GUESTWORKERS IN THE HIGH-SKILL U.S. LABOR MARKET: Analysis of Supply and Employment Trends of the IT Workforce

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Full report available at:
OR:
http://www.epi.org/publication/bp359-guestworkers-high-skill-labor-market-analysis

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Key Questions:

• Is there a shortage of STEM workers in the U.S.?

• What is the impact of high-skill guestworker visa programs?
The Issues

- Are there enough high-performing/STEM-educated students?

- How large is the flow of high-skill guestworkers? And what are the characteristics of these workers?

- What are the employment and wage trends in the IT labor market?
Findings

- Ample supply of STEM graduates
  - Only one of every two STEM graduates employed in a STEM job
  - Computer Science and Engineering produce 50 percent more graduates than hired

- Supply is responsive to demand
  - When wages increase, so does the number of graduates
  - When wages stagnate, so does the number of graduates
Does the U.S. lack STEM-potential Students

Don’t students in the U.S. lag the world in performance?
U.S. Has Largest Shares of Global Supply of High-Performing Students

Source: These figures are reproduced from: Salzman and Lowell, 2008; “Making the Grade” Nature 453, 28-30].
But do STEM labor markets work?

Can STEM employers really find workers?
Graduates Respond to Wages:

Computer Science Graduates

<table>
<thead>
<tr>
<th>Year</th>
<th>Programmer Salary</th>
<th>Programmers Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>$60,000.00</td>
<td>2.00%</td>
</tr>
<tr>
<td>1997</td>
<td>$65,000.00</td>
<td>1.00%</td>
</tr>
<tr>
<td>1998</td>
<td>$70,000.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>1999</td>
<td>$75,000.00</td>
<td>1.00%</td>
</tr>
<tr>
<td>2000</td>
<td>$80,000.00</td>
<td>3.00%</td>
</tr>
<tr>
<td>2001</td>
<td>$85,000.00</td>
<td>5.00%</td>
</tr>
<tr>
<td>2002</td>
<td>$90,000.00</td>
<td>7.00%</td>
</tr>
<tr>
<td>2003</td>
<td>$85,000.00</td>
<td>9.00%</td>
</tr>
</tbody>
</table>
Graduates Respond to Wages:
Computer Science Graduates

- **Comp Sci Grads (Domestic; all degrees)**
  - 1998: 40,000
  - 2004: 80,000
  - Percentage Increase: 101%

- **BS Comp Sci**
  - 1998: 30,000
  - 2004: 60,000
  - Percentage Increase: 116%

- **MS Comp Sci**
  - 1998: 20,000
  - 2004: 50,000
  - Percentage Increase: 72%

- **AA Comp Sci**
  - 1998: 10,000
  - 2004: 20,000
  - Percentage Increase: 209%
Comp Sci-U.S. Grads

Year: 1998 to 2011

Rate of Change (1998=1.0)

1998: 1.0
1999: 1.1
2000: 1.2
2001: 1.3
2002: 1.4
2003: 1.5
2004: 1.6
2005: 1.7
2006: 1.8
2007: 1.9
2008: 2.0
2009: 1.9
2010: 1.8
2011: 1.7

Comp Sci-U.S. Grads
Petroleum Engineering Starting Salaries

Source: IPEDS; Tabulations: Kuehn & Salzman, 2010
Salary data from BLS & NACE
Petroleum Engineering Graduates

Total and U.S. [citizen & perm. resident] grads

Source: IPEDS; Tabulations: Kuehn & Salzman, 2010
Salary data from BLS & NACE
What is the Impact of High-Skill Guestworkers?

• How many?
  – H-1B....but also L, OPT, OPT STEM-extension, and others

• Concentrated in IT industry
Guestworker visas issued annually, by program or visa category, 1991–2011


Source: Department of State (2012) and Department of Homeland Security (2008 and unpublished DHS data)
### Annual Guestworker Population:

**Estimated Total and Certified for Employment in IT, FY2010-2011**

<table>
<thead>
<tr>
<th></th>
<th>H-1B</th>
<th>L-1</th>
<th>L-2</th>
<th>OPT</th>
<th>OPT - STEM</th>
<th>Total New Guestworkers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not-IT</td>
<td>65,858</td>
<td>36,071</td>
<td>57,712</td>
<td>48,724</td>
<td>3,396</td>
<td>160,755</td>
</tr>
<tr>
<td>For IT Employment</td>
<td>63,276</td>
<td>34,657</td>
<td>19,237</td>
<td>32,482</td>
<td>11,103</td>
<td>157,482</td>
</tr>
</tbody>
</table>

Total New Guestworkers For IT Employment: 160,755
Guestworkers and New Hires in IT

- Total Annual New IT Hires
- Guestworkers (low estimate)
- Guestworkers (high estimate)

- Estimated New IT Hires:
  - Low Estimate: 450,000 to 500,000
  - High Estimate: 350,000 to 400,000

- Percentage of New IT Hires:
  - Low Estimate: 49.85%
  - High Estimate: 33.23%
New Hires in IT (2010) and Qualified IT Guestworkers

New Hires with Bachelor's & above
- 30 + years old: 65.7%
- < 30 years old: 34.3%

New IT Guestworkers
- 30 + years old: 34.05%
- < 30 years old: 65.95%
New IT Hires/Guestworkers
Ages 30 and below

New Hires with Bachelor's & above

New IT Guestworkers

64%
What’s happening in the IT labor market?
Change in programmer salaries and in numbers of U.S. STEM-related graduates and IT guestworkers (estimated).

- **Computer science U.S. graduates**
- **Programmer salaries**
- **IT guestworkers**

Change in programmer salaries and in numbers of U.S. STEM-related graduates and IT guestworkers (estimated).
Are there enough IT graduates for industry?
Occupational Field of STEM College Majors One Year After Graduation, 2009

- **Computer & Information Sciences**:
  - Job in Field of Major: 64.5%
  - Job in Any STEM Field: 67.8%

- **Engineering and Eng. Tech**:
  - Job in Field of Major: 53.9%
  - Job in Any STEM Field: 63.7%

- **Biology, Physical Sci, Sci Tech, Math & Agriculture**:
  - Job in Field of Major: 22.5%
  - Job in Any STEM Field: 38.7%

- **Health**:
  - Job in Field of Major: 74.4%
  - Job in Any STEM Field: 76.2%
Primary reason not working in field of college degree
(for those working in job outside their field of major one year after graduation, 2009)
Conclusions

• STEM supply is responsive to market signals (wages)
• Guestworker flows are large and increasing
• Wages stagnate in labor markets with large guestworker in-flows
• Two labor markets:
  – Domestic – increase/decline in response to wages
  – Guestworker – plentiful at wages too low to significantly increase domestic supply

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