three	1	0	8	2	11

Approximately 75 percent of all the students chose the definition for methodology. Two percent of the Economics I and four percent of the Economics II students stated that sciences do not use methodology. Few students chose the definition for heresey. But many of the students, 16 to 30 percent, in the different sections did not know what methodology is. Instructors anticipated that only 5 to 10 percent of their students would not know, and that 3 to 12 percent of their students would choose the definition for heresey. There was more diversity of opinion among the sections for this question then there was for the previous four questions.

Question 6: Does economics use a methodology?

0 Yes.

1 No.

2 I do not know.

The student may have been exposed to the word methodology in the principles course, but is he aware of the role played by methodology in Economics?

In three of the principles sections, 70 percent of the students stated that economics does use a methodology. One Economics I section had 50 percent of its students stating that economics does use a methodology. One Economics II section had 65 percent of its students responding similarly. From 5 to 11 percent, depending on the section, stated that economics does not use a methodology. From 16 to 40 percent, depending on the section, of the students did not know if economics uses a methodology. A

TABLE VI

STUDENT RESPONSES TO QUESTION 6
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	Total
Classification					
Econ I	Freshmen	31	2	17	50
	Sophomores	61	7	28	93
	Juniors	28	3	18	49
	Seniors	4	1	1	6
	Others	0	0	0	0
Econ II	Freshmen	1	0	1	2
	Sophomores	31	0	6	37
	Juniors	19	3	13	35
	Seniors	9	1	2	12
	Others	4	1	0	5
Sex					
Econ I	Male	92	12	38	142
	Female	32	1	23	56
Econ II	Male	58	4	19	81
	Female	6	1	3	10
Overall Grade Point					
Econ I	0.0 - .49	1	0	0	1
	.50 - .99	1	0	0	1
	1.00 - 1.49	3	0	5	8
	1.50 - 1.99	15	0	18	33
	2.00 - 2.49	41	3	21	65
	2.50 - 2.99	32	6	12	50
	3.00 - 3.49	17	4	4	25
	3.50 - 4.00	13	0	1	14
Econ II	0.0 - .49	0	0	1	1
	.50 - .99	0	0	0	0
	1.00 - 1.49	2	0	1	3
	1.50 - 1.99	10	1	7	18

TABLE VI

CONTINUED

Groups		Alternatives 0	1	2	Total
Overall Grade Point					
Econ II	2.00 - 2.49	22	1	6	29
	2.50 - 2.99	18	2	6	26
	3.00 - 3.49	9	0	0	0
	3.50 - 4.00	3	1	1	5
Major					
Econ I	Humanities	8	0	1	9
	Social Sciences	43	1	18	62
	Natural Sciences	67	9	32	108
	Undecided	3	1	10	14
	Economics	3	2	0	5
Econ II	Humanities	2	1	0	3
	Social Sciences	28	3	10	41
	Natural Sciences	23	1	7	31
	Undecided	0	0	2	2
	Economics	11	0	3	14
Class Section					
Econ I	Section A	48	7	37	92
	Section B	76	6	24	106
Econ II	Section C	17	0	9	26
	Section D	34	3	10	47
	Section E	13	2	3	18
Years Passed After Taking Economics I					
	One year	41	2	13	56
	Two years	13	1	7	21
	Three years	2	1	0	3
	More than three	8	1	2	11

higher percentage of the Economics II students were aware that methodology is used by economics. The textbook written by Lipsey and Steiner which is used in Economics II stresses economic methodology. There was very much diversity of students' opinions among the sections.

Students should understand the use and limitations of methodology. Friedman points out that economics must rely on controlled experience, because it can not use direct experiments with control over the relevant variables, to test its theories. For this reason Friedman states that, "More than other scientists, social scientists need to be self-conscious about their methodology."[21]

But when the views of other economists about economic methodology are considered; it appears that the student may be excused if he does not think that methodology is important. Koopman writes, "If methods of scaling are ever applied to measure the relative prestige of various topics in economic research, methodological discussion will undoubtedly be found to rank near the low end of the scale."[22]

Question 7: Inductive reasoning is defined as reasoning from particular facts or individual cases to a general conclusion. Deductive reasoning is defined as reasoning from known principles to the unknown, from the general to the specific, or from a premise to a logical conclusion.

Most economic theory has been developed by using

0 only inductive reasoning.

1 only deductive reasoning.

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[21]Friedman, op. cit., p. 40.

[22]Tjalling C. Koopmans, Three Essays on the State of Economic Knowledge, (New York, Toronto, London: McGraw-Hill Book Company, Inc., 1957), p. 129.

2 both inductive and deductive reasoning; the choice having been influenced by the conditions existing at the time.

3 neither inductive nor deductive reasoning. Other methods are used.

4 I do not know.

Webster's definitions for deductive[23] and inductive[24] reasoning have been used. This question is an attempt to determine what students think is the type of reasoning used by economic methodology.

John N. Keynes writes that economics will use the method that is appropriate for the problem.

> The method of political economy can not be adequately described by any single phrase; and accordingly no one method will be advocated to the entire exclusion of other methods. It will on the contrary be shown that, according to the special department or aspect of the science under investigation, the appropriate method may be either abstract or realistic, deductive or inductive, mathematical or statistical, hypothetical or historical.[25]

Approximately 60 to 95 percent of the students, depending on the section sampled, stated that economics uses both types of reasoning for developing theories. Ten to thirty percent stated that economics uses only inductive reasoning. Approximately 5 percent stated that economics uses only deductive reasoning. None of the Economics II students, and only 3 percent of the Economics I students stated that economics does not use either method.

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[23] Webster's New World Dictionary, op. cit., p. 383.

[24] Ibid., p. 744.

[25] Keynes, op. cit. pp. 29-30.

TABLE VII

STUDENT RESPONSES TO QUESTION 7
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives					
		0	1	2	3	4	Total
Classification							
Econ I	Freshmen	8	3	36	3	2	52
	Sophomores	7	4	72	3	9	95
	Juniors	3	3	40	0	3	49
	Seniors	2	0	4	0	0	6
	Others	0	0	0	0	0	0
Econ II	Freshmen	1	0	1	0	0	2
	Sophomores	2	0	34	0	1	37
	Juniors	8	1	25	0	2	36
	Seniors	1	1	9	0	1	12
	Others	1	0	4	0	0	5
Sex							
Econ I	Male	18	9	105	5	9	146
	Female	2	1	47	1	5	56
Econ II	Male	11	2	66	0	2	81
	Female	2	0	7	0	2	11
Overall Grade Point							
Econ I	0.0 - .49	1	0	0	0	0	1
	.50 - .99	0	0	1	0	0	1
	1.00 - 1.49	1	1	4	1	1	8
	1.50 - 1.99	4	4	22	0	3	33
	2.00 - 2.49	4	4	53	1	6	68
	2.50 - 2.99	5	1	42	1	2	51
	3.00 - 3.49	2	0	26	0	2	30
	3.50 - 4.00	3	0	9	2	0	14
Econ II	0.0 - .49	0	0	1	0	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	0	0	3	0	0	3
	1.50 - 1.99	3	0	14	0	1	18

TABLE VII

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	2	0	26	0	2	30
	2.50 - 2.99	5	0	19	0	1	26
	3.00 - 3.49	1	1	8	0	0	9
	3.50 - 4.00	2	0	2	0	0	4
Major							
Econ I	Humanities	0	0	9	0	0	9
	Social Sciences	4	5	48	0	6	63
	Natural Sciences	11	4	84	5	7	111
	Undecided	3	1	8	1	1	14
	Economics	2	0	3	0	0	5
Econ II	Humanities	0	0	3	0	0	3
	Social Sciences	4	1	34	0	3	42
	Natural Sciences	5	1	24	0	1	31
	Undecided	0	0	2	0	0	2
	Economics	4	0	10	0	0	14
Class Section							
Econ I	Section A	9	5	68	5	9	96
	Section B	11	5	84	1	5	106
Econ II	Section C	8	1	16	0	1	26
	Section D	4	1	40	0	3	48
	Section E	1	0	17	0	0	18
Years Passed After Taking Economics I							
	One year	5	2	46	0	4	57
	Two years	5	0	16	0	0	21
	Three years	1	0	2	0	0	3
	More than three	2	0	9	0	0	11

Instructors anticipated that more students would state that economics uses only deductive reasoning, and that substantially fewer students would state that economics uses both methods.

Question 8: Which of the following do you think best defines a theory?

0 It is a formulation of apparent relationships or underlying principles of some certain observed phenomenon which has been verified to some degree.

1 It is a needless repetition of an idea in a different word phrase or sentence.

2 It is a sequence of events in nature or in human activities that has been observed to happen with unvarying uniformity under the same conditions.

3 I do not know.

This question is an attempt to determine if the principles student is aware of the definition of the theory in economics. Alternative 0 is Webster's definition for a theory.[26] Alternative 1 is Webster's definition for a tautology.[27] Alternative 2 is Webster's definition for a law of nature.[28] Alternatives 1 and 2 are two common misconceptions of what a theory is.

It is desired that students do not think that an economic theory is a law of nature, but the student may have a valid reason for thinking that an economic theory is a tautology. Some economists think that theories are tautological in nature because

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[26] Webster's New World Dictionary, op. cit., p. 1511.

[27] Ibid., p. 1493.

[28] Ibid., p. 828.

TABLE VIII
STUDENT RESPONSES TO QUESTION 8
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	3	Total
Classification						
Econ I	Freshmen	42	0	10	0	52
	Sophomores	80	2	13	0	95
	Juniors	37	0	11	1	49
	Seniors	6	0	0	0	6
	Others	0	0	0	0	0
Econ II	Freshmen	2	0	0	0	2
	Sophomores	31	0	6	0	37
	Juniors	26	1	8	1	36
	Seniors	11	0	1	0	12
	Others	4	0	1	0	5
Sex						
Econ I	Male	113	2	30	1	146
	Female	52	0	4	0	56
Econ II	Male	66	1	13	1	81
	Female	8	0	3	0	11
Overall Grade Point						
Econ I	0.0 - .49	1	0	0	0	1
	.50 - .99	1	0	0	0	1
	1.00 - 1.49	6	0	1	1	8
	1.50 - 1.99	29	0	4	0	33
	2.00 - 2.49	53	2	13	0	68
	2.50 - 2.99	44	0	7	0	51
	3.00 - 3.49	18	0	7	0	25
	3.50 - 4.00	12	0	2	0	14
Econ II	0.0 - .49	1	0	0	0	1
	.50 - .99	0	0	0	0	0
	1.00 - 1.49	2	0	1	0	3
	1.50 - 1.99	16	0	2	0	18

TABLE VIII

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	20	0	9	1	30
	2.50 - 2.99	23	1	2	0	26
	3.00 - 3.49	8	0	1	0	9
	3.50 - 4.00	4	0	1	0	5
Major						
Econ I	Humanities	9	0	0	0	9
	Social Sciences	49	1	13	0	63
	Natural Sciences	91	1	18	1	111
	Undecided	12	0	2	0	14
	Economics	4	0	1	0	5
Econ II	Humanities	2	0	1	0	3
	Social Sciences	35	1	6	0	42
	Natural Sciences	24	0	6	1	31
	Undecided	2	0	0	0	2
	Economics	11	0	3	0	14
Class Section						
Econ I	Section A	80	0	15	1	96
	Section B	85	2	19	0	106
Econ II	Section C	22	1	3	0	26
	Section D	39	0	9	0	48
	Section E	13	0	4	1	18
Years Passed After Taking Economics I						
	One year	46	1	9	1	57
	Two years	17	0	4	0	21
	Three years	3	0	0	0	3
	More than three	8	0	3	0	11

theories are only restating what was present in the postulates they were derived from.[29] But other economists think that an economic theory can not be tautological in nature if it is to be useful. Friedman writes, "But economic theory must be more than a structure of tautologies if it is able to predict and not merely describe the consequences of action; if it is to be something different from disguised mathematics."[30]

Approximately 80 percent of all the students chose the definition for a theory. Only about one percent chose the definition for a tautology. But 10 to 22 percent, depending on the section, chose the definition for a law of nature. Instructors anticipated that more students would choose the law of nature definition and that substantially fewer students would choose the definition for a theory. Instructors also anticipated that 10 to 20 percent of the students would not know the definition of a theory, but only about one percent of the students responded that they did not know.

Question 9: To the best of your knowledge, theory is derived from

0 universal facts of knowledge that are so obviously true and self-evident that they must be accepted as the basis for a theory.

1 noting similarities in the world that happen and devising an explanation for these puzzling events.

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[29]A. B. Papandreou, "Economics and the Social Sciences," The Economic Journal, XL, (December, 1950), p. 715.

[30]Friedman, op. cit., pp. 11-12.

2 studying statistical data. A statistical analysis is performed with the data and a theory is developed from the results of the analysis.

3 Either alternative 0, 1, or 2. The choice of the methods depends on the available material that the economist has to work with.

4 I do not know.

Question 10: A theory is developed by

0 reasoning from principles which are accepted as true. The reasoning is done according to accepted rules of logic and accepted mathematical techniques.

1 observing situations containing the problem under study to discover what parts of these situations are similar. The theory becomes clear by studying these similarities.

2 understanding the results obtained by running a statistical analysis on the data.

3 I do not know.

Questions 9 and 10 refer to three possible ways in which a theory can be developed. Alternative 0, for both questions, refers to the self-evident positive theory that was emphasized by Robbins and is developed by using accepted deductive and inductive methods of reasoning. Alternative 1, for both questions, refers to the method used by the descriptive sciences which usually work with laws of nature. Alternative 2, for both questions, refers to the method used by mathematical economists. The data are usually grouped and analyzed to test hypotheses derived from an existing theory, but there have been a few attempts to develop a new theory by using statistical methods. Economics has at times used all three methods. This is referred to by alternative 3 in question 9.

Each of these methods has its supporters and spokesmen. Robbins is probably the best known spokesman for the positive orientated school of economists. One passage from his book, An Essay on the Nature and Significance of Economic Science, has been used as an example many times.

> In the light of all that has been said, the nature of economic analysis should now be plain. It consists of deductions from a series of postulates, the chief of which are almost universal facts of experience present whenever human activity has an economic aspect, the rest being assumptions of a more limited nature based upon the general features of particular situations or types of situations which the theory is used to explain.[31]

McConnell, in his principles text, devotes some space to a discussion of descriptive economics. He emphasized the importance of properly gathering the facts as the first step to studying an economic problem. The facts must be systematically arranged, interpretated, and generalized upon. This is the task of economic theory or analysis.[32]

Lipsey and Steiner, in their principles text, also devote some space to a similar discussion.

> Theories grow in answer to the question, "Why?" Some sequence of events, some regularity between two or more things is observed in the real world and someone asks why this occurs. A theory attempts to explain why.[33]

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[31]Lionel Robbins, An Essay on the Nature and Significance of Economic Science, (London: MacMillan and Co. Limited, 1937 2nd edition), p. 99.

[32]McConnell, op. cit., p. 6.

[33]Lipsey & Steiner, op. cit., p. 19.

For question 9, fifty to seventy pereent of the students, depcnding on the section, stated that economics uses all three methods. Instructors anticipated that substantially fewer students would choose this alternative. About 8 percent of the students chose the positive alternative. Instructors anticipated that 5 to 25 percent would choose this alternative. Approximately 20 percent chose the descriptive method, which agrecd closely with their instructors' anticipations. The mathematical method was chosen by 8 to 16 percent, depending on the section, of the students. Instructors had anticipated that more students would choose this alternative.

For question 10, the majority of the students were about equally divided between the use of the positive method and the use of the descriptive method, with about 40 percent of all the students choosing each alternative. Only about 8 percent of the students chose the mathematical alternative. About 7 percent stated they did not know. Instructors' anticipations of how their studcnts would answer this question varied widely. However, many more of the students did choose the descriptive method than their instructors had anticipated. This is probably because of the emphasis placed on the descriptive method in the textbooks used in the Economics I and Economics II courses.

TABLE IX

STUDENT RESPONSES TO QUESTION 9
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives					
		0	1	2	3	4	Total
Classification							
Econ I	Freshmen	5	10	6	30	1	52
	Sophomores	6	15	11	59	3	94
	Juniors	5	7	8	28	1	49
	Seniors	0	3	0	3	0	6
	Others	0	0	0	0	0	0
Econ II	Freshmen	0	2	0	0	0	2
	Sophomores	3	7	2	24	1	37
	Juniors	4	5	3	24	0	36
	Seniors	0	2	5	5	0	12
	Others	1	2	0	2	0	5
Sex							
Econ I	Male	15	27	17	84	2	145
	Female	1	8	8	36	3	56
Econ II	Male	7	17	9	47	1	81
	Female	1	1	1	8	0	11
Overall Grade Point							
Econ I	0.0 - .49	0	0	0	1	0	1
	.50 - .99	0	1	0	0	0	1
	1.00 - 1.49	1	1	2	4	0	8
	1.50 - 1.99	3	5	4	21	0	33
	2.00 - 2.49	5	14	9	38	1	67
	2.50 - 2.99	2	10	5	32	2	51
	3.00 - 3.49	5	3	3	14	0	25
	3.50 - 4.00	0	1	2	9	2	14
Econ II	0.0 - .49	0	0	0	1	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	0	2	0	1	0	3
	1.50 - 1.99	4	5	2	7	0	18

TABLE IX

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	3	6	4	16	1	30
	2.50 - 2.99	1	3	4	18	0	26
	3.00 - 3.49	0	1	0	8	0	9
	3.50 - 4.00	0	1	0	4	0	5
Major							
Econ I	Humanities	1	3	1	4	0	9
	Social Sciences	3	14	7	38	1	63
	Natural Sciences	10	18	15	63	4	110
	Undecided	1	0	2	11	0	14
	Economics	1	0	0	4	0	5
Econ II	Humanities	1	0	0	2	0	3
	Social Sciences	4	7	6	24	1	42
	Natural Sciences	1	4	3	23	0	31
	Undecided	0	1	0	1	0	2
	Economics	2	6	1	5	0	14
Class Sections							
Econ I	Section A	9	20	8	55	4	96
	Section B	7	15	17	65	1	105
Econ II	Section C	1	4	2	19	0	26
	Section D	5	10	7	25	1	48
	Section E	2	4	1	11	0	18
Years Passed After Taking Economics I							
	One year	4	9	4	40	0	57
	Two years	2	6	3	9	1	21
	Three years	0	0	2	1	0	3
	More than three	2	3	1	5	0	11

TABLE X

STUDENT RESPONSES TO QUESTION 10
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	3	Total
Classification						
Econ I	Freshmen	25	22	4	1	52
	Sophomores	36	42	8	9	95
	Juniors	18	22	4	5	49
	Seniors	2	1	2	1	6
	Others	0	0	0	0	0
Econ II	Freshmen	0	2	0	0	2
	Sophomores	16	16	3	2	37
	Juniors	18	15	0	2	35
	Seniors	3	7	2	0	12
	Others	2	3	0	0	5
Sex						
Econ I	Male	58	66	14	8	146
	Female	23	21	4	8	56
Econ II	Male	35	37	5	3	80
	Female	4	6	0	1	11
Overall Grade Point						
Econ I	0.0 - .49	0	1	0	0	1
	.50 - .99	1	0	0	0	1
	1.00 - 1.49	3	3	0	2	8
	1.50 - 1.99	11	15	5	2	33
	2.00 - 2.49	18	36	9	5	68
	2.50 - 2.99	26	20	1	4	51
	3.00 - 3.49	19	5	0	1	25
	3.50 - 4.00	3	6	3	2	14
Econ II	0.0 - .49	1	1	0	0	2
	.50 - .99	1	0	0	0	1
	1.00 - 1.49	4	4	1	2	11
	1.50 - 1.99	19	24	5	3	51

TABLE X

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	34	46	11	7	98
	2.50 - 2.99	33	36	3	4	78
	3.00 - 3.49	23	9	0	2	34
	3.50 - 4.00	5	9	3	2	19
Major						
Econ I	Humanities	2	4	1	2	9
	Social Sciences	24	27	7	5	63
	Natural Sciences	49	47	8	7	111
	Undecided	5	7	0	2	14
	Economics	1	2	2	0	5
Econ II	Humanities	2	1	0	0	3
	Social Sciences	17	20	2	2	41
	Natural Sciences	10	16	3	2	31
	Undecided	0	2	0	0	2
	Economics	10	4	0	0	14
Class Sections						
Econ I	Section A	41	41	7	7	96
	Section B	40	46	11	9	106
Econ II	Section C	12	13	0	0	25
	Section D	17	24	4	3	48
	Section E	10	6	1	1	18
Years Passed After Taking Economics I						
	One year	24	25	3	4	56
	Two years	10	10	1	0	21
	Three years	1	2	0	0	3
	More than three	4	6	1	0	11

Question 11: A theory (example: marginal utility explanation of demand) must be accepted

0 because it is obviously the only true explanation for the phenomenon which is being studied. (demand)

1 because the instructor and the text both said the theory was correct.

2 because another better and/or simpler theory for understanding and explaining demand has not been developed.

3 is a false statement. A theory does not have to be accepted if you do not have confidence that it can adequately explain the phenomenon which is being studied. (demand)

This question attempts to determine why a principles student decides to accept an economic theory as being true. Do students attribute to an economic theory the same permanance that is possessed by theories in the natural sciences? Do students accept the theory because the instructor has presented it in class? Do students accept the theory because they believe that it is the best theory available? Or are the students perceptive enough to realize that a theory does not have to be accepted if it does not perform satisfactorily?

Only 5 to 12 percent of the students stated that a theory must be accepted because it is obviously the only true explanation. This was about 10 percent fewer students than the instructors anticipated would pick this alternative. Only 3 percent of the Economics I students, and 1 percent of the Economics II students indicated they would accept a theory because both the instructor and the textbook had stated the theory. Instructors in the Economics II sections anticipated that 8 percent of their students would choose this alternative, which is quite close to the actual results.

TABLE XI

STUDENT RESPONSES TO QUESTION 11
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives				
		0	1	2	3	Total
Classification						
Econ I	Freshmen	0	5	18	28	51
	Sophomores	0	2	43	41	95
	Juniors	9	0	18	24	49
	Seniors	1	0	1	4	6
	Others	0	0	0	0	0
Econ II	Freshmen	0	1	1	0	2
	Sophomores	3	0	23	11	37
	Juniors	2	0	16	17	35
	Seniors	2	0	6	4	12
	Others	1	0	1	3	5
Sex						
Econ I	Male	11	7	58	69	145
	Female	6	0	22	28	56
Econ II	Male	8	1	40	32	81
	Female	0	0	7	3	10
Overall Grade Point						
Econ I	0.0 - .49	0	0	0	1	1
	.50 - .99	0	0	0	1	1
	1.00 - 1.49	0	0	3	5	8
	1.50 - 1.99	5	1	13	13	32
	2.00 - 2.49	5	4	26	33	68
	2.50 - 2.99	5	2	18	26	57
	3.00 - 3.49	2	0	11	12	25
	3.50 - 4.00	0	0	8	6	14
Econ II	0.0 - .49	0	0	0	1	1
	.50 - .99	0	0	0	0	0
	1.00 - 1.49	0	0	3	5	8
	1.50 - 1.99	5	1	13	13	32

TABLE XI

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	5	4	26	33	68
	2.50 - 2.99	5	2	18	26	51
	3.00 - 3.49	2	0	11	12	25
	3.50 - 4.00	0	0	8	6	14
Major						
Econ I	Humanities	0	0	4	5	9
	Social Sciences	6	0	22	35	63
	Natural Sciences	9	7	48	46	110
	Undecided	1	0	4	9	14
	Economics	1	0	2	2	5
Econ II	Humanities	1	0	1	1	3
	Social Sciences	2	1	21	17	41
	Natural Sciences	4	0	17	10	31
	Undecided	0	0	1	1	2
	Economics	1	0	7	6	14
Class Sections						
Econ I	Section A	4	3	38	51	96
	Section B	13	4	42	46	105
Econ II	Section C	3	0	13	10	26
	Section D	3	1	25	18	47
	Section E	2	0	9	7	18
Years Passed After Taking Economics I						
	One year	3	1	29	23	56
	Two years	2	0	11	8	21
	Three years	0	0	3	0	3
	More than three	3	0	4	4	11

Instructors of the Economics I sections anticipated that 25 to 50 percent, depending on the section, would choose this alternative. This was quite different from the actual results. About 40 to 50 percent of all the students stated a theory must be accepted if a better and/or simpler theory has not been developed. Instructors anticipated fewer students would choose this alternative. Approximately 40 percent of the students stated that a theory does not have to be accepted. Instructors anticipated that only about 30 percent would choose this alternative.

Question 12: A theory can only be replaced by

0 a better theory that explains or handles the problem better.

1 a simpler theory that works as well as the more complicated theory.

2 either by a simpler and/or simpler theory.

3 nothing else because a theory is the only explanation of a problem.

4 I do not know.

This question attempts to determine how permanent the principles student thinks a theory is. Does the student think that a theory can not be replaced; or does he realize that a theory can be replaced by a better theory or by a simpler theory?

Lipsey and Steiner, in their textbook, write, "Thus it is rarely, if ever, possible that we can decide to reject some theory on the basis of a single crucial observation. Most often what happens is that evidence tends to accumulate which is more or less at variance with the predictions of the theory. Eventually, as the

mass of evidence against the theory becomes impressive, someone comes forward with a new theory that is in closer agreement with the evidence then the original theory. The old theory is then abandoned."[34]

Machlup provides a vivid description of the testing process which finally determines if a theory is obsolete and should be replaced by a better theory.

> Thus, the procedure of verification may yield findings compelling the rejection of the tested hypothesis, but never findings that can "prove" its correctness, adequacy, or applicability. As in a continuing sports championship conducted by elimination rules, where the winner stays in the game as long as he is not defeated, but can always be challenged for another contest, no emperical hypothesis is safe forever; it can always be challenged for another test and may be knocked out at any time. The test results, at best, in a "confirmation" till the next time.[35]

Approximately 30 percent of the students stated that a theory can be replaced by a better theory, and 60 percent stated a theory can be replaced by a better and/or simpler theory. Only 2 to 5 percent of the students stated a theory could not be replaced. Only about 3 percent did not know, Instructors anticipated fewer students would choose the better and/or simpler alternative, and more would choose the other alternatives.

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[34]Lipsey & Steiner, op. cit., p. 23.

[35]Fritz Machlup, "The Problem of Verification in Economics," Southern Economic Journal, XXII, (July, 1955), p. 4.

TABLE XII

STUDENT RESPONSES TO QUESTION 12
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives					
		0	1	2	3	4	Total
Classification							
Econ I	Freshmen	16	0	33	2	1	52
	Sophomores	25	2	59	4	4	94
	Juniors	18	1	27	1	2	49
	Seniors	2	0	3	0	0	5
	Others	0	0	0	0	0	0
Econ II	Freshmen	1	0	1	0	0	2
	Sophomores	14	0	23	0	0	37
	Juniors	11	1	21	2	1	36
	Seniors	3	2	7	0	0	12
	Others	2	0	3	0	0	5
Sex							
Econ I	Male	42	3	87	6	6	144
	Female	19	0	35	1	1	56
Econ II	Male	26	3	49	2	1	81
	Female	5	0	6	0	0	11
Overall Grade Point							
Econ I	0.0 - .49	1	0	0	0	0	1
	.50 - .99	0	0	1	0	0	1
	1.00 - 1.49	2	0	6	0	0	8
	1.50 - 1.99	11	0	20	0	1	32
	2.00 - 2.49	21	2	36	5	3	67
	2.50 - 2.99	15	0	33	1	2	51
	3.00 - 3.49	8	1	15	1	0	25
	3.50 - 4.00	2	0	11	0	1	14
Econ II	0.0 - .49	0	0	1	0	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	2	0	1	0	0	3
	1.50 - 1.99	5	3	10	0	0	18

TABLE XII

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	10	0	19	1	0	30
	2.50 - 2.99	10	0	15	1	0	26
	3.00 - 3.49	1	0	7	0	1	9
	3.50 - 4.00	3	0	2	0	0	5
Major							
Econ I	Humanities	6	0	2	0	0	8
	Social Sciences	19	0	40	1	2	62
	Natural Sciences	31	3	68	4	5	111
	Undecided	5	0	8	1	0	14
	Economics	0	0	4	1	0	5
Econ II	Humanities	1	0	1	1	0	3
	Social Sciences	12	1	28	1	0	42
	Natural Sciences	10	1	20	0	0	31
	Undecided	1	0	1	0	0	2
	Economics	7	1	5	0	1	14
Class Sections							
Econ I	Section A	28	2	59	2	4	95
	Section B	33	1	63	5	3	105
Econ II	Section C	8	0	16	1	1	26
	Section D	14	2	32	0	0	48
	Section E	9	1	7	1	0	18
Years Passed After Taking Economics I							
	One year	17	0	37	2	1	57
	Two years	8	2	11	0	0	21
	Three years	2	0	1	0	0	3
	More than three	4	1	6	0	0	11

Question 13: Verification is defined as "To prove true, confirm, or substantiate, to check or test the accuracy or exactness of."[36] Keeping this definition in mind should help you to answer this question.

A theory, to be useful

0 must be completely tested and completely verified.

1 must be capable of being tested and subsequently verified, but it does not actually have to be tested.

2 does not have to be tested or verified. It does not even have to be capable of being tested.

3 I do not know.

The necessity of verifying a theory before it can be used has been a subject of much controversy among economists. The necessary degree of verification is a question that has yet to receive a definite and final answer. This question attempts to determine what the student's opinion is about this controversial issue.

There was much variation in both the students' opinions and the instructors' anticipations for this question. This large variation reflects on the controversial subject of this question. From 38 to 60 percent of the students, depending on the section, stated a theory only had to be capable of being tested. From 18 to 36 percent, depending on the section, stated a theory had to be completely tested and verified. From 5 to 20 percent, depending on the section, stated a theory does not need to be tested. Few of the students stated they did not know the answer to the question.

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[36] Webster's New World Dictionary, op. cit., p. 1619.

TABLE XIII

STUDENT RESPONSES TO QUESTION 13
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives				
		0	1	2	3	Total
Classification						
Econ I	Freshmen	16	25	7	4	52
	Sophomores	37	43	10	5	95
	Juniors	19	27	3	0	49
	Seniors	1	2	3	0	6
	Others	0	0	0	0	0
Econ II	Freshmen	0	2	0	0	2
	Sophomores	11	18	6	2	37
	Juniors	12	19	5	0	36
	Seniors	5	3	4	0	12
	Others	1	4	0	0	5
Sex						
Econ I	Male	53	66	19	8	146
	Female	20	31	4	1	56
Econ II	Male	25	40	15	1	81
	Female	4	6	0	1	11
Overall Grade Point						
Econ I	0.0 - .49	0	1	0	0	1
	.50 - .99	0	1	0	0	1
	1.00 - 1.49	1	5	2	0	8
	1.50 - 1.99	12	13	5	3	33
	2.00 - 2.49	24	34	6	4	68
	2.50 - 2.99	21	25	4	1	51
	3.00 - 3.49	10	11	3	1	25
	3.50 - 4.00	5	6	3	0	14
Econ II	0.0 - .49	0	0	1	0	1
	.50 - .99	0	0	0	0	0
	1.00 - 1.49	1	1	1	0	3
	1.50 - 1.99	5	11	2	0	18

TABLE XIII

CONTINUED

Groups		Alternatives 0	1	2	3	Total
Overall Grade Point						
Econ II	2.00 - 2.49	9	15	4	2	30
	2.50 - 2.99	9	13	4	0	26
	3.00 - 3.49	2	5	2	0	9
	3.50 - 4.00	3	1	1	0	5
Major						
Econ I	Humanities	2	3	3	1	9
	Social Sciences	24	33	4	2	63
	Natural Sciences	42	51	14	4	111
	Undecided	3	9	1	1	14
	Economics	2	1	1	1	5
Econ II	Humanities	0	2	1	0	3
	Social Sciences	12	23	5	2	42
	Natural Sciences	12	10	9	0	31
	Undecided	1	1	0	0	2
	Economics	4	10	0	0	14
Class Sections						
Econ I	Section A	31	47	12	6	96
	Section B	42	50	11	3	106
Econ II	Section C	10	10	5	1	26
	Section D	9	29	9	1	48
	Section E	10	7	1	0	18
Years Passed After Taking Economics I						
	One year	18	25	12	2	57
	Two years	8	12	1	0	21
	Three years	1	2	0	0	3
	More than three	2	7	2	0	11

Question 14: A theory is used

0 because it is the best tool available for dealing with the problem being studied and it is generally accepted by economists as the proper theory to use for a certain problem.

1 because it completely explains the problem because it is an exact representation of the relevant facts that are a part of the problem.

2 because nothing else is available for use in dealing with the problem.

3 is a false statement. It will not be used if the user does not think that it is proper to use the theory.

4 I do not know.

Machlup explains how a theory becomes generally accepted by economists as the proper theory to use for a certain type of economic problem.

> Even if a definitive confirmation is never possible, the number of tests which a hypothesis has survived in good shape will have a bearing on the confidence people have in its "correctness." A hypothesis confirmed and re-confirmed any number of times will have a more loyal following than one rarely exposed to the test of experience. But the strength of belief in a hypothesis depends, even more than on any direct emperical tests that it may have survived, on the place it holds within a hierarchial system of inter-related hypotheses.[37]

Few, if any economists, would argue that a theory should be an exact representation of the relevant facts that are a part of the problem because of the difficulty of obtaining all of the necessary data and information to incorporate into the theory. A usable theory can at best be only a simplified model of the real world; and even this simplified model may be very complex and very hard to work with.

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[37]Machlup, op. cit., p. 5.

TABLE XIV

STUDENT RESPONSES TO QUESTION 14
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives					
		0	1	2	3	4	Total
Classification							
Econ I	Freshmen	34	4	4	7	3	52
	Sophomores	70	10	4	9	2	95
	Juniors	36	3	4	6	0	49
	Seniors	3	1	1	1	0	6
	Others	0	0	0	0	0	0
Econ II	Freshmen	1	1	0	0	0	2
	Sophomores	30	1	4	1	1	37
	Juniors	27	3	4	2	0	36
	Seniors	8	0	2	1	0	11
	Others	2	2	0	1	0	5
Sex							
Econ I	Male	100	16	12	15	3	146
	Female	43	2	1	8	2	56
Econ II	Male	59	7	9	4	1	80
	Female	9	0	1	1	0	11
Overall Grade Point							
Econ I	0.0 - .49	1	0	0	0	0	1
	.50 - .99	0	0	0	1	0	1
	1.00 - 1.49	5	0	0	3	0	8
	1.50 - 1.99	17	5	3	5	3	33
	2.00 - 2.49	44	7	6	10	1	68
	2.50 - 2.99	42	4	2	2	1	51
	3.00 - 3.49	20	1	2	2	0	25
	3.50 - 4.00	13	1	0	0	0	14
Econ II	0.0 - .49	1	0	0	0	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	3	0	0	0	0	3
	1.50 - 1.99	13	3	1	1	0	18

TABLE XIV

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	23	2	2	1	1	29
	2.50 - 2.99	17	1	5	3	0	26
	3.00 - 3.49	7	1	1	0	0	9
	3.50 - 4.00	4	0	1	0	0	5
Major							
Econ I	Humanities	7	0	1	1	0	9
	Social Sciences	41	6	5	9	2	63
	Natural Sciences	80	12	6	12	1	111
	Undecided	10	0	1	1	2	14
	Economics	5	0	0	0	0	5
Econ II	Humanities	0	1	2	0	0	3
	Social Sciences	33	2	4	2	1	42
	Natural Sciences	22	2	4	2	0	30
	Undecided	2	0	0	0	0	2
	Economics	11	2	0	1	0	14
Class Sections							
Econ I	Section A	62	6	8	16	4	96
	Section B	81	12	5	7	1	106
Econ II	Section C	20	2	3	1	0	26
	Section D	35	2	6	3	1	47
	Section E	13	3	1	1	0	18
Years Passed After Taking Economics I							
	One year	43	3	7	3	0	56
	Two years	16	1	2	1	1	21
	Three years	2	0	1	0	0	3
	More than three	7	3	0	1	0	11

Approximately 70 percent of the students stated they would use a theory because it is the best tool available. This is almost double the number the instructors anticipated would choose this alternative. The remaining 30 percent of the students are about evenly divided on the next three alternatives, with 4 to 11 percent choosing each alternative. This is about half the number the instructors had anticipated. Only about 2 percent of the students stated they did not know the answer.

Question 15: In practical application, theory is

0 very useful because it accurately describes what happens in the real world.

1 only as useful in the real world as its limitations permit, and any one using the theory should know what its limitations are.

2 completely useless.

3 useful only for classroom and textbook examples; but for nothing else.

4 I do not know.

This question attempts to determine how practical the principles student thinks an economic theory is. One possible extreme is that he thinks a theory is completely worthless or at best a good example to use in a textbook or in a lecture. The other extreme is that he thinks a theory can do much more than it is capable of doing; because he feels that an economic theory is the only possible theory and is as incapable of being changed as a natural law.

The majority of the students, 85 to 100 percent, depending on the section, stated that a theory is only as useful as its limitations permit. Instructors anticipated only 30 to 70 percent,

TABLE XV

STUDENT RESPONSES TO QUESTION 15
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives					
		0	1	2	3	4	Total
Classification							
Econ I	Freshmen	4	43	0	3	2	52
	Sophomores	9	79	2	0	5	95
	Juniors	2	44	0	1	1	48
	Seniors	0	5	1	0	0	6
	Others	0	0	0	0	0	0
Econ II	Freshmen	0	2	0	0	0	2
	Sophomores	2	35	0	0	0	37
	Juniors	2	34	0	0	0	36
	Seniors	0	10	0	1	0	11
	Others	0	5	0	0	0	5
Sex							
Econ I	Male	12	122	3	3	6	146
	Female	3	49	0	1	2	55
Econ II	Male	4	75	0	1	0	80
	Female	0	11	0	0	0	11
Overall Grade Point							
Econ I	0.0 - .49	0	1	0	0	0	1
	.50 - .99	0	1	0	0	0	1
	1.00 - 1.49	1	7	0	0	0	8
	1.50 - 1.99	6	20	1	3	3	33
	2.00 - 2.49	5	55	2	1	4	67
	2.50 - 2.99	1	49	0	0	1	51
	3.00 - 3.49	2	23	0	0	0	25
	3.50 - 4.00	0	14	0	0	0	14
Econ II	0.0 - .49	0	1	0	0	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	1	2	0	0	0	3
	1.50 - 1.99	0	17	0	1	0	18

TABLE XV

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	2	27	0	0	0	29
	2.50 - 2.99	1	25	0	0	0	26
	3.00 - 3.49	0	9	0	0	0	9
	3.50 - 4.00	0	5	0	0	0	5
Major							
Econ I	Humanities	0	8	0	0	1	9
	Social Sciences	6	51	1	1	3	62
	Natural Sciences	7	96	2	3	3	111
	Undecided	2	11	0	0	1	14
	Economics	0	5	0	0	0	5
Econ II	Humanities	0	3	0	0	0	3
	Social Sciences	1	41	0	0	0	42
	Natural Sciences	2	27	0	1	0	30
	Undecided	0	2	0	0	0	2
	Economics	1	13	0	0	0	14
Class Sections							
Econ I	Section A	5	83	1	3	4	96
	Section B	10	88	2	1	4	105
Econ II	Section C	3	23	0	0	0	26
	Section D	1	45	0	1	0	47
	Section E	0	18	0	0	0	18
Years Passed After Taking Economics I							
	One year	2	54	0	0	0	56
	Two years	1	19	0	1	0	21
	Three years	0	3	0	0	0	3
	More than three	1	10	0	0	0	11

depending on the section, of their students would choose this alternative. Only about 10 percent of the students stated that a theory is very useful because it accurately describes what happens in the real world. Instructors anticipated twice as many students would choose this alternative. Only 1 to 2 percent of the students chose each of the three other alternatives.

Question 16: You have been presented supply and demand analysis with graphs. This is a geometrical analysis of supply and demand. You have also been presented the equation $p = mc = mr = ar$ which identifies the equilibrium point where the firm produces under perfect competition. This is an algebraic equation which can be used to mathematically determine the equilibrium point.

How often do you think that economics uses mathematical and geometrical analysis?

0 Very often.

1 Part of the time.

2 Seldom, if ever.

3 Never in practical uses, but only for classroom examples.

4 I do not know.

This question attempts to determine if the principles student realizes how important a role mathematics plays in economics. Does the student, after taking only one or two principles courses in economics, realize that mathematics is used very often in economics?

Baumol points out that it was not long ago that mathematical economists were generally not accepted by the others schools of economists. Mathematical economists, for several years, formed a separate school that was unable to obtain recognition from other economists. Noted economists, such as Keynes and Marshall, who

were themselves excellent mathematicians, often criticized the members of the mathematical school.[38]

But today economics uses mathematics extensively and an economist must have a knowledge of mathematics. Mathematical economists are in large demand by both business and government.[39]

The response to this question is important as the student, who majors in economics, will need more than college algebra for analysis of economic problems. For a graduate program of study in economics, it is very desirable for students to have an adequate mathematical background. This adequate mathematical background should be developed during his undergraduate study. This is why it is important for the principles student to realize that mathematics plays a large and very important role in economics today.

Students indicated that they realize that mathematics is a very important part of economics. Seventy to eighty percent of all the students stated that economics uses mathematics very often. Instructors anticipated only about 50 percent of their students would choose this alternative. Approximately 10 to 20 percent of the students stated that economics uses mathematics only part of the time, which agrees closely with the instructors anticipations. Only about 4 percent of the students stated that economics seldom, if ever, uses mathematics, which was less than the instructors had anticipated. Only about 8 percent of the students stated that they did not know.

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[38]William J. Baumol, "Economic Models and Mathematics," The Structure of Economic Science, edited by Sherman Roy Krupp, (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1966), p. 88.

[39]Ibid., p. 89.

TABLE XVI

STUDENT RESPONSES TO QUESTION 16
PRESENTED BY CLASSIFICATIONS

Groups		Alternatives 0	1	2	3	4	Total
Classification							
Econ I	Freshmen	32	7	0	3	9	51
	Sophomores	63	17	3	1	8	92
	Juniors	38	6	0	0	4	48
	Seniors	1	2	1	0	2	6
	Others	0	0	0	0	0	0
Econ II	Freshmen	2	0	0	0	0	2
	Sophomores	28	5	1	0	3	37
	Juniors	29	5	1	0	0	35
	Seniors	7	2	2	0	0	11
	Others	3	1	0	0	1	5
Sex							
Econ I	Male	96	25	4	3	15	143
	Female	38	7	0	1	8	54
Econ II	Male	61	11	3	0	4	79
	Female	8	2	1	0	0	11
Overall Grade Point							
Econ I	0.0 - .49	0	1	0	0	0	1
	.50 - .99	0	0	0	0	1	1
	1.00 - 1.49	7	1	0	0	0	8
	1.50 - 1.99	17	7	2	1	4	31
	2.00 - 2.49	42	14	1	1	8	66
	2.50 - 2.99	37	7	1	1	5	51
	3.00 - 3.49	20	0	0	0	3	23
	3.50 - 4.00	11	2	0	0	1	14
Econ II	0.0 - .49	1	0	0	0	0	1
	.50 - .99	0	0	0	0	0	0
	1.00 - 1.49	3	0	0	0	0	3
	1.50 - 1.99	12	1	3	0	1	29

TABLE XVI

CONTINUED

Groups		Alternatives 0	1	2	3	4	Total
Overall Grade Point							
Econ II	2.00 - 2.49	24	3	1	0	1	29
	2.50 - 2.99	19	6	0	0	0	25
	3.00 - 3.49	5	3	0	0	1	9
	3.50 - 4.00	5	0	0	0	0	5
Major							
Econ I	Humanities	7	0	0	0	2	9
	Social Sciences	40	10	2	1	7	60
	Natural Sciences	76	19	2	3	10	110
	Undecided	6	3	0	0	4	13
	Economics	5	0	0	0	0	5
Econ II	Humanities	3	0	0	0	0	3
	Social Sciences	31	7	2	0	1	41
	Natural Sciences	23	4	1	0	2	30
	Undecided	1	0	1	0	0	2
	Economics	11	2	0	0	1	14
Class Sections							
Econ I	Section A	59	18	1	1	14	93
	Section B	75	14	3	3	9	104
Econ II	Section C	22	2	0	0	1	25
	Section D	35	6	4	0	2	47
	Section E	12	5	0	0	1	18
Years Passed After Taking Economics I							
	One year	44	9	0	0	2	55
	Two years	15	2	3	0	1	21
	Three years	2	0	1	0	0	3
	More than three	8	2	0	0	1	11

CHAPTER IV

EVALUATION OF THE FACTORS INFLUENCE ON STUDENT'S OPINIONS

A chi-square test is used to determine if any of several factors had a significant influence on the student's opinions. The chi-square tests are used to discover which of these factors were important when the student's responses differed from the responses that the instructor predicted the students would make. The responses are compared for all of the questions to determine which of the factors are consistently important.

This is not a thorough question by question analysis to determine the exact importance of these factors. Such an analysis is greater than the scope of this study. The study is only trying to determine which of these factors appear to deserve more detailed study in future studies.

The student's year in college does not seem to have a large influence on the student's opinion. Seniors, taking Economics I, did respond more often in the way that their instructors had anticipated. The underclassman and upperclassmen taking Economics II usually responded the way that their instructors had anticipated. It is concluded that the student's year in college has very little effect on the student's choice of answers on the questionaire. Underclassmen seem to be as capable as upperclassmen of determining the nature of economics. When breaking the student's responses into the different classifications, the Economics II instructors were considerably more successful in predicting how their students would answer the questionaire.

The student's sex does appear to be an important factor. Women, particularly in Economics II responded more often in the way their instructors had anticipated. Men seldom responded in the way their instructors had anticipated. It is concluded that the instructor has more influence on the opinions of his female students. The men appear to rely on other sources, besides their instructor, when forming their opinions.

The student's grade point also appears to be a factor. Students with an overall high or low grade point average generally responded the way their instructors had anticipated. Students with an average overall grade point consistently responded quite differently than their instructors had anticipated. The majority of the students in the principles classes had an average overall grade point. This seems to indicate that the students with a very high or a very low grade point average tend to base their opinions primarily on the views stated by their instructor, while the students with average grades base their opinions on other sources instead of relying only on what their instructor has stated in the class. Apparently this procedure does not work well enough to help the students with a low grade point to raise their grades, even though it does have a substantial influence on the opinions they form about a course. The instructors were more successful in predicting how the students with high or low grade points would respond when the students responses were grouped according to the students' overall grade point. The instructors for Economics I and for Economics II sometimes differed very much in the predictions

which they made about how their classes would respond, and the responses of their students with high or low grade points reflected the difference in the instructors predictions.

These results indicate either the instructors understand the students with either high or low grades better then they understand the students with average grades; or the students with high or low grades are often accepting their instructor's views without adequately evaluating the opinions expressed by their instructors. It is probably a combination of both factors.

The student's area of major study appears to be an important factor only for Economics I students. Economics and Humanities majors in Economics I classes consistently responded in the way their instructors had anticipated; social science and natural science majors consistently responded differently. This division of opinion did not exist among Economics II students where most of the students either responded the way their instructor anticipated or most of the students did not respond as their instructor anticipated.

The class section the student is enrolled in appears to be the most important factor in determining if the students responded the way the instructor had anticipated. This does not reflect a large difference of opinion among the students in the different sections. It represents the difference in the predictions made by the various instructors. Some of the instructors were very successful in predicting how their students would respond. Other instructors

had less success. The students in sections B and D often responded in the way their instructors had anticipated. The students in Section E responded the way their instructors had anticipated most of the time. Section C, which was tested with the averaged predictions of the Economics II instructors, had the actual responses of the students agreeing very often with the predicted responses. Only the students in section A consistently responded differently then their instructor anticipated. All of the Economics I students responded differently then the responses based upon the averaged predictions of all Economics I instructors. The averaged predictions of all the Economics II instructors agreed closely with the actual responses of all the Economics II students. The averaged predictions of all the Economics instructors seldom agreed with the actual responses of all the Economics students.

The Economics II instructors had much better success in predicting the behavior of their students than the Economics I instructors had. This does not necessarily mean the Economics I students had different opinions than the Economics II students had. There was a greater variation among the Economics I instructors' predictions then there was among the Economics I students' responses and the Economics I classes were much larger then the Economics II classes. The instructor of a small class should know how his class will respond much better than the instructor of a large class.

The correlation tests are used to determine the degree of correlation between the instructor's predictions and the actual responses of his students. The r value indicates the degree of correlation that exists. The correlation tests are used to

supplement the results obtained from the chi-square tests in determining the degree of conformance of the students' responses to the instructor's predictions.

TABLE XVII

THE CORRELATION BETWEEN THE STUDENTS' RESPONSES AND THE RESPONSES ANTICIPATED BY THEIR INSTRUCTOR

Section	r	r^2	Sections	r	r^2
Section A	.5925	.3510	All Economics I	.7985	.6376
Section B	.8506	.7235	All Economics II	.9342	.8727
Section C	.8945	.8001	All Economics	.7100	.5041
Section D	.8169	.6673			
Section E	.7746	.5544			

There was a large variation in the ability of instructors to predict the response of their class. The instructor of Section A had little success in predicting how the class responded. The instructor of section E was moderately successful in predicting how the class responded. The instructors of sections B and D were very successful in predicting how their classes would respond. Section C, which was tested with the averaged predictions for all Economics II students, shows the highest correlation coefficient. The variation in the correlation coefficients reflects the difference in the instructors' predictions; it does not reflect a large difference in the students' opinions.

An attempt was made to determine how much difference in the students' responses existed among the several sections. Because of the high correlation coefficients obtained from the averaged predictions for all Economics II students, these predictions are

used to test the difference that exists among the responses of the students in the different sections.

TABLE XVIII

THE DIFFERENCE IN THE STUDENTS' RESPONSES WHEN COMPARING THE STUDENTS IN DIFFERENT SECTIONS

Section	r	r^2	Sections	r	r^2
Section A	.8932	.7978	All Economics I	.7252	.5295
Section B	.9222	.8505	All Economics II	.9342	.8727
Section C	.8945	.8001	All Economics	.8483	.7196
Section D	.8755	.7665			
Section E	.8384	.7029			

The correlation coefficients for all of the sections, except for all Economics I students have increased. There is little difference in the values for the correlation coefficients for each of the sections. These results indicate that there is little difference among the responses of the students in the different sections.

The different textbooks used for Economics I and for Economics II sections do not appear to have different influences on the Economics I and Economics II students' opinions. Economics I students usually answered the questions similarly to the way that Economics II students answered the same question.

Both textbooks do have an influence on the students' opinions. The students stated that economics uses deductive and descriptive methods to develop theories. These are the methods which are

emphasized in both textbooks. Both textbooks stress the role of the positive economist and the student would select a positive economist to solve an economic problem.

The length of time that has elapsed since the Economics I student took Economics I appears to be an important factor. The students who waited two or more years before taking Economics II usually responded as their instructor had anticipated. The students who took Economics II immediately, or within one year, after taking Economics I seldom responded as their instructor had anticipated.

CHAPTER V

SUMMARY AND CONCLUSIONS

Economics principles students appear to have a better understanding of the nature of economics and of the composition of economic methodology than had been anticipated by their instructors. Few students responded that they did not know the answers to some of the questions on the questionaire. Economics I students do not seem to be as well informed about economic methodology as Economics II students are, but the difference in responses is very small when one considers that the textbook used for Economics II places more emphasis on economic methodology than the textbook used for Economics I. However the Economics II students appear to be influenced by the presentation of economic methodology in their textbook.

Principles students do have some very definite ideas about the nature of economics. About half of the students stated that economics is not entirely a natural science and not entirely a social science, but that it lies somewhere in between these two classifications. About half of the students stated that economics is a social science. Few of the students stated that economics is a natural science. However these responses were based on a question which had the student compare economics with the natural sciences of biology, chemistry, physics, and geology, and with the social sciences of psychology, sociology, and criminology.

The student's decision was based upon this comparison; not upon a thorough understanding of the differences between a social and a natural science.

The students, by a three to two margin, show a preference for positive economists. However these responses were based on the information presented in the question and the textbooks used in their classes. The student's decision was based upon this information and it is doubtful that the student has a thorough understanding of the differences between a positivc and a normative economist.

The students do not expect there will be much agreement among several economists who are attempting to develop a solution for an economic problem. The majority of the students stated this failure to agrce would be caused by the different results obtained by the different methods used for analysis by each of the economists, but some of the students attributed this failure to agree on the complexity of an economic problem. A greater percentage of the Economics II students anticipate that the economists will agree on the solution to the economic problem. However few of the Economics I students anticipated the economists will agrec.

The students do not think the theories presented in the principles course are permanent and unchanging. They realize that economic theories can be replaced by better or simpler theories. The students would consider a new economic theory as a replacement for an existing economic theory. The students would not reject a new theory because it is different than the

theories that were presented in the principles course.

Over half of the students stated a theory does not have to be accepted if the theory does not furnish an adequate explanation for the problem. The rest of the students stated a theory must be accepted if it is the best theory available.

The students stated that economists will use a theory if they consider the theory the best available to use for a certain problem, and because the theory is generally accepted by other economists as the best theory to use for the problem. But the theory is only as useful as its limitations permit, and the economist using the theory should be aware of these limitations.

Most of the students chose the definition for a theory when also given the choice of the definition for a law of nature and the definition for a tautology. However the definitions used on the questionaire were taken from a dictionary. The definition for a theory, even though it is similar to the definition stated by several economists, would probably not be accepted by all economists. It is impossible to state that, based upon the results of this question, the principles student understands the nature of the economic theory.

Approximately three-fourths of all the students could choose the proper definition of methodology when also given the choice of the definition for heresey. However the definitions used for this question were taken from a dictionary, so it is impossible to state that, based upon the results of this question, the principles student understands the nature of economic methodology.

Most of the students stated that economics uses its methodology. Only 20 percent of the students did not know if economics uses its methodology, and only 6 percent of the students stated that economics does not use a methodology.

The students stated that economics uses mathematics extensively. The students seem to realize that economics has become a mathematically orientated discipline.

Several conclusions about the importance of the factors evaluated in the study are reached after interpreting the data. The student's year in college does not seem to have a significant influence on the student's opinion. The student's sex is an important factor as women generally responded the way their instructors had anticipated while men did not. Grades also appear to be an important factor. Students with high or low grade averages usually responded the way their instructors had anticipated; but students with average grade points responded differently. The student's area of major study is an important factor only for Economics I students. The section the student is in is an important factor as students in some sections often responded as their instructor anticipated while students in other sections seldom responded as their instructor anticipated. Economics II instructors were more successful, than Economics I instructors, in predicting how their class would respond. This was primarily because of the variation in the predictions made by the instructors about how their classes would respond. Economics I and Economics II students usually responded similarly. The different textbooks used by Economics I and Economics II classes do not cause the

Economics I students' opinions to differ greatly from the opinions of the Economics II students. The length of time which has elapsed since the Economics II students took Economics I appears to be an important factor. Students that had waited two or more years to take Economics II usually responded as their instructors had anticipated, but students who took Economics II shortly after taking Economics I usually responded differently than their insturctors had anticipated.

The student's sex, area of major study, grade point average, and length of time elapsed since taking Economics I appear to be factors which merit furthur study. The student's year in college does not appear to merit furthur study.

It should be useful for the principles instructor to know what his student's opinions about the nature and usefulness of economics, the usefulness of an economic theory, and the composition of economic methodology are. If the instructor is not satisfied with the opinions that his students have formed; it may be desirable for the instructor to change the type of material that he has presented in his class lectures to provide the student with more adequate information about these subjects.

It would be unrealistic to assume the conclusions reached from this study can be assummed to also apply to other principles students at other universities. The different instructors and different textbooks used at other schools would have a different influence on their students' opinions. It is desirable to find out what the opinions of the principles students at other schools are about the subjects contained in this study. For this reason

it is hoped that more studies of this type will be conducted at Kansas State University and at other colleges and universities in the future.

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A STUDY OF PRINCIPLES STUDENTS' OPINIONS ABOUT THE NATURE OF ECONOMICS AND ECONOMIC METHODOLOGY

by

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The purpose of this study is (1) to evaluate what Economics I and Economics II students think the nature of economics is, (2) to evaluate if Economics I and Economics II students have some understanding of economic methodology, (3) to evaluate, as a guide for future study, if the student's year in school, sex, grades, area of major study, and instructor have had an effect on the student's opinions about the nature and usefulness of economics and the composition of economic methodology, and (4) to determine if the different textbooks used by the Economics I and the Economics II classes have had an effect on the student's opinions.

A questionaire is used for determining the principles student's opinions about the nature and usefulness of economics and the composition of economic methodology. The questionaire consists of sixteen multiple choice questions. Students selected the alternative that agreed most closely with their opinion about the question. The questionaire was administered to 294 principles students; of which 202 students were enrolled in two sections of Economics I and 92 students were enrolled in three sections of Economics II. Each section was taught by a different instructor.

Principles students appear to have some definite ideas about the nature and usefulness of economics. Most of them stated that they considered economics to be a social science or that economics lies somewhere between a social science and a natural science. The students would choose a positive economist to solve an economic problem. The students expected that there would be

little agreement in the solutions prepared by several economists to deal with an economic problem. They attributed this to the different methods of analysis and goals preferred by the different economists.

The students also appeared to possess some knowledge about methodology. They could choose the proper definition for methodology. They also stated that economics uses its methodology. The students also chose the proper definition for a theory. They stated that the economic theories presented in the Principles course could be replaced by other economic theories, but any change should only be made after considering the merit of the new theory. The students will accept a theory if they are convinced that it is the best theory that can be used. The students stated that economics uses both the inductive and deductive methods of reasoning. The students also stated that economics uses mathematics extensively.

Several factors which might influence the student's opinions about economics are considered in this study. These are factors which are generally considered to influence the learning ability of the student. The study does not try to determine the exact role played by these factors in the opinion forming process of the student. The study is only a preliminary effort to determine which of the factors appear to be important and should be more thoroughly analyzed in future studies. A series of chi-square tests and several simple correlation tests were used to evaluate the importance of these factors. The factors included the student's year in college, sex overall grade point average, area of major study,

instructor, and time elapsed since taking Economics I.

The student's year in college did not appear to be an important factor which was associated with the student's responses differing from the responses anticipated by the instructor. The student's sex, overall grade point average, area of major study, instructor, and time elapsed since taking Economics I appear to be factors with varying degrees of importance which are associated with the responses of the students differing from the responses anticipated by their instructors. The different textbooks used do not appear to be a factor which cause a large difference of opinion between the Economics I and Economics II students.

It would be unrealistic to assume that the conclusions reached from the responses of the students who took part in this experiment can be applied to principles students at other schools.

It is hoped that more studies of this type will be conducted at Kansas State University and at other colleges and universities in the future.