Disabled peers and academic achievement

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Presentation at AEFA meetings, April 2008
Overview

▶ Question:
  ▶ What is the effect of disabled peers on a student’s academic achievement?

▶ Data:
  ▶ Longitudinal administrative records on grade 4-7 students in British Columbia.

▶ Methodology:
  ▶ Outcome is test score gain from grade 4 to grade 7.
  ▶ School fixed effects.
  ▶ Peer effects identified from year-to-year compositional variation within school.
Related studies

- Peer effects in education.
- Special education (mostly financing & incentives).
- Hanushek, Kain and Rivkin (REStat 2002, section 7). Similar research design using Texas data. Findings (for nondisabled students):
  - Disabled peers good.
  - Learning disabled or emotionally disturbed peers bad, but just a little.
  - Speech-impaired peers good, but just a little.
  - Peers with other disabilities good.
- Disabled students bring both extra needs and extra resources.
  - Implies peer effects will vary as level of support varies.
Special education in B.C.

► Standard features:
  ▶ Students placed into one of eleven need categories.
  ▶ Support services defined in student’s IEP.
  ▶ Per-student funding depends on category.
  ▶ Placement follows policy of inclusion.
  ▶ Special needs support is a human rights issue.

► Distinctive features:
  ▶ Provincial financing.
  ▶ Census-based funding for some needs.
  ▶ Categories include gifted but not speech impaired.
  ▶ Lower learning disability rate (3.6% vs. 7.6% in U.S., 10.4% in Texas).
  ▶ High exam participation rate (92% vs. 82% in Texas).
  ▶ Substantial aboriginal population.

► Unfortunate features:
  ▶ Small population relative to Texas.
  ▶ Exams given only twice, and not in adjacent years.
Research design

- Population of interest:
  - Students attending a B.C. public school for grade 7 between 2002 and 2004 who were also in B.C. for grade 4.
  - Model estimated separately for non-disabled and (learning or behavioral) disabled populations.

- Dependent variable:
  - Change in test score between grades 4 and 7.
  - Test score measured in standard deviations from provincial mean.
  - Two subjects: numeracy and reading.

- Peer group: same-grade schoolmates in grade 7.
- Endogenous peer selection modeled using school fixed effects.
## Results

### Non-disabled students

<table>
<thead>
<tr>
<th>Variable</th>
<th>Numeracy (2)</th>
<th>Numeracy (3)</th>
<th>Reading (2)</th>
<th>Reading (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% gifted</td>
<td>0.22</td>
<td>0.22</td>
<td>0.34</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.15)</td>
<td>(0.13)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>% disabled</td>
<td>-0.16</td>
<td></td>
<td>-0.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td></td>
<td>(0.09)</td>
<td></td>
</tr>
<tr>
<td>% learning/behavior</td>
<td>-0.24</td>
<td></td>
<td>-0.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td></td>
<td>(0.10)</td>
<td></td>
</tr>
<tr>
<td>% other disability</td>
<td>-0.05</td>
<td></td>
<td>-0.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td></td>
<td>(0.14)</td>
<td></td>
</tr>
</tbody>
</table>

Controls include school fixed effect, sex, Aboriginal status, home language, % male, % Aboriginal, % non-English, % ESL, % ESD.
### Results

Students with learning or behavioral disabilities

<table>
<thead>
<tr>
<th>Variable</th>
<th>Numeracy</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>% gifted</td>
<td>-0.68</td>
<td>-0.64</td>
</tr>
<tr>
<td></td>
<td>(0.50)</td>
<td>(0.50)</td>
</tr>
<tr>
<td>% disabled</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.35)</td>
<td></td>
</tr>
<tr>
<td>% learning/behavior</td>
<td></td>
<td>-0.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.39)</td>
</tr>
<tr>
<td>% other disability</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td></td>
</tr>
</tbody>
</table>

Controls include school fixed effect, sex, Aboriginal status, home language, behavioral disability, % male, % Aboriginal, % non-English, % ESL, % ESD.
Results

Robustness checks

- Modified value-added model
- Binary value-added model
  - Reverses sign on “% other disability” for disabled students in numeracy exam.
- Special needs based on “ever” or “always” status.
- No fixed effects
- Principal fixed effects
- Control for severity of behavioral disorder
- Restricted samples (English, non-Aboriginal)
- Controls for school-switching.
- Grades 5-7 peers.
Conclusion

- Effect of disabled peers on nondisabled students appears to be negative but small.
  - Usually insignificant, exception is learning/behavioral for numeracy exam.
- Effect of disabled peers on disabled students varies in sign.
  - Effect of learning/behavioral disabled negative but insignificant.
  - Effect of other disabilities positive, and significant for numeracy exam.
  - But we have reason to think that result is an artifact of endogenous participation.
- Disabled students bring more needs and more resources. Peer effects will vary as resources vary.