AI AND THE ECONOMIC AND INFORMATIONAL FOUNDATIONS OF DEMOCRACY [i]

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July 19th, 2021

Abstract

As has been the case for previous technological revolutions, AI will have economic and informational effects that may impact the nature and stability of democracy. In advanced democracies, AI may lead to economic transformations (such as a growing division between capital and high-skilled labor on the one hand and the rest of labor on the other, wage inequality, etc.) that may result in rising social tensions and democratic instability. However, a rise in productivity and overall growth plus the capacity of democratic governments to respond to those challenges may mitigate the negative effects of AI. AI's effects are likely to be more strongly de-democratizing in emerging and peripheral economies. With fewer resources to adopt those new technologies, emerging and peripheral economies may be hit by the reshoring of production to advanced economies and fast deindustrialization. That may in turn reduce the kind of economic conditions (development, equality) that nurture democratic stability. AI's economic effects may be compounded by the informational consequences of AI, which seem to reinforce the monitoring and repressive capabilities of states. After assessing the different channels through which AI could impact democracy, the chapter concludes by discussing a set of policy interventions to reconcile AI and democracy.

Keywords

AI, democracy, inequality, information, polarization, globalization, automation

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Technological innovation has historically shaped the way we have organized and managed our collective and political life. Industrialization, both by changing the patterns of human habitat and the structure of employment and by raising living standards, facilitated the birth of mass politics—and, arguably, modern representative democracy. Successive military technologies, from metal arms to chemical weapons, have shifted the balance of power between the state and its citizens. New means of communication, such as the printing press, newspapers and the radio, spawned the formation of a critical public opinion capable of holding policy-makers accountable. Artificial intelligence (AI) should be no different. By both fostering the automation of production activities and speeding up the collection, processing and distribution of information, AI's development should affect our governing institutions as well.

In this chapter, I assess AI's potential impact on the future of democracy as follows. After offering a succinct discussion of the foundations of democracy in Section 1, I explore the mechanisms or channels through which AI may reinforce or disrupt these foundations. Sections 2 and 3 describe two fundamental economic transformations brought about by AI that may affect politics: a shift in the nature of employment resulting in higher income inequality and the potential concentration of capital ownership with a corresponding decline in market competition. Section 4 considers, in turn, what those changes may imply for democracy in both developed and developing countries. In advanced democracies, AI may lead to political polarization due to a growing divide between capital and high-skilled individuals on the one hand and the rest of labor on the other. Nonetheless, that development may not necessarily erode democratic institutions thanks to the "re-equilibrating" role of elections—the process through which electoral competition incentivizes policy-makers to respond to new social and economic challenges. By contrast, in emerging and peripheral economies, particularly those with weak or no democratic mechanisms, AI's effects are

more likely to be de-democratizing. Section 5 explores the contradictory effects of AI on the generation, collection and use of information, and, as a result, on politics. On one hand, digital technologies have been celebrated for their capacity to break information monopolies of media conglomerates, strengthen political accountability, and facilitate the coordination of opposition movements against authoritarian regimes. On the other hand, they have been blamed for fragmenting and polarizing public opinion in democracies and for supplying authoritarian regimes (and even democratic states and big firms) with powerful surveillance tools. Section 6 concludes by discussing a set of interventions to strengthen democratic institutions.[1]

1. FOUNDATIONS OF DEMOCRACY

To understand the potential effects of AI on democracy, let us start by defining the latter as a procedure in which its citizens decide, by casting a vote or a sequence of votes, how to govern themselves—that is, what rules should bind their collective life, what should be the optimal distribution of assets and so on. This procedure implies two things. First, a majority of the population determines the position (or welfare) of each member of the population and, therefore, of the minority that has not voted with the majority. Second, voters are, ex ante, that is before elections, uncertain about who will win. If they were not, it would mean that the election had not been conducted according to fair and equitable norms, that is, that a section of its participants had manipulated the voting procedure to their advantage.

Given those two key conditions, democracy becomes possible only when voters accept (the possibility of) losing elections and, as a result, policy outcomes different from their preferred alternative. Now, acquiescing to a democratic system will depend on the value voters derive from it as opposed to an authoritarian regime. If the

expected gain from submitting themselves to elections is larger than the net benefit they would accrue from supporting a nondemocratic regime, they will accept democracy. Otherwise, they will not.

Those calculations depend, in turn, on two main variables: the structure of social interests and the costs of imposing a non-democratic regime. On the one hand, the likelihood of an authoritarian solution will rise with the heterogeneity of interests in a given political community. The losing party or section in any (potential or already realized) election will be less supportive of democracy the higher the difference between its preferred policies and the ones approved by a democratic majority.[2]

Although that heterogeneity may have different roots, the structure of the economy plays a crucial role in shaping it in three ways. First, rising income (and wealth) inequality tends to exacerbate redistributive tensions, moving the majority to raise taxes and transfers to curb that inequality. High-income individuals, who generally constitute a minority in society, may then become less inclined to accept a democratic regime. Second, economic growth tempers the redistributive impact of inequality and therefore the (high-earners) resistance to democratic rule. If the marginal utility of income declines when income rise, then, as economic development takes place, wealthier individuals will be more willing to tolerate higher taxes and therefore to put up with the consequences of democracy.[3] Finally, asset holders will be more inclined to accept democracy when the value of their wealth does not depend on electoral results, that is, when governments cannot regulate its price and/or return. That is particularly the case for assets that can escape from state monitoring or be moved to other jurisdictions in response to any regulatory actions—or, to employ more technical terms, when the assets are not specific to the place where they are exploited.[4] In Sections 2 and 3, I explore how AI changes these parameters (income distribution, level of income, type of assets) and therefore the

likelihood of democracy.

On the other hand, imposing an authoritarian solution depends on the costs incurred to exclude part of the population from voting—either through fraud or, directly, by disenfranchising them. Those costs have historically varied with the technologies available to both government (to enforce that exclusion) and opposition (to challenge it). As I discuss in more detail in Section 4, neither the recent revolution in information and communication technologies nor the potential applications of AI are exceptions to that rule.

2. AI AND LABOR

As with any technological innovation, AI has the potential to change the economy's production function, that is, the relative contributions of capital and labor to the generation of output, the corresponding returns to each of those factors, and, therefore, the political incentives of their holders toward democracy. In this section, I consider the impact of AI on labor. In the following section, I turn to its potential effects on capital.

Technological change and shifting capital-labor complementarities

Production technologies determine the type of labor that is central or, in other words, complementary to capital and the production system in general. In the last two hundred years, the demand for labor has switched from demand for the unskilled workers that toiled in the first Manchester factories at the time of the first industrial revolution to the highly educated employees of today's Silicon Valley companies—with consequential effects on the overall structure of employment and distribution of income.

During the first industrial revolution, unskilled factory workers replaced artisans

working in small workshops as the main kind of labor employed in a growing manufacturing sector. Their low wages, the declining standards of living in the new industrial towns, at least until the last decades of the nineteenth century, and the rising profits of capital heightened inequality and social conflict, making full democracy impossible. Voting rights were circumscribed, at most, to well-to-do men.

The introduction of the assembly line and mass production techniques as well as the use of electricity and electric motors at the turn of the twentieth century transformed again the structure of production and employment. Semi-skilled and skilled employees replaced unskilled workers as the main type of labor complementary to capital. Riding on rapid economic growth, wages rose across the board, particularly among middle social strata, making the distribution of earnings more equal. The Gini coefficient, which was around 0.5 or higher in the late nineteenth century, declined throughout the middle decades of the twentieth century to about 0.3 in North Atlantic economies. In the wake of higher salaries and living standards and a more equal income distribution, social conflict declined and democratic rule became fully entrenched in all advanced economies by the middle of the twentieth century. In the postwar period, 75 percent of all countries in the world's top quintile in levels of development were democracies. Only 9 percent of countries in the bottom two quintiles were democratic. Democracy came with consensual politics and moderate electoral platforms. Conservative and socialist parties, for a long time at odds with each other, embraced the key tenets of what many have labeled "embedded liberalism" or "democratic capitalism": free and fair elections, competitive markets, and a welfare state that mitigated the risks of economic downturns and protected citizens from illness and aging.

The relationship between democracy and twentieth-century capitalism became, in fact, a two-way, symbiotic one. Economic growth (and the particular production structure of the second industrial revolution) led to social peace and liberal institutions. Yet,

at the same time, democracy, and the kind of welfare state it spawned, reinforced growth and its equitable distribution. Business benefited from having a well-trained, healthy labor force. In turn, voters saw markets as an efficient system to generate growth and to give them better life chances (on the basis of effort and merit). Indeed, to support that economic system, public opinion favored a regulatory framework aimed at reinforcing, even if imperfectly, competitive markets. Antitrust laws led to the break-up of monopolistic structures. A restrictive patent system attenuated the consolidation of first movers in a particular economic sector, fostering a continuous process of technological innovation.

The invention of the personal computer and, later on, the internet, email, and mobile phones transformed again the structure of the production process and, with it, of employment. Automation accelerated in the manufacturing sector, leading to a collapse in its employment numbers. In Europe, for example, manufacturing jobs represented over one fifth of all employment in 1970 but less than one tenth in the middle of the 2010s. More importantly, automation spread to nonmanual routine jobs through the use of software programs that reproduced a growing set of administrative tasks in a wide range of traditional white-collar jobs, from accounting and banking to travel agencies. Whereas almost 45 percent of the working-age population in the United States worked in routine occupations in the mid-1980s, only 31 percent did in 2014 (Cortes et al. 2016). In the meantime, professional and managerial jobs highly reliant in abstract, relatively creative thought processes, rose steadily. In the United States, the share of high-skill occupations (managers and professionals) over total employment grew from almost 28 percent of all civilian employment in 1980 to 39 percent in 2010 (Katz and Margo 2014). In short, highly educated workers became the main type of labor complementary to capital.

A changing labor market came hand in hand with a shifting wage and income distribution. Labor productivity and median earnings, which had trended together

until 1975, diverged afterward. US labor productivity doubled between 1975 and 2016. By contrast, median earnings remained flat throughout the whole period. In economies with flexible labor markets (mostly Anglo-American countries), wage and income distribution broadened. Wages for US workers dropped in real terms for individuals in the bottom quintile of the earnings distribution and stagnated for those around the median while doubling for individuals with postgraduate education.[5] By contrast, in highly regulated economies (mostly continental Europe), low wages rose and earnings inequality remained unchanged – but the cost was minimal job growth or even a fall in jobs in the private sector in net terms.

AI and quasi-automation

Although predictions about future trends in the process of capital-labor substitution due to technological innovation are highly uncertain, we may consider two possible scenarios under AI. In the first one, which we may want to refer to as "quasi-automation," AI substitutes all kinds of labor except for very high-skilled occupations. In the second one, AI replaces labor in all production and distribution tasks, resulting in a system of "full automation."

Quasi-automation, where AI makes unskilled and semiskilled labor superfluous while high-skilled workers are still needed to produce goods and services, seems at this point the most probable outcome—with the caveat that we do not know when it may come to pass. Frey and Osborne (2017) conclude that "transportation and logistic occupations, together with the bulk of office and administrative support workers, and labour in production occupations" (265) have a high probability or risk of computerization. By contrast, "generalist occupations requiring knowledge of human heuristics, and specialist occupations involving the development of novel ideas and artifacts" (ibid., p. 266) have a much lower one.[6] Vulnerability to computerization is correlated with the level of skills – extremely high "for low-skill and low-wage

jobs in the near future" and much less so for "high-skill and high-wage occupations" (267).

The consequences of that change will be arguably different for advanced economies, new industrializing countries, and developing nations. Coinciding with the information and computational revolution that started in the 1970s, and in part fostered by it, the process of economic globalization implied a critical transformation in the international division of labor. As transportation and communication costs declined, a subset of developing countries were able to use their unskilled labor force to build up a manufacturing base. In addition, multinational corporations unbundled their production structure to exploit the specific comparative advantage of each country across the world—mostly maintaining operations based on highly qualified employees in the northern core while moving or subcontracting tasks performed by less skilled labor to the developing world.[7]

Under a scenario of quasi-automation, however, subcontracting and/or moving low-skill tasks to emerging economies may become pointless. With no comparative advantage to be drawn from placing fully robotized plants in periphery economies whose main attraction is having cheap labor, factories could be located anywhere in the world. That could lead businesses to "re-shore" production back to the consumer markets of advanced economies—in order to minimize distribution and transportation costs.

In advanced economies, AI will increase productivity, total output, and per capita income, by saving on labor. Its internal redistributive effects will depend, however, on the capacity of individuals to acquire the relatively high level of abilities demanded by the production model of the future. If education investments are enough to move individuals upwards in the skill ladder (and there are enough jobs available in high-skilled sectors), social conflict will remain subdued. If not, a fraction of the workforce will remain unemployed or employed but lowly paid, contributing to

persistent inequality.

In emerging economies, in turn, the impact of quasi-automation will be mediated by the costs of moving up in the production ladder from low-value-added to high-value-added activities. If the barriers to capital investment or innovation are low, those economies will experience continuous economic growth. However, if those barriers are high, catching up with Europe, Japan and the United States may never materialize. Notice, however, that even in the more optimistic case, middle-income economies may experience, first, some economic backsliding because the process of production "re-shoring" will deprive them of current foreign markets, and, second, the same kind of low-skilled/high-skilled tensions taking place in advanced economies.

Finally, low-income countries are likely to remain stagnant. Lacking in any industrial manufacturing basis, which has historically been the stepping stone toward development, it may be hard for their very unskilled labor force to acquire enough skills and technical capacities to become complementary to the technologies of the future. They may therefore keep being the periphery of the periphery—providing primary products to the rest of the world and services such as tourism and so on.

Full automation

Under the more radical scenario of full automation, no labor will be employed at all at any stage of production. As in the case of quasi-automation, firms will locate their production close to their consumers. Advanced industrial economies will "reindustrialize" (without creating any new jobs) to serve their populations. Here the distributional split will not take place between capitalist and high-skilled individuals on one side and the rest of labor on the other but just between capital and labor.[8]

In middle-income and poor countries, the outcome will be a function of the cost of capital. If innovation and capital investment remain costly, the process of economic

modernization of middle-income countries may stop and even reverse itself. The economic take-off of poor countries may be completely out of the question. If, however, technological innovation reduces the cost of capital (as has happened for cell phones and laptops), even poor countries may have a chance to expand their manufacturing sector (mostly for internal consumption). Still, the internal distribution of gains and losses will follow the same pattern of advanced countries.

3. AI AND CAPITAL

AI may affect capital in two ways: through its contribution (relative to labor) to production (and therefore its share of total income) and through capital's ownership structure.

Relative weight of capital

The relative weight of capital in the production process will again depend on the extent to which AI either complements and enhances (high-skilled) labor or results in full capital-labor substitution. In the first instance, the owners of AI (or those with access to funds to invest in them) will robotize production, appropriating a larger share of the value of the unit or service produced, as soon as the price of using the new technology falls relative to the wage paid to (low-skilled) workers. In the limit, with full automation, only one factor, capital, will be employed and its owners, that is, capitalists, will appropriate all returns from production.

There are already some signs that capital has grown in relative terms within the economy. Among new firms, the ratio of market value to number of employees has exploded. In 2020, the number of employees stood at 147,000 for Apple, 135,000 for Google, 163,000 for Microsoft and 58,000 for Facebook. GM, one of the quintessential companies of twentieth-century capitalism, employed, at its maximum, 97,000

individuals in the USA. By early 2021, Apple, Google, Microsoft and Facebook had a market capitalization ranging from over $700 billion to $1,715 billion—fifteen to forty times bigger than GM at the peak of its market value. In the whole American economy, capital income grew at an annual rate of 2.2 percent while labor income barely inched up at a rate of 0.1 percent per year between 2000 and 2014. The US labor share of national income fell from about 64 percent throughout the postwar period to 58 percent from the mid-1980s onwards (Elsby et al. 2013). Similarly, Karabarbounis and Neiman (2014) report a fall of 5 percentage points in the labor's income share in a sample of 59 countries in the period from 1975 to 2013. By economic sectors in the United States, the labor share of income fell rapidly in sectors with high R&D intensity– from 80 percent in the mid-1970s to 60 percent in 2011. By contrast, it did not vary in less R&D-intense sectors (Guellec and Paunov 2017).[9]

Asset ownership

The impact of AI on the concentration of capital is harder to predict—and could go either way depending on how it may affect, first, the costs of innovation and, second, information costs.

If the barriers to AI innovation and implementation are high, the ownership of capital will concentrate in the hands of "a limited number of exceedingly wealthy property owners," to use the words of Nobel laureate Jame E. Meade back in 1964. AI may lower, however, the costs of producing machines (i.e. of capital investment) directly—to the point of enabling everybody to set up some heavily automatized or robotized shop. Mobile phones have already eased African farmers' access to prices, weather conditions, and state-of-the-art agricultural techniques. Digital platforms have made the use of time by independent truck drivers more efficient. Craft shops and local tour operators in developing countries can contract directly with customers in advanced economies.

The information effects of AI can go both ways too. AI technologies may foster the rise of larger firms and of oligopolistic markets by minimizing the costs of both collecting information about (present and future) preferences of buyers/consumers and integrating production chains. Currently, for example, Google has over 90 percent of the search engine market, Facebook controls almost 70 percent of social networks, and three top firms concentrate almost one third of all the US e-commerce. On the other hand, AI may push down the costs of monitoring production across tasks, weakening the incentives to integrate all jobs in a single plant or under a single firm. Instead of the large corporations of twentieth-century capitalism, there could emerge an economy formed by self-employed individuals engaged in very specific or narrowly defined tasks who then transact with each other in the marketplace. Topcoder has been showcased as a paradigmatic case of this atomized production system: an outsourcing company that offered a worldwide community of around one and a half million freelance programmers, engineers and developers by early 2021.[10] Likewise, the digital platform Airbnb lets homeowners or small companies offer accommodation online to customers—bypassing the fixed costs incurred by hotel chains and traditional travel agencies. In the limit, that would multiply the number of capital owners (particularly if they have skills complementary to that capital) and lead to a highly fragmented production system similar to the networks of craftsmen that existed in European towns before the industrial revolution.

4. POLITICAL CONSEQUENCES

Table 1 summarizes the economic effects of AI on both capital and labor. Its political consequences will then vary with each country's levels of economic (industrial) development and democratic institutionalization. In emerging and peripheral economies, AI is likely to have a de-democratizing effect. In advanced

democracies, its impact will be probably more ambiguous—partly because of the crosscutting consequences of AI and in part because the latter's final effects will be conditional on the policy responses in those countries.

TABLE 1. AI CONSEQUENCES BY PRODUCTION FACTOR AND THE AGGREGATE ECONOMY

	QUASI-AUTOMATION	FULL AUTOMATION
Factors		
Capital	Gain Potential increase in capital concentration	Strong gain Potential increase in capital concentration
Labor		
Highly Educated	Gain	Loss
Rest of Labor	Loss	Loss
Whole Economy		
Average income	Higher in advanced economies Unchanged or lower in LDCs	Higher in advanced economies Unchanged or lower in LDCs
Income dispersion	High	Extremely high & very skewed (if cost of capital is high)
Assets	Decline in specificity	Steep decline in specificity

Developed countries

As discussed in Section 2, transitions to and away from democracy vary with three main variables: positively, with level of income; negatively, with income distribution; and, positively, with non-specific assets (i.e. assets that can be deployed in multiple jurisdictions with no significant loss in their value). AI will

lead, via productivity gains, to income growth in developed countries, which both have the resources to spur these new technologies and will benefit from the process of production reshoring. AI may also have a pro-democratic effect via the nature of new assets: digital know-how seems to be deployable everywhere and therefore difficult to control across borders. These two "democratic" forces will be checked, however, by a growing gap between capital owners and labor or, at least, between capital owners and high-skilled individuals, on the one hand, and the rest of labor, on the other.[11] The question is, therefore, which of these conflicting forces will prevail.

The likelihood of a full democratic crisis seems low due to both the (democratizing) role of income and the plausible "re-equilibrating" dynamics of democracy. Still, the use of AI may have worrying effects on the quality of democracy.

Income and democracy. A large body of empirical research shows that the probability of having democratic institutions is strongly correlated with per capita income. Whereas over 90 percent of the countries with a per capita income above $10,000 were holding free and fair elections at the beginning of the twenty-first century, less than one in five countries with a GDP per capita below $2,000 (in constant dollars of 1996) are democratic. Once established, democracy has never died in wealthy countries. Between 1800 and 2007, there were 69 instances of democratic breakdowns, that is, transitions from democracy to dictatorship, such as Germany in 1933 or Chile in 1973. Half of the democratic breakdowns occurred in countries with a per capita income below $2,500 and one third in the range between $2,500 and $5,000. No country has reverted to authoritarianism above $10,000.[12]

Nevertheless, if per capita income simply serves as a proxy (in those studies) for the lower income inequality of the twentieth century, we may conclude that an acceleration of today's growing inequality (due to an intensification of

technological change) may lead, regardless of whether a country enjoys a relatively high per capita income or not, to the collapse of democracy. Indeed, recent work suggests that current economic and informational changes have resulted in the erosion of democratic institutions across the world (Foa and Mounk 2016, Levitsky and Ziblatt 2018). Still, this interpretation seems debatable for two reasons. In the first place, poverty has been mostly eradicated in advanced economies. In 1850, about half of the western European population had a per capita income similar (in real terms) to today's poorest countries in Africa. Today, over 90 percent of the population in Europe and North America enjoys an income equal to or higher than the income of an individual in the 95th percentile of the income distribution in those same continents during the first half of the nineteenth century.[13] This development has, in turn, eliminated what used to be one of the sources, if not the main source, of riots, revolutions, civil wars, and authoritarian coups.[14] In the second place, recent work that relies on the political trajectories of all the sovereign countries in place since 1900 finds that high levels of development cancel the negative impact of inequality on democratic stability—purportedly because the marginal disutility from higher taxes approaches zero for wealthy individuals (Beramendi et al. 2021).[15]

Democratic "Re-equilibration." Because democracy can be thought of or understood as a political equilibrium, that is a self-sustaining outcome from which no political player has any incentive to deviate (that is, to challenge it) due to the (economic) calculations described in Section 1, AI can disrupt those incentives to the point of making some actors unwilling to support a democratic regime. Still, and provided the disrupting shock is not too abrupt or large, democracy has a built-in mechanism to manage the shock and sustain the democratic commitments of voters: the electoral process itself.

Spurred by the threat of losing elections, policy-makers respond, in principle, to new political and economic challenges (including those that may jeopardize democratic

performance) that harm the electorate (or, at least, the decisive voter). If those new policy interventions are successful, they may reduce economic and social strain, and, therefore, contribute to preserving democracy as a stable political outcome. Policy responses can range from deploying new programs to help workers adapt to technological change (through, for example, new educational investments) to passing new regulations blocking technological innovation. As stressed earlier, democracy and capitalism reinforced each other throughout the twentieth century: public spending on health and education benefited both voters (because it enabled them to take advantage of social mobility opportunities offered by a booming economy) and business (because it generated the kind of productive labor force needed for mainstream production processes). Under AI in full swing, that relationship could become more contentious. If AI firms only need to hire a fraction of the labor force, they may resist supporting broad spending and investment programs that are of little use to them. In turn, those voters that have no access to well-paid AI jobs may end up demanding straightforward redistributive programs rather than policies that nurture and complement the new production technologies.

This process of re-equilibration, through which democratic procedures stir, via elections, policy that brings social conditions back to a pro-democracy equilibrium, is highly unlikely in authoritarian regimes—particularly if its ruling classes are unaffected by the consequences of AI.

The Power of Money. Democratic re-equilibration can only take place if democracy functions well, that is, if politicians remain accountable to the public, uncaptured by specific individuals or economic sectors. Here lies one of the potential threats of AI. Its owners may employ their rising income and influence to muffle the voice of the majority through campaign contributions, political lobbying, and personal connections. They could also push for legislation to block the entry of any potential rivals and lock in its initial economic advantage.

The growing concentration of wealth that has taken place in the last few decades does not bode well for the future. During the last decades, campaign contributions in US federal elections have gradually become concentrated among the super-wealthy. The top 0.01 percent of households (in the income distribution) donated between 10 and 15 percent of all campaign contributions until the early 1990s. In 2012, the proportion was 40 percent. The wealthy have displaced other groups such as organized labor as the main source of revenue for political parties. In the 1980s and early 1990s, donations from the top 0.01 percent and from trade unions were roughly similar. In 2012, contributions from the top 0.01 percent were four times bigger than labor's. At least in the United States, money appears to be shaping policy-makers' preferences and votes. According to Larry Bartels, the views of members of Congress are closer to their wealthy constituents than to low-income voters (Bartels 2008).

The transformation of labor relations in the last decades may reinforce the power of money. Right after World War Two, at the peak of twentieth-century capitalism, union membership ranged from one third of all American workers to over two thirds of the labor force in small European countries. Today, unionization rates stand at around 10 percent in France and the United States, less than one fifth in Germany and around one fourth in the United Kingdom.

Developing countries

For less developed countries, the political horizon looks darker. As in advanced economies, they may experience increased inequality (due to AI). However, without the financial resources and state capacity of richer countries, those effects may result in stronger social and political tensions. In fact, if automation and reshoring intensify, industrializing countries may be unable to escape from a middle-income trap. In the limit, they may even suffer from some form of economic backsliding—negative growth rates and a shrinking middle class. As a result, democratic

institutions and practices will become more fragile in existing democracies. In authoritarian polities, the likelihood of a democratic transition may decline.

5. AI AND THE COSTS OF EXCLUSION

The mechanisms employed to suppress (and, conversely, to support) democracy are of two kinds. On the one hand, the likelihood of democracy depends on the cost of the specific tools states deploy to suppress dissent through force: the higher the differential in strength (as mainly determined by the type of weapons employed by each side) between governments and citizens, the easier it will be for an incumbent to exclude the opposition from power.

On the other hand, the likelihood of democracy depends on the type of information that both opposition groups and governments have about each other. Information plays a key role among opposition groups in the following sense. Demonstrations, protests and social movements rely on the coordination of a sufficiently high number of individuals to be successful. In turn, that coordination is only possible if potential demonstrators (or voters) know (or at least expect with some certainty) that other individuals like them will mobilize too against the incumbent or the regime (Kuran 1991).

Information about their citizens is also essential to governments, and, particularly, authoritarian governments, in two ways. The first function of information consists in facilitating the management of repression. A central problem of dictators is that they operate, by definition, in an information-poor environment. A dictator does not know whether the support he receives is sincere or purely strategic (and, in the latter instance, likely to collapse once his subordinates calculate they can get rid of him successfully). Better knowledge about the preferences of their agents and, more generally, of citizens, and about the political actions they engage (or plan to

engage) in allows dictators to act preemptively against any coups, revolts, and other actions of resistance. It also enables them to repress their opponents in a more targeted fashion. Targeted repression is less costly than indiscriminate repression, less likely to result in international sanctions, less prone to generate a backlash among the population, and, in general, more effective (Siegel 2011, Guriev and Treisman 2020, Xu 2020). Information plays a second function too: generating political consent. The control and definition of news and opinion through either standard or social media helps regimes to distort the beliefs of the opposition and to shape public opinion in general.

AI may affect the type of repressive tools of incumbents (and of resistance tools of oppositions). For example, at some point, the former may count on a completely "robotized" police force. However, AI's effects are likely to be particularly strong in the domain of information collection and use.

On the one hand, AI may strengthen opposition movements—mainly by easing their costs of coordination and by generating news and opinion that weaken the legitimacy of and support for authoritarian regimes. Diamond (2010) famously hailed the internet as a "liberation technology" that would enable "citizens to report news, expose wrongdoing, express opinions, mobilize protest, monitor elections, scrutinize government, deepen participation, and expand the horizons of freedom" (70).[16] Still, the existing empirical research has found little evidence that digital technologies have had any impact on the capacity of anti-regime movements to democratize authoritarian systems (Lynch 2011; Gunitsky 2015).

On the other hand, AI may empower (authoritarian) states through three main channels. In the first place, political incumbents may (and, in some cases, already do) employ these new technologies to engage in the "soft" identification of their opponents. The Chinese state monitors the interactions that occur in the country's social media to

extract information about the interests and grievances of its citizens and to tailor policy accordingly (Qin et al. 2017; Huang et al. 2019). Referring to Putin's rule, opposition leader Alexei Navalny declared back in 2010 that "Internet for the government is some kind of a focus group. [The government] just like[s] to do what the people want. I mean, if it doesn't contradict their own interests. The political agenda, however, will be tested on the Internet."[17]

In the second place, AI may facilitate the "hard" identification and control of opponents. As Carly Nyst at Privacy International writes, "in the digital era, almost every secret we keep, we keep online, whether we are aware of it or not" (Nyst 2018: 12). The construction of a digital profile for each individual makes surveillance, which in the past relied on physical monitoring and was constrained by storage and information-processing capabilities, much easier to finance and implement. Digital surveillance can then be combined with direct physical surveillance, as is the case with China. There, public authorities approved China's Golden Shield Project in 1998 to build population databases, ID tracking systems and internet surveillance tools. A few years later, they started to integrate them with street surveillance cameras and facial recognition techniques. By 2017, China's network included 176 million surveillance cameras—with many of them having the capability of transforming some traits of passersby into data. That same year, China launched pilot programs to automatically detect particular voices on phone conversations (Qian 2019). As AI speeds up the collection and processing of data, the capacity of governments to detect and preempt their opponents may become formidable.

Finally, AI's effects may go beyond the identification, cooptation and/or control of citizens. States are employing (and will employ) digital technologies to shape public discourse directly: discrediting the opposition through fake news, disseminating favorable news about the achievements of the regime in a systematic way (often delivered by supposedly independent agents), censoring partially and strategically

the blogosphere, and mobilizing the regime's supporters in favor of the government and against its adversaries (Gunitsky 2015).

The mostly pro-incumbent bias of AI means that its political impact is likely to vary with the institutional point of departure of each country. In those polities endowed with robust democratic institutions (i.e. having a working constitutional structure and a strong civil society), we may expect legislation and institutional structures to preempt the abusive use of AI from governments and large private actors. By contrast, in authoritarian regimes, AI may simply reinforce the position of incumbents.[18]

6. INTERVENTIONS

Several policy interventions seem advisable to minimize the negative effects of AI on democracy:

1. Speeding up the transition of the workforce from routine jobs, which are at the highest risk of automation, to nonroutine occupations or, at least, jobs that are complementary to AI tasks. The key intervention would consist in investing in an educational system both extensively (in terms of the number of people targeted) and intensively (employing educational strategies such as, perhaps, active learning, that prepare individuals for flexible, creative jobs).

2. Pre-empting the formation of a closed elite. That requires maintaining competitive markets—mostly through an active antitrust policy. It may also imply legal reforms to strengthen democracy of the kind listed in the following point.

3. Implementing reforms to strengthen the representation of the common voter: limiting campaign donations by corporations; democratizing the distribution of electoral funds along the lines of the reform proposed by Bruce Ackerman and Ian

Ayres;[19] disclosing the (ownership and marketing) relations between media and large firms.

4. A growing number of voices have called for the extension of a universal basic income. However, its implementation is not cost-free. First, according to pre-trials in Canada and the United States, it reduces the incentives people have to work (Sage and Diamond 2017). Second, it may subsidize the wages paid by firms, freeing them to offer lower wages, and therefore redistributing resources to employers. Third, it may reduce individuals' incentives to school themselves. Fourth, it may lead to a backlash from voters that have permanent jobs—successful welfare states rely on the idea of risk sharing rather than on pure redistributive schemes.

4'. A different strategy would consist of establishing a "universal basic capital" (UBC), that is, granting each person some fixed capital at birth (in line with a proposal already made by Thomas Paine at the end of the 18th century). To reward prudential behavior and avoid the possibility of their owners to squander it, its recipients would have free disposition only over its returns (and only after becoming legally adult). That solution would combine the supporting component of a universal basic income with an individual incentive to manage it actively, that is, to put some effort instead of consuming an income flow passively. The UBC could be funded through a tax on robots. In any case, its implementation seems advisable if and after AI reduces the number of available jobs and creates a permanently unemployed class.

5. If AI ends up harming less developed economies (through the process of automation and reshoring) and intensifies interregional inequalities (reversing the trend of the last decades toward cross-country economic convergence), establishing a system of open borders that allows labor migration to the North. That system may become the main way for people in the South to escape poverty—that is, it may be the only redistributive tool in our hands to equalize life chances across the world. Given the

political backlash such open-border system may create, especially if AI intensifies a skill divide, migration should probably be gradual.[20]

6. Establishing independent boards or agencies to supervise the use of information by states (and corporations) and passing stringent laws to preserve the privacy of citizens (and to minimize the use and manipulation of "digital profiles").

7. Developing an international framework to maximize the free flow of information and to break through the control exercised by authoritarian states. That strategy would include the use of satellite-based information transmission systems, stronger incentives to establish digital communications through peer-to-peer networks, and so on.

7. CONCLUSIONS

The effects of AI on democracy are not just complex but also partly conditional on the current operation of our democratic institutions. To survive, democracies require that voters accept them and the possibility of losing elections. Relying on a long line of research, this chapter has outlined the conditions that facilitate a generalized acquiescence to democracy: relative high levels of development; moderate to high equality of conditions; the protection of valuable assets against the possibility of expropriation; and a balanced distribution of capabilities and informational resources between incumbents and oppositions.

AI may disrupt some or many of those conditions. The process of capital-labor substitution it implies may generate more inequality and, in fact, impoverish parts of labor. Those effects may happen both in already developed economies—in fact, they are already experiencing growing economic polarization – and in developing countries. It is indeed likely that, in the long run, AI may be more disruptive in the latter.

From an informational point of view, it is also likely that AI may strengthen the resources of governments and incumbents, particularly if they already rely on authoritarian institutions.

At the end of the day, however, AI should not be seen as operating as a “deus ex machina.” Its effects will depend on the political responses we devise. Facilitating the education of labor should allow most of the population to benefit from AI. Establishing the proper kind of institutional and regulatory guarantees should make sure that governments do not exploit the increasing information and control capacities that AI appears to be generating.

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NOTES

[1] Due to space considerations and thematic coherence, this chapter does not cover two additional topics that connect Democracy and AI. First, the impact of social media on public opinion – in terms of misinformation, preference polarization, social segmentation, etc. Jungherr at al (2020) offer a recent and thorough review on this question. Second, a growing literature explores the impact of automation on electoral preferences as a result of employment losses and wage adjustment: see Anelli et al. (2019), Thewissen and Rueda (2019), and Kurer (2020).

[2] On the foundations of democracy from a theoretical point of view, see Dahl (1971), Przeworski (1991: chapter 1), Weingast (1997), Boix (2003) and a recent review in Svolik (2019). Recent empirical work on this questions includes Przeworski et al. (2000), Boix (2011), Miller (2012) and Treisman (2015).

[3] Recent work on the relationship between income and life satisfaction has found that even though higher incomes are associated with more happiness – with the former driving the latter in those cases where individuals get richer by chance (i.e. through lotteries), greater wealth exhibit a diminishing positive correlation with life satisfaction (Layard, Mayraz and Nickell 2008; Frey 2010).

[4] For an extensive formal discussion of these conditions, see Boix (2003) and, more recently, Beramendi and Boix (2021).

[5] On a changing labor market, see Autor (2010, 2015) for the USA, Goos et al. (2014) for Europe.

[6] According to the World Development Report of 2016, two thirds of jobs in developing countries and between 50 and 60 percent in Europe and the United States could be automated over the coming decades (World Bank 2016: 126). Employing different criteria may lead, however, to sharply different results – Arntz, Gregory and Zierahn (2016) estimate that only 9 percent of jobs in OECD countries are highly automatable.

[7] On changes in transportation costs, see Bernhofen et al (2007), Hummels and Schaur (2011). On outsourcing, see, among a broad literature, Baldwin (2016) in general, and, for specific regions, Hanson et al (2005), Bayard et al (2015), Ando and Kimara (2011) and Kinkel et al. (2007).

[8] The nature of these distributional effects will likely vary by sector. Some sectors will experience a capital/labor split. Others may continue to be defined by a cleavage between capital and skilled labor on one side and the rest on the other.

[9] On the other hand, returns to capital may decline over time if information and communication technologies raise inter-firm competition. The introduction of digital technologies has reduced the costs of advertisement and distribution. For purely digital products, transportation costs are now zero, therefore reducing part of the high barriers to entry that producers of physical goods faced in the past. In a global survey conducted in 2015, more than two thirds of firms in the non-digital economy stated that they were experiencing higher levels of competition due to digital technologies (World Bank 2016).

[10] See Malone et al. (2011). Information from https://www.topcoder.com/, as of March 13, 2021.

[11] AI may replace the decentralized information-generation system provided by markets (Hayek, Von Mises), theoretically allowing the emergence of an efficient planner. If so, the state could replace the market, leading to a vast rearrangement of income flows and asset ownership. Control of the state would become crucial, strongly raising the stakes of elections.

[12] The data come from Boix et al. (2013). For a discussion of the (extremely large) literature on democratization and democratic stability, see Geddes (2007) and Boix (2011).

[13] Own calculation based on the data from Bourguignon and Morrisson (2002).

[14] See, for example, Londregan and Poole (1990) and Miguel et al. (2004).

[15] In addition, higher inequality may not result in social strife in affluent societies provided this inequality is rooted in processes that are (or that public opinion believe to be) fair and equitable. Although public concern for current (and rising) levels of inequality has risen, survey respondents seem to prefer some inequality rather than complete equality when they are asked about the optimal distribution of income (Norton and Ariely 2011; Kiatpongsan and Norton 2014). Public opinion tolerance for inequality seems to be conditional on the effective operation of some principle of fairness and moral desert (Almås et al. 2018; Starmans et al. 2017).

[16] See also Tufekci (2017) and, for a detailed study of digital technologies in the context of urban revolutions, Beissinger (forthcoming).

[17] Quoted in Gunitsky (2015: 48)

[18] Although not pursued here, AI may affect the kinds of strategies of resistance and protest among opposition groups. Physical protest, unless it involves a spontaneous, sudden, massive movement against the regime, will be less likely, precisely because governments will have an increasing number of tools to control and preempt the coordination of their adversaries. By contrast, political opposition may take the form of disruptions actions against AI systems ("cyberattacks", broadly construed).

[19] See Ackerman and Ayres (2008). The Ackerman and Ayres' system consists in giving to each citizen a fixed number of dollars to be spent in the electoral campaign in the way (that is, on the candidate) everyone prefers. That proposal is complemented with the decision to establish a blind trust in which all private donations are put – to be transferred to the candidate or parties chosen by the donor. As with the secret ballot, the secrecy of donations may reduce the lobbying by well-identified donors.

[20] Regardless of the impact of automation, due to the current demographic trends in advanced economies (with current below-replacement fertility and negative natural population growth in the near future), a migratory flow from South to North seems fully sustainable and in fact economically advisable.