Employment and Computers

Employment Issues

- Computers create jobs
- Computers destroy jobs
- What is the net effect?
- What, if anything, should we do?

The Issue Isn't New

- There are many centuries of history of machinery displacing humans from some jobs
- Often, that's been good — but not always
- Automation — letting gadgets *decide* things, rather than just supply brute force — has exacerbated this

Jacquard Looms

- Early 19th century invention — controlled the pattern to be woven into cloth
- Took a lot of the skill out of weaving
- Some claim that there were riots
- (There were other issues, including increased global trade)

The Luddites

- The Luddites (England, early 19th century) targeted power looms because they converted a skilled job into low-wage drudgery
- (There were many other reasons for their rebellion)

Woodworking

- Until the 19th century, woodworking tools were largely the same for many, many centuries
- The circular saw blade was invented around 1813 (some say by a Shaker woman, Tabitha Babbit), leading to large, water-powered tools
- A late 19th century woodshop would be familiar to any modern furniture maker — but the tools were driven by belts running to a long, central shaft, instead of by individual electrical motors
- But — a modern computer-numerical controlled (CNC) milling machine works in a fundamentally different fashion

A Continually Contentious Issue

- Displacement of workers by machines has remained a contentious issue
- Management cited cost-cutting; labor asserted that workers, too, should reap the benefits of increased productivity
- Often, the rationale for the displacement was that only low-skill jobs were being taken by machines, freeing humans for more creative work. (People had forgotten the weavers by then. . .)
- That notion broke down by the 1970s

Typesetting

- Typesetting via “hot lead” machines was a very skilled job
- Phototypesetting and computerized typesetting eliminated the entire profession
- An entire class of skilled workers were without jobs
- As computers have become more powerful and more ubiquitous, this phenomenon has occurred repeatly

But. . .

- Computers have also created many jobs
- The high-tech sector was and is one of the hottest sectors in the American economy
- What is the net effect?

Tech Hiring Heating Up

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Tech Sector in Hiring Drive

Google, Intel Add Workers as Profits Snap Back; Start-Ups Also Fight for Talent

By CARI TUNA, JESSICA E. VASCELLARO and PUI-WING TAM

The technology industry, an engine of innovation and U.S. prosperity for more than half a century, is accelerating its recovery from the recession with surging earnings that have spurred companies to sharply ramp up their hiring.

The latest evidence for the rebound came Thursday, when Internet giant

Good Times Again for Tech?

- Google, Intel, Cisco, and more are hiring
- Wages are going up, too
- Start-ups may be squeezed soon

Hardware Jobs

- Computers have to be manufactured, too
- Is this a net job gain or loss?
- Many are manufacturing jobs — and are subject to the same dynamics as any other manufacturing jobs

Manufacturing Computers

- Some of the high-end items (such as very new, high-end CPU chips) are still manufactured in the U.S.
- More and more, computer manufacturing has moved to low-wage countries
- Even highly-automated factories need some people. . .

Computer Hardware Isn't Very Green

- Making chips and circuit boards requires lots of nasty chemicals
- The U.S. and other developed countries generally have much stricter pollution and worker safety laws
- Is that the reason for some of the cost differential?
- Are companies really outsourcing toxic waste and sick workers?
- (Similar problems exist when recyling old computers.)

Telecommunications

- Some of the effects of computers are more due to telecommunications than to computers per se
- That, in turn, is partly due to drastically lower prices for communications
- And while technology has helped, it's likely as much the effect of competition driving innovation, rather than innovation driving down prices

The Phone System

- Prior to 1983, AT%T was “the” phone company – “Ma Bell”
- It provided most of the long-distance capacity; its subsidiaries provided most local service
- It manufactured most of its own equipment
- It was a legally regulated “natural” monopoly, with a guaranteed rate of return

The End of the Bell System

- On 1 January 1983, AT&T was broken up by court order subsequent to a consent decree
- The long distance company retained ownership of (most of) Bell Labs and the manufacturing facilities
- There was already some competition for long distance, notably from Sprint and MCI
- Local service was to be provided by seven “regional Bell operating companies (RBOCs), which would retain their monopoly status

What Has Happend Since Then?

- Bell Labs is no longer the world-class R&D place it once was — not enough funding
- Competition drove down prices for long distance calls, but local calls remained a monopoly — and didn't drop in price very much
- The 1996 Telecom Reform Act was supposed to lead to local service competition
- It didn't, for lots of reasons
- The seven RBOCs merged to two big ones (SBC and Verizon) plus Qwest
- Verizon bought MCI (there was also fraud on MCI's part); SBC bought AT&T
- The growth areas have been Internet and cellular; "POTS" (Plain Old Telephone Service) isn't interesting anymore to anyone

The Rise of Telecommuting

- With the rise of the Internet, it became very easy for many people to work at home
- Great during snowstorms, flu pandemics, etc.
- Spread jobs around

The Down Side

- It can be isolating — no casual conversations with coworkers (though IM and VoIP have helped with that)
- (I experienced that in 1980, using a 134.5 bit/second hard-copy terminal. . .)
- Harder for workers to organize
- Easy for management to move jobs to lower- and lower-wage areas
- Home piecework manufacturing was outlawed long ago — should this be treated the same way?

"It's Not a Real Job"

- Some telecommuters (especially part-timers) have trouble convincing others that they're really working
- "Could FedEx drop off my packages at your house, since I work and you're home?"
- Hard to draw work/life boundaries — how do you "leave" work at the end of the day?
- Blackberries and cell phones have made that worse
- (Back when cell phones were expensive, I turned down opportunities to get an employer-paid phone, because I didn't want to be that available, especially to people who would call instead of emailing. . .)

But. . .

- It has made decent, (relatively) safe jobs available to part-timers across the country, especially women
- A customer service center no longer requires a building with enough trained employees living nearby; instead, it's many people, working from home with a computer, an Internet connection, and a VoIP phone
- Many of these jobs were in economically depressed areas

Off-Shoring

- The obvious next move: move these jobs to low-wage countries
- Not just call center — software can be done elsewhere, too
- Drives corporate costs down, but increases unemployment in the U.S.

Why India?

- Large population of English speakers
- Many of them are well-educated
- (Many other people there are poor and poorly educated — but it's a very large country)
- Stable government; rule of law
- It hasn't worked out quite as well as had been expected

The Problems with India

- Demand for programmers has driven up wages considerably
- Time zone differences and lack of face-to-face contact make managing outsourced software projects a lot harder than many people anticipated
- It's relatively easy to offshore well-specified modules that interact only through well-defined interfaces
- For software with complex interactions, it's a *lot* harder, and generally involves many long airplane rides

Moving Elsewhere?

- Few other places have India's population of well-educated English speakers
- China and Russia have many fewer English speakers (to say nothing of political issues)
- Singapore's population is too low
- These countries and others are competing to some extent, but India is still on top

Is Offshoring Good?

- Yes, it cuts costs for American companies
- Perhaps it cuts employment or wages for American employees
- But — “offshore” people are still people; they need to eat, too
- Why is it better to protect “our” jobs than “theirs”?

We Have to Eat, Too

- The issue isn't so much "us versus them" as the vast disparity in wage scales
- This will, over time, equilibrate
- That said, we're in a transition period now
- It will take time for things to settle down — and it isn't clear what will happen to wages here over the long term