Mobility and Opportunity

Frank Cowell

EC426

24 February 2014
Outline

Background
- Basics
- Ingredients
- Example

Intuition
- Methods
- Example

Measurement
- Fundamentals
- Result
- Example

Value
- Principles
- Questionnaire
- Results
Approaches to mobility

Why are we interested in mobility?
- A means of social and economic description
- A desirable social objective?
- A tool of social policy?

Mobility model may depend on application (Fields and Ok 1999)
- income or wealth mobility
- wage mobility
- educational, social status mobility

Measurement addressed from different standpoints
- temporal context:
  - inter / intra-generational (Van de gaer et al. 2001)
  - long term / volatility
- in relation to a specific dynamic model
- in relation to welfare issues
- as an abstract distributional concept
Fundamentals

First deal with mobility in the abstract
  - covers income or wealth mobility
  - also “rank” mobility where underlying data are categorical
  - separates components of measurement problem

How to characterise mobility
  - in terms of individual “income”?
  - in terms of social position?

Ingredients for a theory of mobility measurement:
  - a time frame
  - measure of individual status within society
  - aggregation of changes in status over the time frame
Ingredients of the problem: classes

“Income” as a generic term

- any cardinally measurable, comparable quantity
- cardinality is not crucial for our approach

Ordered set of $K$ income classes

- class $k$ is associated with income level $x_k$ where $x_k < x_{k+1}$, $k = 1, 2, ..., K - 1$
- $p_k \in \mathbb{R}_+$ is the size of class $k$, $k = 1, 2, ..., K$ and
- $\sum_{k=1}^{K} p_k = n$, the size of the population

$k_0(i), k_1(i)$: class occupied by person $i$ at times $t_0$ and $t_1$

- mobility characterised by
  $(x_{k_0(1)}, ..., x_{k_0(n)})$ and $(x_{k_1(1)}, ..., x_{k_1(n)})$
Ingredients of the problem: valuation

Don’t have to use simple aggregation of the $x_k$ to compute mobility
Could carry out a relabelling of the income classes

- For example use $n_0(x_k) := \sum_{h=1}^{k} p_h, \ k = 1, \ldots, K$
- number of persons in, or below, each class according to the distribution at $t_0$

Suppose sizes $(p_1, \ldots, p_K)$ at $t_0$ change to $(q_1, \ldots, q_K)$ at $t_1$

- Revaluing the income classes: $n_1(x_k) := \sum_{h=1}^{k} q_h, \ k = 1, \ldots, K$
Ingredients of the problem: status

individual $i$’s personal history: $z_i := (u_i, v_i)$

- $u_i$: status in the 0-distribution
- $v_i$: status in the 1-distribution

**Distribution-independent**

- **static (1).** $z_i = (x_{k0}(i), x_{k1}(i))$
- **static (2).** $z_i = (\varphi(x_{k0}(i)), \varphi(x_{k1}(i)))$
  - $\varphi$ arbitrary (utility of $x$?)
  - mobility independent of $\varphi$?

**Distribution-dependent**

- **static.** $z_i = (n_0(x_{k0}(i)), n_0(x_{k1}(i)))$
  - cumulative numbers in class “value” the class
- **dynamic.** $z_i = (n_0(x_{k0}(i)), n_1(x_{k1}(i)))$
Comparing mobility concepts

Consider the following example:

<table>
<thead>
<tr>
<th></th>
<th>$t_0$</th>
<th>$t_1$</th>
<th>$t_2$</th>
<th>$t_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_1$</td>
<td>A</td>
<td>A</td>
<td>_</td>
<td>_</td>
</tr>
<tr>
<td>$x_2$</td>
<td>B</td>
<td>_</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>$x_3$</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>$x_4$</td>
<td>_</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>$x_5$</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
</tr>
</tbody>
</table>

- $0 \rightarrow 1$: growth and inequality increase
- $1 \rightarrow 2$: growth and inequality decrease
- $2 \rightarrow 3$: pure reranking

Different status definitions produce different evaluations
Exchange and structural mobility: (Van Kerm 2004, Tsui 2009)
Intuitive approaches

Comparison with inequality
- collection into groups?
- income distribution as histogram?

Rank mobility
- Bivariate categorical distribution
- Mobility tables
- Transition matrices - rank (Formby et al. 2004, Trede 1998)

Income mobility
- Richer information than simple categories
- Transition matrices (Formby et al. 2004)
- Conditional quantiles (Trede 1999)
Mobility tables

Partition of status space

- $S_1, \ldots, S_K \subset S$ such that $\bigcup_{k=1}^{K} S_k = S$ and $S_k \cap S_{k'} = \emptyset$
- $n_{kk'}$ # households in $S_k$ at $t_0$ and in $S_{k'}$ at $t_1$

use this to get basic construct

- mobility table

- example – intergenerational problem:

<table>
<thead>
<tr>
<th></th>
<th>$C_\ell$</th>
<th>$C_h$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_\ell$</td>
<td>$n_{\ell\ell}$</td>
<td>$n_{\ell h}$</td>
<td></td>
</tr>
<tr>
<td>$P_h$</td>
<td>$n_{h\ell}$</td>
<td>$n_{hh}$</td>
<td></td>
</tr>
</tbody>
</table>

Parents’ margins
$n_\ell = n_{\ell\ell} + n_{\ell h}$
$n_h = n_{h\ell} + n_{hh}$

Children’s margins
$n_\ell = n_{\ell\ell} + n_{h\ell}$
$n_h = n_{\ell h} + n_{hh}$

From the mobility table construct other useful tools
Transition matrices

Use the information in the mobility table

The transition matrix $\mathbf{P}$ is the $K \times K$ array with typical element

$$p_{kk'} := \frac{n_{kk'}}{\sum_{j=1}^{K} n_{kj}}$$

Temporal issue

- if $\mathbf{P}$ constant, over a period of length $t$ we have the matrix $\mathbf{P}^t$
- but be careful with short/long mobility (reversal matrix?)
- problem more acute if $\mathbf{P}$ not constant

Convenient statistic to capture mobility implied by $\mathbf{P}$:

$$m(\mathbf{P}) := \frac{K - \sum_{k=1}^{k} p_{kk}}{K - 1}$$
Conditional quantiles

Take row $k$ of the transition matrix as a vector

- $(\hat{f}_k, \hat{f}_k, \ldots, \hat{f}_k)$ gives the empirical frequency...
- ...conditional on individuals in set $S_k$ at time 0

- $(\hat{F}_k, \hat{F}_k, \ldots, \hat{F}_k)$: estimates of distribution function for time 1, conditional on being in set $S_k$ at time 0

If we know $F_0$ and $F_1$ the (unconditional) distribution function

- go from proportions of the population to quantiles
- $x_p = F_0^{-1}(p), p \in [0, 1]$

- same thing at time 1: $y_q = F_1^{-1}(q), q \in [0, 1]$
- we can convert from $S_k = [q_{k-1}, q_k)$ to income intervals $[y_{k-1}, y_k)$
Example: China (income growth)
Example: China (income inequality)
Example: China (income mobility)

No long-run national representative panel
  - no equivalent of PSID, GSOEP or BHPS (Chen and Cowell 2012)

China Health and Nutrition Survey CHNS
  - tracks effects of the health, nutrition, and family planning policies
  - also collects information on households’ economic circumstances

Coverage
  - nine provinces throughout China
  - occasional years 1989-2011

Extracted income series
  - unit of analysis is the household
  - equivalised total household income
  - valued in 2011 Yuan
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>6,046</td>
<td>5,846</td>
<td>6,642</td>
<td>7,974</td>
<td>10,172</td>
<td>12,595</td>
<td>14,783</td>
<td>20,957</td>
<td>25,429</td>
</tr>
<tr>
<td>median</td>
<td>5,294</td>
<td>5,130</td>
<td>5,292</td>
<td>6,513</td>
<td>8,021</td>
<td>9,179</td>
<td>10,284</td>
<td>15,057</td>
<td>19,964</td>
</tr>
<tr>
<td>Gini(T)</td>
<td>0.39</td>
<td>0.37</td>
<td>0.41</td>
<td>0.41</td>
<td>0.44</td>
<td>0.47</td>
<td>0.50</td>
<td>0.49</td>
<td>0.46</td>
</tr>
<tr>
<td>Gini(R)</td>
<td>0.42</td>
<td>0.39</td>
<td>0.43</td>
<td>0.42</td>
<td>0.52</td>
<td>0.47</td>
<td>0.51</td>
<td>0.50</td>
<td>0.48</td>
</tr>
<tr>
<td>Gini(U)</td>
<td>0.30</td>
<td>0.29</td>
<td>0.37</td>
<td>0.37</td>
<td>0.41</td>
<td>0.45</td>
<td>0.47</td>
<td>0.46</td>
<td>0.42</td>
</tr>
<tr>
<td>90/10(T)</td>
<td>7.87</td>
<td>6.72</td>
<td>8.39</td>
<td>8.54</td>
<td>10.81</td>
<td>13.43</td>
<td>13.77</td>
<td>12.71</td>
<td>13.60</td>
</tr>
<tr>
<td>90/10(R)</td>
<td>9.43</td>
<td>7.47</td>
<td>9.46</td>
<td>9.31</td>
<td>11.47</td>
<td>12.61</td>
<td>13.74</td>
<td>13.27</td>
<td>14.18</td>
</tr>
<tr>
<td>90/10(U)</td>
<td>3.89</td>
<td>4.47</td>
<td>6.40</td>
<td>6.63</td>
<td>7.87</td>
<td>12.19</td>
<td>11.10</td>
<td>10.53</td>
<td>9.36</td>
</tr>
<tr>
<td>cv(T)</td>
<td>0.83</td>
<td>0.72</td>
<td>0.86</td>
<td>0.84</td>
<td>1.02</td>
<td>1.01</td>
<td>1.31</td>
<td>1.27</td>
<td>1.07</td>
</tr>
<tr>
<td>cv(R)</td>
<td>0.85</td>
<td>0.80</td>
<td>0.86</td>
<td>0.87</td>
<td>1.05</td>
<td>1.02</td>
<td>1.33</td>
<td>1.27</td>
<td>1.13</td>
</tr>
<tr>
<td>cv(U)</td>
<td>0.76</td>
<td>0.56</td>
<td>0.83</td>
<td>0.78</td>
<td>0.94</td>
<td>0.95</td>
<td>1.24</td>
<td>1.23</td>
<td>0.96</td>
</tr>
</tbody>
</table>
### CHNS: Rank mobility

<table>
<thead>
<tr>
<th>Year</th>
<th>Rank</th>
<th>1989 Values</th>
<th>2000 Values</th>
<th>2011 Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1989</td>
<td>1</td>
<td>0.290</td>
<td>0.229</td>
<td>0.211</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.253</td>
<td>0.251</td>
<td>0.206</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.185</td>
<td>0.231</td>
<td>0.206</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.137</td>
<td>0.153</td>
<td>0.214</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0.134</td>
<td>0.137</td>
<td>0.162</td>
</tr>
</tbody>
</table>
**CHNS: mobility test**

\[ m(P) := \frac{K - \sum_{k=1}^{k} p_{kk}}{K - 1} \]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.9225</td>
<td>0.8875</td>
</tr>
<tr>
<td></td>
<td>[0.9107, 0.9343]</td>
<td>[0.8748, 0.9002]</td>
</tr>
<tr>
<td>Rural</td>
<td>0.9450</td>
<td>0.9175</td>
</tr>
<tr>
<td></td>
<td>[0.9317, 0.9583]</td>
<td>[0.9033, 0.9317]</td>
</tr>
<tr>
<td>Urban</td>
<td>0.9075</td>
<td>0.8400</td>
</tr>
<tr>
<td></td>
<td>[0.8837, 0.9313]</td>
<td>[0.8133, 0.8667]</td>
</tr>
</tbody>
</table>

rank mobility m-value at 99% CI
CHNS: Conditional quantiles (T)
CHNS: Conditional quantiles (R)
CHNS: Conditional quantiles (U)
Method

Similar to characterisation of other indices

- inequality
- social welfare
- poverty

Use an a priori axiomatisation

- describe meaning of mobility comparisons
- characterise an ordering (Mitra and Ok 1998)
- or a class of indices (Cowell and Flachaire 2011, Fields and Ok 1996, Schluter and Van de gaer 2011.)

mobility ordering $\succeq$ on $\mathbb{Z}^n$

Let $m$ be individual mobility, increasing in $|u_i - v_i|$

- emerges from the axiomatisation
Axioms

**Continuity** \(\succeq\) is continuous on \(Z^n\)

**Monotonicity.** If \(z, z' \in Z^n\) differ only in \(i\) then

\[m(u_i, v_i) > m(u'_i, v'_i) \iff z \succeq z'
\]

**Independence.** For \(z, z' \in Z^n\) such that: \(z \sim z'\) and \(z_i = z'_i\) for some \(i\) then \(z(\zeta, i) \sim z'(\zeta, i)\) for all \(\zeta \in [z_{i-1}, z_{i+1}] \cap [z'_{i-1}, z'_{i+1}]\).

**Local immobility.** Let \(z, z' \in Z^n\) be such that, for some \(i\) and \(j\),

\[u_i = v_i, u_j = v_j, u'_i = u_i + \delta, v'_i = v_i + \delta, u'_j = u_j - \delta, v'_j = v_j - \delta\]

and, for all \(h \neq i, j, u'_h = u_h, v'_h = v_h\). Then \(z \sim z'\).

**Status scale irrelevance.** For any \(z, z' \in Z^n\) such that \(z \sim z'\),

\(tz \sim t z'\) for all \(t > 0\): \(z \sim z'\).
A class of mobility indices

**Theorem.** Given the axioms \( \preceq \) represented by \( \phi \left( \sum_{i=1}^{n} u_i^\alpha v_i^{1-\alpha} \right) \)

A suitable cardinalisation gives:

- \( M_\alpha := \frac{1}{\alpha(\alpha-1)n} \sum_{i=1}^{n} \left[ \left[ \frac{u_i}{\mu_u} \right]^\alpha \left[ \frac{v_i}{\mu_v} \right]^{1-\alpha} - 1 \right] \)

Two limiting cases

- \( \alpha = 0 \): \( M_0 = -\frac{1}{n} \sum_{i=1}^{n} \frac{v_i}{\mu_v} \log \left( \frac{u_i}{\mu_u} / \frac{v_i}{\mu_v} \right) \)
- \( \alpha = 1 \): \( M_1 = \frac{1}{n} \sum_{i=1}^{n} \frac{u_i}{\mu_u} \log \left( \frac{u_i}{\mu_u} / \frac{v_i}{\mu_v} \right) \)

We have a *class* of aggregate mobility measures

- high \( \alpha > 0 \): \( M \) sensitive to downward movements
- \( \alpha < 0 \): \( M \) sensitive to upward movements
Concerned with *ranks* not *income levels*? Then make status an ordinal concept.

Variety of ways to define status ordinally: mobility tables or transition matrices.

However, these approaches are sensitive to the adjustment of class boundaries:

- Consider the case where in the original set of classes $p_k = 0$ and $p_{k+1} > 0$.
- If mobility index is sensitive to small values of $p$ and boundary between classes $k$ and $k+1$ is adjusted there could be a big jump in the mobility index.
- Will not happen if use $M_\alpha$ with suitable status definition.
Rank Mobility
Income mobility
Valuing mobility?

- Can we introduce a social values to $M_\alpha$?
- Could introduce normative elements in the $M_\alpha$ framework
  - definition of status
  - value range of $\alpha$
- Could construct explicit welfare approach
  - like Atkinson inequality? (Gottschalk and Spolaore 2002)
  - must go beyond simple welfare models
  - $W = \frac{1}{n} \sum_i \sum_j U(P_i, C_j) n_{ij}$
- Non-utilitarian welfare principles?
  - $\partial^2 U(P_i, P_j)/\partial P_i \partial C_j < 0$: move weight off-diagonal increase welfare? (Atkinson 1981, Atkinson and Bourguignon 1982)
Intergenerational mobility and opportunity

- Three approaches (Van de gaer et al. 2001)

1 Movement
- Diagonalising switches (Atkinson 1981)
  \[ p_{lq}^* = p_{lq} - \delta, \quad p_{lr}^* = p_{lr} + \delta, \quad p_{kq}^* = p_{kq} + \delta, \quad p_{kr}^* = k_{lr} - \delta \]
- Axiom MOV: if \( P^* \) formed from \( P \) by pushing probability mass away from the diagonal, then \( P^* \) more desirable than \( P \)

2 Equality of Opportunity
- Children of parents in income class \( l \) have worse opportunities than those with parents in \( k \) if the \( k \)-lottery dominates the \( l \)-lottery
- Axiom EOP: \( q < r \) and \( \sum_{j=1}^{m} p_{lj}^* > \sum_{j=1}^{m} p_{kj}^* \), \( m = 1, 2, \ldots \) means \( P^* \) more desirable than \( P \)

3 Life Chances
- If the size of prizes does not matter: focus on probabilities:
- Axiom ELC: \( P \) is just as good as \( P' \) if \( P' \) is formed from a permutation of the columns of \( P \)
Redistribution and mobility

- Redistribution and personal interest
  - Tunnel effect (Hirschman 1973)
  - Land of opportunity? (Alesina and La Ferrara 2005)
  - POUM (Benabou and Ok 2001)

- Something more?
  - POUM dominated by demand for social insurance (Benabou and Ok 2001),
  - Attitudes maybe depend on culture (Corneo and Grüner 2002, Isaksson and Lindskog 2009)
  - Concern with distributive justice (Fong 2001)

- Difference of views
  - on importance of effort and predetermined factors in inequality (Piketty 1995)
  - on trade-off between equality and mobility
  - look again at basic mobility table
Inequality and mobility 1

- Perfect immobility
- Parents have same inequality in X and Y
- Child distribution in X Lorenz dominates Y: Children’s welfare higher in X?
Inequality and mobility 2

- **Perfect mobility**
- Parents have same inequality in W and Z
- Child distribution in W Lorenz dominates Z
Inequality and redistribution: three views

**Substitution view.** Main objective is origin independence

- concern for inequality only if rigidities can’t be removed.
- X socially preferred to Y? (greater child inequality in Y is inherited)
- Z preferred to W? (greater inequality in Z means a “land of opportunities”)

**Priority for the worst off.** Equality of outcome explicit

- inequality at the minimum compatible with the maximum for the least well-off
- X is better than Y and W is better than Z

**Intermediate position.** Promotion of talents: equality of opportunity

- role of incentives for economic efficiency
- also fairness: rewards related to individual desert
- inequality accepted only to the extent it serves this purpose
Questionnaire Approach

Preference elicitation problem
- Not just personal preference
- Common to empirical social choice

Investigate in ABCD study
- Amiel et al. (2012)
- Based on Amiel and Cowell (1999) “bus queue” design

Implementation
- Student respondents
- Three countries: Israel, Italy, UK
1 Full Mixing v Rigidity

Please check (✓) one:

A is preferable
B is preferable
A and B are equally preferable
2 Full Mixing and Widening

Please check (✓) one:

- A is preferable
- B is preferable
- A and B are equally preferable
3 Rigidity v Full Mixing+Widening

Please check (✓) one:
- A is preferable
- B is preferable
- A and B are equally preferable
4 Partial mixing v Rigidity

Please check (✓) one:  
A is preferable  
B is preferable  
A and B are equally preferable
5 Partial Mixing and Widening

Please check (✓) one:
- A is preferable
- B is preferable
- A and B are equally preferable
Please check (✓) one:

A is preferable
B is preferable
A and B are equally preferable
7 Full v Partial Mixing

Please check (✓) one:

A is preferable
B is preferable
A and B are equally preferable
8 Rigidity v Simple Widening

Please check (✓) one:

A is preferable
B is preferable
A and B are equally preferable
Do people value mobility? equality?

- Mobility: Yes if A chosen more often than B in
  - Q1 (Full mixing v rigidity)
  - Q4 (Partial mixing v rigidity)
  - Q7 (Full v partial mixing)

- Equality: Yes if A chosen more often than B in
  - Q2 (Full mixing and widening)
  - Q5 (Partial mixing and widening)
  - Q8 (Rigidity v Simple widening)

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Equality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Q4</td>
<td>Q5</td>
</tr>
<tr>
<td>Q7</td>
<td>Q8</td>
</tr>
<tr>
<td>A</td>
<td>68.8</td>
</tr>
<tr>
<td></td>
<td>67.7</td>
</tr>
<tr>
<td></td>
<td>69.1</td>
</tr>
<tr>
<td>B</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>21.1</td>
</tr>
<tr>
<td></td>
<td>18.0</td>
</tr>
<tr>
<td>indiff</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>11.0</td>
</tr>
<tr>
<td></td>
<td>12.6</td>
</tr>
</tbody>
</table>
Does mobility induce lower support for equality?

- Check if \( #B \) in Q2 (Full mixing+widening) > \( #B \) in Q5 (Partial mixing+widening) > \( #B \) in Q8 (Rigidity v widening)

<table>
<thead>
<tr>
<th></th>
<th>Q2</th>
<th></th>
<th>Q5</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5</td>
<td>A</td>
<td>B</td>
<td>Indiff</td>
<td>A</td>
</tr>
<tr>
<td>A</td>
<td>62.08</td>
<td>5.90</td>
<td>4.49</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>5.34</td>
<td>7.02</td>
<td>2.25</td>
<td>B</td>
</tr>
<tr>
<td>Indiff</td>
<td>3.93</td>
<td>3.09</td>
<td>5.9</td>
<td>Indiff</td>
</tr>
</tbody>
</table>

- Although support for B increases, vastly outweighed by A
- Mobility not a substitute for equality
- Applies to all three subsamples
Willing to sacrifice equality for mobility?

- Yes if #B in Q3 (Rigidity v Mixing+Widening) > #B in Q6 (Rigidity v Partial Mixing+Widening) > #B in Q8 (Rigidity v Simple widening)

<table>
<thead>
<tr>
<th></th>
<th>Q3</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>37.22</td>
<td>48.58</td>
</tr>
<tr>
<td>B</td>
<td>7.67</td>
<td>3.69</td>
</tr>
<tr>
<td>Indiff</td>
<td>2.56</td>
<td>3.69</td>
</tr>
</tbody>
</table>

- From simple percentages, clearly yes
- Applies to all three subsamples
Does more mobility elicit stronger preference?

- Yes if \( #A \) in Q1 (Full Mixing v Rigidity) > \( #A \) in Q4 (Partial mixing v rigidity)

- Yes if \( #A \) in Q1 (Full Mixing v Rigidity) > \( #A \) in Q7 (Full v Partial Mixing)

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q4</th>
<th>Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>60.83</td>
<td>56.67</td>
<td>68.33</td>
</tr>
<tr>
<td>UK</td>
<td>77.53</td>
<td>84.27</td>
<td>68.54</td>
</tr>
<tr>
<td>Israel</td>
<td>70.07</td>
<td>66.67</td>
<td>70.07</td>
</tr>
</tbody>
</table>
Mobility preferences: categorical variable

- Check for each person the answers to Q1, Q4, Q7
- Categorise 0A, 1A, 2A, 3A
- Calculate percentages in each category

<table>
<thead>
<tr>
<th></th>
<th>0A</th>
<th>1A</th>
<th>2A</th>
<th>3A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>10.8</td>
<td>24.2</td>
<td>33.3</td>
<td>31.7</td>
</tr>
<tr>
<td>UK</td>
<td>9.0</td>
<td>11.2</td>
<td>20.2</td>
<td>59.6</td>
</tr>
<tr>
<td>Israel</td>
<td>10.9</td>
<td>16.3</td>
<td>27.9</td>
<td>44.9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10.4</td>
<td>17.7</td>
<td>27.8</td>
<td>44.1</td>
</tr>
</tbody>
</table>

- The higher the category, the greater the percentage (almost)
- Applies to all three subsamples
Equality preferences: categorical variable

- Check for each person the answers to Q2, Q5, Q8
- Categorise 0A, 1A, 2A, 3A
- Calculate percentages in each category

<table>
<thead>
<tr>
<th></th>
<th>0A</th>
<th>1A</th>
<th>2A</th>
<th>3A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>16.7</td>
<td>10.0</td>
<td>23.3</td>
<td>50.0</td>
</tr>
<tr>
<td>UK</td>
<td>13.5</td>
<td>6.7</td>
<td>11.2</td>
<td>68.5</td>
</tr>
<tr>
<td>Israel</td>
<td>9.5</td>
<td>14.3</td>
<td>19.7</td>
<td>56.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12.9</td>
<td>11.0</td>
<td>18.8</td>
<td>57.3</td>
</tr>
</tbody>
</table>

- Except for 0A, 1A, the higher the category, the greater the percentage
- Similar across subsamples
Cross-section: summary results

- Majority of subjects prefer society where mobility is higher
- In most cases more mobility induces stronger preferences
- Majority of subjects prefer the society where inequality is lower
- Preferences for income equality do not become weaker with more income mobility
- Trade-off between preferences for mobility and for equality;
  - subjects willing to sacrifice some equality
  - if this is necessary to obtain more mobility
Regression model

- Seek to explain
  - attitudes to mobility
  - attitudes to equality

- Dependent variable is categorical
  - mobility preferences 0A, 1A, 2A, 3A
  - equality preferences 0A, 1A, 2A, 3A

- Independent variables: personal characteristics
- Use ordered probit
# Personal characteristics 1

1) How old are you? ______.(years)

2) Are you □ male? □ female?

3) Do you consider yourself:
   - □ British?
   - □ other European?
   - □ Chinese?
   - □ other Asian?
   - □ North American?
   - □ Latin-American/Caribbean?
   - □ other? ( ____ )

4) How would your rank the income of your family?
   - □ very low
   - □ low
   - □ adequate
   - □ high
   - □ very high

5) How would you rank the living standards of your family with respect to the average standard in your country?
   - □ much lower
   - □ lower
   - □ the same
   - □ higher
   - □ much higher
6) How would you imagine your income will be in 10 years with respect to your parents’ income at the same age?

□ much lower □ lower □ the same □ higher □ much higher

7) How would you imagine your social position will be in 10 years with respect to your parents’ social position at the same age?

□ much lower □ lower □ the same □ higher □ much higher

8) Please indicate how much you agree or disagree with the following statements:

A) “The more independent are children’s and parents’ economic positions in a society, the more socially preferable is the society”

□ Strongly agree
□ Agree
□ Neither agree nor disagree
□ disagree
□ Strongly disagree

B) “The more independent are children’s and parents’ economic positions in a society, the more equality of opportunity there is in the society”

□ Strongly agree
□ Agree
□ Neither agree nor disagree
□ disagree
□ Strongly disagree
9) “How would you place your view on the following scale?”

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

“The government should take the responsibility to ensure equal opportunity to everyone, but then everyone should be left on his or her own.”

“No matter whether people have equal opportunity or not, it is the responsibility of government to reduce income differences between people as much as possible.”
# Mobility and Equality – Baseline

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Coef.</th>
<th>Equality</th>
<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>0.0062</td>
<td>age</td>
<td>0.0440</td>
</tr>
<tr>
<td>gender</td>
<td>-0.1638</td>
<td>gender</td>
<td>-0.1005</td>
</tr>
<tr>
<td>familyincome</td>
<td>0.0271</td>
<td>familyincome</td>
<td>0.2514 **</td>
</tr>
<tr>
<td>livingstand~s</td>
<td>-0.0311</td>
<td>livingstand~s</td>
<td>-0.0879</td>
</tr>
<tr>
<td>prospects</td>
<td>0.0212</td>
<td>prospects</td>
<td>0.0368</td>
</tr>
<tr>
<td>perspectiv~n</td>
<td>-0.0349</td>
<td>perspectiv~n</td>
<td>-0.2068 *</td>
</tr>
<tr>
<td>independen~a</td>
<td>-0.3152 ***</td>
<td>independen~a</td>
<td>-0.0130</td>
</tr>
<tr>
<td>independen~b</td>
<td>-0.1149</td>
<td>independen~b</td>
<td>0.0114</td>
</tr>
<tr>
<td>government~e</td>
<td>0.0102</td>
<td>government~e</td>
<td>-0.0655 **</td>
</tr>
</tbody>
</table>
# Mobility and Equality – Country

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Coef.</th>
<th>Equality</th>
<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>-0.0164</td>
<td>age</td>
<td>0.0537</td>
</tr>
<tr>
<td>gender</td>
<td>-0.1607</td>
<td>gender</td>
<td>-0.0960</td>
</tr>
<tr>
<td>familyincome</td>
<td>-0.0147</td>
<td>familyincome</td>
<td>0.2566 **</td>
</tr>
<tr>
<td>livingstand~s</td>
<td>-0.0675</td>
<td>livingstand~s</td>
<td>-0.0782</td>
</tr>
<tr>
<td>prospects</td>
<td>-0.0743</td>
<td>prospects</td>
<td>0.0499</td>
</tr>
<tr>
<td>perspectiv~n</td>
<td>-0.0172</td>
<td>perspectiv~n</td>
<td>-0.2077 *</td>
</tr>
<tr>
<td>independen~a</td>
<td>-0.3201 ***</td>
<td>independen~a</td>
<td>-0.0135</td>
</tr>
<tr>
<td>independen~b</td>
<td>-0.0892</td>
<td>independen~b</td>
<td>0.0050</td>
</tr>
<tr>
<td>government~e</td>
<td>0.0125</td>
<td>government~e</td>
<td>-0.0648 **</td>
</tr>
<tr>
<td>italy</td>
<td>-0.3782 **</td>
<td>italy</td>
<td>0.0896</td>
</tr>
<tr>
<td>uk</td>
<td>0.1636</td>
<td>uk</td>
<td>0.1115</td>
</tr>
</tbody>
</table>
# Mobility and Equality – Nationality

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Coef.</th>
<th>Equality</th>
<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>0.0188</td>
<td>age</td>
<td>0.0472*</td>
</tr>
<tr>
<td>gender</td>
<td>-0.1487</td>
<td>gender</td>
<td>-0.0943</td>
</tr>
<tr>
<td>nationality</td>
<td>-0.4375***</td>
<td>nationality</td>
<td>-0.1000</td>
</tr>
<tr>
<td>familyincome</td>
<td>0.0157</td>
<td>familyincome</td>
<td>0.2493**</td>
</tr>
<tr>
<td>livingstandard</td>
<td>-0.0776</td>
<td>livingstandard</td>
<td>-0.0977</td>
</tr>
<tr>
<td>prospects</td>
<td>-0.0093</td>
<td>prospects</td>
<td>0.0296</td>
</tr>
<tr>
<td>perspective-a</td>
<td>-0.0330</td>
<td>perspective-a</td>
<td>-0.2068*</td>
</tr>
<tr>
<td>independencia-a</td>
<td>-0.3168***</td>
<td>independencia-a</td>
<td>-0.0114</td>
</tr>
<tr>
<td>independencia-b</td>
<td>-0.1150</td>
<td>independencia-b</td>
<td>0.0123</td>
</tr>
<tr>
<td>government-e</td>
<td>0.0167</td>
<td>government-e</td>
<td>-0.0642**</td>
</tr>
</tbody>
</table>
Summary

- Principles of mobility measurement lay a foundation
- Introduction of welfare valuation presents a problem
  - individualistic values?
  - mobility a substitute for redistribution?
  - a trade-off between mobility and equality?
- We can reconcile tastes for equality and tastes for mobility
  - common analytical framework
  - use tools from empirical social choice
- Who really value mobility?
  - nothing to do with factors on valuing equality
  - importance of attitudes
  - importance of actions


