

Today: Why so much fuss over models?

We learn things from models that we might not figure out otherwise.

A question presented to Harvard students.

(From G. Mankiw "How to Tax the Rich".)

Consider two plans aimed at providing a social safety net. (For our purposes here, let's keep things simple by assuming both are balanced-budget plans.)

A. A means-tested transfer of \$1,000 per month aimed at the truly needy. The full amount goes to those with zero income. The transfer is phased out: Recipients lose 20 cents of it for every dollar of income they earn. These transfers are financed by a progressive income tax: The government taxes 20 percent on all income above \$60,000 per year.

B. A universal transfer of \$1,000 per month for every person, financed by a 20-percent flat tax on all income.

Would you prefer to live in a society with safety net A or safety net B?

What did the Harvard students say?

They preferred plan A.

More from Mankiw:

When I asked this question to a group of Harvard undergraduates, over 90 percent concluded that plan A is better. Their arguments were roughly as follows: Plan A targets transfer payments on those who need the money most. As a result, it requires a smaller tax increase, and the taxes are levied only on those with high incomes. Plan B is crazy. Why should rich people like Bill Gates and Jeff Bezos receive a government transfer? They don't need it, and we would need to raise taxes more to pay for it.

Superficially, those arguments might seem compelling, but here is the rub: The two policies are equivalent. Look at the net payment—that is, taxes less transfers. Everyone is exactly the same under the two plans. A person with zero income gets \$12,000 per year in both cases. A person with annual income of \$60,000 gets zero in both cases. A person with income of \$160,000 pays \$20,000 in both cases. And everyone always faces an effective marginal tax rate of 20 percent.

In other words, everyone's welfare is identical under the two policies, and everyone faces the same incentive. The difference between plan A and plan B is only a matter of framing.

Let x = pre-tax-and-transfer income.

f_A, f_B = post-tax-and-transfer income under plans A, B respectively.

$$f_A(x) = \begin{cases} 12000 + x - (0.2)x & x \leq 60000 \\ 60000 + \cancel{12000} + (x - 60000)(0.8) & x > 60000 \end{cases}$$

$$f_B(x) = 12000 + (0.8)x$$

After some algebra $f_A(x) = f_B(x)$ for all $x \geq 0$.

The point of the example: you will not see this by making arguments at the level of "here are 3 points in favor of plan A".

Writing down $f_A(x)$ & $f_B(x)$ is a crude version of creating a model.

"The model is smarter than you."

What this means is that writing down a model forces you to think differently.

Our next model was an answer by Samuelson
(Econ Nobel) to Stanislaw Ulam (Polish mathematician)

Ulam asked Samuelson for a social science theory
which was true and not trivial.

Samuelson's answer: Ricardo's theory of
Comparative Advantage.

⚠ Comparative Advantage is confusing terminology
but in common use.

Better: Theory of International Trade.

A model of trade (Ricardo)

2 countries : England , Portugal.

2 goods : cloth , wine.

goods are produced using hours of labor.

	Cloth	Wine
England	100	120
Portugal	90	80

Meaning of table: England produces 1 unit of cloth with 100 hours of labor, etc.

Assume that each country has 3600 hours of labor available (per year?)

Consider 2 possibilities:

free trade , no trade.

no trade: England can produce

18 cloth + 15 wine, because.

$$18 \cdot 100 + 15 \cdot 120 = 1800 + 1800 = 3600.$$

Portugal can produce

16 cloth + 27 wine because

$$16 \cdot 90 + 27 \cdot 80 = 1440 + 2160 = 3600.$$

total production:

34 cloth + 42 wine.

With trade:

England produces only cloth:

36 cloth ($36 \cdot 100 = 3600$)

Portugal produces only wine.

45 wine ($45 \cdot 80 = 3600$)

Trade: 18 units of cloth for 18 units of wine.

England gets 18 cloth + 18 wine.
+ 3 wine!

Portugal gets 18 cloth + 27 wine.
+ 2 cloth!

With trade, England and Portugal are
(collectively) better off; they have more
goods than would be possible without trade.

Why is this model not trivial?

Samuelson's point: people make arguments that
are falsified by this model.

Example: The Portuguese say "why bother trading
with England? We're better at everything!"

A: But in the model, the Portuguese achieve something
by trading that wouldn't have been possible
otherwise.

Example: "These traders are useless parasites
who produce nothing."

A: It is true that the traders produce no cloth and no wine. But with their work, it's possible for England and Portugal to collectively have more than would otherwise be possible.

Some points about this:

- (1) Typical cost differences are much larger, strengthening the case for trade.
- (2)  The most important thing about any model is (sometimes) what's not in the model.

Notice that Ricardo's model assumes that the English winemakers can just shift to working in a factory making cloth.

The English winemakers might be VERY upset by this!

- (3) The model says that trade is better at the collective level.

It does NOT say that trade is better for EVERY SINGLE PERSON.

(4) Why does the trade work?

In the absence of trade, in England one can, with 1200 hours of labor, make either 12 cloth or 10 wine.

In Portugal, with 720 hours of labor, one can make 8 cloth or 9 wine.

Thus in Portugal, 8 cloth costs the same as 9 wine.

In England, 12 cloth costs the same as 10 wine.

How do we make money? Buy low, sell high.

There are 2 relative prices: in England wine is more expensive than cloth. In Portugal, cloth is more expensive than wine.

So: buy wine in Portugal, sell in England
buy cloth in England, sell in Portugal.