Economics 1: Fall 2010

J. Bradford DeLong, Michael Urbancic, and a cast of thousands...

http://delong.typepad.com/econ_1_fall_2010/
Ladies and Gentlemen, to Your iClickers...

- What is the big reason to impose taxes (or bounties) rather than use command-and-control to limit quantities (or draft participants)?
  - A. Market signals allow people to choose what they want to do
  - B. Command-and-control may put the wrong people in places they should not be
  - C. Command-and-control will greatly reduce consumer plus producer surplus
  - D. Command-and-control will create a favored group that would lose from reversion to the market outcome—even though social surplus would be increased
Economics 1: Fall 2010: General Equilibrium

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So Far We Have Assumed the Rest of the Economy Is Stable
Working with Demand and Supply Curves: In-Up Shift in Supply Curve
A Single Market Will Have an Equilibrium

• If you make three assumptions:
  – That when price is high, demand is sufficiently low
  – That when price is low, demand is sufficiently high
  – That small changes in prices call forth small changes in demand and supply
• But does the same thing apply to the economy as a whole?
  – If all markets but one are in balance, and if you then move the price in the one-out-of-balance market
    • That will throw off demand or supply or both in other markets
  – Is there anything that guarantees, or even makes it likely, that the economy as a whole will have a competitive market equilibrium?
Karl Marx Said No

• Karl Marx said:
  – John Stuart Mill is an idiot
  – Mill has only demonstrated the possibility of crisis, when he should have demonstrated their necessity
  – If financial markets are in balance, there will be a reserve army of the unemployed
  – If labor markets are in balance, finance will be in an unsustainable bubble
  – Hence even competitive markets are an unsustainable and inhumane social system
Gerard Debreu and Ken Arrow Say Yes

- Under certain conditions and with certain assumptions, of course...
- ...a competitive market general equilibrium system will have at least one equilibrium
As Adjustments Propagate Through Related Markets and Generate Further Adjustments...

• ...the process will eventually reach a stopping point

• There will be a set of prices in the economy at which all the demands in all the markets will equal supplies
It Is Worth Seeing How This Adjustment Process Works—Once

• So let us see how it all fits together...
  – The problem is that to do anything in class, you have to use a toy model that is, well, somewhat stupid: but we hope that the insights from it generalize
    So let us rev up our toy model...
  – Yes, it is yoga teachers and baristas once again...
• But now we have a lot of markets—not just one:
  – Demand and supply for yoga lessons
  – Demand and supply for coffee
  – What blue-collar workers are doing makes sense
  – What white-collar workers are doing makes sense
  – Fitness businesses are covering their costs (and also not making exorbitant profits)
  – Coffee bars are covering their costs (and also not making exorbitant profits)
  – So we are going to have six different equilibrium conditions to check—not just one—and we only have two commodities and two factors of production
Ladies and Gentlemen, to Your iClickers

- The principal reason to let self-interested buyers and sellers in a market economy find your equilibrium, rather than assemble gigantic computing machines to do it, is:
  - A. The computational task is much too great
  - B. People have too great an incentive to cheat—and nobody has a big incentive to catch them
  - C. Central planning can only deal with the known unknowns, while decentralized human initiative can also deal with the unknown knowns and the unknown unknowns
Our Toy Economy: Setup I

- **Factor supply:**
  - 20 white-collar workers, trained as yoga instructors, can also be baristas
  - 120 blue-collar workers, who can be either baristas or yoga assistants

- **Production**
  - **Yoga:**
    - Two blue collar yoga instructors can teach one student a day.
    - Two white collar yoga instructors can teach five students a day.
    - One white collar yoga instructor plus one blue collar assistant can also teach five students a day
      - As long as the blue-collar wage is lower than the white-collar wage, teams are best
  - **Coffee:**
    - One barista (blue collar or white collar) can make ten cups of coffee a day
      - That pins the real wage of blue-collar workers at ten cups of coffee a day
Our Toy Economy: Setup II

• Households
  – Everybody spends half their income on coffee, and half on yoga lessons

• For what firms are doing to make sense:
  – The cost of hiring an instructor and an assistant is equal to the revenue from their teaching
  – The cost of hiring baristas is equal to the revenue from their brewing

• Labor:
  – Everybody wants to work
Our Toy Economy: Equilibrium I

• Production
  – 20 instructors plus 20 assistants offer yoga instruction to 100 students a day—unless the price of yoga drops really low
  – 100 baristas brew 1000 cups of coffee a day

• Prices
  – $w^b$: wage of blue-collar workers
  – $w^w$: wage of white-collar workers
  – $p^c$: price of coffee
  – $p^y$: price of yoga lessons
  – Three prices or four?
Our Toy Economy: Equilibrium II

• Equilibrium conditions:
  – Firms must cover their costs in yoga:
    • \(20w^b + 20w^w = 100p^y\)
  – Firms must cover your costs in coffee:
    • \(100w^b = 1000p^c\)
  – Demand must equal supply for coffee:
    • \(\frac{1}{2} \times (120w^b + 20w^w) = 1000p^c\)
  – Demand must equal supply for yoga:
    • \(\frac{1}{2} \times (120w^b + 20w^w) = 100p^y\)
Ladies and Gentlemen, to Your iClickers

• 1 barista working in a coffee bar can brew 10 cups of coffee a day. This means that the equilibrium wage of blue-collar baristas will be equal to the price of:
  – A. 5 cups of coffee a day
  – B. 10 cups of coffee a day
  – C. 20 cups of coffee a day
  – D. 40 cups of coffee a day
  – E. 60 cups of coffee a day
This Is a Rigged Example

• I have rigged this example so that you don’t have to solve any systems of equations at all:
  – Coffee firms: \(100w^b = 1000p^c\)
    • The real wage for blue-collar baristas: \(w^b/p^c = 10\)
Ladies and Gentlemen, to Your iClickers

• Everybody spends half their income on coffee. That means that demand in the coffee market is $\frac{1}{2} \times (120w^b + 20w^w)$ and supply is $1000p^c$. We know that the blue-collar wage is 10 cups of coffee. Thus:
  $\frac{1}{2} \times (120 \times 10p^c + 20w^w) = 1000p^c$.

• That means that the equilibrium wage of white-collar yoga instructors is:
  - A. 5 cups of coffee a day
  - B. 10 cups of coffee a day
  - C. 20 cups of coffee a day
  - D. 40 cups of coffee a day
  - E. 60 cups of coffee a day
This Is a Rigged Example

• I have rigged this example so that you don’t have to solve any systems of equations at all:
  – The coffee market: \( \frac{1}{2} \times (120 \times 10p^c + 20w^w) = 1000p^c \)
    • \( w^w/p^c = 40 \)
  – Last, the yoga market: the earnings of assistants and yoga instructors have to match revenue: \( 20(10p^c) + 20(40p^c) = 100p^y \)
    • \( p^y/p^c = 10 \)
  – Yoga firms?
    • We don’t have to solve it—we already have our answers...
Our Market General Equilibrium

• Coffee:
  – 100 blue-collar workers producing 1000 cups

• Yoga
  – 20 white-collar instructors plus 20 blue-collar assistants producing 100 lessons

• Prices:
  – $w^b/p^c = 10$
  – $w^w/p^c = 40$
  – $p^y/p^c = 10$

• Blue-collar workers:
  – Earning a wage of 10 cups of coffee a day
  – Spending it half on coffee—5 cups—and the rest on yoga lessons—½ a yoga lesson a day

• White-collar workers:
  – Earning a wage of 10 cups of coffee a day
  – Spending it half on coffee—20 cups—and the rest on yoga lessons—2 yoga lessons a day
See? It All Adds Up! Karl Marx Was Wrong! Gerard Debreu Was Right!
Ladies and Gentlemen, to Your iClickers

• The principal reason to let self-interested buyers and sellers in a market economy find your equilibrium, rather than assemble gigantic computing machines to do it, is:
  – A. The computational task is much too great
  – B. People have too great an incentive to cheat—and nobody has a big incentive to catch them
  – C. Central planning can only deal with the known unknowns, while decentralized human initiative can also deal with the unknown knowns and the unknown unknowns
Let’s Go a Little Further

- Suppose things change in the economy...
- Can the market find its new equilibrium?
- Suppose that the computer revolution comes:
  - It means that you no longer have to have an assistant to run a yoga class
  - The 20 white-collar yoga instructors can teach their five yoga students a day without assistance
- This is a good thing for society as a whole
  - We now are making what we made before, but we have 20 blue-collar workers that we can redeploy to make other useful things
  - This episode of technological change makes us richer
- And the market economy in general equilibrium will go off and find its new equilibrium
  - What will it be like?
  - Start by noting that the extra 20 blue-collar workers all go off to make more coffee: that is their best alternative use now that they are no longer needed as yoga assistants.
Technological Change Makes Us Richer

• This computer revolution ought to be a good thing for society as a whole
  – We now are making what we made before, but we have 20 blue-collar workers that we can redeploy to make other useful things
  – This episode of technological change makes us richer

• And the market economy will indeed go off and find its new equilibrium
  – What will it be like?
  – Start by noting that the extra 20 blue-collar workers all go off to make more coffee: that is their best alternative use now that they are no longer needed as yoga assistants.
The New Equilibrium

• Our new equilibrium conditions:
  – Supply and demand for coffee: \( \frac{1}{2} \times (120w^b + 20w^w) = 1200p^c \)
  – Supply and demand for yoga: \( \frac{1}{2} \times (120w^b + 20w^w) = 100p^y/p^c \)
  – Yoga firms: \( 20w^w = 100p^y \)
  – Coffee firms: \( 120w^b = 1200p^c = 1200p^c \)

• We still don’t have to solve any systems of equations at all:
  – Cover your costs in coffee: \( w^b/p^c = 10 \)
  – Demand and supply for coffee: \( \frac{1}{2} \times (120 \times 10 + 20w^w) = 1200p^c \)
    • \( 10w^w/p^c = 600 \)
    • \( w^w/p^c = 60 \)
  – Yoga firms: \( 20(60) = 100p^y/p^c \)
    • \( p^y/p^c = 12 \)
Comparing the Equilibria

• Prices:
  – $w^b/p^c = 10$ before, and $= 10$ after
  – $w^w/p^c = 40$ before, and $= 60$ after
  – $p^y/p^c = 10$ before, and $= 12$ after

• Consumption:
  – Blue collar workers:
    • Consume 5 cups of coffee and $\frac{1}{2}$ a yoga lesson a day before,
    • Consume 5 cups of coffee and $\frac{5}{12}$ of a yoga lesson a day after
  – White collar workers:
    • Consume 20 cups of coffee and 2 yoga lessons a day before,
    • Consume 30 cups of coffee and $2\frac{1}{2}$ yoga lessons a day after
What the Fracking Frack?

• This episode of technological change was not a good deal for everyone

• Consumption:
  
  – Blue collar workers consume 5 cups of coffee and ½ a yoga lesson a day before, and 5 cups of coffee and 5/12 of a yoga lesson a day after
    • They have lost 1/12 of a yoga lesson, or 1/12 of their total consumption
  
  – White collar workers consume 20 cups of coffee and 2 yoga lessons a day before, and 30 cups of coffee and 2 ½ yoga lessons a day after
    • They have gained 10 cups of coffee plus half a yoga lesson, or 15/40 of their total consumption
The Market Gives You What You Want to Buy—Only If You Have Something Valuable to Sell

- How did increased productivity in the provision of yoga lessons leave blue-collar workers worse off?
- What do blue collar workers have to sell that is valuable?
- Well, as Karl Marx would put it, they have their labor power and only their labor power.
- And the coming of the computer revolution makes blue-collar labor power less needed and hence less valuable.
How to Evaluate This Change?

• Place everyone “behind the veil of ignorance” and have them decide...

• In changes:
  – 1/7 of the population gains consumption equal to 15 cups of coffee
  – 6/7 loses consumption equal to 5/6 of a cup of coffee
  – $15 \times \frac{1}{7} - \frac{6}{7} \times \frac{5}{6} = (15-5)/7 = +10/7$
  – Place people behind the veil of ignorance...

• In percentage changes:
  – 1/7 of the population gains consumption equal to 37.5% of their initial consumption
  – 6/7 loses consumption equal to 8.3% of their initial consumption
  – $\frac{1}{7} \times 37.5\% - \frac{6}{7} \times 8.3\% = -1.8\%$
  – Place people behind the veil of ignorance...

• The answer hinges on the marginal utility of wealth, and on the weight our assessment of social welfare places on different individuals

• Is it legitimate to place people behind the veil of ignorance?
Test Your Knowledge

• Why did Karl Marx think there would be no stable expectations-consistent general equilibrium?
• What markets do we have to think about when we try to solve a general equilibrium problem?
• What happens to your standard of living if technological progress makes your labor power (and the other factors you own) less valuable?
• How should we assess whether economic changes are on balance good or bad?