

Annotation for Slides

I start by laying out the basic facts.

Slide 1 – The median earnings gap between those with a college degree and with a high school degree doubled between 1979 and 2012. The change in household income – about \$29k in real terms – is roughly four times as large as the redistribution we would get (about \$7,100) if we took all the income gains to the top 1% since 1979 and redistributed them to the bottom 99%. So while top income inequality is clearly a big issue, we can only understand the “other 99 percent” by understanding the growing importance of skills in the labor market.

Slide 2 – Healthy growth in real wages for >BA and modest growth for BA (both sexes); Big gender diff in real wage growth for HS grad and some college; real wage declines for low-skilled males

Slide 3 – Stagnant real wage growth for low-skilled males is probably worse than it appears because falling prime age male LFP overall, but much worse for less-educated males. Murphy and Topel (2016) also show big growth in skill gradient in hours worked per week among full-time employed

Supply of Skills (pre-college)

NAEP Long-Term Trend – designed specifically to make longitudinal comparisons. Trends are similar for ages 9 and 13 (but stronger overall growth for younger test-takers).

Slide 5 – NAEP long-term trend reading scores at age 17 – Little growth overall, and compression of skill distribution. From 1971 to 2012 - 7 point increase for 10th percentile, 2 point loss for 90th percentile.

Slide 6 – NAEP LTT Math Age 17 - similar story – little overall growth since 1978, 7 point gain for 10th percentile, 2 point loss for 90th.

Slides 7 and 8 – trend in NAEP math/reading gender gaps – not much happening. Girls score 8-15 points higher in reading (not much change over time). Boys score 3-8 points higher in math – some narrowing, but was between 1973-1986 – constant 1986-2012.

Slide 9 – This pattern broadly replicates when comparing cognitive skills (AFQT) across NLSY waves – tests administered in 1981 and 1999. Altonji et al do a very careful job of making the skill measure comparable by age and online/in-person format. Find small increases in cognitive skills that are driven by nonwhites, some evidence of compression. Nielson shows that the income-achievement gap has narrowed across NLSY waves under plausible assumptions about score scaling.

BOTTOM LINE – academic skills at age 17 have not changed much since the 1970s. this presents a puzzle for the stories many people tell about the sources of inequality. Either inequality in family environments is not increasing, or it is increasing but in ways not captured by test scores. I think the latter story might actually be important, particularly in explaining gender gaps (behavior, GPA, GED etc.). Has there been growing inequality in “non-cognitive” skills? We don’t even know how to measure them or what they are, much less time trends.

Supply of skills (college)

Slide 12 – increases in the share of HS grads attending and completing college – rapid growth from 1950-1964 HS cohorts; more gradual growth afterward. Two points: 1) big gender split starting in the late 1970s – female attainment continues to rise, male completely flatlines; 2) completion rate declines over time, especially for males

Slide 13 – total college share of hours worked grew rapidly 1964-1982; slowly (and all females) between 1982-2005; rapid rise 2005-2012.

Slide 14 – gender gap in college completion is an international phenomenon – can't be explained by only US-specific factors (decline in two parent homes, changing labor market institutions etc.)

Slide 15 – The Katz-Murphy supply-demand model fits the data pretty well out of sample from 1987 to 2000. But after that, the model actually predicts that the increase in the college premium should have been *larger* than what we've observed. Could be increasing elasticity of substitution (i.e. HS grads and college grads are closer substitutes). Unlikely that HS degree is becoming more like college, but college might be becoming lower quality.

Slide 16 – increase in supply of college grads has been driven almost entirely by non-selective institutions (Hoxby Feldstein lecture, IPEDS data). These schools often don't spend very much and the publics are overcrowded. Carneiro and Lee (2011) find that quality adjustment should have lowered the college premium by around 25 percent. Deming et al (2016) find low labor market returns to for-profit degrees and sub-BA degrees from publics.

Demand for skills

College premium decelerating, but still increasing. Implies that demand for skills has grown faster than supply.

Slide 17 – Acemoglu and Autor (2011) show SBTC (1980s), RBTC (1990s) but then no growth of high-paid jobs since 2000.

Slide 18 – Beaudry, Green and Sand (2014) show “great reversal” in demand for cognitive skills. Decline around 2000 in the share of college grads who can get a “good” job.

Slides 19 and 20 – OK, so what kinds of jobs are not growing? Since 2000, STEM jobs shrank by about 0.3 percentage points as a share of all jobs, after growing by 1.33 percentage points over the previous 2 decades. All non-STEM “cognitive” jobs grew by 2.87 percentage points in 2000-2012, compared to 1.99 percentage points over the previous 2 decades.

Slide 21 – I formalize this by separating jobs according to their task requirements, using the O*NET (a survey administered by DOL that asks workers what they do on the job). I use 2 task composites – 1) Math (nonroutine analytical) – using math and math/formal reasoning; 2) Social Skills – coordinating with other workers; negotiating differences; persuading others to change their minds; social

perceptiveness. Split occupations into above/below median on each and plot employment shares relative to 1980. High math/high social jobs have grown by 6.5 percentage points, mostly between 1980 and 2000. High social, low math jobs (lawyer, dentist) grew by about 2.8 percentage points. High math, low social jobs (including many STEM) declined by 3 percentage points.

Slide 22 – might argue that slow growth of high math/low social jobs is due to inability to fill jobs. This would imply higher wage growth, but I find the opposite. Real hourly wages for high math/low social jobs grew only about 8.5 percent, compared to about 27 percent for high math/high social.

Slide 23 – robust to excluding high-skill “service” sectors like health care, education, as well as all management occupations. Social skill and routine task measures are negatively correlated at the occupation level. Could tell a technology story (computers are bad at social interaction), but also could be unbalanced growth (relatively greater efficiency gains in manufacturing compared to services).

Slide 24 – directly estimate returns to skills in the NLSY79 compared to NLSY97. Restrict to ages 25-33, constant measures of skills. AFQT crosswalk from Altonji et al (2012). Social skill measure is no good – sociability scores in both NLSY waves, best I could do! Bottom line is that a 1 SD increase in social skills is associated with an increase in pr(FT employment) of 0.7 percentage points in the NLSY79 and 3.0 percentage points in the NLSY97 – a more than fourfold increase. Return to AFQT hasn’t changed for employment, declined for wages. This results is if anything stronger for males and for higher education levels.

Summing up

1. Cognitive skills – measured around the time of college entrance – have been roughly constant since the 1970s. Evidence from NAEP and AFQT suggests – if anything – a narrowing of achievement gaps that has been driven by an increase among low-scorers. There is little or no gender gap in cognitive skills at age 17.
2. Some scholars argue that growing wage inequality is due to rising inequality in family environments. This is hard to reconcile with the facts above, unless you think there is inequality in “non-cognitive” skills in ways that are not captured at all by existing measures. I think that’s a real possibility but we don’t have any evidence for it.
3. On the other hand, slowing college attainment starting in the early 1980s and a rising gender gap in college completion do fit the labor market patterns pretty well. It is important to know that the growth in attainment is driven almost entirely by degrees from open access, non-selective institutions. A decline in the quality of college degrees would help explain the bad fit of the Katz-Murphy model starting around 2000. There is strong circumstantial evidence that spending matters for college completion and skill acquisition – this is the subject of ongoing work by me and Chris Walters as well as some other folks.
4. Evidence suggests decelerating – but still rising – demand for college graduates since 1980s. The SBTC and polarization/RBTC stories don’t really explain the slowdown. Specifically, they don’t explain the slow

growth of high wage jobs since 2000. I show that this decline is concentrated in STEM – high math, low social – occupations. In contrast, high math/high social jobs have shown relative employment and wage growth since the 1980s. Also show evidence of growing return to social and/or “non-cognitive” skills, declining return cognitive skills. This could be a technology story, or something more general about a shift toward services and away from manufacturing.

5. The balance of the evidence suggests that the slowdown in college attainment is a major source of wage inequality. The evidence on pre-college skills strongly argues against the arguments by Heckman and others that inequality is all about early circumstances. These folks have also argued that skill development in college is too difficult and expensive (this harkens back to the old “credit constraints” debate.) The implication of this argument is that the return to college for the marginal attendee will be below the average return. In fact, the quasi-experimental evidence from RD studies etc. suggests the opposite.

6. Since elite colleges are mostly private and mostly interested in being seen as “selective”, the increase in college supply must come from the less-selective public sector. There is circumstantial evidence that spending matters – possibly quite a lot – at these institutions. So we need to increase investments in the types of colleges that most people attend. These schools are not building climbing walls – they are overcrowded and underfunded.

7. Lastly, we must think about changing the design of schools at all levels to reflect the demands of the modern labor market. This means less direct instruction and more classroom interaction and project-based learning. “21st century skills” is a gag-inducing term, but there is some real truth in its stated importance. Schools are still designed for a 20th century, assembly-line labor market and that needs to change.