# Principles of Economics
# When Competitive Markets Cannot Work Optimally
# Adverse Selection

J. Bradford DeLong
U.C. Berkeley

# Modes of Market Failure

- Six modes of market failure:
  - Maldistribution
  - Miscalculation—which we will not cover
  - Externality
  - Non-rivalry
    - Market power
  - Adverse selection
  - Non-excludibility

# Today Is Adverse Selection Day!

- Six modes of market failure:
  - Maldistribution
  - Miscalculation—which we will not cover
  - Externality
  - Non-rivalry
    - Market power
  - Adverse selection
  - Non-excludibility
- Today is adverse selection day!
  - Information asymmetry
  - The American question: if this is a good deal for you, why is it a good deal for me?
    - Usually we have a good answer: differing willingnesses-to-pay and opportunity costs
    - But with asymmetric information, this may not be enough…

# Adverse Selection: The Market for Health Insurance

- 10,000 customers
- 2500 **R**ich:
  - Risk neutral
  - Value their lives at $5,000,000
  - Can afford to pay $500,000 over their lifetime for heath insurance
- 7500 **N**ot-rich, who can only afford to pay $150,000 over their lifetime for health insurance
- 1000 will get **S**ick, and cost $1,000,000 each to treat—which not even the rich can pay out-of-pocket
- 9000 will stay **W**ell, and cost $0



The Market for Health Insurance
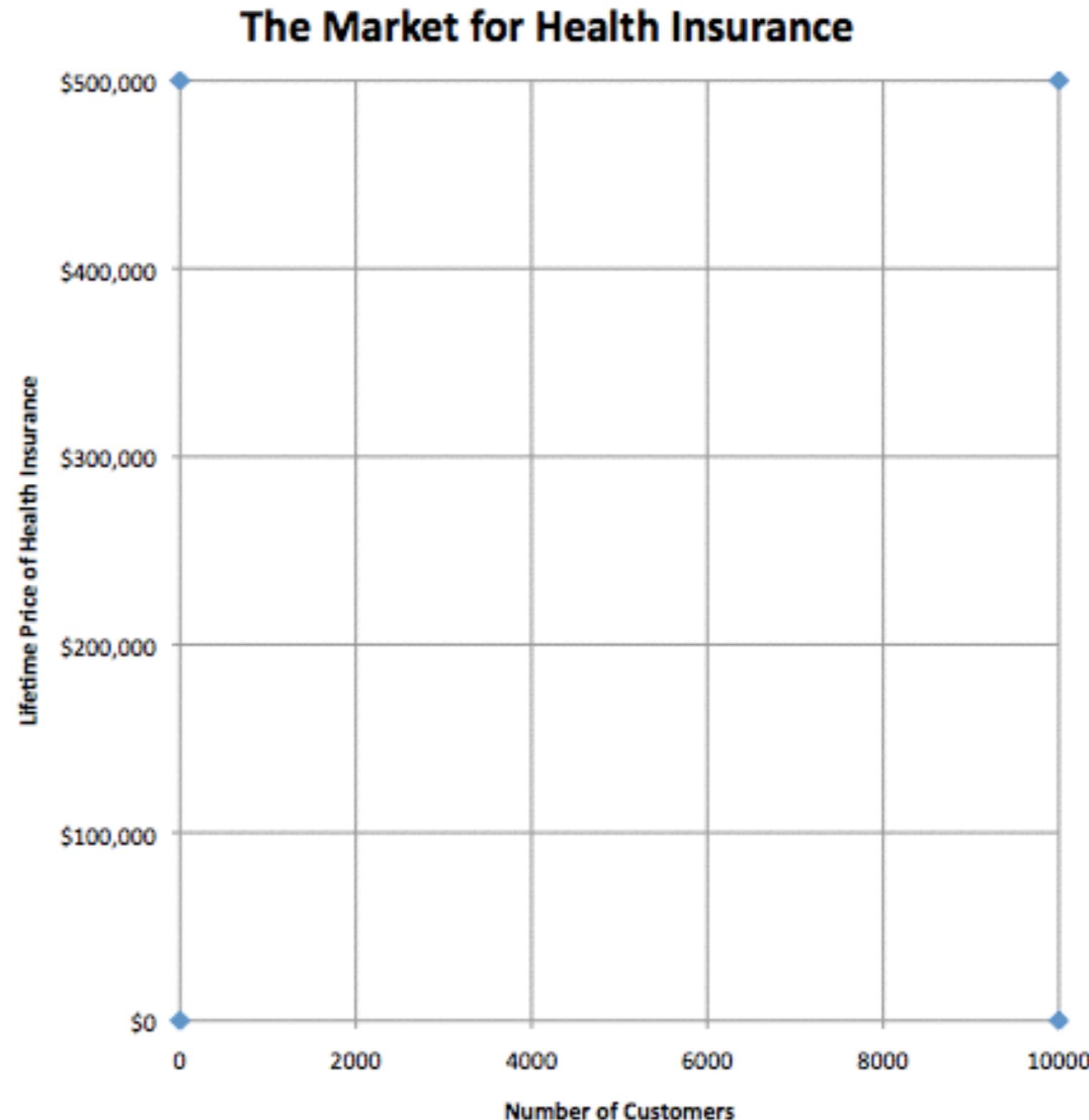
# The No-Information Demand

- 2500 **R**, WTP $500,000; 7500 **N**, WTP $150,000; 1000 **S**ick, cost $1,000,000 to treat; 9000 **W**, cost $0

- Demand:
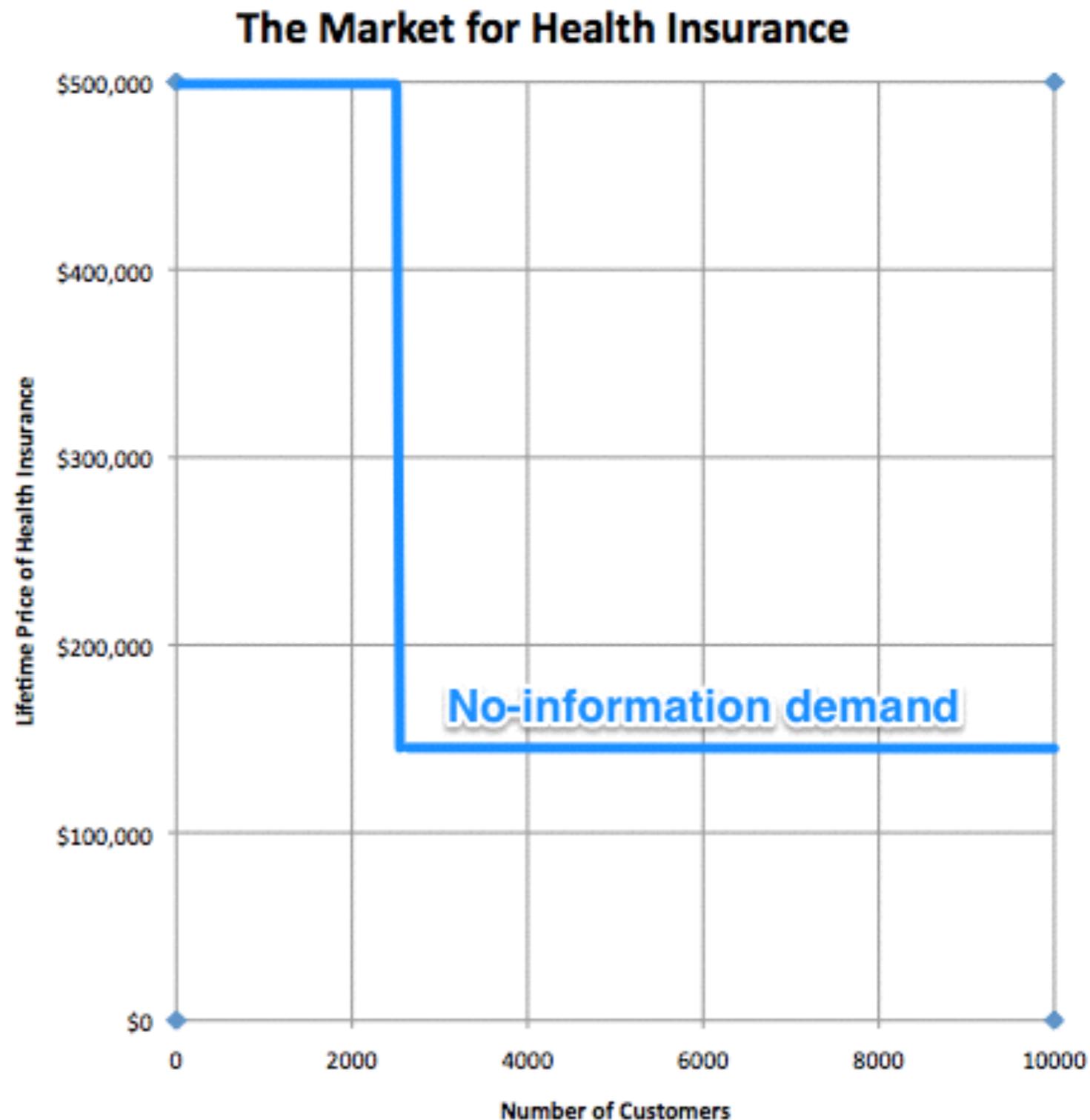
## The Market for Health Insurance
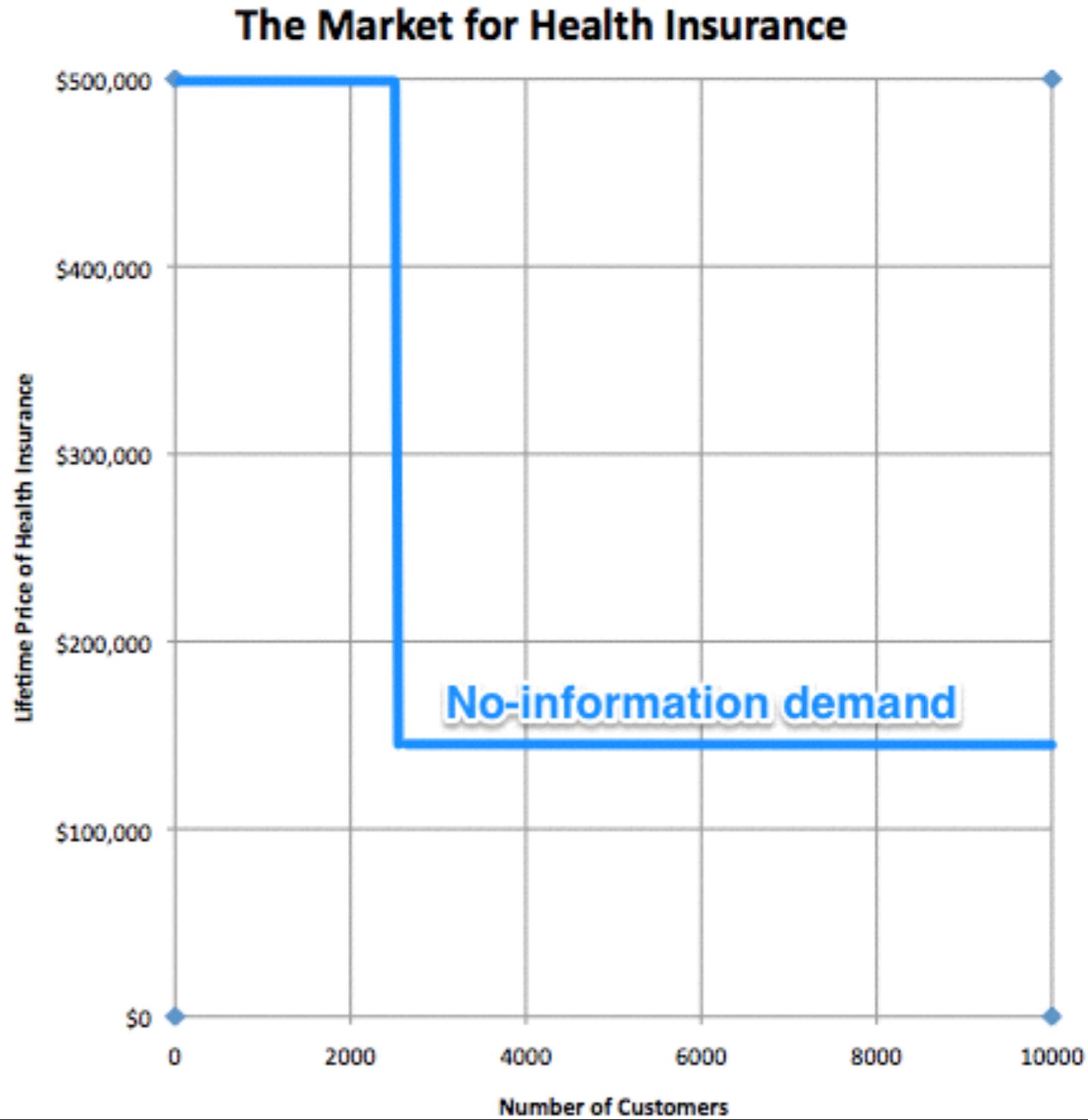
# Ladies, Gentlemen, and Dr. House, to your i>Clickers!

- Suppose the quantity demanded is 10,000. How much surplus will the market create—producer plus consumer surplus?

  - A. $4,000,000,000
  - B. $2,750,000,000
  - C. $500,000,000
  - D. It cannot be determined from the information given
  - E. None of the above
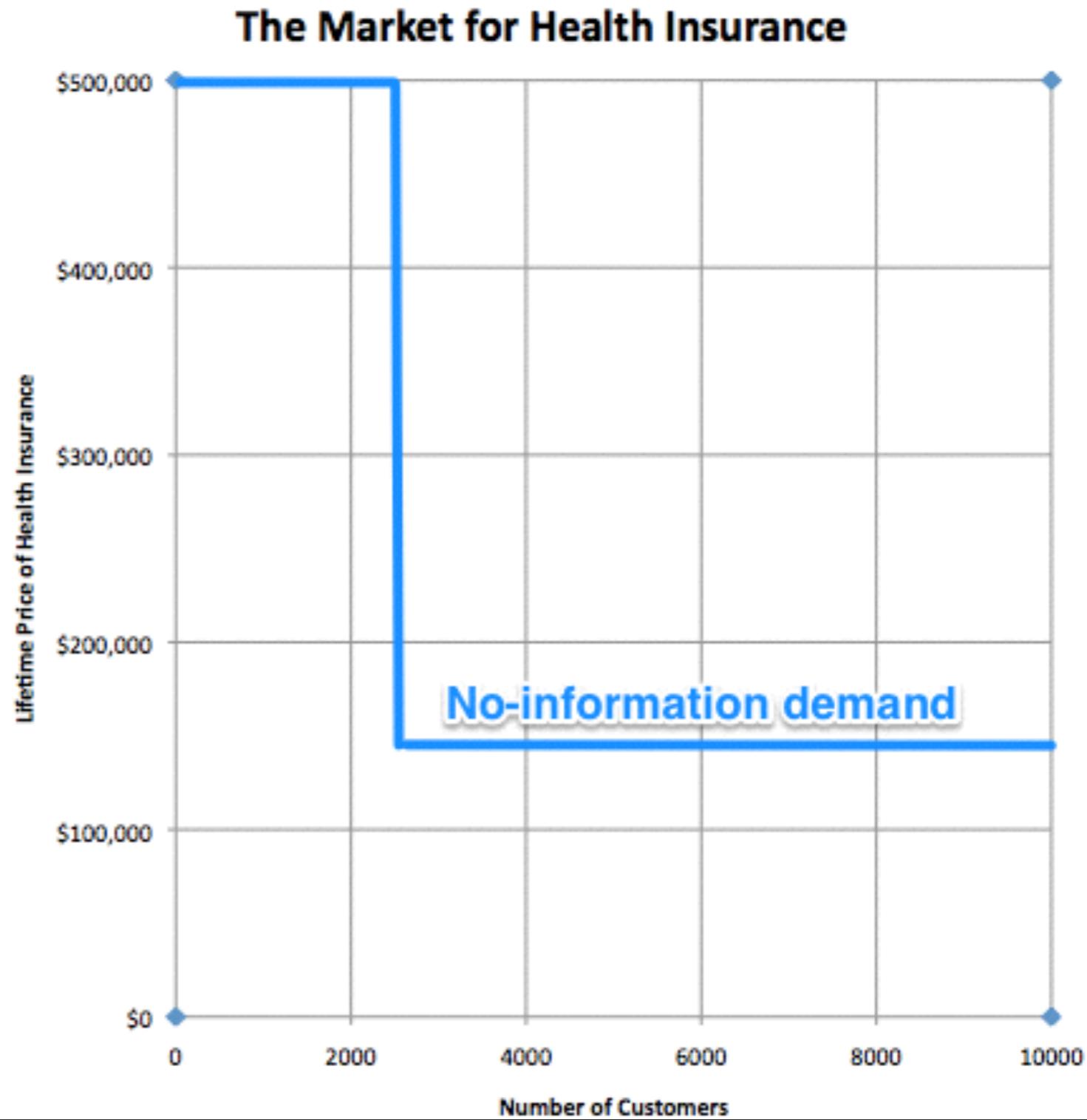


**The Market for Health Insurance**

No-information demand

Lifetime Price of Health Insurance

Number of Customers
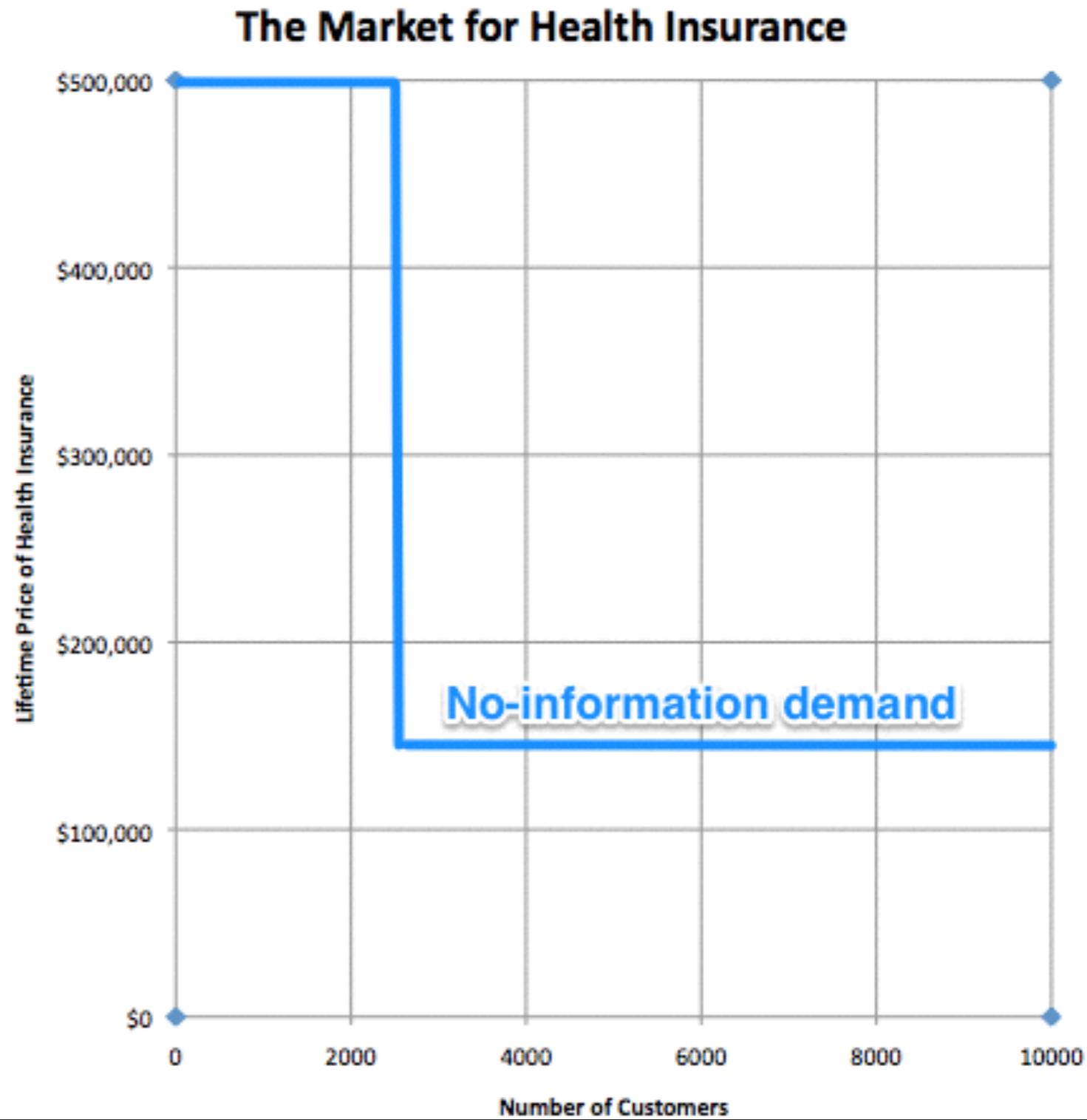
# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer

- Suppose the quantity demanded is 10,000. How much surplus will the market create—producer plus consumer surplus?

  - A. $4B. B. $2.75B. C. $0.5B. D. can't be determined. E. Nota

- **Rich: 2.5K x $500K = $1.25B**

**The Market for Health Insurance**



Lifetime Price of Health Insurance (y-axis): $0, $100,000, $200,000, $300,000, $400,000, $500,000

No-information demand

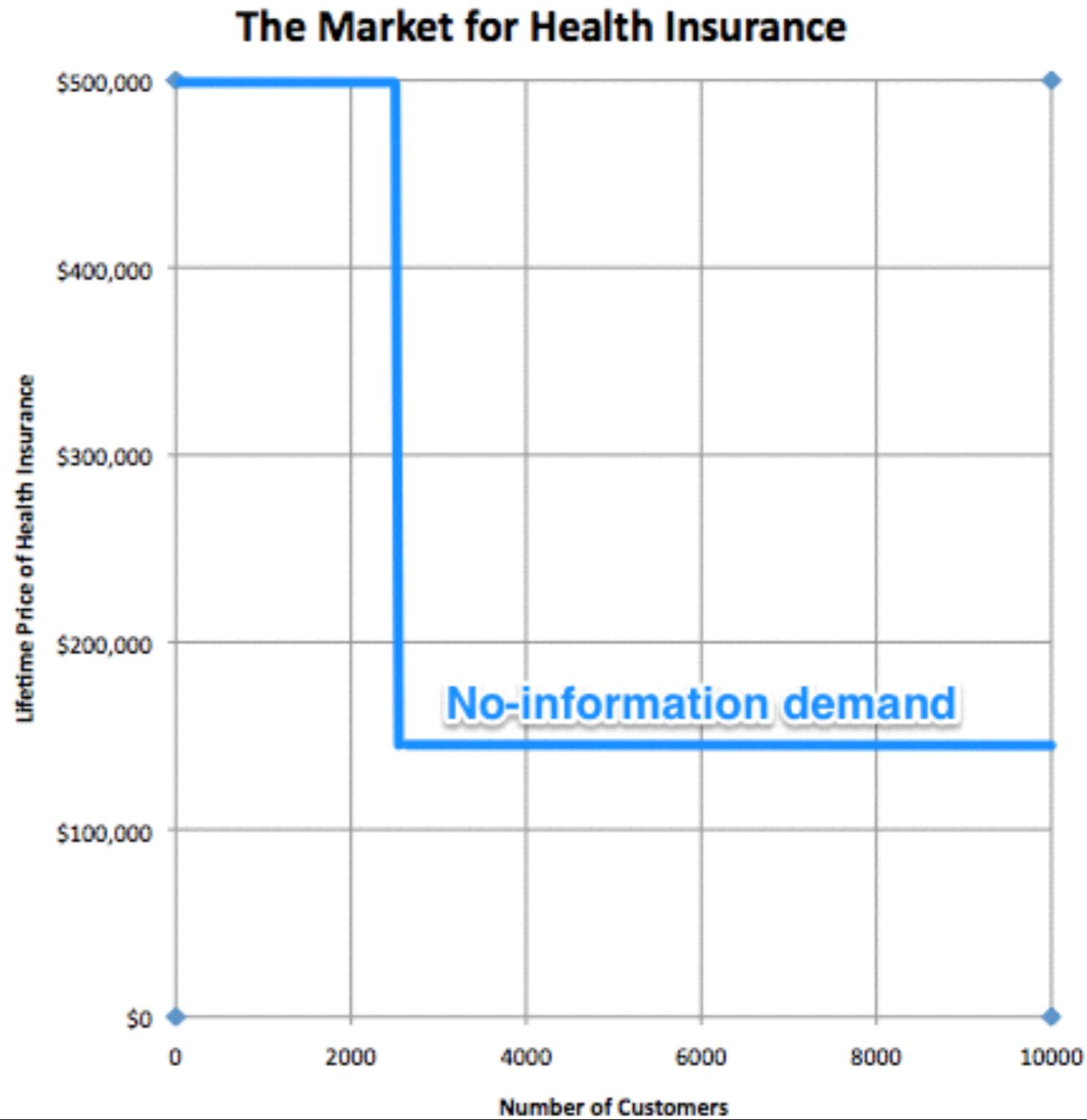Number of Customers (x-axis): 0, 2000, 4000, 6000, 8000, 10000

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer II

- Suppose the quantity demanded is 10,000. How much surplus will the market create—producer plus consumer surplus?

  - A. $4B. B. $2.75B. C. $0.5B. D. can't be determined. E. Nota

- **Rich: 2.5K x $500K = $1.25B**

- **Not-rich: 7.5K x $150K= $1.125B**



The Market for Health Insurance

No-information demand

Lifetime Price of Health Insurance
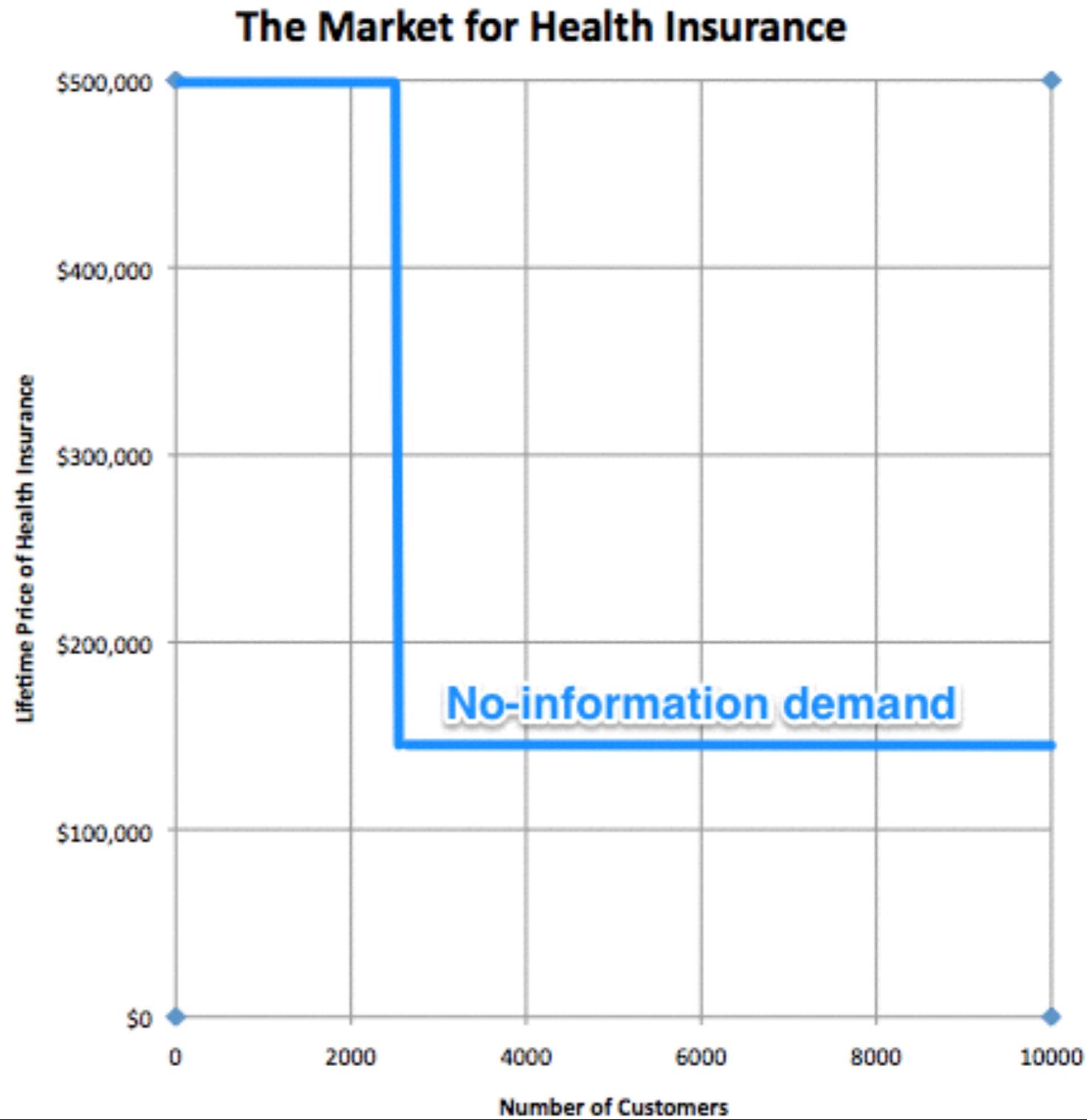
Number of Customers

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer III

- Suppose the quantity demand is 10,000. How much surplus will the market create—producer plus consumer surplus?

  - A. $4B. B. $2.75B. C. $0.5B. D. can't be determined. E. Nota

- **Rich: 2.5K x $500K = $1.25B**

- **Not-rich: 7.5K x $150K= $1.125B**

- **Cost: $1.0B**

**The Market for Health Insurance**



(Graph: Y-axis "Lifetime Price of Health Insurance" ranging from $0 to $500,000; X-axis "Number of Customers" ranging from 0 to 10000. Labeled "No-information demand." Demand line flat at $500,000 from 0 to ~2500 customers, then drops to ~$150,000 and remains flat to 10000.)

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer IV

- Suppose the quantity demand is 10,000. How much surplus will the market create—producer plus consumer surplus?
  - A. $4B. B. $2.75B. C. $0.5B. D. can't be determined. E. Nota
- **Rich: 2.5K x $500K = $1.25B**
- **Not-rich: 7.5K x $150K= $1.125B**
- **Cost: $1.0B**
- **TS = $1.375B**



The Market for Health Insurance

No-information demand

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer V

- Suppose the quantity demand is 10,000. How much surplus will the market create—producer plus consumer surplus?
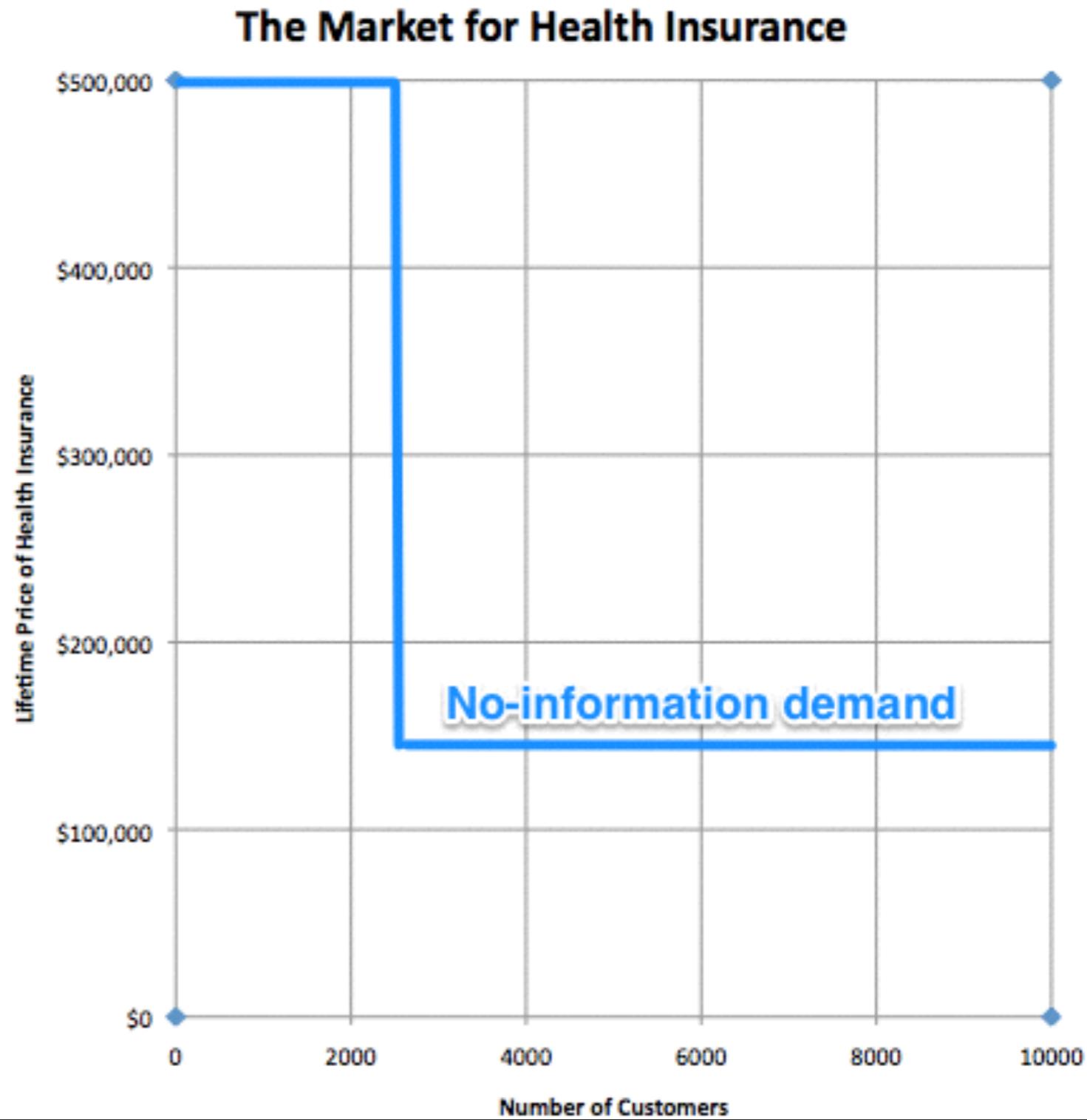  - A. $4B. B. $2.75B. C. $0.5B. D. can't be determined. E. Nota
- **Rich: 2.5K x $500K = $1.25B**
- **Not-rich: 7.5K x $150K= $1.125B**
- **Cost: $1.0B**
- **TS = $1.375M**
- **Equilibrium Price? Somewhere between $100K and $150K…**



**The Market for Health Insurance**

No-information demand
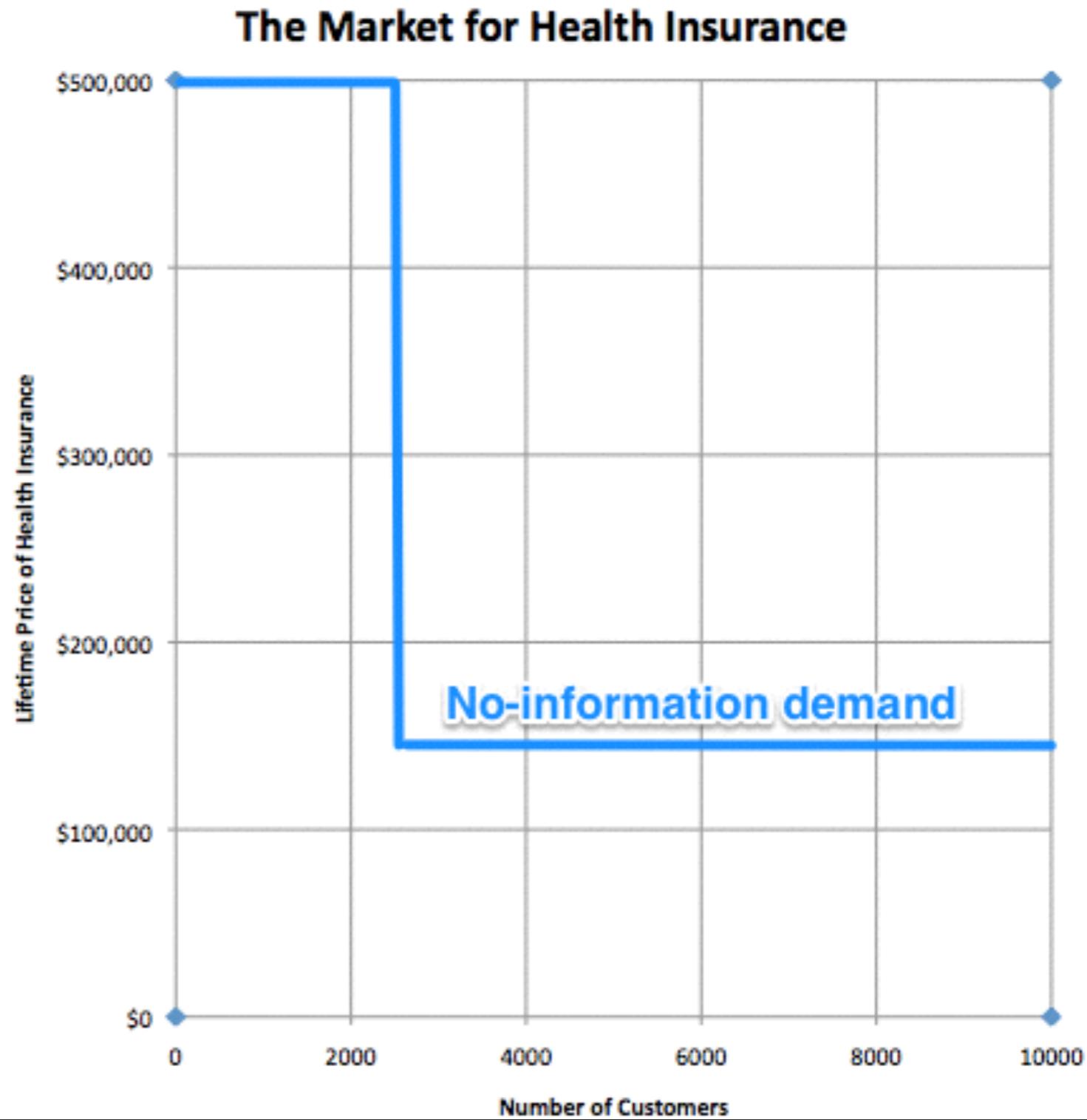
# Ladies, Gentlemen, and Dr. House, to your i>Clickers!

- Is producer plus consumer surplus a good way of calculating what the social welfare from health insurance and health care is?

  - A. Yes
  - B. No
  - C. Maybe
  - D. The question makes no sense
  - E. The question makes sense, but I cannot answer it

**The Market for Health Insurance**

No-information demand

Lifetime Price of Health Insurance

$500,000
$400,000
$300,000
$200,000
$100,000
$0

Number of Customers

0    2000    4000    6000    8000    10000

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer

- Is producer plus consumer surplus a good way of calculating what the social welfare from health insurance and health care is?
  - A. Yes. B. No. C. Maybe. D. The question makes no sense. E. The question makes sense, but I cannot answer it
- **B. No.**
- **Where willingness-to-pay is limited only by your wealth (and your relatives' wealth), consumer plus producer surplus is a statement about the distribution of wealth rather than about social well-being**

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer II

- Is producer plus consumer surplus a good way of calculating what the social welfare from health insurance and health care is?
  - A. Yes. B. No. C. Maybe. D. The question makes no sense. E. The question makes sense, but I cannot answer it
- **B. No.**
- **Where willingness-to-pay is limited only by your wealth (and your relatives' wealth), consumer plus producer surplus is a statement about the distribution of wealth rather than about social well-being**
- **Suppose if we had not 7500 NR but 7500 Truly Poor with wtp of $0K. The market surplus from insuring all 10000 would then go down from $1.375B to $250M, $1B from insuring and treating the rich and -$750M from insuring the poor—insuring and treating the poor would wipe out 3/4 of the societal surplus from providing insurance and treatment to the rich.**
- **Is that a sensible conclusion to draw?**

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer III

- Is producer plus consumer surplus a good way of calculating what the social welfare from health insurance and health care is?
  - A. Yes. B. No. C. Maybe. D. The question makes no sense. E. The question makes sense, but I cannot answer it
- **B. No.**
- **Where willingness-to-pay is limited only by your wealth (and your relatives' wealth), consumer plus producer surplus is a statement about the distribution of wealth rather than about social well-being**
- **Suppose if we had not 7500 NR but 7500 Truly Poor with wtp of $0K. The market surplus from insuring all 10000 would then go down from $1.375B to $250M, $1B from insuring and treating the rich and -$750M from insuring—insuring and treating the poor would wipe out 3/4 of the societal surplus from providing insurance and treatment to the rich.**
- **Is that a sensible conclusion to draw?**
- **I say no, but we are into the moral philosophy weeds here**
  - **Greg Mankiw, for example, says that the rich deserve their wealth, and that the desert of the rich trumps the needs of the poor—in which case the answer is A.**

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!

- The rich value their lives at $5M each—and so their wtp for insurance against a 1/10 chance of needing treatment is $500K.

- Should we use rich person's values to do our societal benefit-cost calculations, in which case the value of health insurance and health care in this situation is $5M x 1000 - $1M x 1000 = $4B?

  - A. Yes
  - B. No.
  - C. Maybe.
  - D. The question makes no sense
  - E. The question makes sense, but I do not know how to answer it

# Ladies, Gentlemen, and Dr. House, to your i>Clickers!: Answer

- The rich value their lives at $5M each—and so have a wtp for insurance against a 1/10 chance of needing treatment is $500K. Should we use rich person's values to do our societal benefit-cost calculations, in which case the value of health insurance and health care in this situation is $5M x 1000 - $1M x 1000 = $4B?

  - A. Yes. B. No. C. Maybe. D. The question makes no sense. E. The question makes sense, but I do not know how to answer it

- **I tend to say A. Yes—But I also say that this is a matter for moral philosophy rather than economics.**

- **If, like Greg Mankiw, you believe that the rich deserve their wealth, and that that desert trumps the needs of the not-rich in a just society, then you say B. No…**

# Now Let's Complicate Things

- 2500 **R**, WTP $500,000; 7500 **N**, WTP $150,000; 1000 **S**ick, cost $1,000,000 to treat; 9000 **W**, cost $0

- There is a test

- The test is free

- The test is bad news for 50% of the people—tells them their chances of getting sick are not 10% but 18%.

- The test leaves the other 50% of people safer

  - But not totally safe: still 2% of them will get sick

## The Market for Health Insurance
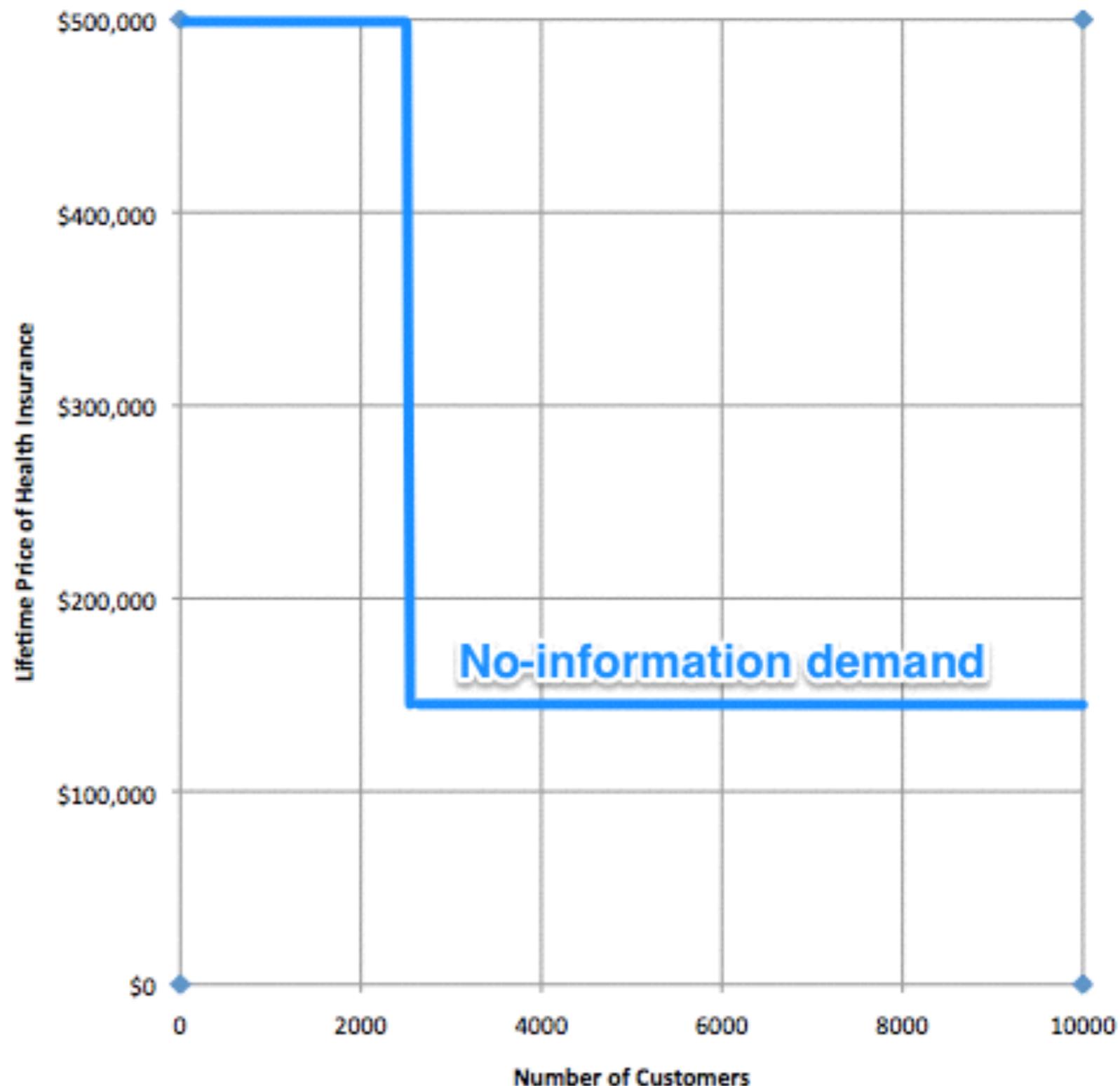
# The Rich Take the Test

- 2500 **R**ich
  - 1250 of them learn they their chances of getting sick are 18%
  - The other 1250 get the absence of bad news, and go into the 2% low-risk pool



**The Market for Health Insurance**

No-information demand
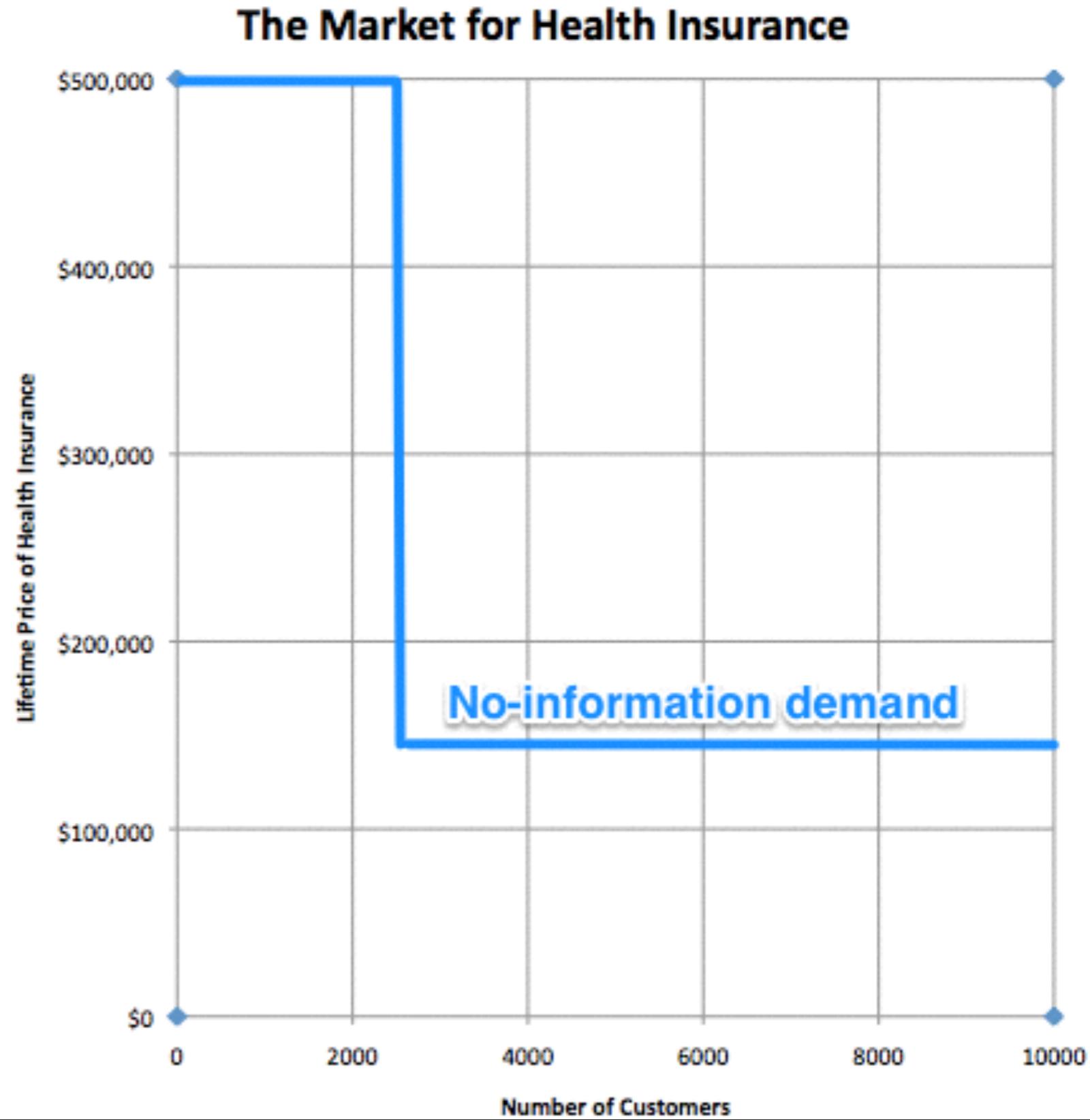
# The Rich Take the Test II

- 2500 **R**ich
  - 1250 of them learn they their chances of getting sick are 18%
  - Their wtp would jump— but say that even the rich are cash-constrained at $500,000
  - The other 1250 get the absence of bad news, which is good news, and go into the 2% low-risk pool
  - Their wtp falls to $100,000
  - The demand curve shifts…
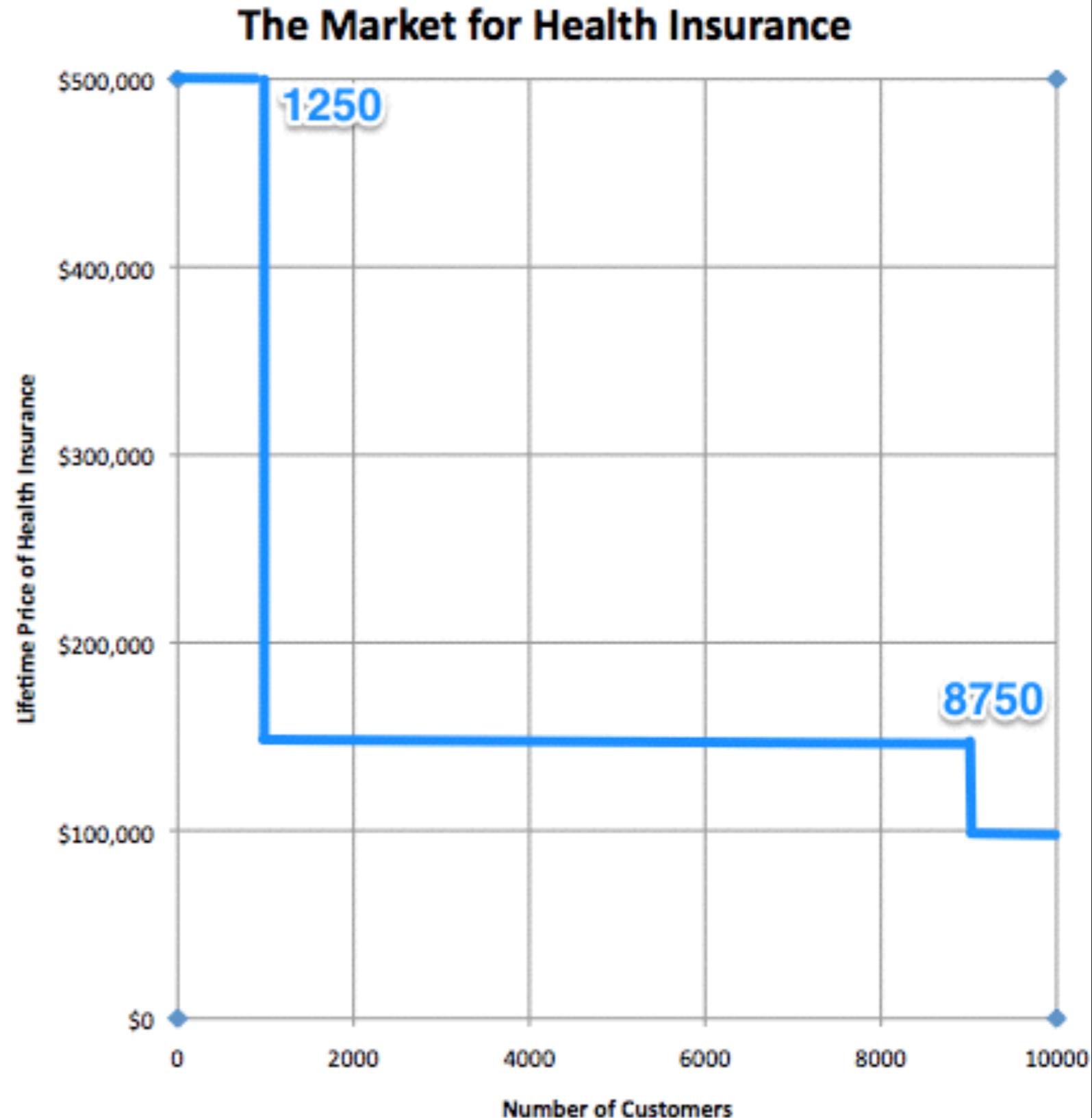
**The Market for Health Insurance**

# The Not-Rich Take the Test

- 2500 **R**ich
  - 1250: chances of getting sick are 18%: wtp $500,000
  - 1250 in the 2% low-risk pool: wtp $100,000
- 7500 **N**ot-rich
  - 3750 of them learn that they are high-risk: wtp $150,000
  - 3750 low risk: wtp; $100,000
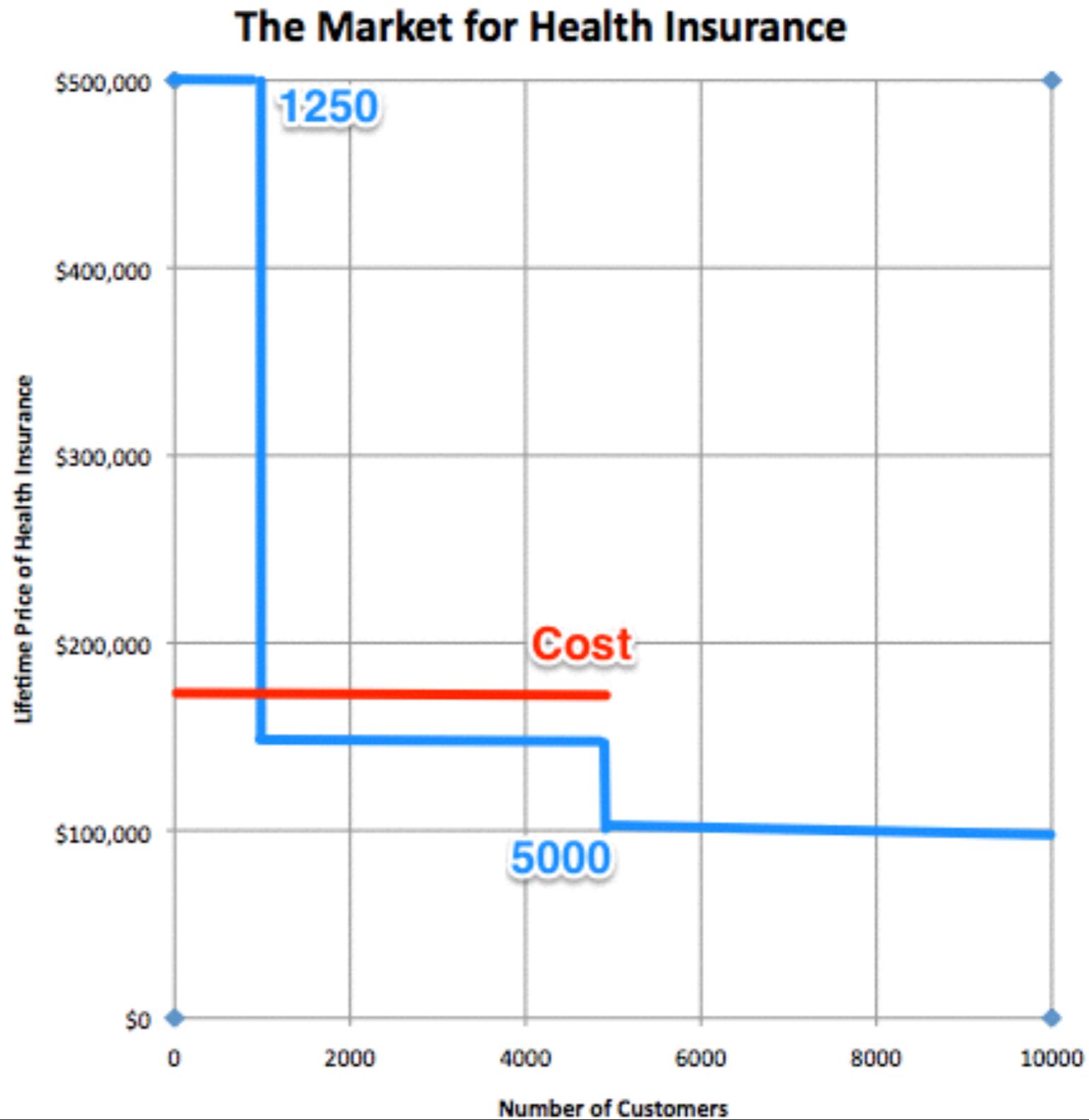
**The Market for Health Insurance**

# The Not-Rich Take the Test II

- 2500 **R**ich
  - 1250: chances of getting sick are 18%: wtp $500,000
  - 1250 in the 2% low-risk pool: wtp $100,000
- 7500 **N**ot-rich
  - 3750 of them learn that they are high-risk: wtp $150,000
  - 3750 low risk: wtp; $100,000

**The Market for Health Insurance**
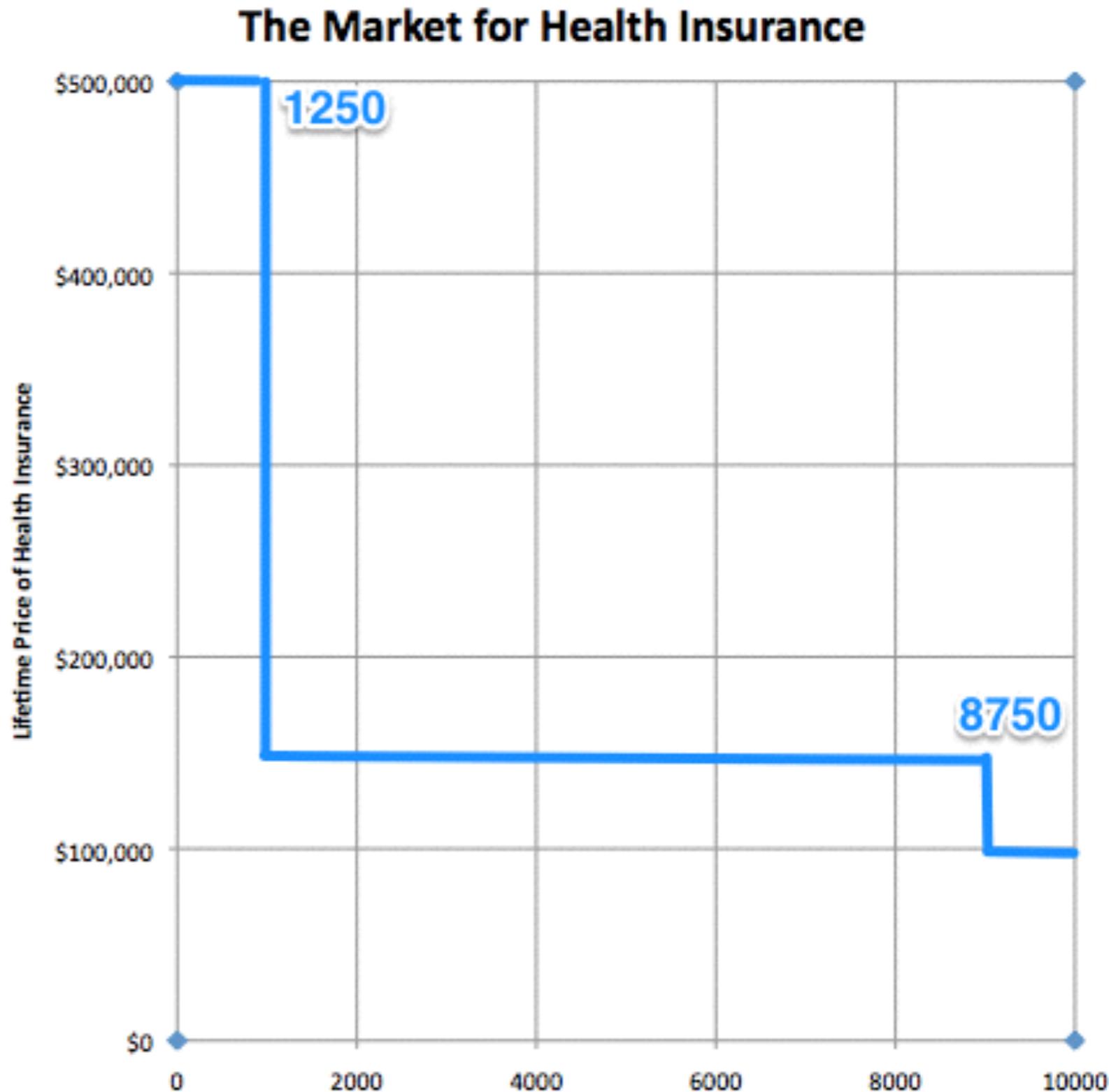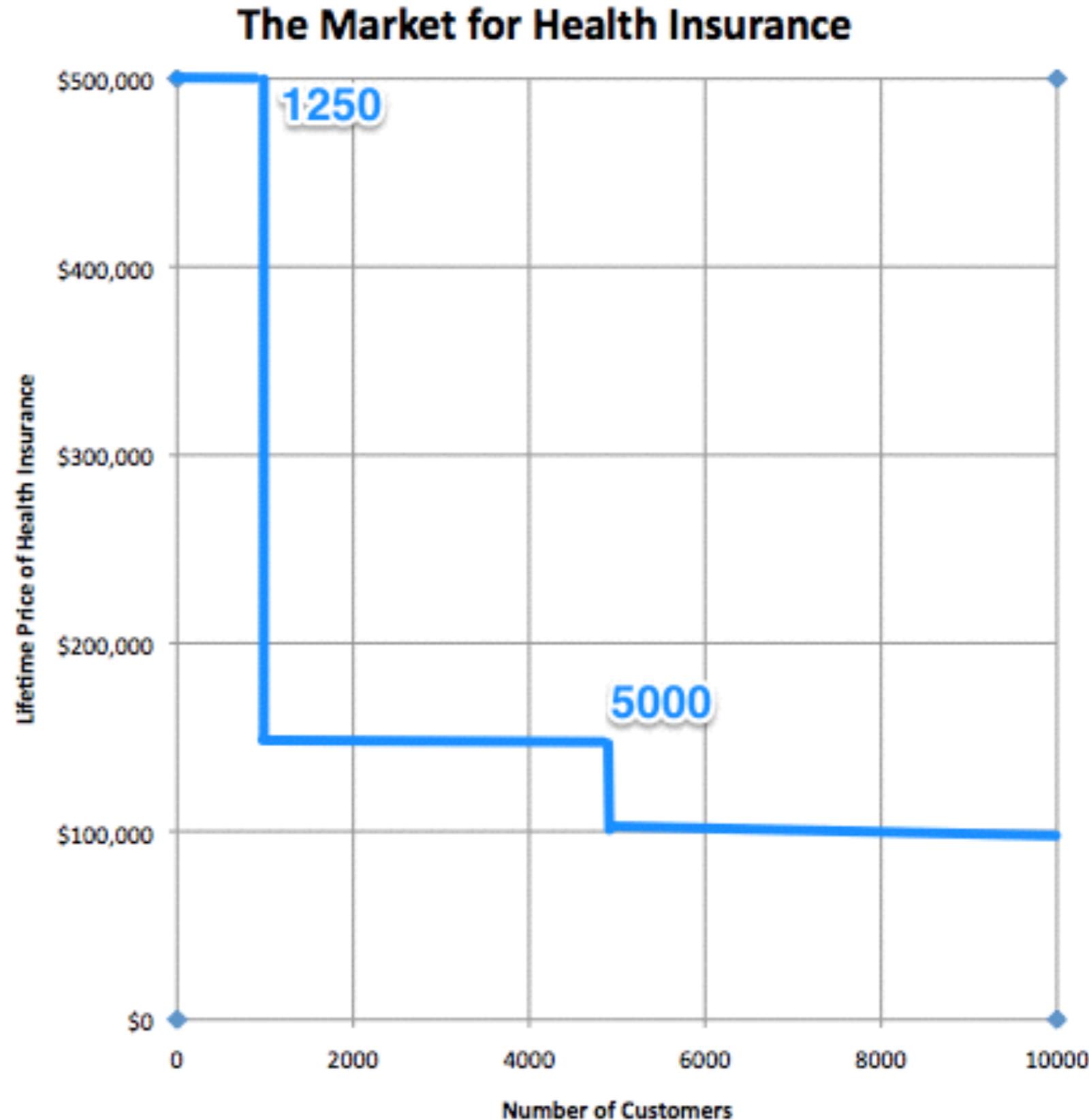
# Information Asymmetry Supply

- What's the cost of insuring the 5000 with the strongest demand?

- Those will be the 5000 in the high-risk pool

- 900 of them are or will become **S**ick

- $900M/5000 = $180K



**The Market for Health Insurance**

1250

Cost

5000

Lifetime Price of Health Insurance

$500,000
$400,000
$300,000
$200,000
$100,000
$0

Number of Customers
0   2000   4000   6000   8000   10000

# Information Asymmetry Supply II

- The cost of insuring the 5000 with the strongest demand is $180K each…

- And as you expand coverage beyond $180K you incorporate people form the low risk pool, and average cost drops…

- Until at 10,000 you are back at an average cost of $100K again…



The Market for Health Insurance
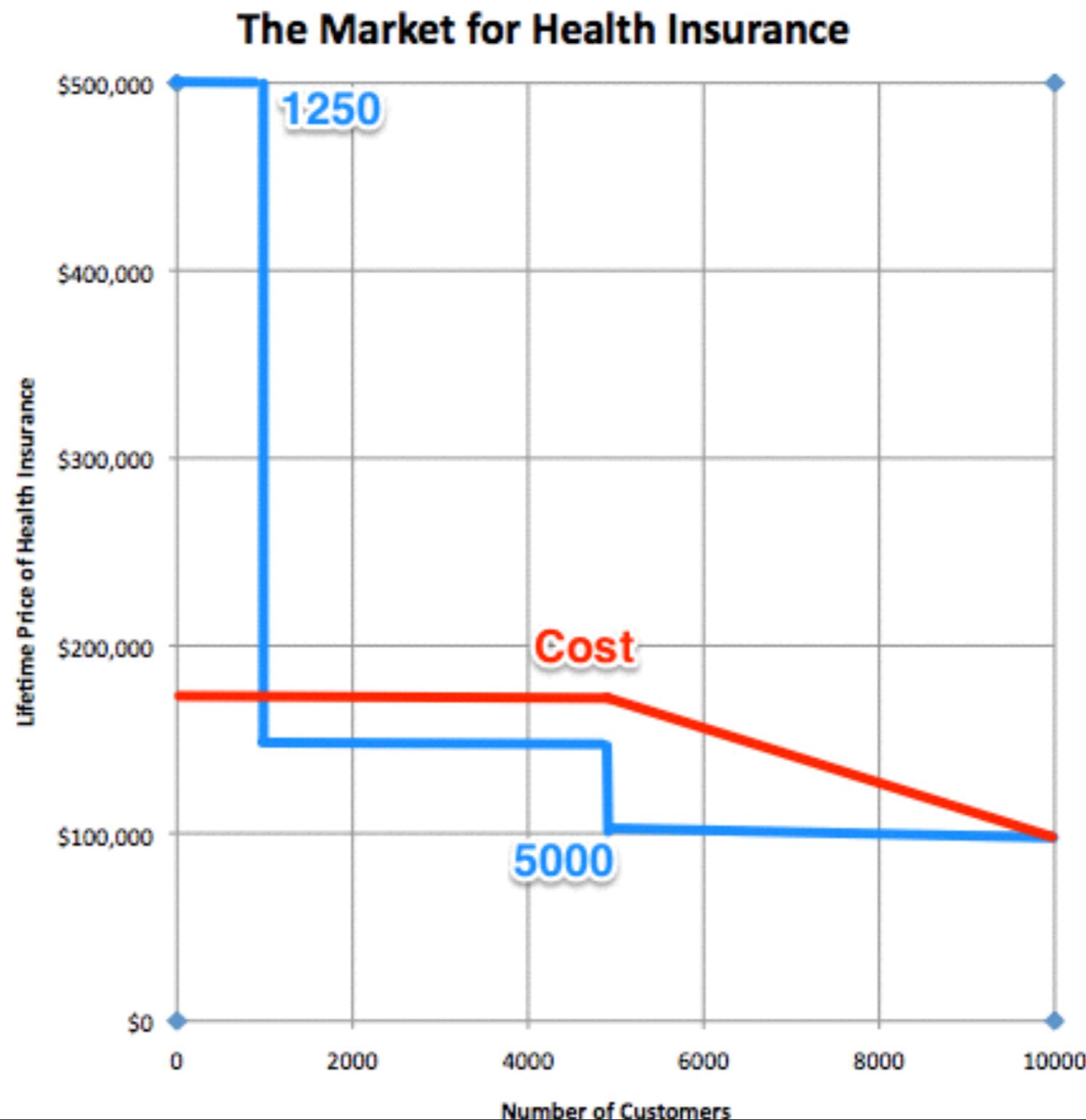
# Information Asymmetry Equilibrium

- Is there an equilibrium in which private insurers ensure only the 1250 **R**ich with a wtp of $500K?

- Yes. They cost $180K to insure, so at any price between $180K and $500K 1250 customers are eager to purchase, and insurers are eager to write 1250 policies

- The market can sustain Q=1250

**The Market for Health Insurance**
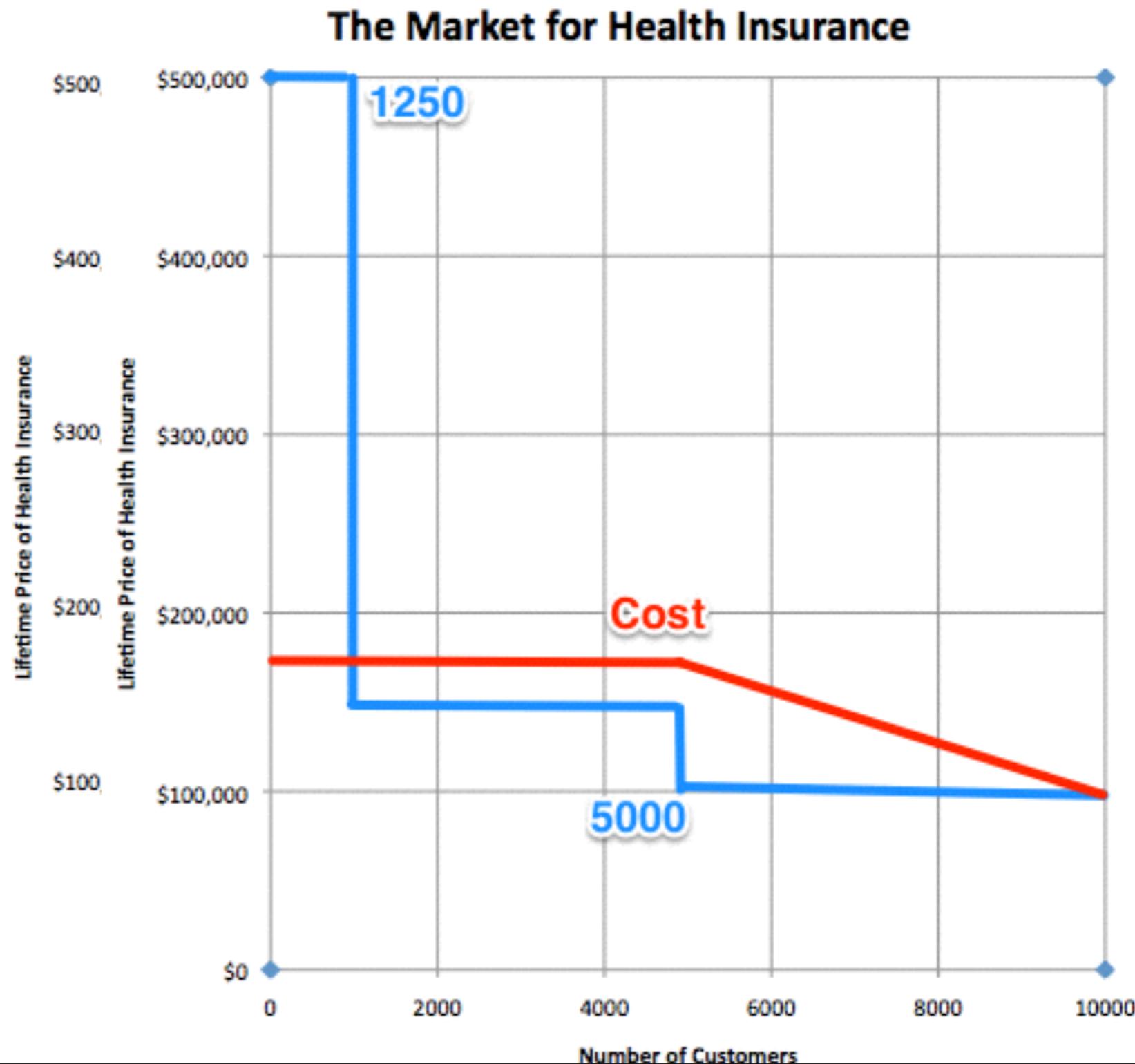
# Information Asymmetry Non-Equilibrium

- At any price between $180K and $500K 1250 customers are eager to purchase, and insurers are eager to write 1250 policies. The market can sustain Q=1250.

- Is there an equilibrium with between 1250 and 5000 customers?

- No: to attract between 1250 and 5000 customers the price must be $150K, and the cost of insuring those who purchase is than $180K—they are all from the high-risk pool



The Market for Health Insurance
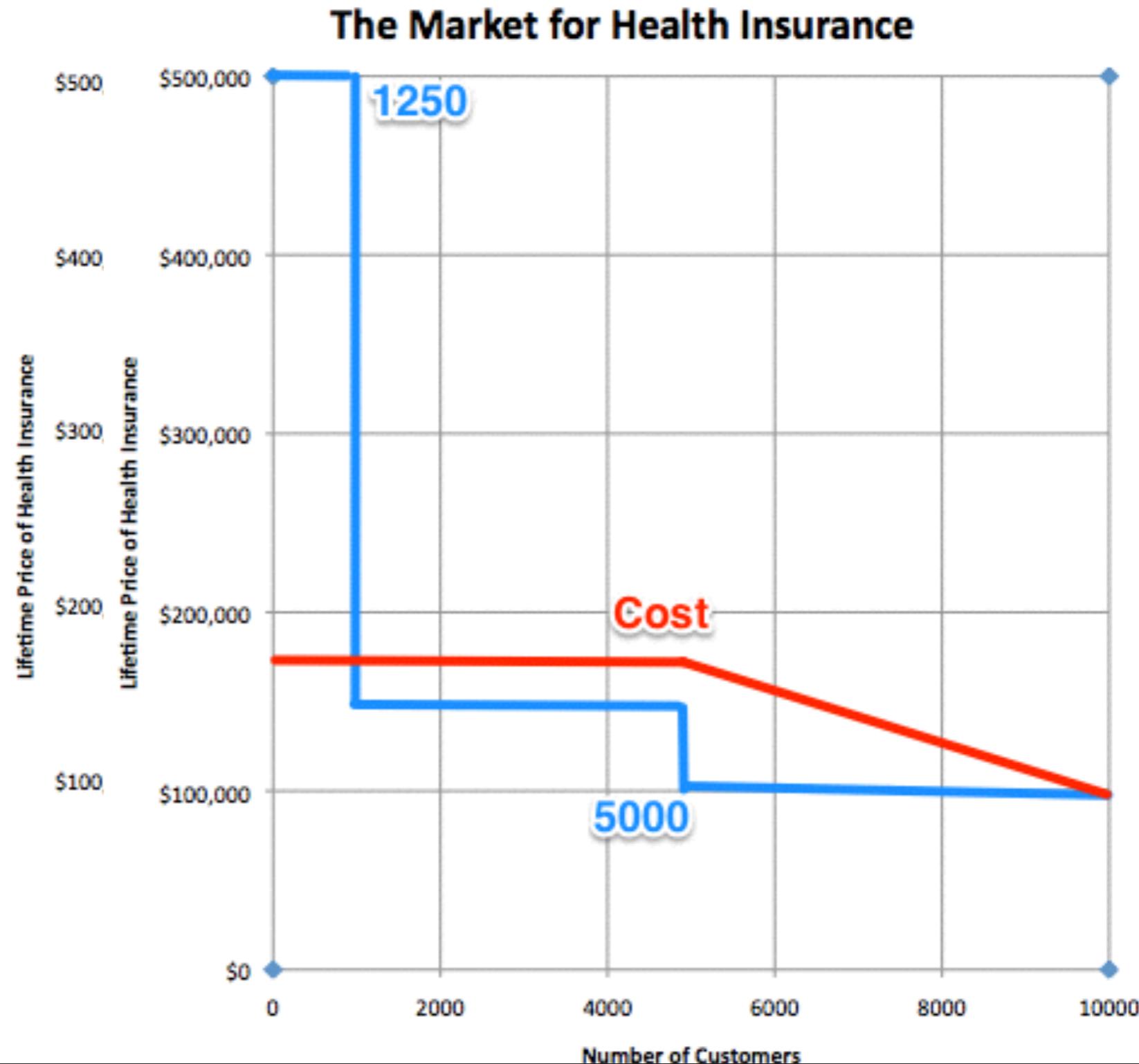
# Information Asymmetry Equilibrium II

- At any price between $180K and $500K 1250 customers are eager to purchase, and insurers are eager to write 1250 policies. The market can sustain Q=1250.
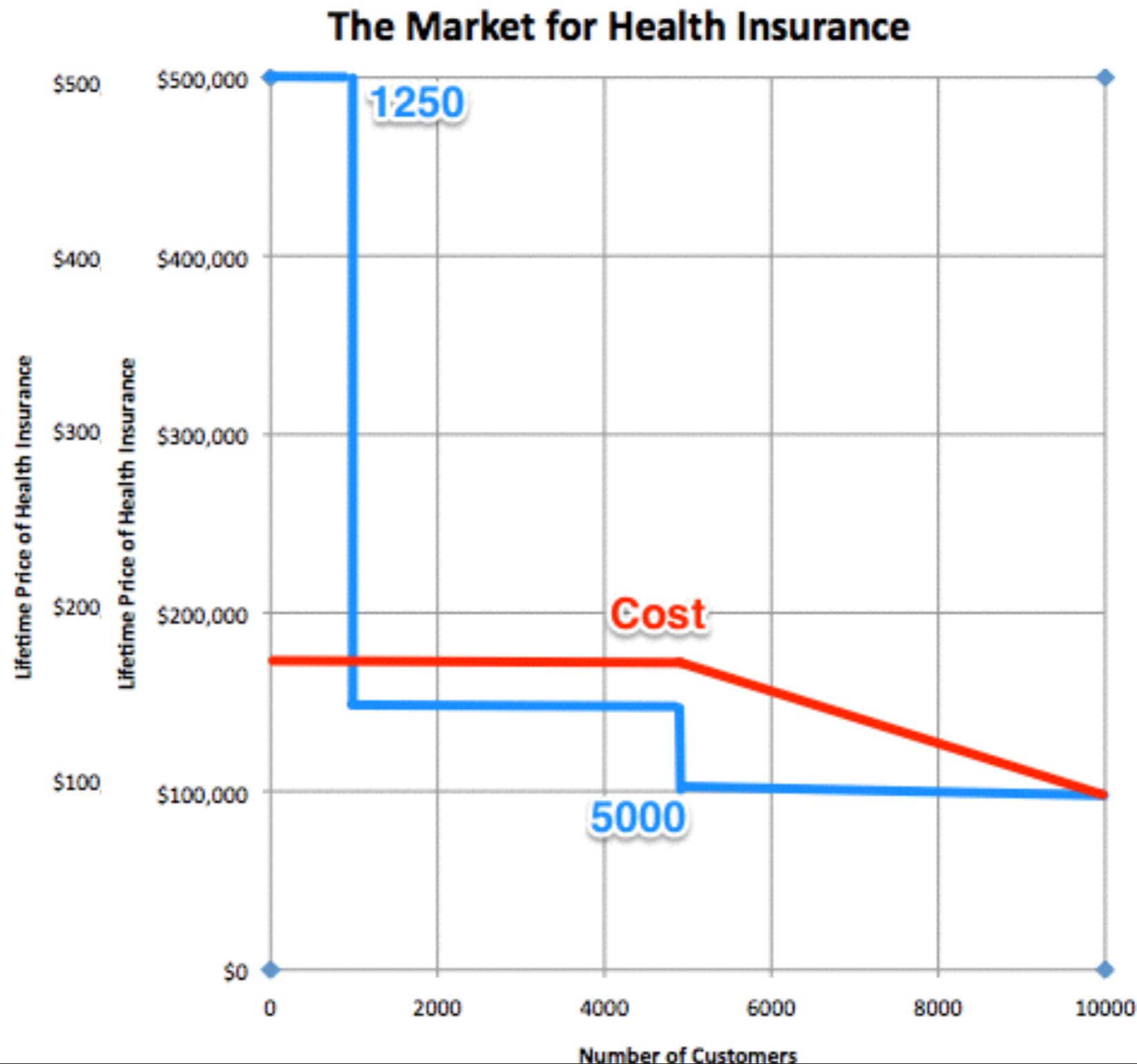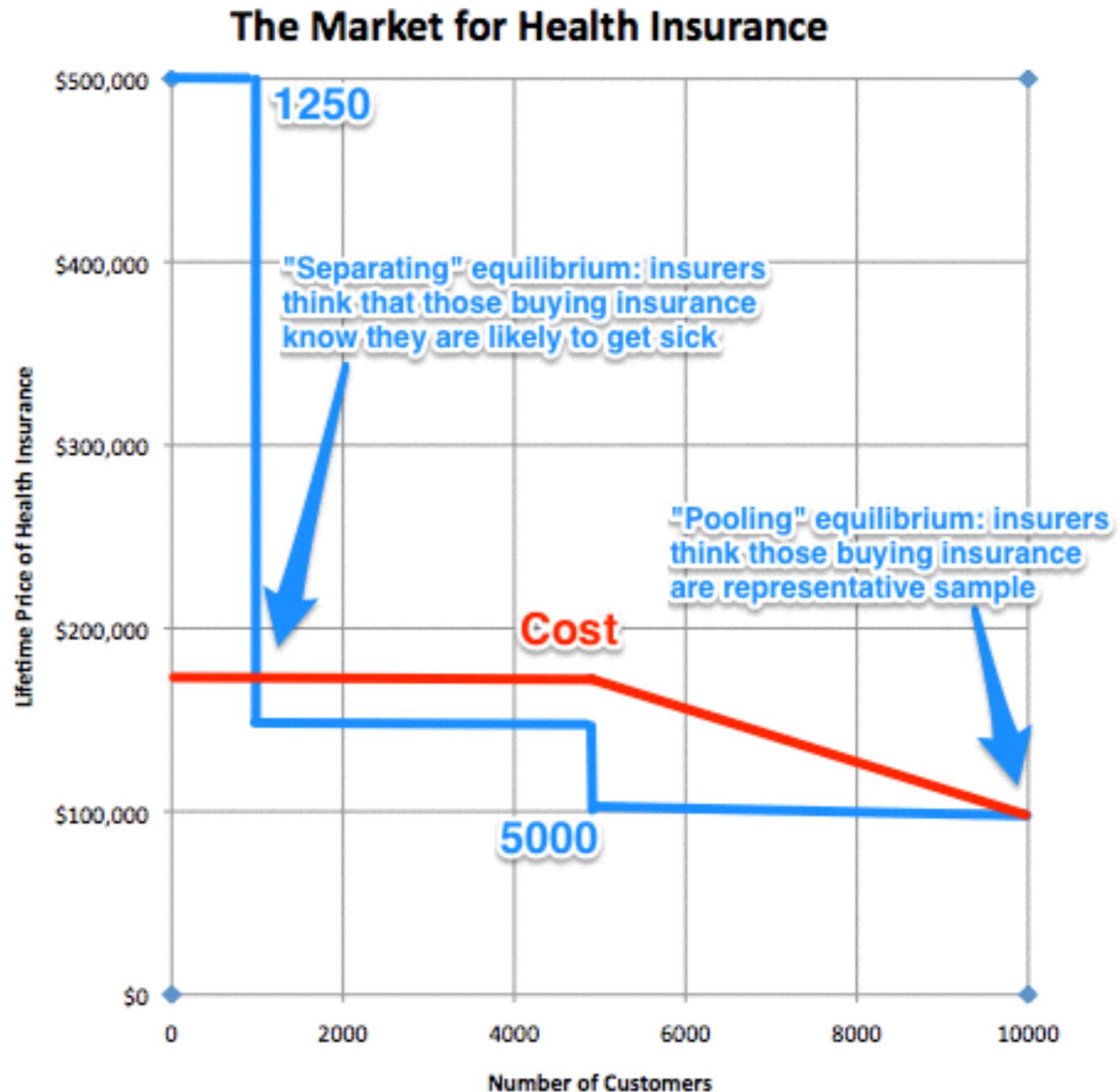
- At a price between $180K-and $100K insurers lose money.

- At a price of $100K there is another equilibrium: everyone buys, and insurance-company costs are $100K per policy



The Market for Health Insurance

# Information Asymmetry Equilibrium III

- This health insurance market with the test can thus support two equilibria:

- A "separating" equilibrium in which the price of insurance is too high for low-risk people to want to purchase

- A "pooling" equilibrium in which everyone buys



The Market for Health Insurance

1250

"Separating" equilibrium: insurers think that those buying insurance know they are likely to get sick

"Pooling" equilibrium: insurers think those buying insurance are representative sample

Cost

5000

Lifetime Price of Health Insurance

Number of Customers

# Information Asymmetry Equilibrium IV

- The "pooling" equilibrium is unstable: if anything disturbs prices and pushes them up, the low-risk drop out, and costs go up, and insurers have to raise prices even more to cover their costs.

- The "separating" equilibrium is stable: if anything disturbs prices and pushes them down, insurers start losing money and must raise prices again.



The Market for Health Insurance
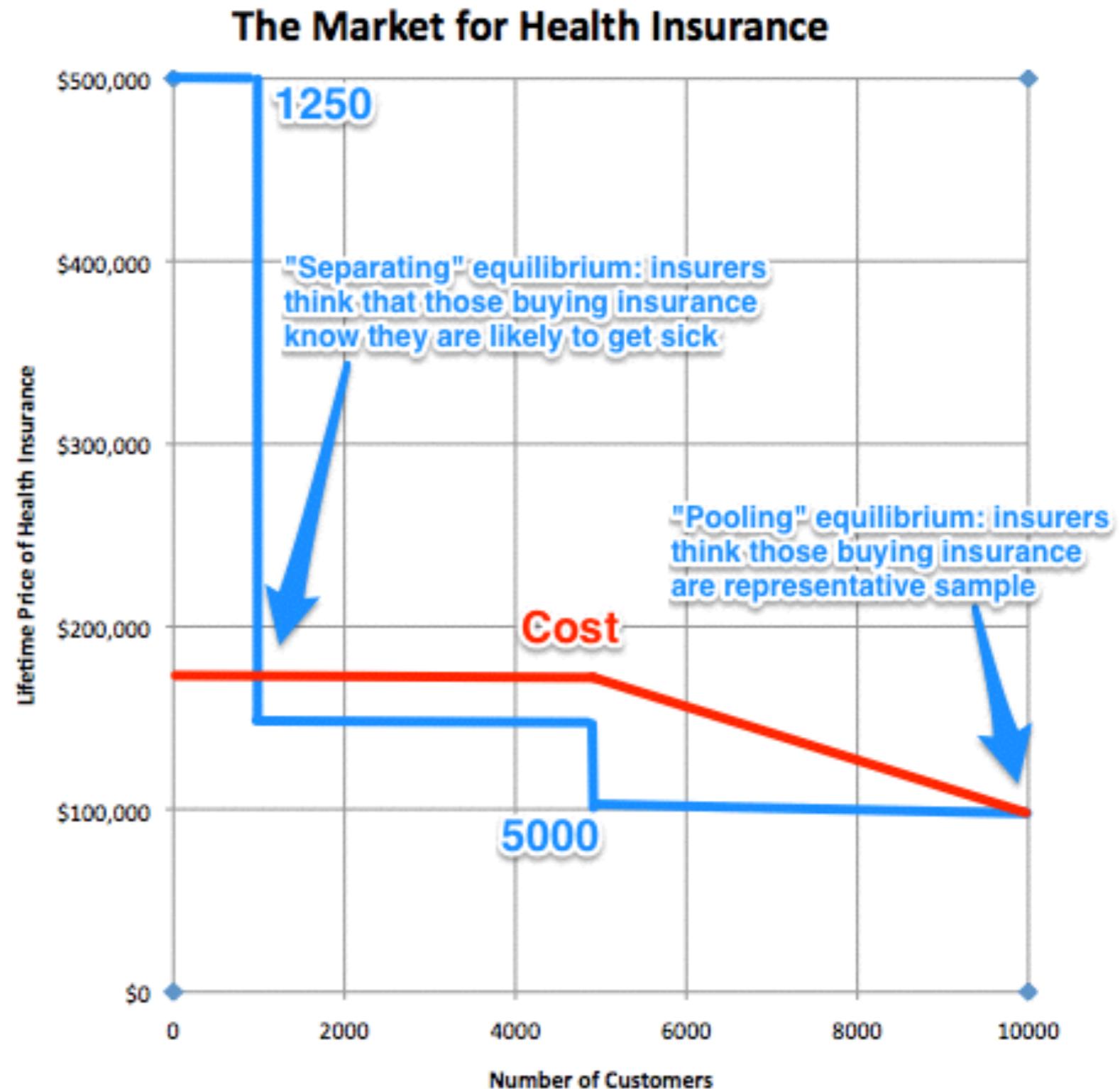
# Welfare Economics

- **Pooling equilibrium:** Q=10000. Total surplus = $687.5M. $500M to h-r rich, $187.5M to h-r not-rich. "Rich person prices" surplus = $2B

- **Separating equilibrium:** Q=1250. Total surplus = $400M to high-risk rich. "Rich person prices" surplus = $400M
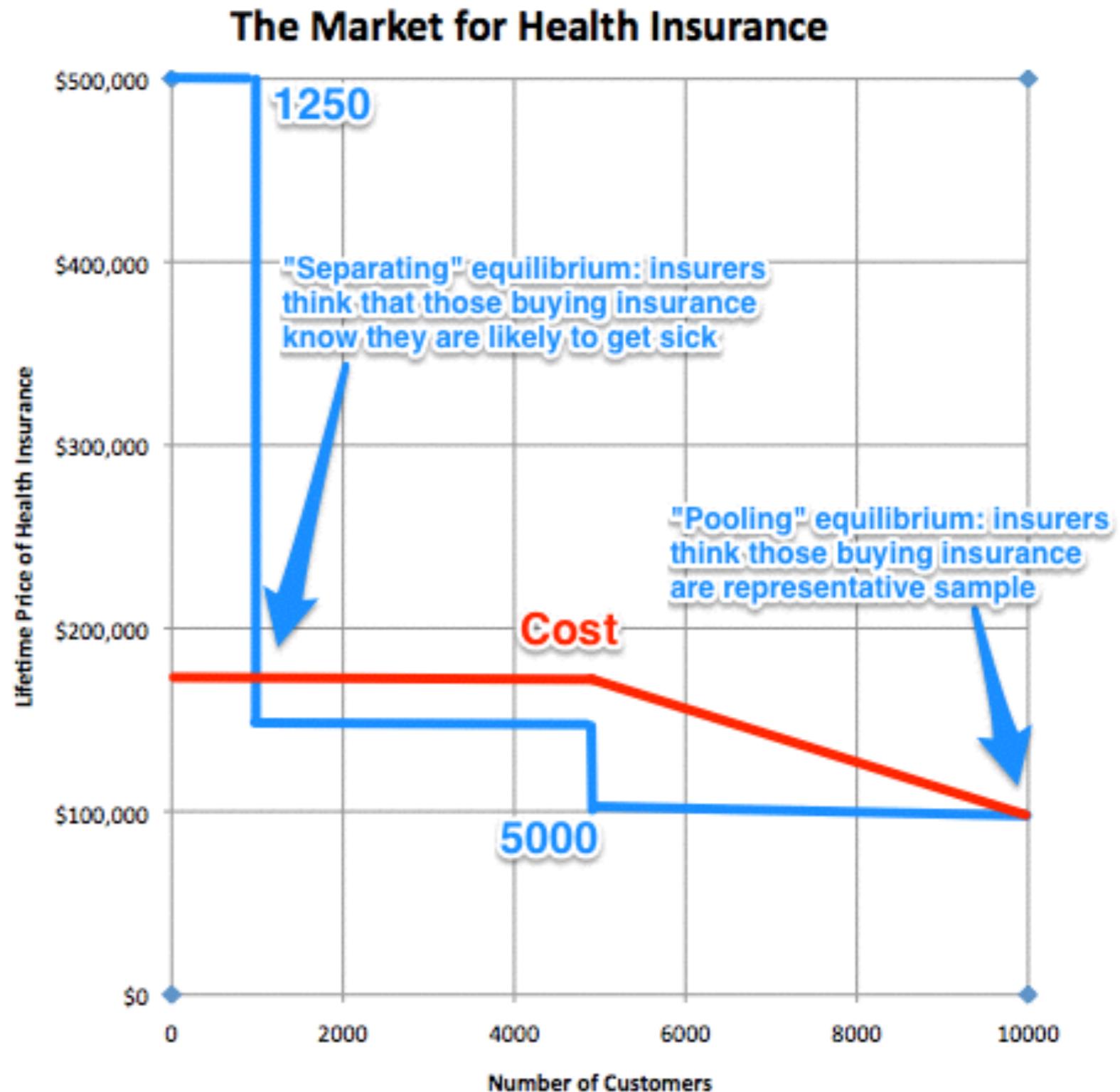


The Market for Health Insurance
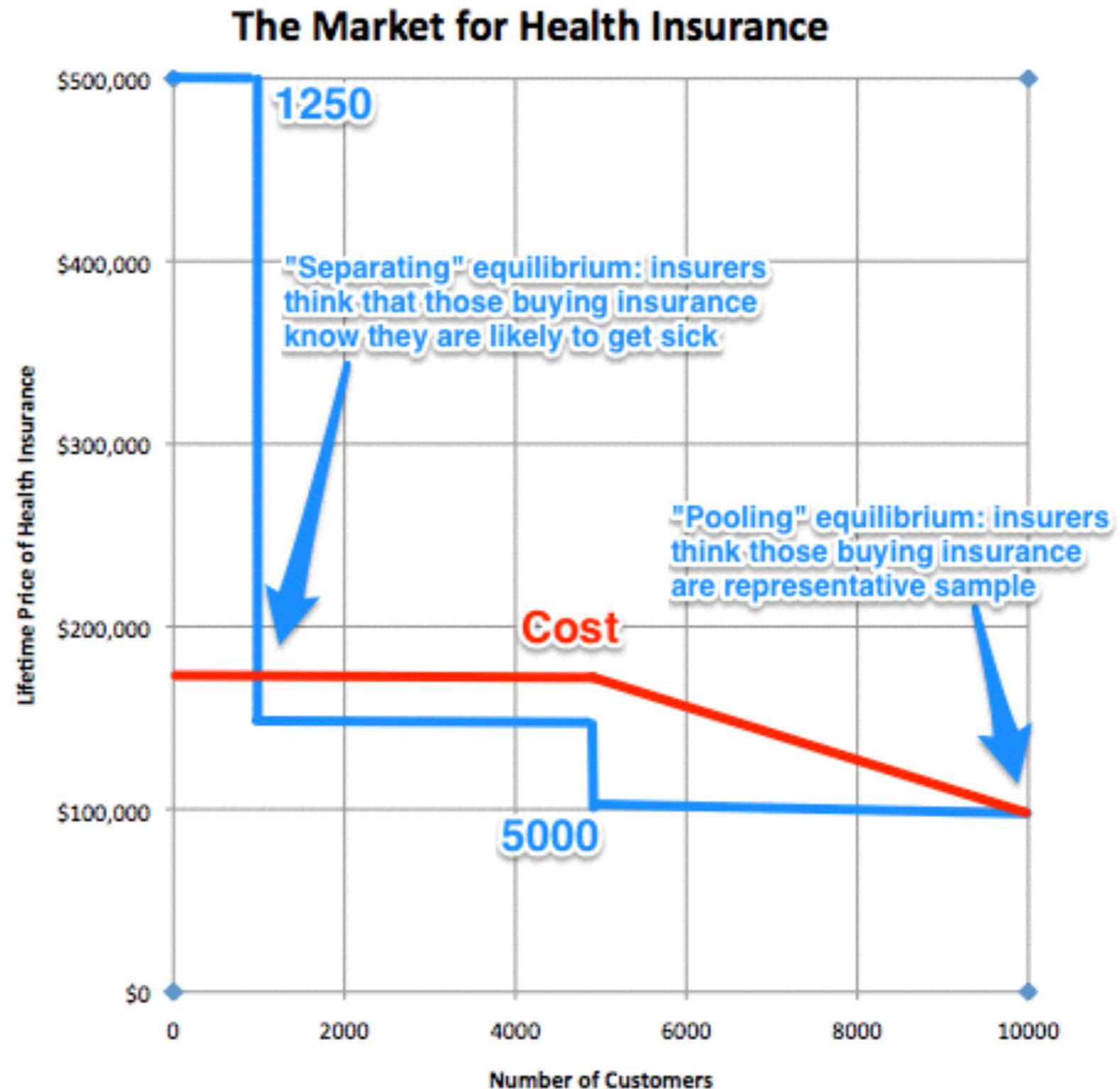
# Welfare Economics II

- **Pooling equilibrium:** Q=10000. Total surplus = $687.5M. $500M to h-r rich, $187.5M to h-r not-rich. "Rich person prices" surplus = $2B

- **Separating equilibrium:** Q=1250. Total surplus = $400M to high-risk rich. "Rich person prices" surplus = $400M

- Is anybody worse off from being in the pooling rather than the separating equilibrium? No.

## The Market for Health Insurance



"Separating" equilibrium: insurers think that those buying insurance know they are likely to get sick

"Pooling" equilibrium: insurers think those buying insurance are representative sample

1250

5000

Cost

Lifetime Price of Health Insurance

Number of Customers

# Impose an Individual Mandate

- How do we make the—better—pooling equilibrium stable?
- Impose an individual mandate to purchase insurance.
- RomneyCare!
- Thus we get all 10,000 buying insurance
- Our average cost would be $100K
- Everyone's willingness to pay is $100K or more
- Our market for insurance does fine…
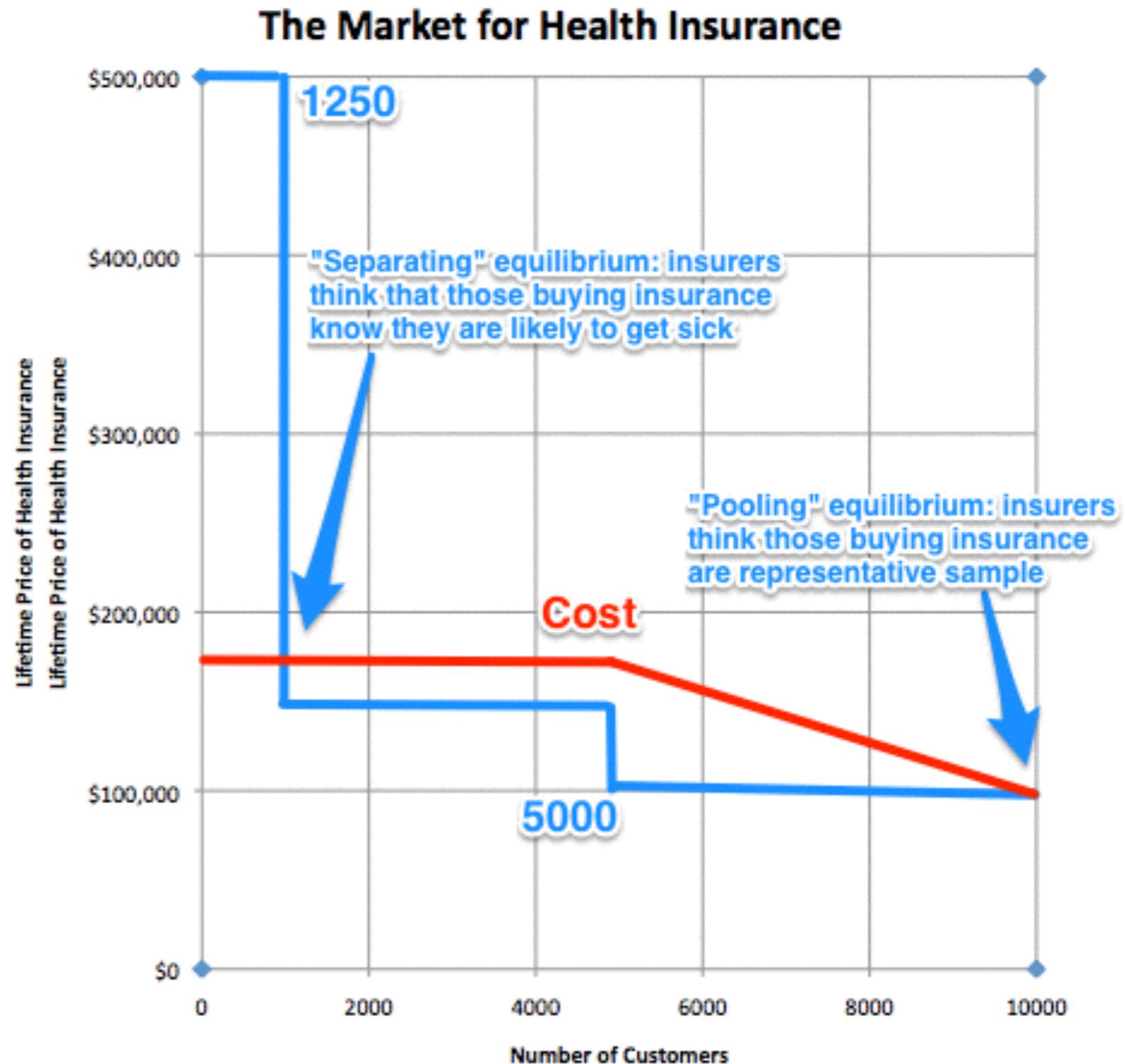
## The Market for Health Insurance

1250

"Separating" equilibrium: insurers think that those buying insurance know they are likely to get sick

"Pooling" equilibrium: insurers think those buying insurance are representative sample

Cost

5000

Lifetime Price of Health Insurance

Number of Customers

# Insurance Marketplace Equilibrium I: No Information

- I. No-information

- Willingness-to-pay of $150K (or more) for all 10,000

- Everybody buys insurance

- All 1000 sick get treated for a total social cost of $1B

- Total benefit of insurance?

  - 1000 lives.

  - We know that the rich value their lives at $5M each: benefit at rich person's values: 1000 x $5M - $1B = $4B

  - Benefit in consumer plus producer surplus: $1.375B

# Insurance Marketplace Equilibrium II: Separating

- II. Information no-mandate "separating" equilibrium
  - Only the rich whose test results came back high-risk can afford to get insurance: Q = 1250
  - Cost of insurance = $180K
  - Benefits of insurance:
    - Only 225 sick get treated—the other 775 die prematurely
    - At rich person's values: 225 x $5M - 225 x $1M = $900M
    - Consumer plus producer surplus: $400M

# Insurance Marketplace Equilibrium III: Pooling

- III. Information mandate "pooling" equilibrium
  - Everyone is forced to buy insurance: Q=10000
  - Cost of insurance = $100K
  - Benefit of insurance:
    - All 1000 sick get treated
    - At rich person's values: 1000 x $5M - $1B = $4B
    - Consumer plus producer surplus: $687.5M

# Insurance Marketplace Equilibrium I: No Information

- I. No-information
  - Willingness-to-pay of $150K (or more) for all 10,000
  - Everybody buys insurance
  - All 1000 sick get treated for a total social cost of $1B
  - Total benefit of insurance?
    - 1000 lives.
    - At rich person's values: 1000 x $5M - $1B = $4B
    - Consumer plus producer surplus: $1.375B
- II. Information no-mandate "separating" equilibrium
  - Only the rich whose test results came back high-risk can afford to get insurance: Q = 1250
  - Cost of insurance = $180K
  - Total benefit of insurance?
    - Only 225 sick get treated—the other 775 die prematurely
    - At rich person's values: 225 x $5M - 225 x $1M = $900M
    - Consumer plus producer surplus: $400M
- III. Information mandate "pooling" equilibrium
  - Everyone is forced to buy insurance: Q=10000
  - Cost of insurance = $100K
  - Total benefit of insurance?
    - All 1000 sick get treated
    - At rich person's values: 1000 x $5M - $1B = $4B
    - Consumer plus producer surplus: $687.5M

# A Fourth Possibility: Force Release of Test Results

- There is another possibility: force public release of test results
- Level the informational playing field.
- What is the consequence?
- We split the market…

**The Market for Health Insurance**
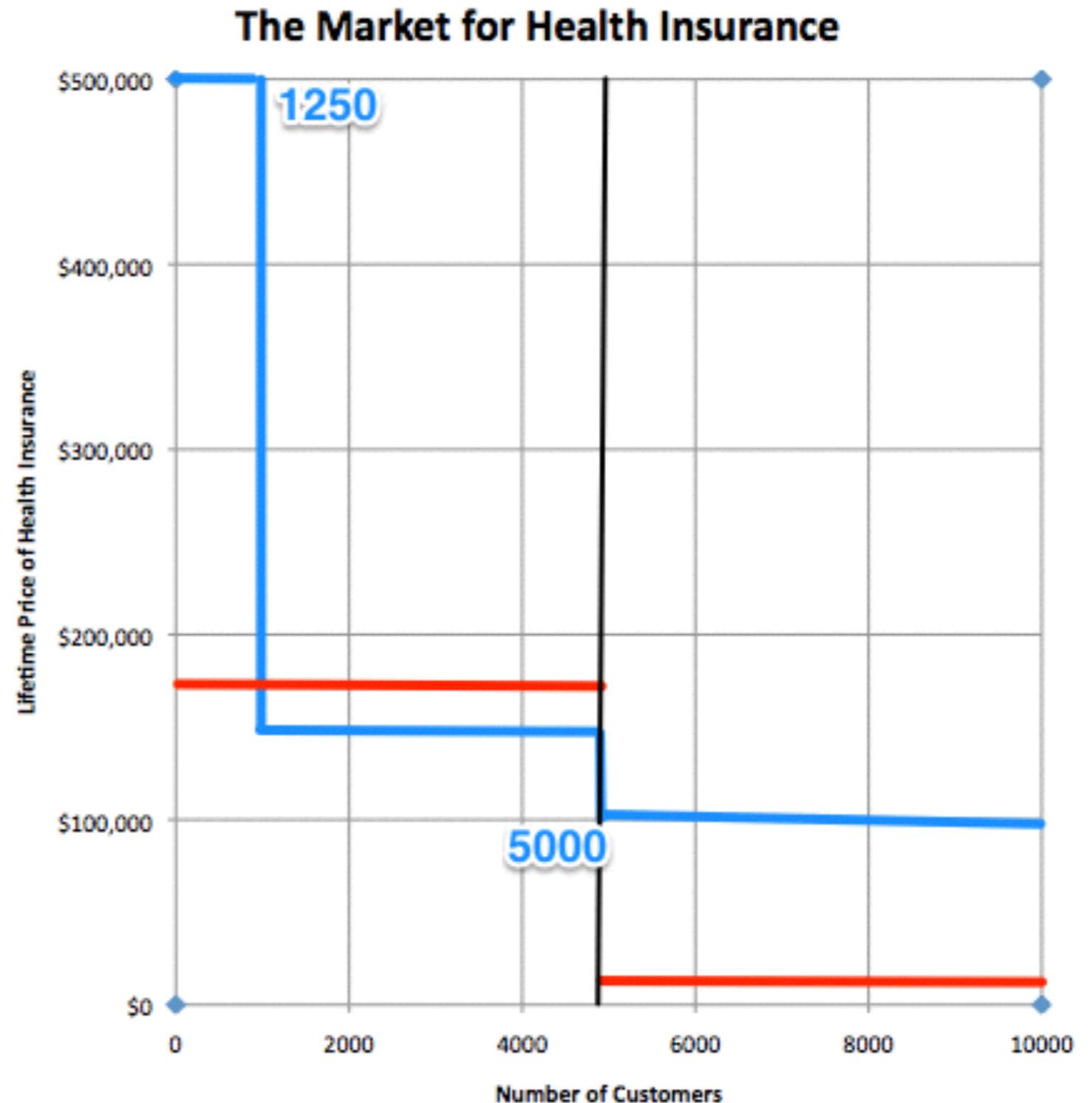
# A Fourth Possibility: Force Release of Test Results II

- High risk people cost $180K to cover…
  - Only the high-risk rich purchase insurance
  - 225 treated—675 die…
  - $900M surplus at rich person's values
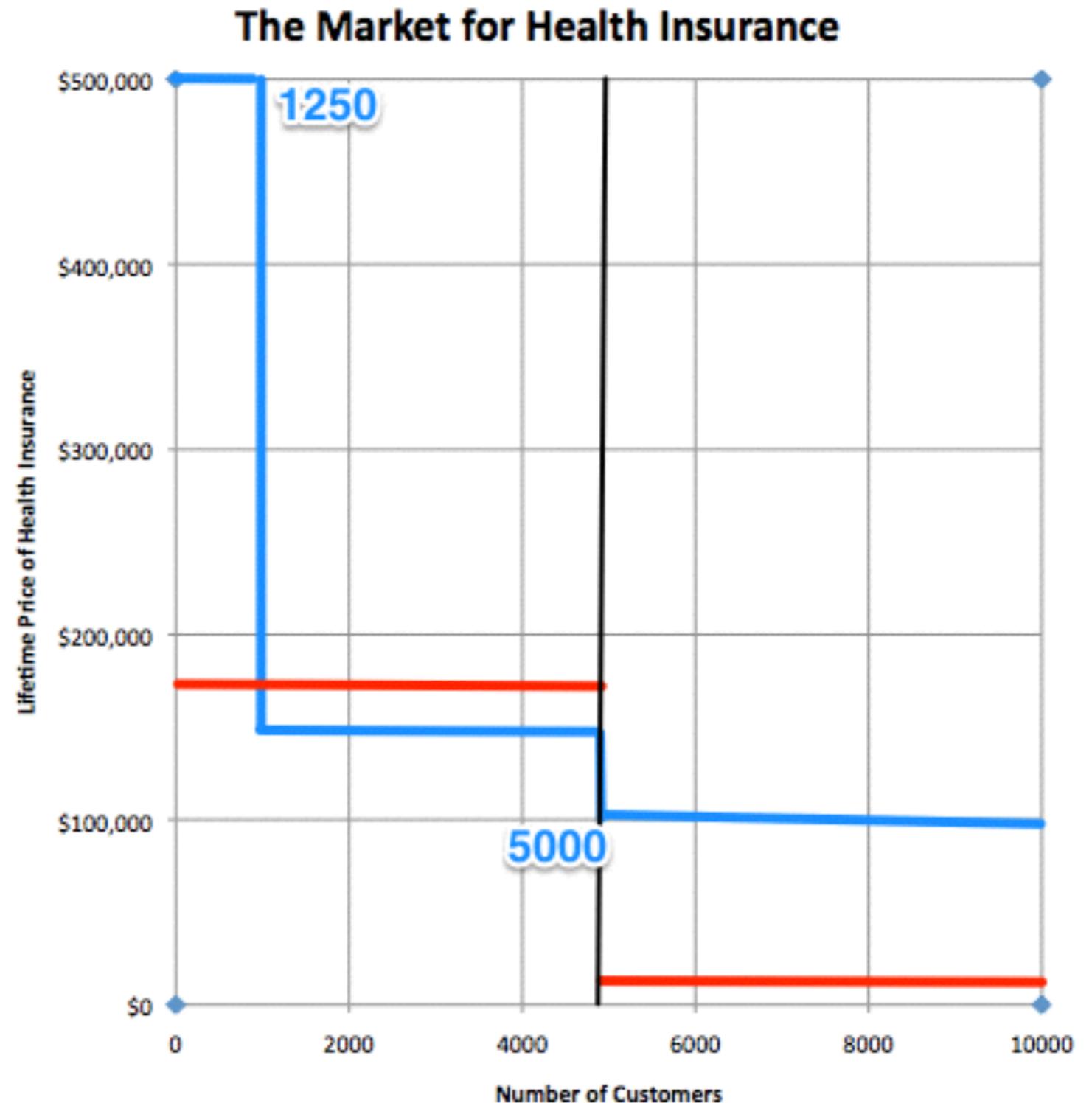  - $400M of CS+PS



The Market for Health Insurance
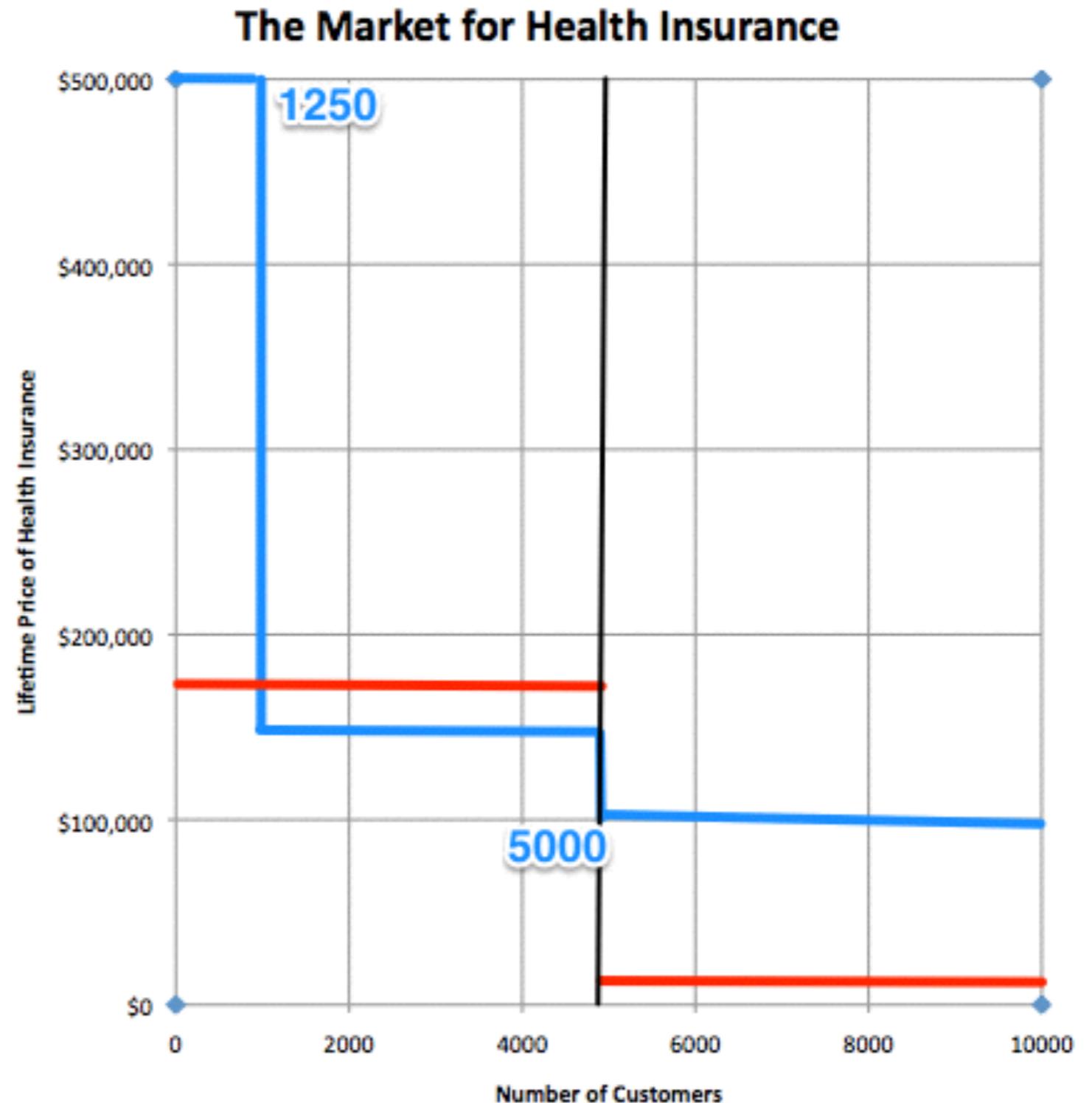
# A Fourth Possibility: Force Release of Test Results III

- High risk people cost $180K to cover…
  - Only the high-risk rich purchase insurance
  - 225 treated—675 die…
  - $900M surplus at rich person's values
  - $400M of CS+PS
- Low risk people cost only $20K to cover
  - All of them purchase insurance
  - 100 treated—none die
  - $500M of surplus at rich person's values
  - $500 M of CS+PS

**The Market for Health Insurance**

# A Fourth Possibility: Force Release of Test Results IV

- Total effect:
  - 325 treated—675 die
  - $1.4B surplus at rich person's values
  - $900M of CS+PS
- Low-risk people better off than in any other situation
- High-risk rich as well off as in separating equilibrium, worse off than in pooling or no-information equilibrium
- High-risk poor in the toilet —as in separating equilibrium



The Market for Health Insurance
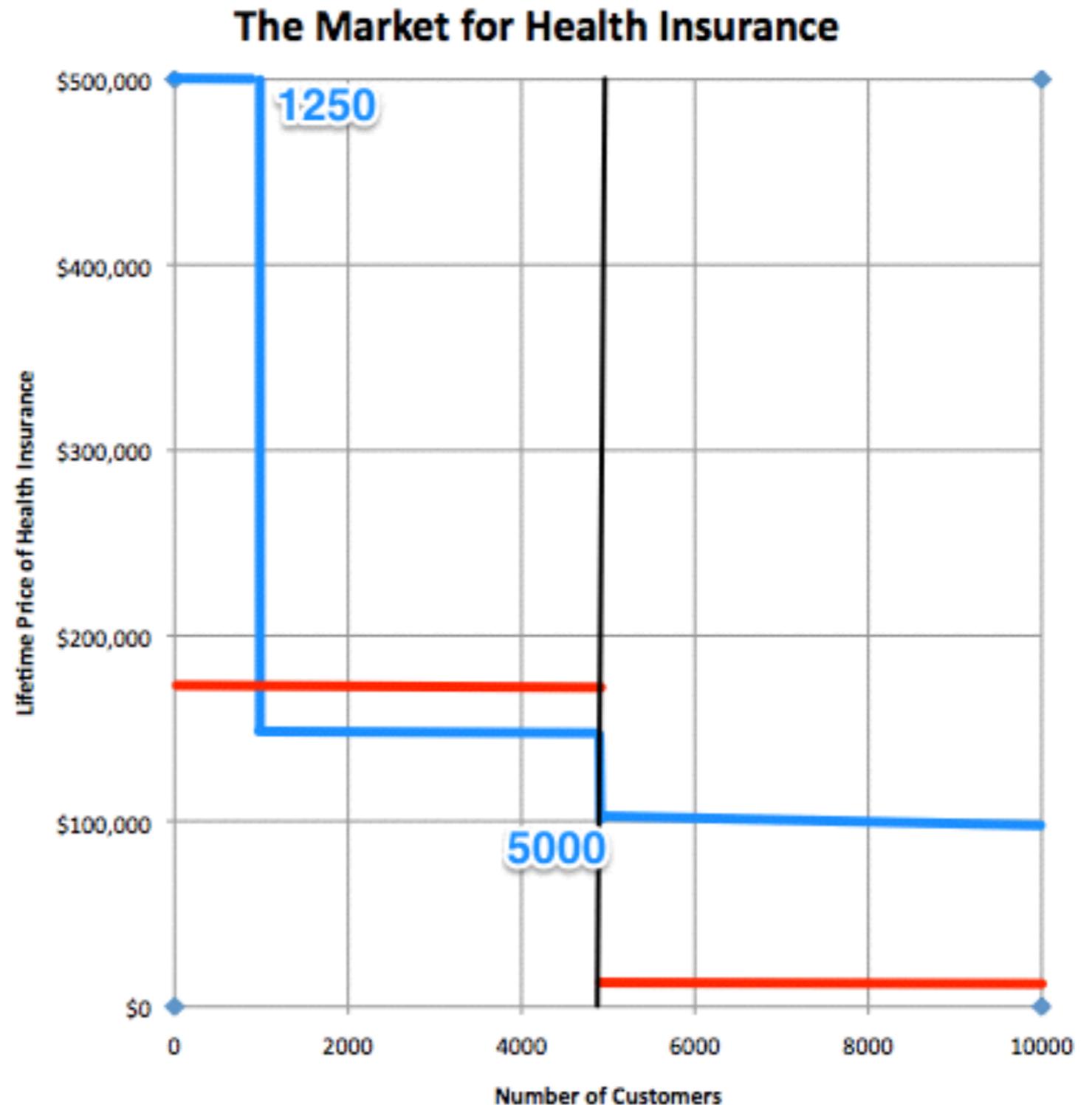
# Wait a Minute!

- NO INFORMATION
  - All 1000 sick get treated
  - $4B surplus at rich person's values
  - $1.375B consumer plus producer surplus

- SEPARATING
  - Only 225 sick get treated—775 deaths
  - $900M surplus at rich person's values
  - $400M consumer plus producer surplus: $400M

- POOLING
  - All 1000 sick get treated
  - $4B at rich person's values
  - $687.5M consumer plus producer surplus

- TEST RELEASE
  - Only 325 get treated—675 deaths
  - $1.4B at rich person's values
  - $900M consumer plus producer surplus

# Wait a Minute! II

- NO INFORMATION
  - All 1000 sick get treated
  - $4B surplus at rich person's values
  - $1.375B consumer plus producer surplus

- SEPARATING
  - Only 225 sick get treated—775 deaths
  - $900M surplus at rich person's values
  - $400M consumer plus producer surplus: $400M

- POOLING
  - All 1000 sick get treated
  - $4B at rich person's values
  - $687.5M consumer plus producer surplus

- TEST RELEASE
  - Only 325 get treated—675 deaths
  - $1.4B at rich person's values
  - $900<M consumer plus producer surplus

- How is it that the "no information" and the "pooling" equilibrium can have different amounts of producer and consumer surplus? The same people are treated for the same cost in both situations?

# Wait a Minute! III
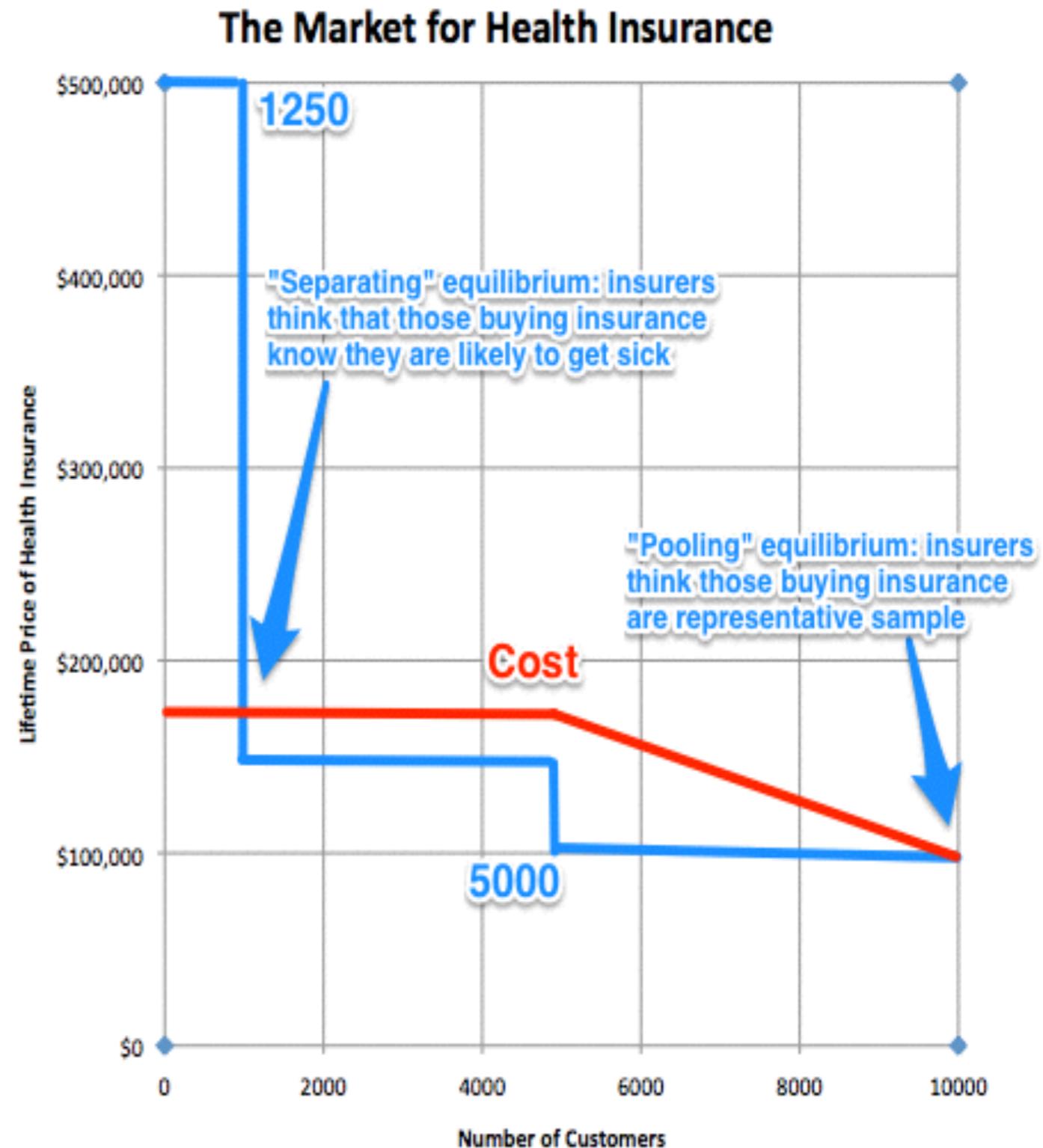
- NO INFORMATION
  - All 1000 sick get treated
  - $4B surplus at rich person's values
  - $1.375B consumer plus producer surplus

- SEPARATING
  - Only 225 sick get treated— 775 deaths
  - $900M surplus at rich person's values
  - $400M consumer plus producer surplus: $400M

- POOLING
  - All 1000 sick get treated
  - $4B at rich person's values
  - $687.5M consumer plus producer surplus

- TEST RELEASE
  - Only 325 get treated —625 deaths
  - $1.4B at rich person's values
  - $900<M consumer plus producer surplus

- How can "no information" and "pooling" have different amounts of producer and consumer surplus?

- The answer:
  - The willingness to pay of those who get good news from the test drops…
  - The willingness to pay of those who get bad news from the test does not rise because they are already willing to spend all they can…

- Another reason not to take CS+PS as your do-all and end-all societal well-being measure…

# Let Me Give a Word to Stanford Professor Thomas Sowell

- Obamacare is not just an issue about money or even an issue about something as important as medical care. Obamacare represents a quantum leap in the power of the federal government over the private lives of individual Americans. Chief Justice Roberts's decision declaring Obamacare constitutional essentially repeals the Tenth Amendment to the Constitution, which declares that powers not given to the federal government belong to the states "or to the people." That central support of personal freedom has now been removed…. The basic, brutal reality is that the federal government can do whatever it wants to do, if nobody stops it. The Supreme Court's Obamacare decision shows that we cannot depend on it to protect our freedom. Nor will Congress, as long as the Democrats control the Senate….

- In the German elections of 1932, the Nazi party received 37 percent of the vote…. The political majority could have united to stop Hitler…. But they did not…. Some figured that they would take over after the Nazis were discredited and defeated…. What such clever strategies overlook is that there can be a point of no return. We may be close to that point of no return, not only with Obamacare, but also with the larger erosion of personal freedom, of which Obamacare is just the most visible part.
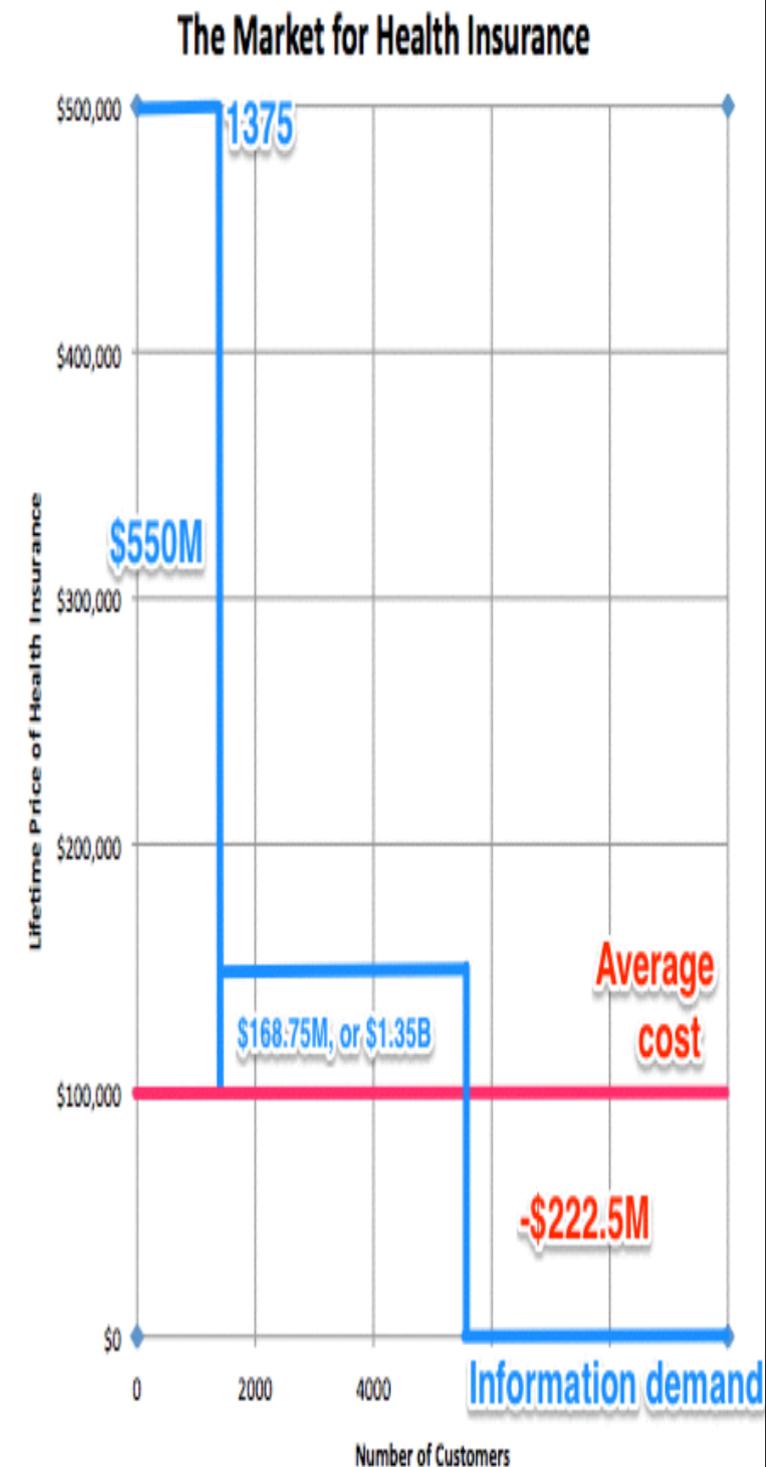
# RomneyCare vs. Coburn-Burr-Hatch

- Individual mandate, or
- Continuous-coverage requirement
  - For there are no perfect tests
  - And only a fool (or somebody genuinely poor) goes naked in the insurance market
- Mandate a redistribution away from the healthy
- Mandate an infringement on individual liberty



The Market for Health Insurance

1250

"Separating" equilibrium: insurers think that those buying insurance know they are likely to get sick

"Pooling" equilibrium: insurers think those buying insurance are representative sample

Cost

5000

# Ladies, Gentlemen, Mitt Romney, Coburn-Burr-Hatch, Greg Mankiw, and Thomas Sowell to Your i>Clickers

- Given that people do have some knowledge of their health status—that we can't get the market to the no-information equilibrium, good public policy is:
  - A. Follow Mitt Romney's RomneyCare, and impose an individual mandate in order to neutralize adverse selection and restore the pooling equilibrium—even though that transfers wealth away from the "young invincibles"
  - B. Follow Greg Mankiw, let the market rip, and if it settles in the "separating equilibrium" in which 775 people don't get treated, then fine—they should have earned enough to pay for (adversely selected) insurance if they valued a full life
  - C. Follow Thomas Sowell, and say that while it may be regrettable, the government has no right to require you to buy or tax you if you don't buy health insurance, and ObamaCare = Naziism
  - D. Follow Coburn-Burr-Hatch, rely on the requirement that you maintain continuous coverage, and hope that the fact that there is no 100% reliable good-health test and that people aren't *that* foolish to push us from the separating (B&C) equilibrium to the (A) RomneyCare equilibrium
  - E. Stop messing around trying to get a market that suffers from this bad an adverse-selection market failure to work. Mammal up, bite the bullet, and run a national health insurance system.



The Market for Health Insurance

# Ladies, Gentlemen, Mitt Romney, Coburn-Burr-Hatch, Greg Mankiw, and Thomas Sowell to Your i>Clickers: Answer

- Given that people do have some knowledge of their health status—that we can't get the market to the no-information equilibrium, good public policy is:
  - A. RomneyCare individual mandate to neutralize adverse selection. B. MankiwCare let the market rip, because redistribution is immoral. C. SowellCare let the market rip, because mandates are slavery. D. CBHCare continuous coverage, and hope people aren't fools. E. SinglePayer.
- **I am for, in this order: E, A, D, [B, C]**
- **But this is moral philosophy**
- **I will accept any answer except D: it seems to me that CBH are engaging in wishful and sloppy thinking…**