

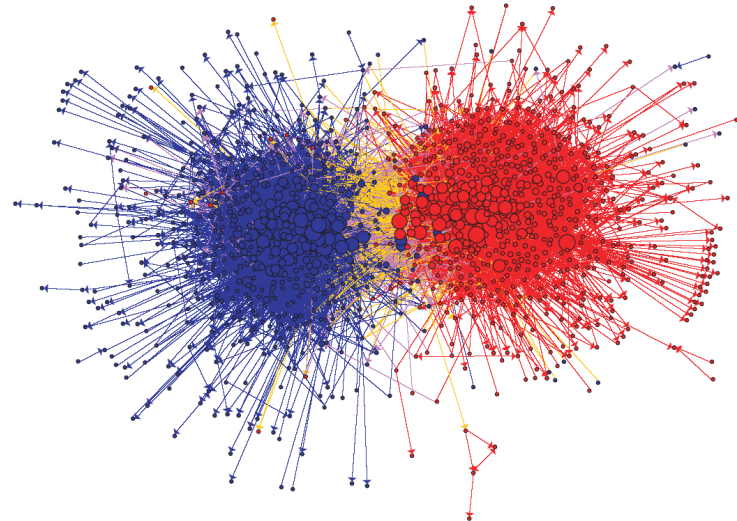
# Social Impact of Cognitive Enhancement

The background of the slide features a collage of US dollar bills, specifically one hundred dollar bills, which are slightly tilted and overlapping. Overlaid on this background is a large, stylized, purple brain graphic. The brain is composed of various shades of purple and has a textured, almost marbled appearance. It is positioned centrally, with its top extending towards the top of the slide and its bottom towards the bottom. The brain's shape is somewhat irregular, with several lobes and a central sulcus. The overall effect is a visual metaphor linking cognitive enhancement (the brain) with money (the dollar bills).

Anders Sandberg  
Oxford Uehiro Centre for Practical Ethics

"[I]t's not the poor families in Africa that are going to be doing this, it's going to be the very affluent who are going to at first have healthier children...and then it becomes the slippery slope, they will have stronger, faster, smarter children... Then you've got these two very disparate classes."

Kalfoglou A, Suthers, K, Scott J, & K Hudson, *Reproductive Genetic Testing: What America Thinks*, Washington, DC: Genetics and Public Policy Center, 2002





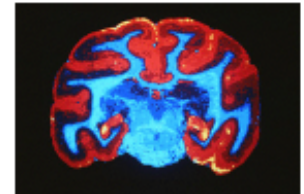




- Benefits
  - Reduction of losses
  - Individual benefits
  - Societal benefits
- Costs
  - Individual
  - Competition

# **TOO MUCH TO DO? TOO LITTLE TIME?** **ACCOMPLISH IT ALL WITH** **BACKUP BRAIN™**

There just aren't enough hours in the day to do all the things on your plate. By the time you get home from work, your brain is totally fried. What you need is something to relieve the stress on your brain during the day so you arrive at home alert and refreshed. What you need is something to do your thinking for you when you don't want to. What you need is a minor surgical procedure: the implantation of a patented Backup Brain™.



It's a real brain taken from a fan of professional wrestling, so it's hardly been used at all!

## **Look at these happy customers!**



"I can get falling down drunk, but my trusty Backup Brain will drive me home safe and sound!"



"My poker game is incredible now that my Backup Brain is keeping track of the cards!"



"The stock market is no mystery to me! My Backup Brain is dedicated to detecting market trends!"



"I can sleep through boring meetings while my Backup Brain takes notes and looks interested!"

## **Look at all the stuff Backup Brain can do!**

Read War and Peace while you sleep • Help your kids with their homework and balance your checkbook at the same time • Tell the difference between presidential candidates • Cure cancer • Complete MYST without cheating • Prevents you from making career-ending remarks to your boss • Understand the ISO9000 standard • Be sensitive yet manly at the same time • Truly comprehend the opposite sex • Foil Microsoft's plans for world domination • And much more!



**Before**



**After**

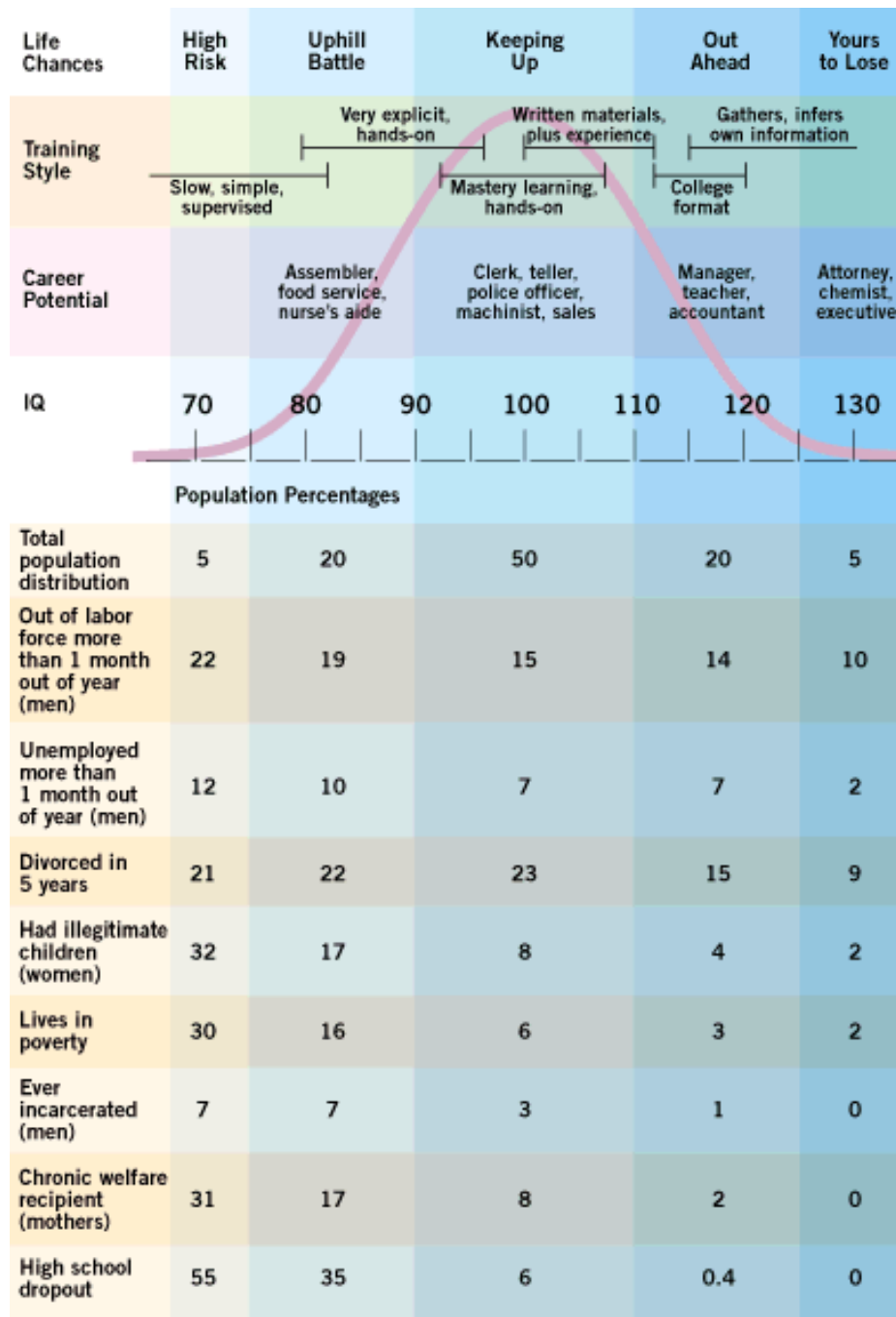
**BACKUP BRAIN: IF YOU'VE GOT THE TIME WE'VE GOT THE BRAINS**



# Reduction of Losses

- Lost keys UK £250 million/year
- Forgotten standing payment orders: £400 million/month (\$53/month person)
- Sleepiness cause 15-20% road accidents (as well as work-related accidents, iatrogenic illness etc)
- Higher IQ likely reduces accident risks
- Can cognitive enhancement reduce this?





# Individual Effects

Cognition important for good life

Environmental toxin models

+1 IQ point = +1.763% income (Schwartz),  
+2.094/3.631% (Salkever, m/f)

Annual gain / IQ point US \$55-65 billion  
0.4-0.5% GDP

Effects on schooling, participation rate,  
social costs

Weiss 1998: 3 point IQ increase:

Poverty rate -25%

Males in jail -25%

High school dropouts -28%

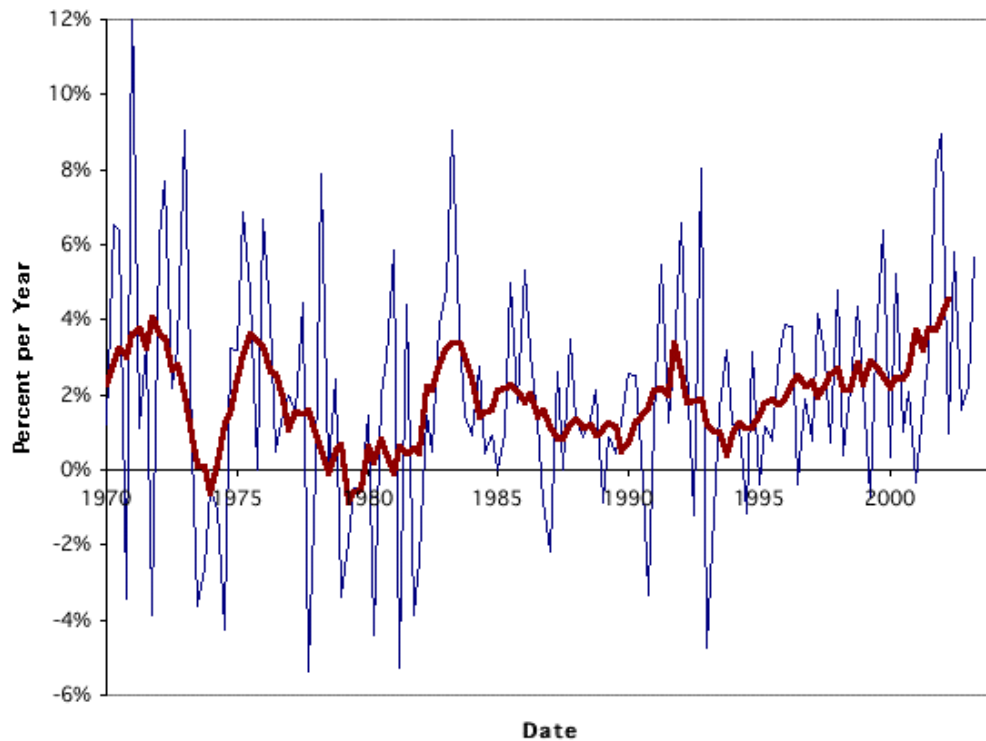
Parentless children -20%

Welfare reciprocity -18%

Out-of-wedlock births -15%

Gottfredson 2002

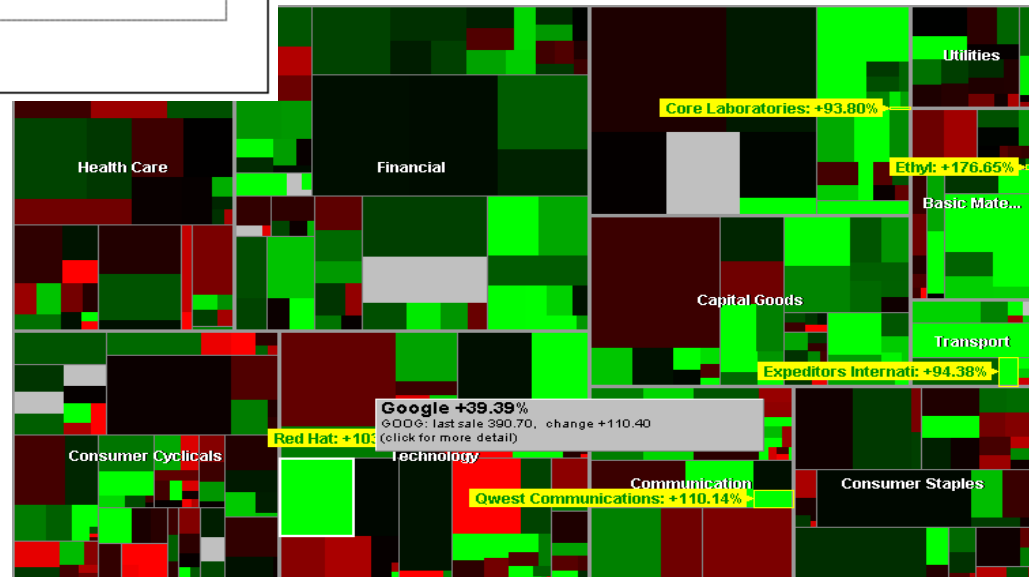
Nonfarm Business Productivity Growth



# Economy Impact

Growth residual due to productivity increase due to technology, human capital and other factors

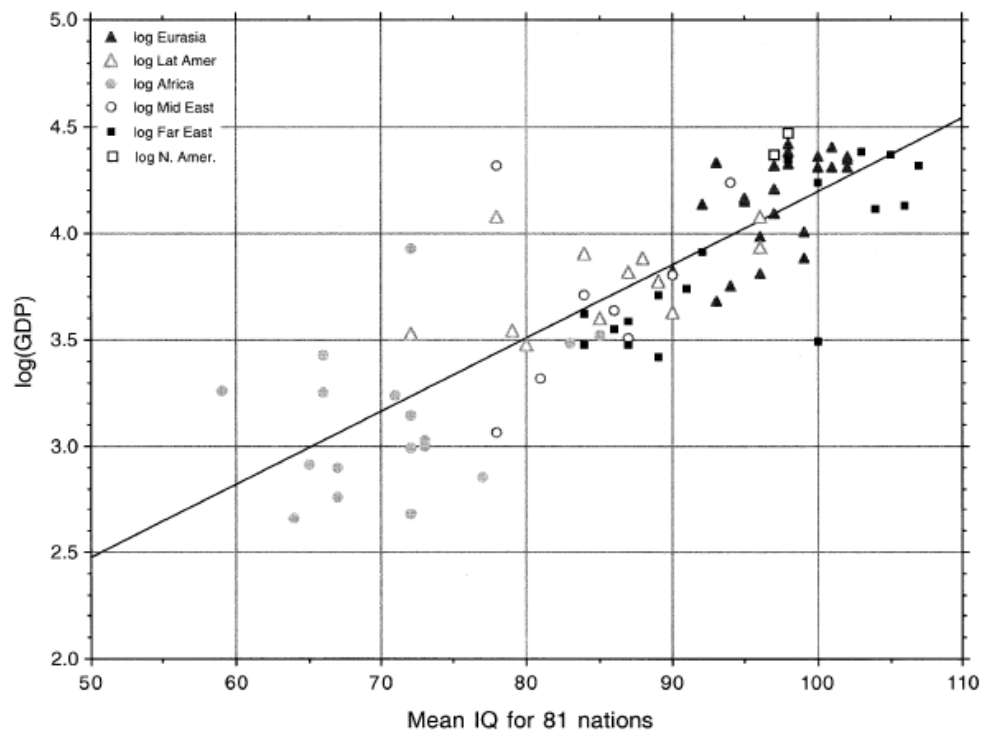
Cognition plays a sizeable role





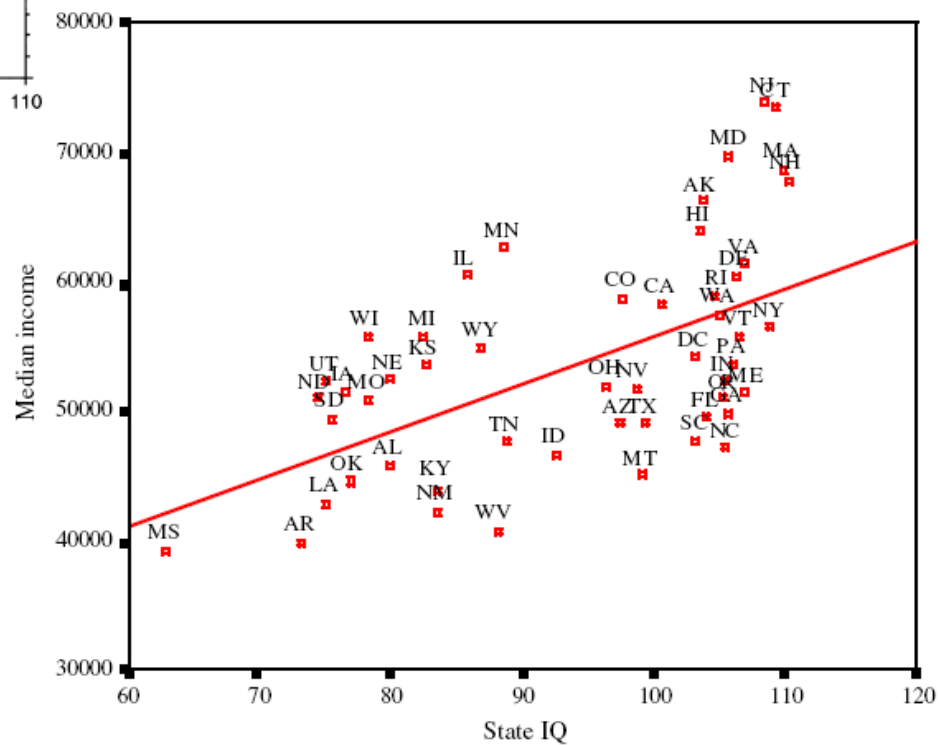
Data from "IQ//GDP, 81 & 185 nations"

$$y = 0.75128 + 3.4414e-2x \quad R^2 = 0.695$$



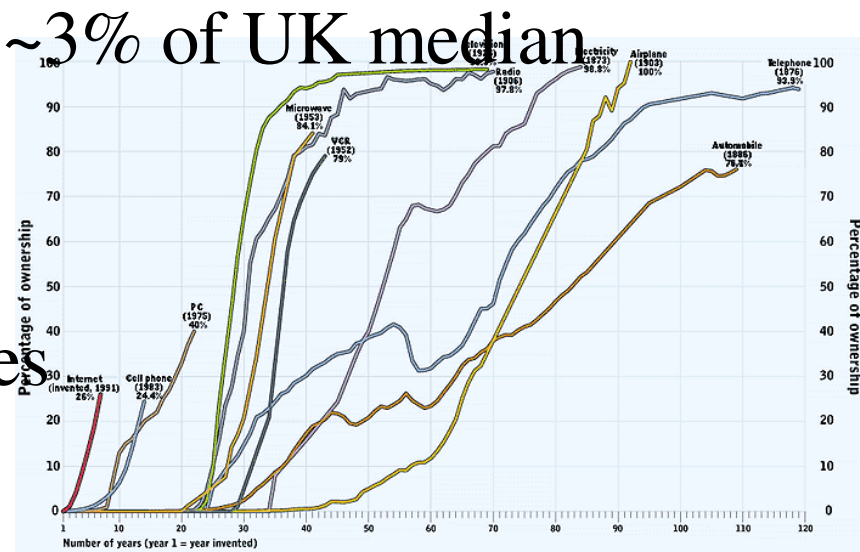
Dickerson 2005  
(+1 IQ = +8.2% GDP)

Kanazawa 2006



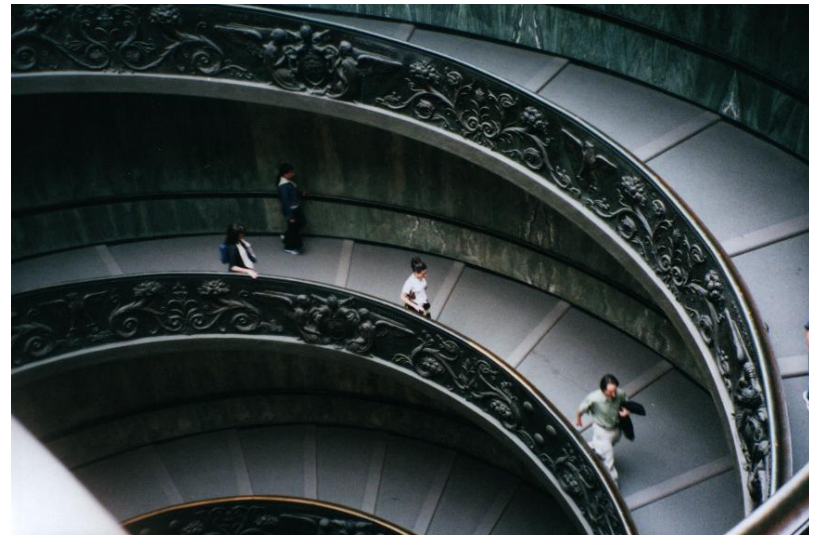
# Costs

- Technology diffusion
  - Devices spread fast and thoroughly
  - Country gap
- Drugs
  - Monthly Modafinil cost ~3% of UK median income
- (Medical) services
  - Cost set by expert salaries

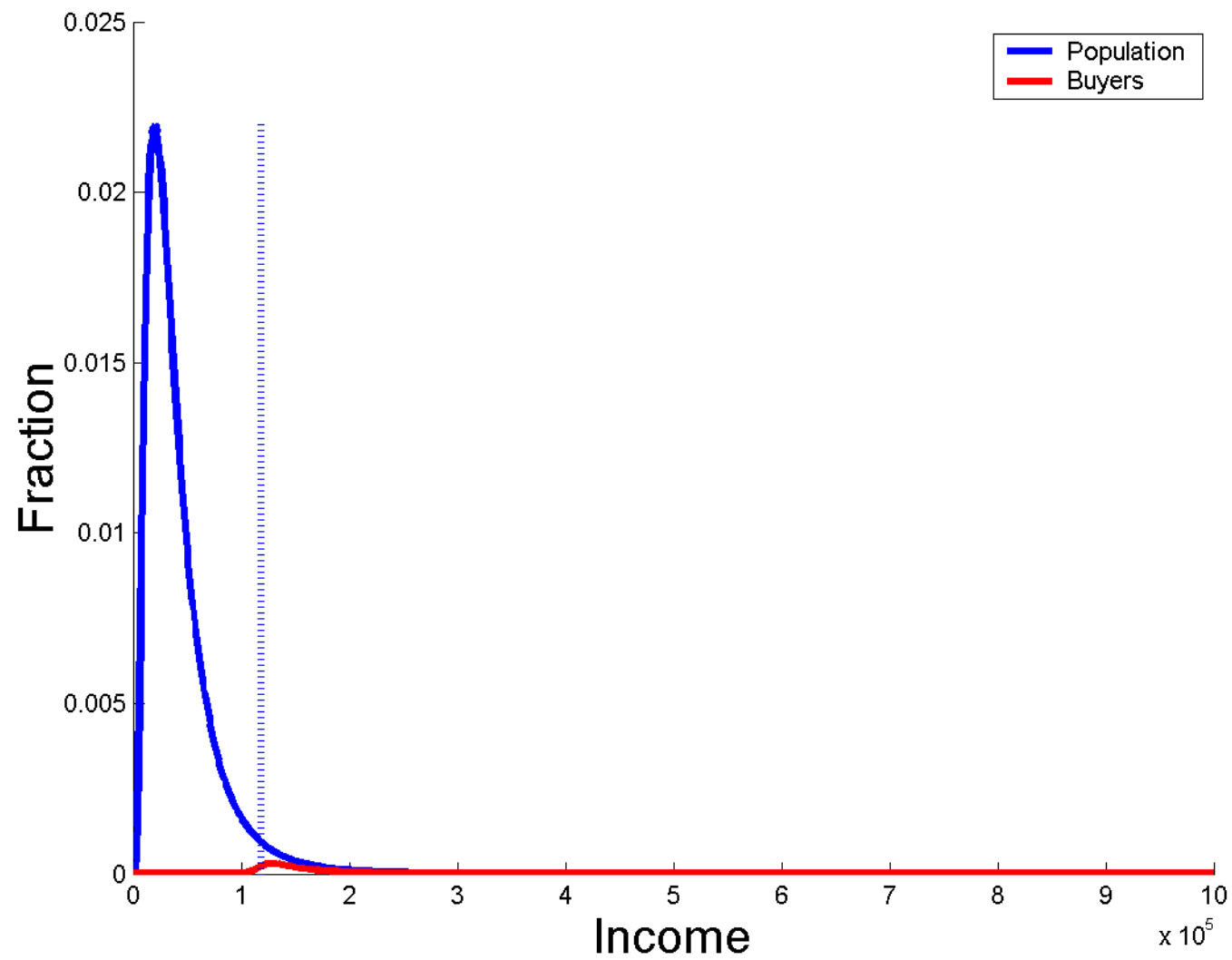


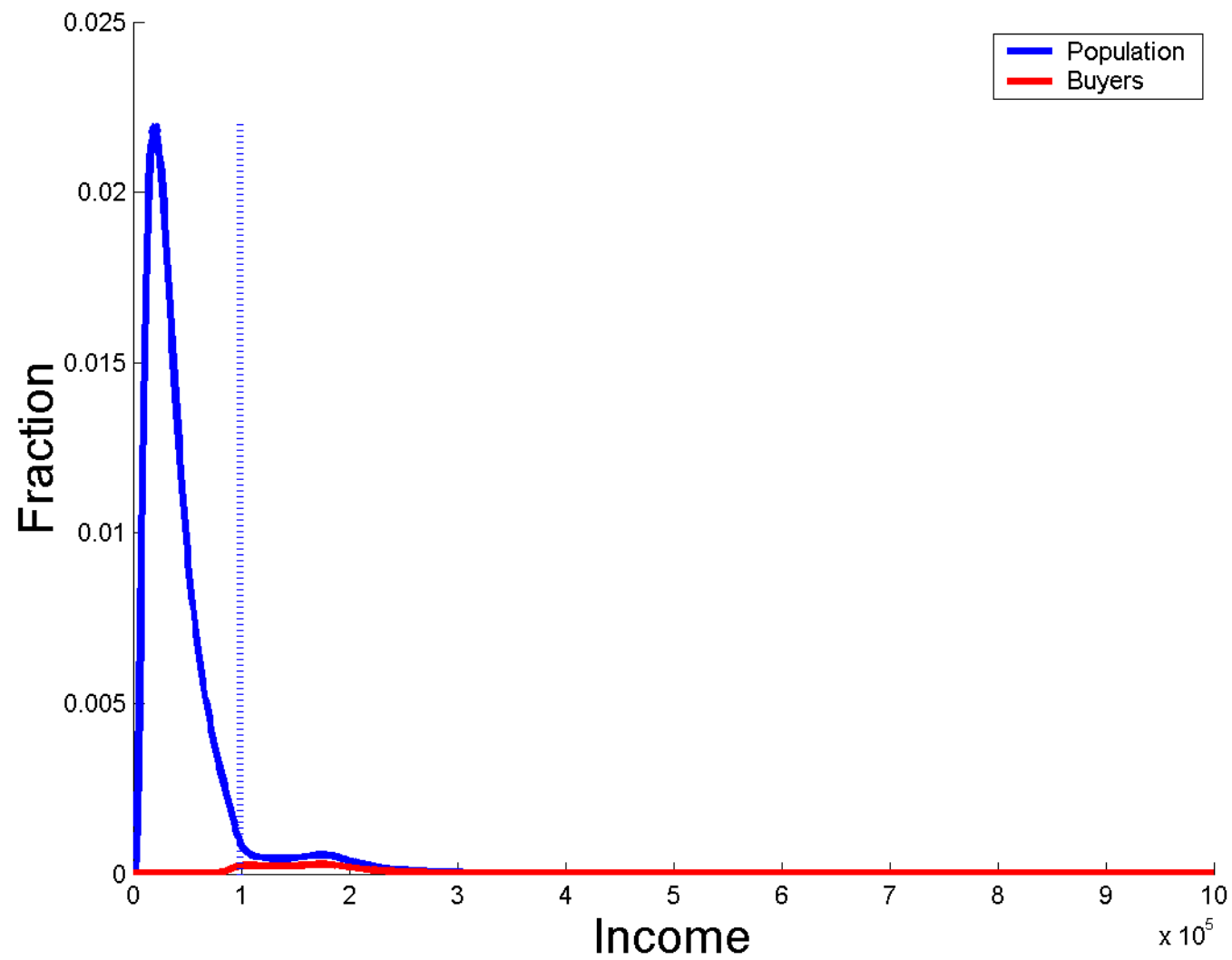
# Simulation

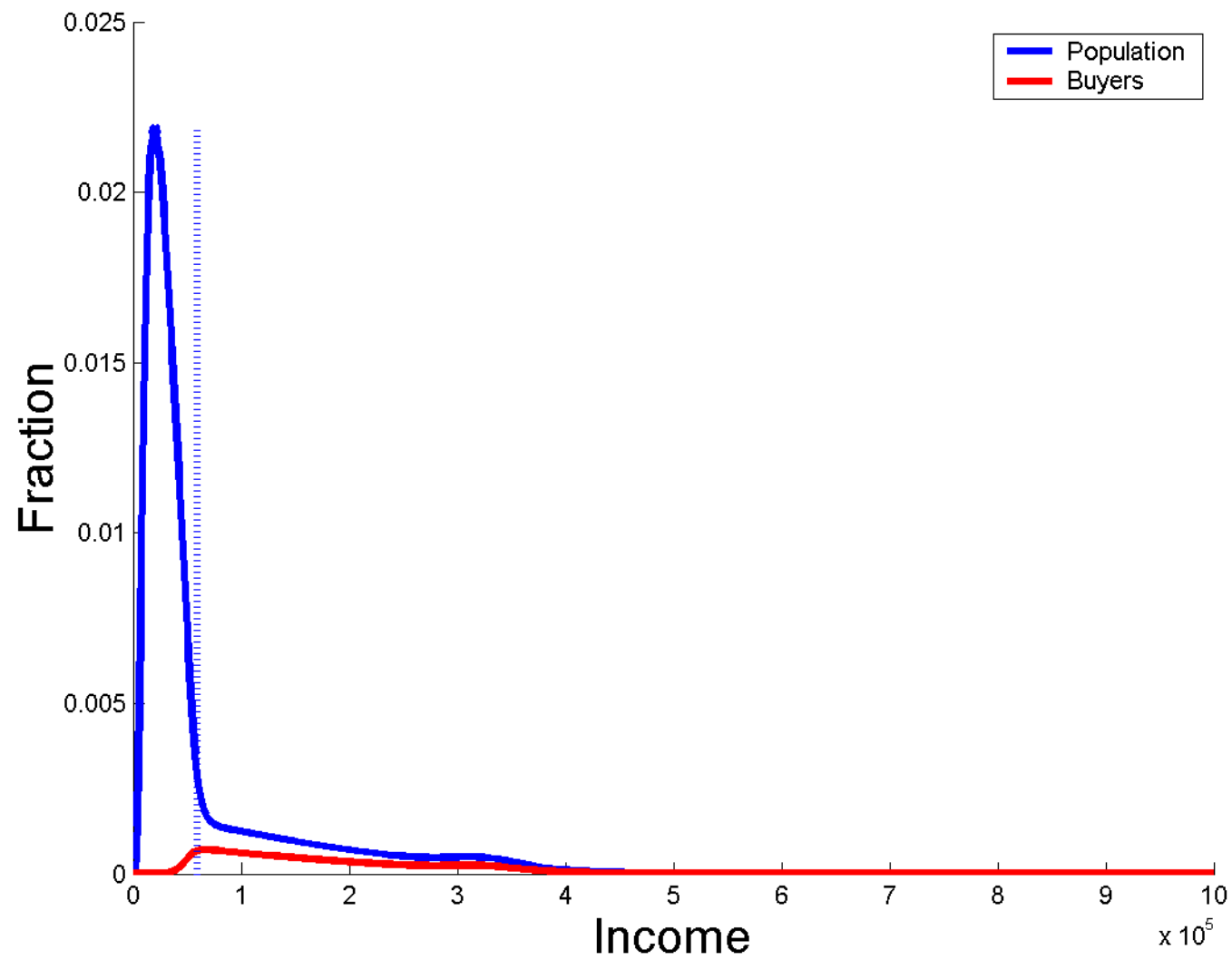
- Initial experiments with income-enhancement models
- Enhancements that increase earning ability constant factor, decreasing to a low price
- Assumes no redistribution



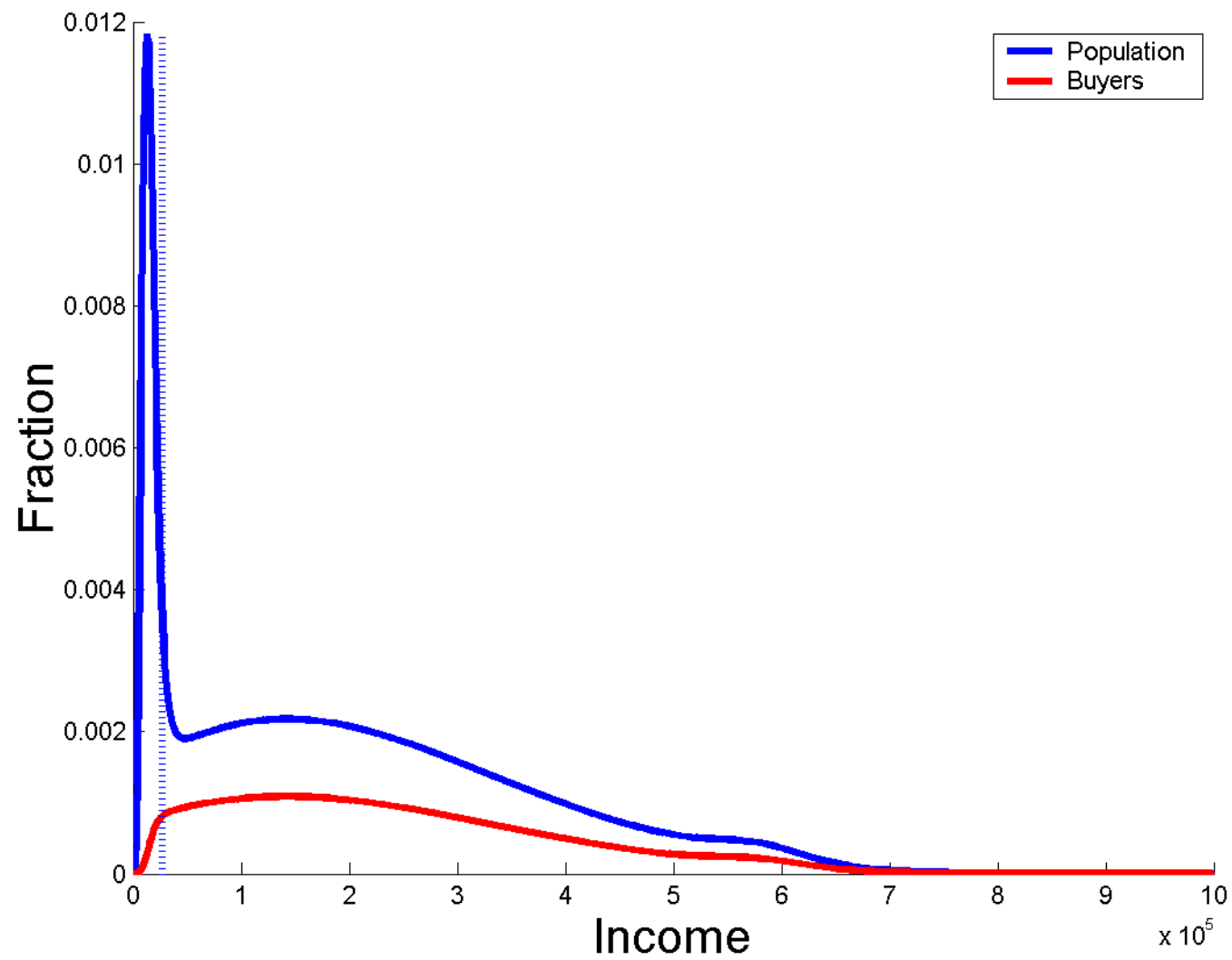


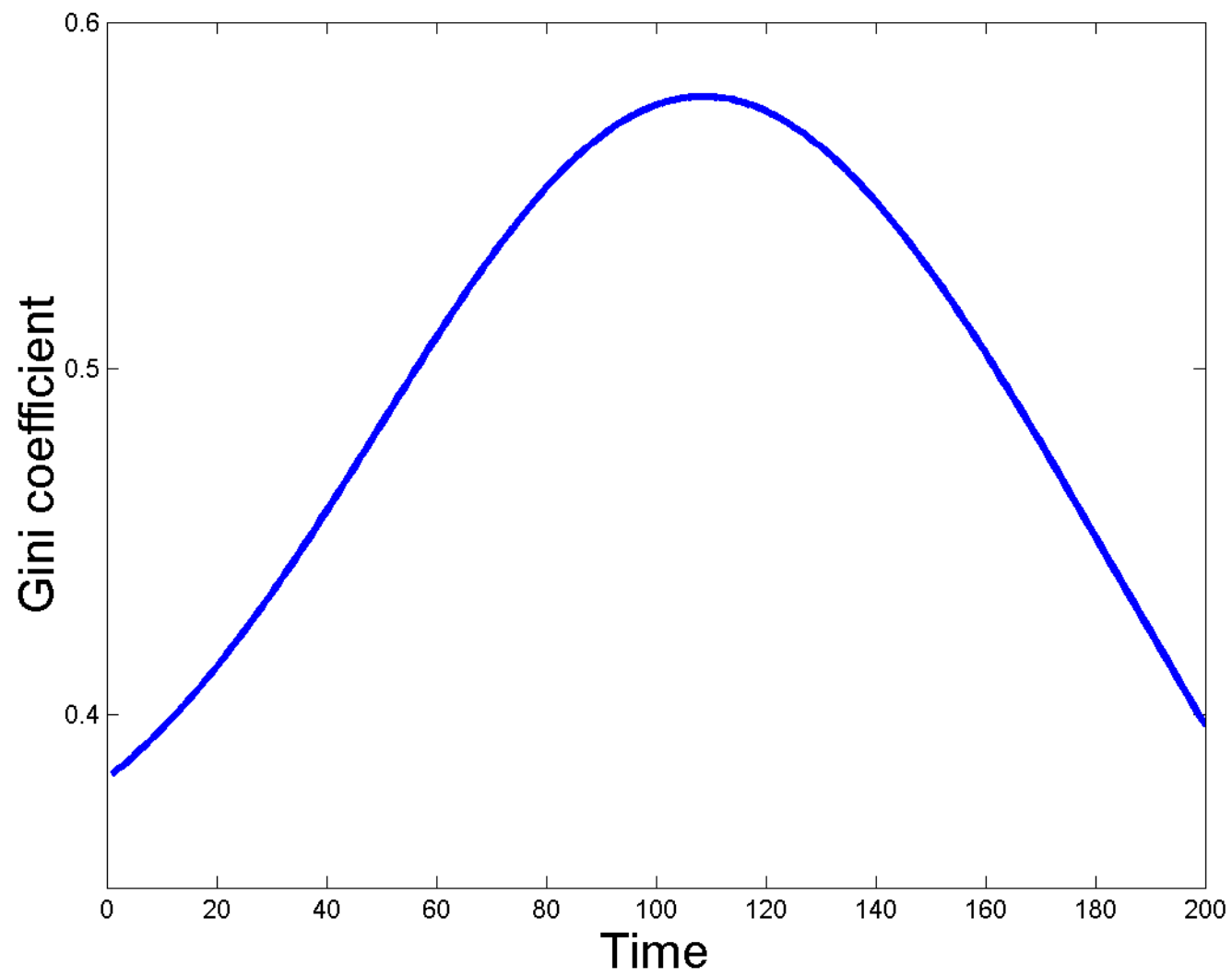




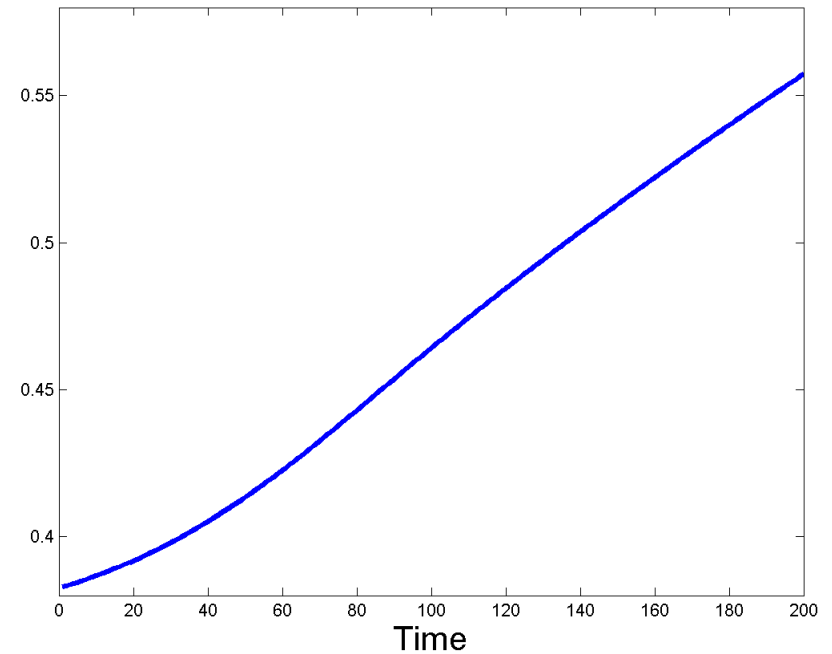
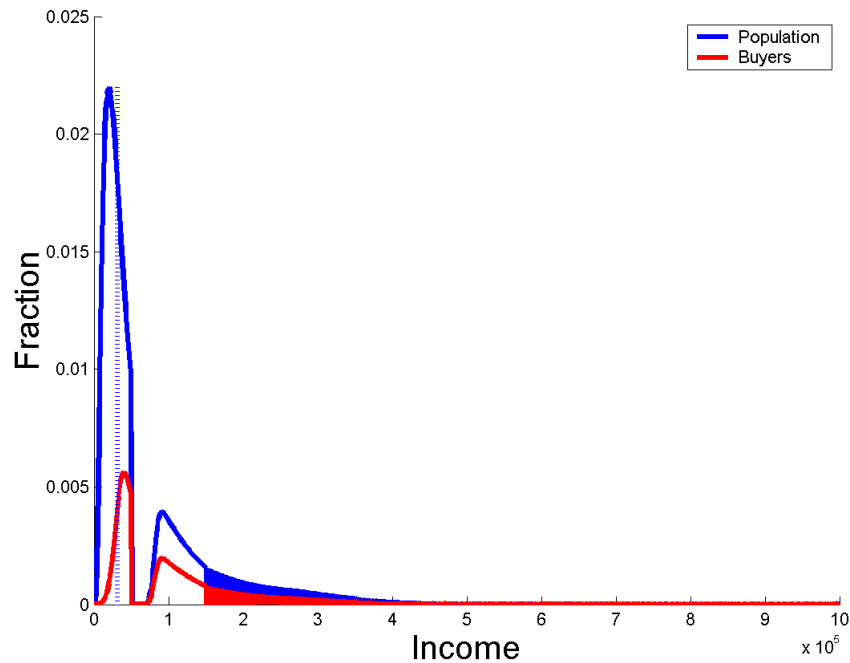






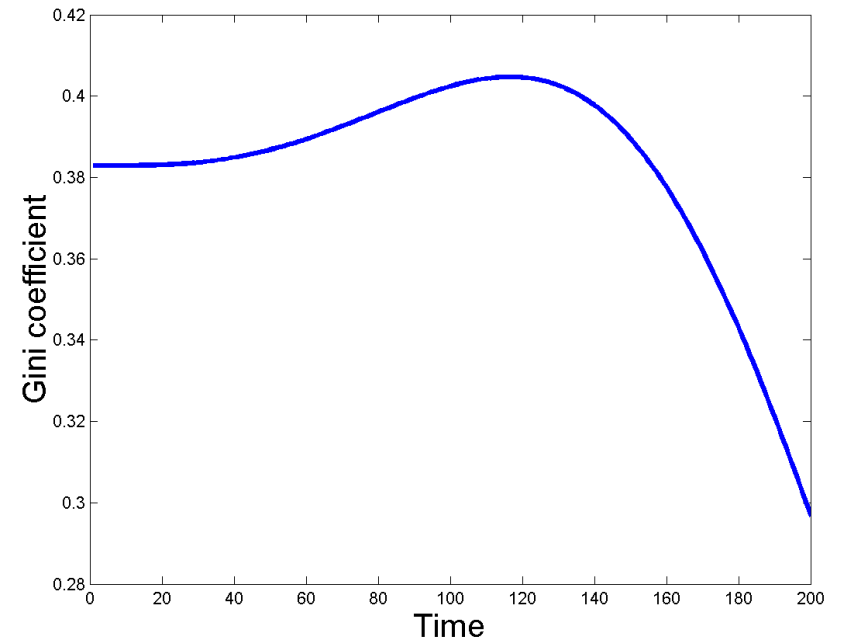
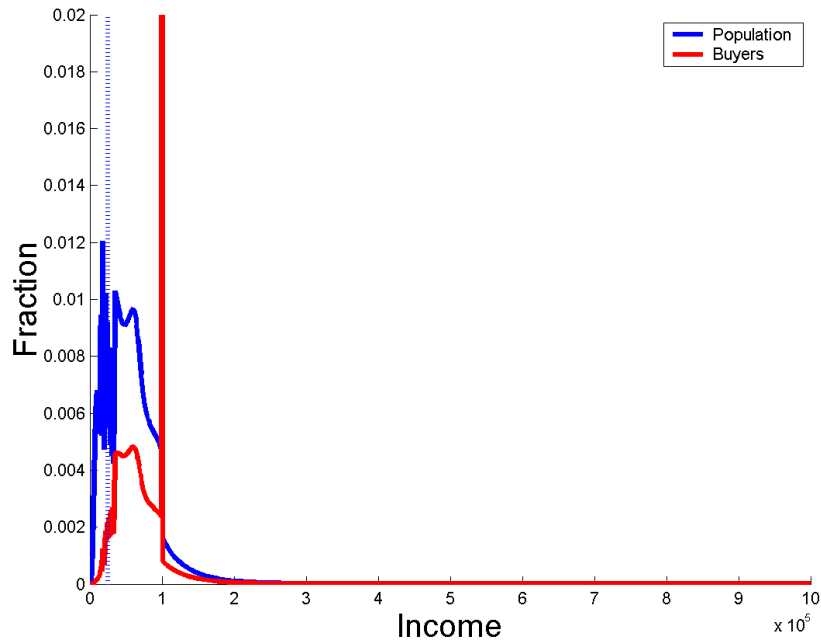


# Enhancement proportional to income





# Decreasing Margins



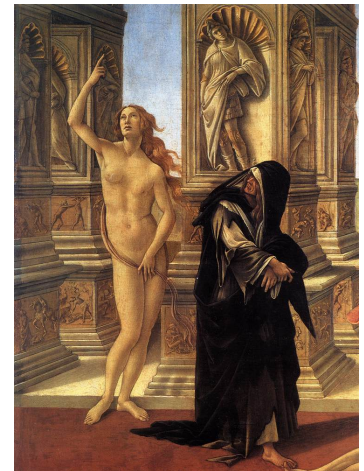
- Gadgets come down in price, problematic if enhances earning capacity proportionally
- Decreasing margins stabilize
- Services likely to be problematic
- Temporary increases in inequality may be worth it if they speed transition

- Near-term enhancements
  - Gadgets and drugs
  - Decreasing margins
  - Narrow task improvements
  - Hence unlikely to be major disruptors
  - Biological enhancements at first less significant than external software, hardware
  - Important tryout for handling more radical enhancement

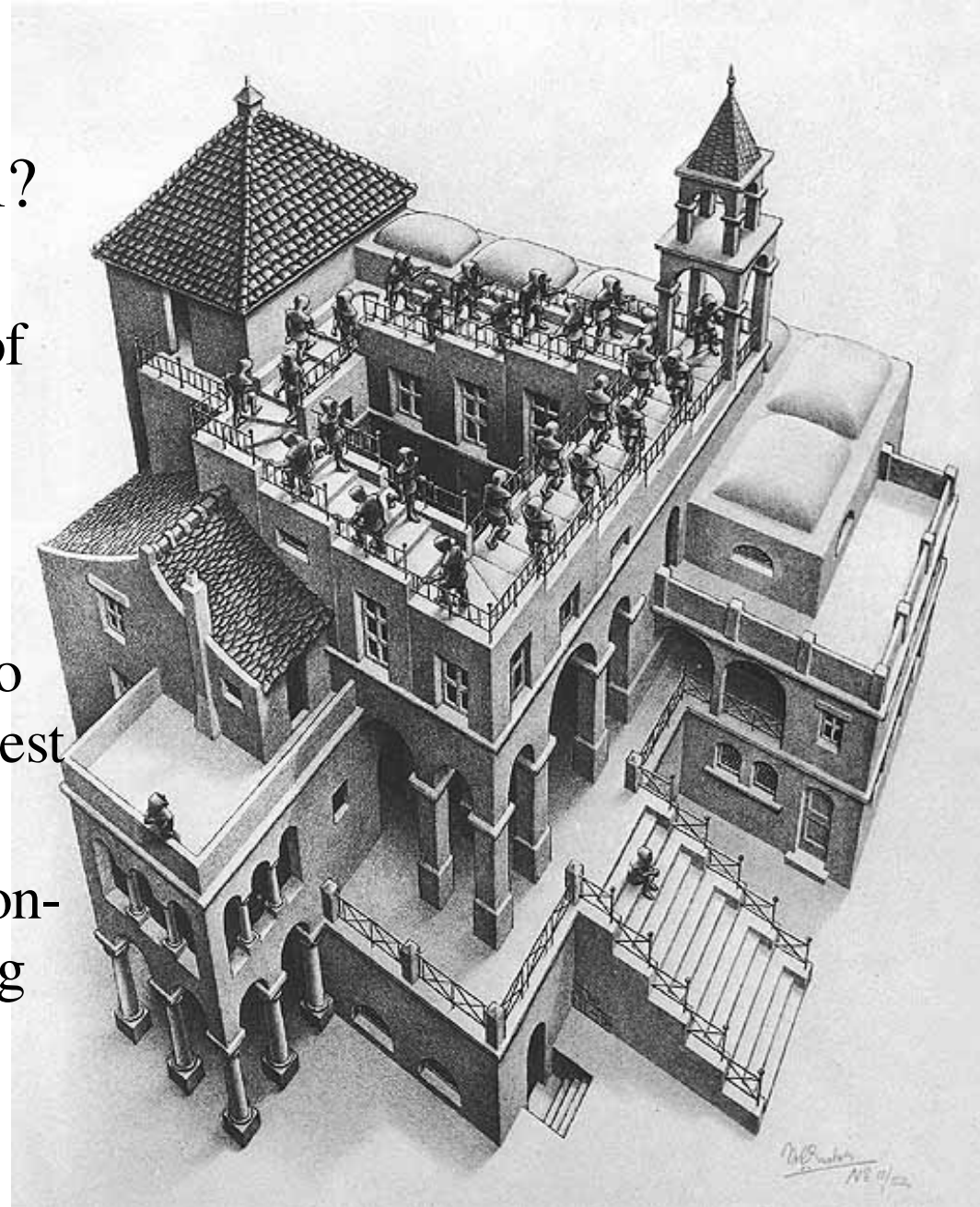


# Approaches

- Laissez-faire
- Rawls: are benefits to worst off worth it?
  - The parties to the social contract "want to insure for their descendants the best genetic endowment (assuming their own to be fixed)."
  - Kaldor Hicks – enhanced pay compensation to the unenhanced through improved economy
- Create a no-envy situation
- Capability approach
- Lottery
- Taxing enhancements
- Taxing enhanceds
- Speed diffusion



- Risks making people fundamentally unequal?
  - Liberal democracy already based on idea of common society of unequal individuals
- Competition
  - Worst off are those who can compete in the fewest domains
  - Many enhancements non-positional (e.g. reducing accidents)



# Conclusions

- Potential gains very large
- Spread across society
- Lowest performers likely gain most
- Competition may increase, but also overall wealth and opportunities
- Risks manageable near term
- Need for ecological studies
- Collective enhancement



