

The Savings/Consumption Game: An Update

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A few years ago, I published a piece in this journal, entitled "A Savings/Consumption Game for Introductory Macroeconomics" (Brauer, 1994). Following a survey of available classroom games and participatory exercises, I found that most such games address issues of *microeconomics*, and I therefore set out to design an exercise of potential use in the teaching of introductory *macroeconomics*. The idea of the exercise is straightforward. Instead of merely *presenting* to students the graphical representation of the theoretical concept of a consumption function ($C = a + bY$, where C is consumption and Y is national income), why not simply collect data from the students themselves about how their own consumption (and savings) behavior might be affected if their own income were to change.

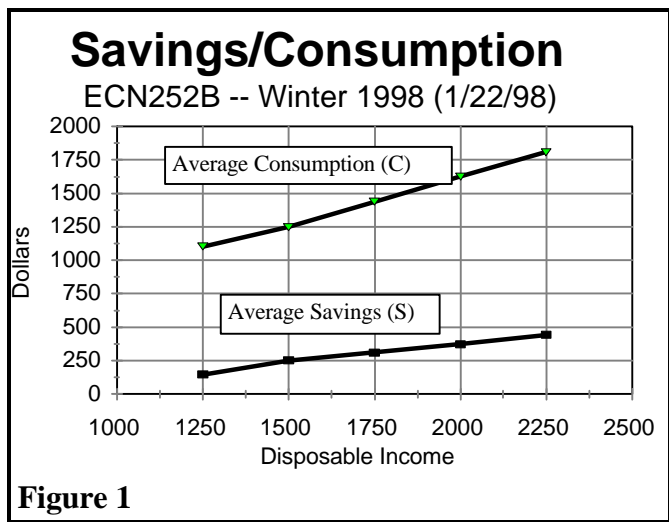
To collect the student data, I designed a simple form (see *Appendix A*, Income/Expenditure Handout). This form can be handed out at the end of one class, collected during the next, and processed in time for your session on consumption, savings, investment, and export and import functions. Therefore, the class-time cost of data collection is essentially zero. I have collected data for eight classes (two each in the Winter quarters 1995, 1996, 1997, and 1998). Without exception I have received consistent results, and they are pedagogically highly valuable to my teaching. The major reason for this statement is that in explaining consumption functions, and how a consumption function becomes part of an aggregate expenditure function, and how the latter is turned into an aggregate demand curve can always be traced back to the *students' own data*. This makes for a powerfully consistent story-line that the instructor can hold before the students' eyes over the course of a week or two of lecturing on the construction of the aggregate demand curve. This technique of collecting data from students and constantly and consistently *using* or *referring to* their own data captures and holds students attention focused on the complex material to be developed.

Table 1 hereunder presents data from a recent class. In this case, I had data from 21 students (but

I present data for only eight students). The reason for having students fill in the full form (Appendix A) is simply that I do not want them to guess that my real interest is not in the distribution of income among various expenditure categories, but merely in the distribution of income between savings and consumption. On a computer spreadsheet, I merely enter the data from the savings line. Since consumption is the difference between income and savings, it is very easy to have a spreadsheet compute the consumption rate, savings rate, and marginal propensities to consume and save out of additional income. If desired, the instructor can later supplement the cross-sectional data from the students with time-series income and consumption data from, e.g., the *Economic Report of the President* or similar data sources, as some textbooks do (e.g., McEachern, 1997, p. 184; Stiglitz, 1993, p. 768).

Table 1: Consumption/Savings Data

Student	\$1,250.00	\$1,500.00	\$1,750.00	\$2,000.00	\$2,250.00
1	\$0.00	\$50.00	(\$50.00)	(\$50.00)	\$50.00
2	\$100.00	\$150.00	\$100.00	\$100.00	\$100.00
3	\$500.00	\$625.00	\$700.00	\$875.00	\$1,025.00
4	\$125.00	\$150.00	\$175.00	\$200.00	\$225.00
5	\$390.00	\$520.00	\$790.00	\$920.00	\$870.00
6	\$70.00	\$100.00	\$150.00	\$200.00	\$250.00
7	\$50.00	\$100.00	\$0.00	\$50.00	\$0.00
21	\$200.00	\$450.00	\$450.00	\$550.00	\$550.00
Average S	\$146.67	\$250.71	\$311.90	\$373.33	\$442.62
Proportion of DI	0.12	0.17	0.18	0.19	0.20
Change in S		\$104.05	\$61.19	\$61.43	\$69.29
Average C	\$1,103.33	\$1,249.29	\$1,438.10	\$1,626.67	\$1,807.38
Proportion of DI	0.88	0.83	0.82	0.81	0.80
Change in C		\$145.95	\$188.81	\$188.57	\$180.71
Check: S+C+DI	\$1,250.00	\$1,500.00	\$1,750.00	\$2,000.00	\$2,250.00
Sum proportions=1	1.00	1.00	1.00	1.00	1.00
Change in DI		\$250.00	\$250.00	\$250.00	\$250.00
MPS=chgS/chgDI		0.42	0.24	0.25	0.28
MPC=chgC/chgDI		0.58	0.76	0.75	0.72
Check: MPS+MPC=1		1.00	1.00	1.00	1.00



The computations carried out in table 1 are, in practice, often difficult for students to follow and to comprehend. Using the students' own data, reflecting their own behavior, makes it easier for and on them to follow the discussion and rationale of constructing a consumption and savings function. Moreover, using the students' data

furnishes a wonderful opportunity to point out that even though *individual* economic behavior differs (as microeconomics teaches), it nonetheless aggregates into highly predictable *macroeconomic* behavior. For example, in table 1, the savings of student #1 *fall* as income is presumed to rise from \$1,500 to \$1,750. It is important to stress to students that this individual behavior is just fine and is not an anomaly at all. Macroeconomists do not need to make data conform to expectations; we just take the data the way they come, and still find that some behavior is highly predictable in the aggregate: in this case, the consumption function is definitely upward-sloping (see figure 1).

On the basis of such data, it is now relatively easy to get students to think about *shifts* in the consumption (and savings) function, depending on external events such as changing expectations, interest-rate changes, wealth-effects, and the like. Because each student filled in his or her own data sheet, it is easy to get them to see and acknowledge that, yes, their *own* consumption and savings behavior might change with changing economic circumstances (other than income, that is). If true for them, then surely also for others, and therefore for the aggregate.

An additional wrinkle is introduced by noting, in table 2, that data from my morning classes show mostly *lower* marginal propensities to consume (MPCs) than my evening classes. Most likely the reason is that the morning classes are predominantly populated by younger students without family commitment, whereas the evening classes (in the 5:30pm to 10pm time slots) are frequented by

students who are more likely to hold regular full-time jobs, have their own family, and are much more money and family-budget conscious than their morning-class counterparts.

Table 2: Comparing MPCs Across Classes

<i>Income</i>	<i>\$1,250</i>	<i>\$1,500</i>	<i>\$1,750</i>	<i>\$2,000</i>	<i>\$2,250</i>
Class 1 (M)	n/a	0.42	0.61	0.72	0.47
Class 2 (E)	n/a	0.75	0.81	0.71	0.77
Class 3 (M)	n/a	0.61	0.68	0.67	0.45
Class 4 (E)	n/a	0.76	0.44	0.81	0.61
Class 5 (M)	n/a	0.56	0.53	0.68	0.49
Class 6 (E)	n/a	0.42	0.69	0.48	0.49
Class 7 (M)	n/a	0.57	0.56	0.52	0.42
Class 8 (E)	n/a	0.58	0.76	0.75	0.72

Depending on your own inclinations, teaching objectives, and students' background, note that the collected data permits you to estimate a regression line through the data. For example, for class 8 the estimated line would be $C = 195 + (0.71)(DI)$, where DI refers to the disposable monthly income of Appendix A, and the estimated average MPC is 0.71. You could rescale figure 1 to show a zero on the horizontal axis, trace the consumption function all the way back to $DI = 0$. From there on, it is pretty straight forward to explain to students how the *graphical* representation of the consumption function is translated into its *algebraic* equivalent (with intercept and slope) and that, in turn, can later on be used to construct a macroeconomic system of equations of which the consumption function is but one equation.

Again, the pedagogical point is that all of this either is developed purely "in the abstract," because the textbook says so, or with the aid of student-derived data — which will increase students' absorption of the material and foster their interest in the matters developed in (and beyond) class.

References

Brauer, Jurgen. "A Savings/Consumption Game for Introductory Macroeconomics." *Classroom Experiments* Vol. 3, No. 2 (Fall 1994), pp. 9-11.

McEachern, William. *Economics*. 4th edition. Cincinnati, OH: South-Western, 1997.

Stiglitz, Joseph. *Economics*. New York: W. W. Norton, 1993.

APPENDIX A

INCOME/EXPENDITURE HANDOUT

Consider only income-column 1 (labeled Col 1 -- \$1,250). Suppose that \$1,250 is your monthly net income, that it has been so for some time, and that you expect that you will continue to receive it for some time. How would you use your money?

When finished with column 1, repeat the exercise for the other columns, always under the assumption that you are receiving the indicated monthly income, have been receiving it for some time, and expect to receive it for some months to come. When finished with all columns, hand the sheet to your instructor.

<i>DISPOSABLE MONTHLY INCOME</i> (i.e., after taxes and transfer payments)	Col 1 \$1250	Col 2 \$1500	Col 3 \$1750	Col 4 \$2000	Col 5 \$2250
<i>MONTHLY EXPENDITURES</i>					
● Food/household (e.g., dishwasher liquid, etc.)	_____	_____	_____	_____	_____
● Housing (e.g., rent, mortgage pymts, repairs)	_____	_____	_____	_____	_____
● Transportation (e.g., gas, car repairs, bus fares)	_____	_____	_____	_____	_____
● Medical (e.g., insurance premium)	_____	_____	_____	_____	_____
● Entertainment/recreation (e.g., eating out)	_____	_____	_____	_____	_____
● Other ordinary expenses	_____	_____	_____	_____	_____
● Savings/personal investments	_____	_____	_____	_____	_____
<i>TOTAL EXPENDITURES</i>	\$1250	\$1500	\$1750	\$2000	\$2250
<i>AVAILABLE SAVINGS</i>	\$4500	\$5000	\$5500	\$6000	\$6500

NOTE: If you find that you cannot cover your ordinary expenses out of your monthly income, you may deplete some of your savings. For example, you would write -\$50 into the savings line when you withdraw from savings and +\$50 when you deposit some of your income into savings.