The End of Farm Labor Abundance

Labor, Water, and California Agriculture

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The Two Flows

• Water
  – Source: Nature
  – Delivery: Pumps & Aqueducts

• Labor
  – Source: Rural Mexico
  – Delivery: Immigration
The Bottom Line

• No one dreams of growing up to be a hired farm worker
• Everywhere as incomes go up the share of the workforce in agriculture plummets
• Mexico saved us, now Mexico is changing
• Immigration policy doesn’t solve the farm labor problem unless people are willing to do farm work
• The biggest change: Kids
The Bottom Line: New Data Show That...

- Mexico’s farm labor supply is declining
- The demand for labor on Mexican farms is rising
- The reservation wage (minimum wage needed to induce new workers to migrate) is increasing
- Immigration policy will not be the solution
- U.S. growers must look for labor substitutes
  - Shift to less labor-intensive FVH production
  - Seek migrant workers from other countries?
  - Invest in labor-saving agricultural technologies
    - ...and management practices
Mexico in Transition

• Mexico is the major supplier of hired labor to U.S. farms
  – Only 2% of California’s hired farm workers are U.S.-born

• Guatemala has become a supplier of farm labor to Mexico

• Mexico is in the transitional phase of being both a farm labor exporter and importer
Fleeing the Farm

The % of workforce in agriculture falls as per-capita incomes rise

Is Something Happening Out There?

Farmers across California are experiencing the same problem: Seasonal workers who have been coming for decades to help with the harvest, planting and pruning have dropped off in recent years.

*SF Chronicle, May 27, 2012*

The workforce has been decreasing in the last two to three years, but last year it was drastic.

*Kristi Boswell, Farm Bureau*

The supply of Mexican labor available to work in the United States has fallen due to a sharp decrease in Mexico’s total fertility rate and employment growth in Mexico.

*Passel, et al. (2012)*
The UCD-COLMEX Mexico National Rural Household Survey (ENHRUM)

- Nationally representative sample of rural households
- Tracks workers from 1980 through 2010, inside and outside Mexico
- 201,779 person-years of data
Mexico’s Decreasing Agricultural Labor Supply, 1980-2010

Estimated Percentage Impacts on the Probability of Individuals Working in Farm Jobs

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) No controls</th>
<th>(2) Control for age</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
<td>-0.062 (0.007)***</td>
<td>-0.070 (0.007)***</td>
</tr>
<tr>
<td>age in year t</td>
<td>0.045 (0.004)***</td>
<td></td>
</tr>
<tr>
<td>L.agriculture</td>
<td>0.809 (0.009)***</td>
<td>0.808 (0.009)***</td>
</tr>
<tr>
<td>L2.agriculture</td>
<td>0.109 (0.009)***</td>
<td>0.108 (0.009)***</td>
</tr>
<tr>
<td>Constant</td>
<td>126.138 (14.396)***</td>
<td>141.037 (14.544)***</td>
</tr>
</tbody>
</table>

Observations: 128,072
R-squared: 0.833

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Charlton and Taylor (2014)
Conditional Probability of Working in Ag (anywhere, in Mexico or the US)

Source: Charlton and Taylor (2014)
How large is that decline?

• The working age rural population of Mexico is 16 million people

• That means the farm labor supply from rural Mexico is decreasing by \textbf{11,200} people each year

• That is a \textbf{0.13\%} decrease in the Mexican farm labor supply each year (working in Mexico or the U.S.)

• U.S. and Mexican farmers compete for this dwindling supply of farm workers
Downward Sloping Trends in all Regions of Mexico

### Percentage Impacts on Probability of working in Agriculture by Region

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Percentage Probability of Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.agriculture</td>
<td>0.797 (0.009)***</td>
</tr>
<tr>
<td>L2.agriculture</td>
<td>0.105 (0.009)***</td>
</tr>
<tr>
<td>age in year t</td>
<td>0.052 (0.005)***</td>
</tr>
<tr>
<td>Centro</td>
<td>72.237 (46.282)</td>
</tr>
<tr>
<td>Centro-Occidente</td>
<td>149.936 (43.639)***</td>
</tr>
<tr>
<td>Noroeste</td>
<td>163.267 (46.618)***</td>
</tr>
<tr>
<td>Noreste</td>
<td>31.029 (50.806)</td>
</tr>
<tr>
<td>Sur-Sureste*year</td>
<td>-0.041 (0.016)***</td>
</tr>
<tr>
<td>Centro*year</td>
<td>-0.077 (0.017)***</td>
</tr>
<tr>
<td>Centro-Occidente*year</td>
<td>-0.116 (0.015)***</td>
</tr>
<tr>
<td>Noroeste*year</td>
<td>-0.123 (0.017)***</td>
</tr>
<tr>
<td>Noreste*year</td>
<td>-0.057 (0.020)***</td>
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<tr>
<td>Observations</td>
<td>128,072</td>
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<tr>
<td>Number of id</td>
<td>8,133</td>
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<tr>
<td>R-squared within</td>
<td>0.502</td>
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<tr>
<td>R-squared between</td>
<td>0.955</td>
</tr>
<tr>
<td>R-squared overall</td>
<td>0.833</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

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The Recession “Quasi Experiment”
Why Did Migration to US Ag Jobs Decrease?

Percentage change in the rural Mexican labor force by sector.
Mexican industry is growing.

Source: Taylor and Charlton (2012)
WHY the Negative Trend?

- A falling birthrate:

  ![Graph showing Sharp Declines in Mexican Fertility](chart1.png)
  Source: Jeffrey Passel, PEW Research Center

- A growing non-farm economy:

  ![Graph showing Mexican Industrial GDP value added](chart2.png)
  Recession
...And Schools!

% of working-age population with a secondary school in their village when 12
How It All Stacks Up (Preliminary)

Source: Estimates by Diane Charlton, UCD ARE
What It Means to Mexico: Producing More with Less

- Rising productivity in Mexico means higher farm wages in CA
- Nonfarm wages are now the major source of household income in rural Mexico
What It Means to California

• Farms will have to produce more with fewer workers
  – Technological change: mechanization
  – Changing crop mixes
  – More efficient labor management practices
    • Demand for more skilled workers
    • Rising farm worker productivity and wages
      – Could be good for rural communities
What Happens to Labor When Farms Tech Up?
Lessons from “Shake and Catch”

• “Shake-and-catch” machines surround a tree and shake fruit and nuts into a catching frame
• They usually replace many low-skilled foreign-born workers with a few US workers with high-school diplomas and sometimes some college
  – Most machine operators speak English and have mechanical skills
  – Some are ex-pickers, but many did not move up from picking to machine operation
Skilled Farm Labor Migration?

• Mexico graduates 113,000 engineers a year, twice the rate per 100,000 residents as the US

• Mexican agricultural education “practical” compared with the increasing “theoretical” orientation of shrinking agricultural programs at US universities

• Some of the foreign workers hired via the H-2A program are skilled, but most are not

• Will there be an expansion of skilled farm labor migration in the future?
Immigration policy plays a role, but it is only an intervening variable against the backdrop of a diminishing farm labor supply in Mexico.
Some Policy Lessons

• Don’t assume immigration will solve the farm labor problem
  – The labor has to be there

• Adjust to a future with fewer workers
  – Get over the tomato harvester
  – UCD: Robots in the fields

• Educate the future farm workforce
  – ...or import it from Mexico

• Good news for ag workers, communities
  – Less labor, higher productivity → higher wages
The Rains Are Likely to Come Back, But the Hired Farm Labor from Mexico Is Not
References

