

Market Design Perspectives on Inequality

Scott Duke Kominers

Society of Fellows, Harvard University

Summer School on Socioeconomic Inequality

Human Capital and Economic Opportunity Global Working Group, University of Chicago

July 21, 2016

Market Design Perspectives on Inequality I: Talk

Scott Duke Kominers

Society of Fellows, Harvard University

Summer School on Socioeconomic Inequality

Human Capital and Economic Opportunity Global Working Group, University of Chicago

July 21, 2016

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

What is Market Design?

Application of economic principles and game theory to the design (or re-design) of market institutions.

What is Market Design?

Market design translates economic theory and analysis into practical solutions to real-world problems.

What is Market Design?

Theory $\longrightarrow$ Practice $\longrightarrow$ Evaluation

What is Market Design?

Theory $\longrightarrow$ Practice $\longrightarrow$ Evaluation

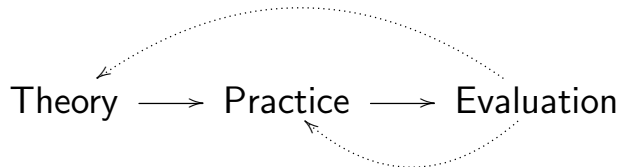
What is Market Design?

Theory $\longrightarrow$ Practice $\longrightarrow$ Evaluation

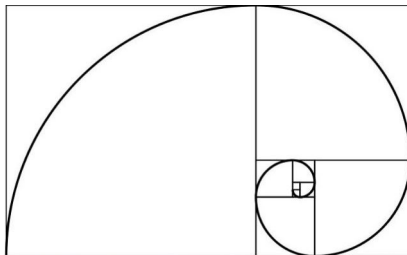
What is Market Design?

Theory $\longrightarrow$ Practice $\longrightarrow$ Evaluation

What is Market Design?



What is Market Design?



What is Market Design?



What is Market Design?

- ① Economic Engineering
e.g., improving incentives; “leveling the playing field”

What is Market Design?

- 1 Economic Engineering
e.g., improving incentives; “leveling the playing field”
- 2 Working Around Impossibility Results
e.g., nonexistence results

What is Market Design?

- 1 Economic Engineering
e.g., improving incentives; “leveling the playing field”
- 2 Working Around Impossibility Results
e.g., nonexistence results
- 3 Working Within Existing Conditions (where possible/necessary)
e.g., existing policy goals

What is Market Design?

- 1 Economic Engineering
e.g., improving incentives; “leveling the playing field”
- 2 Working Around Impossibility Results
e.g., nonexistence results
- 3 Working Within Existing Conditions (where possible/necessary)
e.g., existing policy goals
- 4 Organizing Market Function
e.g., strategy-proof mechanisms → accurate data

Some Key Concepts

- 1 Strategy-Proofness (vs. Manipulability)
 - essential for ensuring simplicity; not always achievable

Some Key Concepts

- ① Strategy-Proofness (vs. Manipulability)
 - essential for ensuring simplicity; not always achievable

- ② Market Thickness
 - success requires *participation*

Some Key Concepts

- ➊ Strategy-Proofness (vs. Manipulability)
 - essential for ensuring simplicity; not always achievable
- ➋ Market Thickness
 - success requires *participation*
- ➌ Market “Details”
 - vary from setting to setting; often depend on policy goals

Some Key Concepts

- ➊ Strategy-Proofness (vs. Manipulability)
 - essential for ensuring simplicity; not always achievable
- ➋ Market Thickness
 - success requires *participation*
- ➌ Market “Details”
 - vary from setting to setting; often depend on policy goals
- ➍ Flexibility
 - often crucial for market organizers

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

(Centralized) School Choice

- Centralized assignment of K-12 public school seats.
- Students (i.e. their parents) are (potentially) strategic agents.
- School seats are “goods”; students have unit demand.
- Students’ priorities at schools are **exogenous**.

Basic Theory of School Choice (Abdulkadiroğlu–Sönmez, 2003)

- $I \sim$ set of students
- $C \sim$ set of schools

Basic Theory of School Choice (Abdulkadiroğlu–Sönmez, 2003)

- $I \sim$ set of students
- $C \sim$ set of schools
- $P^i \sim$ preference ranking of $i \in I$ over schools (and $\emptyset$)

Basic Theory of School Choice (Abdulkadiroğlu–Sönmez, 2003)

- $I \sim$ set of students
- $C \sim$ set of schools
- $P^i \sim$ preference ranking of $i \in I$ over schools (and $\emptyset$)
- $\Pi^c \sim$ priority ranking of $c \in C$ over students
- $q_c \sim$ total capacity of $c \in C$

Basic Theory of School Choice (Abdulkadiroğlu–Sönmez, 2003)

- $I \sim$ set of students
- $C \sim$ set of schools
- $P^i \sim$ preference ranking of $i \in I$ over schools (and $\emptyset$)
- $\Pi^c \sim$ priority ranking of $c \in C$ over students
- $q_c \sim$ total capacity of $c \in C$
- A **match** μ specifies an assignment of students to schools.
(must respect capacities – $|\mu(c)| \leq q_c$)

Basic Theory of School Choice (Abdulkadiroğlu–Sönmez, 2003)

- $I \sim$ set of students
- $C \sim$ set of schools
- $P^i \sim$ preference ranking of $i \in I$ over schools (and $\emptyset$)
- $\Pi^c \sim$ priority ranking of $c \in C$ over students
- $q_c \sim$ total capacity of $c \in C$
- A **match** μ specifies an assignment of students to schools.
(must respect capacities – $|\mu(c)| \leq q_c$)
- A **mechanism** φ assigns a match, given submitted preferences.

Basic Design Goals

- **Individual Rationality** ($\sim$ participation)
 - No student wants to drop out (i.e. $\mu(i)P^i\emptyset$).

Basic Design Goals

- **Individual Rationality** ($\sim$ participation)
 - No student wants to drop out (i.e. $\mu(i)P^i\emptyset$).
- **Elimination of Justified Envy** ($\sim$ stability)
 - If i envies j , then j has higher priority than i at $\mu(j)$ (i.e. $\mu(j)P^i\mu(i) \implies j\Pi^{\mu(j)}i$).

Basic Design Goals

- **Individual Rationality** ($\sim$ participation)
 - No student wants to drop out (i.e. $\mu(i)P^i\emptyset$).
- **Elimination of Justified Envy** ($\sim$ stability)
 - If i envies j , then j has higher priority than i at $\mu(j)$ (i.e. $\mu(j)P^i\mu(i) \implies jP^{\mu(j)}i$).
- **Strategy-proofness**
 - Truthfulness is dominant (i.e. $\varphi(P^i, P^{-i})P^i\varphi(\bar{P}^i, P^{-i})$).

Basic Design Goals

- **Individual Rationality** ($\sim$ participation)
 - No student wants to drop out (i.e. $\mu(i)P^i\emptyset$).
- **Elimination of Justified Envy** ($\sim$ stability)
 - If i envies j , then j has higher priority than i at $\mu(j)$ (i.e. $\mu(j)P^i\mu(i) \implies jP^{\mu(j)}i$).
- **Strategy-proofness**
 - Truthfulness is dominant (i.e. $\varphi(P^i, P^{-i})P^i\varphi(\bar{P}^i, P^{-i})$).
- **Pareto Efficiency**

Basic Design Goals

- **Individual Rationality** ($\sim$ participation)
 - No student wants to drop out (i.e. $\mu(i)P^i\emptyset$).
- **Elimination of Justified Envy** ($\sim$ stability)
 - If i envies j , then j has higher priority than i at $\mu(j)$ (i.e. $\mu(j)P^i\mu(i) \implies jP^{\mu(j)}i$).
- **Strategy-proofness**
 - Truthfulness is dominant (i.e. $\varphi(P^i, P^{-i})P^i\varphi(\bar{P}^i, P^{-i})$).
- **Pareto Efficiency**
- **Respect of (unambiguous) Improvements in Priority**

Backdrop: A Negative Result (Kesten, 2010)

Theorem

There is no Pareto efficient and strategy-proof mechanism that selects the Pareto efficient and stable match whenever such a match exists.

The Deferred Acceptance Mechanism

Step 1

- Each student applies to his/her first-choice school.
- Each school tentatively “holds” its highest-priority applicants (up to capacity) and rejects all others.

Step $\ell \geq 2$

- Each student not currently “held” applies to his/her most-preferred school that has not yet rejected him/her.
- Each school “holds” its highest-priority applicants (up to capacity) and rejects all others.

★ Is stable and strategy-proof; is not Pareto efficient.

The Immediate Acceptance Mechanism

Step 1

- Each student applies to his/her first-choice school.
- Each school accepts its highest-priority applicants (up to capacity) and rejects all others.

Step $\ell \geq 2$

- Each not-yet-accepted student applies to his/her ℓ -th choice.
- Each school accepts its highest-priority applicants (up to remaining capacity) and rejects all others.

-
- ★ Is Pareto efficient; is *neither* stable nor strategy-proof.
 - ★ Popular in practice – why?

The Problem with Immediate Acceptance

Even if a student has very high priority at school c , he can lose his priority to students who have top-ranked school c !

For a better choice of your “first choice” school [...] consider choosing less popular schools.

(Introducing Boston Public Schools, 2004)

The Problem with Immediate Acceptance

Even if a student has very high priority at school c , he can lose his priority to students who have top-ranked school c !

Make a realistic, informed selection on the school you list as your first choice. It's the cleanest shot you will get at a school, but if you aim too high you might miss.

*Here's why: If the random computer selection rejects your first choice, your chances of getting your second choice school are greatly diminished. That's because **you then fall in line behind everyone who wanted your second choice school as their first choice**. You can fall even farther back in line as you get bumped down to your third, fourth and fifth choices.*

(St. Petersburg Times, 2003)

The Problem with Immediate Acceptance

Even if a student has very high priority at school c , he can lose his priority to students who have top-ranked school c !

*One school choice strategy is to **find a school you like that is undersubscribed** and put it as a top choice, OR, find a school that you like that is popular and put it as a first choice and find a school that is less popular for a **“safe” second choice**.*

(West Zone Parents Group minutes, 2003)

Sincere vs. Sophisticated (Parents) (Pathak–Sönmez, 2008)

- Assume that the unsophisticated are truthful.
 - natural default behavior
 - suggested by anecdotes (Hastings–Kane–Staiger, 2005) and experimental evidence (Chen–Sönmez, 2006)
- Assume that the sophisticated best-respond.
- Consider the equilibrium ...

Sincere vs. Sophisticated (Parents) (Pathak–Sönmez, 2008)

- 1 In equilibrium under the Immediate Acceptance mechanism, sincere students lose their priorities to sophisticated students.
- 2 Sophisticated students never lose priority; sincere students may gain priority at the expenses of other sincere students.
- 3 (Coordinated) sophisticated students prefer IA to DA.
- 4 Sophisticated students prefer that the sincere remain sincere.

Sincere vs. Sophisticated (Parents) (Pathak–Sönmez, 2008)

A strategy-proof algorithm “levels the playing field” by diminishing the harm done to parents who do not strategize or do not strategize well.

(BPS Strategic Planning Team, 2005)

Sincere vs. Sophisticated (Parents) (Pathak–Sönmez, 2008)

Changing the market-clearing mechanism can be a step towards ensuring equality of access.

\footnote

The Pathak–Sönmez (2008) paper is a true paragon.

There is LOTS more school choice theory. . . .

- **Incorporating Affirmative Action**

(Kojima, 2012; Hafalir–Yenmez–Yildirim, 2013; K.–Sönmez, 2016)

- **Incentivizing School Improvement**

(Hatfield–Kojima–Narita, forth.)

- **Encouraging Charter Schools to Participate**

(Ekmekci–Yenmez, 2014; Roth–Shorrer, 2015)

- **Achieving “Cardinal” Efficiency**

(Abdulkadiroğlu–Che–Yasuda, 2011; Lu, 2014)

- **Creating True “Choice”**

(Calsamiglia–Güell, 2014; Calsamiglia–Miralles, 2014)

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

Recall: What is Market Design?

Application of economic principles and game theory to the design (or re-design) of market institutions.

Recall: What is Market Design?

Market design translates economic theory and analysis into practical solutions to real-world problems.

So...

What does a “market design problem” look like?

So...

What does a “market design problem” look like?



(Some) Types of Market Design Interventions

(Some) Types of Market Design Interventions

① Marketplace Mechanism (Re-)Design

(Some) Types of Market Design Interventions

- ➊ Marketplace Mechanism (Re-)Design
- ➋ Information Provision

(Some) Types of Market Design Interventions

- 1 Marketplace Mechanism (Re-)Design
- 2 Information Provision
- 3 (Re-)Shaping the Extensive Margin

(Some) Types of Market Design Interventions

- 1 Marketplace Mechanism (Re-)Design
- 2 Information Provision
- 3 (Re-)Shaping the Extensive Margin
- 4 Market Creation

Marketplace Mechanism (Re-)Design

A market exists, but it does not achieve welfare/distributional goals.

- “Classical” market design – often in circumscribed contexts.
 - The welfare function and other design goals are often determined by policymakers and/or market makers; we act as engineers.
- e.g. Boston school choice redesign; implementation of affirmative action systems; design of adoption exchanges. . . .

Information Provision

Participants in the market have unequal information (and/or unequal incentives for information acquisition).

- Goal: Change the information flow, to equalize or rebalance.
 - The market organizer may need to assemble information upfront. . . but some mechanisms do provide efficient information acquisition incentives.
 - Uninformedness is a big issue—agents need to understand that information is available, and how to use it.

e.g. Entry-level job certification; reporting school quality; mapping nutrition/health resources. . . .

(Re-)Shaping the Extensive Margin

*A market exists, but agents do not participate
(or wholly lack access).*

- Solutions often start with ethnography:
 - *Where in the pipeline does participation breakdown? And what is the source of friction?*
- Some Common Causes:
 - transaction costs,
 - historical exclusion,
 - unawareness of the market,
 - inability to locate/define participants.

e.g. Digitization, public healthcare exchanges, land allocation, alternate college access channels. . . .

Market Creation

The market is “missing” somehow—often via failure of coordination or pricing.

- Often associated with “trivial” first-order theory. . .
 - “There’s a good that’s being thrown out; other people want it; all we need is a conduit (with prices)!”
- . . . yet “practical” theory can be subtle.
 - “So why hasn’t a market emerged?”

e.g. Supplying food banks; youth summer employment programs; teacher allocation systems. . . .

(Some) Types of Market Design Interventions

- 1 Marketplace Mechanism (Re-)Design
- 2 Information Provision
- 3 (Re-)Shaping the Extensive Margin
- 4 Market Creation

Notes

Notes

- *Market design is fun!*

Notes

- *Market design is fun!*
- *Lots of policymakers and entrepreneurs do market design!*

Notes

- *Market design is fun!*
- *Lots of policymakers and entrepreneurs do market design!*
- *“Typology” is a bit of a misnomer – Different types of market design overlap!*

Notes

- *Market design is fun!*
- *Lots of policymakers and entrepreneurs do market design!*
- *“Typology” is a bit of a misnomer – Different types of market design overlap!*
- *While we have focused on inequality-related examples, all the stories so far make sense in more general contexts.*

Overview

Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Later

- Case Studies/Examples

Overview

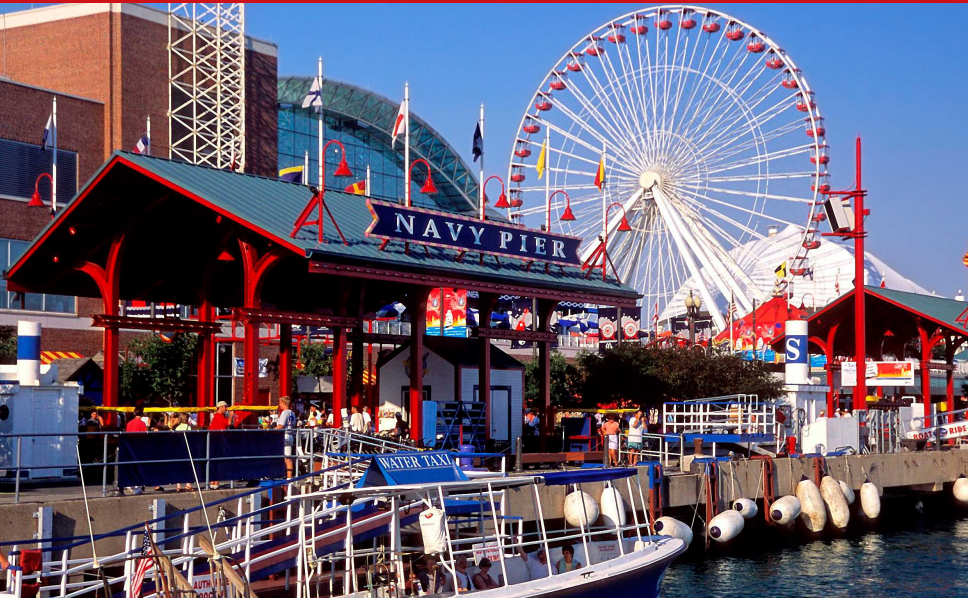
Now

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Next

- Case Studies/Examples

\pause



Market Design Perspectives on Inequality II: Action

Scott Duke Kominers

Society of Fellows, Harvard University

Summer School on Socioeconomic Inequality

Human Capital and Economic Opportunity Global Working Group, University of Chicago

July 21, 2016

Overview

Earlier

- The Market Design Approach
- One Example from School Choice
- Typology and Discussion

Now

- Case Studies/Examples

(Some) Application Domains (Citations NOT exhaustive!!)

- **Adoption** (Slaugh–Akan–Kesten–Ünver, 2016)
- **Food Banks** (Prendergast, 2016)
- **Public Housing** (Leshno, 2015; Thakral, 2016)
- **Refugee Resettlement** (Rapoport, 2014; Jones–Teytelboym, 2015)
- **Healthcare** (Lindau *et al.*, 201*)
- **Sharing Economy** (Edelman–Luca–Svirsky, 2016)
- **Teacher Allocation** (Featherstone, 2014; Davis–Montagnes, 2015)
- **Youth Employment** (Gelber–Isen–Kessler, 2016)
- **Labor Markets** (Pallais, 2014; Stanton–Thomas, forth.)

(Some) Application Domains (Citations NOT exhaustive!!)

- **Adoption** (Slaugh–Akan–Kesten–Ünver, 2016)
- **Food Banks** (Prendergast, 2016)
- **Public Housing** (Leshno, 2015; Thakral, 2016)
- **Refugee Resettlement** (Rapoport, 2014; Jones–Teytelboym, 2015)
- **Healthcare** (Lindau *et al.*, 201*)
- **Sharing Economy** (Edelman–Luca–Svirsky, 2016)
- **Teacher Allocation** (Featherstone, 2014; Davis–Montagnes, 2015)
- **Youth Employment** (Gelber–Isen–Kessler, 2016)
- **Labor Markets** (Pallais, 2014; Stanton–Thomas, forth.)



**KEEP
CALM
AND
DESIGN
MARKETS**

Marketplace Mechanism (Re-)Design

A market exists, but it does not achieve welfare/distributional goals.

- “Classical” market design – often in circumscribed contexts.
- The welfare function and other design goals are often determined by policymakers and/or market makers; we act as engineers.

e.g. Boston school choice redesign; implementation of affirmative action systems; design of adoption exchanges. . . .

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)



“established in 1979 to support county and nonprofit agencies as they attempt to find adoptive families for children who are difficult to place [...]

maintains detailed data on children and the preferences of families [...] to recommend matches between families and children.”

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- Pennsylvania child welfare appropriations $\geq$ \$1.5B in 2014-2015
 - $\sim$ 15,000 children in foster care; 2,000 waiting for adoption
 - Placing children with permanent families is important!

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- Pennsylvania child welfare appropriations $\geq$ \$1.5B in 2014-2015
 - $\sim$ 15,000 children in foster care; 2,000 waiting for adoption
 - Placing children with permanent families is important!
- Individual caseworkers expressed widespread dissatisfaction with the Pennsylvania Adoption Exchange. . .

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- Pennsylvania child welfare appropriations $\geq$ \$1.5B in 2014-2015
 - $\sim$ 15,000 children in foster care; 2,000 waiting for adoption
 - Placing children with permanent families is important!
- Individual caseworkers expressed widespread dissatisfaction with the Pennsylvania Adoption Exchange BUT expressed “positive views about possible helpfulness of the registration data.”
 - $\Rightarrow$ natural avenue for economic design

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

“We reviewed registration and outcome information about children served by PAE to better understand adoption trends in Pennsylvania and the varying levels of difficulty in trying to find adoptive placements.”

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

Table 1 We choose 28 factors from the available 88 factors to model child outcomes using ordinary least squares and logistic regression methods. Age upon registration, which is a negative factor for children six years of age and older, was the most important factor for predicting outcomes.

	Dependent variable:					
	Outcome Value		Outcome (Binary)		Freq.	Import.
	Ordinary	Least Squares	Logistic			
Constant	0.794	*** (0.046)	1.516	*** (0.372)		
Age upon Registration (years)	0.020	** (0.009)	0.102	(0.075)		High
(Age upon Registration) ²	-0.003	*** (0.0005)	-0.017	*** (0.004)		High
Registration Year (after 2005)	-0.009	** (0.004)	-0.059	* (0.031)		
Male	0.019	(0.017)	0.100	(0.128)	57.1%	High
African-American	-0.034	** (0.017)	-0.198	(0.132)	42.5%	High
Hispanic	-0.051	** (0.024)	-0.303	* (0.179)	14.1%	High
SPECIAL NEEDS						
Mental Retardation Diagnosis	-0.109	*** (0.031)	-0.562	** (0.230)	9.0%	High
Multiple Placement History	-0.035	* (0.018)	-0.189	(0.137)	45.6%	Medium
Drug Exposed Infant	-0.020	(0.026)	-0.100	(0.202)	11.6%	Medium
Emotional Disability	-0.019	(0.022)	-0.071	(0.162)	20.2%	Medium
General Education	0.064	*** (0.019)	0.353	** (0.146)	37.1%	
Siblings	0.085	*** (0.019)	0.465	*** (0.143)	47.3%	High
CHILD CHARACTERISTICS						
Blind	-0.164	* (0.085)	-0.899	(0.611)	1.0%	Medium
Uses Foul or Bad Language	-0.118	*** (0.027)	-0.613	*** (0.194)	15.0%	Medium
History of Running Away	-0.086	** (0.043)	-0.443	(0.321)	4.2%	High
Desires Contact with Siblings	-0.079	*** (0.020)	-0.443	*** (0.152)	59.4%	Low
In Contact with Former Foster Family	-0.064	*** (0.022)	-0.353	** (0.162)	18.8%	Low
Rejects Father Figures	-0.061	** (0.031)	-0.345	(0.230)	8.5%	Low
Difficulty Accepting and Obeying Rules	-0.061	*** (0.022)	-0.337	** (0.160)	36.9%	Low
In Contact with Birth Parents	-0.058	*** (0.020)	-0.327	** (0.153)	26.0%	Low
Num. of Characteristics Present	0.007	*** (0.003)	0.034	* (0.020)		
Parent(s) with Criminal Record	0.017	(0.018)	0.087	(0.138)	51.6%	Low
Difficulty Relating to Others	0.018	(0.022)	0.101	(0.168)	31.0%	Low
Speech Problems	0.024	(0.024)	0.176	(0.191)	18.4%	Low
Previous Adoption or Disruption	0.038	* (0.021)	0.220	(0.155)	24.1%	Low
Strong Ties to Foster Family	0.041	** (0.018)	0.226	* (0.134)	54.2%	Low
Vision Problems	0.042	* (0.023)	0.224	(0.175)	17.1%	Low
High Achiever	0.054	** (0.025)	0.283	(0.190)	13.1%	Low
Observations		1,514		1,514		

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

“We reviewed registration and outcome information about children served by PAE to better understand adoption trends in Pennsylvania and the varying levels of difficulty in trying to find adoptive placements.”

- *Uncovered five factors in non-adoption that the PAE had not previously realized were important.*
- *Developed data-driven tool for proposing matches.*

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- “The adoption rate increases with the amount of information about the families’ preferences utilized [. . .].”

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

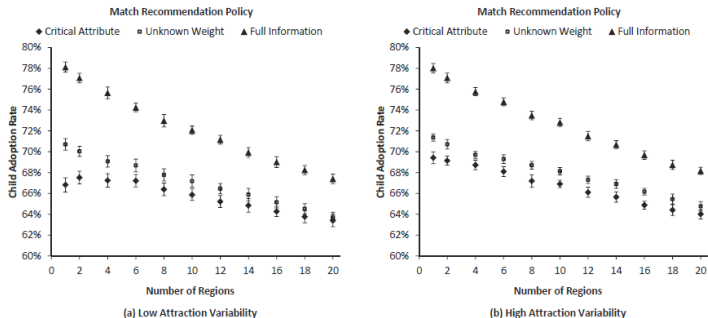


Figure 3 The child adoption rate increases with the quality of information available for matching and decreases with the number of regions (i.e., the segmentation of the network).

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- “The adoption rate increases with the amount of information about the families’ preferences utilized [...].”
 - Using “narrow matching” can yield large gains (7.7% $\rightsquigarrow$ 41%).
 - The PAE is now collecting additional information for use in match recommendations, and is tracking match outcomes.

Designing Adoption Exchanges (Slaugh–Akan–Kesten–Ünver, 2016)

- “The adoption rate increases with the amount of information about the families’ preferences utilized [...].”
 - Using “narrow matching” can yield large gains (7.7% $\rightsquigarrow$ 41%).
 - The PAE is now collecting additional information for use in match recommendations, and is tracking match outcomes.
- The PAE is also working to reduce incentives for strategic manipulation....
 - “Batching” allows the PAE to spot families who may be over-representing willingness to take children with special needs.

Refugee Resettlement

(Rapoport, 2014; Jones–Teytelboym, 2015; Delacrétaz–K.–Teytelboym, 2016)

FINANCIAL TIMES

WORLD US COMPANIES MARKETS OPINION WORK & CAREERS LIFE & ARTS

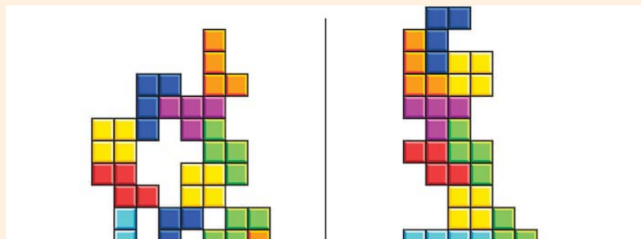
FT Magazine

+ Follow

The refugee crisis – match us if you can

‘However many refugees we decide to resettle, there’s no excuse for doing the process wastefully’

“Undercover Economist



Information Provision

Participants in the market have unequal information (and/or unequal incentives for information acquisition).

- Goal: Change the information flow, to equalize or rebalance.
 - The market organizer may need to assemble information upfront. . . but some mechanisms do provide efficient information acquisition incentives.
 - Uninformedness is a big issue—agents need to understand that information is available, and how to use it.

e.g. Entry-level job certification; reporting school quality; mapping nutrition/health resources. . . .

(Re-)Shaping the Extensive Margin

*A market exists, but agents do not participate
(or wholly lack access).*

- Solutions often start with ethnography:
 - *Where in the pipeline does participation breakdown? And what is the source of friction?*
- Some Common Causes:
 - transaction costs,
 - historical exclusion,
 - unawareness of the market,
 - inability to locate/define participants.

e.g. Digitization, public healthcare exchanges, land allocation, alternate college access channels. . . .

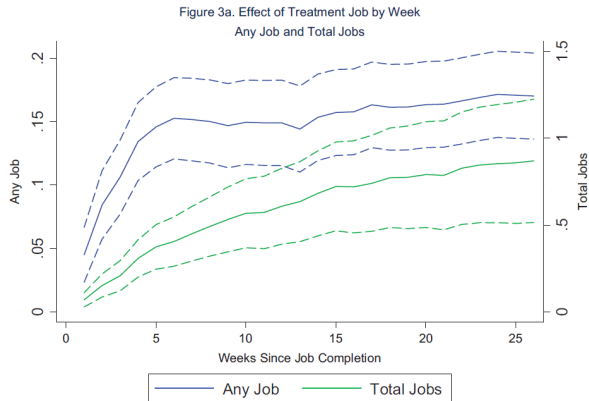
Entry-Level Labor Certification (Pallais, 2014)

“Young workers are more likely to be unemployed than older, more experienced workers. A key question in designing policies to improve young workers’ labor market outcomes is whether their poor outcomes result from human capital deficiencies or barriers to labor market entry. If it is the former, then these workers may need to engage in intensive education or training programs to succeed in the labor market. If it is the latter, then programs that simply give these workers a foot in the door may have long-lasting benefits.”

Entry-Level Labor Certification (Pallais, 2014)

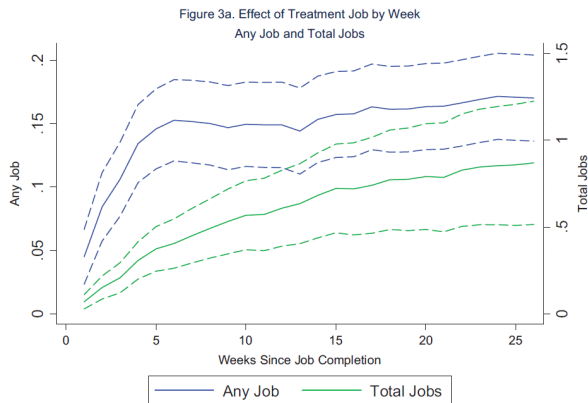
“Workers in the sample were randomized into three groups: two treatment groups (with 476 workers in each) and a control group (containing the remaining 2,815 workers). [...] I hired workers in both the ‘coarse evaluation treatment’ and ‘detailed evaluation treatment’ groups. I provided workers in both treatment groups with a public one-to-five rating, calculated from their actual performance statistics and normed to match the distribution of ratings in the market. [...] The difference between the two treatment groups was the amount of information about workers’ performance that was in the public comment I provided.”

Entry-Level Labor Certification (Pallais, 2014)



Note: Dashed lines indicate 95% confidence intervals.

Entry-Level Labor Certification (Pallais, 2014)



Note: Dashed lines indicate 95% confidence intervals.

- ~ worker welfare gains on the order of \$52,000 (across the market)
- ~ firm welfare gains on the order of \$2,800 (across the market)

Entry-Level Labor Certification (Pallais, 2014)

"It is [un]likely that workers accumulated human capital in these jobs. Workers worked a maximum of 10 hours; the average hire worked for only 7.6 hours. Given workers' offline experience, this was a very small increment to their total work experience. I did not provide training or guidance[...]."

*The second alternative is that **the act of hiring a worker caused the market to positively update its belief about the worker's ability** [and this is supported in further empirical tests]."*

Non-Standard Skill Certification via Contests

(Glaeser–Hilllis–K.–Luca, 2016)

Keeping it Fresh: Predict Restaurant Inspections

HOSTED BY DRIVENDATA



Submissions Close:

July 7, 2015, 11:59 p.m.

Evaluation Period Ends:

Aug. 19, 2015, 11:59 p.m.

Place	Prize Amount
1st	\$3,000
2nd	\$1,000
3rd	\$1,000

The Unequal Sharing Economy (Edelman–Luca–Svirsky, 2016)

Because they facilitate commerce at a distance, online platforms can conceal information that might otherwise enable discrimination. [...]

However, these advantages are by no means guaranteed, and in fact they depend on design choices made by each online platform. Over time, platforms have moved toward systems that favor more revealing profiles that reduce anonymity for users. New platforms also often grant sellers the ability to handpick the people they transact with. [...]

The Unequal Sharing Economy (Edelman–Luca–Svirsky, 2016)

Method: *Split study styled after Bertrand–Mullainathan (2004), with AirBnB accounts “differ[ing] by name but [...] otherwise identical.”*

The Unequal Sharing Economy (Edelman–Luca–Svirsky, 2016)

Method: *Split study styled after Bertrand–Mullainathan (2004), with AirBnB accounts “differ[ing] by name but [...] otherwise identical.”*

Findings: *Significant discrimination against guests with African-American-sounding names (42% inquiry acceptances vs. 50% for guests with distinctively White names).*

The Unequal Sharing Economy (Edelman–Luca–Svirsky, 2016)

Natural Market Design Solutions(?):

- *Reduce information?*
- *Tax bias, and/or provide subsidies that encourage learning/debiasing?*

Digital Divides, More Generally

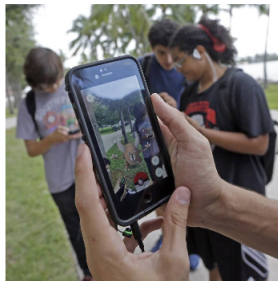
There are fewer Pokemon Go locations in black neighborhoods, but why?

HIGHLIGHTS

The locations in Pokemon Go were crowdsourced in a game with a smaller, tech-savvy audience

The company that made both games shut down user submissions in September

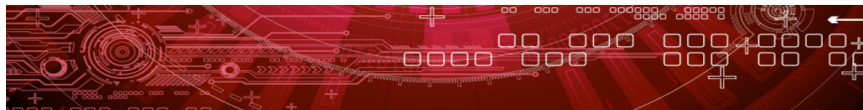
Without pokestops and gyms in their neighborhoods, players have to pay real money to collect items other players can get for free



Digital Divides, More Generally



International Journal of Communication



[HOME](#) [ABOUT](#) [LOGIN](#) [REGISTER](#) [SEARCH](#) [CURRENT](#) [ARCHIVES](#) [SUBMIT](#)

EDITORIAL BOARD FOUNDING EDITORS	Home > Vol 5 (2011) > Reagle Gender Bias in Wikipedia and Britannica <i>Joseph Reagle, Lauren Rhue</i> Abstract Is there a bias in the against women's representation in Wikipedia biographies? Thousands of biographical subjects, from six sources, are compared against the English-language Wikipedia and the online Encyclopædia Britannica with respect to coverage, gender representation, and article length. We conclude that Wikipedia provides better coverage and longer articles, that Wikipedia typically has more articles on women than Britannica in absolute terms, but Wikipedia articles on women are more likely to be missing than articles on men relative to Britannica. For both reference works, article length did not consistently differ by gender. Full Text: PDF	Journal Help
Manuel Castells Larry Gross EDITOR		USER Username Password ☐ Remember me Login
Larry Gross <i>Editor International Journal of Communication</i> USC <i>Annenberg School for Communication & Journalism</i> MANAGING EDITOR		ARTICLE TOOLS Indexing metadata How to cite item
Arlene Luck <i>Managing Editor, USC</i> <i>Annenberg Press, University of Southern California</i> BOOK REVIEW EDITORS		Email this article (Login required) Email the author (Login required) Post a Comment (Login required)
Gustavo Cardoso <i>University of Lisbon</i>		

Digital Divides, More Generally

NS

POLITICS

CULTURE

WORLD

SCIENCE & TECH

OUR WRITERS

LONG READS

THIS WEEK'S

BY
MARK GRAHAM

INTERNET

18 AUGUST 2014

Geotagging reveals Wikipedia is not quite so equal after all

It may be open to the world, but the articles on Wikipedia reflect existing hierarchies of knowledge.



Facebook



Twitter



Reddit



Email



Print

Wikipedia is often seen as a great equaliser. Every day, hundreds of thousands of people collaborate on a seemingly endless range of topics by writing, editing and discussing articles, and uploading images and video content. But it's starting to look like global coverage on Wikipedia is **far from equal**. This now ubiquitous source of information offers everything you could want to know about the US and Europe

Market Creation

The market is “missing” somehow—often via failure of coordination or pricing.

- Often associated with “trivial” first-order theory. . .
 - “There’s a good that’s being thrown out; other people want it; all we need is a conduit (with prices)!”
- . . . yet “practical” theory can be subtle.
 - “So why hasn’t a market emerged?”

e.g. Supplying food banks; youth summer employment programs; teacher allocation systems. . . .

“Feeding America” (Prendergast, 2016)



Mission: “to feed America’s hungry through a nationwide network of member food banks”

“Feeding America” (Prendergast, 2016)

“Conceptually, this is not a difficult problem: Feeding America should ensure that the food ends up with the food bank whose need is greatest, taking account of transportation costs, spoilage, and storage issues.”

“Feeding America” (Prendergast, 2016)

“Conceptually, this is not a difficult problem: Feeding America should ensure that the food ends up with the food bank whose need is greatest, taking account of transportation costs, spoilage, and storage issues.

In practice, it is much more problematic. [. . . O]ne can construct measures of poverty at this level that reflect reasonably well aggregate food needs. Despite this, there remain considerable obstacles in identifying how much any given food bank needs a particular load that Feeding America has to offer.”

“Feeding America” (Prendergast, 2016)

“Conceptually, this is not a difficult problem: Feeding America should ensure that the food ends up with the food bank whose need is greatest, taking account of transportation costs, spoilage, and storage issues.

In practice, it is much more problematic. [. . . O]ne can construct measures of poverty at this level that reflect reasonably well aggregate food needs. Despite this, there remain considerable obstacles in identifying how much any given food bank needs a particular load that Feeding America has to offer.”

~ quality vs. quantity tradeoff?

“Feeding America” (Prendergast, 2016)

“Conceptually, this is not a difficult problem: Feeding America should ensure that the food ends up with the food bank whose need is greatest, taking account of transportation costs, spoilage, and storage issues.

In practice, it is much more problematic. [. . . O]ne can construct measures of poverty at this level that reflect reasonably well aggregate food needs. Despite this, there remain considerable obstacles in identifying how much any given food bank needs a particular load that Feeding America has to offer.”

~ quality vs. quantity tradeoff?

~ unobserved variation in food access “outside the network”

“Feeding America” (Prendergast, 2016)

Design Goals:

- 1 *responding to idiosyncratic demand*
- 2 *sending food to the areas of greatest need*

“Feeding America” (Prendergast, 2016)

Design Goals:

- 1 *responding to idiosyncratic demand*
- 2 *sending food to the areas of greatest need*
- 3 *bringing in more food on the extensive margin*

“Feeding America” (Prendergast, 2016)

Pre-2005: “[A] food bank would receive a call or email from Feeding America letting them know that they had been assigned a ‘load’. This sometimes had conditions, such as a required pickup date. Food banks were (and remain) liable for transportation costs. *The choice of a food bank was to either say yes or no.* If a food bank refused a lot, these counted against their need measure as if it had been accepted.”

“Feeding America” (Prendergast, 2016)

Pre-2005: “[A] food bank would receive a call or email from Feeding America letting them know that they had been assigned a ‘load’. This sometimes had conditions, such as a required pickup date. Food banks were (and remain) liable for transportation costs. The choice of a food bank was to either say yes or no. *If a food bank refused a lot, these counted against their need measure as if it had been accepted.*”

“Feeding America” (Prendergast, 2016)

Pre-2005: “[A] food bank would receive a call or email from Feeding America letting them know that they had been assigned a ‘load’. This sometimes had conditions, such as a required pickup date. Food banks were (and remain) liable for transportation costs. The choice of a food bank was to either say yes or no. If a food bank refused a lot, these counted against their need measure as if it had been accepted.”

~ transparent, “fair”

“Feeding America” (Prendergast, 2016)

Pre-2005: “[A] food bank would receive a call or email from Feeding America letting them know that they had been assigned a ‘load’. This sometimes had conditions, such as a required pickup date. Food banks were (and remain) liable for transportation costs. The choice of a food bank was to either say yes or no. If a food bank refused a lot, these counted against their need measure as if it had been accepted.”

~ transparent, “fair”

~ BUT no demand indicators, treats all food types equally

“Feeding America” (Prendergast, 2016)

Design Puzzle: *“In order for consumer choice to play a role, it must be that – through some mechanism – a budget is created, by which we mean that if a consumer raises her hand to say she would like good x , it reduces the likelihood of receiving good y . Without the creation of such a budget, all hands are raised and so consumer choice becomes uninformative.”*

“Feeding America” (Prendergast, 2016)

Design Puzzle: *“In order for consumer choice to play a role, it must be that – through some mechanism – a budget is created, by which we mean that if a consumer raises her hand to say she would like good x , it reduces the likelihood of receiving good y . Without the creation of such a budget, all hands are raised and so consumer choice becomes uninformative.”*

~ but using real money exacerbates existing inequalities. . . .

“Feeding America” (Prendergast, 2016)

Market Design Solution:

- Feeding America introduced a scrip currency called “shares.”
 - Shares are allocated in proportion to assessed need.
- Food banks use shares to bid in daily food spot markets.
- Shares spent are redistributed the next day.

“Feeding America” (Prendergast, 2016)

Market Design Solution:

- Feeding America introduced a scrip currency called “shares.”
 - Shares are allocated in proportion to assessed need.
- Food banks use shares to bid in daily food spot markets.
- Shares spent are redistributed the next day.
- Additional features:
 - credit,
 - joint bidding,
 - negative prices,
 - selling food to the system. . .

“Feeding America” (Prendergast, 2016)

FEEDING AMERICA CHOICESystem® Logout | User Guide

[Welcome](#)
[Bidding Session](#)
[Reports](#)
[Maroon Load](#)
[Tools](#)
[Offers & Receipts](#)
[Bulletin Board](#)
[Support](#)

Time: 8:36 CT

- Morning session closes at 12:00 CT
- Afternoon session closes at 16:00 CT

FEEDING AMERICA

Load #	Loads	Description	Subsidy	Weight	Point Of Origin	Your Bid	
L144900	1	Bev, Gold Peach, MinuteMaid	\$0	27347	Wac,TX-76732		Bid
L144778	3	Dairy, Silk Cashew 6/64 oz.	\$0	43808	Mount Crawford,VA-22841		Bid
L144780	1	Dairy, Silk Cashew 6/64 oz.	\$0	43054	Mount Crawford,VA-22841		Bid
L144779	1	Dairy, Silk Cashew 6/64 oz. & Ture Almond	\$0	43498	Mount Crawford,VA-22841		Bid
L144786	1	Dairy, Silk, Internatinal Delight Ice Coffee	\$0	24532	Portland,OR-97230		Bid
L144785	1	Dairy, Silk, Internatinal Delight Ice Coffee	\$0	43394	Portland,OR-97230		Bid
L144902	1	DAIRY, YOPLAIT Yogurt various flvrs,4-6oz cups	\$0	35925	Allentown,PA-18106-8803		Bid
L144901	1	DAIRY, YOPLAIT Yogurt various flvrs,4-6oz cups	\$0	27981	Allentown,PA-18106-8803		Bid
L144899	1	HBC, Asst P&G HBC Damaged and Disco	\$0	8188	West Branch,IA-52358		Bid
L144861	1	HBC, EQUATE COLD & HOT PATCH	\$0	28372	Chicago,IL-60638		Bid
ML7691	1	NF, Emoty Banana Boxes	\$0	3900	Colorado Sprinos.CO-80915		Bid

Available Shares 60699
 Available Credit Shares 57000
 Total Shares Available 117699
 [Printable View](#)
 [Export To Excel](#)

~ My Current Bids

Load #	Load Description	Gross Weight	Bid Amount	Shares Used	Credit Used	Transportation	Multiple Ship To	Ship Comments

“Feeding America” (Prendergast, 2016)

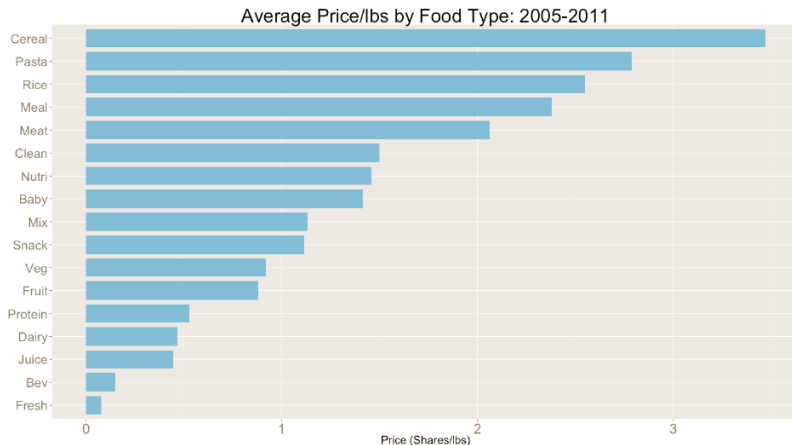


Figure 4: Prices of Different Foods

“Feeding America” (Prendergast, 2016)

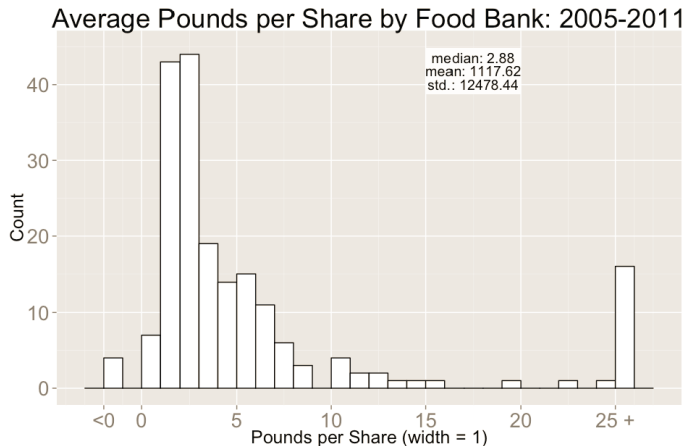
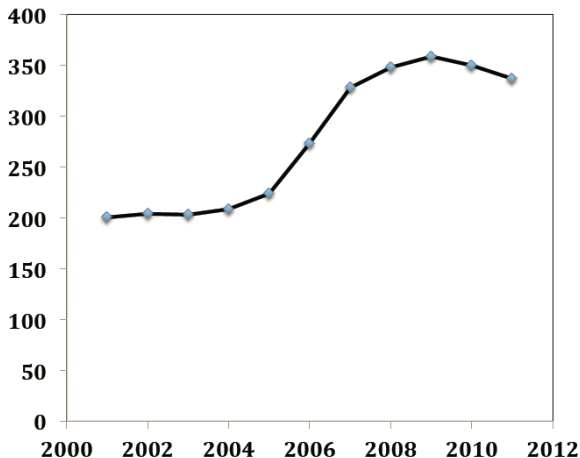


Figure 5: The Distribution of Average Prices Paid by Foodbank

“Feeding America” (Prendergast, 2016)

Total Yellow Pounds -Including those directly placed (Millions)



“Feeding America” (Prendergast, 2016)

Welfare Impact: *“Ignoring all the welfare benefits associated with better allocation of demand across food banks, consider the value of an extra 100 million pounds of food for people fed. The average person eats 4 pounds of food per day, so allowing for 20% spoilage (which is large), this implies that **the increased supply allows approximately an additional 60,000 people to receive those 4 pounds every day.**”*

“Feeding America” (Prendergast, 2016)

Welfare Impact: *“Ignoring all the welfare benefits associated with better allocation of demand across food banks, consider the value of an extra 100 million pounds of food for people fed. The average person eats 4 pounds of food per day, so allowing for 20% spoilage (which is large), this implies that **the increased supply allows approximately an additional 60,000 people to receive those 4 pounds every day.** As such, it represents a considerable endorsement for this market-like allocation mechanism.”*

“Daily Table”



“Daily Table is a not-for-profit retail store that offers our community a variety of tasty, convenient and affordable foods[...].

We [work with] growers, supermarkets, manufacturers, and other suppliers who donate their excess, healthy food to us, or provide us with special buying opportunities.

In this way, we are able to keep prices affordable for all our customers.”

\deepbreath



Recall: What is Market Design?

Market design translates economic theory and analysis into practical solutions to real-world problems.

(Some) Types of Market Design Interventions

- ➊ Marketplace Mechanism (Re-)Design
- ➋ Information Provision
- ➌ (Re-)Shaping the Extensive Margin
- ➍ Market Creation

Goals for Market Design $\leftrightarrow$ Inequality Interface

Goals for Market Design $\leftrightarrow$ Inequality Interface

1 Ensure Equality of Access

$\hookrightarrow$ Understand real-world {strategic, information, ...} deficits.

Goals for Market Design $\leftrightarrow$ Inequality Interface

1 Ensure Equality of Access

$\hookrightarrow$ Understand real-world {strategic, information, ...} deficits.

2 Actively Correct Distributional Inequalities

$\hookrightarrow$ Incorporate distributional goals into the welfare function(!).

Goals for Market Design $\leftrightarrow$ Inequality Interface

1 Ensure Equality of Access

$\hookrightarrow$ Understand real-world {strategic, information, ...} deficits.

2 Actively Correct Distributional Inequalities

$\hookrightarrow$ Incorporate distributional goals into the welfare function(!).

3 “Bring People Into the Market”

$\hookrightarrow$ Locate non-participants, and grok their incentives.

Goals for Market Design $\leftrightarrow$ Inequality Interface

1 Ensure Equality of Access

$\hookrightarrow$ Understand real-world {strategic, information, ...} deficits.

2 Actively Correct Distributional Inequalities

$\hookrightarrow$ Incorporate distributional goals into the welfare function(!).

3 “Bring People Into the Market”

$\hookrightarrow$ Locate non-participants, and grok their incentives.

4 Help Those Who are Already Fighting Inequality

$\hookrightarrow$ Go find them.

Goals for Market Design $\leftrightarrow$ Inequality Interface

Incorporate real-world constraints into a more “true” concept of efficiency

Goals for Market Design $\leftrightarrow$ Inequality Interface

*Incorporate real-world constraints into a more “true” concept of efficiency –
and then take action.*

\end{talk}

You too can be a market designer.

\end{talk}

You too can be a market designer.

