For Good Measure
Cyberjobsecurity

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Five years ago, I focused this column on jobs in cybersecurity and how they compared to the market at large. This column is a revisit with some comparisons.

The cost of anything is the foregone alternative. Cybersecurity is fraught with foregone alternatives—what do I/you get done paired with what I/you pushed aside so as to get at least something done. Five years ago, I wrote that "automation is moving beyond the routinizable to the non-routine by way of the tsunami of ever bigger data." It hardly needs saying that the above is even more true now both in terms of coverage (areas of application) and velocity of change. Machines that are cheaper than you, that make fewer mistakes than you, that can accept any drudgery that risk avoidance imposes, etc. are coming on.

What does that have to do with cybersecurity? Cybersecurity is perhaps the most challenging intellectual profession on the planet both because of the rate of change and because your failure is the intentional work product of sentient opponents. Can automation help with that? Of course and it already is, as you well know regardless of your misgivings about whether anomaly detection will work in an ever more "personalized" Internet where one man's personalization is another man's targeting. So where do "we" fit in the jobs picture?

For comparability, I am going to stick with the same data sources as last time, largely the US Bureau of Labor Statistics. BLS annually predicts [1] the 20 occupations with the best outlook for new jobs over the next 10 years, which includes both the number of jobs to be added over the coming decade and the median pay at the time the prediction is made. Multiplying the predicted number of new jobs by the then current median pay might be said to give a societal investment or cost figure for that particular job.

Figure 1 recaps BLS's values for six years ago (six because of publication schedules) when BLS predicted the decadal job gain for those top 20 occupations to be 5.9 million jobs with a median pay of $32,468 for a decadal cost of $95 million for those top 20 occupations.

For each of the 20 jobs, Figure 1 plots that job's percentage of the 5.9 million new jobs against that job's percentage of the $95 million decadal cost in the aggregate. The three more extreme are labeled: 580,800 personal care aides (9.9% of new jobs) earning $19,910 (thereby contributing 6.1% of the aggregate decadal cost), 526,800 (9.0%) registered nurses earning $65,470 (18.1%), and 244,100 (4.2%) general managers earning $95,440 (12.2%).

Figure 2 is the same scheme and scale, but now using the most current (2018) BLS data.

For 2018, some outliers are the same and some are different: 881,000 personal care aides (19.2%) earning $24,020 (11.1%), 640,100 food prep/servers (14.0%) earning $21,250 (7.1%), 371,500 registered nurses (8.1%) earning $71,730 (13.9%), 241,500 software developers (5.3%) earning $103,620 (13.1%), and 165,000 general managers (3.6%) earning $100,930 (8.7%).

Six years ago, software developers didn't even make the list so there is nothing to compare to. Looking at the other four extrema [2], BLS predicts personal care aides to have a +8.4% CAGR (compound annual growth rate) in new jobs per year over the next decade, and there has been an inflation-corrected +2.8% CAGR in their pay over the last six years. For food

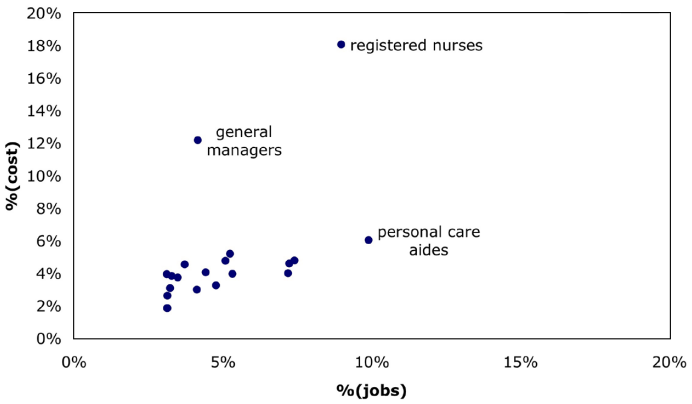

Figure 1: Percent of new labor cost versus percent of new jobs, 2012–2022

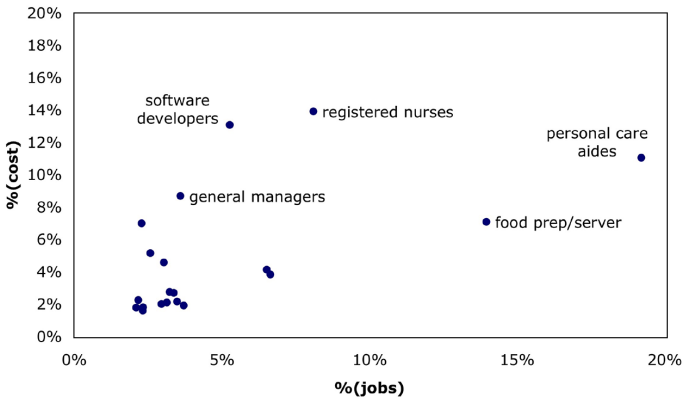

Figure 2: Percent of new labor cost versus percent of new jobs, 2018–2028

prep/servers, there will be a +3.2% CAGR in total new jobs per year, and there has been +2.2% CAGR in their pay. For registered nurses, there will be a +1.8% CAGR in jobs, and there has been a +1.2% CAGR in their pay over the last six years. For home health aides, there will be a +2.3% CAGR, and there has been a +2.2% CAGR in their pay over the last six years. Overall, the CAGR for the predicted rate of new job creation by and amongst the top 20 overall is –2.5%, that is, the top 20 will not collectively grow as quickly as they have been. Nevertheless, the CAGR for pay for those jobs overall has been +4.2%. This perhaps points to concentration of job and wage growth spreading out from the top 20 to elsewhere in the economy. Choosing what to do with your life is not getting simpler.

On the world scale, these top 20 are good jobs. The $21,250 for food prep/servers puts them in the world top 10%, the $24,020 for personal care aides puts them in the world top 8.6%, the $71,730 for registered nurses puts them in the world top 0.9%, and the $100,930 for general managers puts them in the world top 0.3% as does the $103,620 for software developers [3]. In any case, that's the spectrum of the whole US economy.

High paying jobs are precisely the ones that automation most wants to take. Turning to more interesting BLS data, namely that for "Information Security Analysts" (ISAs) [4], BLS says that today (2018) there are 112,300 of us/them with median income of $98,350 per year, putting ISAs in the top 0.4% on the world scale. Six years ago, the figures were 75,000 ISAs with mean income of $86,070 per year, so that's a +6.7% CAGR for the total number of ISAs and a +2.2% CAGR for their pay. Looking ahead, BLS predicts an additional 35,500 ISAs by 2028—a more modest job growth CAGR of +2.8% which rate of increase nevertheless qualifies ISA as the sixth fastest growing of all US occupations (after solar photovoltaic installers, wind turbine service technicians, home health aides, personal care aides, and occupational therapy assistants). For comparison, six years ago the ISA occupation was growing 16th fastest and now it is 6th fastest.

Of those 20 fastest growing jobs, only physician assistants, nurse practitioners, mathematicians, and software developers make more pay than ISAs (from +4 to +10% more). Computerworld's survey [5] confirms the pinnacle status of information security practitioners, putting a CSO (at $173,300) in the world top 0.1% (up from the top 0.2% six years ago).

So, is automation gunning for the ISA role? If not, is it because ISAs are too few to bother with, not enough people are willing to be one, or is it that the job is too hard to automate (yet)? Universities and the White House like to say that as machines take over existing jobs, new opportunities are created for those who "invest in themselves." This has been argued over and over; there isn't room here to deal with it, but for my money Federico Pistono has clear numbers [6] that the rosy version is just not true. Ranking US jobs by how many people hold them, computer software engineer is the only job created in the last 50 years that also has over a million job holders. It is #16 on the list (of 41); there are twice as many cashiers. The #1 most numerous job, truck/delivery driver, is being automated out of existence as we speak. If cybersecurity jobs are safe from automation, should we be retraining all the truck/delivery drivers who are about to be unemployed as information security analysts? Are we lucky that our jobs come with sentient opponents? More to the point, are sentient opponents our job security—the source of both our pain and our power [7]?

If automation is most focused on the most expensive workers, perhaps we should be happy that we cybersecurity folk are not the best paid. All but one of the dozen best paying jobs are in medicine [8] (that one is CEO at #11), but as C. G. P. Grey points out [9], once electronic health records really, really take hold, most of healthcare can be automated—at least the parts for diagnosis, prescribing, monitoring, timing, and keeping up with the literature.

But if it is true that all cybersecurity technology is dual-use, then what about offense? Chris Inglis, former NSA Deputy Director,

famously remarked that if we were to score cyber the way we score soccer, the tally would be 462-456 twenty minutes into the game [10], that is, all offense—confirming not only the dual-use nature of cybersecurity technology but perhaps also that offense is where the innovations that only nation states can afford are going on. Put differently, is cybersecurity as a job moving away from defense toward offense insofar as the defense side is easier to automate? That won't show up in any statistics that you or I are likely to find; offense does not publish.

In sum, everything I see in the security literature and/or the blogosphere argues for automating cybersecurity. One must then ask if, in truth, our job description is to work ourselves out of a job. Or do we say that with a wink [11]?

References

[1] Occupational Outlook Handbook: https://www.bls.gov/ooh/most-new-jobs.htm.

[2] Current Population Survey: https://www.bls.gov/cps/cpsaat11b.xlsx.

[3] Wealth calculator (adjusted for purchasing parity): http://www.worldwealthcalculator.org.

[4] Information Security Analysts: https://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm.

[5] IT Salary Survey: https://www.computerworld.com/salarysurvey/tool/2017/compare?jobTitle=4_1469.

[6] F. Pistono, "Unemployment Tomorrow," in *Robots Will Steal Your Job, But That's OK* (Creative Commons, 2012): http://www.robotswillstealyourjob.com/read/part1/ch9-unemployment-tomorrow.

[7] "Skilled workers historically have been ambivalent toward automation, knowing that the bodies it would augment or replace were the occasion for both their pain and their power."—Shoshana Zuboff, *In the Age of the Smart Machine* (Basic Books, 1989).

[8] "25 Highest Paid Occupations in the U.S. for 2019": https://www.investopedia.com/personal-finance/top-highest-paying-jobs/.

[9] C. G. P. Grey, "Humans Need Not Apply": https://www.youtube.com/watch?v=7Pq-S557XQU.

[10] Chris Inglis, confirmed by personal communication.

[11] "Never write if you can speak; never speak if you can nod; never nod if you can wink."—Martin Lomasney, Ward Boss, Boston.