Conclusion and Perspectives

Alfred Galichon
"Matching Market" course
Sciences Po

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Course wrap-up

- **Differential Rents Model**:
  - bipartite matching, univariate types, Positive Assortative Matching (PAM):
  - which population is in excess supply $=>$ determines employment threshold
  - differential compensations using differential wage equation

$$u'(x) = \partial_x \Phi(x, T(x))$$

  - application: CEO literature (understand wage dispersion, test counterfactuals); hedonic models

- **Monge-Kantorovich duality:**
  - more general theory, works for any production function:
  - qualitative properties in the case of quadratic surplus
  - closed-form solutions for quadratic surplus, Gaussian distributions

- **Frictions:**
  - trade-off between quality of the match and cost of waiting.
  - limited competition: need for a bargaining solution.
  - time discounting solution (Shimer and Smith): realistic, technically involved, strong conditions needed for PAM.
  - additive search costs (Atakan): arguably less realistic model, but lighter derivations/more tractable equations.

- **Estimation**:
  - aim: understand production function

$$\Phi(x, y) = \alpha(x, y) + \gamma(x, y)$$

  and if possible, contributions α and γ individually, based on matching patterns $\mu(x, y)$ and transfers (wages) $w(x, y)$.
  - idea: introduce heterogeneity $\Phi(x, y) + z$.
  - problem: heterogeneity should affect matching patterns.

- **Discrete choice approach**: logit-based utility z, affects interactions between individuals and observable categories. Identifying equation

$$\exp(\frac{\Phi_{xy}}{2}) = \frac{\mu_{xy}}{\sqrt{\mu_{x0}\mu_{0y}}}$$

along with transfers $w(x, y)$, allows to identify α and γ.

- **Frictions approach:** because of frictions, z affects inhomogenously various matches. Surplus identified from

$$\frac{\mu(x, y)}{\mu_0(x)\,\mu_0(y)}$$

and the equation system provided by agents' Bellman equations. Again, α and γ are identified.

Related research fields

A number of fields rely more or less heavily on techniques introduced in this course. Among them:

- **economics of the family** (marriage):
  - identify marital surplus $\Phi(x, y)$
  - typical empirical questions: does change in matching patterns arise from a change in preferences or a change in populations characteristics (education)? what is the effect of college education on surplus through matching ("Marital College Premium")
  - References: Choo and Siow (2006), Chiappori, Orefice and Quintana-Domeque (2010), Chiappori, Salanié and Weiss (2011), Fox (2010), Galichon and Salanié (2010, 2011), Hitsch, Hortacsu and Ariely (2010).

- **finance**:
  - CEO compensation: 2-sided matching between CEOs

and firms, as seen in Lecture 1. References: Gabaix and Landier (2008), Tervio (2008), Edmans, Gabaix and Landier (2009), and Edmans and Gabaix (2011).
- Venture Capital: 2-sided matching between Entrepreneurs and Venture Capitalists. References: Sørensen (2007) and Bengtsson and Hsu (2010).
- Merger and Acquisitions: synergies are modeled as a bipartite matching model with buyers on one side, target on the other. References: Akkus and Hortacsu (2007), Park (2008).

- **industrial economics** (monopolistic competition):
  - Salop/Hotelling model: scarse y's (sellers), continuum of x's (buyers). Prediction of matching patterns, prices, local market power.
  - Feenstra and Levinsohn (1995), Berry, Levinsohn and Pakes (1995).

- **transportation economics/trade/geographic economics**:

- Aim: estimate transportation costs $c(x, y) = -\Phi(x, y)$ where x=residential location/producer country and y=work location/consumer country
- Reference: Gravity models (starting with Tinbergen, 1962 and subseq. lit.), Costinot and Vogel (2010)

- **hedonic pricing**:
  - Aim: estimate $U(x, z)$ and $\Gamma(y, z)$.
  - Reference: Chiappori, McCann and Nesheim (2010), Ekeland, Heckman and Nesheim (2004). Value of Statistical Life (VSL). See e.g. Viscusi and Hersch (2001) and surveys in Schelling (1987) and Viscusi (2008).

- **auction theory**:
  - Combinatorial auctions: radio spectrum, bus routes,
  - Analogy: firms=bidders, employees=goods.
  - References: de Vries and Vohra, R. (2003), Ausubel and Milgrom (2002).

- **contract theory**:
  - incentive compatibility condition in adverse selection problems yields optimal matching between agents and the contract they optimally choose.
  - References: Carlier (2001), Rochet (1987), Choné and Rochet (1998), Figalli, Kim and McCann (2011).

Some directions for future research

- **Tax**. While papers studies here test counterfactuals such as effect of compensation cap on value creation, effect of tax is less clear. How does a tax on transfers (income tax) affect the quality of the sorting between CEOs and firms? what is the effect of progressivity of the tax schedule?

- **Incomplete information**. The analysis in this course (either static, or dynamic) has assumed full information, so any moral hazard problem is ruled out. In

particular, the case where the CEO's effort is costly and unobserved, and his/her compensation can be made contingent on the firm's profits remains quite open. Some steps have been made in this direction, by Edmans, Gabaix and Landier (2009), and Edmans and Gabaix (2011), but some questions remain open, for instance the effect of the heterogeneity in risk aversion.

- **Search frictions**. The literature on search frictions makes a number of strong structural assumptions, and relaxing them may lead to interesting conclusions. In particular, in the model of Shimer and Smith it is assumed that the destruction of matches is exogenous. What happens when it is not, and when types of individuals evolve? Also, it is assumed that agents meet randomly. What happens when they have more control on whom they meet? when they have full control on whom they meet, it is likely that the frictionless solution will be recovered; but reality is probably inbetween. The asymptotics of the model close to the frictionless limit is also of interest.

- **One-to-many matching**. Among the topics discussed in this course, the one where the most promising research directions lie is probably one-to-many models of matching. How to extend the analysis to types in a parsimonious way? how to go beyond the Gross Substitutes hypothesis? how to test for the presence of complementarities between workers?

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