Discussion of “The Effect of Maternal Labor Supply on Children: Evidence from Bunching”

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The views expressed here are the presenter’s and do not necessarily represent those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.
When moms work more, their children learn less

Figure 1: Children’s Cognitive Skills – Quartiles of Maternal AFQT
A COVID-19 labor force legacy: The drop in dual-worker families

Katherine Lim
Economist, Community Development and Engagement

Ryan Nunn
Assistant Vice President, Community Development and Engagement

Shift from dual-participant to solo-participant couples without four-year degrees is persistent

Two participants

One male participant


64
62
60
58
30
28
26
24

Opportunity & Inclusive Growth INSTITUTE
How does this approach work?

\[ S_i = \alpha X_i + \hat{\beta}_{OLS} L_i + \epsilon_i \]

No one believes this is the causal effect of mom’s work time on kids’ skill development.
How does this approach work?

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1. We don’t see desired work for moms who stay home
How does this approach work?

No one believes this is the causal effect of mom’s work time on kids’ skill development:

1. We don’t see desired work for moms who stay home
2. MANY unobserved things determine L and S (ability, tastes, home productivity)
How does this approach work?

These authors: “But what if these moms could fix this problem?”

Children’s test scores (S)

Mother’s hours of work in first 3 years (L)

\( \hat{\beta}_{OLS} \)

(productive) unobservables: \( \eta \)
How does this approach work?

If we could just figure out their unobservables, we could estimate how unobservables affect kids because these moms don’t actually work.

Then net that confounding relationship out of $\hat{\beta}_{OLS}$ to deal with the bias!

(productive) unobservables: $\eta$
How does this approach work?

Imagine two groups:

“high L” observables (red)

And

“low L” observables (blue)
How does this approach work?

If we can estimate mean unobservables…
How does this approach work?

Children’s test scores ($S$) vs. Mother’s hours of work in first 3 years ($L$)

Selection = \[
\frac{\tilde{S}_{high,L=0} - \tilde{S}_{low,L=0}}{\bar{\eta}_{high,L=0} - \bar{\eta}_{low,L=0}}
\]

\[\hat{\beta}_{OLS}^{\Delta \tilde{S}_{high,L=0} - \Delta \tilde{S}_{low,L=0}}\]

\[\bar{\eta}_{high,L=0} - \bar{\eta}_{low,L=0}\]
How does this approach work?

Children’s test scores (S) vs. Mother’s hours of work in first 3 years (L)

Test scores for kids whose moms work a lot are lower than what the moms’ unobservables predict...

→

labor supply slows skill development.
It’s all about imputing $\eta$

Selection $> \hat{\beta}^{OLS} \rightarrow L$ is bad
It’s all about imputing $\eta$.

Selection > $\hat{\beta}^{OLS}$ → L is bad

Selection < $\hat{\beta}^{OLS}$ → L is good!

All we did was impute a little differently.
How to impute $\eta$?

Density

Say 12% didn’t work

Assume that type completely accounts for *observable* reasons why $L$ differs.

→ Differences in $L$ among these moms only reflect their random unobservable
How to impute $\eta$?

Density

Say 12% didn’t work

Then take the top 12% of L for this detailed type

Mother’s hours of work in first 3 years (L)

Assume symmetry in the distribution of unobservables and stick that mass down here.

Assume that type completely accounts for observable reasons why L differs.
How to impute $\eta$?

Now we “know”: $E[\text{unobservables}|L = 0, \text{high } L \text{ type}]$ (call it $\tilde{\eta}_H$)
How to impute $\eta$?

HUGE benefit: no need for an instrument.

Now we “know”: $E[\text{unobservables}|L = 0, \text{low L type}]$ (call it $\tilde{\eta}_L$)
Issues with $\eta \leftarrow \text{are there none?}$

Apparently the relevant selection estimate still implies a negative effect even at the most extreme hours assumption.

Why isn’t this exercise about $E[L^* | L = 0, X]$?
Issues with $\eta$

Table 1: Summary Statistics

<table>
<thead>
<tr>
<th>Outcome variables</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIAT Reading Recognition</td>
<td>105.33</td>
<td>14.04</td>
</tr>
<tr>
<td>PIAT Math</td>
<td>99.72</td>
<td>14.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment variable</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's average hours worked in 3 first years</td>
<td>847.64</td>
<td>838.18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bunching variables</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother worked 0 hours in 3 first years</td>
<td>0.25</td>
<td>0.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control variables</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's AFQT score</td>
<td>38.20</td>
<td>28.21</td>
</tr>
<tr>
<td>Mother's wage year prior to the birth of the child</td>
<td>14.69</td>
<td>11.04</td>
</tr>
<tr>
<td>Mother's education less than high school</td>
<td>0.23</td>
<td>0.42</td>
</tr>
<tr>
<td>Mother's education completed high school</td>
<td>0.43</td>
<td>0.50</td>
</tr>
<tr>
<td>Mother's education some college</td>
<td>0.19</td>
<td>0.40</td>
</tr>
<tr>
<td>Mother's education completed college</td>
<td>0.10</td>
<td>0.30</td>
</tr>
<tr>
<td>Mother's education more than college</td>
<td>0.04</td>
<td>0.20</td>
</tr>
<tr>
<td>Mother's age less than 20 years old</td>
<td>0.11</td>
<td>0.32</td>
</tr>
<tr>
<td>Mother's age 20 to 24 years old</td>
<td>0.33</td>
<td>0.47</td>
</tr>
<tr>
<td>Mother's age 25 to 29 years old</td>
<td>0.28</td>
<td>0.45</td>
</tr>
<tr>
<td>Mother's age 30 to 34 years old</td>
<td>0.18</td>
<td>0.39</td>
</tr>
<tr>
<td>Mother's age 35 years old or more</td>
<td>0.09</td>
<td>0.29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other income (spouse or unearned/wealth)?</th>
<th>Mean</th>
<th>Std.Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's spouse present</td>
<td>0.60</td>
<td>0.49</td>
</tr>
<tr>
<td>Mother's spouse highest grade</td>
<td>12.83</td>
<td>2.69</td>
</tr>
<tr>
<td>Child's age at test (in months)</td>
<td>75.07</td>
<td>14.13</td>
</tr>
<tr>
<td>Sex of child (male=1, female=0)</td>
<td>0.51</td>
<td>0.50</td>
</tr>
<tr>
<td>Birth order of child</td>
<td>2.06</td>
<td>1.18</td>
</tr>
<tr>
<td>Child is Hispanic</td>
<td>0.21</td>
<td>0.40</td>
</tr>
<tr>
<td>Child is Black</td>
<td>0.29</td>
<td>0.45</td>
</tr>
<tr>
<td>Family size</td>
<td>3.85</td>
<td>1.91</td>
</tr>
<tr>
<td>Lives in north region</td>
<td>0.15</td>
<td>0.36</td>
</tr>
<tr>
<td>Lives in north-central region</td>
<td>0.23</td>
<td>0.42</td>
</tr>
<tr>
<td>Lives in south region</td>
<td>0.35</td>
<td>0.48</td>
</tr>
<tr>
<td>Lives in west region</td>
<td>0.19</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Age and composition of other siblings?
(a baby with an toddler gets a VERY different treatment than a baby with a 4th grader...)

Big Sisters

Pamela Jakiela, Owen Ozier, Lia Fernald, and Heather Knauer

June 29, 2020
Unobserved home productivity

What if the unobservable is not taste for work (latent labor supply), but the returns to home production (i.e., childcare)?
Fascinating, clear, creative new empirical approach.

Fits will with complementary methods (not just IV, but things like Altonji/Elder/Taber/Oster)

Biggest challenge is not robustness in that the results change, but cementing the case that this is not just a robustly omitted co-determinant of NILF and children’s test scores.