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The Reversal in the Demand for Skill and Its Implications for Employment and Wages for All Workers

David Green, University of British Columbia

You're listening to a UC Davis Center for Poverty Research Conference podcast. I'm the center's director, Anne Stephens. In October 2015, the Center hosted the conference, Employment, Earnings and Inequality, Realities and Opportunities in Low Wage Labor Markets. The conference featured experts on labor markets who presented both quantitative and qualitative research on a wide variety of topics including wages, shifts in occupations, immigration and the lives of low-skilled workers.

In this presentation, David Green discusses how the shifting demands for job skills over time can change labor markets for all workers. Green is a professor in the Vancouver School of Economics at the University of British Columbia. And an International Fellow at the Institute for Fiscal Studies in London.

>> Okay, this is joint work with Paul Beaudry, who's also at UBC. Ben Sand, who's at York University. And this is based on a few papers. And one of them's with Peter Gottschalk. So, in sort of complete contrast to this morning what I'm gonna do now is, we're gonna go start flying way up here instead of down here, right?

But, but there's gonna be a bunch of connections actually, which should be interesting. And the sort of key point about the whole talk and that I want you to take away is that something big changed in the US labor market around about the year 2000. We're not the only ones who are saying this.

So, there's a paper by Eric Hurston co authors where they argue that for blue collar men, the labor market turned sour somewhere around the early 2000s, at least and that, that was masked by the housing boom, that essentially all these guys who lost jobs in manufacturing got construction jobs for a while until that boom went bust.

And then the paper by Otter et al, that's the paper about Chinese trade where it's sort of arguing that's the sort of driving force. What we're gonna do is say, it's not only happening there, but also even at the very top of the labor market. So the key point here is going to be that there was actually a turnaround in demand for, you could call it skill, or cognitive tasks, essentially for workers at the top end of the pay structure, right?

So that you go from a scenario where we've gotten used to talking about what economists talk about as skill bias demand shifts. And that's been sort of reduced often to the skill bias technical change. The sort of idea that for decades we've been seeing increase in demand for the top and sorta university workers or cognitive task workers, we've been seeing those increases going on for decades.

And that that's the sort of defining motion of the economies we live in, what we're gonna argue is that you have to turn that narrative around, around 2000. But that demand actually shifts down, and that's gonna be important for some of the things that we'll talk about this morning.

And for talking about, say, education policy. And then, the other point is, we're gonna argue that essentially, once that turns around, then you start seeing the workers who would have been in those jobs moving down the occupation structure. And more or less pushing the other workers, the less educated workers, either further down or on out of the labor market.

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Okay? And so that kind of cascading is going to be a key moment and we've already seen talking at least some about this. There was figures this morning about this happening around the time of the Great Recession. I want you to think about that as starting to happen earlier than that, okay?

That's going to be important for thinking about explanations and the explanation I'm going to give you is going to be one based on essentially technological change, and the IT revolution. But anyway, you'll see as we go along. My emphasis is sort of less there if I wanted you to take something away, it's less that explanation than that the world changed around 2000.

So, let me start talking about how it changed. So, first the data is gonna be US CPS data, all from the outgoing rotation group. Samples, hourly wages, no allocated wages. Whenever I say employment rates, I'm just gonna mean the number of employed workers divided by the population in any group.

And, we're gonna focus on people aged 25 to 54, so that we're not talking about early retirement kind of issues and we're not talking about in school kind of issues. And when I talk about education groups it's either going to be the BA or higher are gonna be the high education group, and high school graduates are gonna be the low education group.

And we can change these some, we can add drop-outs in here and the main patterns aren't gonna change. Or we can focus just on the exact BAs, the main patterns don't gonna change. So here's the, yeah, Doug?

>> I just wanted to, the other thing seemed to happen in early 2000 was the peak of and so, I wonder like how

>> Okay, I'll show you, that's a good question.

Yeah, I'll show you that in one second, I'll show you something that might help in thinking about that in one second. So this is, simply, for that group I was talking about, 25 to 54 year olds, this is the average log hourly wage on the vertical axis, and the employment rate on the horizontal axis.

This is the whole US economy. So like I said, we're operating on a completely different level from before. So here's the early 90s recession, but then the US, right, goes on a tear. The period that was at that time often called the US miracle, right. So employment rates go up.

The wages start really going up. But around about 2000 it hangs a left, right? And your eye is sort of drawn to the big drop in employment rate that happened in the Great Recession, but in fact the turn comes much earlier than that. And the sorta housing boom and bust looks like a sort of a cyclone here on top of that long run trend, right?

That the kind of explanations that have been thrown around talking about the Great Recession have been sort of mostly on one side cyclical demand shifts down, and on the other side, claims that there have been structural changes in supply. That things like changing the generosity of UI fundamentally changed the way people were interacting with work.

But if the change happens more in 2000 then those last set of arguments can't hold because those policy changes didn't happen then. And in fact what we're gonna argue is that this is not a, this is a structural change but it's a structural change on the demand side.

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That's what we're gonna try to argue for you. Now back to the Doug thing. So here it is if we just do men, okay? And see, now you can see more of it is in the wages, but it's still basically 1999, 2000 we're gonna do that. We're gonna basically hang a sharp left.

This is for women so now you can see exactly what you said. So that stalls it somewhere around the sort of movement of women into the labor market, and into the labor force. Stalls out somewhere around here and then it starts looking just like the man after that as well.

I actually have some for Canada just cuz.

>> Then I realize I'm the only person in the room who cares, so-

>> We won't do Canada. But this is the UK, okay?

>> And the UK is doing something sort of similar in the same point, right? More of theirs is in the employment rate and less in the wages, but it's gonna do something similar around that same point.

Okay, so the education breakdown is gonna be important as we go through here. This is the employment rate, so the number of workers divided by the population for high school graduates, divided by that same rate, that same ratio, for the college graduates. And what you find is that basically from the 80s through the 90s that ratio increases relatively substantially, but again, right around 2000 it starts coming back down.

And it's not as if these facts aren't known. Lots of people probably, including lots of people in this room are studying these issues about what's going on, particularly with the employment rates of low educated men. But I just want to sort of highlight this notion of when you brought this out, there's a real turn around 2000.

So now what I'm going to do is I'm going to show you parts that are broken down into sort of occupations group. So this just sort of comes off the work in economics of David Otter that sort of says if we gather things in occupation groups we can potentially get insights that are interesting.

And so, he has a set of names for these. So, these are cognitive, non-manual task jobs. Okay? So, the idea is, these are jobs where you're using analytics or management and he's mapping those out, saying those are complimentary to information technology. The idea is that, as the IT revolution comes along, these people get more productive.

In contrast, this group is substituted for, this is the group that is losing their jobs because of the computer revolution, right? So these are basically, just think of these as professional management jobs for the most part. These are mostly clerical and production jobs. And then the third group is gonna be service and labor jobs, and really the sort of average wages are gonna march down too, right?

So. So let me show you the plot, so this is the heavier dashed line here is the plot of the employment rate for men and women combined, normalized to 0 in 1980, in cognitive task jobs, so these management and professional jobs. And what you can see is, this rises substantially all the way through the 80s and the 90s, and then in 2000 and simply stops growing.

The other line is meant to be a sort of rough idea of a supply index, so what we're doing for that is, we're gonna take in 1980 all workers and divide them into cells by age, by education, and by gender,

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within each one of those cells, we're gonna get what proportion of those workers are in either management or professional kind of jobs.

Right? So, we're just trying to, we're sort of noting that high education groups are the ones who are more likely to be in these jobs. Then, we're gonna sort of hold that structure constant and apply those numbers in each of those cells through time. Okay? And get a sort of aggregate index of what would you guess given the education has increased, how many people would be expecting to get management jobs just based on their education?

So essentially, what's going on here is employment is increasing more strongly than sort of relative supply. More strongly than the set of people you would think would probably be in those jobs. So in just a simple demand and supply context, increasing demand for these kinds of skills. Okay, and so that's exactly what people have talked about as skill bias demand shifts.

Right? Like this is. And then in economics, it's been laid at the feet of technological change, which since we're in a joint crowd it's like, that's you know, this is what economist get out of their models, right? Sociologist reached this point and there is like there is no left to explain everything, anything, so we don't know what to say maybe.

The economist say, oh it's a residual, it's a technological change, we've got, we know with that.

>> So that's go by as technical change right there. Okay. Then afterwards, this, the employment rate stays flat but the supply index keeps going up. So for that to happen with employment staying constant but supply continuing to shift out, it has to be that demand has shifted down.

Okay, so in other words, we look at this figure and we say, this figure says a big increase in demands for skills, for these kinds of management and professional tasks, up until 2000 and then the demand curves, turns and starts shifting down. And then I'm gonna give you, that has wage implications and I'll show you the wage implications in a second, this is the same kind of plot but for routine occupations, and there what you can see is these occupations have been moving down in terms of their employment rate for awhile, but they really, as lots of people here know, they really fall off a cliff after 2000.

The explanation I'm going to give you can't really capture how big a drop this is, so there is a reasonable chance that the explanation I'm gonna give you is only part of the story, and something like trade shocks might be the rest of that story. It's also sort of interesting that the employment in the supply stuff actually moves sort of similarly until 2000.

This is manual occupations. And here, and this comes back to some of the discussions before, this morning, this has been moving up over time, right? And it's not just, it's for sure a movement up at the time of the recession, the Great Recession, but it's been moving up for quite a while.

There's a bit of a slow down maybe in the 90s and we'll come back to that, okay? Now the next is, it's completely possible you're looking at these and saying well, I don't know whether I like the way you've grouped occupations. And in fact, I'm haven't given you a very detailed discussion of how I grouped occupations, so this is an attempt to try to see whether these same patterns exist if we take a more disaggregated approach.

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So here, what we're doing is, a figure like this this morning. So here all we're gonna do is we're gonna take three digital occupations. We're going to rank them by their average wage in 1980. Okay, so we're just ranking low occupation jobs up to high occupation jobs. And then, we're seeing how did employment change by decade for each of those ranked in that way.

So this solid line here says, that in relative terms employment dropped in the low wage jobs in the 1980s, okay, so these are gonna be mostly service jobs down here. But they increased a lot at the top end, and these are, again, gonna be mostly these kind of cognitive task jobs.

As you go into the 1990s, we get even more of a relative increase here, and there's a bit of a U shape, which is something that people in economics know, David Otter has talked about. It's not a big one, but it's there. But then after 2000, both of these plots are from 2000, one goes to 2007, the other goes to 2010, just so that you can see it's not the recession that's driving this.

Essentially, the figure becomes it's mirror image, right? You stop having growth at the top end, which fits with that thought I showed you before the employment rate, for the cognitive tasks occupations. And you get big, relative growth at the bottom end, instead. Okay? So, things have turned around.

If we break this down by education, it becomes even starker. So this is the college graduates. And essentially, in the same figure, if we look at those low wage occupations, people are moving out of those occupations in the '80s and the '90s. And they're moving quite strongly into the high-end occupations.

But after 2000, they're moving out of the top and occupations, and into bottom, even quite low management occupations. For the high school graduates, it's a little harder to see because the U shape is very strong here. But something similar is happening in the sense that, this line is the 1990s.

And in the 1990s, there's a bit of growth of both the top and the bottom. In the middle, so this is the loss of manufacturing and clerical jobs in the middle. As you go into the 2000s, now you get bigger drops down here with bigger increases at the bottom end.

So we're basically, seeing big increases in employment at the bottom end of wage structure. This figure is whose gonna take effect into explaining, this figure is essentially, what we're doing here is following college graduates from right after within two years after they graduate through the next five years.

These are all sort of smooth profiles and these are just the share of college graduates employed in, again, these management and professional jobs, okay? And what you can see is, if you start with cohorts that were entering in the labor market in the early 90s, and you go through time through to the cohort that enters in 2000, the proportion that graduate and start in these manufacturing jobs goes up by more than 10%.

So, in some sense, if you go to university in part, in order to win the lottery. The lottery you're hoping to win is the one where you get one of these kinds of jobs. And, your odds of winning that is going up across time. More than that, these profiles are, in some sense, getting steeper or at least, they're pretty steep.

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So, even if you don't start in one of these jobs, if you start as a barista, you're gonna get into one of these jobs relatively, rapidly. But after 2000, what happens is the proportion who start in these jobs goes right back down. And the profiles get flatter. So you're more likely to start in a barista kind of job.

And you're more likely to get stuck in a barista kind of job after 2000. Okay? So, Paul gave this to our undergraduates at one point. That didn't go well.

>> Okay. So the stories that I'm giving you right now, right I'm trying to claim that there is this turn around in the demand, turn around in the demand around 2000.

If there was, then we should see, we should see wages starting to come down for workers at the top end. Okay, and we want to talk about what happens to wages with the other groups. So if this is just a plot, by gender, of average wages within each of these occupation groups.

And here, in fact, it sort of doesn't work that well. So, wages are actually rising in all three groups through the 90s. It's hard to see here because of the way things, I should have put a vertical line in for 2000s. But in fact the wages, the average wage in cognitive jobs for males is actually increasing slightly over the 2000s.

And for females, even more so. But, this is a period when there are big compositional changes. Right? The education proportion continues to go up, and the baby boomers moving up through the experience structure. So, if we plot the same graph, and now in this graph, what we're gonna do is we're just going to hold composition constant.

We're going to rewrite the data so that the age by education composition stays the same as it was in 1980. Now you start seeing that there are some declines up here. There are stronger declines in the two lower wage occupations, and the same is going on for women to some degree.

Okay? Then the other paper I wanted, and I'm just gonna do this one somewhat quickly. But we're still worried that there's unreserved composition shifts. Okay, we've got a whole bunch of people moving into say these cognitive occupations in the 90s and then moving out in the 2000s. So we're worried that these wage shifts we see, or don't see, to some degree, are a reflection of those kind of composition changes.

So what we did to try to get around that, is let me just sort of put out a sort of simple model of wages and sector determination. So imagine that every worker has an ability, A to J. Okay, and you can think of that as a combination of the ability you're born with and the ability you get through schooling.

So let's, for the moment, think of this as sort of cognitive ability. And then that A to J is differentially productive in the different sectors. So you know having high cognitive ability is potentially useful for you as a neurosurgeon, it's not so useful for you in terms of how much you do as a greeter at Walmart, okay?

So these gammas are going to capture the extent to which this ability is useful in a given sector. You want to think about that. This, this logs that. You wanna think about that as essentially how many tasks a worker can do in an hour in a particular job.

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And then there's going to be a price to those tasks, so Doug is a better than me because he can do a lot more of those tasks in any given time than I can. But there's some firm that's willing to pay for however many of those tasks that come out.

Okay, and that price, I'm gonna call P and the key point here is that's what we want. We wanna follow P . P is gonna be firms are demanding those tasks. They're not demanding a worker. And so if there's an increase in demand, we should see an increase in P .

So the wage a person gets is a combination of these how many tasks they can do, and how those tasks are priced out. A worker chooses the cognitive sector over the routine sector if the wage essentially they can get in the cognitive sector is better than the wage they can get in the routine sector, okay?

And so whose gonna end up in the cognitive sector? Well plausibly it's going to be the high ability workers. So the high ability, anybody with an η , and ability that is above this threshold will move in to the cognitive sector. So why is that important? So think about this is, essentially think about this as a distribution of wages of everybody working in the cognitive sector.

Okay, so everybody who works there this is the wage you would get if you work there. But only the workers who have ability in this part of the distribution will actually show up there. So the median wage for those actually in this sector is here, this MCT. Then suppose there was an increase in demand as there was in the 90's.

There's an increase in demand for cognitive jobs, and that means if we could see everybody in the cognitive sector, this whole distribution would just shift right. There's an increase in demand so the price of tasks done in the cognitive sector goes up. But at the same time as it goes up, more people are gonna be drawn in.

Right, and so now I can get a better return in the cognitive sector, so more people are gonna be drawn in. And that means this cut off is gonna move. In fact it's gonna shift down. And so I'm gonna get a median wage after this change, okay? And the median wage, in fact the way I've drawn it, has actually not changed.

So, there's an increase in demand, the price goes up. But, I'm drawing in more people who aren't so good at doing cognitive task jobs, and so the observed wage is not really moving much at all. So, what we would like to do, okay? What we'd like to do is, essentially, try to follow one set of workers through time.

If we could follow these workers who are already in cognitive jobs, through time, their ability would then be constant. You know, we're following, effectively, the same workers, and the only reason that their wages would change would be because this task price changed. We can't actually, so what happens again, when we increase the task price, we bring in new workers into the sector.

But, I can't tell who in here are the workers who are already there, and who are the ones who joined because the price went up. Okay? So what I'm going to do is I'm going to bound it. Okay? I'm going to make an assumption. I know how many people joined the sector, 'cause I now how much the sector increased.

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Okay? So the people who joined the sector could have all come at the bottom end. They could be all the worst workers that I actually observed in T+1, and if they were, that's the highest possible wage I could see for the stayers. Okay? So I could compare that wage to the people who are actually in the sector in period T, and say that's one bound on how much this task price has changed.

Alternatively, these people could have come in the other end. It could be that that net number that I see, that the number of people working in the sector has gone up by let's say 10%. And I'm going to assume the opposite, that everyone who came in was actually at the top end and therefore the stayer, those stayer, they're gonna have a meeting, my guess at that point of their medium wage is gonna be down here and I'll get the other bound.

Okay? I'll get the other bound on what the price is. So if I do that and I use those bounds, what I get is that we see whether I trim from the top or the bottom. One way or another trying to control for what the unobserved compensation of unobservables is, I see a big increase in what I'm gonna call the task price.

The relevant wage in the cognitive section in the 90s, and then a big run down in the 2000s. If I do it for women, same thing. Up and then down, not quite as big an up and not quite as big a down but that same pattern. If we go to the routine sector, now what we see again is an increase.

Not quite as large as what we say for the cognitive, but an increase. And here the bounds are going to split so I can't tell you really whether this task price went down by 40% or only by about 10%. But I can tell you that it went down, okay?

And the same thing for women. So finally, I can do the same thing for the manual sector. And again, increases in the '90s, not quite as much at all in this case. And then declines after 2000. So, if we put that together, the picture is the following. In the period in the 90s, what we're getting is in these jobs in the top end.

The high end jobs, the high paid jobs, the manager and professional jobs. Employment is going up and wages are going up. Or what I'm gonna call the task price is going up. After 2000, employment is going down. And the wages going down. So that again, it all fits together with there's a demand shift up in the 90s and a demand shift down after 2000.

In the routine sector, we're seeing sort of some movement down in employment and wages rising a bit. But after 2000, in the routine sector, we're really seeing just huge drop off in the employment rate and in the wage. Okay? So, again, shifts down in demand. The interesting one is the service sector.

So, in the 90s, you see some increase in employment and you see an increase in wages. And, that fits with this work by David Autor, which says that there was a sort of polarization in demand. An increase in demand at the top end and some increase in demand at the bottom end.

But after 2000, employment keeps going up and down, wages are going down. So that looks like a supply shift instead of a demand shift. Okay? So now I'm gonna give you a model to try to help think about where this might be coming from. Okay? In some sense, the point of this model is to say, if everyone has existed in this mindset of ongoing skill biased demand shifts.

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All right, and in economics, like I said, a lot of it has been labeled on to this sort of technological change. The computer revolution has come along. It's good or you if you're a cognitive worker. It's replacing the routine workers and the manual workers, the service workers, they're getting more demand because the top end guys are so rich they're demanding services.

That's the sort of narrative. Right? What I wanna show you is we can take this same kind of model. Okay? I can take the same kind of model and with one little tweak I can give you all the patterns that are coming here. Okay, and so that's why I'm gonna basically tie our hands, and I'm gonna stick with a pretty standard model of what's going on from the economics literature.

So there can be three types of individuals, High Educated, Low Educated and Entrepreneurs. The Entrepreneurs are going to produce by hiring workers to do two different tasks. A Cognitive task and a Routine task. Okay? The individuals can only do one task at a time and they're gonna choose which sector they're in based on that exact kind of model I just gave you.

They're gonna compare their wages in the two different sectors. Okay? The firm, when it's trying to produce, is gonna think about a production function where it's gonna use routine workers. Okay? So these are the people who do sort of standardized tasks. But rather than employ the cognitive workers directly, they're gonna employ the cognitive workers to construct something that we're gonna call Organizational Capital.

So, the way I wanna think about this is when I first joined the department at UBC in sort of the early 90s, there were seven secretaries. Okay? This is a department of about 40 faculty. There were seven secretaries. Some of them actually were using electric typewriters. All right, because in one of those sort of things about technological change, just before the technology dies, it gets better for a moment.

And then.

>> Okay? So, but then, if you fast forward to now, we have three administrators, some of whom are the same people but the whole place has been reorganized. Right? Now there's a sort of a networking of the computers. There's a different organizational structure, and I wanna think about that whole thing as the technological revolution.

Not just computers, but the whole way of organizing work. Okay? And then the idea is that sort of structure is created by these cognitive workers. They're the ones, they're gonna be, some of them are gonna be computer techs, but some of them are gonna be management type people who tell you how to rearrange your work force, your work place.

This technology is gonna depreciate at a rate δ , which is just, all you want to think about that is I got to hire an IT worker to continue to maintain my network. Okay? After I put it into place. And then the key point here is that, that IT, that organizational capital's gonna be a substitute for routine workers.

So, in other words, when I have more of this, when I move more towards this organization I use fewer routine workers. So in my example there are not secretaries around anymore. Okay? Technological change is going to be an enhancement in the productivity of the of the organizational capital.

Okay, as technological change happens, as computers come online, we're basically gonna find that the ways of producing that use more of that sort of organizational form are gonna get more productive.

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Okay, so what does that mean? So supposed there is a technological revolution. Okay? Supposed that we bring in computers and this way of organizing workplace now is more productive.

So, what's gonna happen? What's gonna happen is firms are going to start demanding cognitive workers. They needed them to put the new systems in place. Okay? And that's sort of the 90s. What's going on in the 90s is you're hiring a whole bunch of people to help you reorganize the workforce.

The miles of fiber-optic cable around the world increase enormously. Okay? We're basically sort of building the spine of this new system. And that increase in demand for those kinds of workers means that both employment and wages go up for them, which is what we've seen. In the routine sector at the same time, demand is shifting down.

Okay? As we move towards these new ways of producing, we don't need clerical workers anymore. Okay? And we don't need as many production workers. Supply will shift back to some degree because these workers will start moving up here. Okay? And that's part of what we saw. We actually saw.

All right, we saw that both low and high educated workers were moving up into cognitive task jobs. Okay, so what's going on here is going to be potentially a fall in the wage and almost for sure a fall in the employment. In the manual sector, again, some of those workers will be drawn higher up, up into the cognitive tasks occupations and the claim is there is an increase in demand here.

Okay, and the increase in demand is what is called the Butlerization of the U.S. economy. Right? This idea that as those guys at the top get more money, they start demanding more services. And all of this amounts to an increase in demand for labor. Okay? So, the 90s is a boom area.

Okay? It's an era when demand is increasing and it's increasing exactly because we need workers to put in place this new technology. Okay, it involves workers of both education types moving up through the skill structure. Moving more and more into cognitive occupations. There's also gonna be a general increase in employment rate.

Why? Because we've essentially got more demand for labor. Okay, and wages will increase. All of that is pretty standard from a standard polarization model. But this one now is what happens after that. So what's gonna happen is, essentially like any investment model, we spent a bunch of time putting this new system in place.

We don't need all those workers who are used to put the system in place, anymore. Okay? We need some, we need to keep around some techs to maintain the computers. But, I don't need as many as I needed when I was putting a whole new system in place.

And that means, relative to the 90s the demand shifts back down. And what we see is a fall in employment and a fall in wage rates. Those workers then move down into the lower sectors and shift the supply out in the lower sectors. The routine continues to have a fall in demand because computers are replacing these workers.

And so these workers are seeing wage drops and potentially employment drops. In the service sector, demand increase for them has stopped, because the workers at the top are no longer doing increasingly

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better each year. But, there's a supply increase. Essentially, these workers from higher up are all now sort of cascading down the occupation structure and ending up in the manual jobs.

Right? And that's what we saw. We saw that new vintage BAs, are more likely to start off in barista jobs and to be stuck in barista jobs. And that's exactly what this is. So we push out supply and then what we're seeing is falls in wages and increases in employment.

So if you're at the bottom end, life is getting worse. There are more people competing for those jobs with you. More of them are probably high educated and wages are generally falling. And then because of that, because you're probably losing some of that competition, the employment rate is going down.

So we go from a decade that looks like a boom to a decade that looks like a bust, okay. And potentially the housing boom keeps us from seeing that as clearly as we might see it during the 2000 itself. Okay. There's a reason why, as a Canadian, I want to present this model.

Which is, you guys probably don't even know this, the rest of the world suffered through the US bureaucratic claims. We all were supposed to adopt your policies, we were all supposed to cut taxes, we were all supposed to do everything the US did to supposedly start the great, and that, our claim is none of that it what's driving any of this but.

All right. So just in case, you think I'm insane, which is possible because what I just told you was that the technological revolution sort of stopped in 2000, right? And then you're thinking about the phone in your pocket and going no, no, no, it's way better than it was in 2000.

Right? The important point here is it doesn't actually have to come to a complete stop. It just has to slow down, the rate of innovation. So, you wanna think about the technological revolution as what economists call it, general purpose technology. It's a technology that's applied all across different sectors.

And there are earlier examples of this. So like electrification is an earlier example of a general purpose technology. The 20s is in the era when the US was building in that infrastructure. Building in that spine. Building those lines. But also changing the way production was done. You moved towards, actually producing at night, right.

Before that, factories would shut down when they lost light. So you again, a complete reorganization. And nobody would claim that everything about electrification and electricity stopped innovating after say 1930, okay. But, that first point, that first meal investment drive. Right? Slows down after you've built the sort of the spine in.

And here, this is investment in either computer, information processing equipment, or software in the US as a proportion of GDP. And what you can see is it rises sharply. You can see the tech boom and bust, but it doesn't start rising again afterwards. It flattens out. Now some of that is because the investment in hardware has gone down.

And we've changed the nature of hardware. So that could be part of what's going on. But if you do software, software does the same thing. Big increases. You can see the tech boom and bust. It starts growing again, but not at nearly the same rate. There's a real break in these series right at this point.

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And the other thing that breaks at this point is actually the proportion of workers in this sector, in this industry, business and repair services. These are exactly the people that you would hire to implement the new system. If you're a construction firm, you're not hiring a permanent guy to put in place a new system, a new computer system.

You're turning to these people, you're gonna hire them for long enough to reorganize your front office. And then they're gonna move on. And the proportion of young BAs in that sector goes from 17% in 1990 to 30% in 2000. And then afterwards, drops from 30% back down to 24%.

Okay, so let me just try out, I know I put a lot on there. Okay, so let me just try to sort of draw it together, so the claim is that in 2000, there's a major break in the US labor market. Okay? But that break was all through the skill structure, the occupation structure.

And in particular, what's different about what we've come to be used to thinking about is the ongoing sort of demand shift in favor of top end occupations stops and turns around. At the same time, at the bottom end, what looked like an increase in demand for low end occupations, sort of modest increase up to 2000, stops and starts looking like a supply increase.

It really looks like we're taking workers and shoving them down into the bottom end labor market, and then that's coming out as a supply increase that's driving up employment and down wages, okay? And then, I've sort of argued for a way to rationalize this. And like I said, I'm not gonna live or die on that explanation.

It's just a way of trying to put everything together into one explanation. I wanna just from the last minute just talk about what this might mean for policy. Okay? So this is again, Beth, various people in the room have said this, Paul has said this for sure, that education is often seen as this sort of silver bullet.

Right? It's the policy that the left and the right, whatever else they disagree on, they'll all say, but obviously, the answer is education. Okay, we're going to educate people more and that will get us all sort of a lot of problem. It will generate growth and it will reduce into calling.

The question is now, part of that comes because there was a belief that we're in a period of ever increasing demand for education, right. And as long as that's true, to some degree you can say, okay, I wanna offset that race by increasing supply. That'll reduce the inner quality increasing effects of increased demand for education.

Now, I argue even that's not necessarily uncontentious, but, when we think about now being in a world where there's not an ongoing increased demand for these kind of cognitive occupations? There, at that point, it's gonna come down in terms of what's it gonna do to inequality, say. Now, we're gonna have to get more specific about what we mean by policy.

A lot of times people talk about more education as if it's this sort of generic thing. But of course, it comes in a lot of different forms, right. We know, because of the work of a lot of people in this room, we know that education is very unequally distributed by parental income, right.

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So, whatever has been done in countries like the US and Canada up to this point, a little more of that, cutting tuition a little bit. Maybe even giving grants at the bottom end a little bit is not something that's necessarily going to overturn this. Who's gonna benefit from those kinda policies will mostly be the upper-middle class and higher-earning families.

To the extent that we're doing that, what are we doing? We're basically gonna again, draw people in who haven't been in the sector before, they're probably lower ability people in the sector. Okay, so the new people, this may not be politically correct this out here. But the people we're gonna bring in are probably gonna be people who aren't gonna compete so well for the management jobs.

They're exactly gonna be the ones who are gonna end up competing for the barista jobs. That means potentially this is gonna have the opposite effect to the one that we think it's gonna have. It could actually lead to further reductions in low end wages, which is what we've been seeing is going on, sort of increased supply at the bottom end.

A policy, sort of more radical policies that would actually, okay, actually bring in the children of low income families into higher education. Now we're drawing from a different part of the ability distribution. Probably higher up. Some of those children could probably compete really for the management or professional jobs.

Potentially then drive some of the kids of the well-off families down lower. Okay? So it's not as if this is like a policy that's gonna do everything at all. But it might be more in a quality reducing in a sort of cross-generational sense. But the key point here is, if we're in a world where demand for education, demand for the high-end skills has turned around and has started shifting down?

You can't put education on the table as a silver bullet. Not that you really necessarily should have believed it was a silver bullet before, but now you really don't wanna believe it's a silver bullet. And that's absolutely some of various things arguing against people being too much in the boat of thinking, this is gonna solve all our ails.

Okay, that's it.

>> I'm Ann Stevens, the Director of the Center for Poverty Research at UC Davis. And I want to thank you for listening. The Center is one of three federally designated poverty research centers in the United States. Our mission is to facilitate non-partisan academic research on domestic poverty, to disseminate this research and to train the next generation of poverty scholars.

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