Land Certification and Schooling in Rural Ethiopia

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Objective and preview of results

Objective

To contribute to the literature on the effects of land certification programs on children’s schooling (and work).

Preview of results

- School enrollment increases in general as a result of the program.
- Grade progress is unaffected in general as a result of the program, except in the case of oldest sons.
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- Findings on the success of individual programs can differ depending on which aspect is under investigation.
  - In many cases depends on both the quality of pre-existing informal institutions, and the specific details of the individual programs.
- To the best of our knowledge, there is no previous research into the effect of such programs on schooling (or child work) in a rural setting.
Related literature

- Positive effects of the Amhara land certification program

Deininger et al. (2011) find positive investment, land rental market development, and tenure security impacts of the program. Bezabih et al. (2012) find that especially women are willing to rent out land more often as a result of the program.

Very few studies have analyzed the effects of land titling programs on children’s activities and, to the best of our knowledge, the few that exist have all studied urban programs in Latin America. Field (2007) in Peru and Moura et al. (2009) in Brazil find decreased child work and increased adult labour supply. Galiani and Schargrodsky (2010) in Argentina find that schooling increases as a result of the program.
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- Land is a productive asset in a rural setting, which may affect child activities in several ways.
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- Land certification may affect the perceived future benefits of education and learning by doing at the field via expectations on inheritance.
- Land certification may increase the marginal productivity of child labor (via e.g. investments) - this may be a more medium-run effect.
Background

The land certification program

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- Periodic land redistributions, most recently in 1997.
- The 1995 Constitution and 1997 Federal Land Law allows land lease, inheritance, sharecropping etc. which was previously illegal.
- The certificates are legally binding documents of land use rights.
- Expanded to the whole region, but due to limited capacity the program went from one kebele (village) to the next.

Detail
There are several potential channels through which improved property rights may affect child activities.

- We choose to focus primarily on the inheritance channel. Land certification makes it easier for children to inherit land from their parents, particularly oldest sons (Fafchamps & Quisumbing, 2002; Gibson and Gurmu, 2011).
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Theoretical background

- We assume that the marginal product of schooling (in terms of future wages) is lower when the child remains on the farm as compared to off-farm labor (Verwimp, 1999; World Bank, 1998).

Therefore, an increase in the probability that a child will remain on the family farm (inherit the land) should lead to a reallocation away from schooling. We do not, however, expect this effect to be very large for a number of reasons: schooling does have a significant positive impact on agricultural productivity, even in the case of traditional farming (Krishnan, 1996). Children can combine school and work without a significant negative impact on schooling outcomes (Ravallion and Wodon, 2000; Ridao-Cano, 2001; Ray and Lancaster, 2003; Khanam, 2008; Dumas, 2012; De Hoop and Rosati, 2014).
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An alternative channel: when land certification improves property rights, children devote less time to securing property rights.
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This allows children to devote more time to productive activities; schooling or child labor.
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  - Two different climatic zones (East Gojjam more fertile, South Wollo drier).
  - South Wollo experienced forced resettlement in the 1980s; voluntary resettlement programs today.
- 14 kebeles in total: 7 in East Gojjam and 7 in South Wollo.
Annual child level panel on school enrollment and grade progress created using retrospective information collected in 4th round.
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Child work is only available at household level for the 12 months preceding data collection (but is available by gender).
How to define the treatment variable?

- Kebele level variation – when did the program arrive?
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- The program signals an intent to keep 1997 land rights stable:
  - we estimate an impact which is immediate, and remains constant once it has occurred.
  - households are likely to adjust behavior in response to the program before receiving their certificate.
  - we argue that the timing of the arrival of the program to the kebele was as good as random, conditional on time-constant urbanity and accessibility.
Econometric model

- We utilize the variation in timing of arrival of the program to the villages to identify the causal impact of the program (diff in diff).
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- We use household fixed effects to control for time-constant differences between households and the kebeles in which they live.
- As there are only 14 kebeles, we have few clusters.
- A linear probability model allows most readily for the incorporation of both fixed effects and methods of inference with few clusters.
## Results

Table 4: The impact of the land certification program on children’s school enrolment – coefficients of the within-household linear probability model.

<table>
<thead>
<tr>
<th></th>
<th>Boys All kebeles</th>
<th>Boys East Gojjam</th>
<th>Boys South Wollo</th>
<th>Girls All kebeles</th>
<th>Girls East Gojjam</th>
<th>Girls South Wollo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land certification</td>
<td>0.042***</td>
<td>0.064***</td>
<td>0.018</td>
<td>0.040***</td>
<td>0.055***</td>
<td>0.036**</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.020)</td>
<td>(0.022)</td>
<td>(0.008)</td>
<td>(0.006)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>*Oldest son</td>
<td>0.017</td>
<td>-0.029</td>
<td>0.072**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.025)</td>
<td>(0.030)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest son</td>
<td>-0.094***</td>
<td>-0.116**</td>
<td>-0.072</td>
<td>0.022</td>
<td>-0.028</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td>(0.039)</td>
<td>(0.038)</td>
<td>(0.025)</td>
<td>(0.029)</td>
<td>(0.034)</td>
</tr>
<tr>
<td>*Oldest daughter</td>
<td></td>
<td></td>
<td></td>
<td>-0.029</td>
<td>0.011</td>
<td>-0.062*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.023)</td>
<td>(0.031)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>Oldest daughter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>11,982</td>
<td>5,953</td>
<td>6,029</td>
<td>10,821</td>
<td>5,004</td>
<td>5,817</td>
</tr>
<tr>
<td>Children</td>
<td>2,526</td>
<td>1,265</td>
<td>1,261</td>
<td>2,258</td>
<td>1,068</td>
<td>1,190</td>
</tr>
<tr>
<td>Households</td>
<td>1,323</td>
<td>650</td>
<td>673</td>
<td>1,315</td>
<td>630</td>
<td>685</td>
</tr>
</tbody>
</table>

* p<0.1; ** p<0.05; *** p<0.01. All models also include age dummies, zone-specific year dummies and a constant. Standard errors are in parentheses and clustered at the kebele level using the few clusters procedure in Brewer, Crossley and Joyce (2013).
Table 5: The impact of the land certification program on children’s grade progress – coefficients of the within-household linear probability model.

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th></th>
<th>Girls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All kebeles</td>
<td>East Gojjam</td>
<td>South Wollo</td>
<td>All kebeles</td>
</tr>
<tr>
<td>Land certification</td>
<td>0.006</td>
<td>0.029</td>
<td>-0.010</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>*Oldest son</td>
<td>-0.041***</td>
<td>-0.064***</td>
<td>-0.023**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.017)</td>
<td>(0.008)</td>
<td></td>
</tr>
<tr>
<td>Oldest son</td>
<td>0.031**</td>
<td>0.025*</td>
<td>0.036**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>*Oldest daughter</td>
<td>0.008</td>
<td>-0.021*</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.011)</td>
<td>(0.029)</td>
<td></td>
</tr>
<tr>
<td>Oldest daughter</td>
<td>-0.016</td>
<td>0.011</td>
<td>-0.029</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.009)</td>
<td>(0.020)</td>
<td></td>
</tr>
<tr>
<td>(N)</td>
<td>4,006</td>
<td>1,781</td>
<td>2,225</td>
<td>3,957</td>
</tr>
<tr>
<td>Children</td>
<td>1,101</td>
<td>511</td>
<td>590</td>
<td>1,043</td>
</tr>
<tr>
<td>Households</td>
<td>777</td>
<td>363</td>
<td>414</td>
<td>770</td>
</tr>
</tbody>
</table>

* \(p<0.1; \) ** \(p<0.05; \) *** \(p<0.01.\) All models also include age dummies, zone-specific year dummies and a constant. Standard errors are in parentheses and clustered at the kebele level using the few clusters procedure in Brewer, Crossley and Joyce (2013).
### Table 6: Land certification and child labor supply

<table>
<thead>
<tr>
<th></th>
<th>Boys &amp; Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Girls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean effect</td>
<td>mean effect</td>
<td>mean</td>
<td>effect</td>
<td>mean</td>
<td>effect</td>
</tr>
<tr>
<td><strong>Panel A: East Gojjam</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2002 (placebo)</td>
<td>6.384</td>
<td>0.133</td>
<td>4.310</td>
<td>-0.448</td>
<td>2.097</td>
<td>0.531</td>
</tr>
<tr>
<td></td>
<td>(1.857)</td>
<td></td>
<td>(1.422)</td>
<td></td>
<td>(0.775)</td>
<td></td>
</tr>
<tr>
<td>- 2005 (treatment effect)</td>
<td>8.511</td>
<td>-2.594*</td>
<td>5.292</td>
<td>-1.581*</td>
<td>3.231</td>
<td>-1.046**</td>
</tr>
<tr>
<td></td>
<td>(1.017)</td>
<td></td>
<td>(0.702)</td>
<td></td>
<td>(0.399)</td>
<td></td>
</tr>
<tr>
<td><strong>Households</strong></td>
<td>669</td>
<td></td>
<td>669</td>
<td></td>
<td>669</td>
<td></td>
</tr>
<tr>
<td><strong>Panel B: South Wollo</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2002 (placebo)</td>
<td>15.150</td>
<td>-3.633</td>
<td>10.543</td>
<td>-2.564</td>
<td>4.799</td>
<td>-0.984**</td>
</tr>
<tr>
<td></td>
<td>(2.374)</td>
<td></td>
<td>(2.233)</td>
<td></td>
<td>(0.249)</td>
<td></td>
</tr>
<tr>
<td>- 2005 (treatment effect)</td>
<td>15.328</td>
<td>7.882**</td>
<td>8.031</td>
<td>6.073***</td>
<td>7.657</td>
<td>1.860</td>
</tr>
<tr>
<td></td>
<td>(2.643)</td>
<td></td>
<td>(1.281)</td>
<td></td>
<td>(1.564)</td>
<td></td>
</tr>
<tr>
<td><strong>Households</strong></td>
<td>747</td>
<td></td>
<td>747</td>
<td></td>
<td>747</td>
<td></td>
</tr>
</tbody>
</table>

* p<0.10, ** p<0.05, *** p<0.01. The effect is estimated using a difference-in-difference approach with a linear specification as described in Section 5. The model includes the following demeaned control variables: the gender and age of the household head, number of children and adults in the household, land size, land quality proxied by slope of the landholding, existence of pair of oxen owned by the household, walking distance to the nearest town, and quality of the roof top of the homestead. Standard errors are in parentheses and clustered at the kebele level using the few clusters procedure in Brewer, Crossley and Joyce (2013).
The main schooling results are robust to several alternative specifications/models, for example:

- Using the wild cluster t bootstrap procedure for inference with few clusters.
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- Using the wild cluster t bootstrap procedure for inference with few clusters.
- A placebo test where we simulate that the program started in 2000 and followed its actual pattern.
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  - In East Gojjam, this is attributed to less focus on schooling on the part of the oldest sons, while in South Wollo this may be the result of the change in the sample of oldest sons enrolled in school.

Children in East Gojjam are found to engage in less child labor as a result of the program, while the opposite is true for South Wollo. Therefore, these negative effects in terms of progress in East Gojjam appear to be the result of an optimization of children’s time use, rather than for example an incentive for parents to increase child farm work.
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  - The permanent certificate includes exact geographical coordinates, and permanent corner stones mark the land boundaries.

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