Settlers and missionaries: a sub-national comparison of the consequences of colonial institutions and historical school investments

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Motivation

Are development outcomes explained by differences in human capital or quality of institutions?

• Around the world sub-national incomes highly correlated with human capital (Acemoglu and Dell 2010, Gennaioli et.al. 2013).

• But a lot of variation not accounted for. This could be due to differences in local institutions (Acemoglu and Dell 2010).

• Existing studies also do not account for endogeneity of human capital and institutions at the sub-national level.
Study approach and contribution

• This study uses historical data on institutions and human capital to deal with these endogeneity issues.

• Compares long-term consequences of missionary schooling and colonial settler institutions within Madagascar.

Main Results

• Robust long-term impacts of colonial settlement institutions

• No sign of regional development impacts of school investments

• Results suggest a ‘reversal of fortunes’ story (AJR 2002): Initially disadvantaged settlement areas developed due to better property rights institutions

• Weak regional impacts of missionary schools probably due to domestic migration
Identification strategy

Study exploits historical variation between missionaries and settlers

Variation in time:

- Missionaries active in Madagascar since 1820
- French colonial rule established in 1896
Identification strategy

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Variation in time:

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Example: David Livingstone travelled Africa from 1850-1873, well before the ‘scramble for Africa’.
Variation in space

- Missionaries preferred the temperate central highland regions.
- European settlers concentrated in coastal lowlands (for cash crop production). These areas had low initial population densities.
- Correlation between missionaries and settlers close to zero.
Dep var: log of mean district hh consumption

\[ \log \text{Exp}_d = \alpha_1 + \beta_2 \log \text{Missionaries} + \gamma \log \text{Controls}_d + \epsilon_d \]

\[ \log \text{Exp}_d = \alpha_1 + \beta_2 \log \text{Settlers} + \gamma \log \text{Controls}_d + \epsilon_d \]

• IV for Missionaries: dummies for stages of expansion of pre-colonial Merina empire

• IV for Settlers: District population densities 1936 (AJR 2002)
What do my historical variables measure?

Missionaries: Number of churches per 1000 inhab per district in 1904.

- Churches historically linked to mission schools. Mission schools often double as churches.
- I combine Protestants and Catholics because they were in the same regions.
What do my historical variables measure?

**Settlers**: population proportion of French non-military personnel 1951

- French encouraged settlement in Madagascar.
- Settlement accompanied by introduction of formal land titles. Traditional communal land-titling system remained intact in non-settlement areas.
What do my historical variables measure?

**Settlers**: population proportion of French non-military personnel 1951

- French encouraged settlement in Madagascar.
- Settlement accompanied by introduction of formal land titles. Traditional communal land-titling system remained intact in non-settlement areas.

NB: Contextual evidence suggests Settlers does not proxy for human capital: “It is often difficult to distinguish a European or Creole plantation from that of his Malagasy neighbour. In general the settlers appear to have had little or no capital and often little competence or aptitude.” (Heseltine 1971: 150)
Main results

- No economic effects of missionary schools
- Robust effects of colonial institutions
Main results

- No economic effects of missionary schools
- Robust effects of colonial institutions

NB: Same result for missionaries and wages levels in 1938
## Estimation results – missionaries and incomes

<table>
<thead>
<tr>
<th></th>
<th>Hh income</th>
<th>Hh income</th>
<th>Hh income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>OLS</td>
<td>2SLS</td>
</tr>
<tr>
<td>Missionaries</td>
<td>-0.002</td>
<td>0.005</td>
<td>-0.081</td>
</tr>
<tr>
<td>SE</td>
<td>(0.077)</td>
<td>(0.069)</td>
<td>(0.086)</td>
</tr>
<tr>
<td>Geographic and historical controls</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>107</td>
<td>106</td>
<td>106</td>
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</tbody>
</table>
## Estimation results – district incomes

<table>
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<tr>
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<th>Hh income</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>OLS</td>
<td>OLS</td>
<td>2SLS</td>
</tr>
<tr>
<td>Settlers</td>
<td>0.139***</td>
<td>0.112***</td>
<td>0.097***</td>
<td>0.275**</td>
</tr>
<tr>
<td>SE</td>
<td>(0.025)</td>
<td>(0.032)</td>
<td>(0.032)</td>
<td>(0.107)</td>
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<tr>
<td>Geographic and historical controls</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Historical wages and infrastructure</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>N</td>
<td>107</td>
<td>106</td>
<td>106</td>
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</tr>
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</table>
What explains greater effect of Settlers?

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<table>
<thead>
<tr>
<th></th>
<th>Settlers</th>
<th>% Land titled</th>
<th>Cash crops</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop density 1936</td>
<td>IV first stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.337***</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>(0.105)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settlers</td>
<td>0.149**</td>
<td>0.057</td>
<td>0.257***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.095)</td>
<td>(0.080)</td>
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</tr>
</tbody>
</table>

Full set of controls included
What explains weak effect of missionary schools?

Evidence for human capital spill overs from missionary districts to former settlement regions

<table>
<thead>
<tr>
<th></th>
<th>Public school teachers</th>
<th>Private school teachers</th>
<th>Secondary school</th>
<th>Adult education rates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Settlers</strong></td>
<td>0.046</td>
<td>-0.016</td>
<td>0.030</td>
<td>0.146**</td>
</tr>
<tr>
<td><strong>SE</strong></td>
<td>(0.054)</td>
<td>(0.056)</td>
<td>(0.062)</td>
<td>(0.059)</td>
</tr>
<tr>
<td><strong>Missionaries</strong></td>
<td><strong>0.210</strong>*</td>
<td><strong>0.885</strong>*</td>
<td><strong>0.341</strong>**</td>
<td><strong>0.150</strong></td>
</tr>
<tr>
<td><strong>SE</strong></td>
<td>(0.109)</td>
<td>(0.145)</td>
<td>(0.169)</td>
<td>(0.167)</td>
</tr>
</tbody>
</table>

Full set of controls included
Conclusions

Paper uses historical experiment to study income effects of institutions and human capital investments.

• Strong support for institutional approach (AJR’s ‘reversal of fortunes’ hypothesis).

• Weak / no support for human capital argument. Missionary education alone was not sufficient for regional economic development.
Conclusions

Paper uses historical experiment to study income effects of institutions and human capital investments.

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But some questions about measurement of human capital impacts:

Is the regional level the right level of analysis to study school impacts?

• Human capital is mobile, institutions less so. Domestic migration may dilute regional impacts of school investments.
IV for missionaries

Stages of expansion of the Merina empire

[Map of Madagascar showing stages of expansion from around 1750 to 1861]