(Discussion of) Peer Effects under Endogenous Selection: An Application to Local and Migrant Children in Shanghai Elementary Schools

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Ideal Assignment Mechanism

cf. Graham (2008, *Econometrica*; 2018, *JEL*)

Idealized double random assignment mechanism:

1. Planner chooses fraction of students, s, in each available classroom that will be ‘local’ (must be *feasible*).

2. Local and migrant seats are filled by independent random draws from the two student populations.

3. Other classroom-level resources (e.g., teachers) also randomly assigned (*ignore differences in class-size*).

Key Question

How does the actual assignment mechanism deviate from this idealized one?

The paper confronts this question quite directly.

Production Function

cf. Benabou (1996, *ReStud*), Graham, Imbens Ridder (2010, *NBER*)

Under double random assignment...

The expected outcome of a local student when fraction s of her classmates are local is:

$$m_L(s).$$

The corresponding expected outcome for a migrant student is

$$m_M(s).$$

Efficiency

The classroom average outcome is

$$m(s) = sm_L(s) + (1-s)\, m_M(s).$$

Consumer two classrooms with ex ante composition s and

1. move ds local students from one classroom to the other (and ds migrant types in the opposite direction);

2. the net change in the average outcome will be:

$$\frac{m(s+\mathrm{d}s) + m(s-\mathrm{d}s) - 2m(s)}{2}.$$

Efficiency (continued)

For ds infinitesimally small this change will be positive if

$$\nabla_{ss} m(s) = 2\eta(s) + \lambda(s) \tag{1}$$

is greater than zero for

$$\begin{aligned} \eta(s) &\overset{def}{\equiv} \nabla_s m_H(s) - \nabla_s m_L(s) \\ \lambda(s) &\overset{def}{\equiv} s\nabla_{ss} m_H(s) + (1-s)\nabla_{ss} m_L(s). \end{aligned}$$

The first term in (1) measures the "technological" *complementarity* between own and peers' type.

The second term is what Benabou (1996) calls *curvature*.

Curvature

If the marginal benefit of an additional local student is declining in the fraction of local students already present in the classroom, then reallocations which increase segregation may be inefficient (even if own and peers' type are complementary).

$\eta(s) > 0$ drives segregation within and across schools.

Hukou system (likely?) amplifies any complementarity induced sorting (cf., effect of credit constraints in residential sorting in US context).

Tension between social planner's assignment and status quo.

Average Effects

Graham, Imbens and Ridder (2010) show that the effect of a small increase in segregation on average outcomes equals

$$\mathbb{E}\left[\omega\left(S\right)\nabla_{ss}m\left(S\right)\right]$$

with $\omega\left(S\right)$ a weight function.

See Eugster, Balestra and Liebert (forthcoming, *RESTAT*) for an nice empirical implementation using data from Switzerland.

Shanghai Context

Two types of policies:

1. those that change the classroom mix across classrooms within the same school (here the actual assignment mechanism may approximate double random assignment).

2. those that change the mix of students across classrooms and schools (here address selection into schools is unavoidable).

Game Theoretic Aspect

Relevance depends on policy under question.

With multiple equilibria the distribution of outcomes can change even in the absence of associational redistribution (e.g., Brock and Durlauf).

- "equilibrium shifts"

If primary policy is one of associational redistribution, underlying micro-structure may be less relevant (of course extrapolation risks).

Seems like a big deal

It appears as though the Shanghai education system is highly segregated.

The benefits of the *hukou system* (e.g., slowing the rate of migration to more manageable levels) need to be weighed against its possible effects of the distribution of human capital for future generations.

If changes in the organization of primary school can generate modest gains in aggregate human capital, the benefits to society can be considerable.

Experiments, lotteries...