Seasonal Migration and Agriculture in Vietnam

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Motivation

- Vietnam experienced rapid economic growth during the 1990s with a small increase in inequality (Benjamin and Brandt, 2004)

- Also agricultural growth during that period

- One path to rural expenditure growth was through migration (de Brauw and Harigaya, 2007)

- Yet the mechanism through which migration affected rural households not well developed in that paper...
Objectives

- To provide more evidence about the ways that migration affects source communities

- Does migration affect agriculture? How?

- To fill in a gap in de Brauw and Harigaya- how does migration lead to increased consumption growth?

- Indirect evidence on how well markets work in early transition Vietnam
Outline of Talk

- Data I use for the paper
- Discussion of methodology
- Instrumental variable strategy and defense
- Results
- Discussion of Results and implications
Data Set

- Use the Vietnam Living Standards measurement Surveys- completed in 1992-3 and 1997-8

- Create a subsample of rural households (Total: 3495 HHs)

- Also subsample of those working in AG (3109 HHs)

- Reasonably Nationally Representative (some non-random attrition)
Data set- key modules

- Labor Module

- Separate form asked about seasonal migration status and briefly on history

- Used to identify households with seasonal migrants

- Also information on time spent in agriculture by person (labor days)
Data set - key modules

- **Agriculture Module**

- *Asked in detail about plots; lots of details on crops grown; aggregate inputs*

- *1993 survey lacks link between crops grown and actual plots*

- *So we have to aggregate...*
Further drawbacks - data

- Difficult to ascertain any semi-permanent migration (people who have left for long periods - limited to seasonal migration)

- Must aggregate crops to at least the household level

- Because of 1992-3 data, yield response not possible either

- Land rental also not captured at the plot level
### Structure of Sample

<table>
<thead>
<tr>
<th>Rural Households in both Vlss Surveys</th>
<th>3495</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report farm income in both surveys</td>
<td>3109</td>
</tr>
<tr>
<td>Report growing rice in both surveys</td>
<td>2602</td>
</tr>
</tbody>
</table>

Note: 3 HHs dropped for incomplete records
### Descriptive Stats.: Ag.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>1992-3</th>
<th>1997-8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RICE PROD.</strong></td>
<td>2253 KG</td>
<td>2905 KG</td>
</tr>
<tr>
<td><strong>VALUE, AG. PROD.</strong></td>
<td>5.65 Mil.</td>
<td>7.63 Mil.</td>
</tr>
<tr>
<td><strong>SHARE OF AG. REVENUE, RICE</strong></td>
<td>0.702</td>
<td>0.696</td>
</tr>
<tr>
<td><strong>DAYS WORKED</strong></td>
<td>593.1</td>
<td>493.1</td>
</tr>
<tr>
<td><strong>LAND</strong></td>
<td>6.7 HA</td>
<td>7.3 HA</td>
</tr>
<tr>
<td><strong>TOT. FERTILIZER</strong></td>
<td>2862 KG</td>
<td>2952 KG</td>
</tr>
<tr>
<td><strong>SHARE LAND, IRR.</strong></td>
<td>0.475</td>
<td>0.601</td>
</tr>
</tbody>
</table>

*Note: For Panel Households*
Panel HHs with a migrant

Households

1992-3

1997-8

0

100

200

300

400
### Characteristics of Migrants, 1997-8

<table>
<thead>
<tr>
<th>Charc.</th>
<th>Migrants</th>
<th>Non-Migrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion Male</td>
<td>0.705</td>
<td>0.453</td>
</tr>
<tr>
<td>Yrs. of Education</td>
<td>6.8</td>
<td>5.9</td>
</tr>
<tr>
<td>Age</td>
<td>29.9</td>
<td>38.4</td>
</tr>
<tr>
<td>Proportion Married</td>
<td>0.49</td>
<td>0.62</td>
</tr>
</tbody>
</table>
How to link migration and ag. production?

Ag. production process can be thought of as:

\[ Q = f(L, A, F, X, \psi) \]

We can think of farm households as profit maximizers

Error term above can be written as:

\[ \psi = \theta + \varepsilon \]
How to link migration and ag. production?

- Migration affects the implicit cost of labor to the households (esp. as ag labor markets are thin)

- Therefore migration enters production decision making as a “price”

- From an estimation perspective, must then estimate factor demands from cost minimization problem

- Cobb-Douglas or more flexible form?

- How to measure agricultural production?
Rice and Inputs

![Graph showing the relationship between Change in Log(Rice Output) and Change in Log(Inputs) for different input types: Fertilizer, Days Worked, Men, Days Worked, Women, and Land Use.]
Estimation strategy

Using the cost minimization framework, I should estimate something like:

\[ \ln Q_{ivr} = \alpha + \beta \ln P_{ivr} + t_r + \psi_{ivr} \]

Since I have a composite error term, I difference to remove time invariant household effects:

\[ \Delta \ln Q_{ivr} = \gamma_r + \beta \Delta \ln P_{ivr} + \Delta \varepsilon_{ivr} \]
Estimation Strategy

But lots of prices are unavailable (land, labor, etc.). So I stick in migration (M), demographics, and X variables:

\[ \Delta \ln Q_{ivr} = \beta_{vr} + \beta_M \Delta M_{ivr} + \sum_{j=1}^{N} \beta_j \Delta X_{ivr} + \beta_f \Delta \ln w_{ivr}^f + \epsilon_{ivr} \]

Included in X are share of land irrigated, commune specific variables.
**Instrumenting Migration**

- **Migration (M) is not a random process- it is an endogenous variable**

- I use a two pronged approach to identify migration (after differencing out household fixed unobservables):
  - Share of the commune out-migrating in 1992;
  - Share of the household born in either Hanoi or Ho Chi Minh City
Are the instruments plausible?

- Share out in 1992- could be related to past rainfall shocks and therefore ag. productivity (a la Munshi, 2003)

- But in this case, migration relatively new in 1992-3, so should be okay- not yet responding to rainfall shocks

- Share born in Hanoi/HCM seems safer, but may be correlated with education/ability levels
Instrument Defense

- Regress the instruments on a long list of community level variables

- F statistics cannot reject coeffs. jointly all zero

- Do find significance on distance to hanoi/HCM for the hanoi/HCM instrument

- Control for these in estimation

- No correlation with education at HH level

- Also no correlation with logarithm of farm income in 1992-3
## First stage (Table 5)

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>(1)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHARE migrants, 1992-3</td>
<td>0.017</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>(0.005)**</td>
<td>(0.007)**</td>
</tr>
<tr>
<td>SHARE, born in Hanoi/HCM city</td>
<td>0.199</td>
<td>0.220</td>
</tr>
<tr>
<td></td>
<td>(0.077)**</td>
<td>(0.084)**</td>
</tr>
<tr>
<td>OTHER controls?</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>F stat.</td>
<td>11.75</td>
<td>10</td>
</tr>
</tbody>
</table>

F stat is cluster corrected
## Determinants of Rice Production (Table 6)

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. OF MIGRANTS</td>
<td>-0.018</td>
<td>-0.317</td>
<td>-0.397</td>
<td>-0.35</td>
<td>-0.243</td>
</tr>
<tr>
<td></td>
<td><strong>0.030</strong></td>
<td><strong>0.246</strong></td>
<td><strong>0.212</strong></td>
<td><strong>0.203</strong></td>
<td><strong>0.196</strong></td>
</tr>
<tr>
<td>CONTROLS</td>
<td></td>
<td>HH DEMOGRAPHICS</td>
<td>(2) +AG. PRICES</td>
<td>(3) +COMMUNE VARS.</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** All specifications include region and terrain dummies; std error is bold.
## Determinants of Ag. Revenue (exc. rice - Table 7)

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>OLS</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Migrants</td>
<td>0.067</td>
<td>1.725</td>
<td>1.747</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td><strong>0.131</strong></td>
<td><strong>0.748</strong></td>
<td><strong>0.692</strong></td>
<td><strong>0.77</strong></td>
</tr>
<tr>
<td>Controls</td>
<td>HH Demographics</td>
<td>(1)+Ag. Prices</td>
<td>(1)+Commune Vars.</td>
<td></td>
</tr>
</tbody>
</table>

Does migration affect factor demands? *(Table 8)*

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>EST. COEFFICIENT ON MIGRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice fertilizer</td>
<td>-0.984</td>
</tr>
<tr>
<td></td>
<td>0.393</td>
</tr>
<tr>
<td>All fertilizer</td>
<td>-0.775</td>
</tr>
<tr>
<td></td>
<td>0.286</td>
</tr>
<tr>
<td>Days worked, men</td>
<td>-1.108</td>
</tr>
<tr>
<td></td>
<td>0.523</td>
</tr>
<tr>
<td>Days worked, women</td>
<td>-0.663</td>
</tr>
<tr>
<td></td>
<td>0.383</td>
</tr>
</tbody>
</table>

*Note: Dep. variable specific controls included*
POSSIBLE EXPLANATIONS

1. Migrant households may be substituting capital for labor (relative to non-migrant households)

2. Migrant households may have increased productivity relative to non-migrant households

3. Could be shifting into relatively land intensive crops from rice/other labor intensive crops
TESTS OF HYPOTHESES

- **LABOR SAVING TECHNOLOGIES:** EXAMINE MACHINE RENTALS OR USE OF MACHINERY SERVICES
  - FIND NO EVIDENCE (BUT FEW HOUSEHOLDS ARE USERS)

- **TFP INCREASE?:** CREATE COMMUNE SPECIFIC TFP MEASURES USING COBB-DOUGLAS FRAMEWORK, REGRESS ON THE MIGRATION INSTRUMENTS
  - FIND NO EVIDENCE (NOTE THAT THIS IS A WEAK TEST)
Ran new regression with revenues from (obviously) land intensive crops on migration, other controls.

Coefficient estimate was 1.75, with std. error of 0.58.

Therefore evidence is consistent with subtle shift into less labor intensive crops.
Conclusion

- Migration had subtle effects on agricultural production in Vietnam
- No aggregate effect on ag. revenue
- But migration positively associated with non-rice production
- Migrant households also decrease labor, fertilizer inputs relative to similar non-migrant households
Conclusion

- Migration in Vietnam leads to improved living standards (de Brauw and Harigaya, 2007)

- But has no aggregate effects on agriculture

- Therefore any “multiplier” effects of seasonal migration on production are likely quite small relative to direct effects