Is Arbitrage Socially Beneficial?

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February 2008

Introduction

- Limits of arbitrage recent focus
- But generally assume that arbitrage good, if succeeds
- Similarly we like market completion
- Is this justified?
  - Models often rely on objectively-mistaken behavioral types
  - This has important welfare implications
- Has financial innovation spread or created risk?

A simple model

- Two periods, two (representative) consumers $c_0 + e^{-rc_1}$
- Segmented markets; need arbitrageur to trade
- One risky asset $\sim N(0, 1)$
- No microstructure frictions
  - If arbitrageur enters, all (subjective) gains from trade
  - Captures fraction α of gains

Beneficial and harmful arbitrage

Two cases:

1. Beneficial arbitrage
   - Asset in positive supply in one market, negative in other
   - Arbitrageur makes everyone better off
   - Standard case
2. Harmful arbitrage
   - 0 net supply in both markets
   - Positive mistaken beliefs in one market, negative in other
   - Arbitrageur enters and creates risk

     $\Longrightarrow$ Everyone worse off under objective measure
   - Risk flows to those who least understand

$\gamma = \frac{\text{Objective loss}}{\text{Subjective gain}}$, β fraction beneficial:

$\Longrightarrow$ Arbitrage beneficial if $\beta > \frac{\gamma}{1+\gamma}$

Interpretation

1. Market segmentation
   - Physical (arbitrageur as transporter)
   - Market incompleteness (arbitrageur as financial innovator)
   - Mathematical/informational (arbitrageur as quant fund)
   - Inter-temporal (arbitrageur as speculator)
2. Mistaken beliefs
   - Mutual funds and ratings
3. Objective welfare measure
   - Some like Campbell (2006) endorse this
   - Can be viewed positive:don't expect smoothing of risk
   - Externalities of risk, systemic issues
   - Mistaken beliefs $\Longrightarrow$ quick reversals

Costly arbitrage

- Assumed arbitrage was pure transfer
- In reality, takes resources (particularly talented workers)
- Simple extension
  - People can produce consumption goods or arbitrage
  - Same production function for both
  - Competitive labor markets
  - Optimal tax $\frac{\alpha+\gamma(1-\beta)-\beta}{\alpha}$
  - Tax optimal (negative externality) if $\beta < \frac{\alpha+\gamma}{1+\gamma}$

Extension with real investment

- Efficient prices important as signal for capital allocation
- My model only considers risk-allocation
- Does introducing real investments weaken it?
- Assets can be produced for cost $\frac{c(\rho,k)|z|^\rho}{\rho}$
  - $c(\rho, k) \equiv k^{1-\rho}(1-k)r^2 e^{\frac{r^2(1-k)^2}{2}}$
  - k is optimal production
  - ρ how cheap (convex cost) production is given optimal level
  - Convex rules out very costly production, given optimal level

Effects of real investment opportunities

- Harmful arbitrage case
  - As costs of investment rise (ρ falls), arbitrage less harmful
  - As amount of investment (k) rises, arbitrage less harmful
  - Still harmful (in this simple model), but does mitigate
- But now consider beneficial case
  - As cost of investment rises, arbitrage more beneficial
  - As amount of investment rises, arbitrage less beneficial
  - More activity indicates less harm, but also less benefits!
  - If alternative available, insurance of arbitrage less helpful
- Doesn't eliminate problem

Contamination

- Could real investments even make it worse?
- Behavioral market, rational market (mortgage lenders)
- Real investments in rational sector
- Arbitrage/innovation contaminates (sub-prime)

Extensions

- Theory
  1. Mutual funds and ratings
  2. Model uncertainty and financial panics
- Empirical
  1. Document risk shifts from financial innovation
  2. How much arbitrage of one sort or other?
  3. Framework to measure improvements in risk allocation from innovation

Practical implications

- Is crazy financial innovation is cause of problems?
  - Still CDO's on corporate debt, held by people who shouldn't
- FDA for medicine, financial innovation shares features
  - Complex to interpret data
  - Major consequences of confused choices
  - Non-observable (preferential) heterogeneity not important
  - Expertise helps
- Lots of calls for regulation, we need framework
- Weigh gains from market completion against confusion
- How to measure second?