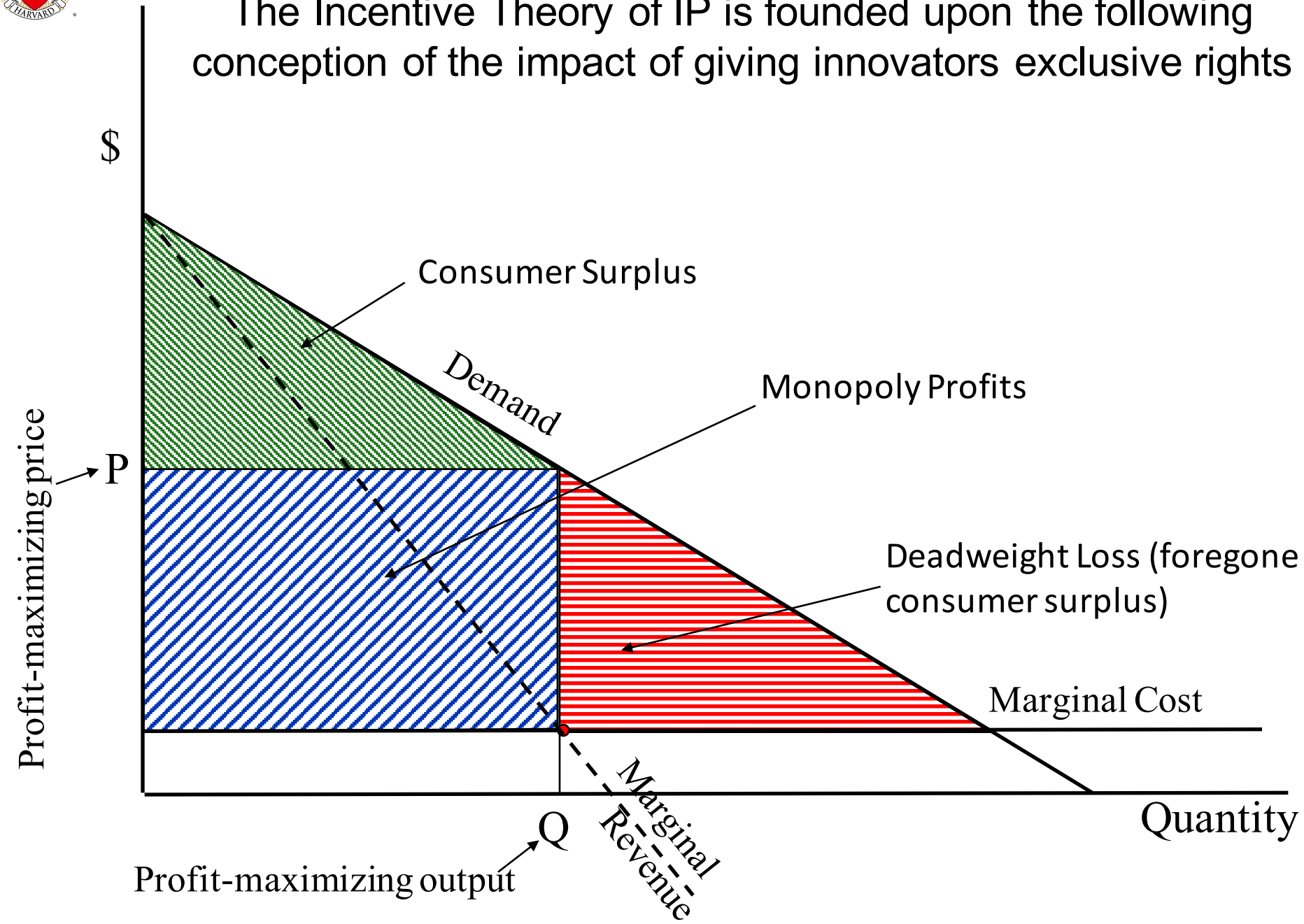
# Bounded Rationality and IP

William Fisher

November 10, 2017

# The Incentive Theory of IP is founded upon the following conception of the impact of giving innovators exclusive rights



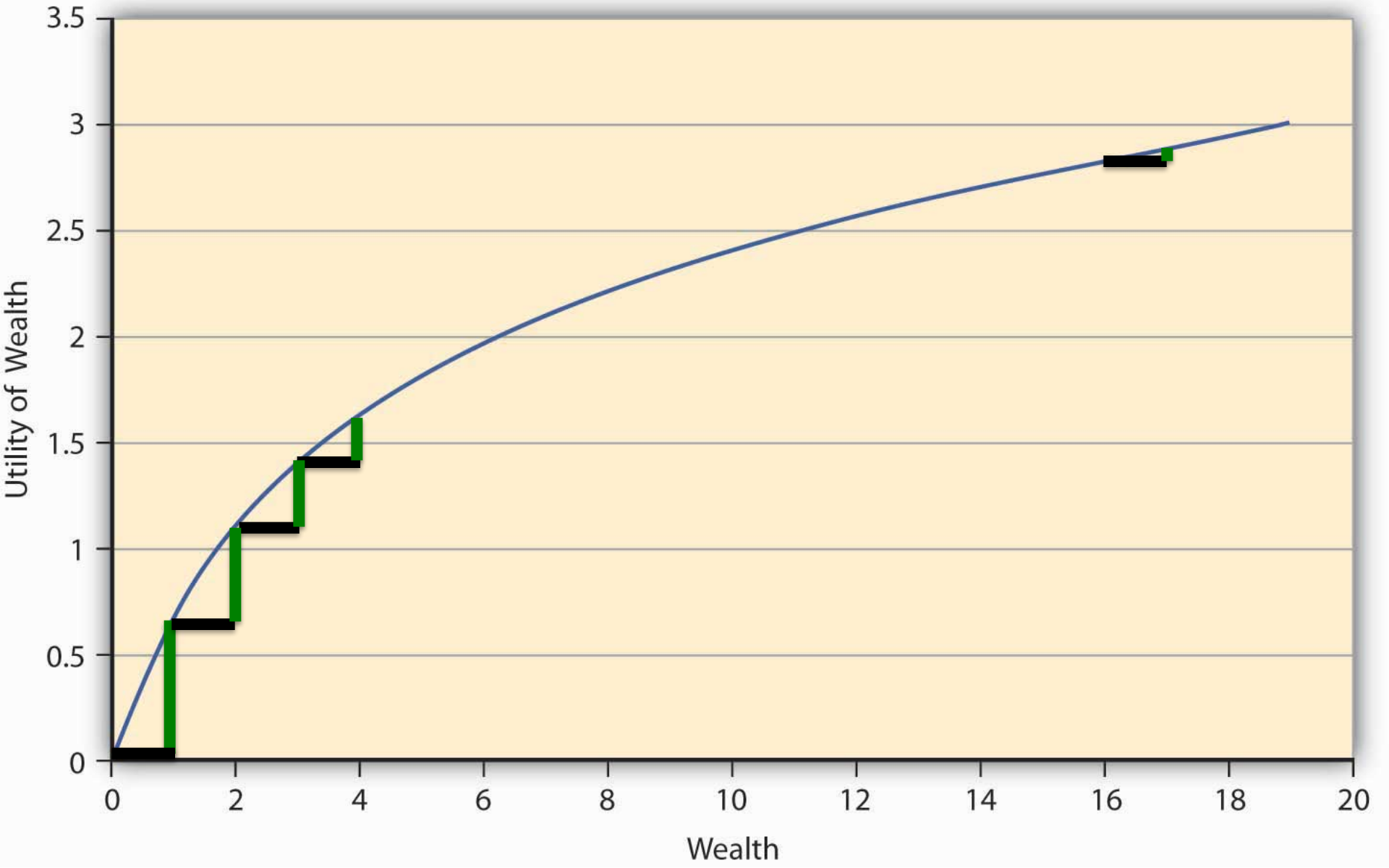
# Refining the Approach

- Our aspiration should be to adjust patent doctrine that increase its socially beneficial effects and decrease its socially pernicious effects
- Our ability to do so will increase if our predictions of the impact of these various incentives is founded upon a more sophisticated model of human motivations

# Rationality

1) Expected Utility Theory
   a) Concave utility functions
   b) Decisionmaking on the basis of expected utility
   c) General phenomenon of risk aversion
2) Ubiquitous Forms of Bounded Rationality
3) Forms of Bounded Rationality specific to creators

# Standard Utility Curve




Source: Prakash, Enterprise and Individual Risk Management

# Standard Utility Curve

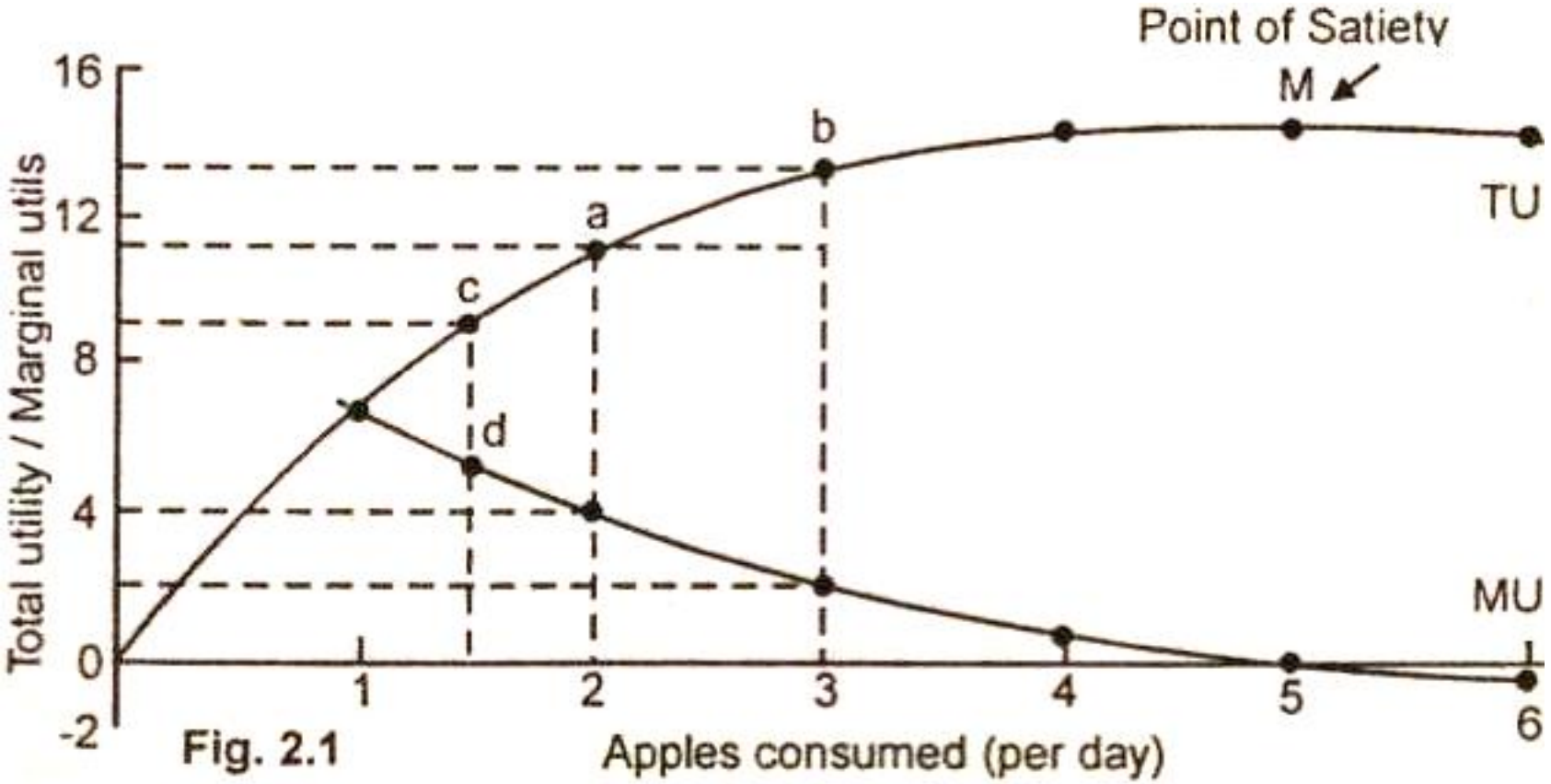



Fig. 2.1

Source: http://economicsconcepts.com/total_utility_and_marginal_utility.htm

# Decision-making on the basis of expected utility

- Rational choice = selecting path B over path A iff the sum of the expected utilities of the various possible outcomes of path B exceed those of path A
- To illustrate:
  - path A leads to certain gain of 20 utiles (or units of pleasure)
  - path B leads to 25% chance of gaining 100 utiles and a 75% chance of gaining nothing
  - expected utility from pursuing path A is 20;
  - expected utility from pursuing path B is .25(100) + .75(0) = 25 utiles
  - Under these circumstances, a rational person will choose path B

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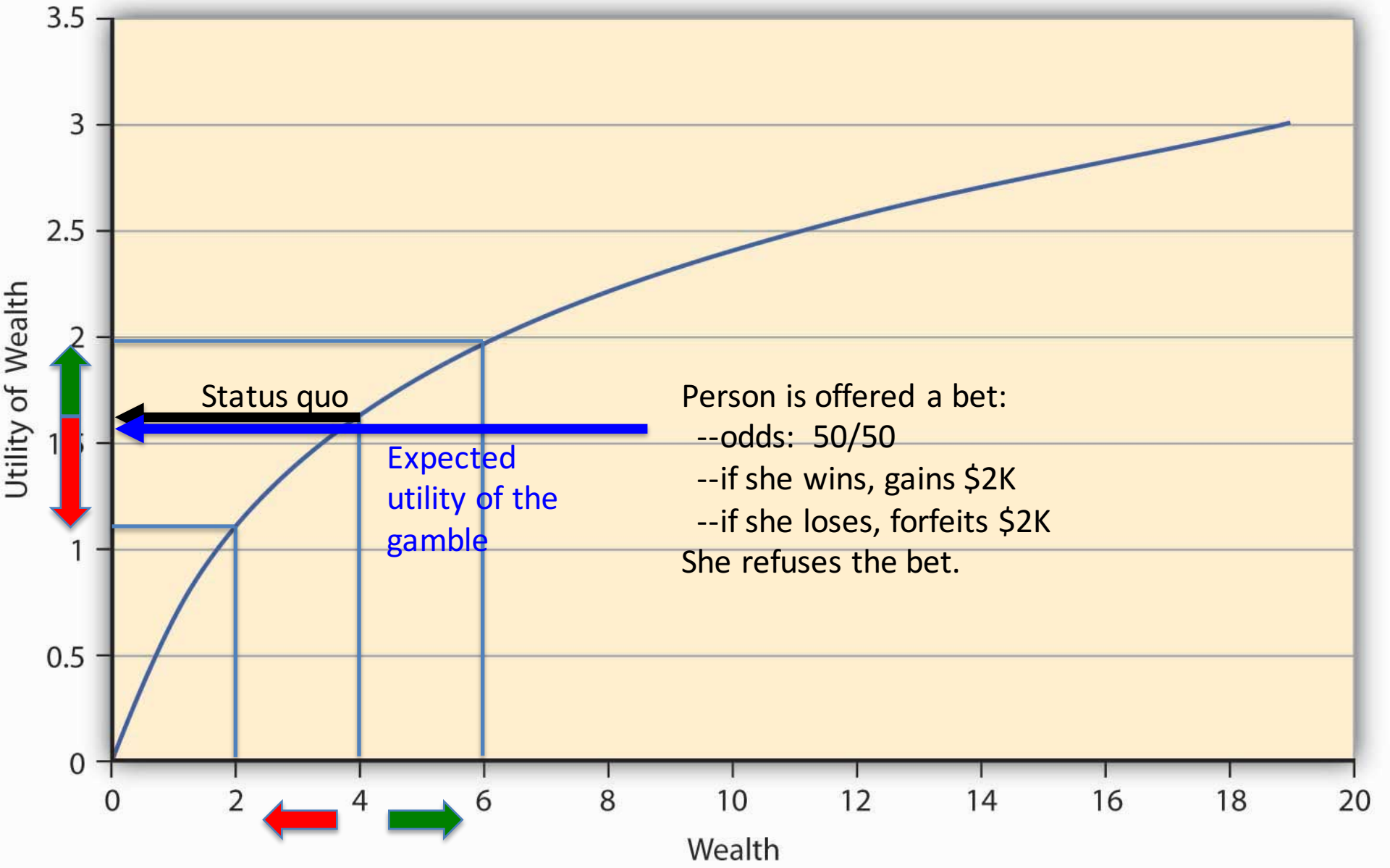
# Standard Utility Curve




Source: Prakash, Enterprise and Individual Risk Management

# Decision-making on the basis of expected utility

- Rational choice = selecting path B over path A iff the sum of the expected utilities of the various possible outcomes of path B exceed those of path A
- To illustrate:
  - path A (Harvard Law School) leads to certain lifetime total income of $20M (discounted to present value)
  - path B (Berkeley Colley of Music) leads to 25% chance of lifetime income of $100M and a 75% chance of $1M
  - expected benefit from pursuing path A is $20M
  - expected benefit from pursuing path B is .25(100) + .75(1) = $25.75M
  - In the absence of risk aversion, a rational person will choose path B
  - But risk aversion is likely to cause the person to choose path A instead

# Rationality

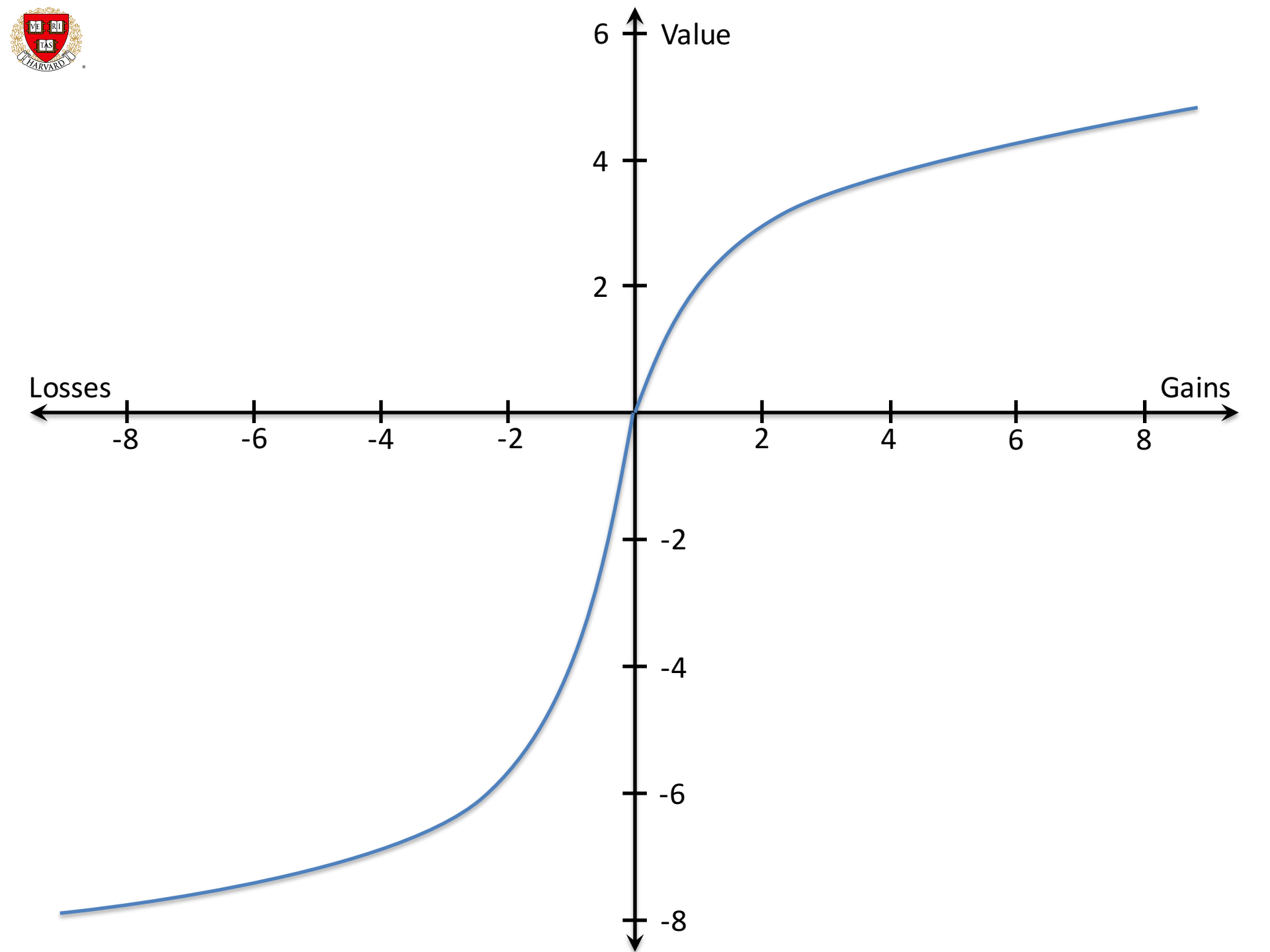
1) Expected Utility Theory
2) Ubiquitous Forms of Bounded Rationality
    a) Prospect Theory
    b) Endowment Effect
    c) Presence Heuristic
    d) Overoptimism
    e) Lottery Effect
3) Forms of Bounded Rationality specific to creators

# Prospect Theory

- In general, people underweight prospects that are merely probable in comparison to prospects that are certain
- Gains:
  - 100% chance of winning $100 should be treated as equivalent of 10% chance of winning $1000
  - but people behave as if the latter is 5%
  - gives rise to risk aversion for gains – but for a reason different from that offered by classical theory
- Losses:
  - 100% chance of losing $100 should be treated as equivalent of 10% chance of losing $1000
  - but people behave as if the latter is 5% -- i.e., expected utility is $500 loss
  - gives rise to risk preference for losses

# Endowment Effect

- The pain caused by a loss of X is typically greater than the pleasure reaped by a gain of X
  - Put differently, people place higher values on things to which they think they already have rights, than they do on identical things to which they think they don't (yet) have rights.
  - The result: people will demand a higher price to induce them to surrender an object or an entitlement than they will offer to acquire that object or entitlement.
- The reference point from which gains and losses are assessed is a psychological question, only indirectly a legal one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# Endowment Effect

- Springsteen tickets: https://www.npr.org/2017/11/09/563133762/bruce-springsteen-on-broadway-comes-with-an-economics-lesson?utm_medium=RSS&utm_campaign=business


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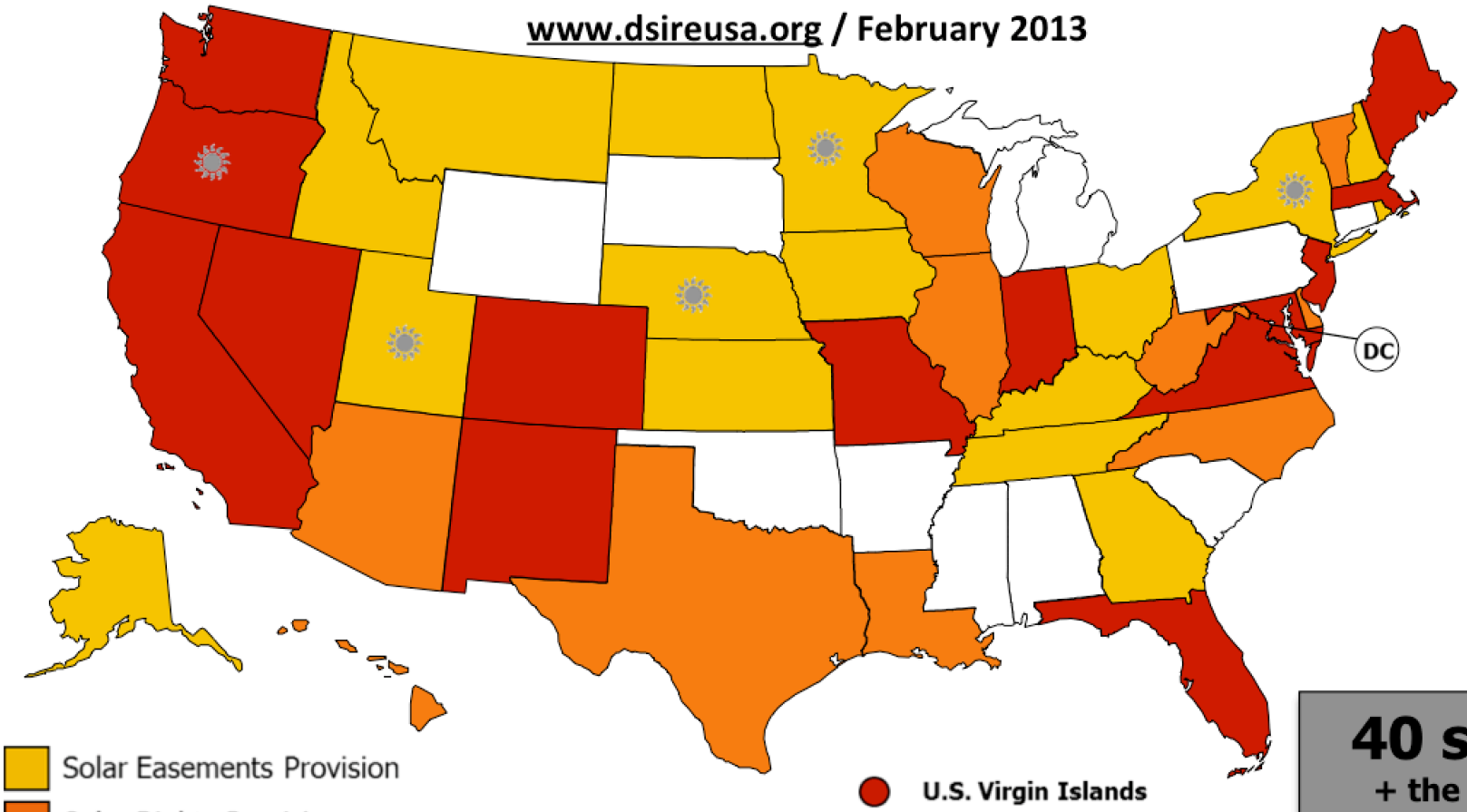
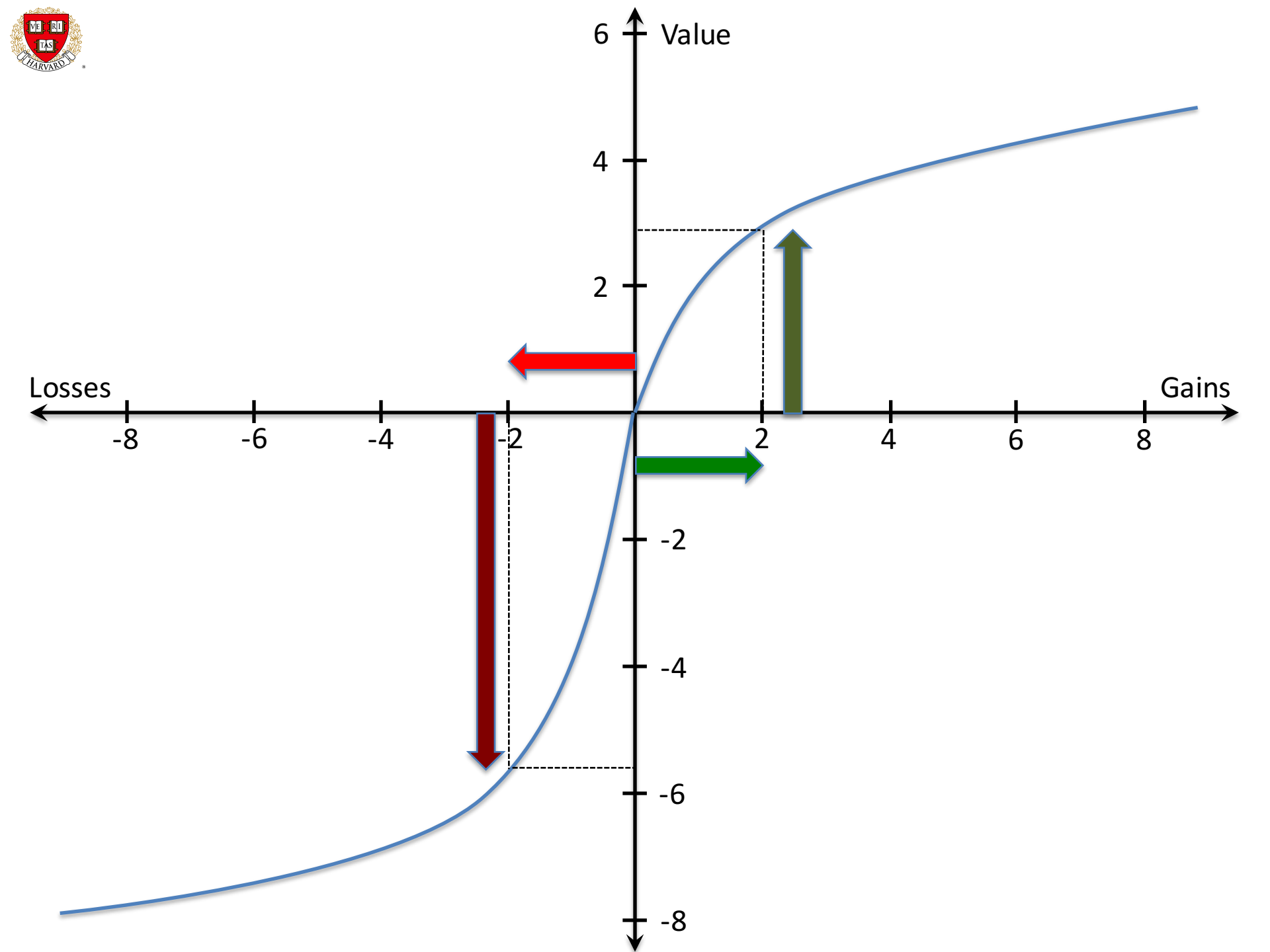
# Illustration: Valuation of Solar Easements

# State Solar Access Laws

www.dsireusa.org / February 2013




**40 states, + the US Virgin Islands, have solar access laws.**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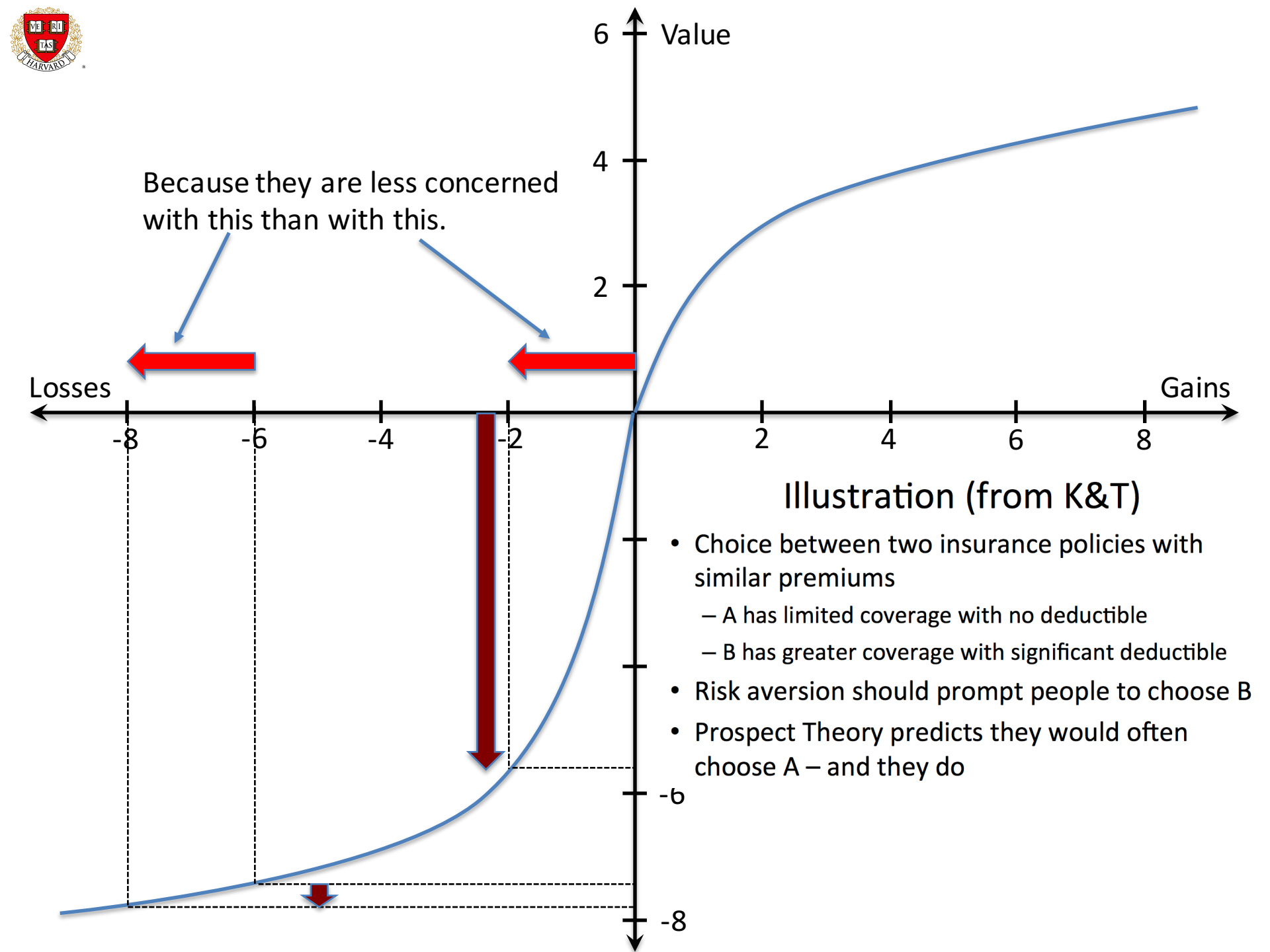
# Illustration: Selection of Insurance-Policy Provisions




## Illustration (from K&T)

- Choice between two insurance policies with similar premiums
  - A has limited coverage with no deductible
  - B has greater coverage with significant deductible
- Risk aversion should prompt people to choose B
- Prospect Theory predicts they would often choose A – and they do

# Rationality

1) Expected Utility Theory
2) Ubiquitous Forms of Bounded Rationality
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   d) Overoptimism
   e) Lottery Effect
3) Forms of Bounded Rationality specific to creators

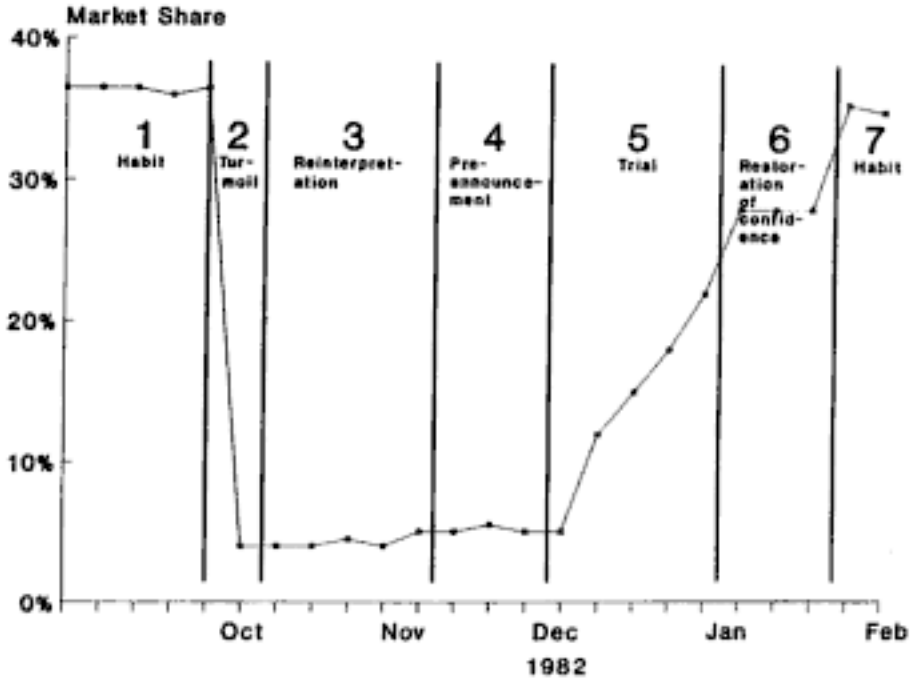


FIG. 13.2. Evolution of consumer attitudes.

Wisniewski, 1982; Deighton, 1983; Greyser, 1982; Mitroff & Kilmann, 1984.)

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# Estimated Probability of Competing in Athletics Beyond the High School Interscholastic Level

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## Men's Basketball

- Less than one in 35, or approximately 2.9 percent, of high school senior boys playing interscholastic basketball will go on to play men's basketball at a NCAA member institution.
- Less than one in 75, or approximately 1.3 percent, of NCAA male senior basketball players will get drafted by a National Basketball Association (NBA) team.
- Approximately three in 10,000, or approximately 0.03 percent of high school senior boys playing interscholastic basketball will eventually be drafted by an NBA team.

Source: http://www.orvfc.org/files/1212/5851/4939/NCAA%20-%20Professional%20Probabilities.pdf

# Estimated Probability of Competing in Athletics Beyond the High School Interscholastic Level

*This document has been reprinted with permission from the NCAA.*

## Football

- About 5.8 percent, or approximately one in 17, of all high school senior boys playing interscholastic football will go on to play football at a NCAA member institution.
- About 2.0 percent, or approximately one in 50, of NCAA senior football players will get drafted by a National Football League (NFL) team.
- Approximately nine in 10,000, or approximately 0.09 percent of high school senior boys playing interscholastic football will eventually be drafted by an NFL team.

Source: http://www.orvfc.org/files/1212/5851/4939/NCAA%20-%20Professional%20Probabilities.pdf

# Levallow & Kahneman, "Delusions of Success: How Optimism Undermines Executives' Decisions" (2003)

"Research into human cognition has traced this overoptimism to many sources. One of the most powerful is the tendency of individuals to exaggerate their own talents—to believe they are above average in their endowment of positive traits and abilities. Consider a survey of 1 million students conducted by the College Board in the 1970s. When asked to rate themselves in comparison to their peers, 70% of the students said they were above average in leadership ability, while only 2% rated themselves below average. For athletic prowess, 60% saw themselves above the median, 6% below. When assessing their ability to get along with others, 60% of the students judged themselves to be in the top decile, and fully 25% considered themselves to be in the top 1%."

# Levallow & Kahneman, "Delusions of Success: How Optimism Undermines Executives' Decisions" (2003)

"The inclination to exaggerate our talents is amplified by our tendency to misperceive the causes of certain events. The typical pattern of such attribution errors, as psychologists call them, is for people to take credit for positive outcomes and to attribute negative outcomes to external factors, no matter what their true cause. One study of letters to shareholders in annual reports, for example, found that executives tend to attribute favorable outcomes to factors under their control, such as their corporate strategy or their R&D programs. Unfavorable outcomes, by contrast, were more likely to be attributed to uncontrollable external factors such as weather or inflation. Similar self-serving attributions have been found in other studies of annual reports and executive speeches."

# Carden, "Behavioral economics show that women tend to make better investments than men" (2013)

"Terry Odean, a University of California professor, has studied stock picking by gender for more than two decades. A seven-year study found single female investors outperformed single men by 2.3 percent, female investment groups outperformed male counterparts by 4.6 percent and women overall outperformed by 1.4 percent. Why? The short answer is overconfidence. Men trade more, and the more you trade, typically the more you lose — not to mention running up transaction costs….

Additionally, men hold onto their losers a lot longer than women. They're sure the stock will come roaring back — even as it sinks. Academics call it confirmation bias; investment advisers call it boneheaded."

# Goodman-Delahunty et al., "Insightful or Wishful: Lawyers' Ability to Predict Case Outcomes" (2010)

"The findings extend previous research on overconfidence in defense lawyers (Loftus & Wagenaar, 1988; Malsch, 1990), by establishing that similar biases arise in predictions by criminal prosecutors and by counsel for both plaintiffs and defendants in civil cases. Lawyers frequently made substantial judgmental errors, showing a proclivity to overoptimism. The most biased estimates were expressed with very high initial confidence: In these instances, lawyers were extremely overconfident. These findings are consistent with a large body of literature documenting overconfidence in a range of judgments (theoretical explanations of miscalibration of confidence are discussed in Gigerenzer, Hoffrage, & Kleinbolting, 1991; Kahneman, Slovic, & Tversky, 1982; Moore & Healy, 2008)."

# Goodman-Delahunty et al., "Insightful or Wishful: Lawyers' Ability to Predict Case Outcomes" (2010)

"With respect to the correlates of the overconfidence bias, certain results were somewhat counterintuitive, such as the finding that lawyers with more experience were not better calibrated than less experienced lawyers….

"With regard to gender, we replicated results obtained by Malsch (1990) that female lawyers were better calibrated than their male colleagues. Male practitioners were more overconfident than female practitioners. These findings are in line with gender differences observed in research on metacognition (Pallier, 2003)."

# “Lottery Effect”

- (Some) people overweight small probabilities of reaping very large gains
- Manifestations
  - Playing lotteries (Scherer; Crouch)
    - People play lotteries, despite “house rake” of ~50%
    - A change in the amount of the payout will affect their willingness to participate much more than a change in probability of the payout
  - Amateur investors (Stout 1995)
  - Entrepreneurialism (Hopenhyn 2003; Astebro 2003)

# Scherer, “Innovation Lottery”

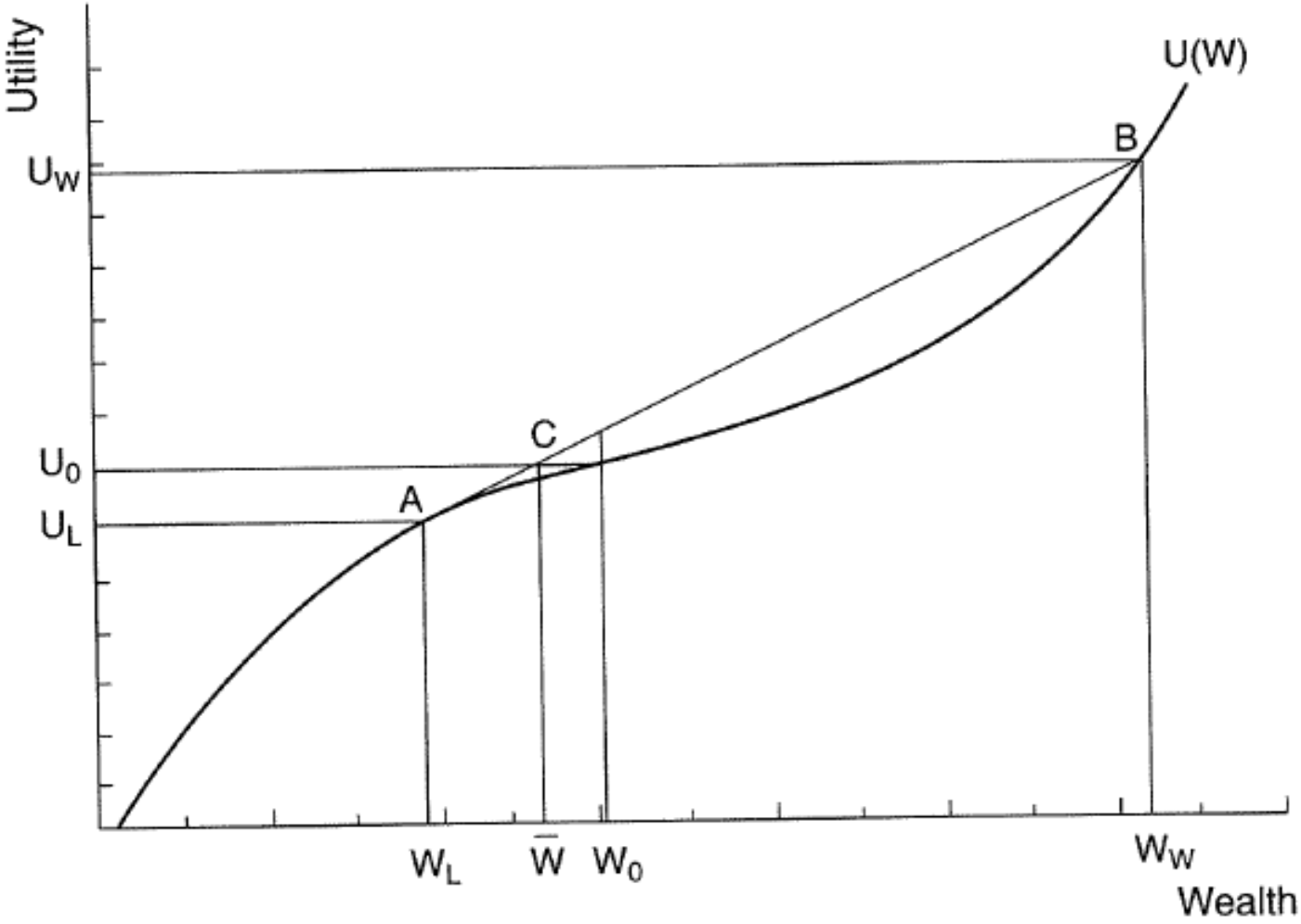
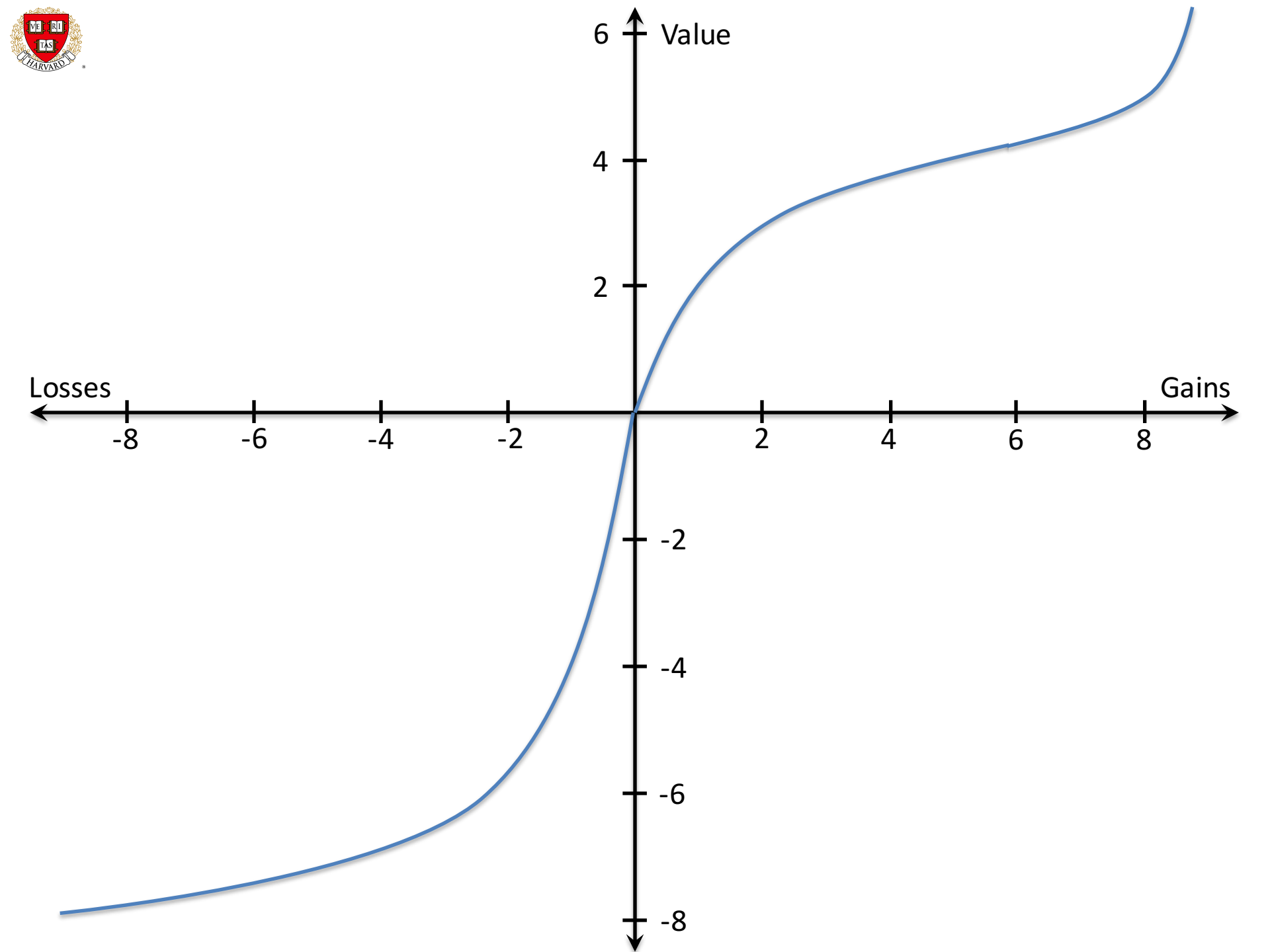



FIG. 1.8: Utility function consistent with buying insurance and betting in lotteries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1) Expected Utility Theory
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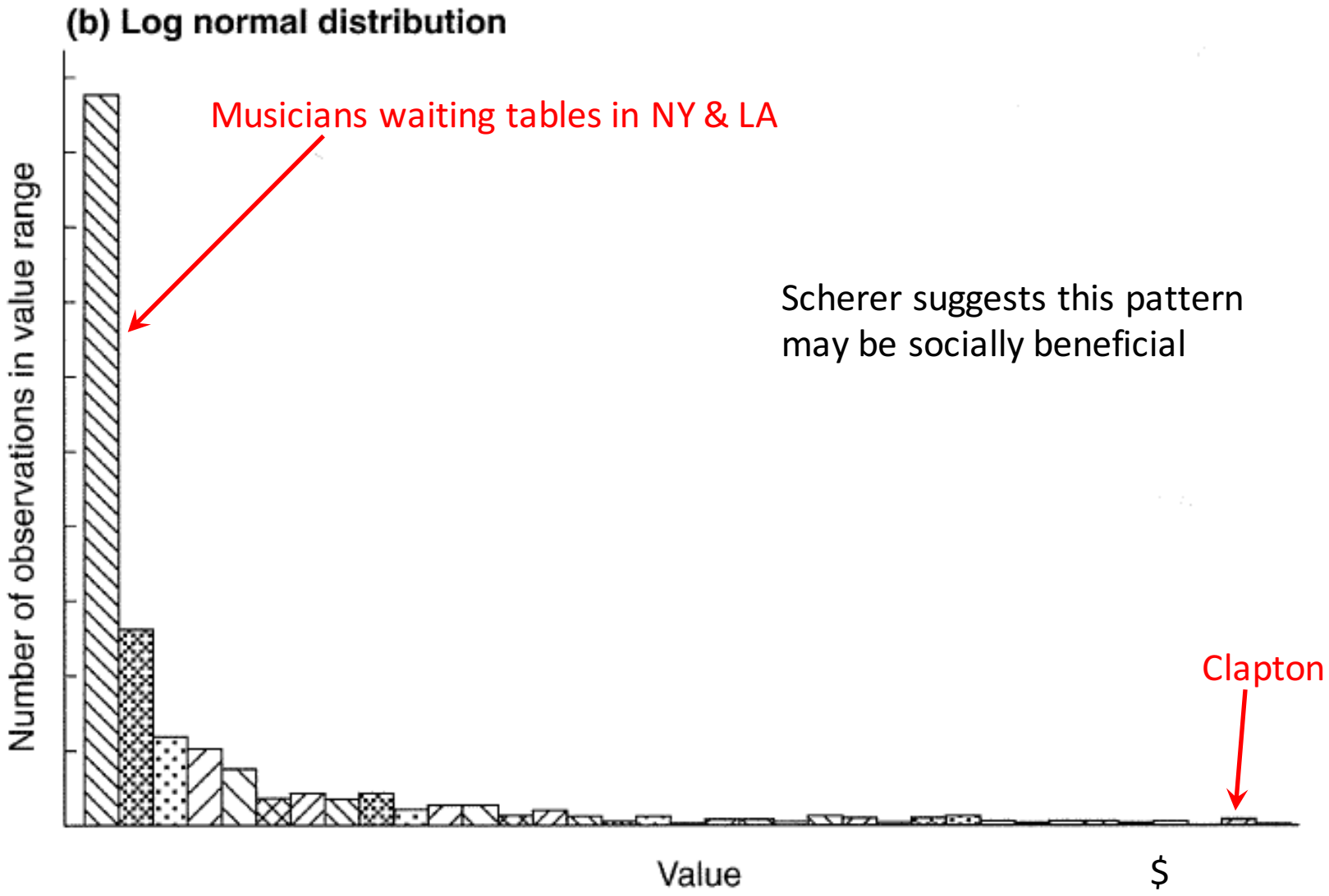
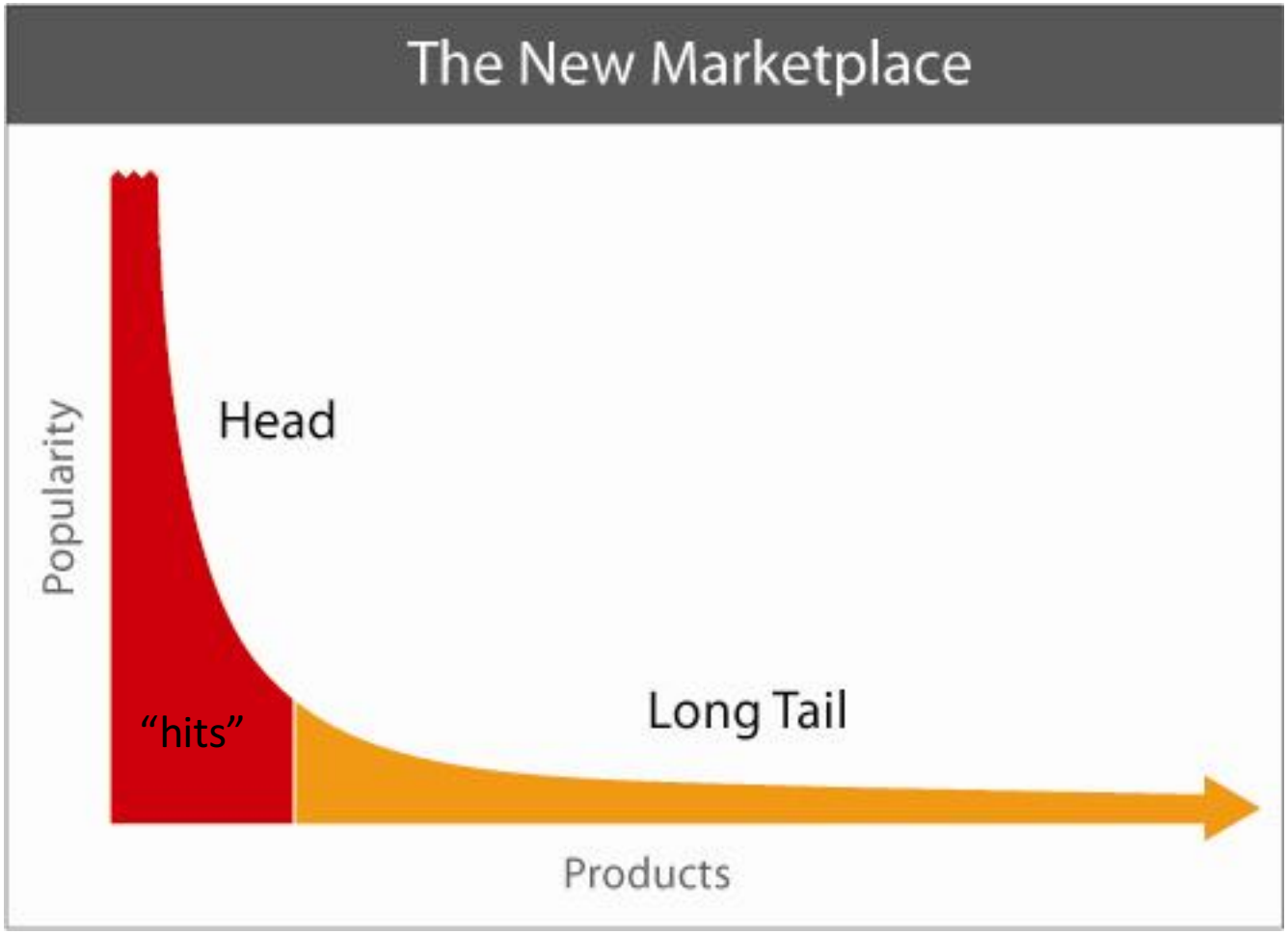
3) Forms of Bounded Rationality specific to creators
   a) Unusually strong version of “overoptimism”?
   b) Are artists “skewness lovers”?
   c) The intuitions underlying personality theory and labor theory may help to define artists’ reference points

# Scherer, “Innovation Lottery”




Scherer suggests this pattern may be socially beneficial

# Chris Anderson, “The Long Tail”



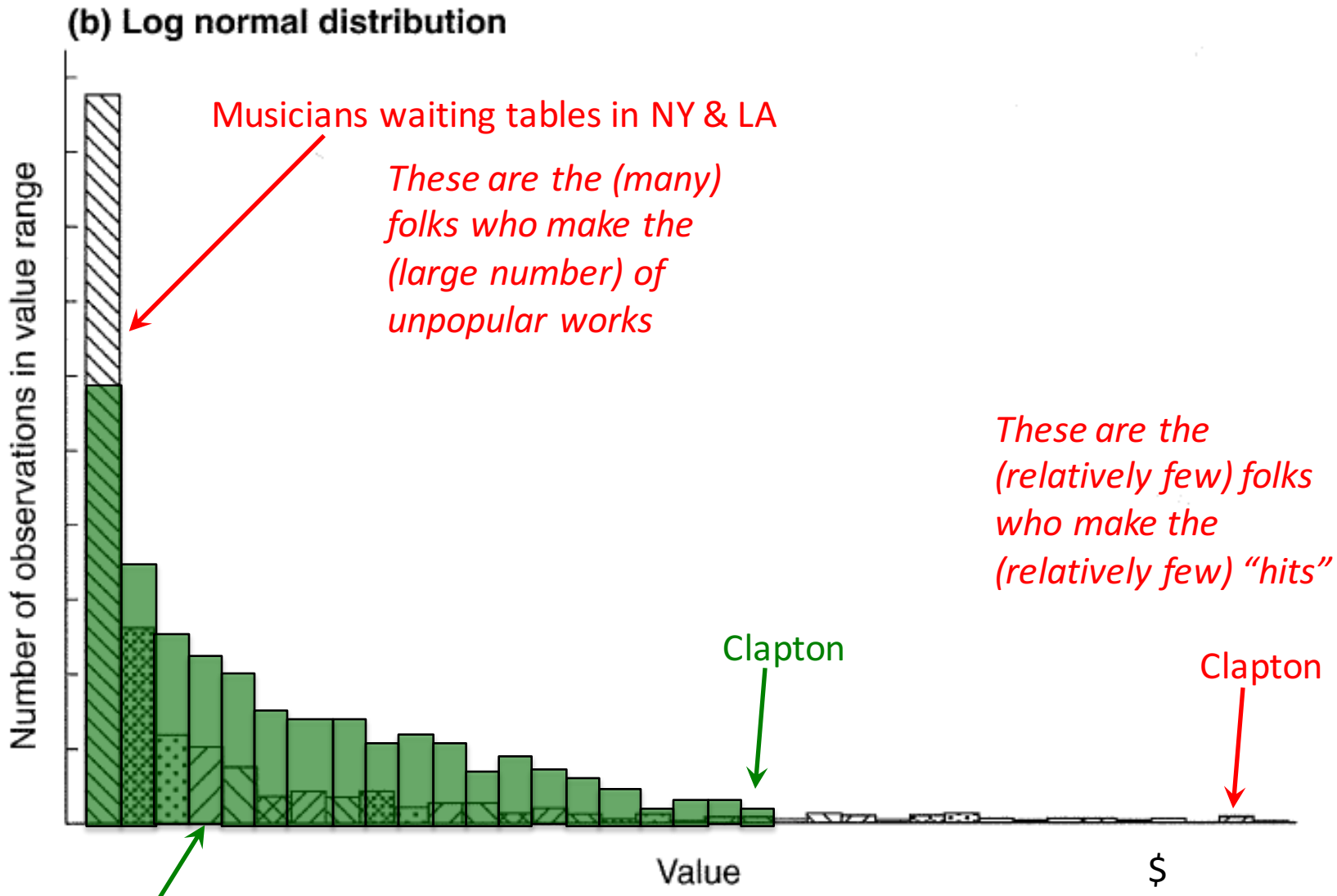

Source: http://www.thelongtail.com/about.html

# Chris Anderson, “The Long Tail”

“The theory of the Long Tail is that our culture and economy is increasingly shifting away from a focus on a relatively small number of "hits" (mainstream products and markets) at the head of the demand curve and toward a huge number of niches in the tail. As the costs of production and distribution fall, especially online, there is now less need to lump products and consumers into one-size-fits-all containers. In an era without the constraints of physical shelf space and other bottlenecks of distribution, narrowly-targeted goods and services can be as economically attractive as mainstream fare.”

Source: http://www.thelongtail.com/about.html

# Scherer, "Innovation Lottery"



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   b) Are artists "skewness lovers"?
   c) The intuitions underlying personality theory and labor theory may help to define artists' reference points

# Taylor Swift

"In my opinion, the value of an album is, and will continue to be, based on the amount of heart and soul an artist has bled into a body of work, and the financial value that artists (and their labels) place on their music when it goes out into the marketplace."

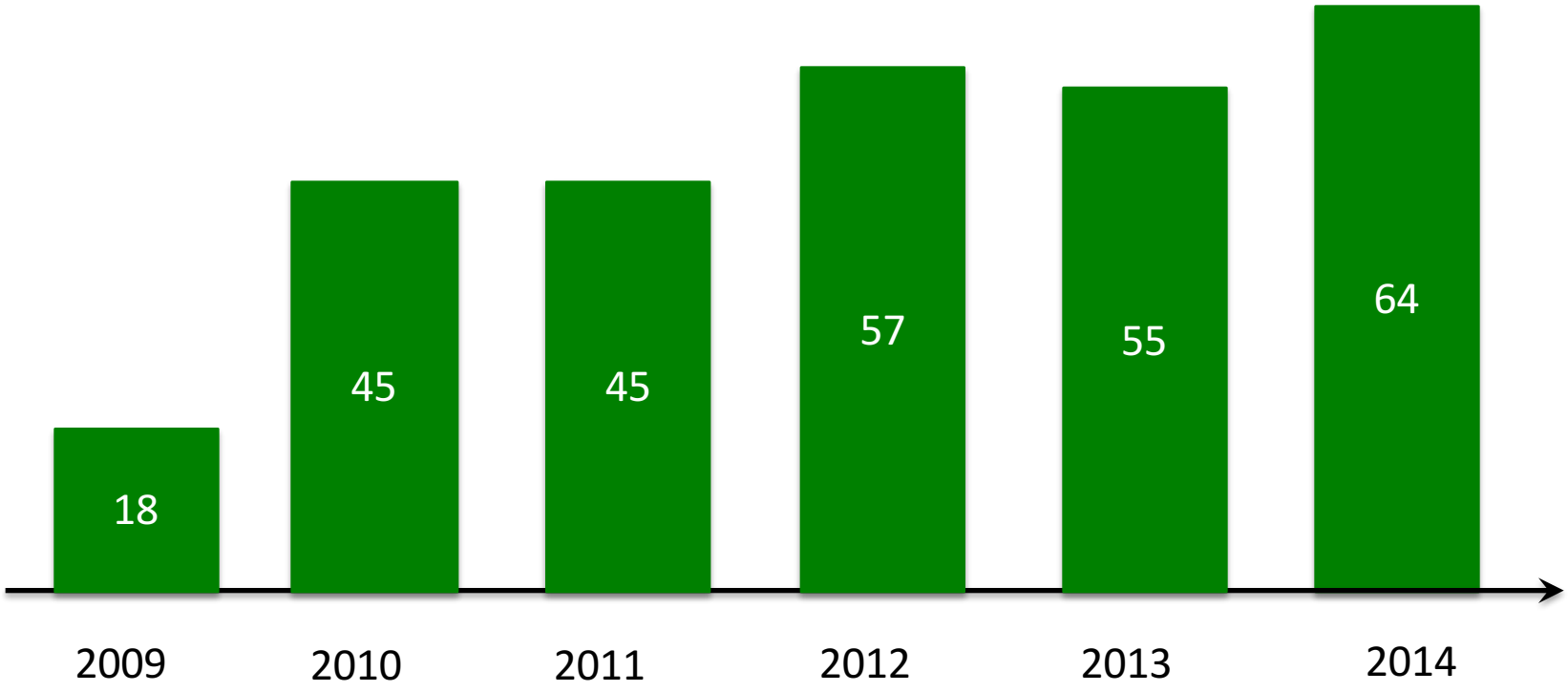
"Music is art, and art is important and rare. Important, rare things are valuable. Valuable things should be paid for. It's my opinion that music should not be free, and my prediction is that individual artists and their labels will someday decide what an album's price point is. I hope they don't underestimate themselves or undervalue their art."

Wall Street Journal, July 7, 2014

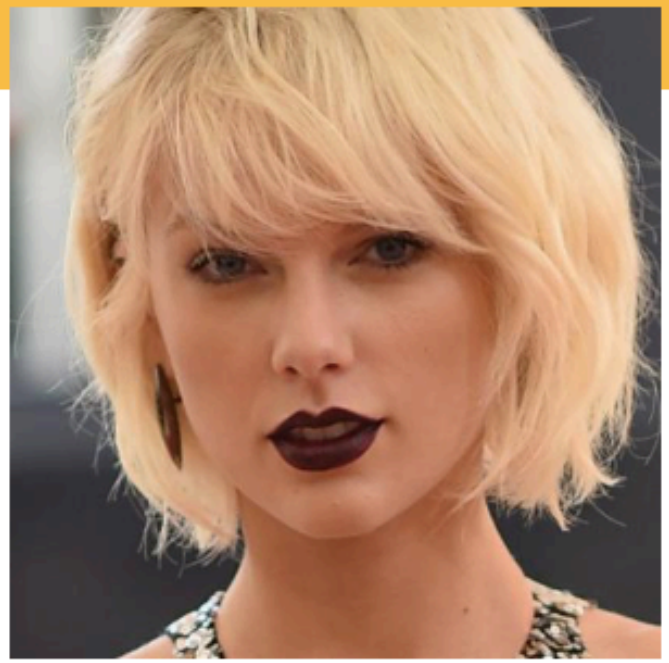
# Swift v. Spotify

- Spotify pays 70% of its revenues in license fees
- Spotify pays record companies in license fees roughly $.01 per play
- In mid-2014, Spotify paid Swifts' record companies and music publisher roughly $500M per month
- In November 2014, Swift removed all her music from Spotify

# Swift's Income ($M)




Sources: http://www.forbes.com/lists/2009/53/celebrity-09_Taylor-Swift_2OIN.html; http://www.forbes.com/profile/taylor-swift/



#55 PREVIOUS NEXT

# Taylor Swift

**Musician**

2017 AMERICA'S SELF-MADE WOMEN NET WORTH — as of 5/17/17

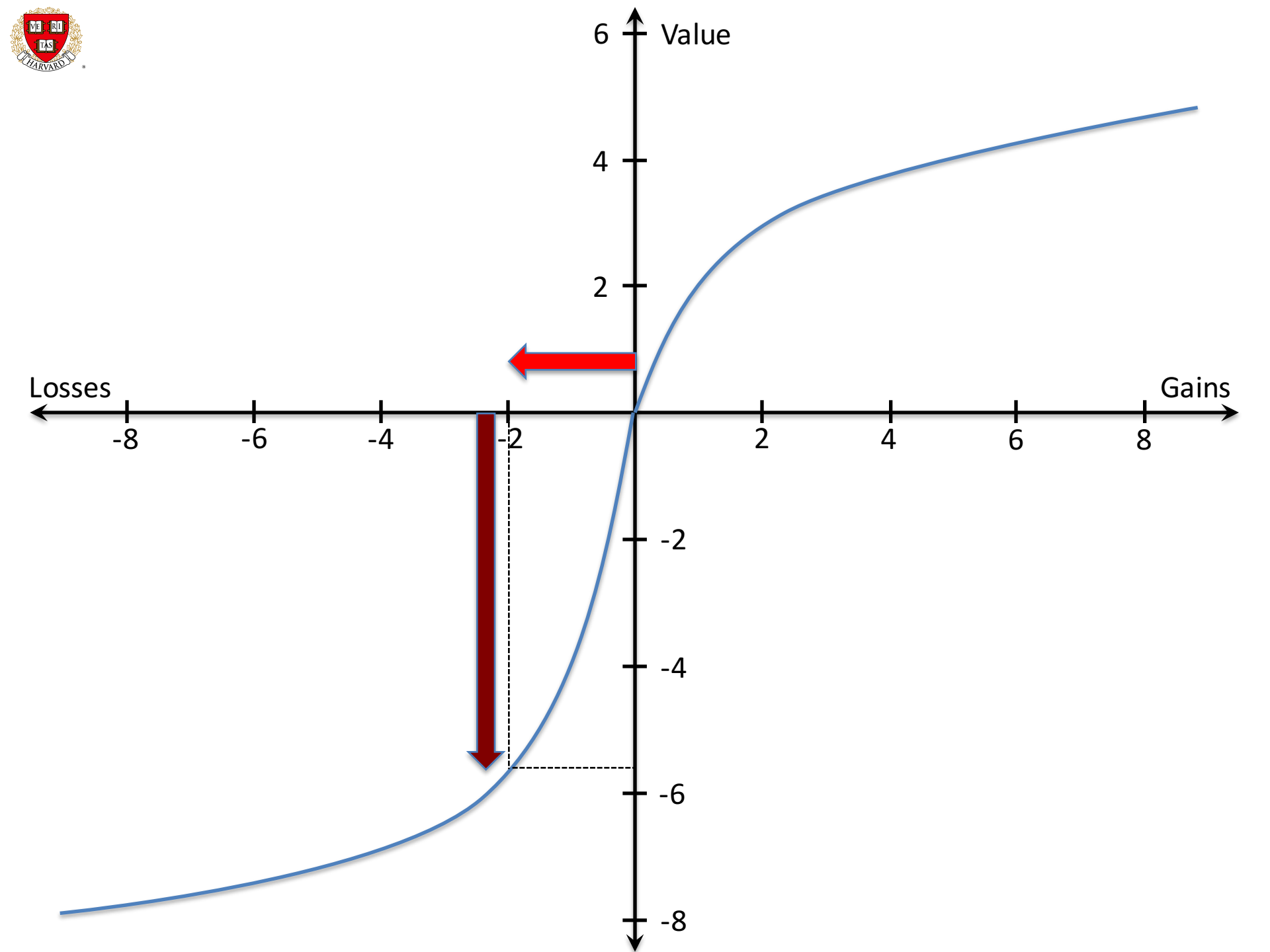
## $280 M

- Taylor Swift's 1989 album was the bestselling album of 2014 despite a late-October release.
- Her 1989 tour smashed North American touring records en route to a quarter-billion dollar gross in 2015.
- Even though Swift stayed relatively quiet in 2016, her net worth has benefited from continued earnings from her music, endorsements and merch.
- Swift has shilled for the likes of Keds, Diet Coke and Apple.
- She owns two Dassault private jets.

# Time Magazine, November 13, 2014

"I think there should be an inherent value placed on art. I didn't see that happening, perception-wise, when I put my music on Spotify. Everybody's complaining about how music sales are shrinking, but nobody's changing the way they're doing things. They keep running towards streaming, which is, for the most part, what has been shrinking the numbers of paid album sales.

"With Beats Music and Rhapsody you have to pay for a premium package in order to access my albums. And that places a perception of value on what I've created. On Spotify, they don't have any settings, or any kind of qualifications for who gets what music. I think that people should feel that there is a value to what musicians have created, and that's that. I wrote about this in July, I wrote an op-ed piece in the Wall Street *Journal*. This shouldn't be news right now. It should have been news in July when I went out and stood up and said I'm against it. And so this is really kind of an old story."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# Possible Implications for IP Law

1) Hyper-optimism of creators may be socially beneficial
   – argument against "debiasing" (Crouch)
2) If creators are "skewness lovers," we should hesitate to alter the current distribution pattern (Scherer)
3) Other things equal, we should adjust doctrines to increase payouts but reduce probability (Crouch)

   -- e.g. *KSR*'s increase in non-obviousness standard makes economic sense
4) Limits on work-for-hire doctrine and pre-employment patent assignment agreements may be socially beneficial (Scherer)
5) Legal doctrine has (partial) control over the location of reference points – and thus how innovators and users value their entitlements

   -- e.g., rhetoric of "intellectual property"

   -- complication: reference points may not be fully complementary (e.g., with respect to file-sharing)
6) Uncertainty may not be so bad (Horowitz)

Ethical?

# Steven Horowitz, "Copyright's Asymmetric Uncertainty"

- Assume both copyright owners (creators) and potential nonpermissive users are individuals
- Endowment effect increases with certainty of legal entitlements
- Uncertainty prompts:
  - Creators to license their works more often, because they are less deterred by loss aversion
  - Users to make more nonpermssive uses of copyrighted works, because they anticipate creators will be less likely to sue
- Both effects promote social welfare