EXPERIMENT 17: BEANS AS A MEDIUM OF EXCHANGE

OVERVIEW

The following experiment is designed to simulate an environment where something that is very similar to fiat money will be accepted in market transactions and thus will have a "value."[1] Under a multiproduct trading system, in which students exchange real goods based on their own personal preferences, beans evolve as an efficient medium of exchange.

MATERIALS NEEDED

- A variety of food items
- Transaction record sheets
- A die

ADMINISTERING THE EXPERIMENT

Prior to your classroom lecture on money announce to your students that they are in for a surprise at the next class: you will be serving food instead of the usual lecture.

Divide the class into groups of two to four students and distribute the various food items to each group (see the Appendices at the end of this experiment for a list of food items that might be distributed to a class of twenty-five students). The initial endowments should be distributed so that complementary products will not end up in the hands of the same group of students or the same individual. This guarantees that some exchange will take place before the food is consumed. For example, if one student gets a chef's salad, then another student should get the salad dressing. The total amount of food distributed should be enough to feed the entire class so that nobody goes away unhappy. Furthermore, it is important that beans are in the endowment of some of these groups (for example, groups 3 and 6).

Have your students arrange their chairs so that each group's food endowment is clearly visible to all. Tell your students that they can consume whatever they desire and that there is enough food for everyone in the class. Emphasize that their initial food endowment is such that they will have to trade part of their supply for other items in order to consume it. Explain that they are allowed to make whatever trade they desire and that the exchange rate is negotiable and should be determined by participating groups. Inform the students that they are not allowed to buy or sell on credit. That is, they cannot get a bagel today and tell their classmates that they

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[1]This is an edited version of an experiment that Harold Fried and Daniel Levy contributed to the Spring, 1992, issue of *Classroom Expernomics*.

will pay for it tomorrow. Also, there is no storage technology, so the students must return any unused items to the instructor.

The transaction period is divided into several subperiods, perhaps five. It is critical that the number of subperiods planned be kept secret from the students. The students are not allowed to eat until after the end of the last subperiod. Each subperiod lasts two to three minutes. At the beginning of the first subperiod announce that at the end of the first subperiod every group will have to pay a certain number of beans as a tax. This makes beans valuable. Inform the groups that you will also collect a tax at the end of every other subperiod, but the amount of the tax will be determined at the end of each subperiod. One way of determining the tax would be to roll a die. Students will need to form expectations about the amount of the tax they will have to pay by estimating the probability of each possible outcome. Students are ejected from the experiment if they do not have enough beans to pay the tax. The experiment ends by closing the market unexpectedly at the end of the fifth subperiod.

Each student or group of students is given a record sheet (found in the Appendices at the end of this experiment) to record their initial endowment of food along with their final endowment, every trade they make, which goods were involved, what the quantities were, and what the exchange rate was. This information is used for the follow-up discussion. The entire simulation, including the dining time, usually takes about forty-five to fifty minutes. If time is a concern, the experiment can be shortened by reducing the number of groups, the number of subperiods, or the number of food items used.

DISCUSSION

Begin your follow-up discussion by soliciting student observations about the experiment. What did they observe or notice that was unique about the trading? Focus the remaining discussion on the functions (medium of exchange, store of value, unit of account), characteristics (homogeneity, divisibility, storability, durability, scarcity), and role of money in an exchange economy.

Since the government (that is, the instructor) accepts tax payments only in the form of beans, beans begin to take on value, and after two or three periods, exchange rates tend to be quoted in terms of beans. Thus, beans start to function as a medium of exchange as well as a unit of account. If the experiment is lengthened to six or seven subperiods, beans may even begin to function as a store of value in the sense that students will start accumulating more beans than they expect they will need to pay taxes. Obviously, if the students know the number of subperiods, they can "rationally" determine the amount of beans they need to accumulate for their future expected taxes. If this happens, beans will have no value beyond the future expected taxes.

A number of variations are possible. Levy and Bergen (1993) describe a setup essentially the same as this one except that they do not provide any beans to the groups. The resulting trades take place under a barter system. The follow-up discussion can then concentrate on the

inefficiencies of a barter system and what would be the desirable characteristics of a common medium of exchange.

The present experiment can also be extended to simulate an economy with inflation/deflation by adjusting the quantity of beans accordingly. For example, the instructor can illustrate the impact of an expansionary monetary policy by conducting an open market purchase of tofu using new money (beans). The experiment can also be used to simulate the inflationary effects of a budget deficit by giving every group fifty new beans as a transfer payment.

QUESTIONS

1. What characteristics of beans make them an efficient medium of exchange?

   [Beans are durable, divisible, portable, and scarce.]

2. What impact would an increase in the number of beans have on prices and the number of transactions?

   [The increase in the number of beans is equivalent to an increase in the money supply. According to the quantity theory of money, we would expect that the nominal prices of all items would tend to rise.]

REFERENCES/FURTHER READING

Fried, Harold O., and Daniel Levy. "Beans as a Medium of Exchange." Classroom Expernomics (Spring 1992): 4.

Levy, Daniel, and Mark Bergen. "Simulating A Multiproduct Barter Exchange Economy." Economic Inquiry (April 1993): 314-21.

Radford, R. A. "The Economics of a P.O.W. Camp." Economica (November 1945): 189-201.

APPENDICES TO EXPERIMENT 17

- Menu and initial endowment allocation for a 25-student class
- Transaction record sheet

MENU AND INITIAL ENDOWMENT ALLOCATION FOR A 25-STUDENT CLASS

Group #1
2 tuna salad sandwiches
2 ham sandwiches
3 servings of lasagna
3 plastic spoons

Group #2
Ice cream (one quart)
16 oz. tofu
3 plastic spoons

Group #3
2 chef's salad
3 plastic spoons
100 beans

Group #4
25 plastic plates
25 plastic knives, 3 spoons, 25 forks
Cookies

Group #5
Ice cubes in a plastic bag
Salad dressing (24 servings)
Cream cheese (6 packs, 8 oz each)
3 plastic spoons

Group #6
8 bagels (various flavors)
10 plastic cups
3 plastic spoons
80 beans

Group #7
2 chef's salads
3 two liter Diet Coca-Cola
3 two liter Coca-Cola Classic
3 plastic spoons

Group #8
Napkins (pack of 50)
Pizza (8 slice pie)
4 plastic spoons

TRANSACTION RECORD SHEET

Name(s) of student(s): _____ _____

_____ _____

Endowment:	Final Consumption:	Leftover:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Initial number of beans	_____	No. beans, end of period 1	_____
No. beans, end of period 2	_____	No. beans, end of period 3	_____
No. beans, end of period 4	_____	No. beans, end of period 5	_____
No. Beans, end of period 6	_____	No. beans, end of period 7	_____

Transaction List:

	Type and Quantity of Good Sold	Type and Quantity of Good Bought	Exchange Rate
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			