Modeling Insurance Markets

Nathaniel Hendren

Harvard

February, 2015
There is no well-agreed upon model of competitive insurance markets. Despite 50 years of research!

Standard notions of pure strategy competitive equilibria break down:
Preferences/Demand are related to cost

Insurers can manipulate not only price but also the design of contracts to affect their own (and others') costs
Leads to unraveling!
Akerlof (1970): Cars lose value the day after they’re sold…

- Argued that market for health insurance above age 65 does not exist because of adverse selection
  - Market unraveled because of adverse selection “death spiral”

Problem with model: single contract traded, so competition only on price

- Rothschild and Stiglitz (1976) + 1000+ other papers…
  - Compete on more than 1 dimension of the contract
  - Standard game-theoretic notions of (pure strategy) equilibria may not exist -> “Market unraveling”
Clarify when the standard competitive model goes wrong (and hence we have to choose amongst competing game-theoretic models)
  - Clarify what we mean by “unraveling”

Discuss 2 classes of “solutions” to non-existence
  - Miyazaki-Wilson-Spence (Reach the constrained pareto frontier)
  - Riley (1979) (Don’t reach the frontier)

Context: Binary insurance model with uni-dimensional type distribution
Model Environment

- Unit mass of agents endowed with wealth \( w \)
Model Environment

- Unit mass of agents endowed with wealth $w$
- Face potential loss of size $l$ with privately known probability $p$
Model

Model Environment

- Unit mass of agents endowed with wealth $w$
- Face potential loss of size $l$ with privately known probability $p$
  - Distributed with c.d.f. $F(p)$ with support $\Psi$

Rothschild and Stiglitz (1976): $p \in \{p_L, p_H\}$ (2 types)
Model Environment

- Unit mass of agents endowed with wealth $w$
- Face potential loss of size $l$ with privately known probability $p$
  - Distributed with c.d.f. $F(p)$ with support $\Psi$
    - Could be continuous, discrete or mixed
    - Rothschild and Stiglitz (1976): $p \in \{p_L, p_H\}$ (2 types)
Model

Model Environment

- Unit mass of agents endowed with wealth \( w \)
- Face potential loss of size \( l \) with privately known probability \( p \)
  - Distributed with c.d.f. \( F(p) \) with support \( \Psi \)
    - Could be continuous, discrete or mixed
    - Rothschild and Stiglitz (1976): \( p \in \{p_L, p_H\} \) (2 types)
  - Let \( P \) denote random draw from population (c.d.f. \( F(p) \))
Model Environment

- Unit mass of agents endowed with wealth $w$
- Face potential loss of size $l$ with privately known probability $p$
  - Distributed with c.d.f. $F(p)$ with support $\Psi$
    - Could be continuous, discrete or mixed
    - Rothschild and Stiglitz (1976): $p \in \{p_L, p_H\}$ (2 types)
  - Let $P$ denote random draw from population (c.d.f. $F(p)$)
- Agents vNM preferences

$$pu(c_L) + (1 - p)u(c_{NL})$$
Insurance structure: Rothschild and Stiglitz (1976) with menus
Insurance structure: Rothschild and Stiglitz (1976) with menus

There exists a set of risk-neutral insurance companies, $j \in J$ seeking to maximize expected profits by choosing a menu of consumption bundles:

$$A_j = \left\{ c^j_L (p), c^j_{NL} (p) \right\}_{p \in \Psi}$$
Insurance structure: Rothschild and Stiglitz (1976) with menus

There exists a set of risk-neutral insurance companies, \( j \in J \) seeking to maximize expected profits by choosing a menu of consumption bundles:

\[
A_j = \left\{ c^j_L (p), c^j_{NL} (p) \right\}_{p \in \Psi}
\]

First, insurers simultaneously offer a menu of consumption bundles
Insurance structure: Rothschild and Stiglitz (1976) with menus

There exists a set of risk-neutral insurance companies, \( j \in J \) seeking to maximize expected profits by choosing a menu of consumption bundles:

\[
A_j = \left\{ c_L^j (p), c_{NL}^j (p) \right\}_{p \in \Psi}
\]

First, insurers simultaneously offer a menu of consumption bundles

Given the set of available consumption bundles,

\[
A = \bigcup_j A_j
\]

individuals choose the bundle that maximizes their utility
An allocation $A = \{c_L(p), c_{NL}(p)\}_{p \in \Psi}$ is a **Competitive Nash Equilibrium** if

1. $A$ is incentive compatible
   
   $$pu\left(c_L(p)\right) + (1 - p)u\left(c_{NL}(p)\right) \geq pu\left(c_L(\tilde{p})\right) + (1 - p)u\left(c_{NL}(\tilde{p})\right) \quad \forall p, \tilde{p}$$
**Definition**

An allocation \( A = \{ c_L(p), c_{NL}(p) \} \) \( \forall p \in \Psi \) is a **Competitive Nash Equilibrium** if

1. **A is incentive compatible**

   \[
   pu(c_L(p)) + (1 - p) u(c_{NL}(p)) \geq pu(c_L(\tilde{p})) + (1 - p) u(c_{NL}(\tilde{p})) \quad \forall p, \tilde{p}
   \]

2. **A is individually rational**

   \[
   pu(c_L(p)) + (1 - p) u(c_{NL}(p)) \geq pu(w - l) + (1 - p) u(w) \quad \forall p \in \Psi
   \]
Equilibrium

**Definition**

An allocation \( A = \{c_L(p), c_{NL}(p)\} \) \( p \in \Psi \) is a **Competitive Nash Equilibrium** if

1. \( A \) is incentive compatible

\[
pu(c_L(p)) + (1 - p)u(c_{NL}(p)) \geq pu(c_L(\tilde{p})) + (1 - p)u(c_{NL}(\tilde{p})) \quad \forall p, \tilde{p}
\]

2. \( A \) is individually rational

\[
pu(c_L(p)) + (1 - p)u(c_{NL}(p)) \geq pu(w - l) + (1 - p)u(w) \quad \forall p \in \Psi
\]

3. \( A \) has no profitable deviations [Next Slide]
For any other menu, $\hat{A} = \{ \hat{c}_L (p), \hat{c}_{NL} (p) \}_{p \in \Psi}$, it must be that

$$\int_{p \in D(\hat{A})} \left[ p (w - l - c_L (p)) + (1 - p) (w - c_{NL} (p)) \right] dF (p) \leq 0$$

where

$$D (\hat{A}) = \left\{ p \in \Psi \mid \max_{\hat{p}} \left\{ pu (\hat{c}_L (\hat{p})) + (1 - p) u (\hat{c}_{NL} (\hat{p})) \right\} > pu (c_L (p)) + (1 - p) u (c_{NL} (p)) \right\}$$
For any other menu, \( \hat{A} = \{ \hat{c}_L (p) , \hat{c}_{NL} (p) \} \) \( p \in \Psi \), it must be that

\[
\int_{p \in D(\hat{A})} \left[ p (w - l - c_L (p)) + (1 - p) (w - c_{NL} (p)) \right] dF (p) \leq 0
\]

where

\[
D(\hat{A}) = \left\{ p \in \Psi \mid \max_{\hat{p}} \left\{ pu (\hat{c}_L (\hat{p})) + (1 - p) u (\hat{c}_{NL} (\hat{p})) \right\} > pu (c_L (p)) + (1 - p) u (c_{NL} (p)) \right\}
\]

- \( D(\hat{A}) \) is the set of people attracted to \( \hat{A} \)
No Profitable Deviations

For any other menu, \( \hat{A} = \{ \hat{c}_L (p), \hat{c}_{NL} (p) \} \), it must be that

\[
\int_{p \in D(\hat{A})} \left[ p (w - l - c_L (p)) + (1 - p) (w - c_{NL} (p)) \right] dF (p) \leq 0
\]

where

\[
D (\hat{A}) = \left\{ p \in \Psi \mid \max_{\hat{p}} \left\{ pu (\hat{c}_L (\hat{p})) + (1 - p) u (\hat{c}_{NL} (\hat{p})) \right\} > pu (c_L (p)) + (1 - p) u (c_{NL} (p)) \right\}
\]

- \( D (\hat{A}) \) is the set of people attracted to \( \hat{A} \)
- Require that the profits earned from these people are non-positive
Two Definitions of Unraveling

- **Akerlof unraveling**
  - Occurs when demand curve falls everywhere below the average cost curve
  - Market unravels and no one gets insurance

- **Rothschild and Stiglitz unraveling**
  - Realize a Competitive Nash Equilibrium may not exist
  - Market unravels a la Rothschild and Stiglitz when there does not exist a Competitive Nash Equilibrium
Two Definitions of Unraveling

- **Akerlof unraveling**
  - Occurs when demand curve falls everywhere below the average cost curve
  - Market unravels and no one gets insurance

- **Rothschild and Stiglitz unraveling**
  - Realize a Competitive Nash Equilibrium may not exist
  - Market unravels a la Rothschild and Stiglitz when there does not exist a Competitive Nash Equilibrium
The endowment, \((w - l, w)\), is a competitive equilibrium if and only if

\[
\frac{p}{1 - p} \frac{u'(w - l)}{u'(w)} \leq \frac{E[P|P \geq p]}{1 - E[P|P \geq p]} \quad \forall p \in \Psi \setminus \{1\}
\] (1)

where \(\Psi \setminus \{1\}\) denotes the support of \(F(p)\) excluding the point \(p = 1\).
Theorem

The endowment, \( \{(w - l, w)\} \), is a competitive equilibrium if and only if

\[
\frac{p}{1 - p} \frac{u'(w - l)}{u'(w)} \leq \frac{E[P|P \geq p]}{1 - E[P|P \geq p]} \quad \forall p \in \Psi \setminus \{1\}
\]

(1)

where \( \Psi \setminus \{1\} \) denotes the support of \( F(p) \) excluding the point \( p = 1 \).

- The market unravels a la Akerlof when no one is willing to pay the pooled cost of worse risks (Hendren 2013)
The endowment, \( \{(w - l, w)\} \), is a competitive equilibrium if and only if
\[
\frac{p}{1 - p} \frac{u'(w - l)}{u'(w)} \leq \frac{E[P|P \geq p]}{1 - E[P|P \geq p]} \quad \forall p \in \Psi\{1\} \tag{1}
\]

where \( \Psi\{1\} \) denotes the support of \( F(p) \) excluding the point \( p = 1 \).

- The market unravels a la Akerlof when no one is willing to pay the pooled cost of worse risks (Hendren 2013)
- Theorem extends Akerlof unraveling to set of all potential traded contracts, as opposed to single contract
Akerlof Unraveling

**Theorem**

The endowment, \( \{(w - l, w)\} \), is a competitive equilibrium if and only if

\[
\frac{p}{1 - p} \frac{u'(w - l)}{u'(w)} \leq \frac{E[P|P \geq p]}{1 - E[P|P \geq p]} \quad \forall p \in \Psi \setminus \{1\}
\]

(1)

where \( \Psi \setminus \{1\} \) denotes the support of \( F(p) \) excluding the point \( p = 1 \).

- The market unravels a la Akerlof when no one is willing to pay the pooled cost of worse risks (Hendren 2013)
  - Theorem extends Akerlof unraveling to set of all potential traded contracts, as opposed to single contract
  - No gains to trade -> no profitable deviations by insurance companies
Akerlof Unraveling

\[
\frac{E[P|P>p]}{1 - E[P|P>p]} \quad \text{pu}'(w-l) \quad (1-p)u'(w)
\]
Akerlof Unraveling (2)

\[ E[P|P>p] \]
\[ 1 - E[P|P>p] \]
\[ pu'(w-l) \]
\[ (1-p)u'(w) \]
Akerlof Unraveling (3)
Aside: High Risks

- Corollary: If the market fully unravels a la Akerlof, there must exist arbitrarily high risks:

\[ F(p) < 1 \quad \forall p < 1 \]
Aside: High Risks

- Corollary: If the market fully unravels a la Akerlof, there must exist arbitrarily high risks:

\[ F(p) < 1 \quad \forall p < 1 \]

- Need full support of type distribution to get complete Akerlof unraveling
Aside: High Risks

- Corollary: If the market fully unravels a la Akerlof, there must exist arbitrarily high risks:
  \[ F(p) < 1 \quad \forall p < 1 \]

- Need full support of type distribution to get complete Akerlof unraveling
  - Can be relaxed with some transactions costs (see Chade and Schlee, 2013)
When does a Competitive Nash Equilibrium exist?
When does a Competitive Nash Equilibrium exist?

Here, I follow Rothschild and Stiglitz (1976) and Riley (1979)
Rothschild and Stiglitz Unraveling

- When does a Competitive Nash Equilibrium exist?
- Here, I follow Rothschild and Stiglitz (1976) and Riley (1979)
- Generic fact: Competition $\rightarrow$ zero profits
When does a Competitive Nash Equilibrium exist?

Here, I follow Rothschild and Stiglitz (1976) and Riley (1979)

Generic fact: Competition $\rightarrow$ zero profits

Key insight of Rothschild and Stiglitz (1976): Nash equilibriums can’t sustain pooling of types
Rothschild and Stiglitz: No Pooling

Good Risk

Bad Risk

Pooled

45

w-l

w

C_L

C_NL

W
Rothschild and Stiglitz: No Pooling (2)
Rothschild and Stiglitz: No Pooling (3)
Regularity condition

- No pooling + zero profits $\rightarrow$ No cross subsidization:

\[ pc_L(p) + (1 - p) c_{NL}(p) = w - pl \quad \forall p \in \Psi \]
Regularity condition

- No pooling + zero profits $\Rightarrow$ No cross subsidization:

$$pc_L(p) + (1 - p)c_{NL}(p) = w - pl \quad \forall p \in \Psi$$

- Insurers earn zero profits on each type
Regularity condition

- No pooling + zero profits -> No cross subsidization:

\[ p c_L (p) + (1 - p) c_{NL} (p) = w - p l \quad \forall p \in \Psi \]

- Insurers earn zero profits on each type

- A Regularity Condition
Regularity condition

- No pooling + zero profits \(\rightarrow\) No cross subsidization:

\[
p c_L(p) + (1 - p) c_{NL}(p) = w - pl \quad \forall p \in \Psi
\]

- Insurers earn zero profits on each type

A Regularity Condition

Suppose that either:

1. There exists an interval over which \(P\) has a continuous distribution
2. \(P = 1\) occurs with positive probability

Satisfied if either

- \(F\) is continuous or
- \(F\) is discrete with \(p = 1\) in the support of the distribution

Can approximate any distribution with distributions satisfying the regularity condition
Regularity condition

- No pooling + zero profits $\implies$ No cross subsidization:
  \[ p c_L (p) + (1 - p) c_{NL} (p) = w - pl \quad \forall p \in \Psi \]

- Insurers earn zero profits on each type

- A Regularity Condition
- Suppose that either:
  1. There exists an interval over which $P$ has a continuous distribution
Regularity condition

- No pooling + zero profits $\Rightarrow$ No cross subsidization:

$$pc_L(p) + (1 - p) c_{NL}(p) = w - pl \quad \forall p \in \Psi$$

- Insurers earn zero profits on each type

- A Regularity Condition

- Suppose that either:
  1. There exists an interval over which $P$ has a continuous distribution
  2. $P = 1$ occurs with positive probability
Regularity condition

- No pooling + zero profits $\rightarrow$ No cross subsidization:

$$pc_L(p) + (1 - p) c_{NL}(p) = w - pl \quad \forall p \in \Psi$$

- Insurers earn zero profits on each type

A Regularity Condition

Suppose that either:

1. There exists an interval over which $P$ has a continuous distribution
2. $P = 1$ occurs with positive probability

Satisfied if either $F$ is continuous or $F$ is discrete with $p = 1$ in the support of the distribution
Regularity condition

- No pooling + zero profits $\rightarrow$ No cross subsidization:

$$pc_L(p) + (1 - p)c_{NL}(p) = w - pl \quad \forall p \in \Psi$$

- Insurers earn zero profits on each type

A Regularity Condition

Suppose that either:

1. There exists an interval over which $P$ has a continuous distribution
2. $P = 1$ occurs with positive probability

Satisfied if either $F$ is continuous or $F$ is discrete with $p = 1$ in the support of the distribution

Can approximate any distribution with distributions satisfying the regularity condition
Result #2: Exhaustive of Possible Occurrences

**Theorem**

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970).

- Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance.
- Or, people are willing to cross-subsidize -> generically, this can't be sustained as a Competitive Nash Equilibrium.

Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold.

Case 1:

\[ P = 1 \] has positive probability.

Risks\[ p < 1 \] need to subsidize\[ p = 1 \] type in order to get insurance.

Case 2:

\[ P \] is continuous and bounded away from \[ P = 1 \].

We know Akerlof unraveling condition cannot hold.

Follow Riley (1979) – shows there’s an incentive to pool types -> breaks potential for Nash equilibrium existence.
Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

• Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance
Result #2: Exhaustive of Possible Occurrences

**Theorem**

*Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)*

- Either no one is willing to cross-subsidize $\implies$ no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize $\implies$ generically, this can’t be sustained as a Competitive Nash Equilibrium
Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

- Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize -> generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

- Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize -> generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
  - Case 1: $P = 1$ has positive probability
Result #2: Exhaustive of Possible Occurrences

**Theorem**

*Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)*

- Either no one is willing to cross-subsidize → no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize → generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
  - Case 1: \( P = 1 \) has positive probability
    - Risks \( p < 1 \) need to subsidize \( p = 1 \) type in order to get insurance
Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

- Either no one is willing to cross-subsidize $\Rightarrow$ no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize $\Rightarrow$ generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
  - Case 1: $P = 1$ has positive probability
    - Risks $p < 1$ need to subsidize $p = 1$ type in order to get insurance
  - Case 2: $P$ is continuous and bounded away from $P = 1$. 
Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

- Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize -> generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
  - Case 1: $P = 1$ has positive probability
    - Risks $p < 1$ need to subsidize $p = 1$ type in order to get insurance
  - Case 2: $P$ is continuous and bounded away from $P = 1$.
    - We know Akerlof unraveling condition cannot hold
Result #2: Exhaustive of Possible Occurances

Theorem

Suppose the regularity condition holds. Then, there exists a Competitive Nash Equilibrium if and only if the market unravels a la Akerlof (1970)

- Either no one is willing to cross-subsidize -> no profitable deviations that provide insurance
- Or, people are willing to cross-subsidize -> generically, this can’t be sustained as a Competitive Nash Equilibrium
- Proof: Need to show that Nash equilibrium does not exist when Akerlof unraveling condition does not hold
  - Case 1: $P = 1$ has positive probability
    - Risks $p < 1$ need to subsidize $p = 1$ type in order to get insurance
  - Case 2: $P$ is continuous and bounded away from $P = 1$.
    - We know Akerlof unraveling condition cannot hold
    - Follow Riley (1979) – shows there’s an incentive to pool types -> breaks potential for Nash equilibrium existence
Generic No Equilibrium (Riley)
Generic No Equilibrium (Riley) (2)
Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz.
Summary

- Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz
- No gains to trade $\rightarrow$ unravels a la Akerlof
• Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz
• No gains to trade $\Rightarrow$ unravels a la Akerlof
  • No profitable deviations $\Rightarrow$ competitive equilibrium exists
Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz

- No gains to trade $\rightarrow$ unravels a la Akerlof
  - No profitable deviations $\rightarrow$ competitive equilibrium exists
- Gains to trade $\rightarrow$ no unraveling a la Akerlof
Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz

- No gains to trade -> unravels a la Akerlof
  - No profitable deviations -> competitive equilibrium exists

- Gains to trade -> no unraveling a la Akerlof
  - But there are profitable deviations
Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz

No gains to trade $\rightarrow$ unravels a la Akerlof
  - No profitable deviations $\rightarrow$ competitive equilibrium exists

Gains to trade $\rightarrow$ no unraveling a la Akerlof
  - But there are profitable deviations
  - Generically, no Competitive Equilibrium (unravels a la Rothschild and Stiglitz)
Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz

No gains to trade -> unravels a la Akerlof

  - No profitable deviations -> competitive equilibrium exists

Gains to trade -> no unraveling a la Akerlof

  - But there are profitable deviations
  - Generically, no Competitive Equilibrium (unravels a la Rothschild and Stiglitz)

We don’t have a model of insurance markets!
Summary

- Generically, either the market unravels a la Akerlof or Rothschild and Stiglitz
- No gains to trade -> unravels a la Akerlof
  - No profitable deviations -> competitive equilibrium exists
- Gains to trade -> no unraveling a la Akerlof
  - But there are profitable deviations
  - Generically, no Competitive Equilibrium (unravels a la Rothschild and Stiglitz)
- We don’t have a model of insurance markets!
  - Generically, the standard Nash model generically fails to make predictions precisely when there are theoretical gains to trade
Solutions to the Non-Existence Problem

- Two classes of models in response to non-existence
- Consider 2-stage games:
  - Stage 1: firms post menu of contracts
  - Stage 2: Assumption depends on equilibrium notion:
    - Miyazaki-Wilson-Spence: Firms can drop unprofitable contracts
      - Formalized as dynamic game in Netzer and Scheuer (2013)
    - Riley: Firms can add contracts
      - Formalized as dynamic game in Mimra and Wambach (2011)
- Then, individuals choose insurance contracts
Reaching the Pareto frontier requires allowing some contracts to run deficits/surplus

- Riley shows that individuals generically are willing to “buy off” worse risks’ incentive constraints

Miyazaki Wilson Spence allows for this if the good types want to subsidize the bad types

- If you try to steal my profitable contract, I drop the corresponding negative profit contract and you get dumped on!

MWS equilibrium maximizes welfare of best risk type by making suitable compensations to all other risk types to relax IC constraint
Predicts “fully separating” contracts with no cross-subsidization across types
- IC constraint + zero profit constraints determine equilibrium

Why no cross-subsidization?
- If cross-subsidization, then firms can add contracts.
- But, firms forecast this response and therefore no one offers these subsidizing contracts

Predicts no trade if full support type distribution
Other non-game-theoretic approaches

- **Walrasian:**
  - Bisin and Gotardi (2006)
    - Allow for trading of choice externalities \(\rightarrow\) reach efficient frontier/MWS equilibrium (pretty unrealistic setup...)
  - Azevedo and Gottlieb (2014)? \(\rightarrow\) reach inefficient Riley equilibria

- **Search / limited capacity / etc.**
  - Guerrieri and Shimer (2010) \(\rightarrow\) reach inefficient Riley equilibria
Empirical Question?

- Need theory of a mapping from type distributions to outcomes
  - Standard model works if prediction is no trade
    - Hendren (2013) shows this happens for those with “pre-existing conditions” in LTC, life, and disability insurance
  - But, standard model fails when market desires cross-subsidization
    - Key debate: can competition deliver cross-subsidization?
    - Should be empirical question!? 
- In short, insurance markets are fun because no one agrees about how to model them!