Revant Mahajan

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Should Robots Be Taxed?

We are in the midst of the Fourth Industrial Revolution (4th IR). This revolution is fueled by the breakthroughs in technology like artificial intelligence, robotics, and 3D printing. These technological breakthroughs are commensurate to the ones witnessed in the previous industrial revolutions. An estimated 400 to 800 million workers can be displaced by automation in the world by 2030. Of these displaced workers, 75 to 375 million will need to switch occupations and learn new skills. For the United States specifically, one-third of the workforce may need to find new occupations and skills.[1] Given these predictions, there is a genuine concern of unemployment in the near future.

One counter-argument to these fears is that the automation, historically, has led to stronger economies with robust wage and employment growth. Where automation has replaced some jobs, it has created other ones where humans have a comparative advantage. This has not only led to burgeoning employment and wages but a more equitable distribution of resources in the process.[2] One detail that is often left out in this argument is that automation, so far, has been accompanied by other new technologies that have kept the displaced human labor in the production cycle, albeit in different roles. For example, if we consider agricultural mechanization in the nineteenth century, we will find that machines did reduce the share of human labor in the net output and consequently displaced a lot of human labor. But at the same time, there was a surge in demand for human workers for novel tasks and occupations in other growing industries.[2] One example is that clerical positions increased in both manufacturing

and the service industry. These new roles propelled wage growth, productivity, and employment. This pattern of growth continued during decades following the World War Two.

It's often extrapolated from these scenarios that the future with the 4th IR is going to follow a similar pattern. This might not necessarily be the case. In the past three decades, the accompanying changes that offset the job losses due to automation have been absent.[2] This has led to wages and employment growth becoming stagnant. This problem gets exacerbated with AI and robotics, given that their growth rate and level of impact on the job market could be faster than what has ever seen before.[2] Furthermore, it is predicted that automation technology is going to invade multiple sectors of the job market, from the industrial to the service sector, which is different from what happened in the previous IRs. Technological progress during previous IRs was largely limited to specific industries. This change is in part due to the general application potential of artificial intelligence in terms of recognition and mobility that is helping robots enter fields that were not accessible previously without them.

According to a Mckinsey report from 2015, "AI's disruption of society is happening ten times faster and at 300 times the scale. That means roughly 3000 times the impact."[3] Low wage and skilled workers will be affected the most by this transition. Most of the tasks workers of this category perform are repetitive and can be automated. I concede that not all the tasks within this category can be automated 100%. There might be still some jobs in this segment that require human labor and some more jobs might be created because of automation. However, it is unlikely that the number of new jobs is proportional to the number of displaced jobs, at least in the short term. The interests of these workers need to be protected and this will require a coordinated and centralized intervention.

Even though there is not a clear consensus on how automation is going to change the landscape of the job market and growth in the long term, there is a "consensus that robots will

significantly disrupt the labor market at least in the short term."[4] Even looking back historically, major technological changes have sent ripples through the job market, causing upheavals and displacing workers. These displaced workers have had to find new employment in other sectors. As such, policymaking will have to play a key part in ensuring there is a pattern of net positive growth along with a steady job market that eases the turmoil of short term job transition. Different approaches to policymaking, like universal basic income or government job guarantees, can be employed to address the issues at hand. But for the sake of a more in-depth discussion, I am going to limit myself to one of the most hotly debated policy-based solution: robot taxes.

The idea of taxing robots has been around for a while but gained considerable attention in 2017 when a bill was proposed in the EU, but failed to garner votes. The recommendation was to treat robots as "electronic persons" for tax purposes. The proposal recommended that the income generated by these "electronic persons" be treated the same as income generated by labor. Essentially, imposing labor taxes on these robots. Since the robots don't physically earn money, the company employing these robots will have to bear the burden of these taxes.[4] The idea of taxing robots had a lot of high profile proponents come out and endorse it. The day after this proposal was rejected, in an interview with Quartz, Bill Gates discussed the possibility of decreased revenue for governments if robots are not taxed. He asserted, "At a time when people are saying that the arrival of that robot is a net loss because of displacement, you ought to be willing to raise the tax level and even slow down the speed of that adoption somewhat."[5] The implications of this assertion become abundantly clear when the potential impact of automation is studied with respect to the current taxation system.

"Under our current taxation system, a significant source of federal and state tax revenues is borne by workers and not capital."[4] Workers are taxed at various levels in the form

of state tax, federal tax, social security tax, medicare taxes. On the other hand, capital income is not taxed like workers. According to a study, labor income was taxed at a higher rate as compared to the capital income in 2018. This is not an immediate change but has been years in the making as taxes on capital have been declining for the past 4 decades.[6] Income derived from other sources like capital gains and qualified dividends is also taxed at a preferential level of up to 20% while a similar level of income through labor is taxed at 37%. In 2019, the US federal government received one-third of its total revenue through employment taxes.[7] As a robot is not classified as a worker and does not earn wages, they are exempt from these taxes levied on labor. Naturally, it would follow that if the number of employed workers decreases, so will the tax obtained through them. For example, let us consider the example given by Bill Gates of a human worker that makes $50,000 a year. A portion of this income is taxed and adds to the government's revenue. If the same thing is now done by robots and there is no tax, the government effectively would be losing money.

Even if automation increases efficiency and leads to economic growth, the majority of the profits will be captured by businesses or through capital gains, and both of these are bound to lower tax rates. As of 2019, corporate tax only accounts for 6% of total tax revenue.[8] Even if the corporate profits significantly increase, it is very unlikely that the tax rate will see a sudden spike. So considering the short-term implications, if a lot of workers are displaced, the government will face an immediate deficit in the revenue and will not be able to afford current spending levels. I concede that some of the gains from increased labor efficiency will be extracted from corporate taxes. Nevertheless, this will not be enough to make for the fiscal deficit which will only grow as more unemployed people will depend on the government. There is a genuine need to capture the wealth generated by these robots and to distribute it within the

society. A robot tax would be one possible approach for this as it would aim to directly capture the wealth generated by these robots.

Another common argument floated around is that untaxed automation could lead to an increase in wage inequality. “This fear stems from the belief that the growing automation of tasks previously performed by workers will contribute to lower wages for workers and greater profits for those who own the robots.”[4] Robots are primarily predicted to replace major proportions of low skilled jobs and would eventually lead to more high paying jobs. If these predictions are to come true, as they have with the previous industrial revolutions, then automation will only lead to mushrooming income disparity. I do concede that not one hundred percent of the low skill jobs will be eliminated and automation is going to occur across the job spectrum. Even some portions of the high skill jobs might end being automated. But the magnitude of effect on the low skilled workers combined with the stagnant wages will cause significant disruptions for this category. After all, it is going to be hard for them to compete with robots. Robots can work without taking any sick days, they don’t have unions, they make fewer errors, they cost less in the long run, and are overall considered more productive. For low skilled workers to compete with them, they would have to accept pay cuts. With robots able to perform low-skilled tasks more efficiently, the demand for these types of jobs will go down whereas the supply, workers looking for jobs, will remain stagnant or increase, leading to exacerbating income equality.[4]

Also, it is entirely plausible that the workers don’t enjoy the economic boom caused by automation, and the majority of the benefits are captured by big businesses and individuals who own these robots. This group is even smaller than the higher-skilled workers. If we observe the current trends, this is already happening. Income and wealth have steadily shifted away from the hardworking labor towards the capital.[4] According to Oxfam in 2016, the wealthy 1%

owned more than 50% of the world's wealth while the bottom 50% owned less than 1%. In fact, the richest 10% captured 90% of the world's wealth. This gap will keep on increasing as the technology becomes more sophisticated and is widely deployed in the industry.[9] It is pointed out that the increase in productivity due to previous industrial revolutions trickled down because people had jobs and salaries. This is not the case today as the major benefits due to automation will be reaped by those who own robots, which is a form of capital. Since capital is usually accumulated within the few and wealthy, mostly the big businesses and their investors, the income disparity is going to keep increasing.[9,4] Taxes can be a potential solution that can curb this growing disparity. In 2017, Rober Shiller, an American economist known for his preemptive prediction of the 2008 housing market crisis, endorsed a modicum tax on robots as a way to address rising inequality.[10] By levying taxes on robots, they can be made more expensive. This would slow down the adoption of these robots, and make companies hire more workers. The argument to be made here is that there would still be an increase in the efficiency of businesses because they will keep adopting robots. But the rate of adoption will be more controlled. Some jobs will be displaced and new ones will be created because of automation. But there won't be a drastic rise in unemployment.[11]

In summary, robot taxes are essentially trying to level the playing field between capital and labor by adding an extra burden of taxes on a form of capital, these new robots. These taxes can help in slowing down the pace of adoption of technology and can prevent significant short term workforce disruptions and job losses. They also contribute to the government revenue stream and curtail the fiscal deficit from growing. This consistent revenue stream is essential to support current welfare and support programs, to support displaced workers, to retrain or reskill displaced workers, to foster the creation of new jobs, and to provide other socio-economic benefits required to mitigate the growing wealth inequality. While the idea of

implementing taxes on robots sounds like an effective way to address these issues of job losses, it is very hard to enforce and actually can have deleterious effects as well.

First of all, what can be defined as a robot? This is something that is overly simplified in a lot of robot tax favoring arguments. The EU's robot tax proposal defined a robot as something that has "(i)The capacity to acquire autonomy through sensors and/or by exchanging data with its environment (inter-connectivity) and the analysis of those data. (ii) The capacity to learn through experience and interaction, (iii) The form of the robot's physical support, (iv)The capacity to adapt its behaviours and actions to its environment."[12] This definition fails to capture some potential labor displacing automation like software robots or other artificial intelligence techniques that might still cause severe job displacements, while at the same time includes some labor enhancing technologies, like exoskeletons, which would protect workers from injuries.[4] Any definition of robot proposed for legal purposes has to be very clear, practical, and justifiable for the policies to be effective. So far, we don't have much consensus on the general definition for legal purposes.

Another interesting question that comes up is why are we proposing to tax a specific type of capital? By proposing to doing so, we are creating a preference for other types of capital. Is this the correct way to go about it? One argument given is that since robots have this unprecedented potential of causing workforce disruptions and wealth inequality, so it makes sense to add more tax burden on them to balance things out.[4] But if the main objective of these taxes is to increase government revenues whilst minimizing workforce disruptions, wouldn't it make more sense to tax all automation and technology that is replacing human jobs? If we decide to go down that path, we are placing a significant roadblock in terms of technological development.

Robot taxes can also have an inimical effect on innovation. There is a tight correlation between automation and innovation. By levying a tax on robots, incentives to adopt these technologies will be reduced which can curb research and development and ultimately hinder technological progress. Technological progress has been a driving factor for economic growth and so some might argue that occluding it might not be the best thing. Ideally, taxing robots could work if it was implemented universally but that's just a pipe dream. If one country imposes such taxes, it will lose the competitive edge over other international competitors who may not choose to impose these taxes. As such, any decision of hindering technological progress and national strength will be met with strong opposition.

Depending on the definition of robots, new tax avoidance loopholes can also be discovered to avoid paying taxes. For example, let's consider a scenario, albeit unlikely, that some AI software is taxed in the US. A potential loophole that can be used is to house the data servers or computers running that AI in a country with no such taxes. To extract any information from the AI, the servers can be accessed remotely. Because a robot tax is generally proposed to impose tax at the location, the previously mentioned strategy will prove effective in avoiding taxes. In the case a company has a physical robot, they can still move operations to a different jurisdiction where no such taxes exist. This is very possible given the globalization of the supply chain. In fact, strategies like this are employed right now by companies like Apple, Google.

Apart from the inherent fallacies of Robot taxes, there are other arguments given against implementing them. Robert Atkinson, president of the Information Technology and Innovation Foundation (ITIF) raises some of these arguments. First of all, he argues that the Mckinsey study extrapolates the overall rate of technological innovations based on a few technologies like mobile phones.[13] He suggests that the evidence to make such speculation is very little and is unbounded from historical analysis. He argues that there is a need for a “technological shot in

the arm", like the one experienced back in the 1950s and 60s.[13] Gross Domestic Product (GDP) per employed person has slowed down from 2.6% per person for every year from 1999-2006 to 2% per year from 2012-2014.[13] Most of this decline is witnessed in developed countries like the USA, Japan, and countries in the EU. The US labor productivity itself has been growing up just at the measly rate of 1.2% since 2008 which is half what it was from 1995-2008.[13] Robots can help us solve this problem. For example, investments in robots contributed to 10 percent of GDP growth per capita in the Organization for Economic Cooperation and Development (OECD) countries from 1993 to 2016. Atkinson argues that given the potential impact robots can have on productivity, it does not make sense to handicap ourselves by imposing restrictions on robots.[13]

Additionally, he points out the lack of consideration for the secondary effects that automation has in multiple arguments. He concedes that automation causes some job displacements and increases profit margins for the companies. But these profit margins are not buried but rather recycled in the form of business expansion and investment which in turn creates additional jobs. ITIF found that, between 1850 and 2015, despite some decades of significant technological changes, employment grew at the same rate as the labor force.[13] Atkinson argues that technology helps companies become more productive which leads to increased market share, which means the companies pay more in corporate and payroll taxes. Also as a secondary effect, technology leads to relative prices falling in the economy which leads to more actual income for employees, resulting in higher taxes.

Atkinson also argues the degree of impact automation has on wealth inequality. He asserts that when the change in occupational pattern reduces lower-income jobs, a natural shift will occur leading to an increased share of middle and upper wage jobs. As lower-income jobs become automated, they lead to a relative decline in prices of goods and services.[13] This

leads to customer saving which then leads to increased spending on these goods and services. This results in an increased demand which is then fulfilled by adding more higher-paying jobs to bring the supply up to the level of demand. He argues that such a result will be a boon to millions of workers who are currently employed in low salaried jobs.[13]

While Atkinson presents some persuasive arguments, I feel like they are purposely skewed. He concedes that the number of low-wage jobs will decrease but there will be an increase in higher-paying jobs. While making this argument, he focuses on evaluating the impact of overall productiveness on overall employment. According to him, some sectors or regions might face slower employment growth as a direct result of slower growth in productivity in those regions and sectors. But the net result, he argues, would lead to higher productivity and jobs.

In my opinion, Atkinson fails to highlight the plight that the workers in the slow-growing sectors and regions might face due to workforce disruptions. Just for the sake of long term growth, you cannot forsake the regional or sectoral growth. That by definition will lead to higher wealth inequality. Carl Frey, an economic historian and automation expert, points out the plight due to the short term effect of significant automation. Referencing the seven decades after the industrial revolution, Frey refers to the economic hardship people faced during that time. Wages were stagnant, food consumption decreased, and quality of life deteriorated. Despite all this, the economy was doing very well. The problem was that most of the workers were not seeing the benefits of the economy.[14] I think this might be what happens with the 4th IR. Under the current system, large corporations and their shareholders will enjoy the most benefits because of these robots.

Furthermore, the availability of higher-paying jobs doesn't necessarily mean that the supply of displaced workers would be able to fulfill those roles. By 2018, it was predicted that

2.4 million STEM jobs will go unfilled.[15] In manufacturing alone, it is predicted that the US will need to fill about 3.5 million jobs by 2025 but as many as 2 million of these jobs may go unfilled due to the lack of a skilled workforce.[16] Considering the argument that automation will create high paying and higher skill tasks, this deficit is going to increase on from here if left unchecked. Even though displaced workers are looking for jobs, they are not skilled enough to fill these positions. Much of this is due to the lack of infrastructure available to these displaced workers to upskill. Not everybody can afford an expensive college education that provides skills for these types of high paying jobs. Companies have recognized this lack of infrastructure and have taken it upon themselves to train their employees and pump money into domestic skill training.[17] But efforts from these independent companies won't be enough. After all, they want to spend the money to upskill the workforce that they can then absorb. There is a need for a national program that can supplement these individual efforts. Korn and Ferry estimate that by 2030, there will be a global shortage of human talent of more than 85 million people. This could itself result in $8.5 trillion in unrealized annual revenues.[18] Switching to the new higher-paying jobs created by automation will require these existing workers to be upskilled. It is in the benefit of both industry and government to aid the workers in this process. Government partnerships with the industry to create these upskilling programs might be the best way to implement upskilling programs. This way, neither one of the parties has to take on the load of implementing the full infrastructure themselves. Additionally, tax incentives to upskill themselves can be given to certain sections of labor to create an incentive to enroll in these programs.

Despite the popular arguments that robots will create new jobs, the job gains will not be commensurate with the job losses in the short term. I want to emphasize that, with the current taxation system, which favors the few rich, fast adoption of autonomy will have serious short term implications. I do concede that implementing a robot tax straight away might be impractical,

given the problems mentioned earlier. Instead, a starting point could be rectifying the inherent flaws within the current taxation system. Labor income covers a substantial part of the employment taxes which in turn fund social security and other programs. Immediate displacement of labor can cause a shortage leading to an increase in the deficit. Relieving labor taxes of the burden of contributing a majority to employment tax revenues could be one way of mitigating this problem. Furthermore, by inherently making companies pay half of the payroll taxes, the cost of human labor is increased and the robots are naturally more incentivized. Restructuring this so that this inherent incentive no longer exists could be one way to slow down the rapid adoption of automation. As mentioned before, the current taxation system favors capital more than labor. There are numerous benefits offered that essentially subsidize the utilization of capital over labor.[4] Imposing additional taxes on capital could be one way to reduce fluctuations in government revenue dependent on employee taxes.

I realize that this is easier said than done. Taxation is a very contested topic of debate and there are massive lobbying powers affecting such proposals. But given the need of the hour, fundamental tax reform, combined with upskilling programs, might help mitigate the short term effects of wide-scale automation. My stance is very clear on automation. I am in favor of the adoption of autonomy. I believe automation will open up new avenues for us and lead us into a new era. I also believe that automation will have a net positive impact in the long term. However, I don’t think we can just ignore the short term plight of various segments of society just for the long term gain. I am in favor of adopting automation in such a way that helps the displaced labor cope with the change, supports existing welfare programs, and creates a more balanced distribution of wealth.

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