The political economy of Artificial Intelligence and labor: Are Capitalism and Artificial intelligence compatible? Labor and Capital reactions to the prospect of AI-automation.

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Labor and Capital reactions to the prospect of AI-automation.

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To those that chose empathy and solidarity over ignorance and brutality during these dark times and kept humanity inside us alive.

Abstract

In this thesis I examine the future of Artificial Intelligence at work. My goal is to investigate whether the replacement of human labor is imminent and whether the use of AI is a source of celebration or worry for labor. I first present some of the hopes and fears around fully-automated, labor-replacing AI technology. I then argue that any predictions are best-situated within the historical and material parameters of value and profit. I aspire to examine how these relate to human-labor, set the pace and shape the limits of the use of AI and labor-replacement. I conclude this thesis by investigating whether it is possible for AI to dominate production within the current economic framework, or not.

Keywords: Artificial Intelligence, robots, Capitalism, human-labor, socialism, labor-replacement, techno-skepticism, techno-optimism, value, profit, labor, falling rate of profit.

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Introduction

In my thesis I deal with the impact of AI-Automation on work and the compatibility of large scale automation with Capitalism altogether. The vision of an automated world in which independent machines assist and serve human beings has been captivating the fantasy of writers. From Jules Verne to Isaac Asimov, and from Ursula Le Guin to the creators of Dune and Star Trek, this is a recurrent theme that appears either as a utopia or a dystopia, and often simply as an open question.

Be that as it may, it is not just sci-fi authors that show an interest in the topic. Social scientists have since long been investigating the relationship between technological advancements, on the one hand, production, employment and social-relations on the other. Artificial Intelligence is the newest form of technology to attract great research interest, with many examining the prospect of AI-led automated production. There is no agreement on the potential breadth, underlying causes and limitations of such a development though. I find the source of disagreement to be the acceptance or rejection of profit as the driving force of economic decisions, while profit's nature, scope and meaning causes even further disagreement.

In this thesis I attempt to shed further light on the motivational forces behind technological adoption in production and human-labor replacement. I show how profit is the main driving factor behind economic decisions and examine its relationship with value and labor. I then investigate whether value and profit can be separated from human labor and what that would mean for Capital and Labor.

The importance of my research is in its attempt to explore the motivational forces behind AI-adoption and the consequences thereof, expanding the understanding of profit and work without losing track of their original meaning within classical Political Economy,

especially in its Marxian account. With this I aim to contribute to the broader debate around AI and human emancipation.

1. The genealogy of AI: Between Angst and failed promises

In 1921 Czech writer Karl Čapek wrote a drama, called Rossumovi Univerzální Roboti (RUR) that depicted the production of artificial people from man-made material, called *robots*. In Capek's initial representation and in many subsequent representations right up to the present, robots have been presented as both potentially emancipatory and dangerous. Emancipatory in that these artificial beings appear as a means to liberate humans from hard labor and menial work. But dangerous because they are also viewed as threatening humankind with obliteration.

Fear of the robot?

In Capek's account, robots can be confused for humans, can reason for themselves, and become revolutionaries. At first they work serving humans quite "happily." But it is not long before these *hard-working* creatures seek to overthrow the prevailing order, placing humanity at the risk of extinction. Since Capek's work, *robots* (or *robota*) in Czech, has been used to mean intelligent machines for hard work. Today, the broader term Artificial Intelligence (AI) is used to refer to a variety of intelligent machines and devices that humans build to assist them in their struggles.

As Ivan Margolius (2017) describes it:

> A new spirit was thought to have arrived, a spirit of synthesis of new concepts, of a new human élan, of multiple views of reality, ambiguity of meaning as in Kafka's works. Čapek's robots were a pure example of modernity not just in the name but by being ambiguous between the real being and the artificial machine. It prompted

> and inspired contemporary artists, writers and architects to create novel ideas based on new thinking and not on an imitation of the past, as had happened before. (p.6).

The RUP drama has been echoing the fears around new technology, a product of WW1 and the Ford assembly line. More importantly, it has been expressing the ancient human fear that one day machines will make us redundant. Today this fear has gained force.

Valerio De Stefano in a working paper for the Employment Policy Department of the International Labour Organization deals with this fear by citing a 2017 New Yorker article. In October 2017, a cover of the New Yorker magazine portrayed human paupers receiving handouts from humanoid robots strolling on the street. The very same issue included an article on job automation showing the consequences of introducing automated labor processes in existing corporations, analyzing in depth the relation and interaction between humans and sophisticated manufacturing machinery (Kolhaktar, 2017). De Stefano (2020) examines the reasons why the artist chose to draw such a cover in order to accompany an article on the consequences of job automation. The answer he gives , is that it is plausible that the artist was affected by an established narrative on job automation and the future of work that intensely fixates on a quantitative approach, trying to guess the number of workers that would be left unemployed as a result of technological developments (Frey and Osborn 2013; Dauth et al. 2017). This is what many describe as an AI takeover, namely a scenario in which some form of artificial intelligence (AI) becomes the presiding form of intelligence on Earth, with computer programs and robots effectively surpassing human intelligence and taking over control, including in the workplace. It is worth mentioning that not everyone that subscribes to a not-so-distant future of (almost) full-scale AI automation shares this stress. Techno-futurists like Peter Thiel, Elon Musk and Sam Altam predict that full AI-automation (the AI-takeover) is approaching much sooner than we think[1] and that it will not necessary be catastrophic,

[1] "Elon Musk warns humans risk being overtaken by artificial intelligence within the next five years."

but just “weird” (Musk) or even a great development altogether, going as far as to call it “an unimaginably great future” [2] (Altman). I call people in this group convinced, because they appear ascertained that full-Automation will be an (economic) reality sooner than later. However, I will show, not all members of this group hold the same normative evaluations about this development.

A future that never arrived?

At the same time others seem to be stuck with an entirely different feeling, that of disappointment, or even frustration, at “the broken promise of a futuristic world”. Among them the late David Graeber (2012) who was asking some years ago:

Where, in short, are the flying cars? Where are the force fields, tractor beams, teleportation pods, antigravity sleds, tricorders, immortality drugs, colonies on Mars, and all the other technological wonders any child growing up in the mid-to-late twentieth century assumed would exist by now? Even those inventions that seemed ready to emerge—like cloning or cryogenics—ended up betraying their lofty promises. What happened to them? (p.66)

He had been expressing a bitter disappointment with what he considered a failed promise. In a sense not only was Graeber not alarmed by AI’s development, but he seemed to be unhappy with what his generation ultimately got:

> We are well informed of the wonders of computers, as if this is some sort of unanticipated compensation, but, in fact, we haven’t even moved computing to the point of progress that people in the fifties expected we’d have reached by now. We

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https://www.independent.co.uk/life-style/gadgets-and-tech/news/elon-musk-artificial-intelligence-ai-singularity-a9640196.html

[2] “The delusions of techno-futurists who ask: crisis, what crisis?”

https://www.ft.com/content/1c1daa87-c48e-4d19-a574-046eadb5b665

> don't have computers we can have an interesting conversation with, or robots that can walk our dogs or take our clothes to the Laundromat. Did I expect I would be living in such a world of wonders? Of course. Everyone did. Do I feel cheated now? It seemed unlikely that I'd live to see all the things I was reading about in science fiction, but it never occurred to me that I wouldn't see any of them. (p. 66)

The promised AI-led utopia never arrived; even worse, most politicians have tried to convince people that we already live in a world of unprecedented -if not maximum- technological progress. How come then that the predictions of so many Sci-Fi blockbusters still seem so distant, even unreal? I have cited Graeber's commentary because Graeber was a sceptic but not a denialist. He was, if anything, a *frustrated* techno-optimist, knowing very well the dangers of a world filled with pointless jobs (which he calls less covertly bullshit jobs[3]), where humans end up doing largely unproductive work. He recognized that this phenomenon could intensify with a certain type of capitalist-driven automation and that there is a certain *something* that holds back the promised AI-Utopia, frustrating the human desire for more meaningful and fulfilling work. In this sense Graeber was sceptical towards the theory of imminent, liberatory AI-Automation within the current economic framework. And as I will show later, he was not the only one with such a view.

Imminent human- labor replacement?

In any case, up until now, we cannot attribute most incidents of human-labor replacement to humanoid robots anyways, since it is mostly algorithms and software that do the trick. This phenomenon has been called "the Moravec's paradox", conveying Hans Moravec's realization (1988) that "it is comparatively easy to make computers exhibit adult-level performance on intelligence tests or playing games, and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility" (p. 15). It is simpler, argues Moravec, to replace human decision-making with some automated

[3] Societal work that is pointless or even (psychologically) destructive. First appears on: https://www.strike.coop/bullshit-jobs

decision-making process, run by a software, than to build humanoids that execute everyday tasks, like doing the housework or serving drinks. Moreover, as Autor et al (2020) have emphasized, despite the notable surge in AI adoption, the impact has been "still too small relative to the scale of the US labor market to have had first-order impacts on employment patterns—outside of AI hiring itself" (p. 3).

Several studies and reports, however, have been providing different estimates. The McKinsey Global Institute, in their mid-point scenario, has predicted that Automation could displace around 15 percent of the global workforce, or about 400 million workers, in the period between 2016–30, (Manyika and Sneader, 2018). At the same time Adrian Cooper for Oxford Economics, argues that "the number of robots worldwide multiplied three-fold over the past two decades, to 2.25 million and trends suggest that the global stock of robots will multiply even faster in the next 20 years, reaching as many as 20 million by 2030, with 14 million in China alone" (2019, p. 3) Furthermore, Joseph Stiglitz and Anton Korinek (2021) in a recent article claim that "it is evident that the Covid-19 pandemic is accelerating automation in workplaces, since, a quarter of all jobs in the economy require physical interaction and are thus directly affected by the pandemic" (p. 19). We shall not therefore underestimate the risk of increasing economic inequalities due to this acceleration. Finally, Knight (2021), citing Daren Acemoglu, reminds us that "automation takes place faster during recessions and tends to stick thereafter, since companies adopt more automation partly due to staff shortages, but also in order to adapt to new safety measures, and to improve efficiency."

So, are there valid reasons to either fear or desire intelligent technology taking over human work? Is Artificial Intelligence a friend or foe of labor? And is Capital able or willing to embrace AI-automation? These are the questions that I examine in this thesis. I aspire to show that what matters -probably more than the technology itself- is the socio-economic context that we place these questions in. I investigate, therefore, how the adoption of AI itself depends on the historical and material conditions that have been

shaping the economic system, emphasizing on the imperatives of profitability and system-stability. I commence my analysis by looking into value and labor.

2. Value and profit, AI and Capitalism.

So far, I have highlighted some of the fears and hopes surrounding AI and jobs. There are many reasons why both criticism and excitement make sense, but often both the sceptics and the convinced forgo the historical parameters and dynamics of the economic system. This makes it harder to answer a series of questions. For example, what would a world of few or no human labor look like for Capital and its historical exploitation of workers and employees? Would it be devoid of profit, or would profit change in its nature? How would this influence production and consumption respectively? What about ownership of algorithms and robots?

In what follows I argue that in order to make sense of the reality of AI at work we should place it in its context, that of (late) Capitalism, its incentives and driving forces. For this, I look into what many describe as the main driving force behind the adoption -or the lack thereof- of AI-technology, namely the theory of the tendency of the rate of profit to fall[4]. I examine, thus, how human-labor-replacement is conditioned by general profitability. I end up investigating whether full-automation and human-labor replacement are incompatible with the current economic framework and if so why.

To begin with, the tendency of the rate of profit to fall, or simply falling rate of profit (FROP) is an empirical phenomenon mentioned by a plethora of economists and philosophers ranging from Adam Smith to David Ricardo and from Karl Marx to John Stuart Mill. I spot three premises upon which the theory rests and one main conclusion that we can draw from them:

[4] A theory in the crisis theory of political economy, according to which the rate of profit—the ratio of the profit to the amount of invested capital—decreases over time.

i) No value is produced without (some sort of) labor.

ii) What generates profit (in production) is the appropriation of value. All firms produce for profit, so all firms appropriate parts of labor value. This (economically produced) way of extracting value, called profit in production, is an historical arrangement.

iii) New technology is initially profitable for the individual firm, as it lessens its dependence on human labor, so it lowers wages too, which are company costs. New technology remains profitable until competition drives all firms to adopt it. Once they do, the (general) profit rate falls, due to the total decrease of human labor and value produced by it.

iv) This creates an -at least temporary- counter-tendency against embracing more technological innovation, since general profitability has been decreased. This tendency runs against the tendency of the individual business to continuously increase their profits by reducing labor costs etc. It looks like a systemic contradiction, found between the micro and macro-targets of Capital.

The conclusion is that Capitalism -seen as the overarching totality of relations within which all individual capitals/firms operate- conditions *innovation* upon profitability, which so far depends largely upon human-labor. Full-automation and full-adoption of AI therefore would necessitate a new historical arrangement, or will not take place.

In what follows, I explore these premises and their conclusion in more depth. It is worth mentioning, for the sake of clarity, that in this section I am dealing with Artificial Intelligence in its narrow sense, meaning as a non-anthropomorphic or human-emulating type of technology that is "primarily designed to address narrow tasks" (Johnson et al. 2016). Therefore, any conclusions in the following section are relevant to this type of AI and not to the more general, superintelligent one that is capable of synthesizing knowledge and emulating human cognition. I will involve this latter type later on in my analysis.

Value and labor

Where does value come from? This is probably one of the most complicated questions in social sciences and humanities. Some claim it is Nature (e.g. the Physiocrats[5]), some labor (labor theory of value- LToV[6]) and others argue that value is whatever people agree it to be in the Market (neoclassical theory of value[7]). This is a fairly complicated debate that is outside the scope of this paper. However, an overview is needed in order to get an understanding about another premise, profit.

In modern economic thought, it was land and Nature where the Enlightenment economists (Physiocrats) looked first for value.

Ole Bjerg (2018) in his book Parallax of Growth summarizes the physiocrat argument:

The main trait in Physiocrat economics is a substance theory of value. Value is ultimately derived from the organic substance produced by the land. For the Physiocrats, the economic growth of a nation is achieved by the expansion of the areas of land cultivated for the purpose of farming, forestation or other kinds of natural production or by the improved cultivation of existing areas of land. The purpose of such efforts is the increase and optimization of the growth of natural organisms that may ultimately become the objects of human consumption. At the same time, the physiocrat notion of growth does not coincide entirely with the purely ecological notion of growth. Economic growth does not comprise the growth of all natural organisms but only those organisms that become the direct or indirect objects of human consumption. The farmer is referred to as the cultivator, and only those parts of nature which are subject to human cultivation are also

[5] "Any of a school of economists founded in 18th-century France and characterized chiefly by a belief that government policy should not interfere with the operation of natural economic laws and that land is the source of all wealth. It is generally regarded as the first scientific school of economics". Source: https://www.britannica.com/topic/physiocrat

[6] A theory of value that argues that the economic value of a good or service is determined by the total amount of labor required to produce it: https://www.investopedia.com/terms/l/labor-theory-of-value.asp

[7] Neoclassical Economics on value: https://www.econlib.org/library/Enc1/NeoclassicalEconomics.html

considered part of the economy. All economic value may ultimately derive from a natural substance but not all natural substances are necessarily economically valuable. (p. 66).

It was some years later, and on the other side of the Channel, that Adam Smith and David Ricardo turned their focus from land and Nature to labor:

Adam Smith (2010) inquired what is the real measure of this exchangeable value; or, wherein consists the real price of all commodities and the answer he gave was that: "It is labour that is the real measure of the exchangeable value of all commodities. The real price of everything, what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it." (p. 28)

In contrast with the substance theory of value, that we can actually measure in rather simple physical terms (hectares, kilos, yards etc.), the labour theory cannot be measured in such a way, besides time. David Ricardo's definition of value as the exchangeable value of commodities produced, in proportion to the labour bestowed on their production, comes close to this. By "production" Ricardo means not only the immediate production, but all those implements or machines required to give effect to the particular labour to which they were applied. The labour theory of value appears to enclose therefore the value of Nature and the productive means within the labor activity and "credit" them all to labor (Dooley, 2005).

It is Karl Marx (2008) and his interpretation of this theory that offers further clarity. His break with his predecessors came through the use of the concept of *socially necessary labour time*[8], which introduced a social perspective in production, in contrast to the starting point of other thinkers (the individual laborer). "But one man is superior to another physically, or mentally, and supplies more labor in the same time, or can labor for a longer time; and labor, to serve as a measure, must be defined by its duration or intensity, otherwise it ceases to be a standard of measurement", argued Marx. Contrary to popular

[8] The necessary labour time is the time (per day or per week) which workers must work (in the average conditions of the industry of their day), to produce the equivalent of their own livelihood (at the socially and historically determined standard of living of their day): https://www.marxists.org/glossary/terms/n/e.htm

belief though, Marx never used the term "labor theory of value" itself in any of his works, since he opposed ascribing a supernatural creative power to labor, arguing that: “Labor is not the source of all wealth. Nature is just as much a source of use-values (and it is surely of such that material wealth consists) as labor, which is itself only the manifestation of a force of nature, human labor power” (p.3).

It seems therefore that Marx was making a distinction between concrete types of labor and general (abstract) human labor. The latter is then what unites different sorts of varying concrete types, providing some basis for measurement of value, based on (human) time-spent and energy expended on the creation of goods. The term *socially necessary* refers to the quantity of labor that is needed for the production of a good within a *given* society, under some *average* conditions of production, with a given *median* intensity and skill of labor. If we were led then to compare different sorts of labor with each other and ascribe a comparative relationship between them (establish prices), abstract socially-necessary labor would be its standard of measurement, according to this theory. This is far from arguing that price is a “natural characteristic” of the goods produced in general even when measured in terms of socially-necessary labor-time. Not due to questioning the importance of abstract labor-time, but rather the universality and naturalness of (strict) exchangeability. After all, Marx himself “focused on commodities and money as a kind of symbolic analysis in social theory” rather than a natural, objective, material reality altogether (Bollier, 2017, p.6).

The neoclassical theory, to the contrary, sees practically no difference between market price and value and describes both as, largely *an agreement* between buyers and sellers; a bargain between rational actors seeking to maximize their utility in an environment of full information[9]. In this, the neoclassical analysis “treats the labor theory of value as a theory of price determination, and a poor theory at that. While its study might be an interesting

[9] This is the typical homo economicus approach, namely the perception that individuals are conscious of making decisions based on their own self-interest, having relevant and full information so they can make a rational calculation that would maximize utility, their primary goal being maximizing profits and utility.

excursus into the history of economic thought, say the neoclassicals, it has no role in modern economic analysis." (Mohun, 1994, p. 391)

As far as I am concerned, by no means do I equate value with price. Value is not even merely limited within the Market altogether, since non-commercial labor is equally value-producing although often not measured or appreciated as such (Federici, 1975). Could we ever come up with a fair price that would reflect the real value of a good? Are there even alternatives to price itself? I will not delve into these questions now. For the sake of the argument I make is enough to recognize that human labor is *indispensable* for value-making and respectively profit-making. Whether the Market reflects this indispensability *fully*, *partly*, or not at all, is a long and interesting debate, but does not fundamentally change the conclusion: there is no value without some form of human labor and no profit without its appropriation in the current framework of production.

Labor and profit

So far I have examined the idea that human-labor[10] is the main component in the creation of value as labour-time spent in the production process. In the following part I deal with profit and its relationship with value.

In the sphere of production when a company hires workers, these workers usually produce initially a value roughly equal to the cost of hiring them. Once they are done creating this value and proceed with further work, they begin to *valorise capital*, i.e, to increase its value without receiving the corresponding compensation for it. Thus, usually laborers work part of the day "for themselves", meaning that they produce the equivalent of their wage, and part of the day for their employer. (Farjoun and Machover, 1983, p. 183)

[10] As human ability that is deployed over time towards a certain productive outcome.

The simpler way to understand profit[11] *in production*[12] is to compare what laborers *actually* produce, during a day of work, and what they *actually* receive. In order to do so, we quite naturally think that we need a *general equivalent*, to compare all productive activities and outcomes with one another. What comes to mind is time and money. Both time and money have homogenizing qualities, since we can measure them (or so we think at least) with accuracy, are universal and embrace everyone in their web. So one can actively measure how much time one spends at work, how many units of goods/services one produces and how much money these units correspond to. This time-money relationship could be arbitrary, made-up, etc; what matters is that it applies to all those giving or receiving payments and serves as an indicator of *difference*. Finding the *difference* between what one *actually* produces and what one *actually* receives as compensation is the basis of the quantitative calculation of profit in production.

The ideas of *surplus value*[13] and (economic) exploitation[14] (Fine, 2012) are based exactly on this difference between total value produced and total value received. Schematically:

i) Goods/services can be translated into labor-time units (time needed until the final product is produced, including previous training, education, skills-acquiring etc.).

[11] Marx claims that profit arises not by selling commodities above their value, in which case capitalists could raise prices at will, but that commodities sold at or near their "natural" value create profit since workers are only paid for that portion of their work which pays for their own labour power, i.e. that labour which creates enough value to provide workers with their wages": http://www.mtholyoke.edu/~fmoseley/lrcgpric.html

[12] Production is not necessarily the main source of profit; this affects the explanatory power of the falling profit theory too. For profit in circulation see: Lapavitsas, C. (2009). Financialisation, or the Search for Profits in Circulation. *Economiaz*, *72*(3), 98-119. For a critique of the falling rate of profit as a crisis-explanatory theory altogether: Rasmus, J. (2016). *Systemic fragility in the global economy*. SCB Distributors.

[13] Marxian economic concept that professed to explain the instability of the capitalist system. https://www.britannica.com/topic/surplus-value

[14] Marx's Theory of Exploitation: https://plato.stanford.edu/entries/exploitation/#MarxTheoExpl

ii) There is a social element in labor-time, meaning that the duration needed from the beginning until the end of a productive process can be measured in time-units and be compared to other similar ones.

iii) A fair compensation for labor would be the refund of the full amount of value-units produced. Getting less means labor is at loss.

iv) Since labor lacks access to productive means, it is forced to be dependent upon the owners of those means (either concrete i.e. industrial or more abstract ones i.e. software/patents etc.), so it usually gets less; i.e. dependent labor is always at loss.

v) This dependence brings exploitation (persistent loss of surplus value) which, quantitatively, is expressed in *fewer units of value* received than produced.

This, in short, is the quantitative account of surplus-value appropriation and profit-making and helps make sense of the salaried-labor exploitation. This is not the full story though. Ernesto Screpanti in his book (2019), asserts that "the production sphere is the place where the fundamental capitalist misdeed is carried out" (p. 89). Laborers appear to exchange their labor-power with wage, as in any other commodity exchange. Yet, what they actually do comes closer to "someone who has brought their own hide to market and now has nothing else to expect but a tanning" (Marx 1976a, p. 280).

The owners implement production plans by using their authority. Workers are then forced to labor efficiently and produce goods-to-be-sold (commodities), whose value-added is higher than their compensation (wage). But see how there are two premises that define profit? The first is that compensation is *smaller* than actual value-added (quantitative). The second is that workers are *obliged* to work for the production of *commodities* (qualitative). So labor does struggle to get both fair compensation for its work, and to *influence/control* the very nature of its work and its overarching goals away from an imposed heteronomy.

When Capital hires labor what it actually buys is *compliance* and *subjugation*, or else the ability to direct human activity -and creativity- towards a certain productive outcome,

that it decides (command power). Those that have signed a labor contract know this very well. Terms of contract set the duration, goals and frames of the desired activity, in a way that is seemingly free and uncoerced. Historically though it is not. Wage-labor, albeit an improvement to previous arrangements, signifies the move from a system of extra-economic, personal and largely political exploitation (serfdom, slavery etc.) to a system of impersonal, economic and *seemingly* apolitical exploitation (wage-system). (Wright, 1982)

To better understand this we can compare older forms of economic organization e.g. feudalism and serfdom, with their successor, Capitalism:

Within a craft, guild, and corporation there no longer exists the direct unity between humans and land, but there is still a stable connection of the producers with their means of production thanks to the intersubjective coordination of the entire production, which hinders the full penetration of the power of Capital. The complete dissolution of the tie between the workers and their objective means of production for the first time prepares "free" labor, in a "double sense," and thus the impersonal, reified dominance by "liberated capital." Modern laborers, on the contrary, lose any direct connection to the land. On the one hand, they are free from personal dominance. On the other hand, they are also free from the means of production and thus can no longer relate to nature as their own "inorganic body." The original unity with the land disappeared with the collapse of precapitalist personal domination. Its result is alienation from nature, activity, species-being, and other people—or simply said, modern alienation arising from the total annihilation of the "intimate side" of production. When the land becomes a commodity, the relationship between humans and land is radically modified and reorganized for the sake of producing capitalist wealth. (Saito, 2017)

But this profit imperative for labor means actually a double constraint of its freedom:

Labor *subsumes* its capacities and also the ownership of the commodities it produces (besides the part that corresponds to wage). So labor does not produce freely and *at will*, but following certain orders, attempting to reach set targets. The supposed "freedom of exchange" in production is then quite artificial, since laborers are ultimately "free" only to subsume their labor-power and creativity to the commands of the producers, or be left outside the Market, without any means to sustain themselves. Their "freedom" is the "freedom" of having their labor controlled by an owner (or Market imperatives *en long et en large)*, to avoid starvation.

Screpanti (p. 107) shows the labor market as a place where a very mystifying form of commodity fetishism ravages and where agreement is construed as a transaction of "free and equal" commodity exchange, while in reality it is a social relation of subjugation and exploitation. The mystification of the employment contract depicts it as a "mutually beneficial partnership agreement" that allows "significant agency" and freedom of decision to the laborers. It is employers though that -more often than not- mold and direct the employees' skills. The basis of profit in production is, therefore, this relational imbalance between labor, in abstract, and owners, also in abstract. Do we have reasons to assume that owners do not compensate labor, or opt-in for some form of co-ownership out of personal malice? I do not think so.

Employers do not act in an unconstrained way either, since they operate within the Market and are bound by Market imperatives. The most important one being the obligation to remain profitable, or not survive the intra-Capital competition. Labor is a cornerstone of value; I have already described how the structural imbalance against it leads to the continuous extraction of profit that favors Capital. This value, however, is fully realized only in the Market, where the firm gets to sell its goods and services. Were they not to sell, corporations would be forced out of business and whichever profit would remain unrealized. In practice nowadays many companies are not profitable in their productive activities. This explains the monumental amounts of government support given

to business (bailouts) directed to stock buybacks (creation of fictitious capital) in the place of investments in productive expansion (Mazzucato, 2020).

For now it suffices to conclude that profit in production is expressed as a quantifiable indicator of structural imbalance between firm owners and employees in terms of control, compensation and access to productive (and respectively consumptive) activity. The way that this imbalance is enforced, perpetuated and measured is an outcome of the historical struggles between capital and labor that replaced previous arrangements (feudalism, serfdom, slavery). Former serfs and slaves that turned into wage-workers were forced out of the land and away from the productive means. Wage-workers had to go look for them. Personal domination by the landlord (direct domination for direct theft of the produced value) was transformed into a commercial relationship of seemingly "free" bargain. Control became less direct and more impersonal, but did not vanish. It changed from fear-based to need-based. The transition from personal (rent) to impersonal (profit) domination meant that human-labor became a side-cost of production; one to calculate with more precision and accuracy and "reduce".

This brings me to the next premise, that of human-labor-saving technology and its impact on profitability.

3. Technology, labor, and the falling rate of profit.

"Only where labour has been separated from the means of production, only where it expresses certain specific social relations of production, namely a system of free wage labor, where labor is a commodity and where labourers have been emancipated from any direct relation of domination (such as slavery or serfdom), are both capital and labour power 'free' to make possible their combination at the highest possible level of technology." (Brenner, *1977*, p. 32)

"Only when both labour and capital are commodities freely exchangeable in the market will the resulting competition between productive units force them to produce at the socially necessary labour time necessary to survival, and entice them to surpass this level of productivity to reap the super-profit which,

for a time, is the prize of the innovator. It is only under the pressure of such market constraints that capital accumulation develops." (Henry Heller, *2011*, p.84)

What drives the capitalist game is profitability and I have already described how this means exploitation of labor-time, both qualitatively and quantitatively. An enterprise that fails to achieve profitability is unable to function within the Market, at least not competitively. It is soon forced either into bankruptcy, take-over or to become a charity; enterprises are *obliged* to make a profit to stay afloat. Quantitatively it means buying labor-time *low* and selling *dear* (compensating labor for less than labor has produced); qualitatively it means being able to *command and dictate* labour activity towards an outcome.

Competition among capital is real (no monopoly) but not perfect (no invisible hand). To assume either the one or the other away would be a mistake. It is Anwar Shaikh (2016) that makes this argument and Bruce Parry (2018, p. 442) that offers a good summary of it. What motivates real competition is profits and capitalists are forced to lower costs (so to lower prices) in order to beat competition. However, increasing the exploitation of labor (so increasing working-hours, decreasing compensation etc.) is not limitless. Capitalists are obliged to adopt technological advances that boost productivity, decrease costs and revolutionize the means of production. Within industries, prices of production are "roughly" leveled by consumers searching the best offers among competing commodities. Technological change also leads to what Marx named "increasing organic composition of capital" (Shaikh does not use the term). However, rejecting perfect competition does not mean that monopoly capital is empirically true either. This school of thought "is based on the theory of imperfect competition, which in turn depends completely on the theory of perfect competition". Thus, real competition overrides and much more accurately describes today's economy than the theory of monopoly capital.

It is not surprising, therefore, that technology seems, *prima facie*, salvatory for corporations. It makes sense to assume that the replacement of as much human labor as possible, for the sake of saving the main cost of a corporation, is the driving force of

innovation and technology adoption. And were we to extend this further not only would companies save labor-costs, but technology could eventually free laborers too, since they would not have to occupy themselves with trivial, repetitive and dull tasks.

However, the initial realization that it is profitable for the individual company to invest in new technology in the short term, since it lowers unit costs, is followed by two others that end up forming what is known as the "falling rate of profit theory" and a conclusion on technological adoption.

i) Other companies mimic this and introduce similar technology, to lower their unit costs , motivated by the higher expected rate of return.

ii) When all/most companies introduce the new technology, general profitability falls.

All in all, when general profitability falls, businesses (Capital broadly seen) become more hesitant to replace more human labor, so they tend to invest less in new technology. I will now scrutinize those premises and their conclusion.

The essence of capitalist accumulation, says the British economist Michael Roberts, is that in order to boost profits corporations introduce machines in order to increase the productivity of employees and reduce costs compared to competitors. Roberts (2015) builds on Marx's theory of organic composition of Capital, namely the ratio between *constant Capital -machines and equipment-* and *variable* Capital *-wage labor-*. The more machines and equipment a company uses, the higher its organic composition of Capital (OCC) becomes. Various authors see limitations to how far this replacement can go, with the main argument being that the human element and particularly emotional intelligence, empathy and wisdom, are hard to replace; our experience with a machine would never be equally fulfilling and satisfying (e.g. Nilsson, 2005/ Bhargava et al, 2021). Therefore, goes the argument, consumers would reject automation and AI-offered services, if they were to

feel that their needs are not served, including ethical concerns around the use of AI (Du and Xie, 2021).

I think that this limit is secondary, if a limit at all. The question is not whether we would like to replace all or most human activity from a consumer's viewpoint. I share the strong reservations against demand driving production and supply (Garegnani, 1984). It does not. To remake another of Shaikh's arguments (1989), even Keynes, although initially seeing aggregate demand governing investment decisions, replaced it later with *net profitability*[15] (namely, the difference between interest rate and the rate of return). Capital seeks new investments and new opportunities with the highest net rate of return. The interest rate is the minimal rate of return, since it's what one makes by putting investment funds in the bank.

Firms produce (create supply) on the basis of short-term profitability. To produce, they must acquire raw materials, hire workers, buy investment goods, and distribute dividends and interest to their owners and lenders. So profit-based decisions to create supply boost demand for raw materials, and through the payment of wages, dividends, and interest, generate the consumption demand. At the same time, long-term profitability regulates investment demand. In other words, profitability steers both supply (production) and demand. Of course, large numbers of firms and consumers do this on an individual basis, so aggregate supply and demand only relate to each other through a process of errors and adjustment that Shaikh calls "turbulent regulation." "Real macroeconomics", he argues, "is therefore neither supply side nor demand side: it is profit side".

The conclusion is that profitability (both short-term and long-term) sets the tone for investment decisions, including investments in AI. In the short-term a firm has a strong

[15] Shaikh, A. (1989). Accumulation, finance, and effective demand in Marx, Keynes, and Kalecki. *Financial Dynamics and Business Cycles: New Perspectives*, p.72

And (2020)
https://jacobinmag.com/2020/04/anwar-shaikh-interview-Capitalism-competition-conflict-crises

preference to replace laborers (variable capital) with machines (constant capital), especially intelligent ones. The difference between them is that the latter's cost is predictable and eventually lower than that of human labor: their maintenance cost plus their R&D. So is their productivity, given that their working hours and production rate does not fluctuate. However, variable capital (human labor) is more perplexing. Variable capital can be scarce (especially if rare skills are needed), gets tired or bored, has to deliver birth, demands rights, etc. Its productivity is not a given and neither is its compensation, since it cannot usually fall under some historically-produced agreement around a minimum wage; it can grow through strikes and negotiations. In the short-term those businesses that first introduce this new technology drive down total labor cost and -given that they can sell at the same price as previously- they increase their profits, above average per sector (King, 1996; Freeman-Kliman 2000).

However, "looking at the profits of companies that have seized the value created by labour in the new sectors is not necessarily a guide to the health of capital as a whole" (Roberts, 2015). Other corporations bring in similar technology to harmonize their profit-rates. But there is a paradox here. By attempting to boost labor-productivity, with the introduction of technology, human labor-shedding takes place, i.e. new technology replaces human labor. Rising productivity results in increased production, which results in job openings in new sectors, but total human labor goes ultimately down.

This (rising organic composition of Capital) implies a falling rate of profit. Between industries, profit rates are equalized on new investments, embodying the latest technology. This occurs due to accelerated or decelerated flows of capital into or away from those industries with a higher or lower rate of return on new investment. There is no "normal rate of profit" and no capitalist is guaranteed a profit. That is what (real) turbulent competition is about. Rates of profit increase and decrease and revolve around some average, but never fully attain it, unlike in perfect competition. (Shaikh, 2016, p. 19)

This is a conclusion that seems to be backed by empirical evidence, as shown in the graphs below:

Figure 1

Note: This graph (Roberts, 2020), based on Penn World Tables and Roberts' own calculations[16], shows the long-term decline in profitability and rise in the organic composition of capital.

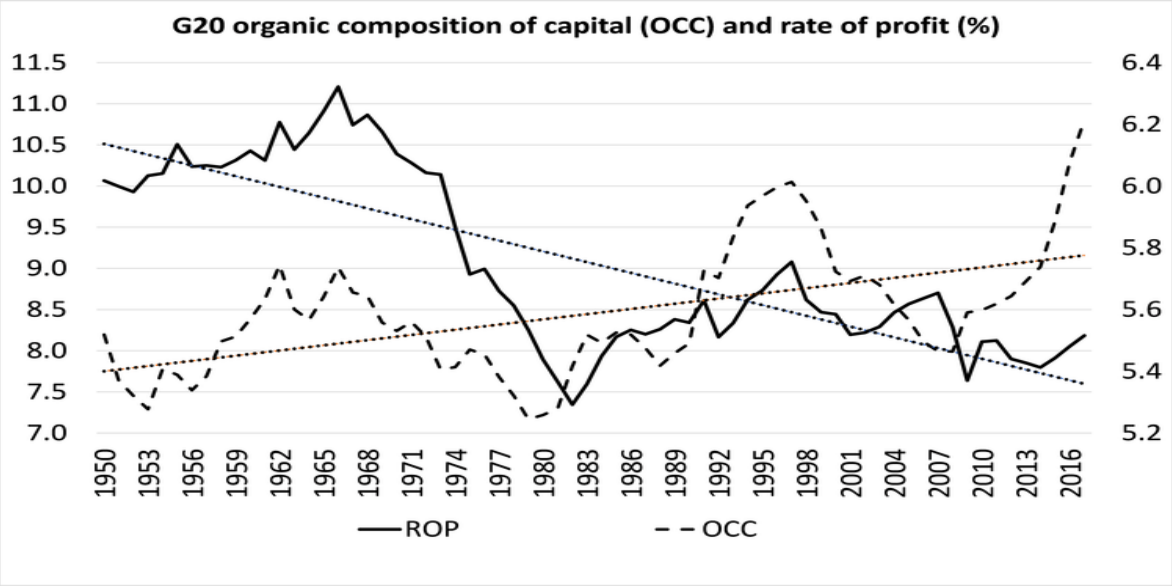
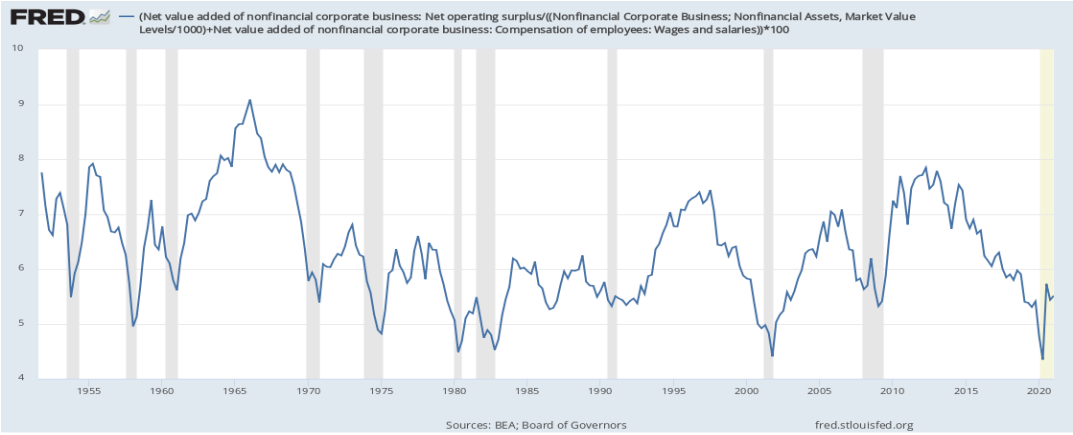


Figure 2

Note: A graph on the falling rate of profit (US only), from the Federal Bank of St. Louis [17], using the equation profits/(fixed assets+wages).

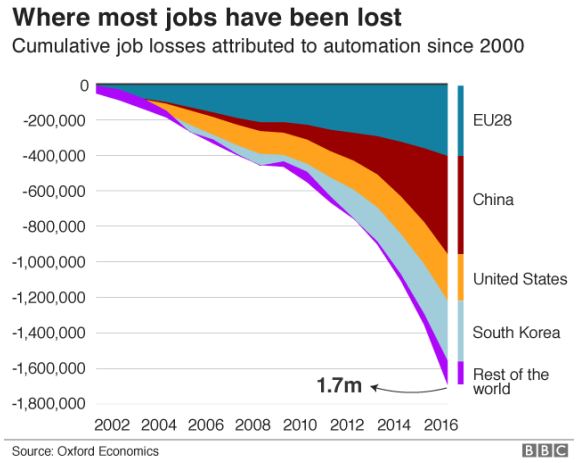
[16] https://thenextrecession.wordpress.com/2020/09/20/more-on-a-world-rate-of-profit/
[17] https://research.stlouisfed.org/dashboard/53250

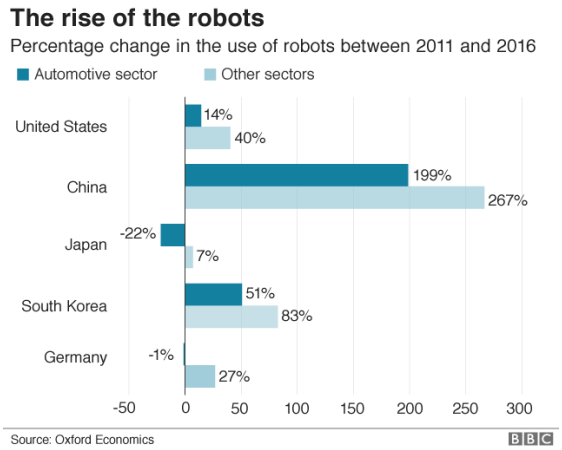


Figures 3,4,5

Note: The rising organic composition of Capital is depicted by two charts by Oxford Economics[18] and one from the International Federation of Robotics[19], showing the rise of fixed capital/robots (fig. 3&4) taking place parallelly with a decline in human labor/variant capital (fig. 5).

[18] https://www.bbc.com/news/business-48760799
[19] https://ifr.org/news/robots-china-breaks-historic-records-in-automation/





Estimated Operational Stock of Industrial Robots in China (Thousands)

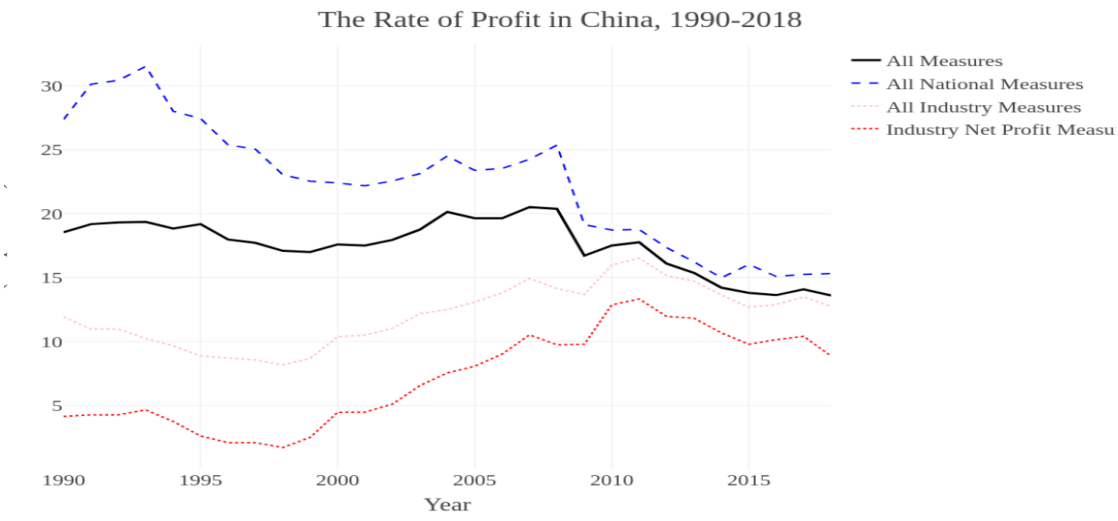
Year	China	World
2010	52	1,059
2012	97	1,235
2014	189	1,472
2016	340	1,828
2018	649	2,440

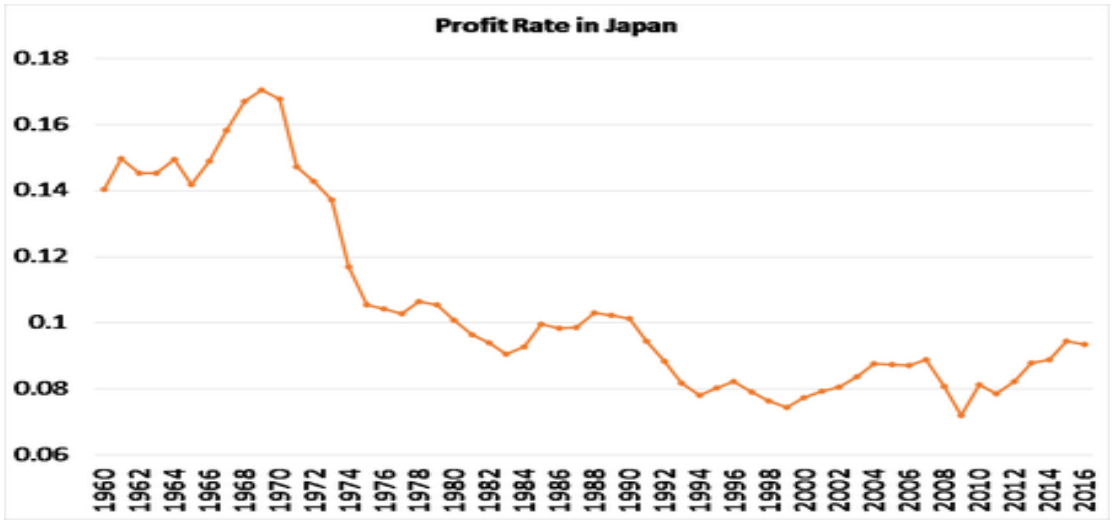
Source: International Federation of Robotics

Figures 6,7

Note: The faster pace of automation in China -compared to the US, Japan or Germany- correlates with an historically higher profit rate in China (although still declining) than in e.g. Japan. This is a strong indicator that a lower rate of profit holds back, or at least discourages, investments in automation (comparison of profit-rates in Japan[20] and China[21] and the relative percentage change in the use of robots).

[20] https://thenextrecession.wordpress.com/2017/10/23/abes-mandate
[21] https://chuangcn.org/2020/06/measuring-profitability/





These charts seem to verify both the tendency of the rate of profit to fall, as well as the link between the profit-rate and the pace of the rise of automation (a lower profit-rate means a lower rise of automation). All in all automation and innovation are not natural outcomes of a "growth sequence". They do not happen *because* of the drive for profits, they happen *despite* it.

Now this is a crucial observation that seems to explain the frustration of authors like Graeber. The answer to the questions of the sort of "where are the automated self-driving mass transportation systems we have been promised" is not that "we are not capable of having the technological tools yet", but that "they are not too profitable for Capital yet."

It would be a mistake, however, to treat this solid tendency as an unbreakable rule. In what follows I explain the reasons why.

4. Value without human labor? AI and the captivation of human abilities.

So far, I have been dealing with the nature of value and profit and their relationship with the introduction of AI robotic technology (in its narrower sense). I have demonstrated how it is difficult to understand both without linking them to labor. Moreover, I have shown how labor's historical exploitation by Capital sets limits to technological innovation, in an environment of real competition, through the falling profit rate. In addition, I have cited various authors that highlight this phenomenon and presented empirical evidence that seems to be confirming it. Finally, I have shown that this quest for (exchange) value and profit is what hinders the full realization of scientific and technological potential.

Industrialists, said Graeber (2012) in his flying-cars paper "poured research funds not into the invention of the robot factories that everyone was anticipating in the sixties, but into relocating their factories to labor-intensive, low-tech facilities in China or the Global." (p.8)" Investments moved to China -due to the higher return of profit that the country has been offering- but then real competition between firms led to the adoption of labor-saving technology in the numerous (new) Chinese productive sites. The higher return on profit in China was what forced owners to move their production there. In countries with a low return on profit (Japan, Germany) not only was the adoption of robotic technology slower than in China, but even fell in some sectors. Even in China though this rise is just a *fragment* of the automation we *could* see if investment decisions were based on public and social need instead of return on profit. However, under the current circumstances innovation takes place if (and only if) it boosts profits, not the other way around. And so does the development and flourishing of humans.

As Henry Heller (2011) describes it:

> Under such circumstances the full realization of the potential of the mature productive system would entail the withering away of value. But Capitalism cannot permit such an abolition of value because it lives off of it: 'the theft of alien labour time, on which the present wealth is based, appears a miserable foundation in face of this new one, created by large-scale industry itself'. The overthrow of value is only possible through the overthrow of Capitalism. Otherwise, the further transformation and development of the forces of production in the direction of the full application of science and new technologies, including those that are more ecologically sound, is crippled by the persistence of the indispensable quest by capital for value, and especially surplus value. (p.250)

The built-in assumption in this statement, -and the one that runs through the previous part of my thesis- is that the source of (surplus) value cannot be but of *human* origin. The falling rate of profit and the limitations it sets make sense within a setting of human owners profiting off of the work of other humans in the workplace. Development, innovation and labor replacement are strangled by the need to increase profitability, i.e. to accumulate more (exchange) value through the "theft of alien labor time"; or more precisely, *human* labor time. Currently Capital needs human labor due to its skills, knowledge and capacity in order to fulfill the productive outcomes set, produce more, accumulate more exchange value, maintain the circuit of capital[22] and its dominant position. Labor on the other hand needs Capital because of its ownership of tools, infrastructure etc. The difference is that labor's dependency on Capital is a construct since Capital's ownership of tools and infrastructure is -if anything- a legal artefact. Were the owners to "abandon" their legal rights to tools and infrastructure, labor would be able to handle them all well and continue production without disruptions in most cases. Capital's dependence on labor skills and knowledge is not just a construct though. Capital would cease to exist without the exploitation of labor power, unless it found refuge to non-economic methods of extraction (basically by *directly forcing* labor to work). Said

[22] Otani T. (2018) The Circuit of Capital. In: *A Guide to Marxian Political Economy. Springer, Cham.* https://doi.org/10.1007/978-3-319-65954-1_12

differently, Capital would have to find a way to go beyond profit altogether. But what that means is that Capital would have to go beyond human work, replacing both manual and cognitive labor, with non-human one. Roberts and Shaikh, as seen earlier, think that the falling rate of profit is a limit against that. And so does Ernest Mandel (1979), arguing that "large-scale automation of production constitutes the "absolute inner limit of Capitalism".

Not everyone shares this view though. After all, the falling rate of profit is just one of the Marxian *images of Capitalism*, as George Caffentzis (2013) calls them. And is one that has only been developed in the later phase of Marx's treatise on Capital. In the Fragment on Machines, in the Grundrisse, Marx (2005) himself mentions another tendency, another image of Capitalism:

To the degree that labour time.. the determinant principle of production… is reduced both quantitatively, to a smaller proportion, and qualitatively as an indispensable but subordinate moment,... compared to general scientific labour, technological application or natural sciences… {it makes} Capital work towards its own dissolution as the form dominating production (p.700)

Marx does not give a name to this tendency, but Caffentzis (p. 61) does; he calls it "the increasing incommensurability of wealth and labor-time". One could also name it the "tendency towards the abolition of human labor", "the tendency towards the increase of fixed capital over variable Capital" and "the "tendency towards the transfer of value creation from humans to machines". Caffentzis explains how this tendency is a product of an earlier Marxian thought, that observes the system's monetary and commercial crisis in 1858 with growing excitement, anticipating the increasing introduction of technology to accelerate its destabilization. This stance comes with a tacit, albeit strong, technological optimism, if not determinism and an *ex ante* conviction that automation would necessarily diminish Capital's dominance. This assumption, although legitimate at first, probably underestimates Capital's readiness to find new ways for profit-extraction and control over labor, ending up seeing production in a rather narrow way. Such a shift did not take place,

at least not due to technology alone. Marx realized it and started placing his hope in the human, rather than the machine, especially after the breakup of the Paris Commune. This together with later, unrealized predictions, like Keynes' on the 15-hour working week[23], led many more to lose hope on technological introduction significantly undermining Capital's dominance.

Now this already seems to be some bad news, but it might not be the end of it. What if AI-automation does not only fail to assist labor liberation, but also contributes to the perpetuation and strengthening of its exploitation? Would the falling rate of profit then allow full human-labor replacement altogether, or function as a limit as argued?

In their recent book Dyer-Whiteford, Mikkola Kjøsen and Steinhoff (2019) have brought forward an argument made by the historian Tessa Morris-Suzuki, asking us "*to consider ways that capital might perpetuate itself under conditions of automation*" claiming that "*some of the disarray of the contemporary left stems from its reluctance to confront the possibility of a highly automated Capitalism*" *(p. 22)* Newer forms of Artificial intelligence, especially machine learning and its deep-learning subtype, have already started substituting activities long seen as purely cognitive, intelligent and ultimately human. Activities that have been seen as "a refuge for the labor chased out of industrial production". What distincts us from other animals is our imagination, creativity and conscious reasoning. It is, argue Kjøsen et al (p. 118), a series of mental capabilities, like *"aesthetic appreciation; learning and understanding; a conscious mind; forming ideas; imagining and conceiving plans;"* that constitute general intelligence and equip humans with flexibility, adaptability and the improvisation-capacity to deal with unexpected situations, both at work and more broadly.

Historically, once human capabilities (mostly muscular until now) became embodied in some form of machinery (e.g. automated assembly machines), they disturbed the existing balance of power between workers and owners, at least initially. Capital needs to

[23] "Economics: Whatever happened to Keynes' 15-hour working week?" : https://www.theguardian.com/business/2008/sep/01/economics

convince, coerce, punish or reward a worker; it does not need that with robots or software. Leaders of the Scientific Revolution including Francis Bacon, and Robert Boyle have been working towards the appropriation of knowledge from craftspeople, in order to reorganize and deliver it into the hands of capitalists (Houghton et al, 1941). The invention of new, intelligent machines does substitute for (or at least augments) human activity, by encapsulating it in its robotic body and brain. It is therefore a consolidated form of past experience, observation and ultimately pattern memory and knowledge. Were the above-mentioned, uniquely human, capabilities to be emulated by robots, this would undoubtedly have consequences for the labor-Capital struggle.

Steinhoff et al cite Nick Land, a reactionary accelerationist who -with outspoken fatalism- embraces and welcomes Capital autonomization. Land welcomes this autonomization that would exclude humans, and importantly laborers, thus "liberating" the owners of the troublesome burden to deal with class struggle. This is, say the authors, "the neoreactionary restoration of traditional political hierarchies of race, gender and class, through futuristic and technological means" (p. 158). Land himself proclaims that he is "no longer interested in...pretending this (emancipation through AI) is the same thing as what the left really means when they're talking about emancipation… {what} the left means by emancipation is freedom from capital autonomization." (Land, 2018)

Despite the cynicism of this statement and the overt support for Capital, Land is right to pinpoint that many progressives have been eyeing the rise of AI as a great opportunity for liberation and emancipation[24]. An opportunity to break the chains of profit and free labor from its golden cell. They see cognitive Capitalism as having eroded some of the hierarchical divisions found in the Fordist stage of the assembly-line Capitalism and AI as boosting this trend. It is tougher after all to keep intelligence and knowledge (and its

[24] "Artificial Intelligence Will Kill Capitalism": https://worldcrunch.com/opinion-analysis/artificial-intelligence-will-kill-Capitalism

"Give Us Fully Automated Luxury Communism": https://www.theatlantic.com/ideas/archive/2019/06/give-us-fully-automated-luxury-communism/592099/

Bastani, A. (2019). *Fully automated luxury communism*. Verso Books.

laborers) contained and under control in the same way as with labor in a 19th century factory. Information flows much easier and even the productive means of this new era (e.g. 3D printers) are harder to keep privatized and confined in large-scale factory sites, like, for example, the water frame in textile manufacture. Optimists, therefore, see a chance of tipping the balance in this computer-driven era of Capitalism towards not the owners but the producers, since Capital's ability to exploit has been challenged in a fundamental way.

It is Caffentzis (2013) again that describes the way in which highly automated businesses gradually appropriate the value generated by labour-intensive capital and how automation sparks the need for low-skill and low-paid labor in other sectors and places: "{E}very increase in the introduction of science and technology in one branch of industry will lead to an equivalent increase in the introduction of low organic composition production in another" (p. 280).

What he reveals is, in short, a contradiction: the rise of automation on the one hand, and of low-skilled, underpaid labor on the other; a geography of privileged and immiserated labor in which the latter, in places like Africa and South America, is the "hidden" backbone of the AI explosion in the former (core capitalist countries). What automation gives with one hand, takes with other and would be erroneous to treat all labor like the labor aristocracy inhabiting Western affluent nations.

It seems therefore that as long as the historical circumstances are so disproportionately against labor (with an increasing gap between the 99% and the 1%, rising unemployment and stagnating wages in many countries), automation will not serve the needs of the many, but the few. In this sense the falling rate of profit could even be met with some relief for being a barrier to that. The question then being, would it hold?

In the current conditions of partial automation and human-labor dependence, Capital prioritizes *the quest for profit (economic exploitation)* in order to maintain its dominant position. For the moment, and as long as it remains profitable (guaranteeing easier and faster exploitation) Capital would keep a "self-employed" precariat, -on the shoulders of

which the side-effects of AI-led automatization currently fall (gig economy workers, Amazon factory workers etc.)- and a legion of low-skilled and underpaid workers in the global periphery intact (Scholz, 2017). The full automation of jobs like food-delivery, fruit picking, fishing or warehouse sorting, is probably uneconomical hence undesirable for Capital, yet.

At the same time automation comes with a parallel increase in unemployment that can be useful for Capital's operations. Joblessness, although a social malaise with horrendous consequences for the people suffering it, creates the so-called "reserve army of labor"[25]. This "army", besides being a side-effect of technological adoption, works also as a counterbalancing force to the falling rate of profit, through the suppression of wages and maintenance of labor discipline. Capital allows having *some* value (human labor) gone "wasted", if this helps maintain an adequate profit rate through more obedient laborers (due to the fear of being replaced by the unemployed). If the recent labor struggles[26] were to intensify and become "unmanageable", the urge for automation would become much stronger. There are reasons to believe that Capital would not hesitate to get rid of these workers, by automating further, even if that meant reducing its profits on paper, but keeping a more manageable and obedient labor altogether. After all, this has been the case historically, more often than not. Sure some businesses would be forced out, some Capital might be destroyed and value would be lost. But the main imperative that pressurizes Capital, more than profitability pressurizes individual businesses, is the maintenance of its *ownership status* over non-Capital, the maintenance of its dominance. In moments of need, Capital unity and discipline[27] has been very strong and very forceful, so that individual

[25] A term used to describe the ranks of the unemployed who – through the absence of any meaningful choice – are prepared to work for very low wages in temporary jobs.

[26] (On Thursday, Nov. 26 2020,, India witnessed the biggest organized strike in human history. https://www.peoplesworld.org/article/250-million-indian-workers-and-farmers-strike-breaking-world-record

(Teacher strikes in the USA made 2018 the biggest year for worker protest in a generation) https://www.washingtonpost.com/us-policy/2019/02/14/with-teachers-lead-more-workers-went-strike-than-any-year-since/

[27] Said, E. W. (2012). *Culture and imperialism*. Vintage.

business interests have finally succumbed to the general interest of preserving class domination.

In this case we can assume that labor will not stay an observer of this unfolding reality. To expect that a growing precariat -managed and controlled through AI-automated processes- would passively accept those changes, is erroneous. The same counts for an expanding labor reserve army -even with some sort of UBI in place-.

I conclude this thesis by highlighting how a post-profit, post-capitalist world is neither inevitable nor a given, but ultimately comes down to both labor and Capital decisions. Since I have not hidden my preference towards labor I end this thesis by urging both well-intended sceptics and convinced to join forces and adopt a dynamic-realist stance on the matter.

5. Conclusion: Paths towards post-Capitalism

In this thesis I have been dealing with the question of labor-replacement by Artificial Intelligence. I have spotted the fears and hopes around the use of AI at work, before analyzing the underlying economic forces that motivate its adoption and rejection. For this, I have delved into the analysis of value and profit. I have first shown how human labor is indispensable for a proper understanding of value. Then I have examined how the appropriation and control of labor, namely profit, operates as the motivational force of investment decisions. Thereafter, I have looked at the adoption of AI technology through the lenses of the profit motive, showing how the tendency of falling profitability conditions innovation and automation. I have highlighted that Capital could go past this tendency nevertheless to fully replace human labor. Finally, I recognized that this would signify a change in the very nature of profit. In these closing remarks I will elaborate on

Wood, E. M. (2005). *Empire of capital*. Verso.
Zinn, H. (2015). *A people's history of the United States: 1492-present*. Routledge.

this observation and present some afterthoughts about the post-capitalist world and its potential forms.

Beginning this thesis I spotted two “camps” of AI-authors, the convinced and the sceptics. Since these groups are quite heterogeneous in their members it makes sense to further distinguish between those acting in good faith and those acting in bad faith. This distinction boils down to either reaching a conclusion without hiding one’s own ideological commitments or not. Of course analyzing material and historical conditions is much more handy than mere wish which alone offers poor predictability. In this sense good faith is not enough for a general argument quality, if not based on solid ground. This is not it though. Given that reality is malleable to a certain extent, wish accompanied with power ceases to be just wish and becomes a new material reality (reflexivity theory). It is one thing to be a (realist) sceptic due to one’s own analysis of real conditions that inhibit AI-Automation (like the falling rate of profit); and totally another to subscribe to it without evidence, for an own political benefit, cultivating just fear on the side. Moreover, it is different to predict an imminent future of human-labor replacement, presenting real difficulties and challenges, than to sugarcoat them, for own gain. This is why it is the debate between the realist groups that I particularly find worthy of our attention.

The realist-sceptic group makes a valid point when positioning the falling profit rate as a limit to Capital’s investments in AI-technology and automation. Capital would rather hold back general innovation and progress than allow profitability fall very low, undermining its dominance over labor. I have explained how profitability is crucial for Capital’s position, in the historically-developed system of economic exploitation of workers that succeeded the *extra/outra*-economic exploitation of feudalism. This group’s argument is that the introduction of new technology, especially of new human-like machines, would increase profits temporarily for individual companies but decrease them in the long term for all owners (the distinction between capitals and Capital). Therefore it will either be extremely slow or even a non-event.

On the other hand the realist-convinced group accepts falling profitability as a more complicated phenomenon. For this group, the falling rate of profit causes, among others, greater dependence upon the employed while increasing unemployment. This ends up augmenting the bargaining power and per-capita produced value of the employed on the one hand and the frustration of the unemployed on the other. Capital has to ensure the work discipline and obedience of those creating value, ending up fostering what Graeber calls bullshit jobs, namely meaningless, unfulfilling jobs that serve as managerial importance-boosters, solidifiers of exploitative hierarchy, or both. This is in-line with what Marx calls unproductive labor; labor that does not add new value, but feeds off of productive labor. Its utility is the maintenance of a class-based social order by securing private-property relations (e.g. police, security, licencing, accounting etc). Besides its active use, unproductive labor has a *passive* one too, since it is charged with directing human creativity and imagination towards senseless repetitive and ultimately repressive ends. The backwash of Artificial Intelligence automation is bullshit and unproductive managerial jobs together with automated precarity for gig labor in the core countries. While, at the same time, in the global periphery it means fewer, worst paid jobs for the unskilled and mass-unemployment for those pushed-out by technological advances.

This increasing unemployment fosters an unstable and miserable environment for the unemployed, while enlarging the gap between them and the employed. Unemployment breeds anger, frustration and enhances class consciousness among the left out ones. After all, it is tough to convince people of the necessity of a system that does not even offer a chance for work, creation and fulfillment. It is no surprise that high unemployment works like a ticking bomb for systemic stability, especially in the absence of counterbalancing measures (e.g. welfare). This adds up pressure upon both Capital -and consequently the State- to maintain some social cohesion, necessary for the system's reproduction. In this environment Capital is left with certain choices to avoid a social explosion that could challenge its dominance and ownership.

Capital's first choice is to push for Universal Basic Income (UBI). This is a policy that has already entered the mainstream, finding support from neoliberals, like Andrew Yang in the US, to conservatives like S. Edward Leigh in the UK. This, at first, seems quite bizarre, given that the UBI is a policy promoted by many left-leaning economists, academics and politicians, that see either an unconditional safety net (Camper, 2017) or an indispensable stepping stone towards a post-Capitalist world in it (Srnicek and Williams, 2019). Why would Capital and its spokespeople show any preference towards a policy that could decrease the appropriation of surplus value, ease the pressure on both unemployed and employed (Gupta et al, 2021), equip labor with more political power and even pose a long-term threat for Capital's domination? As Cristicuffs notes (2015), "what presents itself as taming the effects of the capitalist economy could in fact contribute to its maintenance" (p. 6). Capitalism exhibits a certain "elasticity", meaning that when challenged it prefers to "subsume rather than oppose" (Boltanski and Chiapello, 2015). UBI could therefore replace worker unionization, cooperation and solidarity at the workplace with an atomised and impersonal connection to a powerful State. It is easy to see how this undermines collective bargaining, Union power and general class conflict in production.

At the same time, Capital does not cease its effort to extract value from human activity "outside/expanding the workplace". In Cognitive Capitalism, the successor of Industrial Capitalism, the nature of commodities has changed. They no longer are finite objects that "expire in consumption", but -entangled with knowledge and information- practically transform into non-static, animated, processes (Terranova, 2000). Production is not limited to the workplace, but embraces the whole spectrum of social relations and engages with the production of human subjectivity. Moreover, the rising dependence upon value-producing, consuming activities have blurred the lines between consumption and production. Well-intended UBI supporters often miss that, by focusing on wage-labor, assuming that the end of waged-work is the end of Capitalism; that the space outside-work is free from exploitation and a space of self-realization. This is not the case.

What we ignore, says Mathers (2020), is "the work performed outside work: the free labour pervasive to cognitive Capitalism, which is exerted willingly rather than through coercion or the threat of destitution." (p. 15). The so-called data economy uses free-time labor (clicks, rankings, reviews, content-making) in order to categorize and extract value. Twitter's initial price offering showed a company market valuation of more than $20 billion (Kennedy, 2013), even though the company has not been producing any palpable commodities. Its market value in 2021 is near $50billion, surpassing companies like Ford or E-bay. What is astonishing is that Ford employs around 200k people worldwide, while Twitter no more than 6k. This is a staggering comparison that reveals the power of exploitation of "free-time" labor. Some authors have gone as far as to reject the Capitalism label for this new model of profiteering and exploitation, opting for "techno-feudalism" instead (Varoufakis, 2021). I will not dig further in this semantic debate, but it is false to think that the algorithm, robot and platform owners -whether called Capital or else- would cease value-extraction and exploitation in the digital and automated world. Labor should be aware of this development, if it is to form meaningful opposition to this brave new world. Capital is not playing without an opponent.

What could labor do? Maintaining unity looks increasingly difficult. WIll the gig-precariat feel the same about automation as the elite employees in their bullshit, but well-paid jobs? Will the -on paper- unemployed, click-and-attention-economy workers and UBI-receivers feel part of labor at all? Will they even feel exploited, if receiving "free" money? And will they seek a way to unionize and tackle these new forms of exploitation? Will they push for more or less automation? And would they care to have a say on its direction and workings? The truth is that we simply cannot know in advance, especially if rejecting deterministic readings of history altogether. After all, if the subject of history is the working class itself, the most authors can do is to analyze the material circumstances and motives of Capital and labor.

Having said that, in my thesis I have attempted to provide some tools to assist in the examination of these questions. I have therefore investigated a fundamental variable in

this field: profit. I pinpointed both existing definitions and theories (labor theory of value, falling rate of profit), as well as their limitations and potentially extended readings in a new context (i.e. moving beyond human labor in value creation, overcoming the falling profit limitations etc.). Since the field (AI in production) is not yet fully established, the verification of these theories lacks the necessary empirical backing for its confirmation or rejection. This certainly provides space for further research. Moreover, despite my labor affiliation, it remains arguably a more academic than experiential thesis. All things considered though it hopefully manages to analyze adequately the principal driving forces and elements behind the adoption of AI, as well as to present both Capital and labor perspectives and motives, without some artificial normative neutrality.

We can claim with some confidence that Capitalism, as we know it, and AI are not compatible in the long-run. The sceptics are right in this. This does not mean that capitalist motives and logic will magically wither away though and not transform to embrace automation. So the convinced group is not wrong either. I sense that the Capital-posed dilemma is quite tough. On the one hand a turbo-charged version of (AI-run) exploitation that benefits a multi-billionaire oligarchy, too busy with its space-wars to seriously bother about the side-effects on the environment and overall life-quality. An automated "hyperCapitalism" without (much) human labor in production. An economic system that would be Capitalism in name only, with the extraction of surplus value taking place in production increasingly less. On the other hand is an internationalized "movement" of uncritical technological rejection (together with increasing nationalism) that advocates some form of post-modern techno-primitivism and traditionalism. I do not see how this is a viable option either and how any of the two "proposals" benefit the oppressed. It is left to them then to find a new, unexplored alternative.

All in all, In order to make sense of this new reality we have to be able to see profit and exploitation differently, knowing the existing readings while being ready to expand them. The distinction between quantitative and qualitative exploitation helps. Do we (collectively) control our labor or do we find ourselves following incentives whether from

a manager, or an automated system; for whom? Do we programme AI to work for the benefit of the people, or does it come with an exploitative logic ingrained in its software? In this latter case, not only do we risk losing our jobs to AI, but also to get a ruthless supervisor even of our “free-time”. Before blaming the poor robots though, we better point to the real culprit: the frenzy of commodification, accumulation and exploitative profit-making that has already been running the planet amok and seems ready for a new transformation.

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