A Classroom Economic Experiment: How to Estimate the Unemployment Rate

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Abstract

This classroom economic experiment to estimate the unemployment rate is appropriate for an undergraduate course in macroeconomics. Class instructors can use the experiment to make many macroeconomic principles readily accessible to the unskilled reader. This experiment examines the dynamics of calculating the unemployment rate with the aid of an in-class document. Students can learn that the unemployment rate is calculated using estimates of the size of the labor force, which includes individuals that are both employed and unemployed. In addition, they discover that their estimated unemployment rate agrees with the estimates made by leading economic indices. Thus, by participating in the experiment, students better understand how to calculate the unemployment rate and how to understand published unemployment estimates.

JEL Codes: A22, C90, E24

Key Words: Economic Experiments, Unemployment Rate

Introduction

The study of economics is broad in scope. It is "the social science that deals with the production, distribution and consumption of goods and services and with the theory of management of economies or economic systems (Houghton, 2000)." Since the information is of great breadth, communicating known facts can be difficult. At the same time, while learning fact-based information is important, active learning stimulates the mind to process information more effectively. It enhances a student's ability to solve problems by putting economic ideas and facts to use. Practical examples and experiments encourage student participation and are widely used in classroom settings to demonstrate abstract ideas. Thus, experiments are a very useful tool in economics education.

Traditionally, the study of economics has not been an experimental science (Holt, 1999). Recently, however, the use of classroom experiments has grown in economics courses. As an article in the *Journal of Economic Education* states, "textbooks for introductory courses often come with supplements of classroom games or focus exclusively on classroom experiments (Dickie, 2006)." A test was conducted to determine whether classroom experiments increase learning in introductory microeconomics. Although the evidence was limited and mixed, results from a student survey indicated "that experiments helped half the students learn better than lectures did, compared with one-eighth who found the lectures more helpful (Dickie, 2006)." Emerson (2004) stated that, "the use of experiments in the principles classroom provides students with an experiential learning opportunity: the chance to participate in a controlled market environment and to observe market forces that are normally only talked about and described as movements on a graph." Thus, "the use of classroom experiments provides an important

connection between theories and key features of the markets and institutions being studied (Holt, 1999)."

Educational tools used in economic courses go beyond the traditional textbook material. Learning economics has become easier with the help of multimedia presentations and experiments. Understanding key topics, such as inflation and the unemployment rate, represents challenges to students. Understanding the unemployment rate in macroeconomics differs from unemployment in microeconomics. Recognizing the dynamics of both microeconomic and macroeconomic issues when discussing the unemployment rate is more effective when interactive presentations are involved. Students can easily understand the causes of fluctuations in the unemployment rate if they understand how it is calculated.

For example, based on the U.S. Bureau of Labor Statistics household survey data, U.S. nonfarm payroll employment was reduced by 17,000 persons in January 2008, while the national unemployment rate declined to 4.9% from 5.0% during the same month. Declination in both employment and unemployment has been rare historically. However, it occurred again in November 2009 when nonfarm employment declined by 11,000 persons while the national unemployment rate dropped from 10.2% to 10.0%. Without an understanding of how the unemployment rate is estimated, students were puzzled when this phenomenon was introduced. The unemployment rate can often confuse laypeople when substantial changes in the labor force occur.

In the classroom experiment discussed in this paper, students are given the opportunity to learn about the unemployment rate by engaging in a hands-on activity. The primary focus of this experiment is to develop the unemployment rate. The students insert their own household

information into a matrix. Please note that the instructor should make sure that the students are able to distinguish between a household and a family.

The matrix is designed to organize a student's records of five households. Based on the matrix totals, students are able to calculate the unemployment rate. From this experiment, students will learn that the unemployment rate is determined based only on those individuals in the labor force and that the unemployment rate is directly related to those employed and unemployed, and is only indirectly related to changes in population. Furthermore, students will learn that an increase in the total unemployed population, in relation to the employed, leads to a rise in the unemployment rate. Likewise, students will understand that when the total employed population increases and the unemployed population remain steady, the unemployment rate declines.

Description of the Experiment

This experiment in estimating the unemployment rate is based on data taken directly from the students' own lives. By using personal data, students are able to extrapolate their daily experience to understand how the unemployment rate fluctuates and is calculated due to changes in the labor force.

The foundation of the experiment is developed when the students generate data to be used, with the aid of an in-class document. The instructor forms groups of four or five and distributes a blank matrix to initiate the development of the unemployment rate. Students insert their own household information into the matrix. The matrix consists of six categories. The six categories include households with individuals who are: 1) under 16 and/or institutionalized, 2)

not in the labor force, 3) employed and 4) unemployed, 5) the total household population and 6) the unemployment rate (this is initially left blank until students calculate it).

Students should be informed of the definition of each element before they begin. The instructor may need to introduce or review each of the concepts in the experiment by asking questions, such as “where does a full-time student belong?” and “where does a military person belong?” It is strongly recommended that the instructor explain the definition of “being employed.” Students are often confused between the concepts of “being unemployed” and “not being in the labor force.” The instructor also needs to explain how an unemployed person can be excluded from labor force under certain conditions.

According to the U.S. Bureau of Labor Statistics, unemployed persons are “16 years and over who had no employment during the reference week, were available for work, except for temporary illness, and had made specific efforts to find employment sometime during the 4-week period ending with the reference week.” The unemployment rate is the number of unemployed workers divided by the total civilian labor force, which includes both the unemployed and the employed. In practice, however, measuring the number of unemployed workers actually seeking work is extremely difficult. It might be beyond the scope of an introductory macroeconomic course to explain the several different methods used to measure the number of unemployed workers in details. However, it is necessary to emphasize that the statistics are the estimates and each country has a slightly different definition of unemployment.

The matrix is designed to organize the students’ records of their five households. Within each group of four or five, each student records his/her data in the designated boxes under column headings HH1, HH2, HH3, HH4 and HH5. See Table 1 for the record-keeping sheet that students use.

Table 1: Student Record-Keeping Sheet

	Number of People (in thousands)	HH 1	HH2	HH3	HH4	HH5	Group	Class	Note
Under 16 and/or Institutionalized	71,485.8								in mental hospitals, or correctional inst.
Not in Labor Force	82,316.0								homemakers, FT students, retirees
Employed	138,864.0								A
Unemployed	15,142.0								B
Civilian Labor Force	154,006.0								C = A + B
Population	307,807.8								
Unemployment Rate	9.8%								B / C

Source: Bureau of Labor Statistics (September 2009)

For each column heading, a student inserts the number of members in his/her household who conform to any of the six categories. The second column shows the U.S. statistics as an example of reasonable approximations of what it is supposed to measure, while the last column demonstrates definitions and formulas used. In the case that no family member conforms to one or more descriptions, a zero should be placed in the corresponding box. Once everyone in the group has finished recording their data, the group reviews all the data in their matrix. Once the students have completed their review of the designated boxes, they need to calculate the total number of household members for each of the six categories independently. The sum should appear under the column heading “group.” Based on the totals, students are able to calculate the unemployment rate for their group.

Since the unemployment rate is based on those individuals in the labor force, all other categories are ignored except the employed and unemployed categories. The unemployment rate is calculated based on the numbers from the employed and unemployed rows. After each group has their unemployment rate calculated, the instructor gathers the group totals to display the results on either the board or projector screen using a spreadsheet. Using the data, the instructor

can compute an average of the overall unemployment rate. Based on the overall average unemployment rate, the class can see exactly how the unemployment rate is calculated.

Experiment Results

This in-class experiment was conducted in our introductory economics courses at Western Carolina University (WCU). The experiment was run twice, in spring 2009 and fall 2009. This paper reports the results from both semesters.

Table 2: Results of Classroom Experiment

	spring 2009			fall 2009		
	section 1	section 2	total	section 1	section 2	total
Under 16 and/or Institutionalized	57	30	87	34	30	151
Not in Labor Force	107	76	183	92	52	327
Employed	203	130	333	132	111	576
Unemployed	29	17	46	18	20	84
Civilian Labor Force	232	147	379	150	131	660
Population	396	253	649	276	213	1,138
Unemployment Rate	12.5%	11.6%	12.1%	12.0%	15.3%	12.7%
NC unemployment rate when the data was collected	10.8%			11.0%		

Source: Class Experiments 2009

In each course section, the students were formed into groups of four. After the students had collected their data, they informed their group members of their findings. When each group

finished their discussion, all group results were reported. Table 2 summarizes the aggregated findings for each class section.

When the experiments were conducted, in both the spring and fall semesters, the actual unemployment rate in North Carolina was 10.8% and 11.0%, respectively. Surprisingly, the spring 2009 results of section 2 and fall 2009 results of section 1 were very close to the actual unemployment rate in North Carolina at that period in time. However, both the spring 2009 section 1 results and fall 2009 section 2 results overestimated the unemployment rate. It is surprising that the class results revealed a higher unemployment rate than North Carolina considering that, in general, college students have relatively higher family incomes and their parents tend to have higher levels of education, both of which are inversely related to unemployment in general. It may be caused by a sampling bias, which also can be discussed with students.

Effectiveness of the Experiment

The learning style between a controlled group and a reference group is statistically different. For the purpose of this study, a controlled group is defined as any group of students that engage in the unemployment rate activity. A reference group is defined as any group of students that learn how to calculate the unemployment rate through class lecture.

Table 3: Difference in Means: Controlled vs. Reference Groups

	Mean Value		t value	Pr > |t|
	Controlled	Reference		
	N = 59	N = 29		
Midterm Exam	28.8%	24.1%	0.458	0.648
Final Exam	42.4%	7.1%	3.510	0.001

Source: Authors' estimation

The difference in means between the two groups is shown in Table 3. The sampling distribution was computed for the fall 2009 semester only. The data set for both the controlled group and reference group is 59 and 29, respectively. Based on the sample data, the independent mean difference test was applied. Results show that students that engage in the classroom experiment retain and understand the purpose of the unemployment rate better than students that listen during a class lecture. To illustrate, 28.8% of the controlled group understood how to calculate the unemployment rate on the midterm exam while 24.1% of those in the reference group. This difference in means was not statistically significant. However, it became statistically significant one and a half months later when the students took the final exam. Forty two percent of the controlled group was able to calculate the unemployment rate correctly on the final exam, in contrast to only 7.1% of those in the reference group. It is also surprising that more students in the controlled group could answer the question correctly on the final exam as compared to the midterm exam.

Suggested Questions for Discussion

The following questions can provide the basis for follow-up discussion. It is recommended that each student answer the questions for himself/herself, prior to open discussion.

1. How is the unemployment rate measured? How would you interpret the unemployment rate?

2. What was the unemployment rate in your group? What was the unemployment rate for the entire class? Are they close to each other? Are they close to the state and/or national unemployment rate? If not, what does it imply?
3. What individuals make up the labor force? How does the size of the labor force affect the unemployment rate?

Conclusion

This experiment demonstrates how the unemployment rate is estimated. Students are introduced to one of the most fundamental concepts in economics – unemployment rate – by participating in an economic experiment. They will also be able to distinguish labor force from total population as the basis of unemployment when they figure out who is employed or unemployed in the sample households. The follow-up discussion embraces policy issues such as how employment statistics can mislead people when there are substantial changes in labor force.

Independent mean difference testing showed experiential learning, when teaching the unemployment rate, to be significantly more effective than teaching the concept lecture style. The methodology and findings of this study suggest that the unemployment rate should be taught through active learning to reach its full effectiveness.

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