IT Employment Prospects: Beyond the Dotcom Bubble

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The Enrollment Problem

Figure 1: Enrollment in the University of Hawaii Undergraduate MIS Program

1. Massive Enrollment Declines Since 2001
2. Really just returning to “normal”?
3. Still too low for employer needs, program viability
Student Concerns

- Employment drop following the bursting of the dotcom bubble
- Concerns over offshoring
- General future employment prospects
- Other
  - Difficulty of the major
  - Viewed as “a guy thing”
  - Etc.
The dotcom bust’s impact on the stock market was massive. It was a disaster for investors who stayed in too long.
Corporate Impact Concentrated in Dotcom Firms

Dotcom firms (heavy impact)

Existing brick and click firms (modest impact)

Other firms (no impact)

Although many pure dotcom firms failed, most firms were only slightly affected by the dotcom bust.
E-Commerce continued to grow rapidly after the bubble burst

- 1999: 0.7% of all consumer retail sales
- 2001: growth stalled due to the recession
- 2007: 2.9% of all consumer retail sales
- Overall, 23% annual compound growth rate
- In contrast, consumer retail sales are growing only about 3% per year
IT Unemployment Employment (U.S.)

- Moderate Impact
- Quickly Reversed

IT unemployment was only high for two years. Even then, it did not reach the overall national unemployment rate.
IT Employment (U.S.)

- Small dip
- Higher than the dotcom peak since 2005

![Employment Chart]

- 2001 Employment at Dot.Com Bubble Peak: 3,410
- 2002 Employment: 3,294
- 2003 Employment: 3,327
- 2004 Employment: 3,335
- 2005 Employment Exceeds Dot.Com Bubble Peak: 3,454
- 2006 Employment: 3,464
- 2007 Employment: 3,679

Employment is 4.3% Lower than peak
IT jobs are projected to grow much faster than total employment

<table>
<thead>
<tr>
<th>Category</th>
<th>Actual 2006 Employment (x1,000)</th>
<th>Projected 2016 Employment (x1,000)</th>
<th>Percentage Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All occupations</td>
<td>150,620</td>
<td>166,220</td>
<td>10.4%</td>
</tr>
<tr>
<td>All computer specialties</td>
<td>3,200</td>
<td>4,006</td>
<td>25.2%</td>
</tr>
</tbody>
</table>
Excellent prospects at the high end

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Projected 2016 Jobs (x1,000)</th>
<th>Growth Rate</th>
<th>Growth Rate Rank (1)</th>
<th>Jobs Added</th>
<th>Jobs Added Rank (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network systems and data communications analysts</td>
<td>402</td>
<td>53.4%</td>
<td>1</td>
<td>140,000</td>
<td>23</td>
</tr>
<tr>
<td>Computer software engineers, applications</td>
<td>733</td>
<td>44.6%</td>
<td>4</td>
<td>226,000</td>
<td>15</td>
</tr>
<tr>
<td>Computer systems analysts</td>
<td>650</td>
<td>29.0%</td>
<td>23</td>
<td>146,000</td>
<td>26</td>
</tr>
<tr>
<td>Database administrator</td>
<td>154</td>
<td>28.6%</td>
<td>24</td>
<td>35,000</td>
<td></td>
</tr>
<tr>
<td>Computer software engineers, systems software</td>
<td>449</td>
<td>28.2%</td>
<td>25</td>
<td>99,000</td>
<td></td>
</tr>
</tbody>
</table>

(1) Among all 821 detailed occupations
Bureau of Labor Statistics Projections

Strong prospects in the middle range

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Actual 2006 Jobs (x1000)</th>
<th>Projected 2016 Jobs (x1,000)</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network and computer systems administrators</td>
<td>309</td>
<td>393</td>
<td>27.0%</td>
</tr>
<tr>
<td>Computer and information scientists, research</td>
<td>25</td>
<td>31</td>
<td>21.5%</td>
</tr>
<tr>
<td>Miscellaneous Computer Specialists</td>
<td>136</td>
<td>157</td>
<td>15.1%</td>
</tr>
</tbody>
</table>
## Bureau of Labor Statistics Projections

### Two soft spots

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Projected 2016 Jobs (x1,000)</th>
<th>Growth Rate</th>
<th>Jobs Added</th>
<th>Jobs Decrease Rank (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer support specialists</td>
<td>624</td>
<td>12.9%</td>
<td>71,176</td>
<td></td>
</tr>
<tr>
<td>Programmers</td>
<td>417</td>
<td>-4.0%</td>
<td>-18,000</td>
<td>22</td>
</tr>
</tbody>
</table>

(1) Among all 821 detailed occupations

Employment for computer support specialists is still growing 20% faster than total U.S. employment.
Outsourcing versus Offshoring

- **Outsourcing**—moving jobs out of the firm
- **Domestic outsourcing**—moving jobs within a single country
- **Offshoring**—moving jobs from a high-wage country to a low-wage country
Forrester

- At the peak of the IT employment problem, Forrester forecast massive offshoring in IT (and other occupations)
  - First forecast in 2002
  - Second forecast in 2004 was worse

- Gartner forecast massive offshoring in 2004

- Forecasts received wide media attention

- Fueled fears among potential students
Offshoring: The Reality

- Offshoring is certainly occurring
- But is it massive?
- We do not have good data
- However, we have adequate data to indicate if offshoring is a crisis
Mass Layoff Statistics

- Data for all large (50+ person) layoffs
- Should indicate offshoring if it is massive
- Does not indicate massive offshoring

<table>
<thead>
<tr>
<th>Category</th>
<th>Mass Layoff Actions</th>
<th>Percent of Total ML Actions</th>
<th>Mass Layoff Separations</th>
<th>Percent of Total ML Separations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Mass Layoff events</td>
<td>5,010</td>
<td>100%</td>
<td>993,511</td>
<td>100%</td>
</tr>
<tr>
<td>Events involving domestic outsourcing or offshoring</td>
<td>382</td>
<td>7.6%</td>
<td>55,122</td>
<td>5.5%</td>
</tr>
<tr>
<td>Events involving offshoring</td>
<td>103</td>
<td>2.1%</td>
<td>16,197</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
European Restructuring Monitor Program

- Study of news reports of restructurings in Europe
- Not as good as the BLS mass layoff data
- Still should indicate massive offshoring if it exists
- Offshoring represented only 3.4% of all job losses in major restructurings during 2005
Problem with Offshoring Forecasts

- In the economy, job gains and job losses are enormously larger than net job gains
- Cannot only consider job losses
- Must also consider inshoring job gains
  - The same technology that lower-cost countries use to take jobs away from the U.S. and Western Europe can also be used to export IT services from the U.S. and Western Europe to less-developed countries
  - This has long happened, in fact
Inshoring

- The U.S. has a large surplus in IT services
- International Monetary Fund
  - List of largest recipients of offshoring pacts
    - United States
    - U.K.
    - Germany
    - France
    - Netherlands
    - India

Really inshoring
Study in Denmark

- Only nation-level study to measure inshoring and offshoring
- Inshoring was considerably larger than offshoring
Productivity Gains

- Probably “destroy” far more jobs than offshoring
  - Cost savings create other jobs
- Hard to measure offshoring because the same occupations are susceptible to both productivity gains and offshoring
  - Examples: programming, computer support specialists
Net Impact of inshoring and offshoring?

- May actually be positive in highly-developed countries
- May bring in higher-level IT jobs while losing lower-level IT jobs
Offshoring

- Was deliberately built into the 2006–2016 BLS occupational projections
  - Considered to be negligible for all IT jobs but two
    - Support specialists (help desk workers)
    - Programmers (versus software engineers)
Key Points

- The Bubble’s Burst Produced Minor Effects
  - Biggest effect was shareholder loss
  - Only destroyed a small fraction of firms
  - E-Commerce revenues continued growing, apart from one flat year during a recession
  - The IT employment shock was shallow and quickly reversed
    - IT unemployment rate remained below national unemployment rate
    - IT employment quickly passed its dotcom peak
Key Points

- Offshoring does not appear to be a crisis
  - Certainly is occurring and substantial
  - But no indication that offshoring is a massive problem
  - Domestic outsourcing seems more common
  - Inshoring may considerably outweigh offshoring
  - The Bureau of Labor Statistics forecasts high growth rates for most IT jobs, despite attempting to factor in offshoring
Key Points

There is an IT employee shortage

- Not discussed in the paper (which is an archival document)
- However, every indication indicates a hot job market today
- Enrollment declines in IT have created a substantial gap
- Students come home!
The world is changing

- The real growth is in higher-end technical jobs
  - Software engineers versus programmers
  - Network analysts more than network administrators

- Student need strong technical skills as well as business skills

- Students need to consider graduate work to prepare them for higher-end technical jobs and management
This paper has focused on student employment concerns

However, we need to do far more research on the enrollment decline:

- Image of the field in the minds of students
- Difficulty of the program
- Reasons for declines among women students
- Advice of high school counselors
- Etc.
The End

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