

Demonstrations in Large-Enrollment Principles Courses Poster Prepared for the AEA CEE Poster Session at the January 2010 Meetings

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Why should our colleagues in the sciences have all the fun? They are blowing up things, making liquids change color, cutting open things that make me squeamish. Students remember the demonstrations long after they forget much of the “material” from the course.

In my Principles of Economics course at U.C. Berkeley, I have introduced several demonstrations into the lecture time. Students enjoy the demonstrations and – more importantly – remember the point. Indeed, as they studied for the Spring 2009 final, one student wrote to her classmates in the chat room “thanks julie, i remember it [credit default swaps] now from the demonstration olhey did in class.”

My poster for the ASSA meetings describes several of the demonstrations I’ve done. In this accompanying handout, I describe the class I teach and provide detail about the in-class demonstrations.

What are Demonstrations?

By “demonstrations,” I mean in-class activities that “act out” principles or concepts. Most demonstrations bring a few students to the front of the room to participate. Some demonstrations keep all students in their seats but still directly involve a few in the experience.

Demonstrations are separate from iClicker or other CRS activities. There are many iClicker activities that can also be used to illustrate economic concepts, but that is not the point of this presentation.

It is important when doing in-class demonstrations to be prepared. What is the goal of the demonstration? What props do you need? What questions will you pose? What if a student’s reply is seemingly unrelated to your intent? As much as possible, leave nothing to chance. The message of a demonstration is lost if it is embedded in mumbling and bumbling.

The Advantages to Demonstrations

Demonstrations have several advantages.

- Demo’s break up the 50-minute lecture period. Mixing up the ways in which you are presenting the material helps keep students engaged.

- Demo’s appeal to a different part of the brain than lectures do. For some students, retention is greater with demonstrations than with lecture. Kinesthetic or experiential learners in particular benefit from the use of demonstrations.

- Demo’s may improve learning. Research on this point is primarily in the physics field, and is mixed. It is clear that active student participation enhances learning. Passively observing the professor doing a demonstration is no different than passively observing any other aspect of class. But active participation can come in a number of ways: being part of the demonstration, offering suggestions to a classmate, anticipating what will happen in the demonstration.

- Demo’s bring students to the front of the room. They have fun and receive applause. Their classmates enjoy seeing someone other than the professor up on the stage.

- Demo’s are fun for the prof, too!

About My Class

My Principles of Economics class at U.C. Berkeley covers both micro and macro in one term. There are 700 students and 12 graduate student teaching assistants. Students meet with me in one group of 700 students in 29 fifty-minute lecture sessions over 15 weeks. They meet with their graduate student instructor in groups of 30 students in about 26 fifty-minute discussion sessions.

The students are expected to complete 5 problem sets, do group problems and 2 presentations in section, write 2 midterms and a final exam. Exams contain no multiple choice or true/false questions. The problem sets and exams all require application of the principles to the real world.

I do about 4 or 5 demonstrations during the term. The novelty and effectiveness would be lost, I think, were I to create too many more demonstrations.

Demonstrations are one of several active-learning activities in my large-enrollment class. Every day there is some active-learning component to class. I use iClickers in every session, generating great student satisfaction. I do in-class pair or triplet exercises of various formats. And I use a lot of call-and-response in my teaching.

The Demonstrations

I describe four different demonstrations below.

Credit Default Swaps

Goal: To explain what a credit default swap is.

Number of student volunteers: 5+ volunteers

Props: Several prepared slips of paper.

[1] A set of identifiers. These are 8.5x11 signs that say who/what each volunteer is.

The signs can be held by the students, held by a teaching assistant standing next to or behind the student, or (for the crafty among us) attached to pieces of string or yarn and hung around the students' necks. The signs should say (in very large font)

- The Bank
- AIG (an insurance company)
- Diana's Diner
- Restaurant equipment seller

Just some guy (make several of these)

[2] Money. I use money from a board game. You can also just cut up green sheets of paper into appropriate size pieces.

[3] Several identical insurance certificates (CDS). I make small slips of paper that say on them "If Diana's Diner defaults, we (the insurance company) will pay you \$10,000."

The activity: One student is "the bank." Another is "AIG." Another is "a borrower" such as "Diana's Diner." Another is "restaurant equipment seller." Another is "just some guy." It helps to have several different people who are each "just some guy."

Diana's Diner borrows money from the bank (bank gives green "dollars" to borrower), and uses the money to buy equipment (borrower gives same green dollars to equipment seller). Bank buys CDS from AIG to insure itself against risk that Diana's will default (bank pays premium to AIG, AIG gives bank an insurance certificate).

"Just some guy" also buys CDS from AIG, which will also pay out if Diana's Diner defaults. (Alliteration makes the demo more fun.)

Then the recession hits. Fewer people eat out. You ask Diana: can you make your loan payments? Diana's Diner will respond: "Sorry, no."

Have Diana tell the banker, "Sorry, no money."

Banker turns to AIG and says "Diana's Diner defaulted." AIG pays off banker. Banker is happy.

All of the "Just some guy" volunteers also turn to AIG and say "Diana's Diner defaulted." So many people turn to AIG for payoff that AIG says to them, "Sorry, no money."

When I ran this demo in class, I asked the student who was AIG what she would do now. "Call the government and ask for a bailout!" she replied.

Point out that the restaurant equipment supplier has been paid and is happily out of the picture. Diana's Diner has defaulted on the loan and may be closing due to a lack of business. (What would happen, you can ask, if there had not been a recession that depressed restaurant business.) Ask students what would happen to the bank's willingness to lend if they couldn't buy CDS. You could even ask them "who represents Main Street?" and "who represents Wall Street?"

Distribution of Income

Goal: To illustrate the distribution of income (or any other distribution)

Number of student volunteers: 5-50 volunteers (must be multiple of 5), depending upon the size of the stage and the class. I did this with 25 volunteers, which worked well.

Props: 100 slips of green paper, dollar sized.

The Activity: Call up the first group of volunteers and have them stand at the far left of the stage. This is the lowest quintile of income earners. Call up the next group of volunteers, and have them stand together, but somewhat apart from the first group, to the right of the first group. Call up the 3rd, 4th, and 5th groups. Once everyone is on stage, you'll have 5 equal sized groups, each group standing a bit apart from the next group.

"If these 100 slips of paper were the total income in the economy, and income were equally distributed, how much income would the people in the first group have?" Ultimately the students will answer "20." Give 20 pieces of paper to the first group. Then give 20 to each of the next four groups as well.

Now display the actual distribution of income on the screen.

Go to the first group (lowest quintile) and take away slips of paper so they are left with their share of total income. "You only receive 3% of total income, so give me back 17 of those slips of paper, please."

Go to the second group (2nd quintile) and repeat. By the time you get to the 4th quintile, you'll be giving them extra "money." The 5th group (top quintile) will wind up with lots of money. With the right combination of personalities, the students on stage will have some fun with this.

You can also illustrate the top 10% by peeling off 1/2 of the top group. To illustrate the top 1% is more challenging with less than 100 participants. I did it with 25 participants and said "the top 1% is the upper right quadrant of Hank," which was a silly but effective image.

If you circle back to the demonstration later in the class, it reinforces the ideas. For instance, if 15-30 minutes later you are discussing the sources of the uneven distribution of income, you can call on the students in the highest or lowest quintile: "What makes you different from the people in that other group, that helps explain why you all had so much more (or less) income than the others?"

Spending Multiplier

Goal: Illustrate both the closed and open economy spending multipliers

Volunteers: 3-5 students

Props: Money (I use money from a board game; you can also use green slips of paper)

Staging: Have some part of your room that you can define as being "outside of this economy."

For instance, in my lecture hall, there is a projection booth on the 2nd floor with windows that open to the lecture hall. I ran up the stairs and used the projection booth as "another country" when I got to the open-economy aspect of this demonstration.

Pitfalls: Student responses are unscripted. Be ready for answers that aren't what you expect!

The Activity: Start with some initial burst of spending. The government pays 1,000 workers to build a bridge. Or, 1,000 businesses decide to purchase new equipment. The key is that you want to be clear that the initial burst of spending is going to a lot of people, not to just one person.

"Who wants to represent the 1,000 workers building a bridge?" Some student will volunteer.

"Congratulations, each worker receives an extra \$1,000 a week in income for bridge building!"

Run over to that student and give them \$1,000. "What will you do with that \$1,000? Will you save some? Use any to pay off debt? Spend some?"

(Pitfall: the first time I did this, I told the student he was representing all 1,000 workers and receiving \$1,000,000 per week. He said he'd "buy Disneyland" with the money. Whoops!)

Here is where you have to be able to "dance with the [ever-changing] music." The student might save it all, might use it all to pay off debt, might spend none or some or all. Whatever their response, use it to illustrate what happens next.

"I'll save some, pay off some debt, and spend some." How much will you spend? "\$400." Ask the student to give you the \$400. "What will you buy with \$400?" The student will answer something – let's suppose the student says "a washing machine." Turn to the class and ask "Who here sells washing machines?"

Go to that student and give them \$400. "This is \$400 in income for you!" What will you do with it; save, pay off debt, spend? How much will you spend? What will you buy? Hand me the money. Repeat!

The first time you do the exercise, pretend everything is produced domestically. After you've gone through a few rounds, add up how much spending there has been (don't forget the first round of \$1,000 per worker by the government) and how much income has been generated. Point out that total income generated is more than the initial \$1,000 in income. Total spending is more than the initial \$1,000 in spending. If your first student saved all of the income, you can point out that if the $mpc = 0$, there is no spending multiplier.

Now you can repeat the exercise, but this time allow for imports. When a student says "I'll buy

clothes" or some other item that is typically imported, take the spending money from the student and run to the place you've designated as being "outside of this economy" or "the rest of the world." Point out that the spending multiplier process stops in the home economy but continues in the other economy.

The point of this exercise is to illustrate the process of the multiplier. Let the students make their own decisions about how much they'll spend and on what. Don't get too hung up on the specifics of mpc and so on; don't tell them what their mpc is supposed to be, or what they can spend the money on. It's important that they see that the multiplier doesn't depend upon their behavior being scripted, but just on their "doing what comes naturally."

Utility Maximization

Goal: To illustrate that MU/P is equal across all goods when utility is maximized

Volunteers: 1 student (perhaps a 2nd to help the 1st student decide the "right" action)

Props: Apples, books, and coffee cups (or other items that begin with "A," "B," and "C")

A MU table that is projected onto the screen.

The Activity: Set out the items on a table at the front of the room. Display the MU table for all to see. Choose one student volunteer. Give the student some money (I use money from a board game). Tell the student their goal is to maximize utility. How will they spend their money? Ask if they'd like to have a spending buddy to help them decide what to do (if so, get a 2nd volunteer to come forward). The alternative to a spending buddy is the student can just ask the class what s/he should "buy next!"

Here is the table I use, with MU and Prices. I give the student \$20 to spend.

Quantity	Apples ($P_A = \$1$) MU_A	Books ($P_B = \$5$) MU_B	Cup of Coffee ($P_C = \$2$) MU_C
1	20	50	48
2	12	40	40
3	8	20	10
4	5	10	4

"What will you buy first?" The student might say "A book" because MU of the 1st book is 50. The "right" answer is "a cup of coffee" because $MU/\$$ of the first cup of coffee is 24, the highest of all. Whatever answer the student offers, ask a follow-up question: "why?" If the student offers faulty logic, s/he can consult with the shopping buddy or with the entire class.

Ultimately, perhaps with help from you, they'll come to the conclusion that the first thing to buy

is a cup of coffee. Have the student pay you \$2 and give them a cup of coffee. How much utility have you received so far? (48 utils)

“What will you buy next?” Here the 1st apple and the 2nd cup of coffee provide the same MU per dollar, so you can point out that they don’t really need to decide; they can buy both. “Now how much utility have you received so far?” (Be sure the answer includes the first 48 utils from the first cup of coffee.)

Continue on with the example. In the end, with this MU table and \$20, the student should end up buying 3 cups of coffee (\$6 total), 2 books (\$10 total), and 4 apples (\$4 total). Total utility will be 233 utils.

The MU/P is not equal at the end: MU/P of the last item bought is 5 for apples, 8 for books, and 5 for cups of coffee. But the principle of purchasing the item with the highest MU/\$ has been illustrated.

Students may want to know why MU/P is not equal at the end. Apples, books, and cups of coffee must be bought in integer units. The example is small-scale. “Imagine if we had many, many more goods and \$1,000 to spend per week.” Or, you may want to say that the point of exploring utility maximization is to see that we care about MU per dollar and not MU per good.

Conclusion

Have fun! The point of demonstrations is to give the students a different way of seeing and experiencing a concept, and for you to have a little bit of fun in your class.

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