EconoFact Chats: Winners and Losers from Technological Change
Eduardo Porter, The Washington Post
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I'm Michael Klein, executive editor of EconoFact, a nonpartisan, web-based publication of the Fletcher School at Tufts University. At EconoFact, we bring key facts and incisive analysis to the national debate on economic and social policies, publishing work from leading economists across the country. You can learn more about us and see our work at www.econofact.org.

Michael Klein
The world today is magical. We can connect with people across the world with a phone that sits in the palm of our hand. Calling this a phone does not even begin to describe the way that these devices connect us to vast stores of knowledge and information, not to mention games, videos of cats and dogs, and rants on social media platforms. Robots and machines perform tasks that have taken the drudgery out of work, and in some cases, have put people out of work as well. The prefix in the name cryptocurrencies appropriately describes how these are hidden or secret forms of money. Few people seem to fully understand how they work or what they are truly worth, and this is reflected in the volatility of their value. The question arises whether all these technological marvels are helping or hurting people. This is a topic that has been addressed in a number of articles by my guest today, Eduardo Porter. Eduardo is a columnist and a member of the board of the Washington Post and formerly wrote for the New York Times, the Wall Street Journal, and Bloomberg. Eduardo, welcome back to EconoFact Chats.

Eduardo Porter
Oh, thank you, Michael.

Michael Klein
Eduardo, you and I are both old enough to remember a world before cell phones and the internet, and you don't have to be too old to recall a time before AI and cryptocurrencies. What do you see, broadly speaking, as the way the economy has shifted with the advent of these technologies?

Eduardo Porter
These technologies have clearly drastically changed the world. What I find particularly interesting is in how they've changed it in ways that we didn't really expect the world would be changed. I can think back to when I was a kid and I would watch, there was this science fiction cartoon called The Jetsons. I don't know if you ever saw it, but it was like a nuclear American 1950s family, but with all this tech, right? And the idea of technology there was a car that looked like a small UFO and actually flew, and a little robot that would do your household chores and things like that. So that was our idea of the future. We were protecting the way that we live, and

we just put these gadgets that we thought, well, this is what technology is going to bring about. And when you see, actually, what, you know, I'm old now, my youth is not that super long ago, and what technology actually did to society and the economy seems to be incredibly different from what we thought it might, you know? We do have robots in factories, but the most significant change seems to be in less conspicuous domains or less immediately obvious and intangible domains that are incredibly, incredibly powerful, that we weren't thinking about back then, like, you know, our production and analysis of information. I don't know, just think of the changes that all the collection of personal data, and our ability to leverage that to detect patterns of behavior and think about strategies to sway people, or just think of the change in what social media has done to interpersonal relations and affected the political discourse. And, you know, in kind of like a weird throwback way, all this new tech has brought us back to the 17th century where, you know, Tulip Mania took over the Netherlands. Now our version of Tulip Mania is Bitcoin Mania. It's another thing that has no inherent value and that we think is enormously valuable and that we trade.

Michael Klein
Well, I certainly remember George and Jane Jetson, their boy Elroy, and Rosie the robot. And you're right, you know, that's not what it ended up looking like. It was much more about information. So what evidence do you see about the way in which some workers have been hurt and how others have been made better off by the advances in information technology and automation more generally?

Eduardo Porter
Well, the impact, the people that are hurt are kind of like the most obviously conspicuous. You walk into a McDonald's today in many parts of the world and you won't see many people taking your order. Actually, you're going to poke your order into a screen and then your hamburgers come out. So there's much less employment at each one of these McDonald's. So the workers who would have previously been taking your order, who no longer have a job have clearly been hurt. You can see this across a range of service occupations, including famously bank tellers who…we expected to be vastly hurt by the invention of the ATM. At first, it turned out that this wasn't in fact true because even though each bank branch had fewer tellers because the ATM was replacing many of the tasks they did, it turns out that we had a lot more bank branches because it was cheaper for a bank to set up a new branch without so many tellers. Ultimately, the overall number of bank tellers did not change very much. But if you go look at government data today, you'll see that they expect the number of bank tellers to actually fall by like, I don't know, 20, 25 percent over the next 10 years. These service jobs have very much been made redundant by new technologies. It's unclear to me, thinking about is this good or bad. Clearly for the people displaced, it's bad. But more broadly speaking, for society, I would actually question that this is in fact an improvement. I'm not sure that customers' experiences have been made better by many of these technological inventions. One that jumps out to me is the idea of customer service.

When customer service was replaced by these machines where you have to press one if you want it in English and two in Spanish, and then you have a limited set of options as to what your problem is. I find that terribly frustrating. I very much doubt that this form of customer service has done any good for customers. So I think the overall impact of these technologies on the quality of our experiences of these industries has been, in fact, good.

Michael Klein
Well, you're talking about service now, and there's also a big debate about manufacturing. You have cited the work of David Autor, and we've actually had David on the podcast about the so-called barbell effect and the loss of manufacturing jobs and what that's done to middle-income Americans. Can you describe that a bit?

Eduardo Porter
Well, yeah. I mean, that was, I think, perhaps the first most salient impact of the introduction of automation technology in the workplace was in manufacturing, and what it did was it knocked out a lot of jobs that used to be fairly high paying for manufacturing workers because what these technologies did is that they would take over the routine tasks like painting a car, or welding a door or, you know, screwing in a nut and bolt. These sorts of jobs that many manufacturing workers did were kind of relatively easy to automate once we figured out how to make machines that could repeatedly do a routine task. And so you can see this in the manufacturing employment data. Right now, about 8% of jobs are in manufacturing, but if you go back 20 years, it was 11%. If you go back to 1984, it was about 20%. And if you go back to the 1950s, about one-third of employment was in manufacturing. So clearly, there's been…and technology is the main reason for this dis-employment in this sector. This doesn't mean that we're producing less stuff. In fact, if you look at manufacturing, value added has actually risen quite substantially, and that's because of all these new technologies, all this automation has increased worker productivity. So for each worker, you get a lot more work done than you did in the past. But it has clearly hit a segment of the workforce that was relatively well-paid. And this is what has had a very substantial impact on inequality in the United States, is that there was this whole layer of employment that paid relatively decent wages to workers that did not have enormous levels of education, you know, workers with a high school diploma or even less could perform these tasks and earn a good middle-class living. When these tasks or these jobs disappeared, you basically deprived a big swathe of the American workforce of a decent-paying job.

Michael Klein
So I'd like to compare and contrast this experience with manufacturing to what happened with agriculture a century ago. And you bring up this really interesting point in one of your articles. You wrote that in 1900, agriculture employed 12 million Americans. That was about one-sixth of the population at that time. And now agriculture employs less than 1% of the population. The shift from agriculture to services and manufacturing was widely beneficial, but of course, it also

led to the depopulation of many rural areas. So if you were in one of my classes, Eduardo, I'd probably ask an exam question, something along the lines of “compare and contrast the diminishment of agriculture in the early 1900s to what's been going on with manufacturing in the latter part of the 20th century and the beginning of the 21st century.” Now, I know you’d do a really good job. I'd probably give you an A. What would your answer look like?

Eduardo Porter
I think this comparison is super, super interesting, and it speaks to how the role of technology in the economy and society has changed, how technology is not always going to affect us in the same sort of way. But yes, I mean, one of the standard economic arguments for technological progress, for introducing more and more machines into the economy was, yes, new technology brings change. One of the changes that automation brings is labor displacement. So, you know, a new machine will take out a job and will take out a worker. But this is not the only change that technology brings. It also makes the remaining workers more productive, gives them higher incomes. They will want to spend these incomes on more and more things. Our possibility frontier will expand. We will want new things. We will be able to produce more things. These new things will create new industries that will generate more jobs. And these new jobs will ultimately, say, absorb the workforce that was displaced from the older industries. And this clearly happened in the movement from agriculture to industry in the United States and across the world. You had a vast number of workers displaced from agriculture by tractors and so forth. But at the same time, you had the arrival of factories, and factories employed tons of workers and employed tons of workers in a very, very productive way. Actually, most of the workers displaced from agriculture were moved into jobs, or the new jobs that appeared were actually more productive than the old jobs in agriculture. The new industrial jobs, making whatever plastic toys or TV sets and refrigerators or whatnot, those jobs were more productive than the old agricultural jobs of the former economy. And so you had an actual rise in incomes that was quite well distributed across the workforce. And so that just makes the case for technological progress. Problem is, if you move that to the present today, that's not really what's happening. You're not getting the guys that were displaced from working at whatever the Ford factory or some electrical appliance factory moving into some new, greater thing that's high productivity and high pay. What's happening is they're falling back into a low-productivity, low-wage part of the economy, which is essentially this service economy, the bank tellers and the supermarket cashiers and the people who take your order at McDonald's. And it's that bottom end of work that we still haven't managed to fully automate because it requires human interaction, maybe think of nannies, but it's not very well paid, and it's not very productive. And so what you had is kind of like a movement backward of a whole segment of the labor force into lower productivity, low pay jobs because this movement into a higher productivity equilibrium that happened when we came out of agriculture is not happening now. The new jobs that are occurring in the technology are basically the new high pay jobs that are occurring in the technology are open to people with higher levels of education, people with at least a college degree, if not a postgraduate degree.

And so there's, you know, in this country still two-thirds of this country does not have a college degree. So for a vast, vast share of the labor force, there are not any great opportunities open.

Michael Klein
So what you're pointing to is the way in which technological change might not always be beneficial to everybody. And one very important contribution to this line of thought is by Simon Johnson and Daron Acemoglu in their book, *Power and Progress*. I interviewed Simon about the book soon after it was published, and before he and Daron won the Nobel Prize in economics this year. And one of the very interesting parts of that is that they point out that there is not an inevitability of which innovations become widely adopted. And also some innovations have malevolent rather than beneficial consequences. Has this work influenced your thinking about technological change, Eduardo?

Eduardo Porter
Oh, for sure. For sure. The notion that every technology that comes into our society is going to be benevolent is, I find, immensely naive, promoted clearly by those that benefit from technologies. But clearly, what technologies get deployed depends on who has power to make the decisions to deploy them. There's a great example in Daron and Simon's work about the cotton gin. The cotton gin created enormous fortunes in the United States because it vastly accelerated the separating of the cotton from the seeds. And so very, very, very rapidly expanded the productive capacity of cotton acres. But of course, that also created enormous new demand for cotton. So plantations expanded and there was an increasing demand for the work of slaves in cotton plantations. And these workers were not made any better off by the cotton gin. In fact, they were probably made much worse off because the conditions on these plantations became even harsher than they had been because it demands to produce ever more cotton to feed this new technology…this new cotton gin was more intense. And because coercion was a form of extracting work from workers, from slaves, the coercion became more intense. So this is clearly an example of…the cotton gin was great for the cotton gin owners, and the cotton owners, but it was clearly not great for the slaves that were harvesting the cotton.

Michael Klein
Yeah, it's sort of a standard case of a coordination failure. Eduardo, the newest technological advance, of course, is artificial intelligence. And the disruptive economic effects of this may be even more wide ranging than previous types of technological advances. You began an article you wrote this last spring with the sentence, there is good reason to believe that artificial intelligence is coming for our jobs. Who is us in this sentence?

Eduardo Porter
Well, us in this sentence is the new kind of cohort of workers that this new technology could feasibly replace. So as I was mentioning before, automation throughout most of the 20th century

was mostly about replacing workers that performed routine tasks, you know, the welding and the spray painting and that kind of thing, that were easily encoded into some software and you could teach a machine to move identically across a range of cars, for instance, and paint them properly and flawlessly. And so that took out, well, the jobs of all the welders and the painters. And that's, you know, that was what decimated manufacturing employment. But that wave of technology was actually good for what we would make, might call, you know, the creative workers or, you know, the problem solvers, you know, people mostly with college degrees whose job was trying to figure out complex tasks, and resolving complex problems that are not easily turned into an algorithm, you know, that you could not like just create a set of rules and tell a machine, just repeat these rules and that's how you'll get this done. But you had to be more creative, more imaginative, you know, bring things from different parts of experience into solving a problem. Now artificial intelligence is threatening those jobs. So if the older wave of automation was actually beneficial for these workers, because, you know, like creating Excel might have whacked at the job of an executive assistant at a company, it might have vastly improved the productivity of the data analyst that could suddenly at his or her computer figure out some weird calculations. Now, and you can see this in the data, you can see that this wave of automation was actually great for workers at the top end of the distribution of income and of skills that could take advantage of these new…that could leverage these new technologies in their favor. Problem with artificial intelligence, artificial intelligence might, and I think the jury is still out on this broadly, but it offers a possibility of replacing these more creative tasks, these more problem-solving tasks, this, you know, whatever I'm thinking like the paralegal that, you know, has to do some fairly complex things and figure out the case law on something and look through the files and figure out if something really relates to the case at hand. Well, now apparently AIs can do that. AIs can make songs and paintings and things like that. So all this new creative work that was safe from the prior kind phase of automation now seems at risk.

Michael Klein
So Eduardo, I'd like to conclude by shifting gears a little bit and talk about another new technology, cryptocurrencies. President-elect Trump has said he wants to make America the cryptocurrency leader of the world, but cryptocurrencies have not become widely used and we see their values fluctuate wildly. What has been the role of cryptocurrencies, and what do you see happening with them?

Eduardo Porter
I mean, as I said at the beginning, I think cryptocurrencies are the perfect high-tech version of tulips in 17th century Amsterdam. Basically, somehow people were convinced that these things had enormous inherent value, and started trading them and they became the utmost proof of the greater fool theory. Something will be valuable as long as there is a greater fool willing to pay you for that thing that you have, regardless of what its purpose can be in society, and whether it has any sort of ulterior value. Crypto basically does nothing, solves no problem, but somehow

many people have been convinced that this kind of ersatz electronic currency is inherently valuable and they're willing to pay enormous sums for it. The value in the real world, I would say, has been limited to paying for illegal transactions. So, you know, drugs, weapons, child pornography, human trafficking. So, you know, people who want to make transactions that are hidden from the law because they are illegal, because they are transactions for illegal activity have found some value in crypto because crypto does offer an anonymous way to transact. A little bit like cash, except that it's electronically. But it offers a sort of anonymity that makes it valuable for people who need this anonymity, which has been mostly criminals. But other than that, the real world value of cryptocurrency is near zero, and the whole little drama around it is mostly about people hoping to mint a fortune because some other person next door will pay them an enormous amount of money for something that really has no inherent value whatsoever.

Michael Klein
Well, Eduardo, our discussion today really got into some of the more subtle points of technology and technological change, showing how there are advantages, but also it's not always benign and might even be malign. And certainly there are always winners and losers. I always learn a lot from your columns, Eduardo, and I appreciate you joining me today to discuss these issues on EconoFact Chats.

Eduardo Porter
Thank you very much, Michael. This has been fun.

Michael Klein
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