

Discussion Paper

No. 2017-43 | July 10, 2017 | <http://www.economics-ejournal.org/economics/discussionpapers/2017-43>

Technological change, inequality and the collapse of the liberal order

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Abstract

We are witnessing the start of a deep and prolonged political convulsion. This convulsion is caused by the impact of technological change on how wealth is generated and distributed in our societies. Since the 1970s advanced economies have seen a strong productivity increase and stagnant labor income. We believe this should be described as a major breach of our social contract. It is leading to the stagnation of income of the Middle Class, growing inequality and, ultimately, a radicalization of our politics. Unless the cause of this is properly diagnosed and the underlying drivers addressed head on we are bound to see a worsening of the convulsion. Here the paper analyzes technological change, its key cause and propose a series of bold experiments that countries should undertake in order to develop a new social contract with its citizens. The risk of doing nothing involves a long period of uncertainty and convulsion as well as the likelihood that little is achieved in tackling the underlying problems.

(Submitted as [G20 Policy Paper](#))

JEL J24 J31 D72

Keywords Automation; workforce polarization; basic income; public venture capital; vocational education

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Citation Carlos Lastra-Anadón and Manuel Muñiz (2017). Technological change, inequality and the collapse of the liberal order. Economics Discussion Papers, No 2017-43, Kiel Institute for the World Economy. <http://www.economics-ejournal.org/economics/discussionpapers/2017-43>

Inequality on the rise

The background facts on the evolution of income in developed world are stark. For 90% of the population in the United States, income has grown less than .5% per year on average between 1979 and 2013. This is about half of the growth for those in the top 5%. A worker with the median salary earned \$31,500 in 1979 (in today's terms), while the median worker earns today \$33,000. At the same time, the top 5% of earners made 75,000, while they make \$106,000 today (Bivens et al. 2014). Put differently, an American born in the 1940s had a probability of over 90% of accumulating more wealth during his lifetime than his parents. That probability was only 50% in the case of Americans born in the 1980s (Chetty 2014). For 90% of the population in the United States, income has grown less than 0.5% per year on average between 1979 and 2013 (Dobbs et al. 2016).

The result of this differential earnings paths has been one of stark inequality. In every country in the OECD, inequality levels have risen since 1980. This inequality has particularly affected certain groups. Unemployment levels in Southern European countries hover around 20% and are higher for the youth. The resulting displacements have consequences that can be traced to wide malaise for certain groups: middle-aged whites in the United States have seen their mortality increase, due to suicide and substance abuse in the period 1999-2013 (Case and Deaton, 2016)

There are a number of factors contributing to this rise of inequality, from the possible demise of alternative models of labor unionization to increasing trade with low cost countries. However, we will focus on the role of technology given that is determinant in understanding the long-term trends in the erosion of the return to labor. The importance of other explanations is clear but their magnitude tends to be smaller. For instance, despite the political rhetoric around trade, it has been estimated that without trade, manufacturing value added in the United States would be (only) about a fifth higher than it is now, whereas manufacturing employment has halved since its 1950s peak (Krugman 2016).

The role of technology and skills

The role of technology has been for a long time one of enhancement of increased skills. Economists have argued that in the West since at least the 1940s education and technology have been in a “race” with one another (Goldin and Katz 2004). During the post-war period the expansion of education levels to universal secondary education and tertiary education coincided with a long period of technological advancement. More educated workers were required to operate more sophisticated machines and later they contributed to more productive activities, since bank clerks could free themselves to, for example, design and sell products, rather than settle accounts and handle cash.

In that way, since education was expanding more rapidly than the penetration of technology in the economy (although this is hard to measure), the private economic return to increasing education were clear and rising. (Autor 2014). Education thus stayed ahead of technology in the race and this contributed to relatively homogenous increases in income for people and different levels of skills.

The premium to university degrees, however, has been flat since about 2000 with university graduates earning about twice as much as high school graduates (Autor 2014). This indicates that education is no longer ahead in the race. University graduates, on average are receiving no increasing premia, but a small group of those at the very top 1% and 5% are.

One explanation for this is that the middle skill jobs that require a university degree are no longer expanding and may in fact be decreasing. Autor and Dorn (2013) find that middle-skill jobs (by level of salary in 2000) may have contracted by almost 10% between 1980 and 2005. At the same time, those at the bottom and top of earnings levels have expanded by 20%. The results are similar in the 16 countries in Europe for which data are available (Goos, Manning, and Salomons 2009)

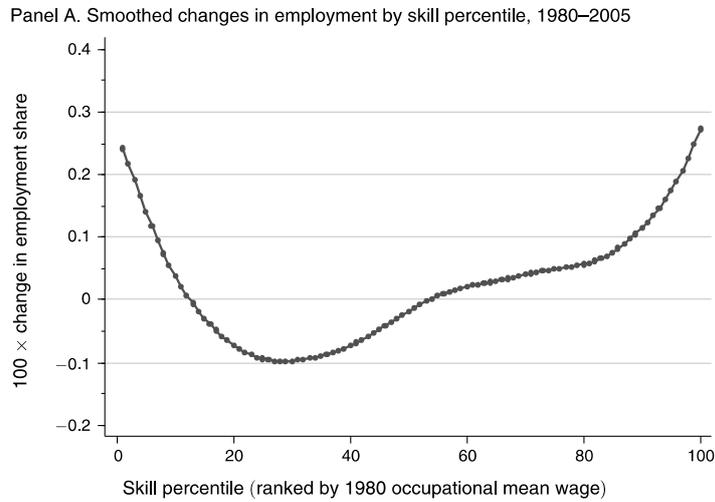
The expanding jobs include, at the top level of earnings managers, professionals and executives, while at the bottom the expanding occupations are almost singularly service occupations such as restaurant workers, security guards, janitors, health workers. In the middle, the disappearing jobs include machine operators, secretarial jobs, cashiers, archivists, bank clerks and tellers, etc.

The way to understanding this is that tasks that are still today not automated include those that may not sufficiently routine or involve human interactions or customer service and so either are difficult to automate (simple interactive tasks for a person are notoriously hard to automate) or there have not been sufficient economic pressures for automation. At the other end, they include tasks that are not routine and so not codifiable as a set of rules easily followed by machines, with management being perhaps a quintessential one. These are precisely the professions with heavy use cognitive non-routine tasks that have been greatly benefited by automation.

The solution that governments have pursued for decades has been a continuous increase in skill levels: longstanding investments in skills through universities have implied that, on average in the OECD, 40% of the 25-34 year olds have tertiary education today, compared to 26% of those aged 55-64. The middle skill jobs that require a university degree have already contracted in Europe and the United States by an average of 9 percentage points as a share of total hours worked over the period 1993-2010. By contrast, the lowest paying occupations have expanded by about 4 percentage points and the highest paid occupations, by 6 percentage points. The workforce is increasingly polarized, with hollowing of the workforce at the middle and increases in employment at the top and bottom earnings.

The hollowing out of the middle manifests itself in the disappearance of jobs such as machine operators, secretarial jobs, cashiers, archivists, bank clerks and tellers, etc. The result is a *bumping down* of formerly manufacturing or clerical workers to occupy the expanding and low-pay service occupations such as restaurant workers, security guards, janitors, health workers. These positions are disproportionately occupied by the young, middle-aged workers displaced by automation.

Graph: Polarization of the workforce 1980-2005



Source: Autor and Dorn (2013).

These new service professions are often precarious: part-time or of short length, unprotected by labor unions and with few benefits. A lot of these occupations are often filled by non-employees, working through a succession of “gigs”. This self-employed workforce has been on the rise in every industry and especially services since the early 2000s, sometimes as overall industry employment decreases and may be as much as 10% of the economy. This new emerging class, which is not formally captured by the unemployment figures, is nonetheless extremely precarious. Some have referred to it as “the Precariat” (Muniz 2016b).

With the current limitations to automation, or “engineering bottlenecks”, researchers at Oxford University have estimated that 47% of all occupations will be automatable within one or two decades (Frey and Osborne, 2017). It is increasingly clear, however, that this is, if anything, a temporary limitation. We see more and more evidence of computers being used in tasks that are outside the scope of “routine” operations. The ability to use big datasets combined with pattern recognizing technology means that to automate a task, no one needs to fully specified a set of rules or models of behavior. In order to recognize handwriting, billions of handwriting samples combined with their transcription and techniques for detecting commonalities between them suffice. This is readily available and manageable with computing power. In sum, jobs that most benefited from increased computing power, such as software engineers, will likely be substituted eventually.

Political Ramifications

Sustained majorities in the US and Europe have expressed mistrust in the academic, political and business elites that have sustained the system they see as failing. The collectives with lowest levels of trust in political elites are precisely those that belong to the “precariat” cited above. In the United States. The counties where routine level occupations are highest were more

likely to vote Republican in the 2016 presidential election (by a margin of +35%). By contrast, unemployment levels explain little of the variation in voting patterns.

Supporters of Brexit or Donald Trump have consistently expressed net negative levels of trust in elites. This breach of trust is a particularly serious threat to the liberal order. That order, which is made up of, among other things, free trade, porous borders and regional integration, necessitates trust in elites to be sustainable due to its complexity. Without trust in current elites, citizens are voting for ever more radical political alternatives. Alternatives that propose extremely simple solutions to what are, in reality, complex issues in need of nuanced policies. Hence, we find ourselves at the beginning of a political convulsion caused by the emergence of radical political options, their arrival to power and the implementation of their value-destructive and over-simplistic political agendas (Muniz 2016a).

Worryingly, levels of support for democracy as a system of government also seem to be declining in Western countries. Today over a third of American citizens say it would be “good” or “very good” to have a “strong” leader “who does not have to bother with parliament or elections” (reference). The number of people who say that living in a democracy is “essential” is declining across the world. Today only a little over 25% of US or British citizens born in the 1980s consider it “essential” to live in a democracy. In the case of the US over 70% of those born in the 1930s say it is “essential” to live in a democracy while only 30% of those born in the 1980s concur with that statement. We live, therefore, through a period of strong questioning of the overarching political framework within which we live (Foa and Mounk 2016).

Proposals

We believe that what is needed is a substantial effort to change the course of the tendencies of material decline of a large group of the population, the middle classes, through renewed efforts to provide them with opportunities to pre-empt or remedy dislocation. In addition, this should be coupled with a re-think of the role of taxation and redistribution within the state, to re-adjust the prevailing social contract to this new reality. Corporations will also have to adjust the way they define their relations with their shareholders and workers as well as the broader society and their stakeholders, such as the purchasers of their products may well play a role in it. We are, however, in uncharted territories, and we should concede that we do not have at the moment all answers. Substantial amount of experimentation will be needed. A grand agreement across countries to pursue a coordinated portfolio of pilot policies that may differ across countries should be considered that enables review and experimentation.

The overarching approach should be one of continuous experimentation. may look appealing in the short term but may bring substantial risks, such as very large capital taxes (and even seizures). Taxes on machines would likely stifle the growth of innovative companies of high profitability. These are the types of companies that have enabled substantial (if ill-distributed) rises in material well-being across the world and on which we have come to rely. Instead, we should acknowledge the strains that unmitigated automation is likely to continue to cause upon

the distribution of material resources but also the fact that they are an essential part of progress in the form of the productivity increases to which we have become accustomed.

Investing in the right kind of education

The European Commission has estimated that there are at least 2 million jobs in the EU that cannot be filled because employers cannot find candidates with the right skills. So irrespective of the automation process we are failing at managing the transition to the new economy. There is value to be claimed through better educational policies.

While a lot of investment in education has been misguided and seen limited returns, we now know how to design reforms and target efforts to increase performance. Investments in early childhood education have societal rates of return that are up to 10x the amount money invested through the opening of opportunities for young children, making them some of the best investments a government can make (Heckman et al., 2016). The quality of teachers also constitutes one of the biggest drivers of educational performance that can in part be solved through the provision of the right incentives. A recent Harvard study (Chetty et al. 2014) shows that even doubling the salary of the teacher workforce would self-finance through increased future tax revenues. These investments and policy changes in basic education may close the tragic gap between those who are already disadvantaged by an inadequate education system. However, they will not propel challenged developed economies to new levels of productivity.

Vocational education

In the labor force, the tendencies described above have resulted in the polarization of the labor force, with middle skilled workers suffering the most (Autor, D. and Dorn, D. 2013). It should be those groups that constitute a new focus. Groups that formerly included manufacturing or clerical workers have an opportunity to train and re-train into the new emerging professions that will mostly be focused in services.

Vocational education has, overall, not been very successful in achieving more employable graduates in the services sector, certainly not at scale. The German apprenticeship model seems to be effective in training a workforce for the manufacturing sector but it is doubtful it could serve as a viable template for other countries or for other sectors of the economy. Extant training programs have, collectively no effect on levels of employment in the “knowledge economy”. New or revamped sector-based programs targeted at growing professions should balance close collaboration with employers and a deep understanding of their needs with not being captured by the immediate employer-specific needs, but a platform for trainees to grow. Fifty-nine percent of hiring managers state that soft skills are “difficult” to find, and 58 percent say the lack of soft skills among candidates is “limiting their company’s productivity. Training programs should thus also include a training component in general skills (such as project management, negotiation, ideation, complex communication and other social skills) needed in a more volatile environment in which they will have to switch occupations.

Higher education institutions should also be better at matching their graduate pool to the job market. This will involve, first, continuously adapting their programs to market developments. Second, becoming better at matching graduates with opportunities. Serious efforts will require cross-institution collaboration or government intervention in developing platforms for matching applicants to programs, and students to employment opportunities

Higher Education

This will need the upgrade of curricula to shorter programs accessible to a broad base that are focused on a cross-section of subjects that includes a modern evolution to the traditional liberal arts curricula, as well as a minimum of technical competency in digital skills such as coding and social skills developed through projects, group work, communications and leadership opportunities. At the same time, universities should become a hub for lifelong learning and the continuous upgrading of skills of students. For that to happen, new delivery models through online courses of high quality will need to be developed. The experience of the online expansion of quality Master's courses in Georgia Tech has allowed for the reach to large numbers of middle-age professionals at relatively low cost, who would not have undertaken a 2-year Master's residential program (Goodman et al., 2016).

Changing the shape of the State

Changes to how the State procures income

We believe that taxation of all sources of income should continue to be a central priority for governments and that the increase in inequality of income generation calls for progressive taxation. But as the importance of labor income declines so does the ability of the states to collect taxes. Income tax remains the main source of revenue for advanced economies. This means that new ways of collecting taxes should be found, and, in particular, ways of having some form of fiscal traction over capital. Here two options emerge. The first seeks to increase capital tax (particularly capital gains tax) but these measures are difficult to implement in a global economy where capital can move freely and, in many instances, avoid taxation. A possible solution to this would be a global tax on capital but, again, implementation should prove difficult. A coordinated fight against tax havens and international tax evasion would be a good place to start.

A second option is to follow the participatory route and “democratize capital”. This could be done through the creation of large public venture capital funds that hold stakes in major innovation companies. Over time the state would procure itself with a large portfolio of capital holdings in profitable companies. This would enable the public sector to profit from the concentration of wealth in capital and ultimately design mechanism to distribute through tools different to labor wages.

A third option proposed by Shiller (2012) would be to deal with the underlying tensions once and for all by linking the rates of income tax or indeed their progressivity to fluctuations in the levels of inequality or unemployment in the country. New, more robust ways of measuring

inequality would be needed as well as careful modeling and debate of the elasticity of the indexed rates. This measure would substantially embed sustained change and short term fluctuations into the fabric of the tax system and will thus generate an automatic source of funds that enable the compensation of those dislocated and reduce potentially unproductive political debates with a short-term horizon.

Changes to how the State disburses income to ensure funding of public services and distributes adequately

Having procured the necessary income, the State should proceed in two directions. First, it should guarantee the proper funding of public services. Public services are themselves major distributive mechanisms and they are facing major budgetary constraints in most developed economies. So investment in public education, public health care, and infrastructure should be a priority moving forward.

Second, governments around the world should design new ways to distribute wealth to non-capital holders. Any expansion in the transfer system will require a fair amount of experimentation, as successful models have not been fully developed for the new era we describe. While universal income programs should be explored, the greatest successes in welfare over the last decade have come from conditional transfer programs. We can foresee a conditional program that, like traditional unemployment insurance ties a steady income stream to particular activities. However, these activities need not be job search: given that a lot of the new opportunities for employment will be due to innovation and new jobs, they may involve the development of new businesses or of creative activities. Or they could involve their commercialization in new contexts or even “purely social” contributions to the strengthening of communities through mentorship or other non-commercially viable programs. These constitute potential ways to simultaneously support those dislocated and foster continuous innovation. Simple unconditional transfers, by contrast, may be morally and politically problematic as well as counter-productive if they incentivize dependence and disincentivize the pursuit of innovative and entrepreneurial activities that society values.

There is also an opportunity to revamp job-seeker support through the use of a combination of new models and better-targeted casework. Some encouraging evidence from innovative programs in this field comes from France. It has since 2002 provided the unemployed with insurance against unsuccessful entrepreneurship. Through those incentives, it increased the creation of companies in the economy by one third. Separately, some experimental reforms there have enabled private firms to compete in providing employment support services (training and casework), and linked payments to those firms to the success of finding employment. This doubled the success rate of the jobseekers in finding employment. (Crépon et al. 2013)

A New Role for the Corporation

The decoupling of productivity and hourly wages makes the concept of maximizing shareholder value an insufficient one for corporations. Unless corporations want to operate in extremely hostile social and political environments they need to find ways to distribute income through

means that are different to labor wages. The concept of sustainability of business needs, therefore, to be expanded to include ideas of social sustainability and the continuous examination of the duties of the corporations to their workers and clients. There is here a real opportunity for social entrepreneurship to take root and have meaningful impact on peoples live. An enhanced role for corporations in society can be made more operational in two ways that deserve greater focus and can be facilitated by incentives or regulations.

First, more clarity on how companies are contributing to mitigate the challenges in inequality or expanding a social mission is required. This needs to go to the heart of companies' businesses, rather than being an (always small) sideshow in the form of corporate social responsibility units or foundations. Standards of reporting and information that are comparable across industries are needed. This would facilitate the role of management in monitoring progress and benchmarking themselves. But it also would provide a new focus for activist investors and consumers to take information on social responsibility into account in making decisions. For instance, consumers could make active choices to buy from companies that decide to employ humans rather than machines, thus expressing their preferences in an additional venue aside from politics.

Second, the tax system could within reasonable ranges favor practices that contribute to the mitigation of the challenges: they could favor investments in training to upgrade skills or on machines that augment rather than substitute human labor. As stated, temptations to tax technology outright should be resisted.

Conclusion

There are no easy solutions to what is in many ways the challenge of our time. As emerging countries that have been developing on the basis of manufacturing increasingly substitute technology away for labor, the challenge of automation is only likely to affect more people. The trend is one that concentrates capital into the owners of the machines or those high-skilled workers who can become more productive from the use of technologies. This already has a direct link with the tumultuous political times in which we are living. We have proposed a number of measures that collectively would amount to a new understanding of the role of the state or a new social contract. They constitute a substantial departure of the current settlement in the West and as such should be pursued with a renewed sense of experimentation and with an open mind. We have also suggested what an internationally coordinated process where those policies emerge may look like. Only carefully crafted policies that have been proven to be effective and go to the heart of the challenges of automation for most workers will serve as a bridge between the current era of turmoil and a new social order.

References:

- Autor, D., Dorn, D. (2013): “The Growth of Low-Skill Service Jobs and the Polarization of the U.S. Labor Market”. *American Economic Review* 103(5): 1553–1597
<http://www.aeaweb.org/articles?id=10.1257/aer.103.5.1553>
- Bivens, J., Gould, E., Mishel, E., Shierholz, H. (2014). “Raising America’s Pay” Economic Policy Institute, Briefing Paper 378. <http://www.epi.org/publication/raising-americas-pay/>
- Dobbs, R., et al. (2016). “Poorer than their Parents? A New Perspective on Income Inequality”, *McKinsey Global Institute Report*. <http://www.mckinsey.com/global-themes/employment-and-growth/poorer-than-their-parents-a-new-perspective-on-income-inequality>
- Case, A., & Deaton, A. (2015). Rising Morbidity and Mortality in Midlife among White Non-Hispanic Americans in the 21st Century. *Proceedings of the National Academy of Sciences*, 112(49), 15078–15083. <http://www.pnas.org/content/112/49/15078.full>
- Chetty, R. et al. (2014). “Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States”, *Quarterly Journal of Economics*, 129(4), pp.1553–1623. doi:10.1093/qje/qju022. <https://dash.harvard.edu/handle/1/30750027>
- Crépon, B., Duflo, E., Gurgand, M., Rathelot, R., Zamora, P. (2013). Do Labor Market Policies Have Displacement Effects: Evidence from a Clustered Randomized Experiment. *Quarterly Journal of Economics* 128(2): 531–580. <https://doi.org/10.1093/qje/qjt001>
- Goldin, C. D., & Katz, L. F. (2009). *The race between education and technology*. Harvard University Press.
- Foa, R.S., Mounk, Y. (2016). “The Democratic Disconnect”, *Journal of Democracy*, 27(3): 5–17.
<http://www.journalofdemocracy.org/article/danger-deconsolidation-democratic-disconnect>
- Frey, C.B., Osborne, M.A. (2017): “The future of employment: How susceptible are jobs to computerization?”. *Technological Forecasting and Social Change* 114: 254–280
http://econpapers.repec.org/article/eeetefoso/v_3a114_3ay_3a2017_3ai_3ac_3ap_3a254-280.htm
- Heckman, J., Garcia, JL, Leaf, D. , Prados, M.J. (2016): “The Life-cycle Benefits of an Influential Early Childhood Program”. HCEO Working paper 2016-035
http://www.cfc.ca.gov/pdf/Garcia_Heckman_Leaf_et_al_2016_life-cycle-benefits-ecp.pdf
- Goos, M., Manning, A., & Salomons, A. (2009). “Job polarization in Europe”. *The American Economic Review*, 99(2), 58–63. <https://www.aeaweb.org/articles?id=10.1257/aer.99.2.58>
- Goodman, J., Melkers, J., Pallais, A. (2016): “Can Online Delivery Increase Access to Education?” *Harvard Kennedy School Research Working Paper* RWP16-035
<http://www.nber.org/papers/w22754>
- Krugman, P. (2016). “Trade and Manufacturing Employment: No Real Disagreement”. *The New York Times*, 4-12-2016

Muniz, M. (2016a). “Brexit and the Anti Elite Era”, *Europe’s World*, June.

<http://europesworld.org/2016/06/24/brexit-exemplifies-anti-elite-era/>

Muniz, M. (2016b). “Populism and the Need for a New Social Contract”, *Social Europe*, October.

<https://www.socialeurope.eu/2016/10/populism-and-the-need-for-a-new-social-contract/>

Shiller, R. (2012). *Finance and the good society*. Princeton University Press.

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