

Economics 1: Introduction to Economics: January 25, 2016 Lecture

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Economic Models and Liberal Education

January 25, 2016 8-9 AM
Wheeler Auditorium, U.C. Berkeley

A Word or Two on How Economists Think

- Strip a situation down to its essentials—that is, neglect almost every aspect...
- Play with this grossly-oversimplified world...
- Reach conclusions...
- Check those conclusions...
- Iterate...

Productivity Levels in Avicenna

Person	Yoga Lessons	Triple Lattes	Number of People Like...
Enkidu	100	900	10
Fujiwara Takako	100	700	10
Hypatia	200	1000	5
Ibn Khaldun	100	300	10
Odysseus	50	50	20

- “Avicenna”: Peter Beagle (1987): The Folk of the Air <<http://amzn.to/1PvCcdN>>. “State of Euphoria”: David Lodge (1975): Changing Places <<http://amzn.to/1nhoXXp>>. Ibn Sina: Abū ‘Alī al-Ḥusayn ibn ‘Abd Allāh ibn Al-Hasan ibn Ali ibn Sīnā <<http://tinyurl.com/n58rjc6>>. Enkidu: Gilgamesh <<http://amzn.to/1PepdkP>>. Fujiwara Takako: Genji Monogatari <<http://amzn.to/1nhCkXy>>. Hypatia <<http://tinyurl.com/z9uyqyw>>. Ibn Khaldun: Abū Zayd ‘Abd ar-Raḥmān ibn Muḥammad ibn Khaldūn al-Ḥaḍramī, Muquaddimah <<http://amzn.to/1Sd0uhv>>. Odysseus: <<http://amzn.to/1nhCA94>>.

Economic Models

- Move back and forth between:
 - Verbal descriptions of how people act
 - Quantitative examples
 - Individual-behavior equations
 - Aggregate equations
 - Graphs: analytic geometry
 - Equilibrium conditions as “where the curves cross”

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And in the Process Have Some Fun

- Refer to our common collective human cultural heritage.
- Not because I am going to test you on it.
- But because our common collective human cultural heritage is an important intellectual resource.
- Liberal education

Productivity Levels in Avicenna

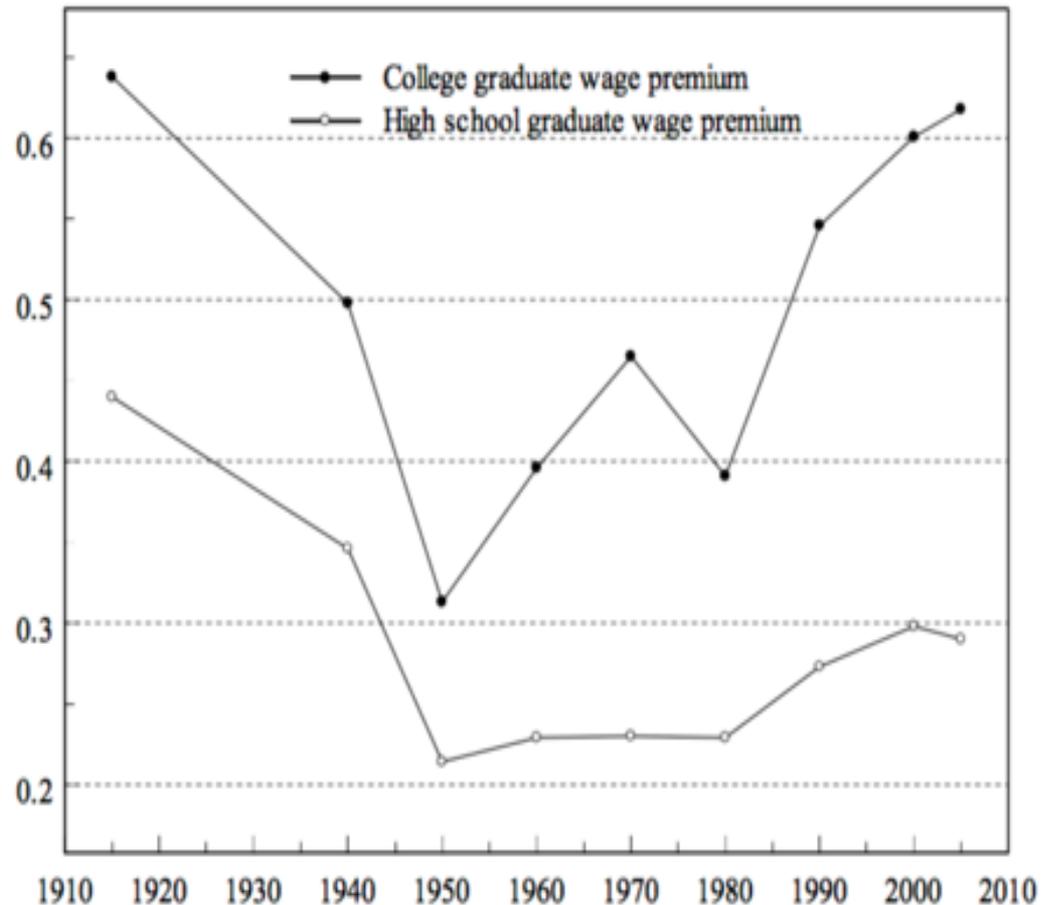
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A Word or Two on a Liberal Education

- “Liberal education” ≠ “kinda left-wing education” here
- “Liberal education” here means “appropriate to somebody free”
- Someone with control over their own and a share of control over our common destinies
 - Not someone taught a particular skill to do one thing
 - But, rather, someone whose life will be spent in a wide range of activities
 - And who thus needs a wide range of knowledge
- A liberal education is a very valuable thing
- Difference in the natural log (ln) of 0.6 means that the higher number is $1 + 0.6 + (0.6)^2/2 + (0.6)^3/(3!) + (0.6)^4/(4!) + \dots = 1.8221$ times the lesser: is 82% higher.

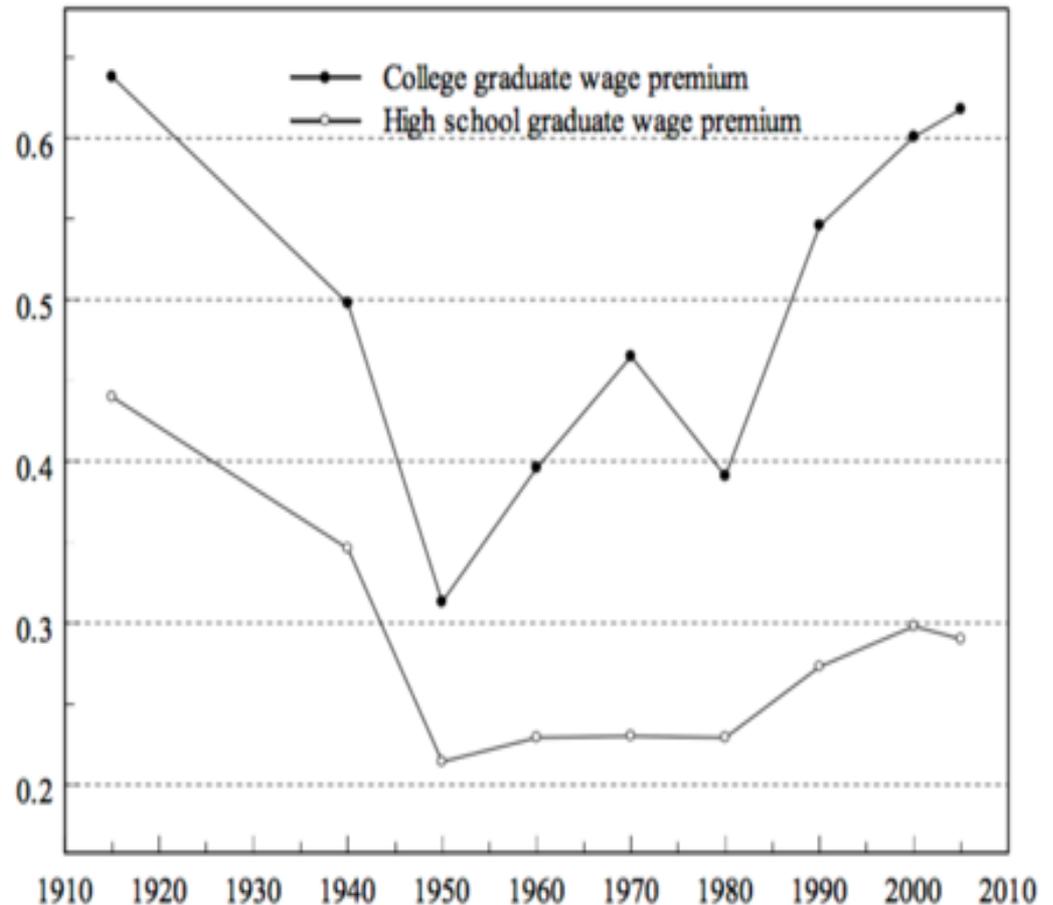
Figure 1
College Graduate and High School Graduate Wage Premiums: 1915 to 2005



A Liberal Education Is a Very Valuable Thing

- At a \$40,000/year average earnings level...
- $82.2\% \times \$40,000/\text{year} = \$32,884/\text{year}$
- Go to college: invest \$15K/yr (tuition and fees) + \$20K/yr (earnings not made) for 5 years = \$175,000
- Get an extra \$32,884/year for 40 years *if you're the kind of person who can graduate*
- Plus: freedom, depth of experience...

Figure 1
College Graduate and High School Graduate Wage Premiums: 1915 to 2005



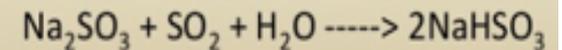
Liberal Education: It is Not the “Technical” Training That Is the Most Valuable



Wellman – Lord Proc

- This process consists of the following
 - Flue gas pre-treatment.
 - Sulfur dioxide absorption by sodium sulfite
 - Purge treatment
 - Sodium sulfite regeneration.
 - The concentrated sulfur dioxide stream is a marketable product.

The flue gas is pre - treated to remove the part
sulfite neutralizes the sulfur dioxide :



- In my extended family, three people who were, are, or look like they are headed not for the top 1% but the top 0.1%...
- construction and chemical engineering—ultimately pollution control—“smart money” on Wall Street managing the flow of financing of investment, “the industry” as they call it in LA...
- Learning how to deal socially as an outsider at Harvard in the 1920s, historical source analysis in the 1980s, messing around in Dartmouth AV in the 1990s

So Learn!: Extend Your Brains in Every Direction Your Curiosity Moves You

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A Word or Two on How Economists Think

- Did you see what I did there?

Production Possibilities, Specialization, and the Division of Labor

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Specialization and Division of Labor I

- Different capabilities and talents
- Practice-makes-perfect (or at least better)
- Better if we all manage to specialize (to some degree at least)

Fujiwara Takako's Potential Productivity

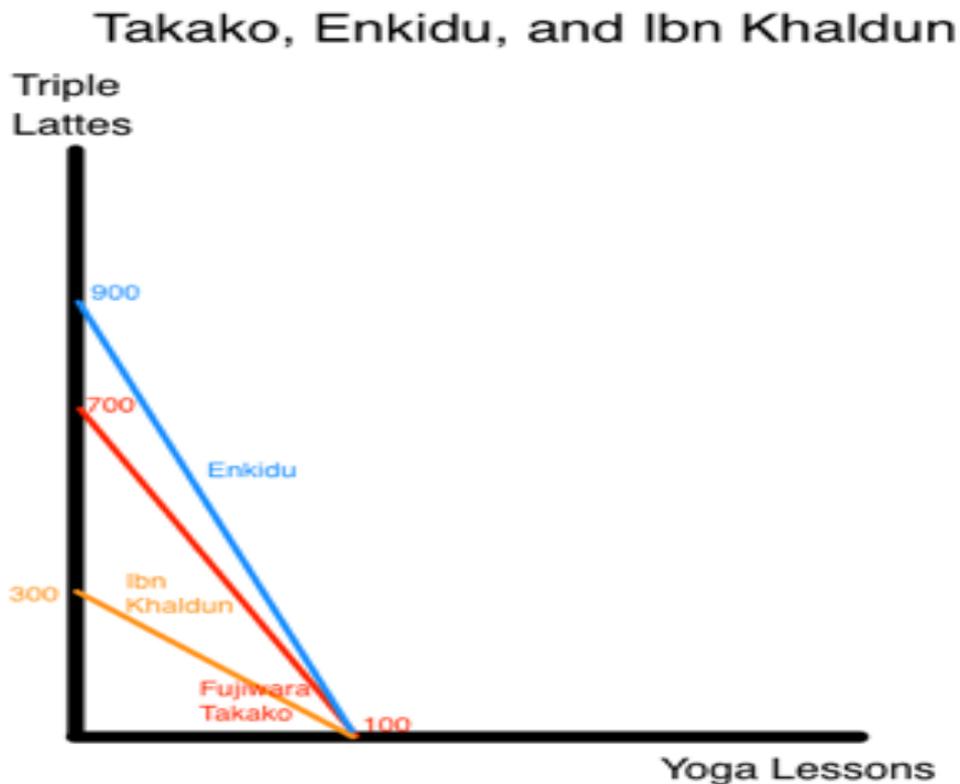


Productivity Levels in Avicenna

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Specialization and Division of Labor II

- Of these people, Enkidu is the best at everything...
- Does that mean everybody else should sit back and let Enkidu do everything?
- Suppose everybody spends half their time at each task...
- Total production: 150 YL, 950 TL



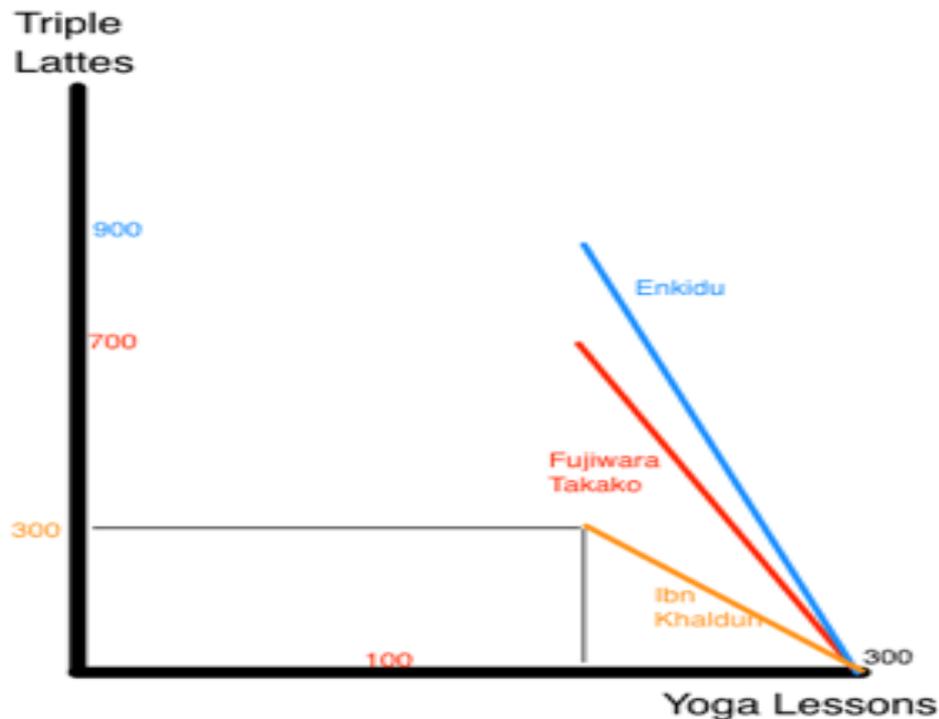
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Specialization and Division of Labor III

- But... Start with everybody teaching yoga...
- If we want to make lattes, who should we pull off the mat?
- Ibn Khaldun?
- Then we wind up with 200 YL, 300 TL

If Ibn Khaldun Makes the Lattes...

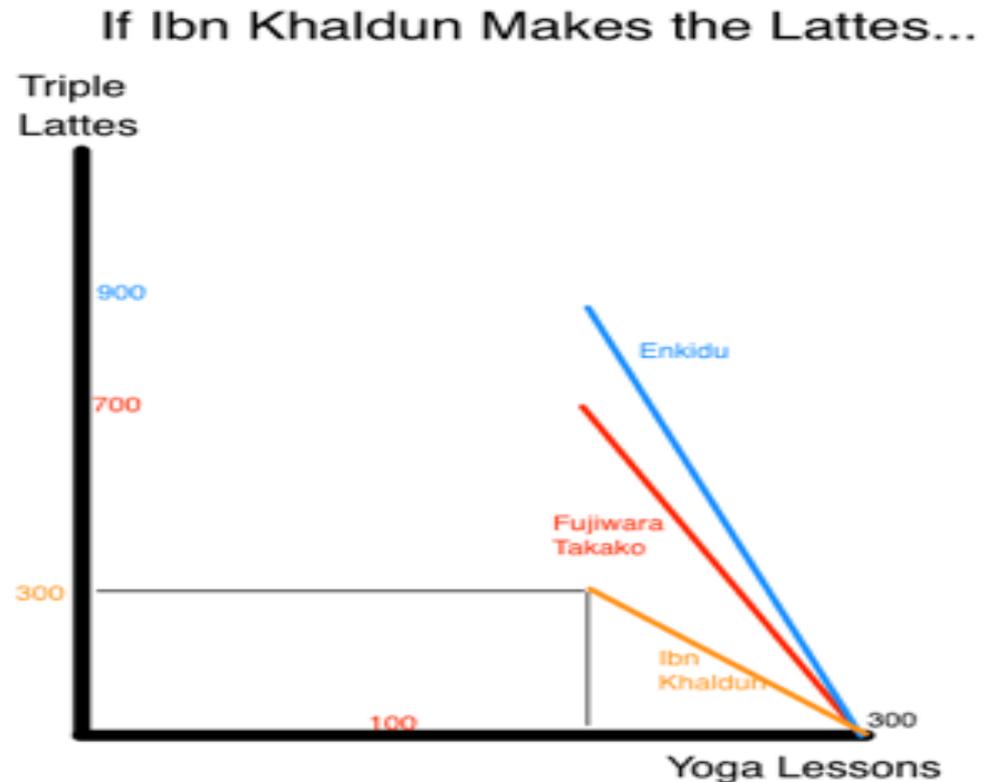


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Specialization and Division of Labor IV

- If we pull Enkidu first off of the yoga mat and put him on the espresso machine?
- Then we wind up with 200 YL, 900 TL.
- An *efficient* economic system would prefer that Enkidu be first on the espresso machine
- That is his comparative advantage

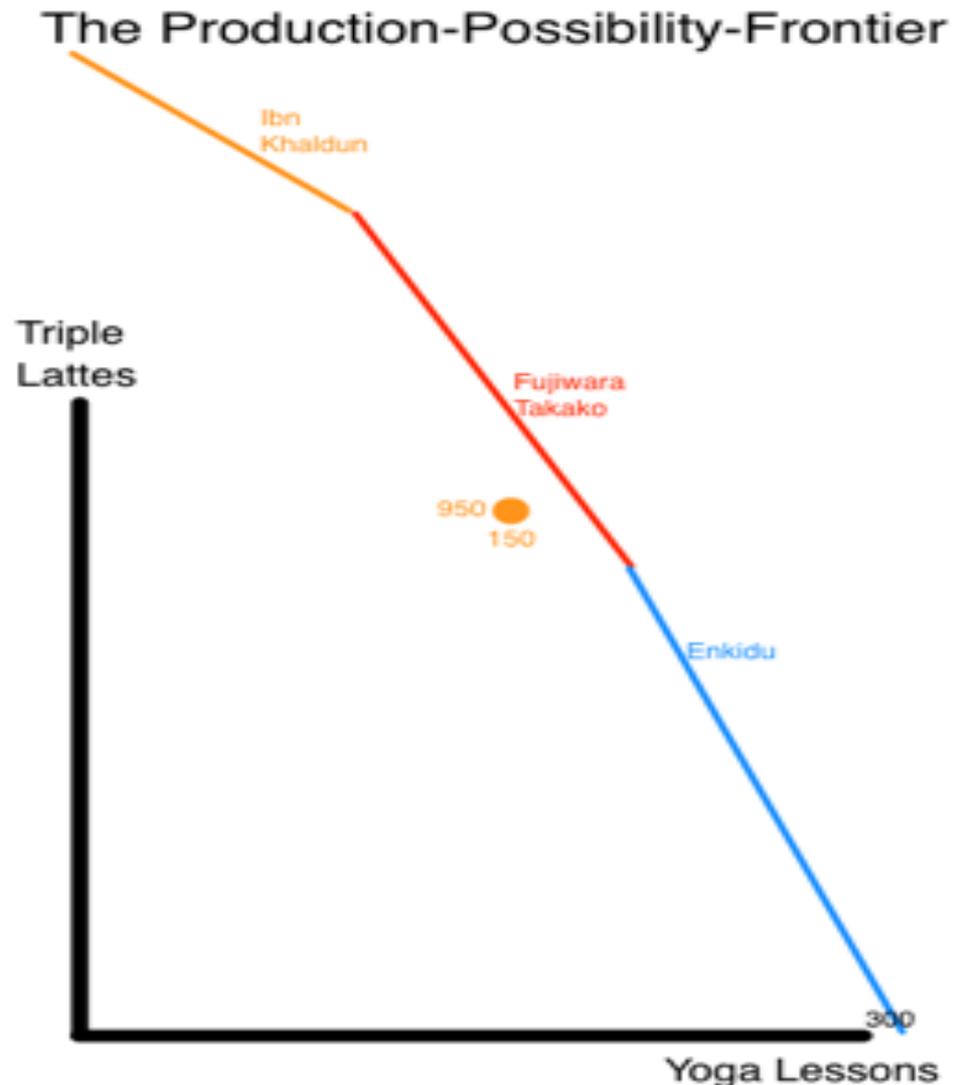


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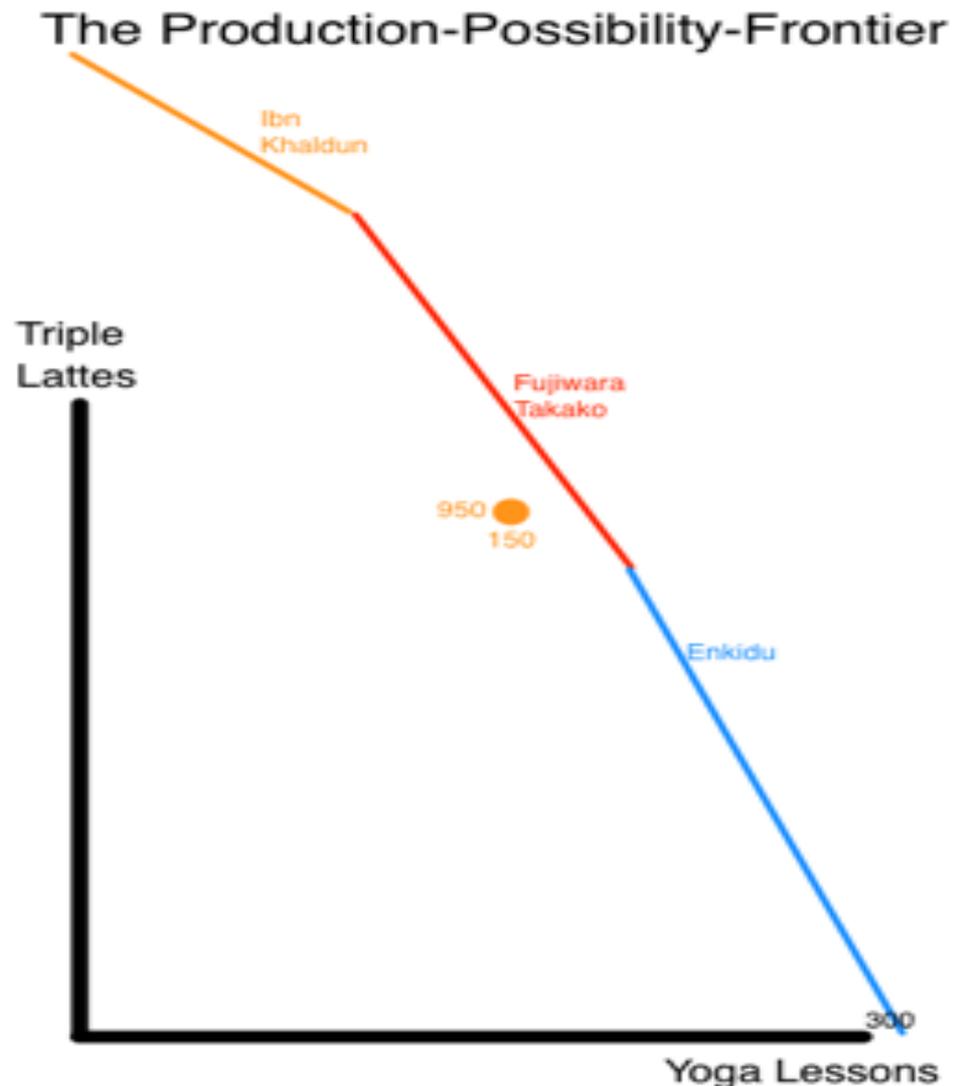
The Production Possibility Frontier

- If we pull Enkidu first off of the yoga mat and put him on the espresso machine?
- Then we wind up with 200 YL, 900 TL.
- An *efficient* economic system would prefer that Enkidu be first on the espresso machine
- That is his comparative advantage
- And if we want still more coffee, who do we put on the espresso machine next?



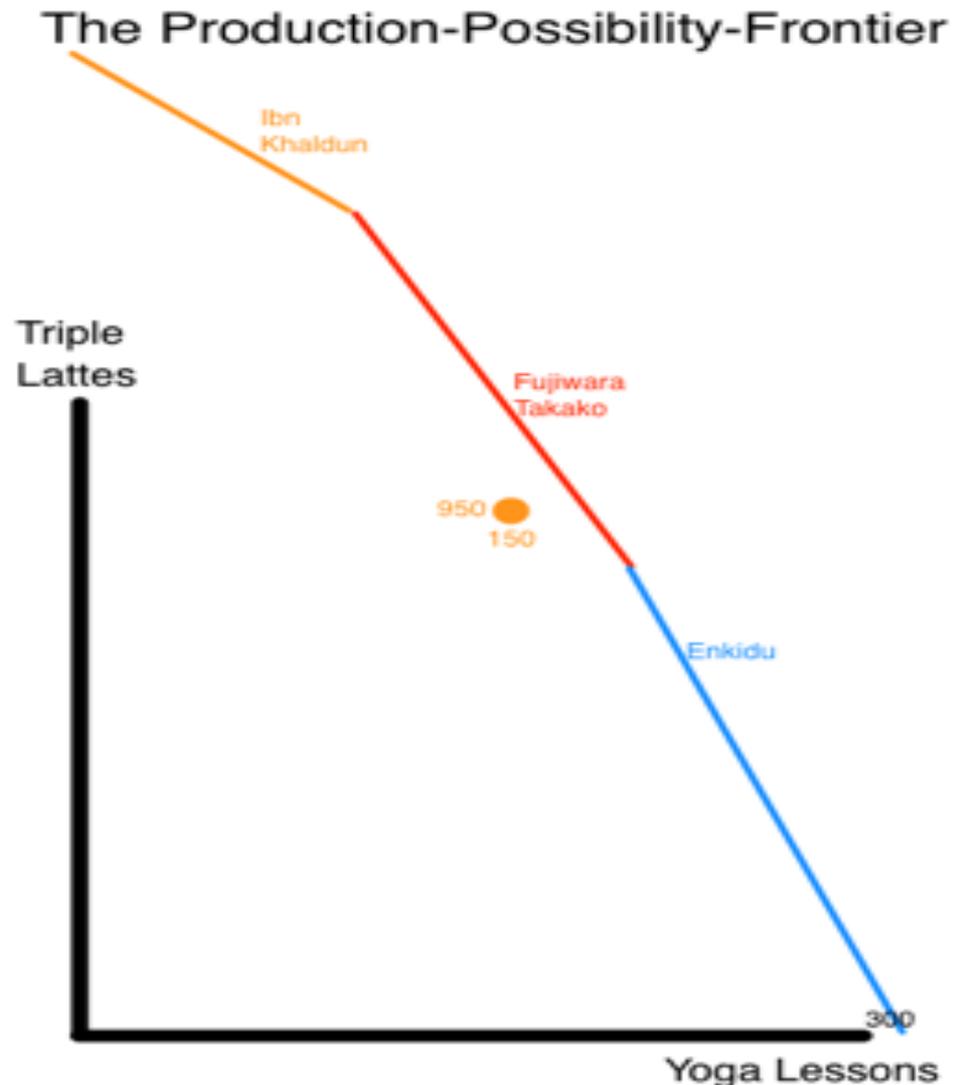
The Production Possibility Frontier II

- We now have a rule for how to allocate tasks in order to make society most productive
- Rank people by their comparative efficiency —their comparative advantage
- Put those with the greatest comparative advantage to the task —the espresso machine, or the mat— first.



Additional Questions

- What point on the PPF is it good for a society to choose?
- How is it good for a society to distribute the stuff that its economy manages to make?
- Whenever economists talk “efficiency” talk, they are reserving those two additional questions for later.



Production Possibilities II

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Let's Calculate Our Full PPF

- Given capabilities and talents
- Clear in what order you should take people off the mat and put them on the espresso machine
- And let's have more than five workers: let's say that there are 20 Odysseus-like workers, etc.

Individual Productivity Levels in Avicenna

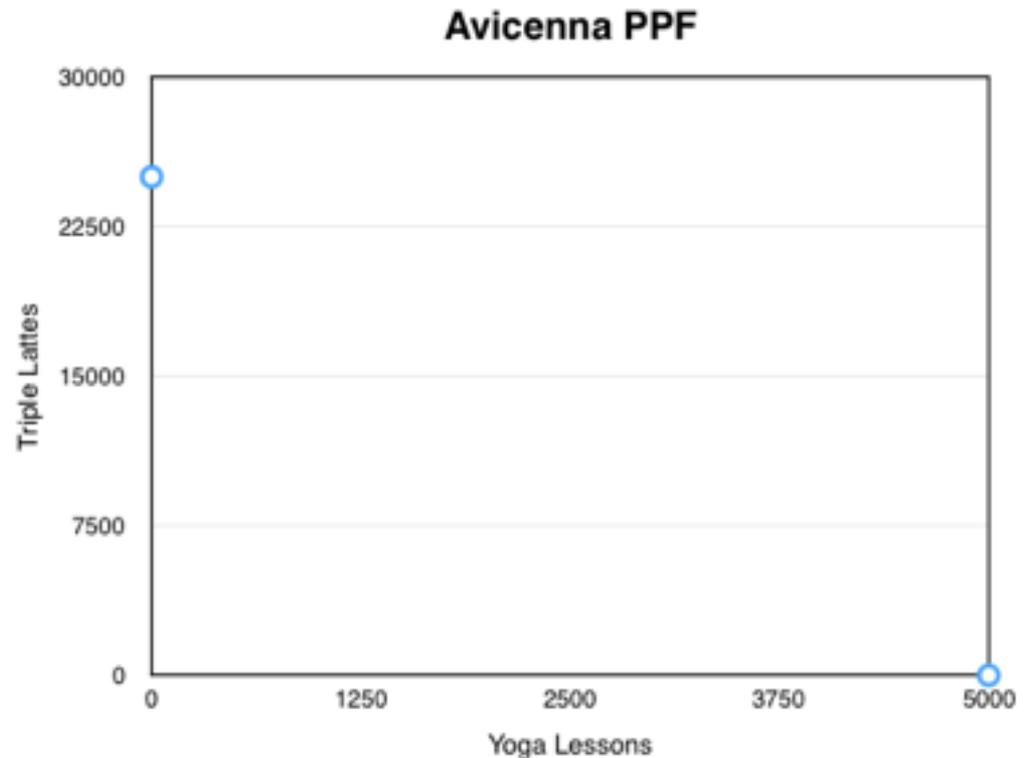
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Odysseus	50	50	1

Individual Productivity Levels in Avicenna II

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Let's Calculate Our Full PPF II

- If all 55 workers teaching yoga...
5000 lessons/day
- If all 55 workers pulling lattes...
25000 lattes/day
- And we know what order to put people onto the mat/machine

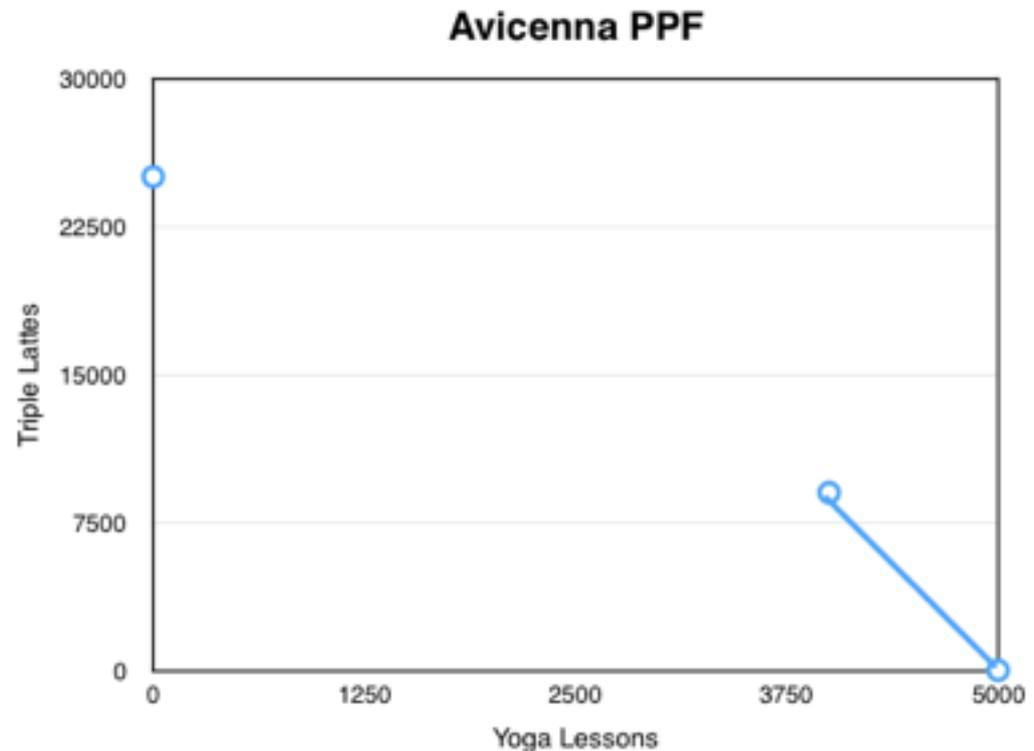


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Let's Calculate Our Full PPF III

- Putting all 10 Enkidu-like workers on espresso machines moves us from (5000 YL, 0 TL) to (4000 YL, 9000 TL)
- Now look at the (0 YL, 25000 TL) point. Who do you pull off the mat first?
- Yes: Odysseus, and those like him...

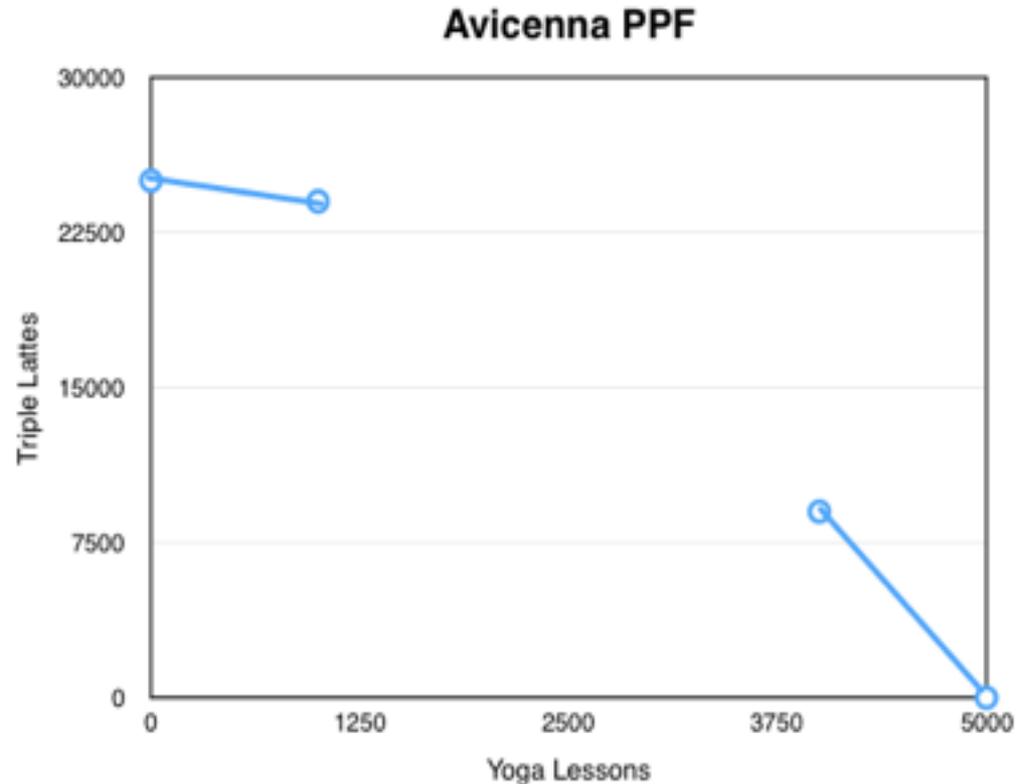


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Let's Calculate Our Full PPF IV

- Yes: the 20 Odysseus-like workers are the first that you should set to work teaching yoga
- Even though the Odysseus-like workers are the worst yoga teachers in the economy, right?
- It's just that Odysseus's badness at making lattes is much worse, relatively, than their badness at teaching yoga...

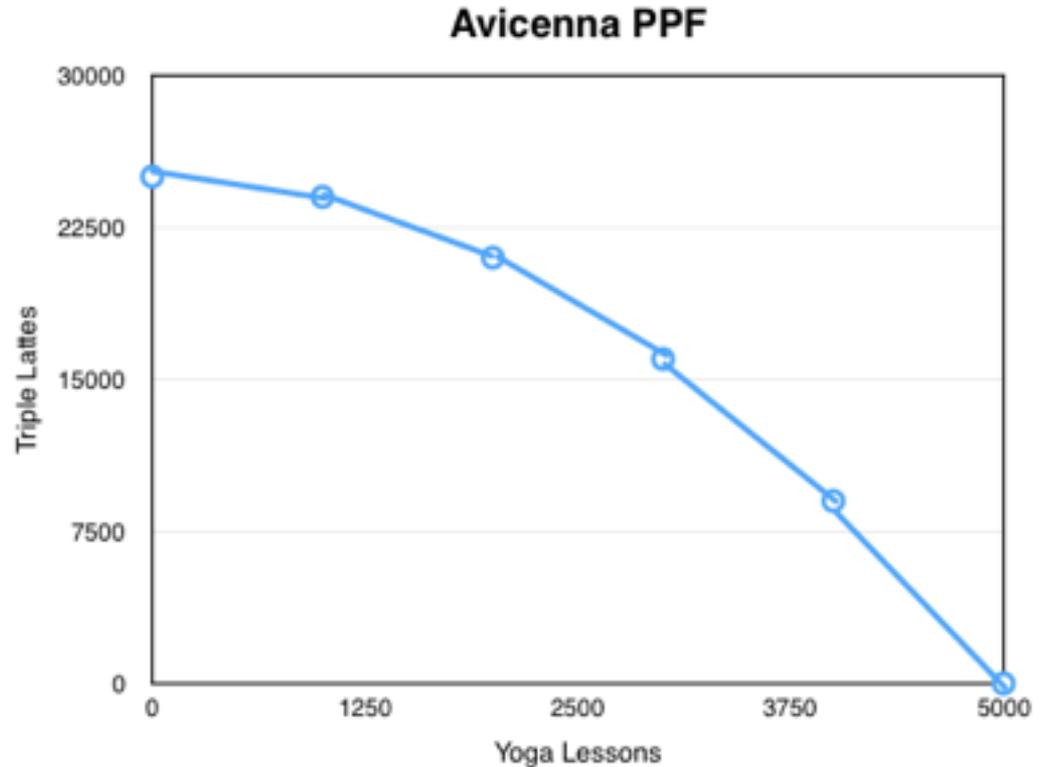


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Let's Calculate Our Full PPF V

- And the next class of workers to put to work teaching yoga are Fujiwara-clan workers like Takako...
- And the next class to put to work pulling lattes are the Arab civil servants like Ibn Khaldun...
- With the Alexandrian mathematicians like Hypatia in the middle...
- And we are done!

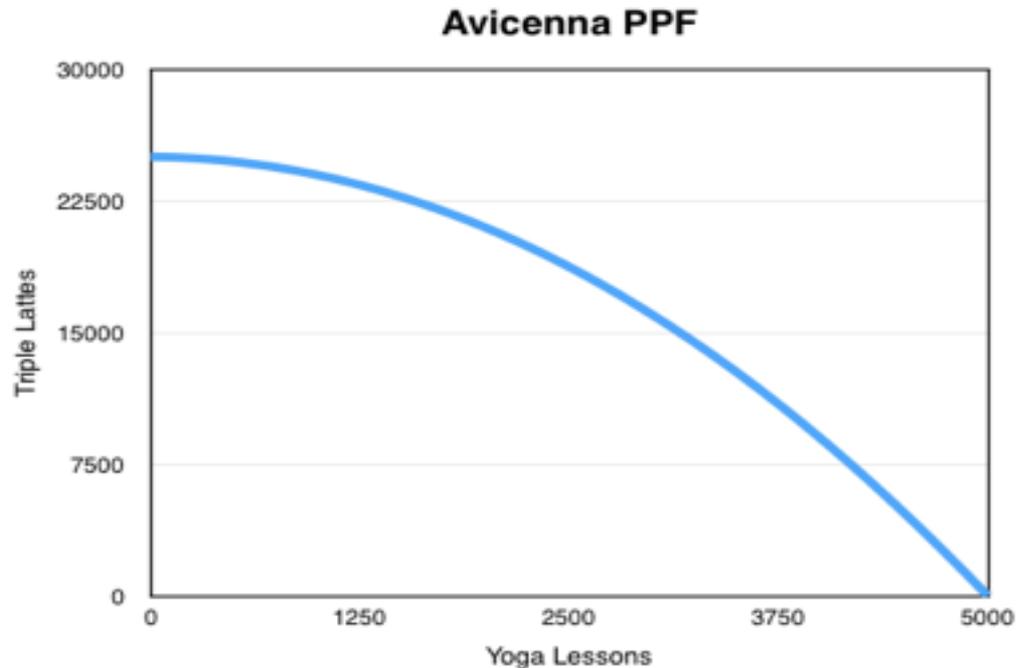


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Model Building

- But this has been a pain—
carrying all these numbers and individuals around in our head
- Could there be a better way of writing down all this information about relative productivities and numbers in a very small space?
- There is: an equation
- Much better than:
 - Having a large table of 55 individuals, each with their relative productivities
 - Plus another table of derived calculations from that first table, no?
- But remember: in economics, equations are there so that we can describe very concisely what people are or would be doing...



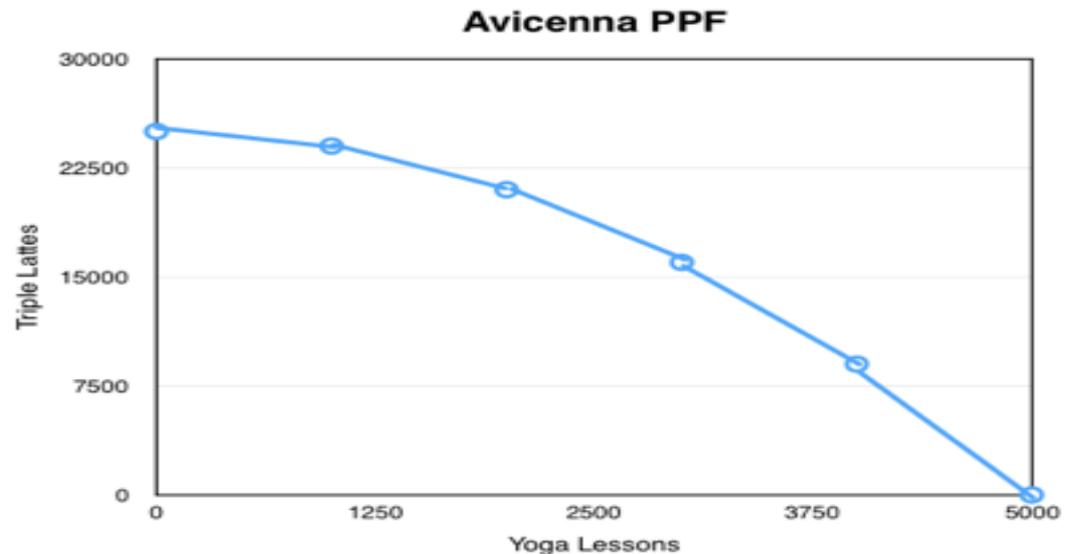
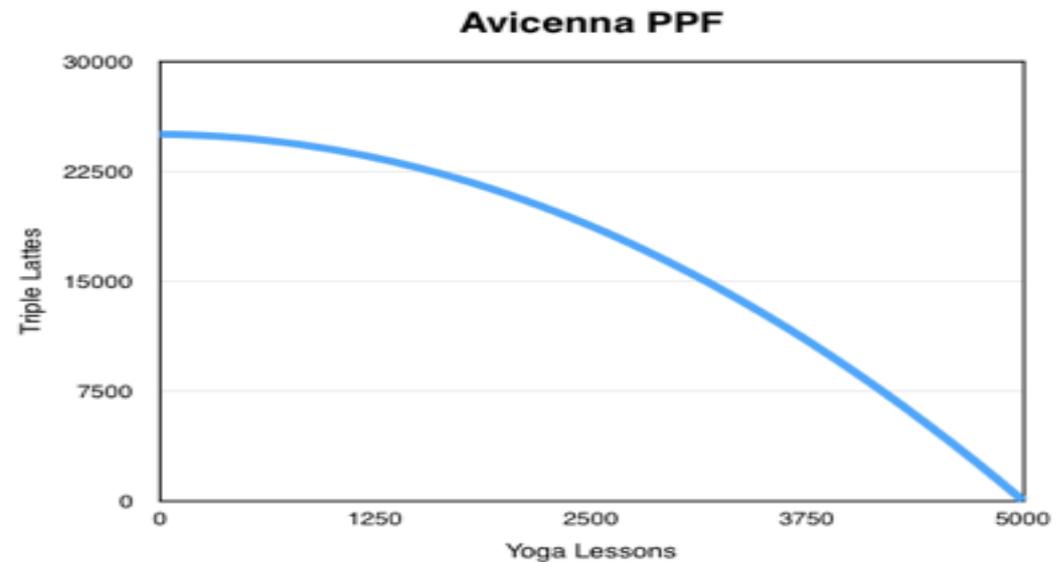
$$TL = 25000 - (YL)^2/1000$$

The Price Mechanism

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We Have Our PPF

- The smoothed equation version—TL = 25000 - (YL)²/1000
- The 55-workers version—the Odysseus, Ibn Khaldun, Hypatia, Fujiwara Takako, and Enkidu-like.
- But how do we get people to properly sort themselves into the right jobs to create an efficient economy?



How About If We Pay Them?

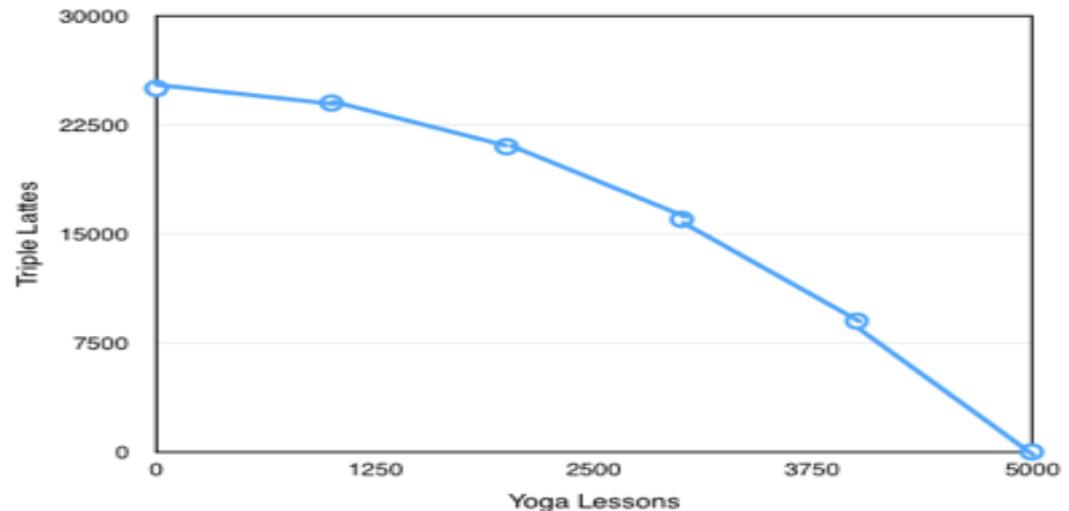
- Let's say that a YL costs \$10 to the student—pays \$10 to the teacher...
- Then if the price of a TL is \$1... then nobody will pull lattes...
- But if the price of TLs goes to \$1.12... Enkidu shows up...
- And at \$1.43 Fujiwara Takako shows up...
- And at \$2, Hypatia; and \$3.34, Ibn Khaldun...
- And at \$10 for a TL, Odysseus and company...

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0 1250 2500 3750 5000
Yoga Lessons

Avicenna PPF



Supply and Demand

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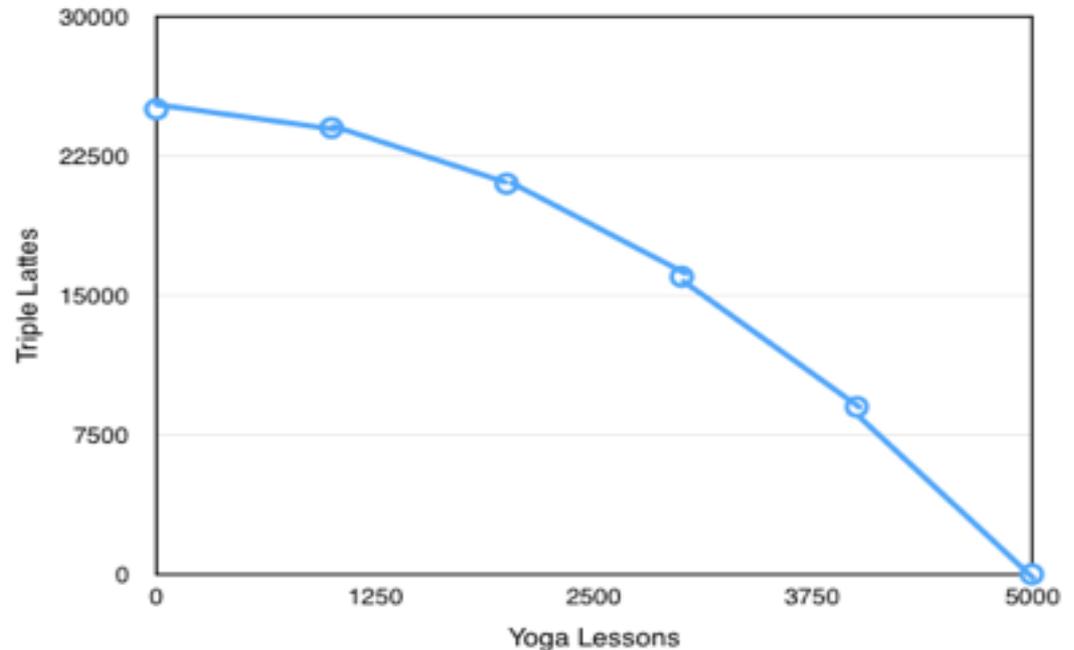
The Magic of the Marketplace

- We do not need any complicated bureaucratic command-and-control system to get the “right” people working the espresso machines...
- All we have to do is to cry out the right price, and people—people seeking their own betterment—will arrange themselves so that the “right” people are at the espresso machines all by themselves...

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Avicenna PPF



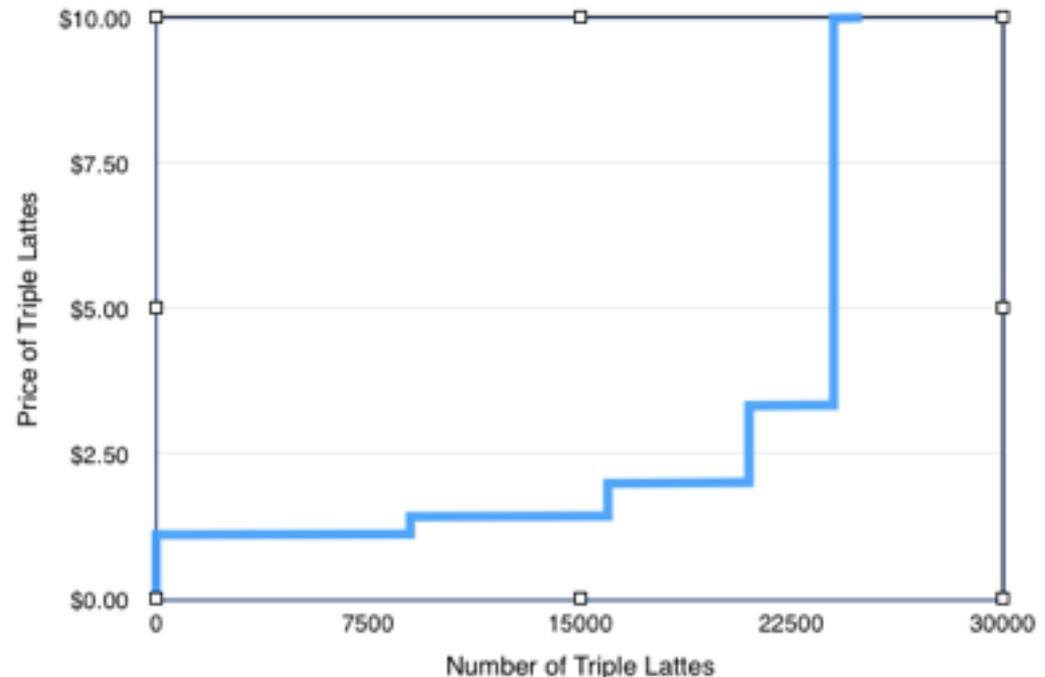
Let's Graph This! This Is Our Supply Curve

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Supply Curve for Triple Lattes in Avicenna



But Life Will Be Much Easier If We Simplify Again, and Consider Only Smooth Supply Curves

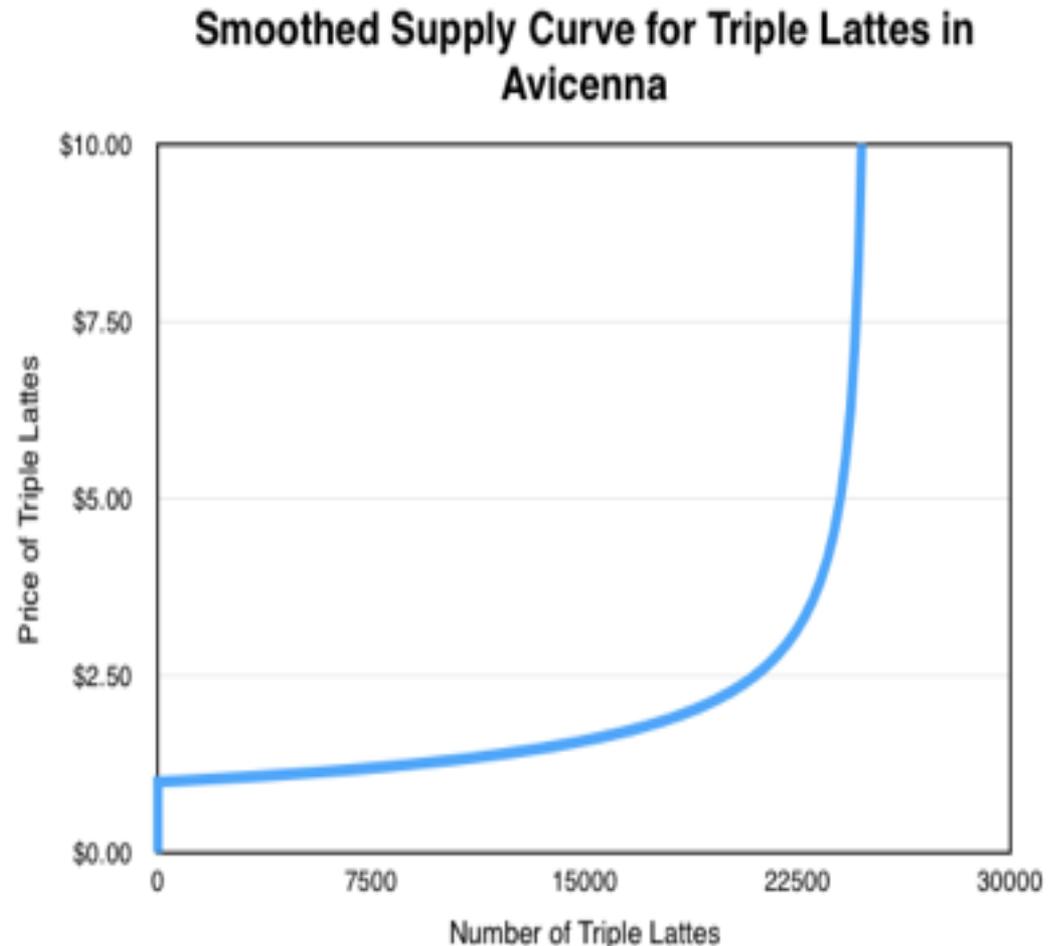
- Remember our equation for the nice smooth PPF?

$$TL = 25000 - (YL)^2/10000$$

- Just as we drew our flat-and-jump supply curve for our table, there is a smooth supply curve for the equation.

- Here it is
- In general, from here on out we are going to start our analyses with supply curves

- But lurking behind supply is the relative productivity analysis that led to the PPF



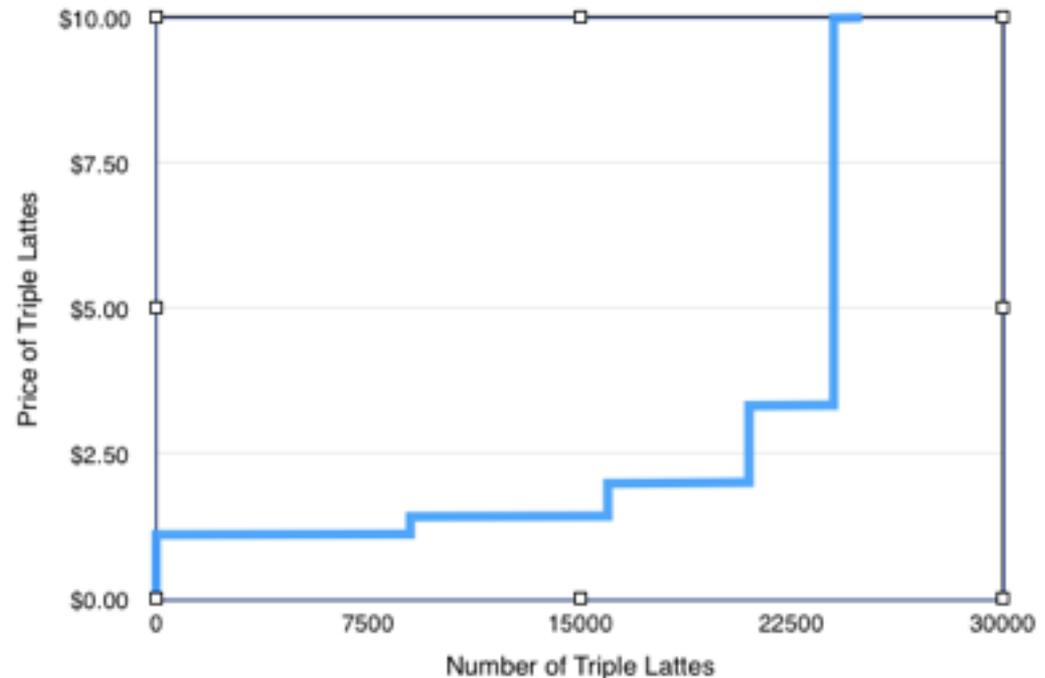
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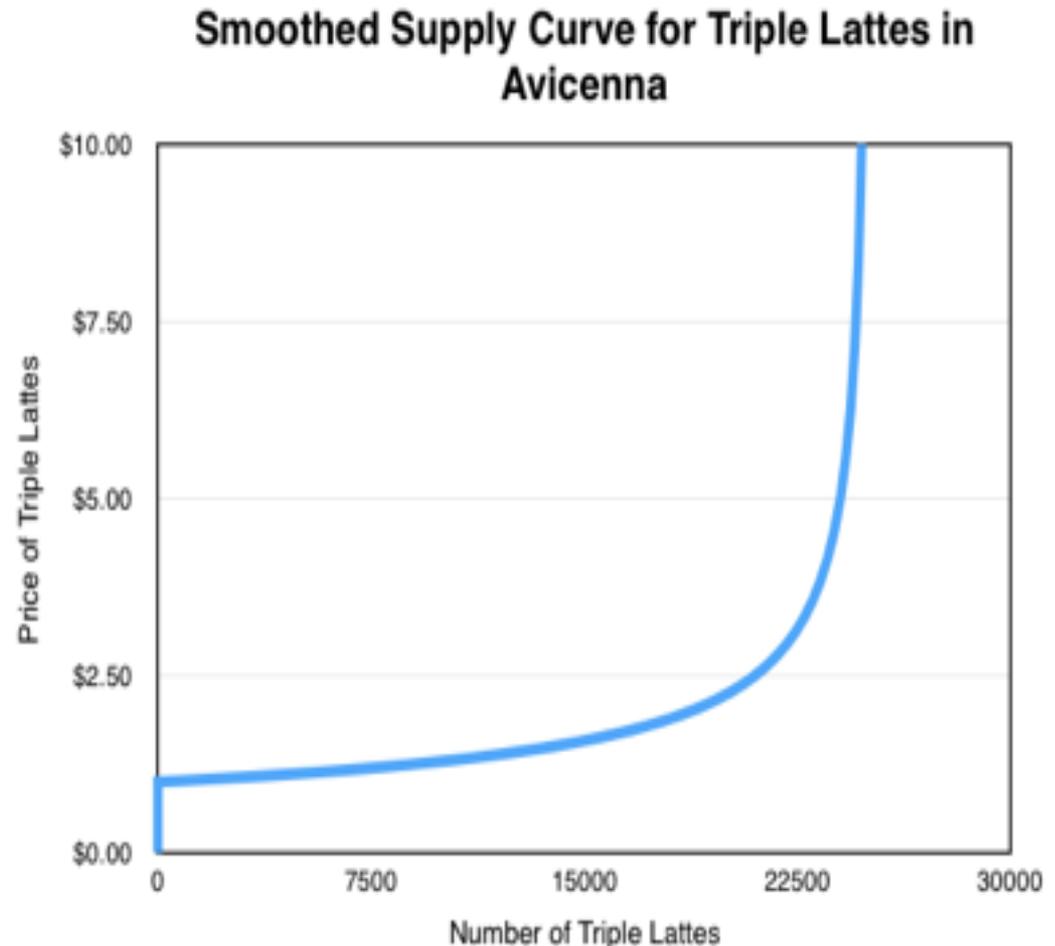
Supply Curve for Triple Lattes in Avicenna



Life Will Be Much Easier If We Considered Only Smooth Supply Curves

- But working with a supply curve with jumps and flats will be a pain...
- Remember our equation for the nice smooth PPF?
- Just as we drew our flat-and-jump supply curve for our table, there is a smooth supply curve for the equation.
- Here it is
- In general, from here on out we are going to start our analyses with supply curves
 - But lurking behind supply is the relative productivity analysis that led to the PPF

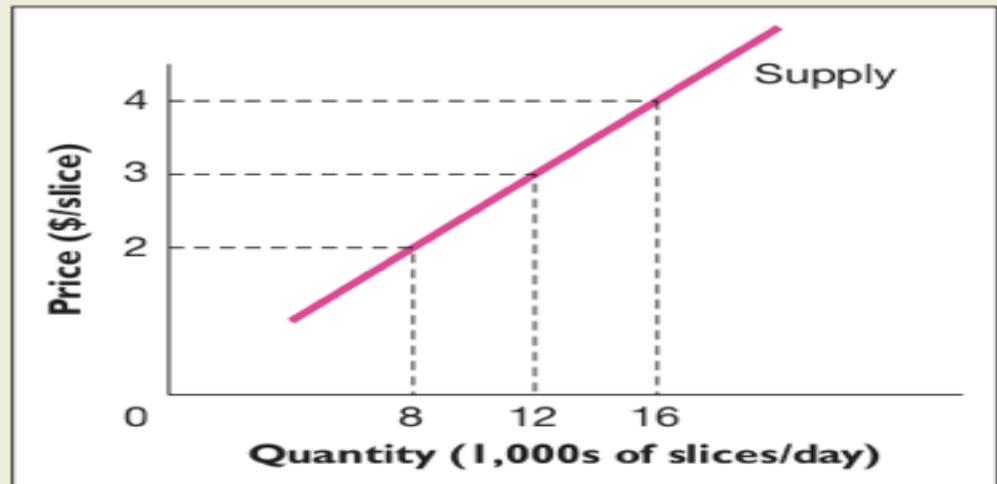
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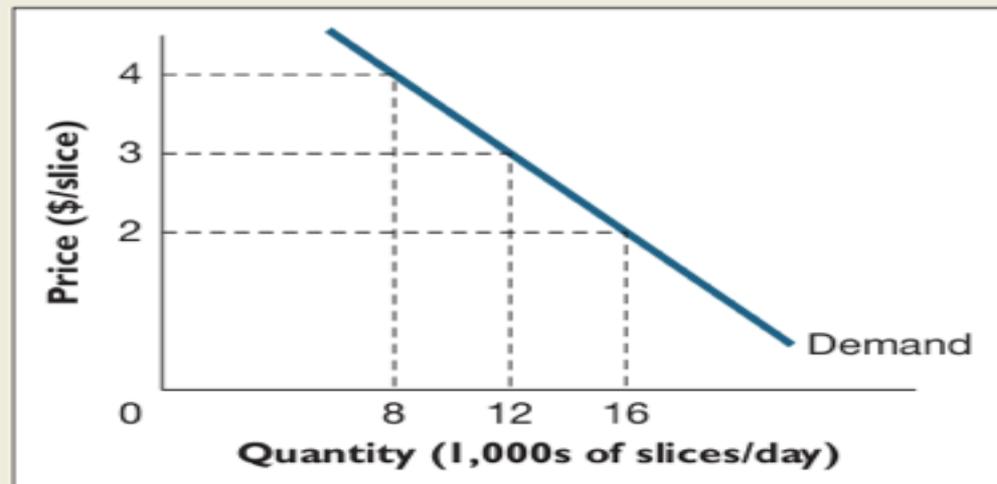
Supply and Demand

- And in addition to the supply curve, there is a demand curve...
- Behind the supply curve, there lurked production possibilities and other opportunities:
opportunity cost...
- So behind the demand curve, there lurks an analysis of alternative opportunities to buy and happiness,
willingness to pay...

Frank-Bernanke Pizza Supply



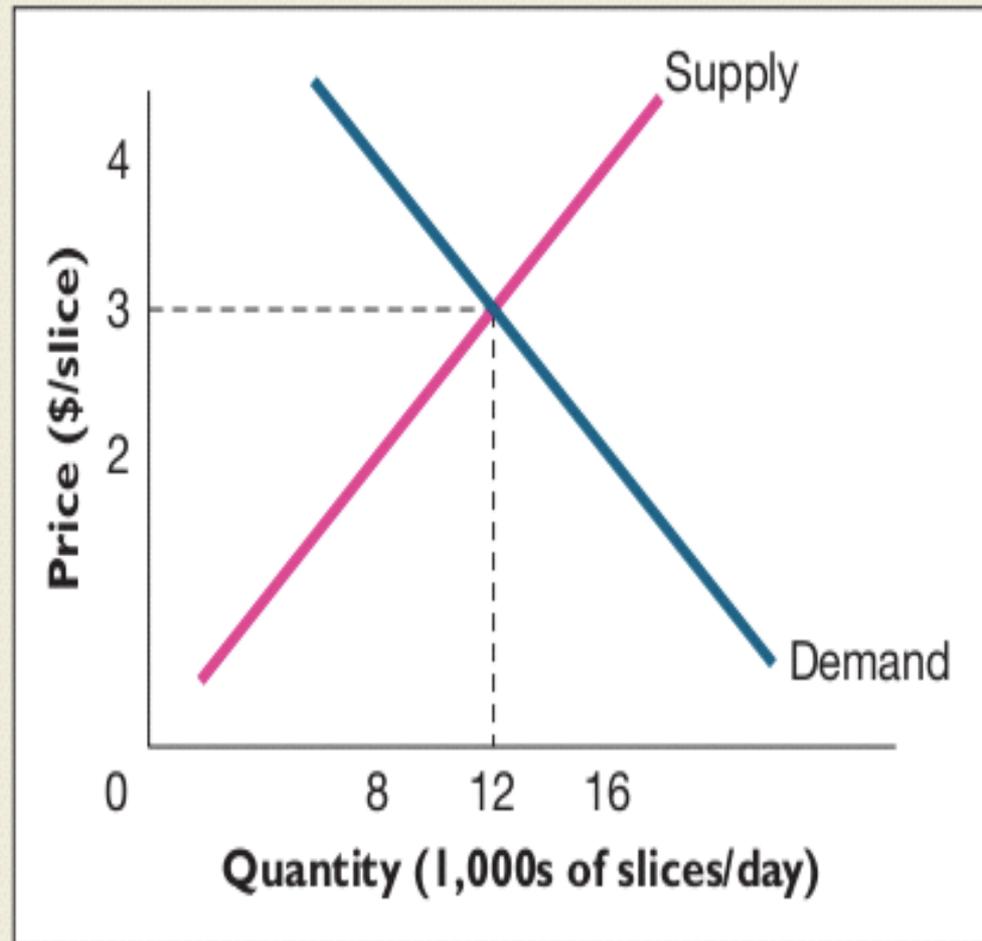
Frank-Bernanke Pizza Demand



Market Equilibrium

- Take, however, the *opportunity cost* of working at the espresso machine and the *willingness to pay* of customers as given.
- Thus we have our supply and demand curves
- Move to Chicago and pizza...
- What would happen if the price of pizza was, say, \$4 a slice?
 - Excess supply: unsold pieces of pizza...
 - The following day (or late that same day) some producers would cut their price—and the price would fall...

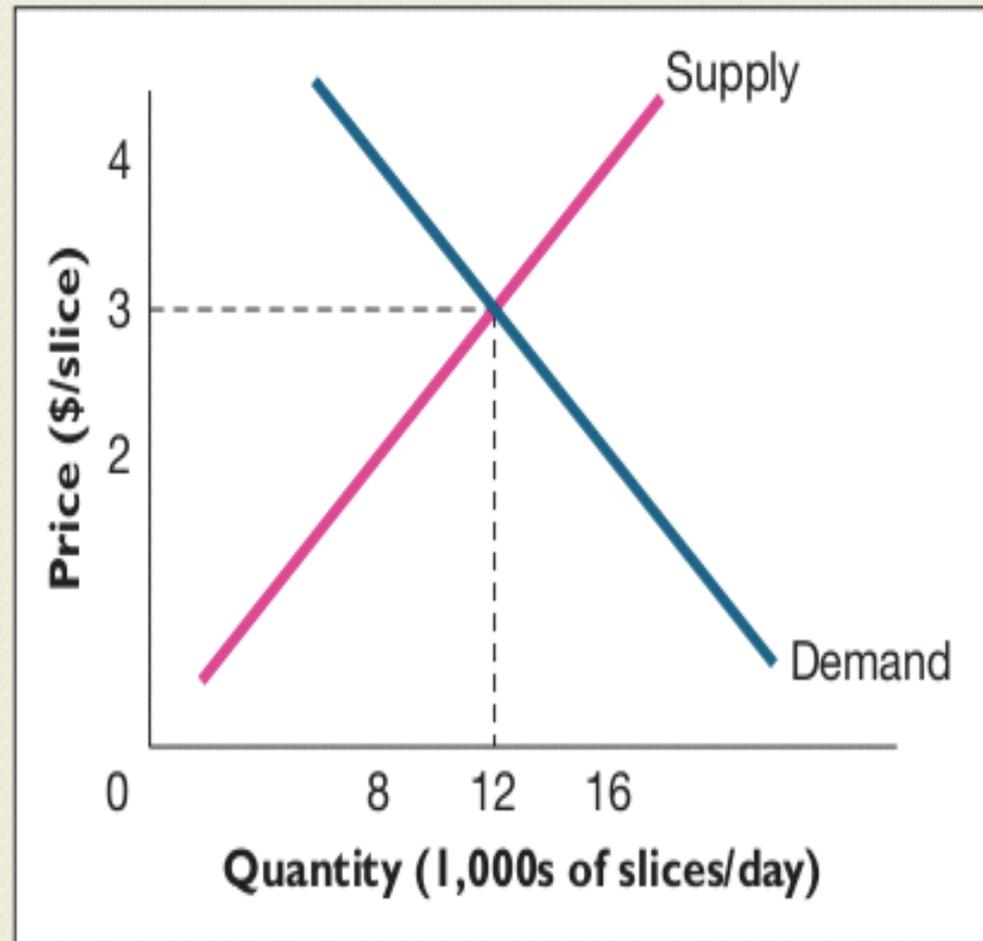
Frank-Bernanke Pizza Equilibrium



Market Equilibrium II

- What would happen if the price of pizza was, say, \$2 a slice?
 - Excess demand: unhappy customers...
 - Customers in line would try to outbid those ahead of them, and the price would rise...

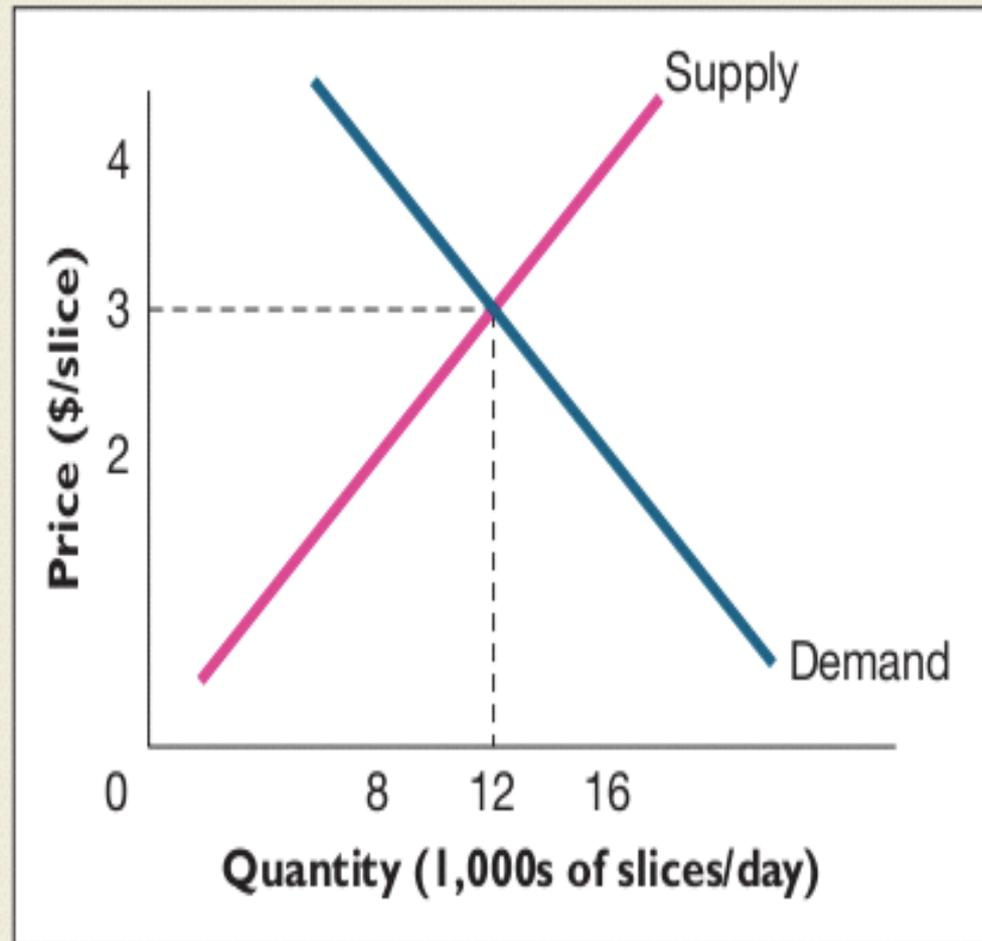
Frank-Bernanke Pizza Equilibrium



Market Equilibrium III

- Only at a price of \$3/slice will the market be in *equilibrium*
- No buyers unhappy because they could not buy...
- No sellers unhappy because they could not sell...
- No buyers who would be willing to pay more remaining at the end of the day to bid up the price...
- No sellers who would be willing to accept less remaining at the end of the day to cut the price...

Frank-Bernanke Pizza Equilibrium



Market Equilibrium IV

- At market equilibrium, there is no reason for the price to change...
- And at market equilibrium, nobody is unhappy...
- We are on the PPF—the right people are, in this case, cooking the pizza, and they are cooking the right amount of it...
- And, in a sense, we are at the right point on the PPF as well...
- Note: nobody has to fix the equilibrium price: *it spontaneously emerges...*

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