Automated vehicles promise much in the way of both economic boons and increased personal safety. For better or worse, the effects of automating personal vehicles will not be felt for some time. In contrast, the effects of automated work vehicles, like semi-trucks, will be felt much sooner—within the next decade. The costs and benefits of automation will not be distributed evenly; while most of us will be positively affected by the lower prices overall, those losing their livelihoods to the automated semi-trucks and other similar work vehicles will be much worse off. This sets up a classic distributive justice problem: how do we balance the harms and benefits of automation? In this paper, the authors recommend work alternatives: policies that the government would enact in order to ensure that each person could live a decent life even if one could not work, especially for reasons like having one’s job automated. After arguing for this position, we propose some policy guidelines.

autonomous vehicles, ethics, supply chains, work alternatives, universal basic income

Chapter 19

Supply Chains, Work Alternatives, and Autonomous Vehicles

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Work and Automation

Our quest to augment our labor with tools started at least as far back as the Oldowan toolkits of the Early Stone Age, some 2.6 million years ago.[[1]](#endnote-1) Millions of years later, our tools have become so unbelievably complex—replete with many human-like features—that we can even feel empathy for them.[[2]](#endnote-2) Throughout the evolution of these tools, we have been able to expand our capacities, and this has had the effect of reducing the amount of human labor that tasks would otherwise take.[[3]](#endnote-3) Automation is the next phase of this technological evolution, wherein the required labor could be eliminated altogether—or at least substantially relocated. This relocation could, for example, mean that humans are no longer performing the relevant tasks themselves, but rather designing processes or systems that perform those tasks; a design model that again aims to reduce human labor through increased productivity and efficiency.[[4]](#endnote-4)

Automation, however, is more morally complex than it might initially seem. We are quick to praise technological innovation, particularly when it leads to benefits for consumers. In principle at least, automation can lead to lower prices, by reducing our reliance on comparatively expensive human labor.[[5]](#endnote-5) Similarly, it can lead to vastly improved supply chains, which can also benefit consumers—not just in terms of prices, but in terms of increased availability (e.g., though rapid delivery).[[6]](#endnote-6) Automation, by definition, reduces our reliance on human labor; it is the *labor itself* that is being automated. And philosophers occupying as disparate worldviews as John Locke and Karl Marx have regaled the moral status of labor.[[7]](#endnote-7) More recently, Matthew Crawford has defended not only the value of labor itself, but even manual labor in particular.[[8]](#endnote-8) He critically assesses the advent of “knowledge workers,” particularly as emerged after the introduction of assembly lines during the Industrial Revolution. His view is that we have now drawn such implausible distinctions between “thinking” and “doing” (e.g., disparaging “vocational” work, in favor of more “intellectual” undertakings) that, not only does our moral ethos suffer, but our psychologies suffer as well.[[9]](#endnote-9)

And so there is more to think about vis-à-vis automation than may be initially obvious. While widespread automation has historically given rise to panic over the end of work, or similar economic catastrophe,[[10]](#endnote-10) current economic research suggests mechanisms by which the economy will compensate for large-scale job loss in any particular sector.[[11]](#endnote-11) For example, automation in one industry might reduce prices for that industry’s products by reducing production costs. Those cheaper products will then be consumed by a second industry. This second industry can now hire more workers because of the reduced price of the now-automated first industry’s products that it takes as inputs. Labor displaced by automation in the first industry is relocated to its consumer industries. These increases in efficiency end up having a net positive impact on the number of jobs even while they reduce the amount of value added to the final product by labor. That is, they are “*employment-augmenting* yet *labor-share displacing*.”[[12]](#endnote-12)

So, the thought might go, if the effect of automation is simply to move jobs around the economy, what ethical concern could there be? Workers in one industry move to another once automation reduces the need for their labor. No harm, no foul. This picture quickly gets complicated, however. Unsurprisingly, not every worker can perform every job. There must be a match between any particular worker’s skills and the job she is hired to do. There is a relatively constant rate at which the education level of the labor force and the education required by the labor market are mismatched.[[13]](#endnote-13) That is to say, there are always workers without the schooling required for the jobs available, and there are always workers with more schooling than is necessary for the jobs they have. Nevertheless, individual workers may still be harmed if automation leaves them with a set of skills which is not a match for the skills required by the labor market.

Consider another example: manufacturing. Industrial factory jobs were a huge part of the American economy for years, but those jobs turned out to be a prime target for automation.[[14]](#endnote-14) The relative simplicity of the jobs themselves, especially given the nature of the specialized jobs along the assembly line, made creating machines to replace factory workers a relatively easy project. Factories became increasingly automated, laying off workers by the thousands. But instead of moving to find other work or retraining for new jobs, workers often dropped out of the workforce and relied on disability benefits.[[15]](#endnote-15) This is the result many wish to avoid—automation replacing low-skill, high-paying jobs of all kinds, leaving a dearth of options for those without more than a high-school diploma.[[16]](#endnote-16)

Autonomous Trucking

Autonomous vehicles (AVs) are one instance of automation. The labor replaced in this instance is the labor of the driver. By combining the power of global-positioning satellites (GPS) with cameras, light detection and ranging (LIDAR), and/or ultrasonic sensors, AVs promise to get us to our location just by plugging in the destination and letting the car take us there. They also promise to become safer and better drivers than us; and given enough time, many find it plausible that they will replace us altogether. For many of us, this just provides more free time: for example, if we do not have to drive our cars to work, we can do all sorts of things on our phones, anything from reading news to social media to whatever else catches our fancy. Or we could even work “from the cockpit” as we are ferried to our physical workplaces. In these regards, automation promotes either more leisure time or else more work productivity. But, for others, AVs can be an existential threat to their livelihood.[[17]](#endnote-17) Taxi, Uber, and Lyft drivers stand to lose their jobs to automated taxis that do their job better than they could, for cheaper, and at all times, rather than just when the drivers are on the clock.[[18]](#endnote-18) Moving trucks, airline vehicle operators, and most, if not all,[[19]](#endnote-19) other vehicle operators face the same fate.[[20]](#endnote-20)

This trajectory is not necessarily problematic on its own. As with most careers that invoke some romanticized past (e.g., blacksmithing), the replacement will be slow enough that few people’s livelihoods will be immediately threatened by the automation.[[21]](#endnote-21) The complexities of street driving and the slow speed of GPS map updates mean most AVs struggle in the strange and unique traffic situations found in the world, particularly cities.[[22]](#endnote-22) But this merely slows rather than stops the progression of AV technology. As AVs become more and more sophisticated, fewer and fewer people will consider vehicle operation as a stable or desirable job, leading to a natural decline in the workforce for AVs to fill.

As noted above, workers are harmed when automation reduces the demand for their labor and they are left with a set of skills which does not match those required by the labor market. Commercial drivers replaced by AVs are likely to find themselves in this situation for a combination of reasons. The trend toward new technologies has been toward technologies which are skill-biased.[[23]](#endnote-23) New technologies tend to promote the efficiency of high-skill workers. Computers connected to the Internet allow lawyers to spend less time flipping the pages of law books to find citations and more time on the legally demanding parts of their job. This increases the value which high-skill workers add and thereby increases the demand for high-skilled labor. This has not always been true.[[24]](#endnote-24) Consider, for example, the introduction of machines with replaceable parts. This technology reduced the need for skilled labor and replaced skilled artisans ultimately with assembly lines and factories. Before the advent of interchangeable parts, all machine repair required a skilled machinist to craft a replacement part with a chisel and file. After the introduction of this technology, machine repair simply required swapping out one part for another easily available replacement. Skilled machinists had far less work to do. Rather than augmenting the value of skilled labor, this technology drastically reduced the value of skilled labor in manufacturing. In this way, AVs are more like replaceable machine parts and less like computers and the Internet. While the trend in new technologies is skill-biased, AVs will drastically reduce the need for skilled commercial drivers.

There has also been an increasing amount of polarization in the labor market. That is, more work opportunities are for either high-skill jobs or for low-skill jobs. Fewer opportunities exist for those in the middle.[[25]](#endnote-25) Driving a semi-truck is an example of a middle-skill job. It requires more training than a high-school diploma, but less than a four-year degree. Because of the steep increase in job polarization, workers with skills appropriate for middle-skill jobs find themselves without the skills the job market demands. When automation reduces the need for their labor, they are not easily able to slide into new work in another sector. This in combination with the skill-replacing rather than skill-biased nature of AVs means that drivers replaced by AVs are at risk of falling through the cracks of the labor market.

While labor displacement is not an externality unique to AVs, there are a set of unique circumstances that make it a problem in the case of AV technology. The vehicles that are slated to be automated vary in their implementation speed. Ordinary cars driving their passengers face the problems of idiosyncratic road signs (and their placement), road configurations, changing landscapes, and the unique driving conditions between cities. The degree and speed of automation of a particular vehicle-type matter for labor displacement. Of these vehicle types, the speed and scope of producing automated semi-trucks appear the most likely to create serious labor displacement issues for the market.[[26]](#endnote-26) Even before fully autonomous semi-trucks appear, various semiautonomous technologies like platooning (in which several automated trucks follow one human driver) on interstates and freeways seriously threaten the trucking labor force.[[27]](#endnote-27)

Although many jobs will be affected by AV production (taxi drivers, Uber drivers, moving trucks, airport and airline vehicles, etc.), the introduction of autonomous semi-trucks will have the largest and most rapid impact on the availability of work and on the working population. Autonomous semi-trucks (ASTs) do not face many of the production and development problems afflicting AVs that must confront city driving conditions. Interstates and highways are relatively simple for trucks to navigate; the beginning and end of their journey which involves city driving can be picked up by humans without having to pay the driver for all of the miles driven on the highway. Even in the early stages of automation, we can expect a serious reduction in the number of semi-truck drivers on the road. “Convoys” or “platoons” of trucks are already on the roads.[[28]](#endnote-28) The U.S. Postal service is experimenting with self-driving trucks to move mail across state lines, and TuSimple completed its first driverless autonomous truck run on public roads late in 2021.[[29]](#endnote-29) Even if this is the only technology to be approved for many years, platooning alone would have major labor displacement effects—most platoons involve one human driver leading between two and seven other vehicles.[[30]](#endnote-30) Furthermore, the ability for fully automated trucks to travel without stopping for rest greatly improves the efficiency of the supply chain.[[31]](#endnote-31) Finally, like other AVs, ASTs promise to be much safer than human drivers.[[32]](#endnote-32) This combination of greatly reducing cost, increasing efficiency, and saving lives means ASTs will take over much more rapidly than other types of AVs. Reports estimate ASTs and their early predecessors will supplant many of these jobs in five to ten years, and they will transform the business in fifteen years.[[33]](#endnote-33)

Recall that we were not concerned with the replacement of ordinary vehicle operators with AVs due to the long timeline before AVs are prevalent enough to cut into the market along with the difficulties inherent in designing AVs which can operate in all the various situations ordinary vehicle operators face. The timeline for ASTs is much shorter. There’s reason to worry that the five to ten years we can expect before ASTs replace truckers is not long enough for the labor market to adjust. While many economic models predict that long-term unemployment will not rise as a result of technological development,[[34]](#endnote-34) some are not nearly so optimistic.[[35]](#endnote-35) Beyond long-term predictions, there is also disagreement about what short-term effects of technological development on employment rates will be.[[36]](#endnote-36) The upshot of all this uncertainty is that there is no guarantee labor markets will simply absorb displaced workers without significant disruption both to the labor market as a whole and to the individuals affected.

Of even more concern than the timeline is the scale at which this will occur—unlike the market share of other vehicle operators, trucking is the number-one job in twenty-nine US states, with a total of approximately 3.5 million truck drivers.[[37]](#endnote-37) Beyond trucking as its own job, many businesses are built to cater to these drivers and their crews, like truck stops, food courts, and so on, which add up to over 7.9 million workers.[[38]](#endnote-38) Altogether, we stand to lose or imperil over 10 million US jobs in the next fifteen years.[[39]](#endnote-39) Is there something these truckers could turn to? Semi-truck driving is a relatively well-paying, middle-skill job, so alternatives would have to be similar in those respects. There are two ways to answer this question in the negative.

First, alternative jobs that truckers may be able to move to do not appear very high-paying or are themselves threatened by automation. Self-checkout, fast food kiosks, farming, and factory-line robots have replaced some of what might have provided jobs for truckers to easily move to, due to the lower educational or specialized training requirements. Truck drivers rarely have bachelor’s degrees and some even lack a high school diploma or equivalent, severely limiting their career alternatives.[[40]](#endnote-40) The jobs that are least likely to be automated are jobs in which employees are paid very little.

But what about other mainstays of American society? Farming and factory work both promised similar low- or middle-skill, high-paying jobs to many. Unfortunately, both have fallen prey to automation. Farming has gone from one of the most prevalent jobs in the country to a job for the few, owning fleets of enormous vehicles specialized to do the job of a hundred men.[[41]](#endnote-41) The invention of the tractor, and later the combine harvester, meant that many former farmers and farmhands moved to more urban areas.[[42]](#endnote-42) Farming is also vulnerable to the same type of automation as truck-driving: automated vehicles. AVs for farming in “platoons” are being shipped out, much like for ASTs. In both, the lead vehicle is piloted by a human while several other AVs follow their lead (e.g., two to six more vehicles).[[43]](#endnote-43) This innovation alone threatens both rural farmers and semi-truck drivers. If one person can do the job of seven others, then we can expect the number of jobs for commercial drivers to drop significantly from what it is today.

There are other, white-collar jobs that might have provided opportunities for retraining, such as accounting. These jobs too are under threat. In one study, accountants, bookkeepers, checkout operators, and general office administration workers were the most likely to become completely or near-completely automated in Australia in the next twenty years.[[44]](#endnote-44) There is little reason to suppose that similar white-collar jobs in America would be more immune to automation. So, unfortunately, we stand to lose many of the jobs available to those without bachelor’s degrees in about a decade.

Second, we know from past experience that those who lose their jobs to automation often do not retrain or are otherwise unable to move to rejoin the workforce.[[45]](#endnote-45) Thus, even if there *were* good alternatives, it is unlikely displaced workers would be able to take advantage of those opportunities. Further problems complicate the road to retraining. For example, coal miners living in Appalachia were offered coding classes to bring them skills useful in the post-coal era. These efforts were stymied by a myriad of factors.[[46]](#endnote-46) Inability to secure fast and reliable Internet was a big obstacle even for those willing to undertake radical change to stay in the job market.[[47]](#endnote-47) Moreover, while job training increases one’s chances of moving from a lower- to a higher-paying job, there’s reason to think this effect is strongest for those who already have high-skill jobs.[[48]](#endnote-48),[[49]](#endnote-49)

This sounds bleak, but, as noted above, the wave of automation will not necessarily hurt the economy as a whole. Widespread implementation of AVs will make transportation cheaper and more efficient than it is while employing manned vehicles, bringing savings to industries and consumers, boosting the economy as a whole.[[50]](#endnote-50) Furthermore, traffic and work-related accidents will significantly decrease, saving lives and many millions of dollars in healthcare and other costs, making automation of commercial vehicles nearly certain.[[51]](#endnote-51) While the overall effects will almost certainly be good, the individuals replaced by AVs, their families, and potentially entire local communities will be devastated.[[52]](#endnote-52) This makes the problem primarily one of distributive justice.

The individual effects are quite massive. Losing one’s job without comparable options for employment means an almost-certain drop in quality of life.[[53]](#endnote-53) Many low-paying jobs cannot support families or even individuals, meaning the loss of one’s trucking job is an existential threat.[[54]](#endnote-54) This threat is not limited to the individual—the effects of parents losing their jobs can affect their children’s behavior and academic performance.[[55]](#endnote-55) Reliance on welfare will almost certainly increase, especially on disability benefits.[[56]](#endnote-56) If a community has been arranged around trucking, the community itself will suffer much in the same way as factory towns or mining towns did when their factory or mine shut down.

There are also minority-specific harms worth noting. Many minority communities have turned to trucking and trucking companies plan to recruit minority communities aggressively,[[57]](#endnote-57) and trends show the employment of women and Hispanic drivers are higher than ever and on the rise.[[58]](#endnote-58) As one of the easiest ways to become an entrepreneur in the United States, buying one’s own rig and shipping as a contractor holds great appeal.[[59]](#endnote-59) These individuals and families are not only threatened in the same ways as other individuals who truck but would also experience harms as an oppressed minority community. Because of social structures, oppressed communities are not well-positioned to break into new markets in the United States, shown in economic and other data.[[60]](#endnote-60) They have for now found one way of doing so: buying one’s own rig. The paucity of options forces many individuals from minority communities to choose trucking, which will now be removed as an option. This minority-specific harm strongly merits mitigation.

Mitigating Harms and Promoting Benefits

One response to the above concerns is to oppose the automation of vehicles. This is not a plausible position to take, as other authors have covered.[[61]](#endnote-61) Suffice to say, given the life-saving and economic benefits of automating vehicles, opposition to automation is not desirable.[[62]](#endnote-62) But even if it were, it is not clear it is possible to stop such automation. AVs are in production and testing *right now*.[[63]](#endnote-63) The benefits to corporations are much too appealing to be passed up. Automation of vehicles is simply not avoidable.

We have now highlighted a specific harm—labor displacement—that AVs, specifically ASTs, will bring about. Now it appears that we are faced with questions of distributive justice. We take as an assumption that the only effective solutions are likely to be state-based. There are two reasons for doing so. First, the problem is of a huge magnitude and most private entities are not well-positioned to enact timely countermeasures. Amazon, for instance, has pledged to fund retraining for many of their workers to move to other sectors. It should be pointed out, however, that historical examples do not bode well for this. As noted before, coal miners have been offered retraining, but the effort was stymied in a number of ways, not the least of which was the expense and selectivity, which left many workers out of the effort.[[64]](#endnote-64) Furthermore, each company that is involved in the automation would have to offer a similar deal in order to satisfy the concern brought up in this paper. Many companies are simply too small to offer such monetary compensation. Trucking in particular will struggle to meet this issue since many truckers are self-employed and own their own rig.[[65]](#endnote-65)

Second, even if private or market-based solutions are tried, we would want to have thoughtful alternatives in the wings or perhaps even acting simultaneously. The state-based solutions we explore provide good reason to believe the state is well-positioned to provide solutions to the concerns raised earlier. So, given a state-based approach, the question of what a just distribution of these benefits and harms would then look like has two parts: is any response warranted and, if so, what kind of response?

Some philosophical views, such as Nozickian libertarian views, might forbid the state from intervening in any way.[[66]](#endnote-66) If there are only two ways to justly acquire property (creating or claiming unclaimed property and justly transferring property), then the state can lay no claim to my property, even to address extremely unfortunate circumstances for others.[[67]](#endnote-67) The right thing to do for each property owner nevertheless may be to give generously to those worse off, but the state cannot force citizens to do so.[[68]](#endnote-68),[[69]](#endnote-69)

One might disagree with this conception, but we will point out at least one way it appears a libertarian may *still* be committed to the state responding to labor displacement. As noted before, there are only two ways of justly acquiring property. Acquiring property unjustly means one has no right to it. Now consider the citizen who intends to justly acquire some property and is transferred property that was previously unjustly acquired. Is this transfer just? Under most conceptions, it seems not. Given the racialized harm contained in the labor displacement that is directly traceable to unjust (read: racist) acquisitions of property in the past, the libertarian may be committed to the state responding to rectify chains of unjust property acquisition.[[70]](#endnote-70),[[71]](#endnote-71) To the extent that present-day differences in labor opportunities in whites and African Americans are traceable to unjust past policies such as slavery or Jim Crow laws, the libertarian might well be committed to a vast effort to rectify the unjust acquisition of property.

But there are other alternatives to this libertarian view. Following Rawls, we can argue that the harm to individuals should be mitigated, especially when it adversely affects the worst off.[[72]](#endnote-72),[[73]](#endnote-73) This line gives a range of possible responses for the state, the most interesting of which involve reconceptualizing work or valued labor. The problem as conceived earlier is merely trying to replace one set of jobs on the market: trucking industry jobs. But the phenomenon is much greater than this and therefore so is the problem. Eventually most everything we consider to be essential work will be automated, leaving most citizens without jobs to do. An abbreviated list of jobs that are almost certain to become fully or nearly fully automated in the next twenty years include accountants, clerks, cashiers, financial and insurance administration workers, secretaries, and fabrication trade workers.[[74]](#endnote-74) Even under the optimistic lens, as noted before, the effects of automation will not usually harm the economy overall, but there are workers who will be hurt due to transition costs. As the number of workers affected in this way radically increases, so do our obligations to help them. We used to think society had years before it had to reconceptualize work in such a way that this result would be beneficial. The point argued here is that the automation of vehicles has radically sped up that clock. In order to deal with this, we must seriously consider workplace alternatives such as reducing the workweek, universal basic income, job guarantees, or distributivist alternatives in the next five to fifteen years. As it stands, caring for children and for elderly members of society is largely unrecognized as important by market value. Reconception of this work as valuable presents an opportunity to benefit our own overall well-being as well as the well-being of society. There are a number of ways this might be achieved, however.

Consider, as an example, universal basic income (UBI). Under this conception of human labor, one deserves enough money to live regardless of the amount of work one does. Most proposals are enough to pay for basic groceries, utilities, and a place to live. More robust proposals include money to pursue inexpensive hobbies of various kinds.[[75]](#endnote-75) Combined with public transit and places like libraries, one could have a fulfilling life without ever working another job. This is not to say there are no other jobs. Ideally, other jobs would be available for those who would want them. If one wants to make more money to enjoy more expensive hobbies, as an example, one would be motivated to get one of these jobs. Other proposals can also be combined with UBI at this point. If a central part of a jobs guarantee act would be to create community-centric jobs (like caring for the elderly, cleaning park spaces, etc.), the proposal could “stack” on top of UBI. The combined UBI/jobs guarantee proposal would then offer guaranteed community-centric jobs in addition to the other jobs brought about by market forces.[[76]](#endnote-76)

Notably, the set of alternatives do not demand any particular conception of how we *ought* to view labor so long as the alternatives are effective at mitigating the harm brought about by massive, rapid labor displacement. If one prefers a capitalist approach, UBI provides a welfare-capitalist approach to mitigate the harm. If one prefers a socialist or Marxist approach, there are solutions to fit those ideals. There are other reasons for favoring one over the other (perhaps one is more humane than the other), which will be discussed briefly at the end of this paper. The point we wish to drive home here is that *some* radical change in how we value labor seems necessary. Some commonly thought this necessity was far in the future. This is not so; this necessity is within a decade.

There are some other considerations here. We have so far assumed the compensation or redistribution would be mainly based on end-state considerations. This need not be the case. Depending on the analysis of responsibility, methods to redistribute gains from automation to those adversely affected by automation could take other forms. The technological equivalent of proposals by Thomas Pogge and Nicole Hassoun to reform the pharmaceutical industry provides a sketch of such an alternative.[[77]](#endnote-77) Specifically, they propose to incentivize research into less-researched pharmaceuticals that would differentially benefit the world’s poorest populations—but that are not otherwise lucrative enough to foster development. For example, our pharmaceutical research program is not well-suited to curing malaria, because those most affected by the disease would not be able to afford it. As it stands, researchers often receive private research money or apply for grants from the government to perform their research.[[78]](#endnote-78) They then file for a patent to prevent other companies from cheaply recreating the drug, which would leave the researchers deeply in debt. They then rely on the money provided by the monopoly to recoup costs.[[79]](#endnote-79)

Alternatively, Pogge recommends (1) making all research money public and putting money in an enormous public fund; and (2) awarding it to researchers based on how much their research alleviates the Global Disease Burden. Pogge argues this approach is more effective at reducing the Global Disease Burden than a reliance on clumsy monopolies created by patent proposals.[[80]](#endnote-80) Under Hassoun’s complementary account, it would not be taxation so much as providing incentives. Her model more closely resembles various Fair Trade enterprises for other products.[[81]](#endnote-81) The technological version here might be something like incentivizing development of affected communities, retraining, job insurance, and other similar measures in return for something like a Fair Trade label that consumers would find desirable, thus increasing the consumers’ interest in buying products with that label.[[82]](#endnote-82)

Applications of these or similar ideas have already found their way into law and policy journals.[[83]](#endnote-83) In short, these proposals seek to tax the benefits of such technological advances (such as some of the savings from switching to AVs) and redistribute them more evenly by taking some amount of the economic gains and using those benefits to fund those adversely affected. This might be more appealing to those who think the economic situation is exploitative and that sudden labor displacement resembles cases in which reparations or compensation might be necessary.

How to Assess Future Proposals

Not all work alternatives are equal. Previously, we only considered one component that would determine if a work alternative is good enough to be considered “adequate”: economic feasibility given the impending loss of jobs due to automation. There are several other aspects which ought to be considered.

As an example by which these aspects will come to light, contrast a guaranteed jobs proposal with a universal basic income proposal. Suppose that the results of some studies of UBI come back,[[84]](#endnote-84) and it turns out that many people become depressed after several months of receiving their money if they also lack a job. People often get a feeling of meaning in their own lives from their work, which, as Danaher points out, can be split two ways.[[85]](#endnote-85) First, work may very well be helpful or necessary to advancing the good for human persons. Second, work may bring about the subjective feeling of meaningfulness. Furthermore, work is a fruitful place for friendship, further adding to the meaning-giving function of work.[[86]](#endnote-86) Finally, the classical arguments for the value and nature of work by Locke, Marx, and others mentioned earlier might give reasons to be hesitant about reconceptualization of this kind.[[87]](#endnote-87) Indeed, the empirical findings may be seen as confirmation of their views. Under this supposition, universal basic income does provide economic support for the loss of these jobs, but it does not appear to salvage the other meaning-giving aspects of having a job.[[88]](#endnote-88) A jobs-guarantee proposal, however, might do both. Providing a guaranteed job would preserve both the economic and meaning-giving benefits of having a job. So one aspect that might be considered when evaluating work alternatives is how it addresses our sense of meaning in our own lives.

Now, it might be objected that tying one’s life worth or sense of meaning to one’s job is not a good attitude to have, and thus should not be considered as a criterion of work alternatives. While the antecedent might be true, it can be granted and yet nevertheless one’s sense of meaning should be considered. Presumably the goal of lessening the economic hardship of losing jobs to automation is subservient to the goal of enabling people to live meaningful and worthwhile lives. Furthermore, people’s disposition to feel this way when not working has been inculcated by the complete lack of work alternatives or of taking them seriously. Finally, one must think of the opposition’s narrative. If we make the choice to favor UBI and ignore the depression that can ride along with it, the policy’s less-than-stellar results will be used as a reason to regard UBI (and other work alternatives) as a failure.

Another thought might be that UBI can be supplemented with public festivals or education or any number of other things meant to replace the meaning-giving benefits of work. But notice that this is not *merely* UBI anymore, for it contains additional proposals to balance the loss of meaning-giving and purpose as well. This doesn’t make for an objection to UBI; it simply points to a norm of addressing meaning-giving in addition to the economic aspects of job loss.

So what factors should we judge work alternatives by? We propose a list of five criteria, many of which we have already discussed, at least implicitly. The first has taken up most of our discussion thus far: economic effectiveness. This criterion determines if the proposal will solve economic hardships for individuals and communities moving forward, especially with regard to issues of automation.

Second, we should consider the conservation of value. Work alternatives can fit a range of ideological and value-theoretic frameworks, from Marxist conceptions of labor to thoroughly capitalistic ideals. The more a proposal suggests we change this framework, the less likely those affected will support it. Furthermore, these ingrained values might be psychologically harder to change. Even if one thinks one’s labor should not determine one’s worth, it may be hard for an individual to value themselves without their labor after a lifetime of such attitudes, even implicitly. Finally, the closer a proposal matches current values, the fewer transition costs there will be in switching over.

A third criterion might be stated as “valuing the valuable.” The idea here is to match what the market values to what we think is valuable. There is always a gap—today there are few who would say elder care is not valuable, but elder care is not highly valued by the market—but the more we can close the gap with work alternatives, the better the proposal will be. This is one of the arguments put forth by those supporting the Green New Deal: green energy is not currently valued by the market as much as it should be to avoid climate catastrophe; thus, guaranteeing jobs in the green energy sector will substantially shift the values in the market closer to the ideal.[[89]](#endnote-89)

A fourth criterion discussed in our toy examples above is purpose fulfillment or meaning-making. The better a proposal can address this concern, the more we should favor the proposal.

A fifth criterion concerns how well work alternative proposals can mitigate oppression and historical injustices. Following Iris Young, oppression might be fruitfully thought of as having five faces: exploitation, marginalization, powerlessness, cultural imperialism, and violence.[[90]](#endnote-90) To the extent that work-alternative proposals promise to mitigate these things, we should increase our support for such a policy. We need not come down on any particular ideological definition of oppression to point to examples to rectify with our proposed policies. The racial and gender wage gaps, for instance, are prime targets for proposals wishing to distinguish themselves. Some people already value something like this, as indicated by the positive response to US Senator Cory Booker’s universal economic proposals that nevertheless significantly mitigate the racial wage gap.[[91]](#endnote-91) Similarly, the Green New Deal intentionally tries to mitigate historical injustices to minority and disabled communities.[[92]](#endnote-92)

Looking forward, we should try to further narrow the list of alternatives using the criteria given here. There are many proposals already, and this list will increase greatly once acceptance of the necessity of work alternatives becomes mainstream. Having concrete criteria by which to evaluate these proposals will save us time and guide us more effectively toward the proposals that fit our values most closely.

Unfortunately, the biggest obstacle to evaluating work alternatives is the extreme lack of data. As it stands, universal basic income is the most empirically studied work alternative, but is still in need of much more data before its effects can be well-predicted. This is even more pronounced in the case of the other, even less-studied work alternatives. Given the exigencies and harms of automation laid out earlier, we should not delay in beginning our investigation into these proposals. Once these data are in hand, the criteria above will determine more clearly which alternative will work best.

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1. Early kits were used by *Homo habilis*—an ancestor of *Homo sapiens*—and consisted of hammerstones for battering, stone cores for ax-like cutting, and stone flakes for smaller cutting edges. Acheulean stone tools emerged some 1.6 million years ago, used by *Homo erectus*, a closer ancestor to *Homo sapiens* (Smithsonian Museum of Natural History 2019). [↑](#endnote-ref-1)
2. Fink (2012). Or even have sex with them (Geher 2019). [↑](#endnote-ref-2)
3. Autor and Salomons (2018). [↑](#endnote-ref-3)
4. Parasuraman and Riley (1997). [↑](#endnote-ref-4)
5. In practice, it is not obvious this desideratum is often realized, e.g., because of corporate profit-taking or reinvestment into research and development. See, for example, Noe and Weber (2019). [↑](#endnote-ref-5)
6. Noe and Weber (2019). [↑](#endnote-ref-6)
7. Locke (1986), § V; Marx (1994), 58–68. [↑](#endnote-ref-7)
8. Crawford (2009). See also Crawford (2015). [↑](#endnote-ref-8)
9. His more recent book further elaborates the costs of our overreliance on technologies. See Crawford (2015). [↑](#endnote-ref-9)
10. Rifkin (1995); Binfield (2004); Autor (2015). [↑](#endnote-ref-10)
11. Autor and Salomons (2018); Autor (2015). [↑](#endnote-ref-11)
12. Autor and Salomons (2018): 11. [↑](#endnote-ref-12)
13. Groot and van den Brink (2000); Leuven and Oosterbeek (2011). [↑](#endnote-ref-13)
14. Carlsson (1995); Brynjolfsson and McAfee (2016); Autor (2015); Devaraj, Hicks, Falk, and Wornell (2017). Cf. *TIME* (1961). [↑](#endnote-ref-14)
15. Joffe-Walt (2013); Peters and Fisher (2004). [↑](#endnote-ref-15)
16. Akst (2013). [↑](#endnote-ref-16)
17. Akst (2013). [↑](#endnote-ref-17)
18. Lipson and Kurman (2017); Kelly and Schwartz (2018); Kahn (2019). [↑](#endnote-ref-18)
19. Racecar drivers or other vehicle sports do not seem to be in any threat, for instance. [↑](#endnote-ref-19)
20. Lipson and Kurman (2017); Kelly and Schwartz (2018). [↑](#endnote-ref-20)
21. Autor (2015). [↑](#endnote-ref-21)
22. Autor (2015); Kahn (2019). [↑](#endnote-ref-22)
23. Acemoglu (2002). [↑](#endnote-ref-23)
24. Acemoglu (2002). [↑](#endnote-ref-24)
25. Autor (2010); Autor, Katz, and Kearney (2006). [↑](#endnote-ref-25)
26. We saw something like this with the decline of manufacturing jobs due to automation, although there were other jobs for workers to move to (Pierce and Schott 2016). [↑](#endnote-ref-26)
27. Davies (2015); Kirtroff (2016); Dormehl (2017); Marshall (2017). [↑](#endnote-ref-27)
28. Davies (2015); Kirtroff (2016); Dormehl (2017). [↑](#endnote-ref-28)
29. Romo and Domonoske 2019; Bellan 2021. [↑](#endnote-ref-29)
30. See Kirtroff (2016); Alsin (2017). [↑](#endnote-ref-30)
31. Alsin (2017); Kirtroff (2016). Platooning also promises efficiency increases due to reduced drag (Kirtroff 2016; Isaacs 2017). [↑](#endnote-ref-31)
32. Marshall (2017); Ford (2015); Schwartz and Kelly (2018); Isaacs (2017). [↑](#endnote-ref-32)
33. Alsin (2017); Balakrishnan (2017); Kirtroff (2016). [↑](#endnote-ref-33)
34. Autor (2015). [↑](#endnote-ref-34)
35. Susskind (2017). [↑](#endnote-ref-35)
36. Postel-Vinay (2002). [↑](#endnote-ref-36)
37. Bui (2015); Costello (2019). [↑](#endnote-ref-37)
38. Bui (2015); Costello (2019). [↑](#endnote-ref-38)
39. Costello (2019). [↑](#endnote-ref-39)
40. Day and Hait (2019). [↑](#endnote-ref-40)
41. Rifkin (1995); Gee (1930). [↑](#endnote-ref-41)
42. See Rifkin (1995). The cotton-picking machine alone could do the job of fifty men (Rifkin 1995). [↑](#endnote-ref-42)
43. ACEA (2017). [↑](#endnote-ref-43)
44. Reading, Thorpe, and Peake (2015). [↑](#endnote-ref-44)
45. Joffe-Walt (2013); Peters and Fisher (2004). Automation usually replaces low-education, high-wage jobs with some number of high-education, high-wage jobs, but this result is not helpful to those replaced (Autor 2015). [↑](#endnote-ref-45)
46. Bailey (2017). [↑](#endnote-ref-46)
47. Bailey (2017); Peterson (2016). [↑](#endnote-ref-47)
48. Pavlopoulos, Muffels, and Vermunt (2009). [↑](#endnote-ref-48)
49. One might have other worries, such as that automation will not spare something like coding for very long, whereas something like interpersonal care (e.g., nursing) might be a better long-term choice. [↑](#endnote-ref-49)
50. Autor (2015); Devaraj, Hicks, Falk, and Wornell (2017); Alsin (2017). [↑](#endnote-ref-50)
51. Alsin (2017); Schwartz and Kelly (2018). [↑](#endnote-ref-51)
52. This is best illustrated by the implementation of the interstate system. The reduced visitation from long-distance travelers did indeed devastate many local communities, most famously those around Route 66 (Vale and Vale 1983; Liebs 1985; Kaszynski 2000). Although many degrade the modern equivalents due to their uniformly corporate-controlled structure (Liebs 1985), such equivalents do exist and will suffer serious loss of customers. This bodes ill for the inhabitants manning such stops. [↑](#endnote-ref-52)
53. Brand (2006, 2015); Brand and Burgard (2008); Brand and Wachter (2013); Sullivan and Wachter (2009). [↑](#endnote-ref-53)
54. Alsin (2017). [↑](#endnote-ref-54)
55. Johnson, Kalil, and Dunifon (2012); Kalil and Ziol-Guest (2008); Kalil and Wightman (2011). [↑](#endnote-ref-55)
56. Joffe-Walt (2013): Autor and Salomons (2018). [↑](#endnote-ref-56)
57. Levy (2005): Magner (2018); Morris (2019). [↑](#endnote-ref-57)
58. Day and Hait (2019). This phenomenon may vary in kind and degree from country to country. [↑](#endnote-ref-58)
59. Marshall (2017). [↑](#endnote-ref-59)
60. PEW (2016); American Psychological Association (2019); Sears and Badgett (2012); Marshall (2017). [↑](#endnote-ref-60)
61. Cf. other chapters in this volume. [↑](#endnote-ref-61)
62. Kelly and Schwartz (2018); Alsin (2017); Devaraj, Hicks, Palk, and Wornell (2017); Brynjolfsson and McAfee (2016). [↑](#endnote-ref-62)
63. Eisenstein (2018). [↑](#endnote-ref-63)
64. Joffe-Walt (2013); Peters and Fisher (2004). [↑](#endnote-ref-64)
65. Day and Hait (2019). [↑](#endnote-ref-65)
66. There are, of course, many political philosophies that might present issues here (e.g., anarchism would have an obvious problem with state-based solutions). We leave these for others and address only the most common political stance opposing state-based action here. For more discussion, see Nozick (1974), especially chapters 1–6; Fiala (2017); Casey (2012); and Chomsky (2005). [↑](#endnote-ref-66)
67. Nozick (1974). [↑](#endnote-ref-67)
68. Nozick (1974). Of course, Nozick thinks that taxation is theft—or at least forced labor—and is therefore impermissible. For more contemporary discussion of libertarianism and taxation, see Mack (2006). [↑](#endnote-ref-68)
69. It is not clear to at least some of the authors that this is the case. Consider Feinberg’s analogy to interpersonal relations. If some person A will freeze to death unless they can break into a cabin owned by some second person B, A is permitted to break into the cabin (Feinberg 1978). Feinberg’s analogy can now be extended: consider a case in which A will freeze to death unless they can get into the cabin but do not possess the skills to do so. A better-bundled third person C (who does not own the cabin either) with the requisite lock-picking skills is permitted to pick the lock for A as well. Now consider C as a state actor, and so we see one apparent reason for thinking the state can intervene on the behalf of the well-being of others if it at least threatens their life. [↑](#endnote-ref-69)
70. One might be able to run a class-centered version of this argument as well. [↑](#endnote-ref-70)
71. Under Lockean conceptions, this is rectification is compensation rather than reparations. For more discussion on Nozick’s style of libertarianism and reparative or compensatory claims on the state, see de Greiff (2006a). See also de Greiff (2006b). [↑](#endnote-ref-71)
72. Rawls (1971): 26–27. [↑](#endnote-ref-72)
73. Our position could be slightly different; the response we give to Nozick appears to gesture toward a more modest alternative to Rawls’s principles. All the state is obligated to provide is enough for its citizens to pursue decent human lives. [↑](#endnote-ref-73)
74. Reading, Thorpe, and Peak (2015). The original list contains twenty-four jobs at the cross-section of the most likely to be automated and the most popular jobs in Australia. While these are estimates for Australia, but there is little reason to think similar American jobs will not suffer the same fate. [↑](#endnote-ref-74)
75. This has objections of various kinds. One class of objections focus on the moral irrelevance of hobby preferences: why does someone who prefers train hobbies now have to get a job while a second person who merely enjoys walking and viewing sunsets have his hobbies subsidized (cf. Nozick 1974)? [↑](#endnote-ref-75)
76. Hybrid models and stacked models differ—stacked models are two independent models that are implemented simultaneously. Hybrid models combine aspects of both into one unique program. [↑](#endnote-ref-76)
77. Pogge (2016); Hassoun (2012). [↑](#endnote-ref-77)
78. Hassoun (2012). [↑](#endnote-ref-78)
79. Hassoun (2012). [↑](#endnote-ref-79)
80. Pogge (2016). [↑](#endnote-ref-80)
81. Hassoun (2012). [↑](#endnote-ref-81)
82. Hassoun (2012). [↑](#endnote-ref-82)
83. See, e.g., Abbott and Bogenschneider (2018), where they argue that taxing the profits of some tech companies can and should be used to offset harms visited upon those put out of work by technology. [↑](#endnote-ref-83)
84. Studies like Kangas et al. (2019) or those listed in Weller (2016). [↑](#endnote-ref-84)
85. Danaher (2017). [↑](#endnote-ref-85)
86. Steger and Dik (2009); Allan, Duffy, and Douglas (2014). [↑](#endnote-ref-86)
87. See Locke (1986), § V; Marx (1994): 58–68. [↑](#endnote-ref-87)
88. There are ways this can be mitigated or eliminated entirely. There is a vast antiwork and postwork literature that can be drawn on to try and address this issue. For a brief overview of their arguments and replies, see Danaher 2017. The classic antiwork polemic is Black (1986), and an explicitly Feminist-Marxist form can be found in Weeks (2011). [↑](#endnote-ref-88)
89. Kurtzleben (2019); Green Party US (2019). [↑](#endnote-ref-89)
90. Young (2004). See also Heldke and O’Connor (2004). [↑](#endnote-ref-90)
91. Kliff (2018). [↑](#endnote-ref-91)
92. Kurtzleben (2019). [↑](#endnote-ref-92)