

## **Developing students' ability to connect economic modeling to real world issues**

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### **Part 1: Background**

#### **1.1 Course**

ECO 120: Global Macroeconomics. We conducted the lesson study in James Murray's sections in Fall 2014 and Fall 2015. This is an introductory level general education course and also a required course for all students with a major in the College of Business Administration. The course provides an introduction to the general functioning of a country's economy in the context of global influences. The course has a heavy emphasis, at least in terms of time, on solving problems using graphical modeling strategies. The purpose is to be able to frame a real-world economic issue within a graphical model, and use the model to explain causes and solutions to economic problems. This lesson study is focused on getting students to connect their graphical modeling skills with reading and thinking about economics stories in the news.

#### **1.2 Abstract**

In introductory economics classes, we emphasize graphical modeling, which for many students is a new way of framing problems, thinking about them, and solving them. We have learned in past years by assessing these courses that students struggle with modeling. We have made some improvement in this area, but we recently learned that even when students correctly set up and solve a graphical modeling problem, they fail to connect the result to the real world economic problem. For example, students are often able to correctly model and solve a problem involving taxes, but when in a separate question they are asked to describe the implications of the same tax policy, their answers are inconsistent with the results they had just found. Often answers showed little relationship to the previous analysis.

We created a lesson that challenges students to integrate graphical modeling and economic reasoning in the context of an authentic scenario. Students present their case in a manner appropriate to a non-expert audience while still using economic reasoning based on graphical

modeling. In our lesson, the instructor demonstrates this thought process with a few examples. Then we give in-class group exercises that ask the students to do the same. In this report, we present our lesson, some findings on our students' thought processes, and identify some common challenges in student learning and hurdles we still face as instructors.

## **Part 2: The Lesson**

### **2.1 Learning goals**

The common course learning outcomes that are the focus for the lesson study are the following:

- Apply the model of aggregate demand and aggregate supply to current international economic and political issues.
- Apply the model of aggregate demand and aggregate supply to evaluate the impact of fiscal and monetary policy on real GDP and price level in the short run and long run.

In this lesson study, we take another cognitive step forward, asking students to *describe* a real world economic problem, *hypothesize* on the causes of the problem, and *describe and defend* solutions to the problem. Our hope for our students is that they conduct this analysis in the context of a graphical model such as the aggregate supply / aggregate demand model, without being prompted to do so.

### **2.2 Lesson Plan**

We have two iterations of an exercise in which students read a current news story that describes an economic problem. Without prompting students to use a graphical model, we challenge students to (1) describe the problem, (2) comment on what may have caused the problem, and (3) prescribe economic policy to address the problem. We then hand out students another sheet of paper that specifically prompts them to use a graphical model and in the context of the model, ask them the same three questions. Finally, the students were asked to explain or reconcile differences in their answers to the questions that prompted graphical modeling to those that did not. The news stories and follow up questions are given in Appendix A.

Students were split into groups of three or four and given approximately 30 minutes to read each news story and discuss the follow-up questions in their groups. We asked all students to write down the answers to help assure that all students were engaged in the conversation.

## **Part 3: The Study**

### **3.1 Approach**

We sat in on group conversations as they attempted to answer these questions, making note of whether students were thinking about the news story in the context of a model even if not prompted, or if they were thinking about the problem in a way that is consistent with an economic model from class. The classroom observation guide we used is given in Appendix B.

### **3.2 Findings / Discussion**

#### **3.2.1 Student Success**

When not prompted to think about the problem in terms of a model, few students did so. Still, one group completed the entire first problem in the context of a model and gave equivalent answers to the second set of questions. In most of the groups, we frequently heard some discussion put into the context of the aggregate supply / aggregate demand (AS/AD) and labor supply/demand models, but largely students did not find it convenient or useful to continue the discussion in these terms or answer the questions in this context.

When students were prompted for a model, they confidently picked the right model to use (AS/AD, Labor supply/demand, or both) and often gave appropriate justification for shifts in the curves based on the article, even if they were not always complete in their justifications. When using these models, they were largely successful in correctly illustrating an economy in recession / high unemployment.

#### **3.2.2 Student Difficulties**

Sometimes students did discuss models in the first questions that did not explicitly prompt the students to do so, still most had difficulty applying the model and using it to answer the questions and settled on final answers so general that it was not clear how the models should be applied. Many students applied a strategy of repeating back content from the article to answer the first set of questions, rather than attempt to apply class content to the application in the article.

When students were prompted to answer the questions in the context of a model, students did not try to consider their previous answers or reconcile their previous answers with their new answers. Most students kept a cognitive separation between the two sets of questions. Only one group tried to reconcile the differences, and only one other group concluded correctly that their answers were identical. When others were challenged to reconcile the differences in their answers, many students insisted on the cognitive separation, suggesting instead that the questions were different.

When students were prompted to prescribe economic policy, they thought about policies discussed in the previous class lecture instead of applying earlier class content which was more appropriate to connect to policies mentioned in the article.

While students were largely successful in correctly using the models when prompted to do so, there were some difficulties. Some students struggled with how to illustrate the initial equilibrium using AS/AD model (short-run equilibrium at potential GDP, left of potential GDP, etc). We view this as a strength and a weakness in student learning. It is a strength insofar as students did consider and struggle with the question for how to appropriately illustrate the economic problem, and not immediately draw the short-run equilibrium at potential GDP, which is how most of the problems in class and the textbook begin, but which would have been incorrect. Also, some students fixated on related modeling issues that are frequently discussed in class, but which were not relevant to the questions in the exercises.

### 3.2.3 Ideas for teaching improvements

We knew when we started designing the lesson that it would be a significant challenge for students to think about economic current events in the context of a model, without explicitly prompting students to do so. It is already challenging for students to pick the correct graphical model and manipulate it appropriately even when they are prompted to do so. Still, the skill is an important one if the class is to make a difference in how students think critically about economic issues in their lives beyond their economics courses.

We are planning on making two changes in our teaching approaches, both of which we will implement throughout the semester. The first is to give the students more practice like this. Prof. Murray already has one writing assignment early in the semester that is similar in its construction and goals, asking students to read a news story and answer questions in the context of the supply/demand model, but in plain language that a general audience can understand. We plan to create two or three more such assignments and/or in-class exercises to administer throughout the semester.

The second innovation is to amend to several in-class exercises, quizzes, and exam problems a prompt to have students explain their conclusions from their graphical model in plain English, again so that a general audience can understand the line of reasoning behind the graphical models. We will push the learning goal to our students, that not only is it important to correctly set and analyze graphical models to answer questions in economics, but be able to learn and communicate the line of reasoning in plain English.

## Appendix A: Lesson Materials

### Spanish Unemployment Falls as Economy Emerges From Recession

By Emma Ross-Thomas - Bloomberg - Oct 24, 2013

Spain's unemployment rate fell for a second quarter in the three months through September as the economy emerged from a recession lasting more than two years.

The jobless rate declined to 26 percent from 26.3 percent in the second quarter, the National Statistics Institute in Madrid said in an e-mailed statement today. That compares with a median estimate of 26.1 percent in a Bloomberg News survey of seven economists.

Spain's economy grew for the first time in two years in the third quarter, the central bank estimated yesterday, exiting the second recession since 2008. Prime Minister Mariano Rajoy, half-way through his term, is pledging job creation starting next year as he tries to convince the 56 percent of young Spaniards who are out of work that they have a future in Spain.

The economy is starting to recover as foreign investors buy into the nation's stock and bond markets, sending the main Ibex 35 index up 21 percent this year. The spread between Spain's 10-year borrowing costs and Germany's has narrowed to less than half its peak in July 2012.

Rajoy's government, led by the pro-business People's Party, has overhauled labor rules to make it easier to lower wages and cheaper to fire staff. The legislation allowed Solaria Energia & Medio Ambiente, a solar-panel maker, to cut wages by 16 percent in a deal announced this month. As wage costs decline, companies including Ford Motor Co. are increasing production in Spain.

The new legislation, like an overhaul passed by the previous administration, wasn't enough to prevent 3.8 million jobs being destroyed in the crisis that started when a debt-fueled building boom collapsed. The nation may be saddled with an unemployment rate of more than 25 percent until 2018, according to estimates by the International Monetary Fund.

Faced with those forecasts and evidence that some unemployed may be working illegally, Rajoy's administration is looking for other ways to reduce the jobless rate. The government, which has budgeted 30 billion euros (\$41 billion) for jobless benefits next year, is planning to crack down on people claiming benefits while working in the underground economy and to prevent them rejecting job offers, Deputy Prime Minister Soraya Saenz de Santamaria said on Oct. 11.

Telefonica SA Chairman Cesar Alierta said this month that the unemployment rate is overstated because of the size of the shadow economy, and Saenz de Santamaria said more than 500,000 jobless claims contained fraudulent elements.

### Short-answer questions

1. Describe the economic problem experienced in Spain in Fall 2013.
2. Speculate on what may have caused the economic problem. Describe how this cause may have led to the current situation.
3. Describe a solution to the economic problem. Describe how this policy will improve the economic situation in Spain.
4. Use one or more graphical models to describe and illustrate the economic problem experienced in Spain in Fall 2013.
5. Use the model to describe and illustrate how the Spain's economy moved from a relatively healthy state to the situation you described in the previous problem.
6. Use the model to describe and illustrate a solution to the economic problem. Show how your policy suggestion affects the outcome in your graphical model.
7. Comment on how your answers to the questions on previous page are different than the first three questions. Did you give different economic explanations when prompted to use a graphical model?
8. Describe your answers to problems #4- #6 in plain English. Use the intuition and results from the model, but explain it in a way that a person outside an economics class can understand.

Younger Generation Faces a Savings Deficit  
Postrecession Thrifty Ways Fade Amid Weak Jobs Market, Hefty Student Debt  
John Zumbrun - Wall Street Journal - Nov 9, 2014

After a flirtation with thrift after the recession, young Americans have stopped saving.

Adults under age 35—the so-called millennial generation—currently have a savings rate of negative 2%, meaning they are burning through their assets or going into debt, according to Moody's Analytics. That compares with a positive savings rate of about 3% for those age 35 to 44, 6% for those 45 to 54, and 13% for those 55 and older.

The turnabout in savings tendencies shows how the personal finances of millennials have become increasingly precarious despite five years of economic growth and sustained job creation. A lack of savings increases the vulnerability of young workers in the postrecession economy, leaving many without a financial cushion for unexpected expenses, raising the difficulty of job transitions and leaving them further away from goals like eventual homeownership—let alone retirement.

“In the very near term it's a plus for spending and economic growth, but in the long run these households are not saving, and that will impair their ability to spend in the future,” said Mark Zandi, the chief economist of Moody's Analytics who calculated the numbers with Moody's economist Mustafa Akcay.

To be sure, Americans' savings is still growing in the aggregate. The Commerce Department's main figures on savings show a nationwide increase in saving since the recession as baby boomers and other older Americans have maintained the cautious savings habits developed during the recession.

But the new Moody's data—using a technique developed at the Federal Reserve to combine its Survey of Consumer Finances and Financial Accounts of the United States reports—show how savings rates diverge across demographic groups.

“I've been saving almost exclusively in my mind,” said 26-year-old Emily Turner, a 2010 graduate of Villanova University who lives in southern Maryland. Most of her paycheck from the digital consulting and web-design firm she works for “doesn't even make it to a conventional bank account. I've certainly not had the opportunity to invest in stocks or anything.”

The money mostly went to her social life and travel, she says: a trip to Central America, a wedding in Southern California, a bachelorette party in Austin, Texas, trips to Atlanta and Charlotte, N.C., to see friends, another bachelorette party in Austin.

There was a sign it wouldn't be this way. After the recession, the savings rates of those under age 35 climbed to 5.2% in 2009 and even briefly surpassed the savings of those age 35 to 44, according to Moody's.

The problems from a lack of savings promise to reverberate for years. Those who don't save are unlikely to be wealthy in the future, meaning American angst over wealth inequality seems poised to persist if most millennials are unable to save or choose not to.

Young households' wealth has declined even more than their incomes. In the previous generation, Americans who were under 35 in 1995—often labeled Generation X—earned wages that were 9% higher than today after adjusting for inflation. Now, the median millennial has a net worth of \$10,400, down 42% from \$18,200 for Generation X, according to Fed data.

The Fed's data also show young Americans are less likely to own a variety of investments and investment accounts than their counterparts in Generation X were at this age, including certificates of deposit, savings bonds, stocks, retirement accounts and other managed assets. The only savings vehicles young people today use more than Generation X did at the same age are transaction accounts.

"They are truly a vulnerable group," said Annamaria Lusardi, an economist at George Washington University who studies the implications of financially fragile young households. "They don't have assets to buffer themselves against shocks, and they also have to manage debt."

Some, however, have the means to save and invest, but opt not to. Curtis Holland, a 30-year-old software developer in Arlington, Va., has held stable jobs since graduating in 2007, and—unlike the majority of millennials—has a retirement account. But he has avoided other types of investments as "too complicated."

"I don't know the risks," he said. "I don't know the benefits."

For some young households, the inability to save reflects the weak job market, said Shai Akabas, an economist at the Bipartisan Policy Center. While unemployment nationally has fallen below 6%, workers age 25 to 34 have a 6.2% unemployment rate and those 20 to 24 face 10.5% unemployment.

#### Short-answer questions

9. Is the change in savings behavior of the millennial generation good or bad for the U.S. economy? Explain the benefits or consequences.
10. Use one or more graphical models to describe and illustrate the recent change in behavior of the millennial generation.
11. Use the model to describe and illustrate the benefits and/or consequences to the U.S. economy from the change in behavior of the millennial generation. Describe if your responses are short-run or long-run consequences.
12. Describe your answers to problems #9 - #10 in plain English. Use the intuition and results from the model, but explain it in a way that a person outside an economics class can understand.



## Appendix B: Classroom Observation Guide

1. Describe students' thinking process when answering the questions immediately after reading the article.
  - Did students explicitly discuss an economic model?
  - Without being explicit about an economic model, was the discussion consistent with one?
  - Was the discussion logically consistent?
2. Describe students' thinking process when answering problem solving questions explicitly requiring an economic model.
  - Did students struggle with picking the correct model?
  - Did students manipulate the model appropriately?
3. Describe students' thinking process when challenged to integrate modeling with their everyday thinking on economics topics.
  - Are they willing to reconcile differences with previous thinking?
  - Are they capable of describing implications of a model in plain English?