

Economics 1: Introduction to Economics

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Warm-Up

March 2, 2016 8-9 AM
Wheeler Auditorium, U.C. Berkeley

Let's Start with a Graph

- Let's take a look at American cities and housing prices
 - One-bedroom center rental-equivalent
 - One point sticks out like a sore thumb: SF (and Boston, and Washington)
 - Another point—one that seems unusually cheap: sunbelt LA (and also Dallas, Houston, Phoenix, & Detroit)
- It looks as though cost-of-construction-and-infrastructure gives us a supply curve:
 - $P = \$0.5 + 0.125Q$
 - with price in K/bedroom, and Q in millions of people



What Is Demand?

- Supply:
 - $P = \$0.5 + 0.125Q$
 - with price in \$K/bedroom, and Q in millions of people
- Perhaps SF and LA are equally nice places to live?
- Demand:
 - $P = \$4 - 0.125Q$
 - with price in \$K/bedroom, and Q in millions of people
- To your i>Clickers...



To Your i>Clickers

- For these supply and demand curves:
 - S: $P = \$0.5 + 0.125Q$
 - D: $P = \$4 - 0.125Q$
- What should the rental price of apartments and population of Greater SF be?
 - A. \$3.3K & 6M
 - B. \$2.25K & 14M
 - C. \$1.5K & 20M
 - D. \$1.4K & 6M
 - E. None of the above



To Your i>Clickers

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 - B. \$2.25K & 14M <<**
 - C. \$1.5K & 20M
 - D. \$1.4K & 6M
 - E. None of the above
- Demand is pretty flat because Americans are a mobile bunch
- San Francisco (and to a lesser extent Boston, and Washington) stand out



Why Is the Population of San Francisco so Low?

- Supply and demand curves:
 - S: $P = \$0.5 + 0.125Q$
 - D: $P = \$4 - 0.125Q$
- Two hypotheses:
 - It's really difficult to build in SF—earthquakes, big bay in the middle, unforgiving hilly terrain
 - NIMBYism run wild...
- Let's assume the second hypothesis...
- That NIMBYism has capped the population of SF at 6M because city councils make it very difficult to get building permits
- To your i>Clickers...



To Your i>Clickers...

- S: $P = \$0.5 + 0.125Q$
- D: $P = \$4 - 0.125Q$
- Assume (which is debatable) that NIMBYism run wild has imposed a quota of 6M on the population of San Francisco
- What are the quota-market prices and quantities here?
 - A. 6M & \$1.25K
 - B. 6M & \$2.25K
 - C. 6M & \$3.25K
 - D. 6M & \$4K
 - E. None of the above



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- D: $P = \$4 - 0.125Q$
- Assume (which is debatable) that NIMBYism run wild has imposed a quota of 6M on the population of San Francisco
- Rent of \$3.25K/bedroom/month
- What are the consumer and producer surplus here?
 - A. CS=\$4.5B, PS= \$2.25B
 - B. CS=\$4.5B, PS= \$4.5B
 - C. CS=\$2.25B, PS= \$14.25B
 - D. CS=\$14.25B, PS= \$2.25B
 - E. None of the above



To Your i>Clickers...

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 - B. CS=\$4.5B, PS= \$4.5B
 - C. CS=\$2.25B, PS= \$14.25B**
 - D. CS=\$14.25B, PS= \$2.25B
 - E. None of the above
- Remember: $CS = (AWTP - P) \times Q$
- Remember: $PS = (P - AOC) \times Q$



Compare Quota to Free-Market Equilibrium

- $S: P = \$0.5 + 0.125Q$
- $D: P = \$4 - 0.125Q$
- Assume (debatable) NIMBYism has imposed a quota of 6M
- Rent of \$3.25K/bedroom/month
 - CS=\$2.25B
 - PS=\$14.25B
- In the free-market equilibrium $Q=14M, P=\$2.25K$
- In the free-market equilibrium:
 - CS = \$12.25B
 - PS = \$12.25B



Compare Quota to Free-Market Equilibrium II

- S: $P = \$0.5 + 0.125Q$
- D: $P = \$4 - 0.125Q$
- Quota:
 - NIMBYism has imposed a quota of 6M, rent of \$3.25K
 - CS=\$2.25B
 - PS=\$14.25B
- Free-Market:
 - $Q=14M$
 - $P=\$2.25K$
 - CS = \$12.25B
 - PS = \$12.25B
- Net effect:
 - Transfer \$2B from renters to landlords
 - Throw away \$8B/month of wealth
- Cf: GDP of SF some \$40B/month



Caveats...

- Is this analysis of the situation broadly correct?
 - I tend to think so. It is the obvious economist's analysis.
 - But I would think that, wouldn't I? I am an economist.
 - I also recognize that economists' analyses aren't everything.
- On the other hand:
 - People who reject the economist's argument really need to come up with some equally convincing and innocent alternative explanation for San Francisco's striking divergence from the American pattern.
 - And they have not done so.



Caveats... II

- Analytical leaps:
 - There are many analytical leaps in the argument.
 - Could we really have, over the past generation or so, built out to San Francisco to LA-class population without running into sharply higher costs than LA has experienced?
 - And is willingness to pay for the San Francisco experience so large?
- That is what the relatively flat demand and supply curves that I have drawn say.
- But that does not mean they correspond to reality.
- They are not reality: they are just colorful lines on the screen.



Political Economy

- Why does this pattern persist?
- Leaving \$8 billion per month in wealth on the table is truly remarkable...
- A few political economy reflections:
 - Landlords—importantly including homeowners and condo owners—are not unhappy with the situation.
 - To the extent that existing property owners are a different group than developers, existing property owners would be very unhappy with quota relaxation.
 - And developers do not have many votes
 - Jarvis-Gann
 - Renters do vote in San Francisco-area elections:
 - They feel, strongly, that the rent is too damn high.
 - But they also feel that, in some sense, it is worth it for them.
 - They are, after all, here...
- The real absolute losers are those who:
 - would like to live and could be productive in San Francisco
 - but live elsewhere
 - because their willingness to pay is not that high.
 - **And they do not vote in San Francisco area elections...**



Administrivia

March 2, 2016 8-9 AM
Wheeler Auditorium, U.C. Berkeley

Meta-Announcement

- We are moving announcements and administrivia out of lecture time and onto the “announcements” bCourses page...
- That is all...

On the Calendar

- Problem Set 4 is due today and tomorrow Mar 2/3. Both problem set and sample exam...
 - Link off of:
 - <http://www.bradford-delong.com/course-syllabus-econ-1-spring-2016-uc-berkeley.html>
 - <https://bcourses.berkeley.edu/courses/1411451/assignments/syllabus>
 - Direct link at: <http://delong.typepad.com/files/2016-02-24-econ-1-s-2016-problem-set-4.pdf>
- Paper Assignment is now out: due first section after spring break. Link off of:
 - <http://www.bradford-delong.com/course-syllabus-econ-1-spring-2016-uc-berkeley.html>
 - <https://bcourses.berkeley.edu/courses/1411451/assignments/syllabus>
 - Direct Link at: <http://delong.typepad.com/files/2016-02-23-econ-1-essay-question.pdf>
- Midterm! In a week!

On the Calendar II

- Lecture today: FBAH chapter 13, Benefit-Cost Analysis
- Lecture Monday: Pre-Midterm Review
- Midterm on Wednesday—on lectures, sections, Dasgupta, section exercises, problem sets, and FBAH through the end of chapter 13 (except for ch. 12, ch. 4 on elasticity, and those parts of the theory of the firm we did not touch in monopoly: i.e., no short-run long-run supply stuff)
 - No sections next Wednesday and Thursday—your underpaid GSIs will be grading
- SLC in Cesar Chavez is holding two review sessions:
 - Friday 5 – 7 pm
 - Monday 7– 9 pm
 - RSVP link: <http://tinyurl.com/slc1form>

Orientation

February 29, 2016 8-9 AM
Wheeler Auditorium, U.C. Berkeley

The Market as an Institution

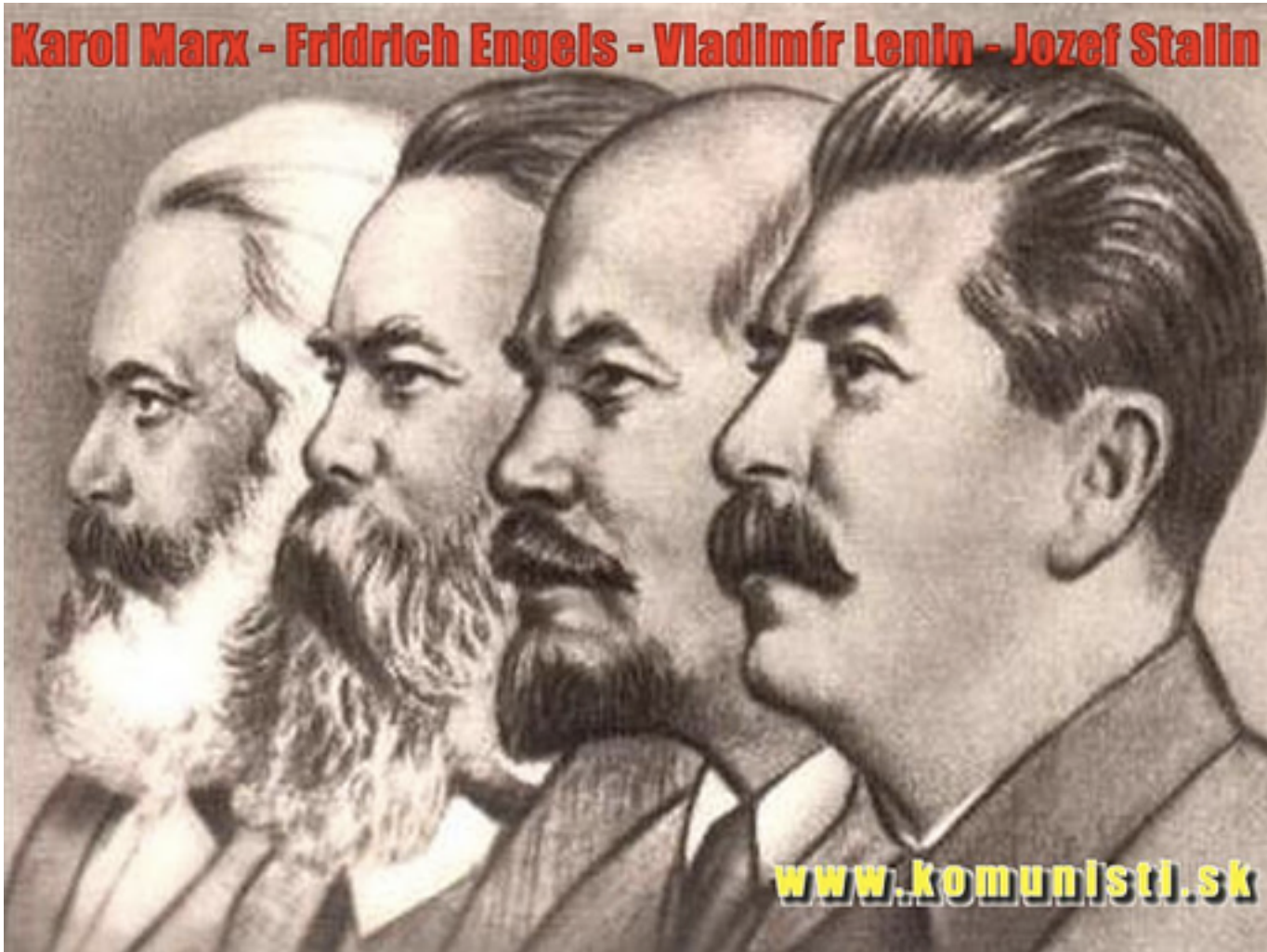
- We start from what look like to us deep truths of human psychology
 - People are *acquisitive*
 - People engage in *reciprocity*—i.e., want to enter into reciprocal gift-exchange relationships in which they are neither cheaters nor saps
 - With those they *trust*...

The Market as an Institution II

- We devised money as a substitute for trust...
- And so on the back of these human propensities have constructed a largely-peaceful global 7.4B-strong societal division of labor:
 - Built on assigning things to *owners*—who thus have responsibility for stewardship and the incentive to be good stewards...
 - And on very large-scale webs of *win-win exchange*...
 - Regulated by *market prices*...
- This is a very valuable and important societal institution

The Communist Experiment

Karol Marx - Fridrich Engels - Vladimír Lenin - Jozef Stalin



www.komunisti.sk

The Communist Experiment II

| East-Block Country | GDP per Capita | Matched West-Block Country | GDP per Capita | Percentage Gap |
|--------------------|----------------|----------------------------|----------------|----------------|
| N. Korea | \$700 | S. Korea | \$7,660 | 91% |
| China | \$490 | Taiwan | \$9,500 | 95% |
| Vietnam | \$170 | Philippines | \$850 | 80% |
| Cambodia | \$150 | Thailand | \$2,110 | 93% |
| Georgia | \$580 | Turkey | \$2,970 | 80% |
| Russia | \$2,340 | Finland | \$19,300 | 88% |
| Bulgaria | \$1,140 | Greece | \$7,390 | 85% |
| Yugoslavia | \$3,240 | Italy | \$19,840 | 84% |
| Hungary | \$3,350 | Austria | \$23,510 | 86% |
| Czech Republic | \$2,710 | Germany | \$23,560 | 88% |
| Poland | \$2,260 | Sweden | \$24,740 | 91% |
| Cuba | \$460 | Mexico | \$3,610 | 88% |
| | | | | |
| Geometric Mean: | \$930 | | \$8,030 | 88% |

The Market Balance Sheet: Pro

- The market failure-free competitive market in equilibrium, from the perspective of a utilitarian seeking to achieve the greatest-good-of-the-greatest-number, accomplishes these goals:
 1. It produces at a scale that exhausts all possible *win-win exchanges*—and is “efficient” in that sense.
 2. It allocates the roles of producers and sellers to those who can make and sell them in a way least costly to society’s overall resources—to those with the lowest *opportunity cost*.
 3. It rations the goods produced to those with the greatest *willingness-to-pay*—to those who, by the money standard, need and want them the most.

The Market Balance Sheet: Con

- Markets can go wrong. They can:
 1. not fail but be failed by governments that fail to properly structure and support them or break them via quotas or price floors/ceilings
 2. be out-of-equilibrium
 3. have market power
 4. be non-rival (increasing returns to scale; natural monopolies)
 5. suffer externalities (in production and in consumption, positive and negative; closely related to non-excludibility)
 6. suffer from information lack or asymmetry
 7. be non-excludible (public goods, etc.)
 8. suffer from miscalculations and behavioral biases
 9. suffer from maldistributions
- On Monday we were in Chapter 11 of FBAH, with adverse selection



THE MARKET FOR "LEMONS": QUALITY UNCERTAINTY AND THE MARKET MECHANISM *

GEORGE A. AKERLOF

I. Introduction, 488. — II. The model with automobiles as an example, 489. — III. Examples and applications, 492. — IV. Counteracting institutions, 499. — V. Conclusion, 500.

I. INTRODUCTION

This paper relates quality and uncertainty. The existence of goods of many grades poses interesting and important problems for the theory of markets. On the one hand, the interaction of quality differences and uncertainty may explain important institutions of

Orientation

- On Monday we were in Chapter 11 of FBAH, with adverse selection
- Today we will finish Chapter 11 with “Market Makers” and move on to Chapter 13 of FBAH, “The Environment, Health, and Safety”—on benefit-cost analysis and regulation
 - Skipping for the nonce chapter 12...
- Next Monday we will be doing our pre-midterm review
- Next Wednesday is our midterm
- Monday March 14 we will be doing maldistribution—the Bengal famine of the 1940s
 - Amartya Sen coming to Berkeley Sunday night March 13: 4-5:30 p.m. The Sanctuary, First Presbyterian Church, 2407 Dana St, Berkeley, CA
- Wednesday March 16 we will be doing public goods, tax policy, and political economy

CHAPTER 13

The Environment, Health, and Safety



IN THE DOMAIN OF HEALTH CARE, THE CHALLENGE IS TO PROVIDE ACCESS FOR ALL CITIZENS WHILE PREVENTING COSTS FROM ESCALATING TOO RAPIDLY

In 1979, in the wake of the second major oil supply interruption in a decade, officials in the Carter administration met to discuss policies for reducing the risks to domestic security inherent in U.S. dependence on foreign oil. The proposal they ultimately got forward was a gasoline tax of 50 cents per gallon. Anticipating objections that the tax would impose an unacceptable hardship on the poor, policymakers proposed to return the revenues from the tax to the citizenry by reducing the payroll tax—the tax on wages that supports the Social Security system.

Proponents of the gasoline tax argued that, in addition to reducing the nation's dependence on foreign oil, the tax would reduce air pollution and ease highway congestion. But critics ridiculed the proposal, charging that if the revenues from the tax were returned to the people, the quantity of gasoline demanded would remain essentially the same. Their argument raged the debate, and officials never managed to implement the proposal.

Whatever the ultimate merits of the administration's proposal, there was no merit at all in the argument the critics used to attack it. True, the proposed tax rebate meant that people could have bought just as much gasoline as before the tax. Yet the tax would have given them a powerful incentive: not to do so. As we saw in the chapter on demand, consumers can change their behavior to escape the effects of a steep rise in the after-tax price of gasoline—by switching to cars with smaller, more fuel-efficient

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Use economic analysis to show how the U.S. health care system can be improved.
- LO2 Compare and contrast the ways in which taxes and tradable permits can be used to reduce pollution.
- LO3 Apply the Cost-Benefit Principle to improve workplace safety.
- LO4 Show how economic analysis contributes to debates regarding public health and domestic security spending.

Market Makers

March 2, 2016 8-9 AM
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Market Makers

- The price as an information channel...
- But what is “the price”?
- And what do you want to buy?
- Almost always whenever we go do something we have not done many times before, we are uncertain:
 - Both uncertain about what “the price” really is
 - And uncertain about what commodity we really want to buy

CHAPTER 11

The Economics of Information

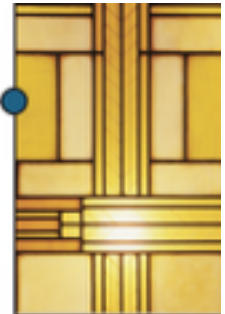


MATCHING THE RIGHT BUYERS WITH THE RIGHT SELLERS CREATES ECONOMIC VALUE THAT IS JUST AS REAL AS THE VALUE CREATED BY THE ACTUAL PRODUCTION OF GOODS AND SERVICES

Years ago, a naive young economist spent a week in Kashmir on a houseboat on scenic Dal Lake, outside the capital city of Srinagar. Kashmir is renowned for its woodcarvings, and one afternoon a man in a gondola stopped by to show the economist some of his wooden bowls. When the economist expressed interest in one of them, the woodcarver quoted a price of 200 rupees. The economist had lived in that part of Asia long enough to realize that the price was more than the woodcarver expected to get, so he made a counteroffer of 100 rupees.

The woodcarver appeared to take offense, saying that he couldn't possibly get with the bowl for less than 175 rupees. Suspecting that the woodcarver was merely flouting anger, the young economist held firm. The woodcarver appeared to become even angrier, but quickly retreated to 150 rupees. The economist publicly rotated his jaw 180 degrees to pay more than 100 rupees. The woodcarver then tried 120 rupees, and again the economist replied that 100 was his final offer. Finally, they struck a deal at 100 rupees, and with cash in hand, the woodcarver left in a huff.

Frustrated with his purchase, the economist showed it to the houseboat's owner later that evening. "It's a lovely bowl!" he agreed, and asked how much the economist had paid for it. The economist told him, expecting praise for his negotiating prowess. The boat's owner failed to attempt at suppressing a laugh was the economist's first clue that he had paid too much. When asked how much such a bowl would normally sell for, the houseboat owner was reluctant to respond. But the economist pressed him, and the boat operator said the seller had probably hoped for 30 rupees at most.



LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Explain how middlemen add value to market transactions.
- LO2 Use the concept of rational search to find the optimal amount of information market participants should obtain.
- LO3 Define asymmetric information and describe how it leads to the lemons problem.
- LO4 Discuss how advertising, conspicuous consumption, statistical discrimination, and other devices are responses to asymmetric information problems.

Variety and Well-Being

- Henry Ford and the Model T
- Alfred P. Sloan and General Motors
- Behavioral economics con game?
 - Should we all wear identical blue overalls?
 - Or Mao jackets?
 - Or blue Berkeley hoodies?
 - Or Lululemon yoga pants?
- No! We have different needs and tastes, and it's good:
 - As long as we can satisfy them cheaply
 - As long as we can figure out what we might be able to buy

CHAPTER 11

The Economics of Information



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The woodcarver appeared to take offense, saying that he couldn't possibly get with the bowl for less than 175 rupees. Suspecting that the woodcarver was merely trying to anger the young economist and hold firm, the woodcarver appeared to become even angrier, but quickly retreated to 150 rupees. The economist politely restated his own 100 rupees to pay more than 100 rupees. The woodcarver then tried 125 rupees, and again the economist replied that 100 was his final offer. Finally, they struck a deal at 100 rupees, and with cash in hand, the woodcarver left in a huff.

Flustered with his purchase, the economist showed it to the houseboat's owner later that evening. "It's a lovely bowl!" he agreed, and asked how much the economist had paid for it. The economist told him, expecting praise for his negotiating prowess. The boat's failed attempt at suppressing a laugh was the economist's first clue that he had paid too much. When asked how much such a bowl would normally sell for, the houseboat owner was reluctant to respond. But the economist pressed him, and the boat operator said that the seller had probably hoped for 30 rupees at most.

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Variety and Well-Being

- Paul Baran and Paul Sweezy, *Monopoly Capital* (New York: Monthly Review Press, 1966). pp. 138-39:
 - One need not have a specific idea of a reasonably constructed automobile, a well planned neighborhood, a beautiful musical composition, to recognize that the model changes that are incessantly imposed upon us, the slums that surround us, and the rock-and-roll that blares at us exemplify a pattern of utilization of human and material resources which is inimical to human welfare...

Variety and Well-Being

- Alan Greenspan
- The declining *weight* of GDP
- Implications....

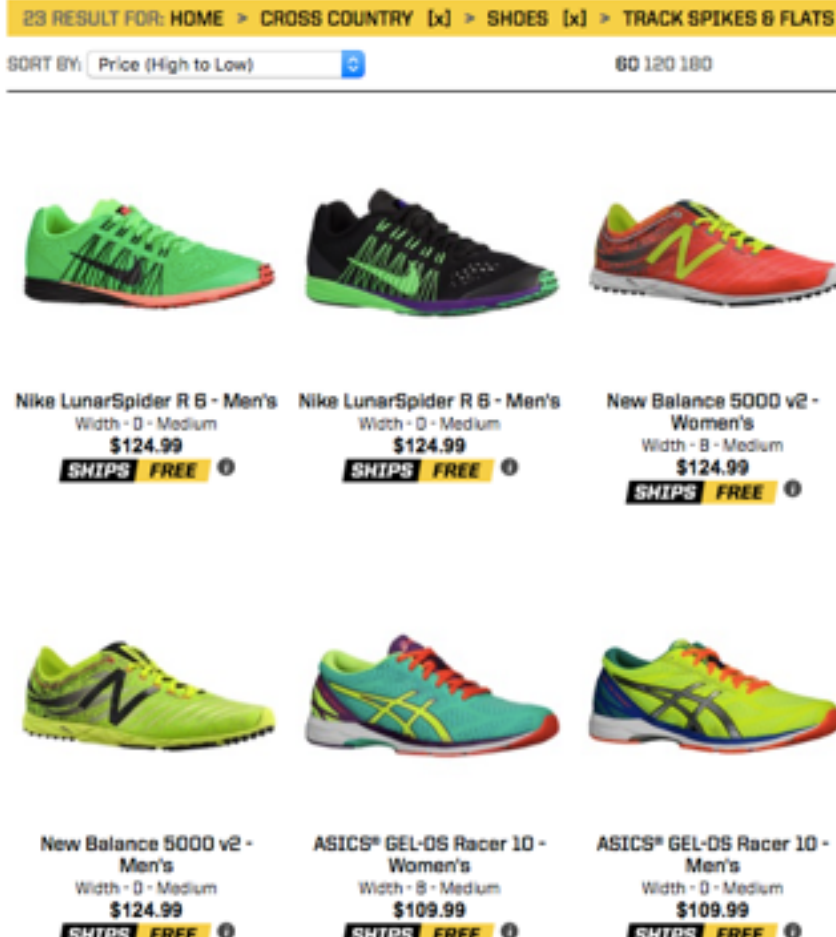








The Value Chain for Cross-Country Racing Flats

- Components of value
 - Materials: \$14
 - Assembly in Shenzhen: \$10
 - FOB Oakland: \$1
 - Design: \$20
 - Marketing: \$10
 - Transportation to Walnut Creek: \$15
 - Fitting by wild-eyed marathoner in WC: \$50
 - California sales taxes: \$10
- Retail cost: \$135

23 RESULT FOR: HOME > CROSS COUNTRY [x] > SHOES [x] > TRACK SPIKES & FLATS

SORT BY: Price (High to Low) 60 120 180



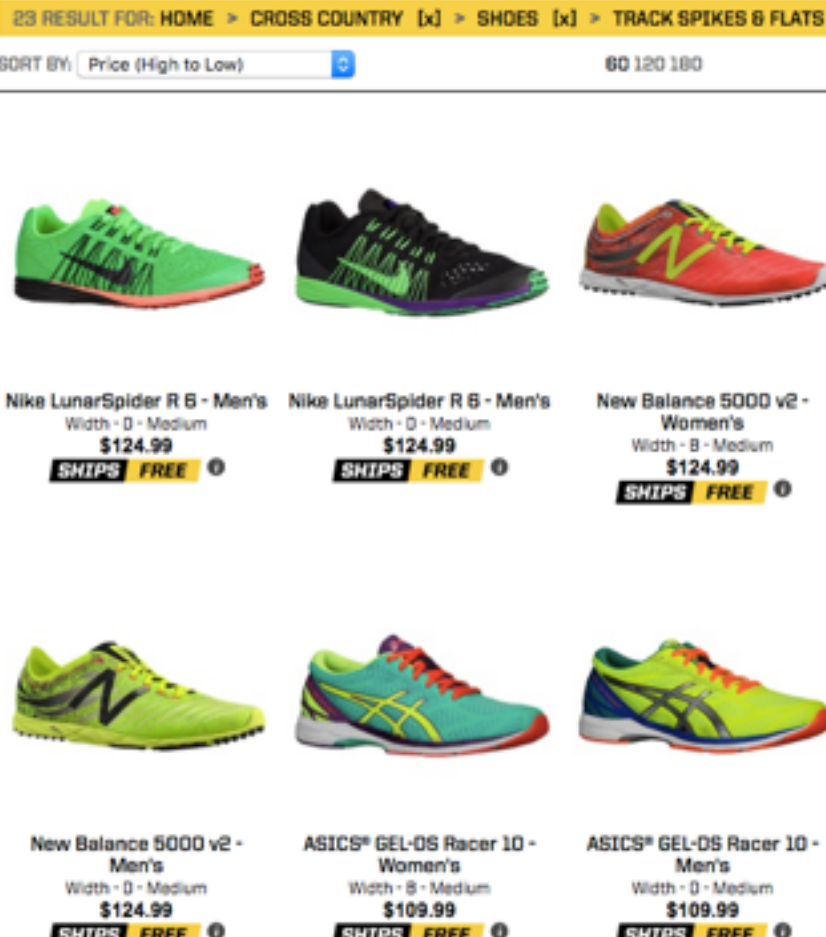
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But What About the Next Time?

- FBAH:
 - “The market would provide the optimal level of retail service except for one practical problem, namely, that consumers can make use of the services offered by retail stores without paying for them. After benefiting from the advice of informed salespersons and after inspecting the merchandise, the consumer can return home and buy the same item from an Internet retailer or mail-order house. Not all consumers do so, of course. But the fact that customers can benefit from the information provided by retail stores without paying for it is an example of the free-rider problem , an incentive problem that results in too little of a good or service being produced. Because retail stores have difficulty recovering the cost of providing information, private incentives are likely to yield less than the socially optimal level of retail service.”
- Non-excludability
- Information: both non-rival, and (ex post) non-excludable

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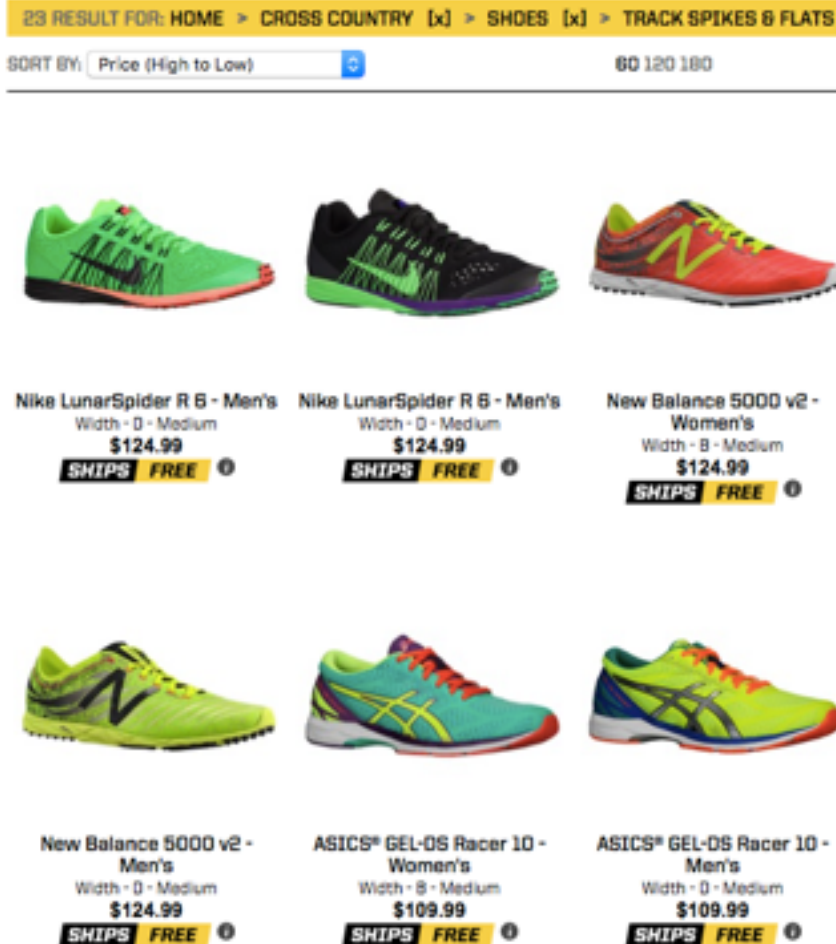
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“The Market for Information”

- Moreover: one side of the market knows a lot more about what is being bought and sold...
- No reason to think that this is going to work well at all...
- An increasing problem in our economy as the variety of things we might want to spend our money on grows...

23 RESULT FOR: HOME > CROSS COUNTRY [x] > SHOES [x] > TRACK SPIKES & FLATS

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Benefit-Cost Analysis

March 2, 2016 8-9 AM
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Principles of Benefit-Cost Regulation

- We already started thinking about it:
 - Do SF's development restrictions as a whole appear to make sense?
- Don't be stupid:
 - Impose only regulations where the benefits are greater than the costs
 - But don't confuse "benefits" with "willingness to pay"
 - Unless you really, strongly believe that the distribution of income and wealth corresponds to individual desert and societal utility
 - And really, strongly believe that people are both well-informed about the situation and are thinking about tradeoffs in the proper framework

CHAPTER 13

The Environment, Health, and Safety



IN THE DOMAIN OF HEALTH CARE, THE CHALLENGE IS TO PROVIDE ACCESS FOR ALL CITIZENS WHILE PREVENTING COSTS FROM ESCALATING TOO RAPIDLY

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LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Use economic analysis to show how the U.S. health care system can be improved.
- LO2 Compare and contrast the ways in which taxes and tradable permits can be used to reduce pollution.
- LO3 Apply the Cost-Benefit Principle to improve workplace safety.
- LO4 Show how economic analysis contributes to debates regarding public health and domestic security spending.

Principles of Benefit-Cost Regulation II

- Take a broad view of benefits and costs
 - Recognize second-order and general equilibrium effects
- Use the market and the incentives it provides whenever possible:
 - Try to align individuals' incentives with societal goals
 - Tax polluters—don't impose quotas on them
 - If you do impose quotas, let people “trade” them
- Apply extra-strict scrutiny to regulatory plans that drive wedges between individual incentives and societal benefits
 - “Skin in the game”
 - How much “skin in the game”?

CHAPTER 13

The Environment, Health, and Safety

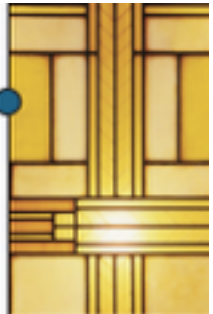


IN THE DOMAIN OF HEALTH CARE, THE CHALLENGE IS TO PROVIDE ACCESS FOR ALL CITIZENS WHILE PREVENTING COSTS FROM ESCALATING TOO RAPIDLY

In 1979, in the wake of the second major oil supply interruption in a decade, officials in the Carter administration met to discuss policies for reducing the risks to domestic security inherent in U.S. dependence on foreign oil. The proposal they ultimately got forward was a gasoline tax of 50 cents per gallon. Anticipating objections that the tax would impose an unacceptable burden on the poor, policymakers proposed to return the revenues from the tax to the citizenry by reducing the payroll tax—the tax on wages that supports the Social Security system.

Proponents of the gasoline tax argued that, in addition to reducing the nation's dependence on foreign oil, the tax would reduce air pollution and ease highway congestion. But critics ridiculed the proposal, charging that if the revenues from the tax were returned to the people, the quantity of gasoline demanded would remain essentially the same. Their argument raged the debate, and officials never managed to implement the proposal.

Whatever the ultimate merits of the administration's proposal, there was no merit at all in the argument the critics used to attack it. True, the proposed tax rebate meant that people could have bought just as much gasoline as before the tax. Yet the tax would have given them a powerful incentive: not to do so. As we saw in the chapter on demand, consumers can change their behavior to escape the effects of a steep rise in the after-tax price of gasoline—by switching to cars with smaller, more fuel-efficient



LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- LO1 Use economic analysis to show how the U.S. health care system can be improved.
- LO2 Compare and contrast the ways in which taxes and tradable permits can be used to reduce pollution.
- LO3 Apply the Cost-Benefit Principle to improve workplace safety.
- LO4 Show how economic analysis contributes to debates regarding public health and domestic security spending.

Principles of Benefit-Cost Regulation III

- There is no such thing as perfect safety
 - Recognize that there are always tradeoffs
 - Recognize that prioritizing one single goal above all others will circle around to bite you
 - The “optimal” number of bank robberies is not zero
- Responsibility and liability for avoiding risks should rest on those who can take action at the least cost

CHAPTER 13

The Environment, Health, and Safety

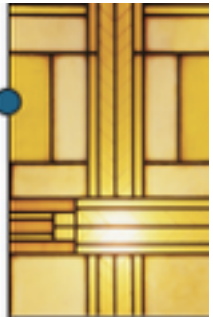


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Review: The Market: The Logic of Our Understanding

February 29, 2016 8-9 AM
Wheeler Auditorium, U.C. Berkeley

What Are We Trying to Do Here?

- The key to understanding how to deal with externalities is to back up to first principles of societal organization
- What should a good set of societal arrangements for managing our collective division of labor do?.
- It would manage the collective prices of deciding:
 - who is to produce what,
 - who is to consume what, and
 - at what scale production should take place.

What Are We Trying to Do Here? II

- It would accomplish these goals by somehow carrying out some analysis of costs and benefits of different ways of organizing things.
- It would try to get as many benefits while incurring as few costs as possible.
- It calculate the benefits of producing at any number of possible scales.
- It would calculate the cost of producing at any bunch of possible scales.

What Are We Trying to Do Here? III

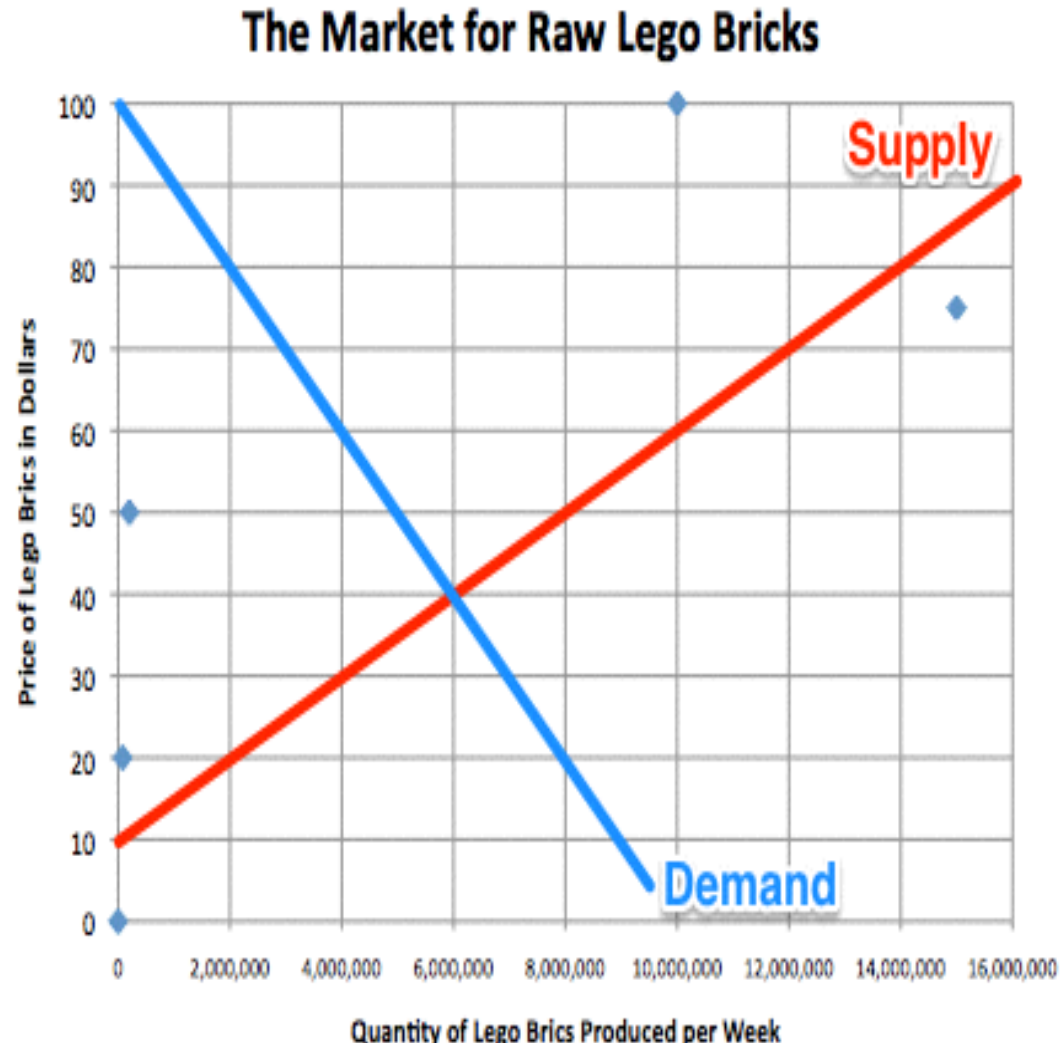
- But if only there were some way of avoiding the bureaucratic busywork of calculation!
- And if only there were some way of getting people who actually tell the truth
 - The truth about what their capabilities are
 - The truth about what resources they need to produce
 - The truth about what they really want, and how much they want it

But There Is Such a Way!

- It's called the competitive market in equilibrium

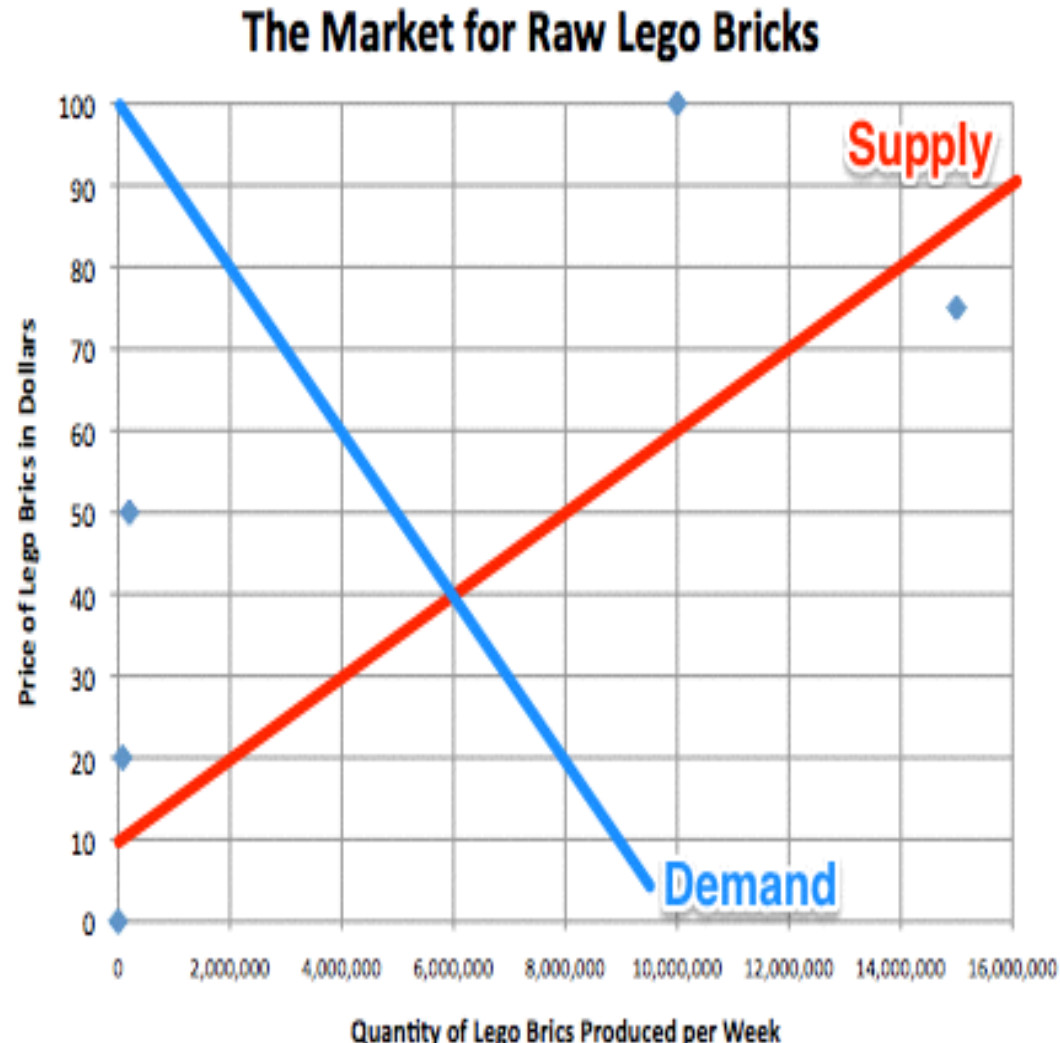
The Market Does It For Us

- Supply:
 - $P_s = 10 + 0.000005Q$
- Demand:
 - $P_d = 100 - 0.00001Q$
- Equilibrium
 - $P = \$40$
 - $Q = 6M$
 - $CS = (\$70 - \$40) \times 6M = \$180M$
 - $PS = (\$40 - \$25) \times 6M = \$90M$



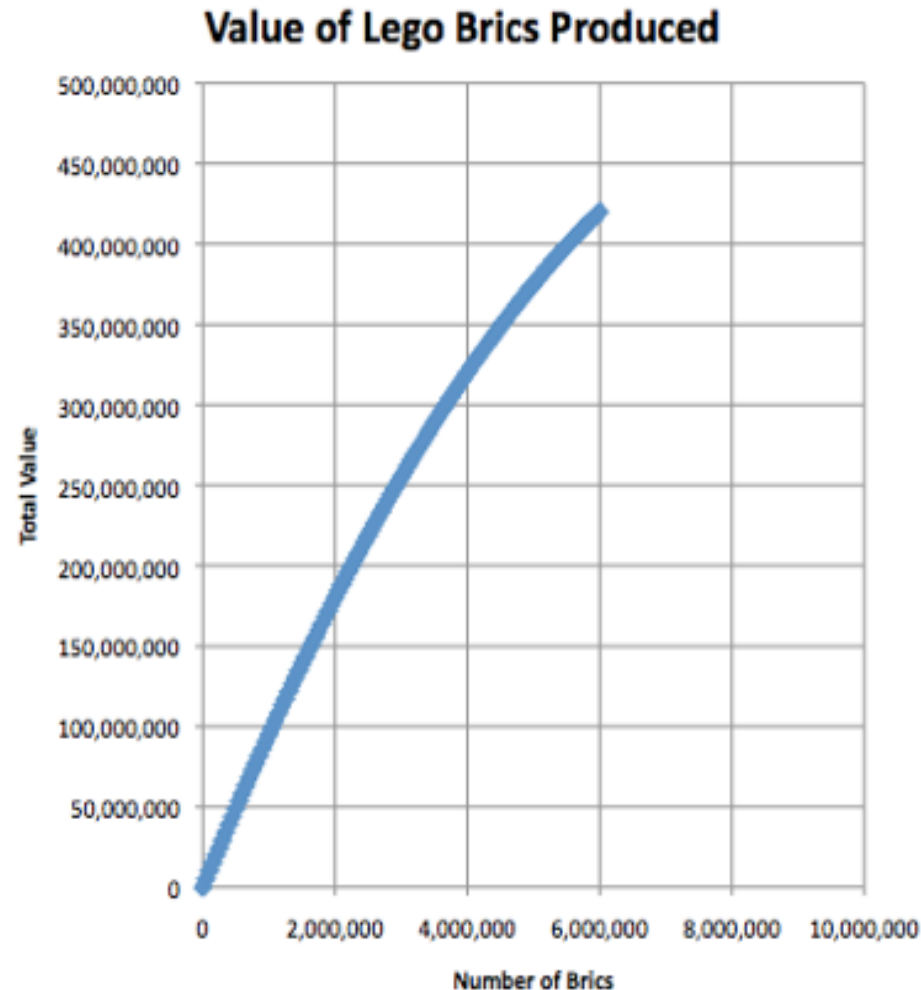
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- But suppose we looked at it from a top-down perspective...



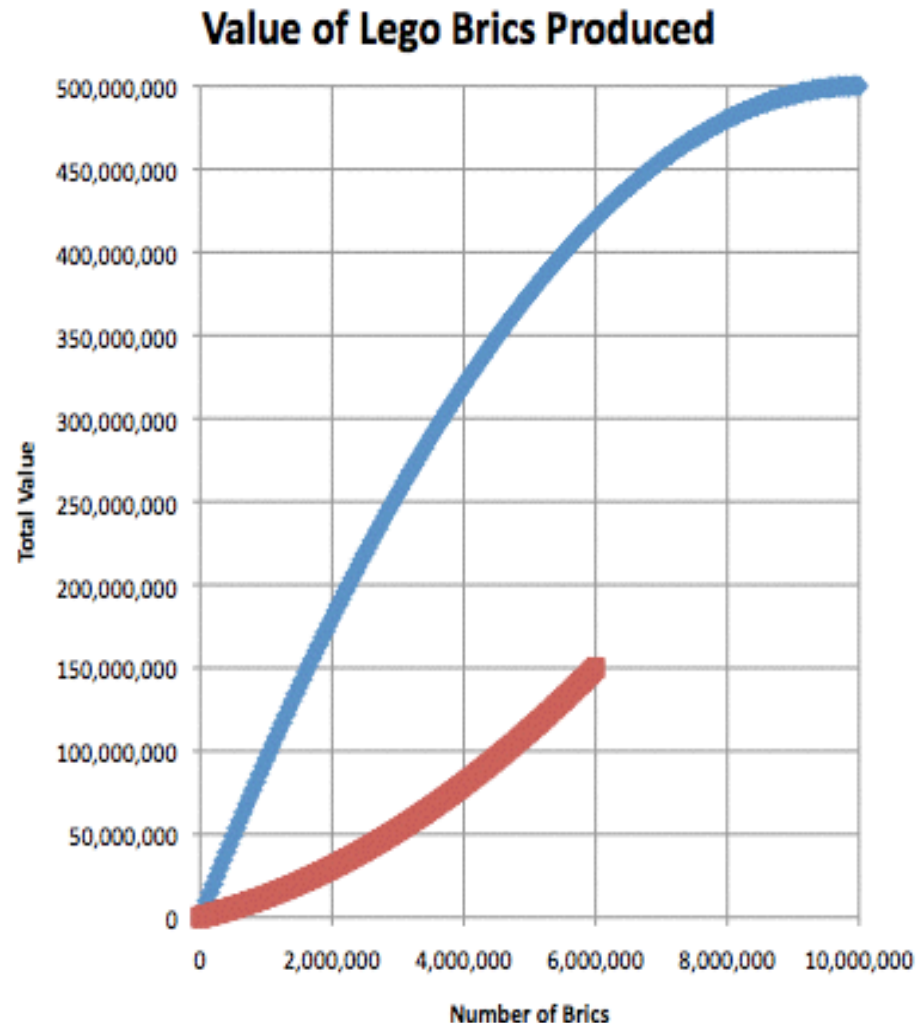
A Visual Representation of Total Value

- The total for the first 1,000,000 brics is up to 95,000,000...
- As we keep on (hypothetically) adding more and more brics, and seeing what they are worth to the master builders who want them...
- By the time we reach 6,000,000 brics...
- The willingness-to-pay of the master builder who purchases the 6,000,000th bric is down to \$40...
- And our total value is at \$420,000,000—growing less than half as fast with each bric as it grew at the beginning...



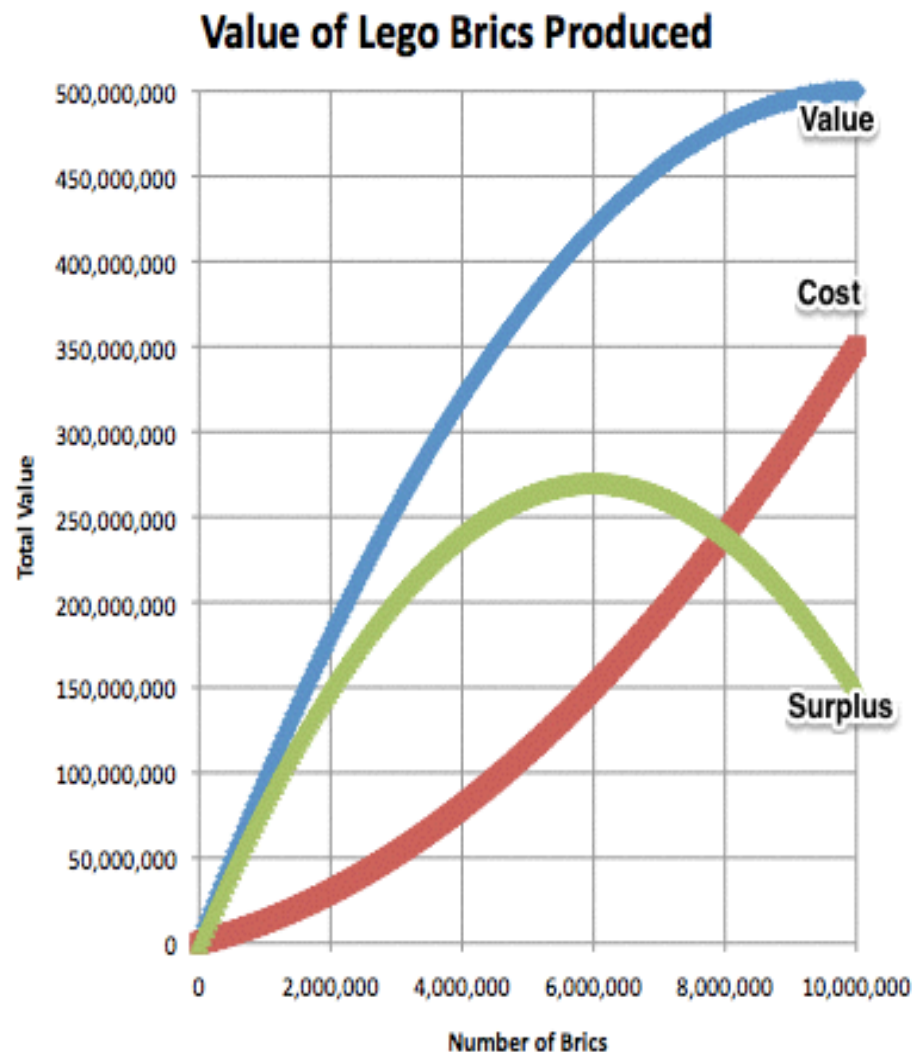
A Visual Representation of Total Cost

- Looking first at the \$10 cost of producing the first bric...
- On up to the \$15 cost of producing the millionth. with the total cost of the first million brics at \$12,500,000...
- And the 6,000,000 bric requires \$40 in resources to call it forth, with a total cost of \$150,000,000



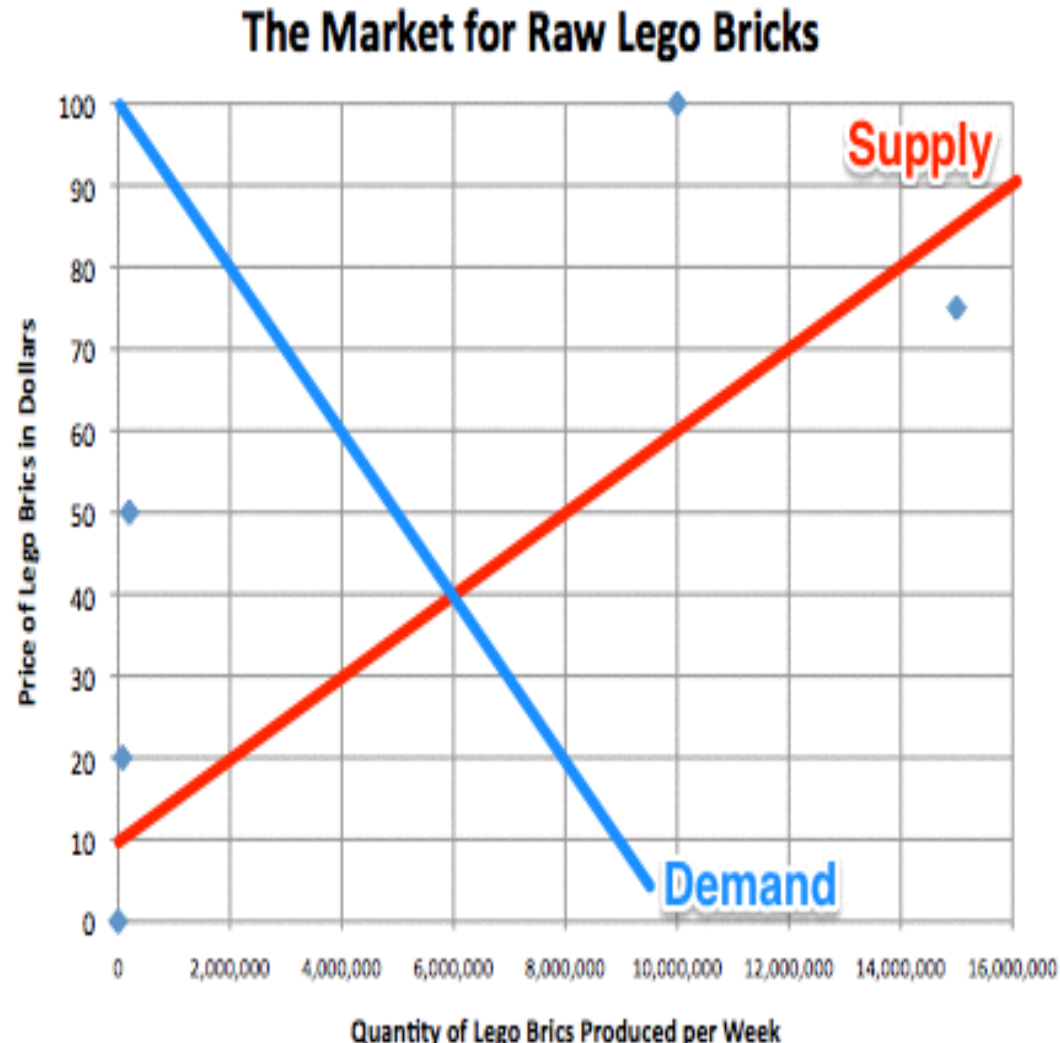
Value, Cost, and Surplus

- All this is encapsulated in the three equations:
 - $TV=Q(100-0.00001Q/2)$
 - $TC=Q(10+0.000005Q/2)$
 - $TS=90Q-0.0000075Q^2$
- There is a lot of information packed into these few symbols, isn't there?
- To convey the same information would require a huge table, or oceans and oceans of words.
- But assembling a bureaucracy to calculate all that would be expensive and cumbersome



The Market Does It For Us

- Planning:
 - $TV=Q(100-0.00001Q/2)$
 - $TC=Q(10+0.000005Q/2)$
 - $TS=90Q-0.0000075Q^2$
- Is the same thing as market:
- Supply:
 - $P_s=10+0.000005Q$
- Demand:
 - $P_d=100-0.00001Q$



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But What If There Is an Externality?

- The effect on those who suffer (or benefit) from the externality shows up nowhere in the marketplace...
- But if we could only somehow make the effect of them show up in the marketplace...
- That is what a Pigovian tax (or bounty) does...

What Would Our Benevolent, Omniscient Central Planner Want to Do?

- Now we have three things happening in this marketplace:
 - Value to consumers:
 - $TV = Q \times (100 - 0.000005Q) = 100Q - 0.000005(Q^2)$
 - Cost to producers:
 - $TC = Q \times (10 + 0.0000025Q) = 10Q + 0.0000025(Q^2)$
 - Externality cost to Cloud-Cuckoo Landers:
 - $XC = -30Q$
 - Net value to consumers and producers:
 - $NV = 60Q - 0.0000075(Q^2)$

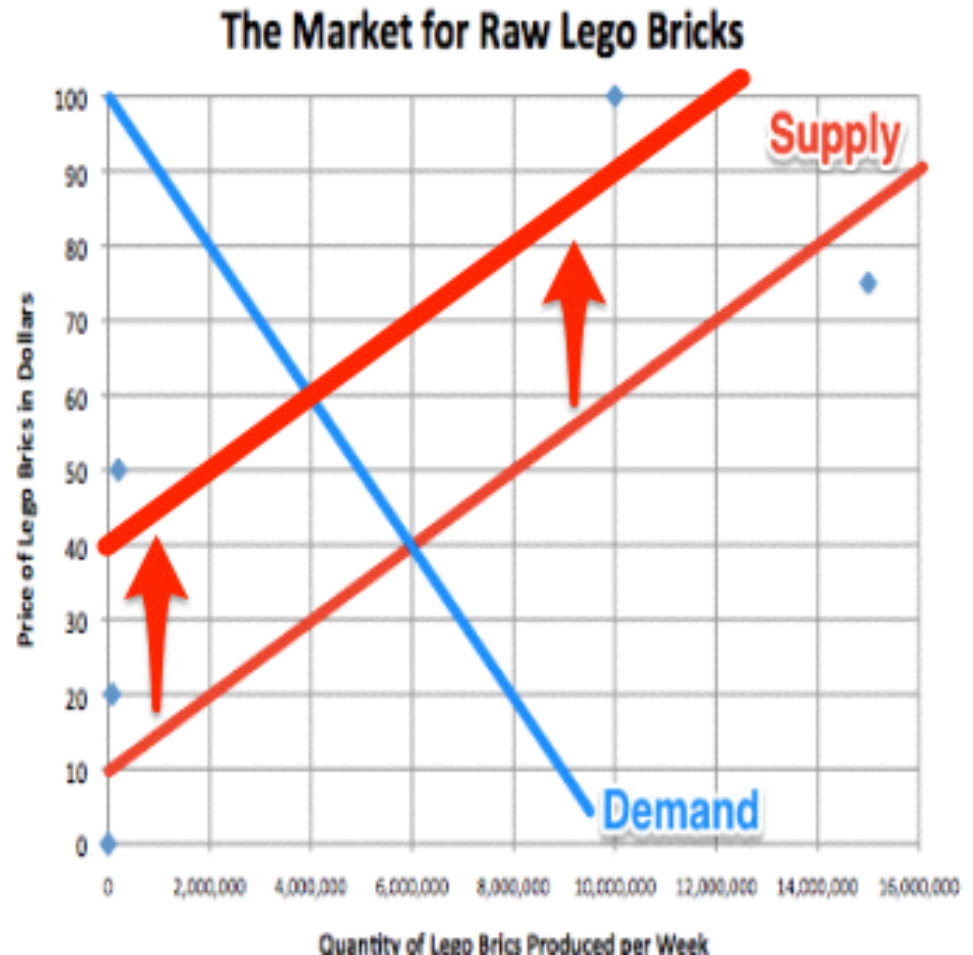
What Would Our Benevolent, Omniscient Central Planner Want to Do? II

- Net value to consumers and producers:
 - $NV = 60Q - 0.0000075(Q^2)$
- Maximized at a quantity of 4,000,000 lego brics produced
 - Compare to 6,000,000 produced by competitive market

| Brics | Value |
|------------|----------------|
| 0 | \$0 |
| 1,000,000 | \$52,500,000 |
| 2,000,000 | \$90,000,000 |
| 3,000,000 | \$112,500,000 |
| 4,000,000 | \$120,000,000 |
| 5,000,000 | \$112,500,000 |
| 6,000,000 | \$90,000,000 |
| 7,000,000 | \$52,500,000 |
| 8,000,000 | \$0 |
| 9,000,000 | -\$67,500,000 |
| 10,000,000 | -\$150,000,000 |

Impose the Pigovian Tax, and the Market Does It For Us

- Planning:
 - $TV=Q(100-0.00001Q/2)$
 - $TC=Q(10+0.000005Q/2)$
 - $XC = -30Q$
 - $TS=60Q-0.0000075Q^2$
- Is the same thing as market:
- Supply:
 - $P_s=10 + 0.000005Q$
- Demand:
 - $P_d=100-0.00001Q$



Impose the Pigovian Tax, and the Market Does It For Us

- Planning:
 - $TV=Q(100-0.00001Q/2)$
 - $TC=Q(10+0.000005Q/2)$
 - $TS=90Q-0.0000075Q^2$
- Is the same thing as market:
- Supply:
 - $P_s=10 + 0.000005Q$
- Demand:
 - $P_d=100-0.00001Q$
- $Q = 4,000,000$; $P_d = \$60$, $P_s = \$30$
- $CS = \$8M$
- $PS = \$4M$
- $TR = \$12M$
- $TS = \$24M$

