Natural experiment evidence on whether selection bias overstates the gains from migration

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Introduction

Migration from developing to developed countries and the resulting remittance flows are emerging as key development policies. Restrictions on international migration may have larger welfare costs than the more widely studied restrictions on international trade (World Bank, 2005). Estimating the gains from migration requires estimating what workers in developing countries would earn if they emigrated. Our results show that popular approaches for estimating these gains from migration, at least compared with the benchmark of an experimental method overstates the gains in income from migration. Thus, assessments of global gains from migration are also used. These mainly compare the migrants to the pseudo-randomly selected non-applicants (as a measure of health), being born on the main island of Tongatapu (a dummy variable for success in the ballot). The ballot outcome is strongly correlated with migration and is a valid instrument estimating average treatment effects (Angrist, et. al, 1996). The ballot dummy variable for success in the ballot.

Methods

Randomized surveys of four random samples of Tongan households were conducted by the authors in 2005:
1) 67 migrant households who came to New Zealand through the 2002/03 PAC ballot (a 70% sampling rate);
2) 55 households whose members had successful ballots but who had not yet migrated to New Zealand (these are non-compliers to the migration treatment) (a 30% sampling rate); and
3) 78 unsuccessful ballots who were still in Tonga (a 3% sampling rate), and
4) 60 households in Tonga who had never entered the migration ballot and who were living in the same villages as the successful and unsuccessful PAC applicants (a 1% sampling rate). Figure 1 shows the relationship between these four samples and the PAC immigration program.

Figure 1: The immigration ballot and the four household samples

If ballot winners randomly choose to migrate, the income gain from migration could be estimated by comparing the mean earnings, I, of successful ballots who migrated and unsuccessful ballots (Group 1 vs 3).

SEE = \frac{\bar{I}_{\text{success}} - \bar{I}_{\text{nonsuccess}}}{\text{prop. non-compliers}}

This simple estimate ignores the “dropout bias” from successful ballots who failed to migrate. But the “intent-to-treat” (ITT) effect, which is the earnings difference between all ballot winners (regardless of whether they migrated) and unsuccessful ballots, when divided by the proportion of non-dropouts (33% here) gives an unbiased estimate of the average treatment effect on the treated.

Instrumental variables (IV) provide another unbiased method for estimating average treatment effects (Angrist, et. al, 1996). The ballot outcome is strongly correlated with migration and is a valid instrument because randomization (see Table 1) ensures that ballot success is uncorrelated with unobserved attributes that might also affect earnings.

Table 1: Evidence for Randomization

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mean Income</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicants</td>
<td>103.7</td>
<td>88.0</td>
</tr>
<tr>
<td>Non-applicants</td>
<td>104.051</td>
<td>-60.422</td>
</tr>
<tr>
<td>Migration dummy</td>
<td>273.996</td>
<td>273.736</td>
</tr>
<tr>
<td>Male dummy</td>
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Table 2: OLS and IV Regression Equations for Weekly Earnings (NZD)

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<tr>
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<tr>
<td>OLS</td>
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Conclusion

Measuring the gains from increased international migration requires estimating what workers in developing countries could earn if they emigrated. Our results show that popular approaches for estimating these gains from migration, at least compared with the benchmark of an experimental estimate. Thus, assessments of global gains from migration are also used. These mainly compare the migrants to the pseudo-randomly selected non-applicants (as a measure of health), being born on the main island of Tongatapu (a dummy variable for success in the ballot). The ballot outcome is strongly correlated with migration and is a valid instrument estimating average treatment effects (Angrist, et. al, 1996). The ballot dummy variable for success in the ballot.

Non-experimental results

The natural experiment provided by the use of a ballot to admit Tongans to New Zealand provides a unique chance to estimate the gains in income from migration. Other studies attempt to deal with selectivity issues by using non-experimental methods to compare the income of migrants to those of non-migrants with similar pre-migration characteristics. To see how well such methods work in practice, the experimental results are compared with those from five non-experimental methods:

• experimental estimate [% overestimate] = [log odd]
• Single difference using pre-migration income [24.6]
• Detection on observable (OLS regression) [34.8]
• Difference in difference regression [36.9]*
• Propensity score matching [23.9]
• Using migrant network in New Zealand [82.0]
• Using distance to ballot office [1.2]

The single-difference estimator, which relies on migrants’ retrospectively recalling their pre-migration earnings, overestimates the gains by 23%. The difference-in-differences estimator compares the change in migrants’ earnings with the similarly calculated change in non-applicants’ earnings and overestimates the gains by 28%. Propensity-score matching, which uses the characteristics listed in Table 2 to match migrants to ‘similar’ non-migrants, overestimates the gains by 24%. OLS using the same characteristics overestimates the gains by 40%.

Notes

1) Corresponding author: jkgibson@waikato.ac.nz

References


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