



Inequality

The IFS Deaton Review

Beyond technology and wages: power and the history of inequality

Walter Scheidel

An IFS initiative funded by the Nuffield Foundation

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Walter Scheidel (Stanford University)¹

In his exploration of the ebb and flow of British and American inequality during the last four centuries, Allen (2021) focuses primarily on the interplay of wages and technological change. In some periods, productivity and wages grew together whereas, in others, wage growth lagged behind rising productivity and wage dispersion increased. By and large, technology is in the driver's seat of what is essentially a story of supply and demand shaping incomes from labour and thus income inequality. In my commentary, I want to broaden this perspective in two ways: by expanding it over the very long run of history and, above all, by considering the role of other determinants of the distribution of material resources. My goal is to provide wider as well as deeper historical context for the dynamics analysed in Allen's contribution.

I begin with the very long term. It goes without saying that the advent of modern science and engineering turned technological change into a particularly powerful force acting on labour markets and earnings opportunities. Even so, technology's impact on inequality has a much longer pedigree that stretches back into the early Holocene.

Broadly speaking, small-scale agricultural and pastoralist societies display greater inequality than communities of foragers or horticulturalists. These differences are rooted in specific modes of production and institutions that govern property rights and the vertical transmission (heritability) of assets (Borgerhoff Mulder et al., 2009); farmers and herders accumulate and claim material goods in ways that are alien to foragers and often even horticulturalists. At first blush, technology appears to play a relatively minor role in accounting for this divide; it is only in mature farming regimes that the mode of production is meaningfully associated with technological innovation such as the use of ploughs.

However, it has recently been argued that technological change was in fact critical in generating, sustaining and increasing material inequality (Bogaard, Fochesato and Bowes, 2019). Garden farming, which relies on the use of simple hand-held implements such as hoes, is labour-intensive and labour-limited in the sense that output is limited by (human) labour rather than access to land; additional land would not be of much use if labour was insufficient to bring it under cultivation. This regime consequently values labour more than land. Plough farming, by contrast, tends to be land-limited in the sense that the availability of ploughs propelled by draft animals makes access to land a more significant constraint on output than access to labour, and therefore raises the value of land relative to that of labour.

Working from these premises, Bogaard et al. present a model of how labour-limited regimes may have transitioned to land-limited ones, and of how inequality might have grown in the process. Initial wealth disparities – which were common in pre-plough systems – would have produced uneven access to draft animals and ploughs. In this context, there was an incentive for those equipped with animal labour to acquire additional land from those who relied entirely on human labour and for whom land was therefore of lesser value. Such transfers, and more generally the

¹ I thank Bob Allen, Angus Deaton and other panellists for valuable feedback.

disproportionate ability of the former group to bring more land under cultivation, would have created greater and self-perpetuating inequalities. Over time, members of the latter group were downgraded to tenants, clients or debt-bondspersons. This in turn helped establish and maintain inequalities in terms of status and political power, which then reinforced economic disparities.

This model meshes well with the finding of another recent survey that Old World societies, which had access to large domesticated animals that could be employed for farming as well as warfare, on average experienced higher levels of material inequality (proxied by dispersion of house sizes) than New World societies that lacked these features (Kohler et al., 2017; see also Kohler and Smith, 2018, for datasets and Fochesato, Bogaard and Bowes, 2019, for methodological issues). In this scenario, technology-driven disequalisation (via the use of animal power in food production) coincided and interacted with the build-up of coercive capabilities (via the use of animals in military activity) – capabilities which, as I will show, tend to play an important role in determining economic inequalities.

Allen has long emphasised the role of high wages in driving machine invention, not least in his account of the British Industrial Revolution (Allen, 2009; see also Kelly, Mokyr and Ó Gráda, 2014, for criticism. But once we look beyond the early industrialisers, it becomes apparent that the assimilation of human labour to machine labour had long been governed by similar dynamics. The social technology of enslavement is the most dramatic example, in keeping with Aristotle's dictum that 'a slave is a living tool, just as a tool is an inanimate slave' (Nicomachean Ethics 8.1161b4). In earlier work, I have argued that relatively high wage levels in classical Greece and in the Roman Republic – caused in part by broad-based popular military mobilisation – provided a powerful incentive for the expansion of chattel slavery (Scheidel, 2008). For slave labour to raise productivity in ways analogous to the process described by Allen, unfree workers had to be degraded to robot-like status – a form of innovation in social rather than physical technology.

How did employment of human 'robots' affect workers' wages? It ought to have put downward pressure on slave compensation (even as we have to account for amortisation of the initial investment). As for free workers, in a system such as ancient Rome, owners preferentially invested in the human capital of their own slaves (in rather stark contrast to what happened under modern race-based slavery). This skewing of training and skilling was bound to disadvantage free commoners. In this environment, slavery thus served as a means of depressing both free and unfree wages whilst sustaining growth. More generally, slavery increased inequality by inflating elite wealth by counting workers as property. In the best-documented case, the United States in 1860, when slaves accounted for about half of all private wealth in the Antebellum South (Wright, 2006, p. 60), wealth inequality in the slave states was markedly higher than in the others (Lindert and Williamson, 2016, p. 116).

The influence of predatory power on labour markets and income inequality became particularly visible in the wake of the Black Death of the late Middle Ages, when catastrophic mortality led to severe labour shortages (Scheidel, 2017, pp. 293–313). Different responses produced diverse outcomes. In parts of Western Europe, due to the ascent of price-setting labour markets (made possible by the erosion of feudal restraints), real incomes for workers (wage labourers as well as tenants) rose in keeping with the plague-induced shift in the balance of labour to capital. While we would expect the resultant pressure on employers to have precipitated the development of labour-saving devices, that process is less well supported by the evidence than has sometimes been claimed (*pace* Herlihy, 1997).

Alternative strategies yielded results that were far less favourable to workers. The social technology of the so-called 'second serfdom' was one of them. In Central and Eastern Europe,

landlords successfully colluded to suppress wage pressures by restricting worker's mobility and other freedoms. As with slavery, this depressed wages and boosted inequality. In Egypt, the Mamluk regime resorted to violent intervention in its attempt to coerce peasants into paying rent without making adjustments for the increased demand for labour (Scheidel, 2017, pp. 311–13).

Comparable dynamics are documented for central Mexico. For much of the sixteenth century, the Spanish colonisers strove to suppress workers' bargaining power in the face of massive demographic contraction brought about by recurrent pandemics. Once these constraints were relaxed, real wages shot up in the seventeenth century. It was only when population growth resumed that inequality scaled new heights (Arroyo Abad, Davies and van Zanden, 2012; see also Williamson, 2015).

In all of these pre-modern settings, exploitative institutions and violent coercion – in other words, social technologies – came to play a major role in determining wages regardless of physical technology. Whereas the transition from labour-limited to land-limited agricultural regimes could at least in theory have unfolded quite peacefully, requiring little more than mutual agreements and some basic property rights, the comparative assessment of early inequality on both sides of the Atlantic points to the contribution of organised violence. The practices of slavery, serfdom and other forms of subordination in the ancient Mediterranean, during the late Middle Ages and in early colonial Mexico were overtly coercion-intensive.

This brings us to a key point: the centrality of power in shaping distributional outcomes. As the sheer diversity of responses to plague-induced labour scarcity demonstrates, equivalent shocks to the labour supply could produce very different outcomes that depended entirely on prevailing power structures – on the ability of elites to withstand such shocks and keep the labour force in line. By the same token, societies with access to slavery were able to address the issue of labour costs in ways that were not available to those that lacked such access. Likewise, societies with access to domesticated horses generated coercive capacity that ultimately translated to higher material inequality.

We cannot brush all this aside by assuming that that was then and this is now. Even as slavery, serfdom and cavalry charges have fallen from favour, power relations have remained instrumental in shaping economic inequality. If technological change affects wages in equalising or disequalising ways, are such distributional changes not mediated by power relations? Allen acknowledges this mostly by referring to the contribution of organised labour, both in the past and going forward. Yet other elements are conspicuous by their absence, such as democracy and violent shocks, and 'political and social institutions' are mentioned only in passing.

To be sure, democracy as such appears to have had little effect on economic inequality (Bonica et al., 2013; Acemoglu et al., 2015; Scheve and Stasavage, 2017). Other factors, however, have more consistently proven relevant. Education is one of them. Access to education is surely mediated by politics. In addition, returns on education are determined not just by the supply of education in relation to demand driven by technological change – the famous 'race between education and technology' – but also by exogenous shocks. Thus, US data reveal a sudden collapse of skill premiums precisely during and right after World War I and during World War II, hereafter WW2 (Scheidel, 2017, pp. 375–6 from Kaboski, 2005; Goldin and Katz, 2008). On a smaller scale, the Vietnam War, which boosted college enrolment to avoid conscription, temporarily lowered subsequent returns on college degrees (Autor, 2014, pp. 846–7).

Shifts in the relative importance of different sectors of the economy – a major element of Allen's account – are also influenced by politics. The fact that spending on health care has gone up

across nations is largely a function of modernising development per se. But that alone cannot explain why health care spending in the US has risen from 2% in 1929 to 18% of GDP today; the latter level is much lower in peer societies, which also tend to be less unequal. The reasons for this discrepancy, and thus for the scale of the expansion of the health care sector, need to be sought in the politically conditioned configuration of the American health care system.

By the same token, labour union penetration is not simply a function of urbanisation and industrialisation, even if these have been essential preconditions. In both the UK and the US, Allen's two principal cases, union membership rates soared in the wake of both world wars and, in the US, also during the New Deal (Scheidel, 2017, pp. 165–7). Industrialised mass warfare was the single most important trigger of these jumps, as increasingly total war mobilised men not just as soldiers but also as workers. Broader trends, such as an overall peak in union density in the immediate post-WW2 period across a number of OECD countries and an accelerating decline ever since, are consistent with this explanation. Technological change and political shifts have both contributed to the secular decline in union power.

Concerns about systemic challenges also shaped inequality outcomes. From 1917, Western market economies faced an intimidating antagonist. Communist revolution would have seemed a plausible option early on (see most recently Meriläinen, Mitrunen and Virkola, 2020, for Finnish inequality after 1918). During the Cold War, proximity to the Soviet bloc acted as a disciplining device on capitalism by promoting welfare measures and redistribution, thereby reducing net inequality (Obinger and Schmitt, 2011; Albuquerque Sant'Anna, 2015; Rasmussen and Knutsen, forthcoming).

Globalisation, briefly referenced by Allen, depended on technological change but was likewise sensitive to political incentives and constraints. If it had not been, the first globalisation of the late nineteenth century would have ushered in a continuous expansion of international exchange and interconnectivity. As it was, war, depression and protectionism caused a massive mid-century hiatus that was only gradually overcome. Furthermore, the distributional effects of globalisation also depend on policy responses (which matter even if these effects are as modest as Allen avers).

Finally, even technological change itself has at times been mediated by political preference: witness the British parliament's sympathy for machine innovation in the early stages of industrialisation (Mokyr, 2009, p. 73; see also Hoppit, 2017), Japan's state-sponsored modernisation drive during the Meiji period (Vries, 2019), colonial restraints that repeatedly suppressed industrialisation elsewhere, or tax incentives for automation today.

In short, political and social power has always been a critical determinant of economic inequality. It is not an accident that state collapse used to be the most reliable leveller of all: the gap between the haves and the have-nots shrank the most when exploitative power structures unravelled (Scheidel, 2017, pp. 255–87). But states do not have to fail tout court for inequality to drop. Regime change can have a similar effect. The transitions from Czarist Russia to the Soviet Union and the Russian Federation are a classic example. Although industrialisation continued from the late Czarist period well into the Soviet era, inequality was high under the Czars and much lower throughout the communist phase before it went through the roof just as some of the state-run industries collapsed after 1991 (Novokmet, Piketty and Zucman, 2018). In this case, the relationship between technological change, sectoral shifts and inequality was quite different from that which Allen posits for the UK and US, and political power would need to be assigned a much more central role.

Japan offers an even better – because less extreme – example. Export-driven industrial development occurred both before and after WW2, but with dramatically different inequality outcomes. Income and wealth inequality kept rising into the late 1930s, collapsed during and right after WW2, and then stayed very low for decades (Moriguchi and Saez, 2010). The underlying mechanisms are well understood: unfettered elite power in the pre-war period and a combination of much diminished capital income and (specifically for wages) predistributive intervention in the post-war period. Political power lay behind all of these features.

Taken together, all this suggests that a narrative that seeks to account for the evolution of inequality by tracking changes in technology and wages (leavened with a dose of unionisation) can take us only so far. In order to flesh out this claim, I will briefly consider each of Allen's four phases to see how well inequality metrics correlate with the dynamics he describes.

Unfortunately, this is easier said than done. Phase 1 – pre-industrial growth in the UK from 1620 to 1770 (deemed beneficial for labour) – lacks decent data on income or wealth inequality (Milanovic, Lindert and Williamson, 2011). Proxy data paint a mixed picture: while real wages rose for much of this period – according to both Allen's own datasets and Humphries and Weisdorf (2019) – labour's share in GDP appears to have declined. The latter does not suggest falling inequality, and in any case there is no real sign of such a trend.

According to Allen, Phase 2 – the Industrial Revolution in the UK from 1770 to 1867 – did not favour workers. Yet while wealth concentration kept increasing, income inequality may have first risen and then fallen (Roine and Waldenström, 2015, p. 572; Allen, 2019, pp. 110–11). The US offers a more consistent picture of rising inequality after a modest dip in the Revolutionary period (Lindert and Williamson, 2016, pp. 82–90, 114–39).

Phase 3 – the age of manufacturing in the US from 1867 to 1973 – is said to have delivered gains for labour. However, it is impossible to discern coherent inequality trends for this period; as far as the distribution of income and wealth is concerned, it did not form a distinct phase. Metrics for the first half of this period generally point to growing income as well as wealth concentration (Roine and Waldenström, 2015, p. 572; Lindert and Williamson, 2016, pp. 171–93). Inequality subsequently fell during the Great Depression and WW2 before declining more gently all the way into the 1970s.² Comparable compressions are documented for many other countries and generally associated with the world wars and post-war reforms (Scheidel, 2017, pp. 130–73). In terms of contributing factors, Allen notes the abatement of immigration since World War 1 (which leaves out the preceding immigration boom), the rise of labour unions (which however only took off in the 1930s) and education. At least the first two of these elements (as well as returns on education) are closely related to politics and war.

Phase 4 – the Service Revolution since 1973 – produces the best match between Allen's dynamics and inequality metrics: the latter definitely went up in the US, and to varying degrees almost everywhere else.³ Allen invokes the contribution of information technology, automation, the relative decline of manufacturing and the expansion of the service sector, stressing that the last item matters because of strong wage dispersion in that sector. Overall, the last 50 years have been a period of high corporate profits and uneven service sector wages (for the latter, see, e.g., Autor and Dorn, 2013).

² See <https://wid.world/country/usa/>.

³ See the World Inequality Database, <https://wid.world/>.

The reasons why service sector wages are so uneven and profits so high continue to be debated, as are the drivers of the income surge in select professions (e.g., Philippon and Reshef, 2012; Bivens and Mishel, 2013; Kaplan and Rauh, 2013). In all of this, the influence of power relations has received considerable attention (for a review, see Scheidel, 2017, pp. 411–22). Globalisation and outsourcing, whilst considered of lesser import by Allen, are of course also subject to political constraints.⁴

Even allowing for the fact that the relevant metrics for the first two phases are not nearly as solidly documented as one would wish them to be, what emerges from this quick review is that inequality trends have been more complex than Allen's four-phase model suggests. Alongside technology, power relations were crucial in shaping the distribution of income and wealth. Allen himself implicitly acknowledges this when he considers possible remedies, such as more education and progressive policies exemplified by minimum wages, support for unions and universal basic income.

In the end, the recent history of economic inequality has witnessed little that can count as genuinely new. Technological change has shaped distributional outcomes since the dawn of agriculture. So has social and political power, embodied in institutions or manifesting in violent conflict. As Thomas Piketty observes in his latest tome, '[i]nequality is neither economic nor technological; it is ideological and political' (Piketty, 2020, p. 7). Yet, if taken at face value, this claim goes too far. The stock of useful knowledge has grown for millions of years, from the simplest stone tools and controlled use of fire to AI and gene editing. While none of these changes directly generated inequality, they repeatedly and substantively altered the potential for inequality. History sends a clear message: whether it takes the form of a plough or a saddle or a computer, technology, by itself, creates options for the creation of greater and more durable inequality that the better-off would not otherwise enjoy. We need to understand how technological change, political preference, and cultural and legal norms interacted in determining distributional outcomes. But we must not privilege one of these factors over the others: together they have structured the evolution of inequality through the ages.

References

- Acemoglu, D., Naidu, S., Restrepo, P., and Robinson, J. A. (2015), 'Democracy, Redistribution, and Inequality', in A. Atkinson and F. Bourguignon (eds), *Handbook of Income Distribution*, Amsterdam: North-Holland, 1883–966.
- Albuquerque Sant'Anna, A. (2015), 'A Spectre Has Haunted The West: Did Socialism Discipline Income Inequality?', MPRA Paper No. 64756.
- Allen, R. C. (2009), *The British Industrial Revolution in Global Perspective*, Cambridge: Cambridge University Press.
- Allen, R. C. (2019), 'Class Structure and Inequality during the Industrial Revolution: Lessons from England's Social Tables, 1688–1867', *Economic History Review*, 72, 88–125.
- Allen, R. C. (2021), 'Technical Change, Globalisation and the Labour Market: British and American Experience Since 1620', IFS Deaton Review of Inequalities.

⁴ For recent surveys of different factors, see Bourguignon (2015, pp. 74–116), Milanovic (2016, pp. 103–12) and Scheidel (2017, pp. 405–23).

Arroyo Abad, L., Davies, E., and van Zanden, J. L. (2012), 'Between Conquest and Independence: Real Wages and Demographic Change in Spanish America, 1530–1820', *Explorations in Economic History*, 49, 149–66.

Autor, D. H. (2014), 'Skills, Education, and the Rise of Earnings Inequality among the "Other 99 Percent"', *Science*, 344, 843–50.

Autor, D., and Dorn, D. (2013), 'The Growth of Low-Skill Service Jobs and the Polarization of the U.S. Labour Market', *American Economic Review*, 103 (5), 1553–97.

Bivens, J., and Mishel, L. (2013), 'The Pay of Corporate Executives and Financial Professionals as Evidence of Rents in Top 1 Percent Incomes', *Journal of Economic Perspectives*, 27 (3), 57–77.

Bogaard, A., Fochesato, M., and Bowles, S. (2019), 'The Farming-Inequality Nexus: New Insights from Western Eurasia', *Antiquity*, 93, 1129–43.

Bonica, A., McCarty, N., Poole, K. T., and Rosenthal, H. (2013), 'Why Hasn't Democracy Slowed Rising Inequality?', *Journal of Economic Perspectives*, 27 (3), 103–23.

Borgerhoff Mulder, M. et al. (2009), 'Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies', *Science*, 326, 682–88.

Bourguignon, F. (2015), *The Globalization of Inequality*, Princeton, NJ: Princeton University Press.

Fochesato, M., Bogaard, A., and Bowles, S. (2019), 'Comparing Ancient Inequalities: The Challenges of Comparability, Bias and Precision', *Antiquity*, 93, 853–69.

Goldin, C., and Katz, L. F. (2008), *The Race Between Education and Technology*, Cambridge, MA: Harvard University Press.

Herlihy, D. (1997), *The Black Death and the Transformation of the West*, Cambridge, MA: Harvard University Press.

Hoppit, J. (2017), *Britain's Political Economies: Parliament and Economic Life, 1660–1800*, Cambridge: Cambridge University Press.

Kaboski, J. P. (2005), 'Supply Factors and the Mid-Century Fall in the Skill Premium', Working paper.

Kaplan, S. N., and Rauh, J. (2013), 'It's the Market: The Broad-Based Rise in Return to Top Talent', *Journal of Economic Perspectives*, 27 (3), 35–55.

Kelly, M., Mokyr, J., and Ó Gráda, C. (2014), 'Precocious Albion: A New Interpretation of the British Industrial Revolution', *Annual Review of Economics*, 6, 363–89.

Kohler, T. A., and Smith, M. E., eds (2018), *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*, Tucson, AZ: University of Arizona Press.

Kohler, T. et al. (2017), 'Greater Post-Neolithic Wealth Disparities in Eurasia than in North America and Mesoamerica', *Nature*, 551, 619–22.

Lindert, P. H., and Williamson, J. G. (2016), *Unequal Gains: American Growth and Inequality since 1700*, Princeton, NJ: Princeton University Press.

Meriläinen, J., Mitrunen, M., and Virkola, T. (2020), 'The Violent Origins of Finnish Equality', SSRN Working Paper, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3741493.

Milanovic, B. (2016), *Global Inequality: A New Approach for the Age of Globalization*, Cambridge, MA: Harvard University Press.

Milanovic, B., Lindert, P. H., and Williamson, J. G. (2011), 'Pre-industrial Inequality', *Economic Journal*, 121, 255–72.

Mokyr, J. (2009), *The Enlightened Economy: An Economic History of Britain, 1700–1850*, New Haven, CT: Yale University Press.

Moriguchi, C., and Saez, E. (2010), 'The Evolution of Income Concentration in Japan, 1886–2005: Evidence from Income Tax Statistics', in A. B. Atkinson and T. Piketty (eds), *Top Incomes: A Global Perspective*, Oxford: Oxford University Press, 76–170.

Novokmet, F., Piketty, T., and Zucman, G. (2018), 'From Soviets to Oligarchs: Inequality and Property in Russia 1905–2016', *Journal of Economic Inequality*, 16, 189–223.

Obinger, H., and Schmitt, C. (2011), 'Guns and Butter? Regime Competition and the Welfare State during the Cold War', *World Politics*, 63, 246–70.

Philippon, T. and Reshef, A. (2012), 'Wages and Human Capital in the U.S. Finance Industry: 1909–2006', *Quarterly Journal of Economics*, 127, 1551–609.

Piketty, T. (2020), *Capital and Ideology*, Cambridge, MA: Harvard University Press.

Rasmussen, M. B., and Knutsen, C. H. (forthcoming), *Reforming to Survive: The Bolshevik Origins of Social Policies*, Cambridge: Cambridge University Press.

Roine, J., and Waldenström, D. (2015), 'Long-Run Trends in the Distribution of Income and Wealth', in A. B. Atkinson and F. Bourguignon (eds), *Handbook of Income Distribution*, Volume 2A, Amsterdam: North-Holland, 469–592.

Scheidel, W. (2008), 'The Comparative Economics of Slavery in the Greco-Roman World', in E. Dal Lago and C. Katsari (eds), *Slave Systems: Ancient and Modern*, Cambridge: Cambridge University Press, 105–26.

Scheidel, W. (2017), *The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-First Century*, Princeton, NJ: Princeton University Press.

Scheve, K., and Stasavage, D. (2017), 'Wealth Inequality and Democracy', *Annual Review of Political Science*, 20, 451–68.

Vries, P. (2019), *Averting a Great Divergence: State and Economy in Japan, 1868–1937*, London: Bloomsbury.

Williamson, J. G. (2015), 'Latin American Inequality: Colonial Origins, Commodity Booms, or a Missed 20th Century Leveling?', NBER Working Paper No. 20915.

Wright, G. (2006), *Slavery and American Economic Development*, Baton Rouge, LA: Louisiana State University Press.