STEM ENROLLMENTS AFTER SPUTNIK CAME DOWN

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The pipeline feeding into STEM jobs is very much bigger than the STEM workforce, and
- the number of students needed to be highly proficient in STEM skills is rather small;
- most students would benefit from some STEM knowledge, but that’s not a workforce issue.

Many STEM degree holders work outside of STEM, but
- expanding the definition of “STEM” into other jobs is a shell game (and at least very inefficient);
- if STEM workers aren’t working in STEM either there are surplus workers or STEM jobs lose their attraction.
Percent of high school graduates going to college, graduating, and then entering a STEM job

- High school graduates: 100%
- Enter college (as freshman at four-year college): 39%
- Graduate four-year college: 24%
- Graduate in STEM field: 4%
- Enter STEM job one year after graduation: 2.5%

Source: Authors’ analysis of National Center for Education Statistics (2009b, 2013)
STEM education can be improved & diversified, but it's not broken

- **High school course taking up** – 75% of high schoolers complete algebra II/ trigonometry (up 50% since 1990); big increases in courses on calculus & sciences (NCES)

- **STEM interest steady/up** – since 1972 about 33% of college freshmen planned to study S&E; now 38% (NSF)

- **College attrition normal** – about half of BS STEM candidates leave before completing a college degree; roughly the same as other fields (NCES)

- **Domestic graduates up** – 2000-2009 increases: BS 27%, MS 35%, PhD 43% (NSF); enrollments appear to be edging up further (ACM)
STEM BS+ graduates in STEM + Medical + Management + Closely related occupations, % 2003

- Occupation, STEM (including teachers)
- Occupation, STEM (including teachers, and Medical & Health Related)
- Occupation, STEM (including teachers, Medical & Health Related, STEM Management)
- Occupation, STEM (including teachers, Medical & Health Related, STEM Management, closely related)
STEM workforce growth is robust, but not booming

- STEM job growth not robust, BLS tends to overproject actual STEM employment
  - no computer or large STEM occupations projected in the top 30 fastest growing jobs to 2020 (BLS)

- About half of STEM graduates land a STEM job
  - IT and engineering - 50% more graduates than hires
  - CS grads not hired – 32% say IT jobs unavailable, 53% say better jobs elsewhere (NCES data)

- Demand in information technology is not what it was, wage growth is flat & unemployment relatively high
**Figure 1**

Average salaries and unemployment rates for computer and IT occupations, 1992–2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Programmer Salary</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>$30,000</td>
<td>4%</td>
</tr>
<tr>
<td>1994</td>
<td>$35,000</td>
<td>2%</td>
</tr>
<tr>
<td>1996</td>
<td>$40,000</td>
<td>6%</td>
</tr>
<tr>
<td>1998</td>
<td>$45,000</td>
<td>10%</td>
</tr>
<tr>
<td>2000</td>
<td>$50,000</td>
<td>12%</td>
</tr>
<tr>
<td>2002</td>
<td>$55,000</td>
<td>14%</td>
</tr>
<tr>
<td>2004</td>
<td>$60,000</td>
<td>12%</td>
</tr>
<tr>
<td>2006</td>
<td>$65,000</td>
<td>10%</td>
</tr>
<tr>
<td>2008</td>
<td>$70,000</td>
<td>8%</td>
</tr>
<tr>
<td>2010</td>
<td>$75,000</td>
<td>6%</td>
</tr>
</tbody>
</table>

**Note:** The list of Computer and IT occupations was expanded considerably for the Current Population Survey in 2002, so that continuous data on the set of occupations currently identified as IT occupations can only go back to 2002. Some major computer and IT categories, such as "programmers," are available before 2002. Data on these workers are included to provide a longer data series for comparison purposes.

**Source:** Authors' analysis of Current Population Survey Annual Social and Economic Supplement microdata
Research shows STEM enrollments track federal R&D (with sticky lags)

Industry R&D – especially D – has increased significantly

STEM earnings relative to other professional jobs has dropped since the Sputnik era
R&D expenditures and the relative earnings of core-STEM to other professional full time, prime age, BA degree workers
Improving the pipeline in the absence of robust demand is not a good strategy

But even if there is no shortage, there are needed improvements to the pipeline

- Employers report shortage of soft not technical skills
- Employers want just-in-time workers and need to invest in career training
- Domestic minorities and women should be tomorrow’s STEM workers
- Technical degrees, non-college and college-masters, may be a preferred alternative