Evaluating the Impact of Mothers’ Self-esteem on Early Childhood Home Environment

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Western Economic Association, 14\textsuperscript{th} International Conference
Newcastle, Australia
January 12, 2018
Outline

Research summary

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Research summary

• **Research question**
  - Development of children’s cognitive and non-cognitive skills is largely determined by parental (and family) characteristics.
  - Current study examines the relationship between mother’s self-esteem (an important non-cognitive parental attribute) in early childhood development process.

• **Data**: NLSY79 (mother’s cohort) matched and merged with NLSY86 (child and young adult’s cohort).

• **Identification**: Instrumental variable regression (supported by multiple robustness checks).

• **Key finding**: Mother’s self-esteem significantly improves children’s home environment quality (preschoolers).
Contribution to the early childhood development (ECD) literature

- First study to systematically explore how early childhood outcomes are related to mothers’ self-esteem.
- Introduction of a novel way of constructing instrumental variables to address endogeneity in measures of self-esteem.
- Policy recommendations for programs and interventions directed towards mothers of young children to develop long-term human capital.
Early childhood development

- Importance of family-level (parental) characteristics and inputs during early childhood is well-documented in the ECD literature.
- These inputs are related to parental attributes (e.g. education, ability, emotional support), family relationships, and socio-economic background.
- Prominent studies in this space: Coleman report (1966); Heckman (2000); Phillips & Shonkoff (2000); Campbell et al. (2001); Anderson et al. (2003); Heckman (2006); Cunha et al. (2006); Cunha & Heckman (2007); Currie & Almond (2011); Heckman et al. (2012); Campbell et al. (2014).
- Naturally, further research evidence suggests that parental inputs are key drivers of children’s home environment, a precondition for child development (Payne et al. 1994; Brooks-Gunn 1996; Baharudin & Luster 1998; Evans 2004; Strauss & Knight; Meluhish 2008).
Mothers’ self-esteem matters

- Self-esteem (how a person values herself) is closely associated with positive life outcomes (Fox, 2000; Neiss et al. 2002; Baumeister et al., 2003; Cheng & Furnham, 2003a,b).

- Self-competent mothers demonstrate authoritative parenting styles (Steinberg et al. 1989, 1992; Suldo & Huebner 2004; Milevsky et al. 2007) characterized by:
  - Higher levels of acceptance and supervision.
  - Allowance of children’s psychological autonomy.

- Mothers with high self-esteem are also more likely to be in stable marriages (Furnham & Cheng 2000; Baumeister et al. 2003).
For our analysis, we match mothers’ information from the NLSY79 to their children’s data from the NLSY-CYA.

NLSY79 cohort- 12,686 respondents ages 14-22 years when first interviewed in 1979. The surveys were conducted annually till 1993 and biennially thereafter.

Data-Outcome variables

- **Children’s home environment quality** (preschool ages): **HOME-SF score** (Home Observation Measurement of the Environment-Short Form), **Cognitive stimulation score**, and **Emotional support score** (separate child samples: 0-2 years and 3-5 years).

- **Mother-specific inputs** (preschool ages): Mother’s report on frequencies of- reading, grocery store visits, conversations while working.

- **Cognitive outcomes** (ages 6-14 years) - Peabody Individual Achievement Test (PIAT) standardized scores in math, reading recognition, and reading comprehension.
Data-Covariates

- **Explanatory variable of interest (MSE)**
  - The self-esteem scores are calculated on a 10-item questionnaire designed by Rosenberg (1965).
  - For comparability across time, we consider Item Response Theory (IRT) scores of self-esteem.
  - To circumvent this problem, we estimate weighted average of 1987 and 2006 self-esteem scores (rank order-stability finding by Robins & Trzesniewski (2005)):
    \[
    MSE_{\text{year}} = \frac{(2006 - \text{year})}{19} MSE_{1987} + \frac{(\text{year} - 1987)}{19} MSE_{2006}
    \]

- **Mother controls**: Rotter scale, AFQT score, Pearlin mastery scale, education, BMI, self-reported health, age, and marital status.

- **Child Controls**: Age, sex, and race.

- **Family Controls**: Household size and poverty status.
**Threats to identification**

Possible sources of endogeneity in self-esteem scores:

- Unobserved heterogeneities in error terms that affect the dependent variables might be correlated with self-esteem scores.
- Simultaneity bias between child outcomes and mother’s self-esteem.
- Measurement error.

Solution - Employing instrumental variables (IV) to generate exogenous variations in mothers’ self-esteem scores.

- Wooldridge (2009) and Reed (2015) suggest that using distant lags of explanatory variables as instruments address the concerns related to reverse causality.
- However, there may still be unobserved heterogeneities that are correlated with 1980’s self-esteem measures and also affect child outcomes in later years - serial correlation.
- Not possible to empirically test the validity of exclusion restriction assumption in an exactly identified system.
Empirical strategy

• To perform empirical test for overidentifying restrictions, we devise a novel procedure of decomposing \( MSE_{1980} \) into two IV's - by using Gram-Schmidt’s orthogonal transformation.
  • The orthogonal component of self-esteem 1980 is the variable of interest (ortho80).
  • By construction, ortho80 is uncorrelated with ortho06 and is likely to be correlated with \( MSE_{87} \).
• Second, we estimate the following model:

\[
Self\ esteem_{1980} = \gamma_1 + \gamma_2 \cdot (Ortho_{1980}) + \epsilon
\]  
(1)

• Instrumental variable, \( Z \) is a vector of \( (\gamma_1 + \gamma_2 \cdot (Ortho_{1980})) \) and \( \hat{\epsilon} \)

• Tests for validity of instruments:
  • Overidentification test - Sargan-Hansen test, \( \chi^2 \) value indicates whether the instruments are uncorrelated with the error term (correctly excluded IV's) (Cameron & Trivedi 2009).
  • High F-values (F-statistic > 10) of overall significance of models indicate relevance of IV (Stock & Yogo 2005).
Empirical strategy

Finally, we estimate the instrumental variable regression.

First Stage
\[ \text{MSE} = \alpha_1 + \alpha_2 Z + \alpha_3 M + \alpha_4 C + \alpha_5 F + \nu \quad (2) \]

Second Stage
\[ Y = \beta_1 + \theta \cdot \text{MSE} + \beta_2 M + \beta_3 C + \beta_4 F + u \quad (3) \]

- \( \theta \) is the coefficient of interest
- \( M, C, \) and \( F \) are vectors of mother, child, and family controls.
- We estimate weighted OLS/LPM and IV regressions using NLSY’s child sampling weights and the standard errors are clustered on mother’s ID.
Mothers’ self-esteem & home environment - Data
Mothers’ self-esteem & home environment - Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS</th>
<th>IV</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>HOME-SF</td>
<td>Cognitive</td>
</tr>
<tr>
<td>Mother Self Esteem</td>
<td>0.020*** (0.007)</td>
<td>0.013*** (0.004)</td>
</tr>
<tr>
<td>N</td>
<td>5124</td>
<td>4987</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.18</td>
<td>0.24</td>
</tr>
<tr>
<td>P-value (SH test)</td>
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<td>-</td>
</tr>
</tbody>
</table>

**Table:** Sample: Children aged 0-2

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HOME-SF</td>
<td>Cognitive</td>
</tr>
<tr>
<td>Mother Self Esteem</td>
<td>0.035*** (0.007)</td>
<td>0.019*** (0.005)</td>
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<td>N</td>
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<td>6284</td>
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<td>0.31</td>
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<td>P-value (SH test)</td>
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<td>-</td>
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</table>

**Table:** Sample: Children aged 3-5
Standardized regressions

Child sample: 0-2 years
- HOME-SF: 0.04, Cognitive stimulation: 0.09, Emotional support: 0.08

Child sample: 3-5 years
- HOME-SF: 0.09, Cognitive stimulation: 0.11, Emotional support: 0.12

Legend:
- Self-esteem
- Rotter
- Pearlin mastery
- AFQT
- Schooling
# Mother Self-esteem and mother inputs

<table>
<thead>
<tr>
<th>Variables</th>
<th>LPM (0-2)</th>
<th>LPM (0-2)</th>
<th>LPM (0-2)</th>
<th>LPM (3-5)</th>
<th>IV (0-2)</th>
<th>IV (0-2)</th>
<th>IV (0-2)</th>
<th>IV (3-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE</td>
<td>0.0002 (0.0001)</td>
<td>0.0002 (0.0001)</td>
<td>0.0002*** (0.0001)</td>
<td>0.0001 (0.0001)</td>
<td>-0.0000 (0.0002)</td>
<td>0.0007*** (0.0002)</td>
<td>0.0002* (0.0001)</td>
<td>0.0001 (0.0002)</td>
</tr>
<tr>
<td>N</td>
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<td></td>
<td></td>
<td></td>
<td>5486 5492 5468 6653</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value (SH test)</td>
<td>- - - -</td>
<td></td>
<td></td>
<td></td>
<td>0.70 0.15 0.96 0.98</td>
<td></td>
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Mothers’ self-esteem & cognitive outcomes - Data
Mothers’ self-esteem & cognitive outcomes- Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother Self Esteem</td>
<td>0.001</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>N</td>
<td>15494</td>
<td>15490</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.23</td>
<td>0.19</td>
</tr>
<tr>
<td>P-value (SH test)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table: PIAT Scores 6-14 years
Additional analysis & robustness checks

- Regression estimates are robust to estimation of limited information maximum likelihood & generalized methods of moments models.

- Limited sample analysis- No significant differences in regression coefficients when we perform our analysis restricting our sample to survey years that are close to MSE reported years (1986, 1988, 2004, 2006, 2008).

- Further analysis performed by mothers’ demographic characteristics - Increase in MSE has larger impacts for mothers belonging to low socio-economic background (poor & low education group), especially for children aged 3-5.
Concluding remarks

• This is the first study to investigate the presence of a causal link between mothers’ self-esteem and family-specific inputs that are important for child development.

• Mothers with high self-esteem are more efficient in ensuring the better quality of inputs that determine the development of their children.

• The results motivate scope for alternative early childhood policy options that can be directed towards improvements in mother’s non-cognitive traits for ensuring better future human capitals for children.

Thank you for your time!