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The End of Modern Economic Growth as We Know It

by Jean-Pierre Dormois

Economic progress is behind us in the West, warns Robert J. Gordon in a 750 pages-tome which revisits the economic history of the U.S. in the last century and a half. Measuring the impact on living standards of the major technological breakthroughs of the “second industrial revolution,” he observes that sources of productivity growth seem to have dried since the 1970s oil shock and that the productivity-enhancing effects of the digital “revolution” have so far proved elusive.

Reviewed: Robert J. Gordon, *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War*, Princeton, Princeton University Press, 2016.

Between 1870 and 1970, or more precisely between 1890 and 1940, the author demonstrates, the U.S. pioneered and developed the “mega-inventions,” which underlay the process of “sustained economic growth” in the twentieth century: electricity and the internal combustion engine – along with a host of secondary or ancillary innovations. Together the new technologies multiplied economy-wide productivity growth three- or four fold in the long-run, boosting income per capita and living standards by the same order of magnitude. Western Europe and Japan experienced such modernization during the “Golden Age” (from 1950 to 1975) by adopting the same set of technologies, thus “catching up” on the U.S. Despite the “hype” surrounding the recent innovations in communications technology,

everyone can feel, as Gordon asserts, that these don't carry with them the same welfare-enhancing effects as their (great) predecessors.

Economic history textbooks usually feature graphs showing inexorably rising curves in comprehensive welfare indicators for the past two centuries. By contrast, R. J. Gordon's book which brings the story to the present, contains the sobering realization that over the past two generations, the U.S. and with them, the developed world, has entered a period of 'secular stagnation': apart from a short-lived revival at the turn of the twenty-first century, productivity growth has been sluggish since 1973 – and do not expect to find a better record in other parts of the West. The book encourages us to change our perspective on the present, arguing that the hype surrounding new technologies obfuscates the underlying dynamics of our time. The author takes up and applies Paul Krugman's famous 'kitchen test'¹, which surmises that we tend to exaggerate, mistakenly, the importance of the most recent innovations. According to Krugman, this results from a faulty perception: today's typical kitchen shares far more common features with a 1950s kitchen than the latter does with a kitchen from the early twentieth century.

The book is divided into three sections. The first two sections are devoted to examining the impact in terms of living standards and the quality of life, of technological change during the two periods 1870-1940 and 1940-2015, addressing in turn the subject of food, housing, transport, communications, health, working conditions, and risk control. The third section weaves together the lessons learned from the two periods that may prove useful for the future and examines the policy options likely to counter the 'headwinds' slowing down current economic growth. In light of this, the outlook seems bleak even if an advanced economy like that of the U.S. still has much to achieve in terms of efficiency: the 'third industrial revolution' is so far no match for the achievements of the previous two.

The Secret History of the Twentieth Century: the Surge of Productivity Growth since 1870

This book is, of course, a "case study" and some will read it as a cautionary tale about the impending end of American economic and technological leadership – which a number of indicators don't seem to warrant in any case. However, the observations made for the U.S. are easily transferable to the other OECD countries – with the appropriate time lag – and the lessons drawn from the 'special century' between 1870 and 1970 can be broadly applied to all developed countries². The book's underlying theme consists in 'reading' the course of the

¹ <http://krugman.blogs.nytimes.com/2011/01/30/the-kitchen-test/>

² The author explains in his preface, that the insight for this mammoth 762-page study, which took him ten years to complete, originated when, as a young doctoral student, he was puzzled by the steep increase in the productivity of capital in the U.S. economy between 1920 and 1940. This implies that return on investment rose

American economy-wide (or ‘total factor’) productivity since 1870. To non-economists, productivity does not have good press: it tends to force companies (and everyone else) to constantly question their way of working and destroy jobs. However, as economists have insisted since Adam Smith, sustained and rising productivity gains are the *sine qua non* for increasing the living standards of ordinary people in the long run.

The author’s method has the merit of being straightforward as well as robust. He measures productivity using the most comprehensive indicator and the least likely to conceal hidden flaws: the ratio of GDP to annual hours worked – in other words, labour productivity. This indicator obviously flattens out disparities between occupations and sectors, but it does provide a measure of the efficiency of the productive system overall. To this end Gordon traces change in annual hours worked and annual income levels (GDP and GDP per capita). The strength of this model lies in its simplicity. The statistical database available for the United States is probably the most comprehensive and reliable of all developed countries, due to the U.S. having been a pioneer in the collecting and processing official statistics. These have fueled some landmark studies,³ but these often make for a somewhat arduous read for the layman and general surveys are rare. This book has the merit of offering a clear and well-documented account of these issues. Though an economist by trade, the author takes pains to make his reasoning accessible to the non-specialist, supplying benchmarks for the measures he cites and putting them in perspective; besides, he is visibly aware of the limitations of some of the instruments he uses. Like others before him, he does not confine his analysis to GDP but explores other welfare indicators such as those supplied by demography (life expectancy, gender-specific and infant mortality) or the education level (those being cornerstones of the UN’s ‘Human Development Index’).

Charting the Incredible Improvement in Living Conditions in the Twentieth Century

Demographic data provide the most uncontroversial measures of the material improvement of Western man’s living conditions. Compared to other countries, the United States in the nineteenth century was one with relatively high infant mortality (still 180‰ by 1900) which points to the prevalence of unsanitary living conditions. Post-1870 industrialization of the country went hand-in-hand with urbanization, which resulted in displacing the masses from the countryside, where morbidity rates were low, to improvised

significantly over this period, a fact which was overshadowed by the emphasis placed on its corollary: the shrinking share of capital in value added (as Q/K rises, K/Q falls). As R. J. Gordon explains in detail, this steep rise was the outcome of the introduction and then widespread diffusion of the ‘general purpose technologies’ of electricity and the combustion engine. In other words, during the 1930s depression, capital became scarcer but much more productive.

³ Among others, Wassily Leontief (1906-1999) and Simon Kuznets (1901-1985). See his *Modern Economic Growth: Rate, Structure, and Spread* (New Haven: Yale University Press, 1966).

urban areas, where they were much higher. Due to the endemic presence of infectious diseases before the advent of efficient antibiotics (mid- twentieth century), improvement could only come from control over the environment. This is what happened after 1910 thanks to spectacular progress in urban sanitation and personal hygiene. Gordon cites simple and inescapable evidence: out of 1000 live births, 188 lives were saved between 1880 and 1950 – against only 21 between 1950 and 2010. This ‘victory over death’ and the longer lives that ensued were essentially due to the lower virulence of pathogens. Life expectancy at birth made headway twice as fast between 1890 and 1950 as it did between 1950 and 1998 (0.32 years gained per year against 0.15). As the author shows, the development of medicine, particularly hospital care, accompanied this transformation rather than caused it.

The Great Transformation of Work

As Paul Krugman notes in his review, improved working conditions are a key component in measuring improved living conditions, because the varying degrees of arduousness of labour are only imperfectly factored into pay. The author draws on socio-occupational data to sort out ‘painful,’ ‘degrading’ and merely ‘unpleasant’ jobs to assess the improvement in the quality of jobs. A different chronology seems to emerge here, with the most spectacular gains made after 1940. However, the author also cites earlier advances in this trend: between 1900 and 1914, average nominal wages in industry rose by 30% and between 1870 and 1940 real wages increased 1% per year faster than productivity; between 1910 and 1920, workers’ compensation insurance paid for by employers became compulsory in 44 out of 48 states of the Union. The lever of productivity growth also enabled reduced working hours: when the United States entered World War Two, the 40-hour working week had become standard. One is reminded of Norman Thomas: the US had no socialist party because it was already a socialist society.

A Reflection on Our Time (and Our Future)

Gordon’s tome is also a rarity. Few academic economists are inclined (or able?) to write for the wider public.⁴ Paul Krugman (who is one of them) likens the book to the third volume of historian Daniel Boorstin’s (1914–2004) celebrated trilogy.⁵ It can certainly be read at times as a celebration of the achievements of the ‘American century.’ But it isn’t triumphalist or complacent in its tone. Witness the attention devoted to the changing role of

⁴ Hence the proliferation of non-professional writers on economics, some of whom Krugman took to task in *Pop Internationalism* (MIT Press, 1996).

⁵ See his widely acclaimed (winning the Pulitzer and the Bancroft prizes) *The Americans*, vol. 3 *The Democratic Experience* (1st edition Random House, 1973).

American women in the economy or the reflections on Negroes in the ‘Deep South’ left behind the first waves of ‘modernization.’

The book shares the features of an essay and a textbook: it is an in-depth examination of the workings of a progressive economy and how it fueled rising living standards, irrigated by some key ideas.

Hence, especially for those versed in the literature, a sense of déjà-vu (or *déjà-lu*). But the very time span covered by Gordon’s investigation also affords a crystal-clear understanding of the links between causes and effects. In most accounts of the ‘Golden Age’ for instance, there remains a certain sense of mystery or miracle (German *Wirtschaftswunder*, Italian *miracolo*). By contrast, the carefully woven tapestry offered by *Rise and Fall* leaves no corner in the shade. This was possible because, apart from using the material in his own area of expertise (national accounting), the author has ‘stood on the shoulders of giants’ (as he would readily admit) and brought into his narrative a colossal amount of information drawn from a variety of sources (as the bibliography testifies).

This approach makes for a more accessible ‘tale’ because the dynamics measured by economic indicators – which are abstract in form – are pursued to show their tangible manifestations. For example, he pays attention to developments which are often overlooked: the impact of the creation of interstate highways between 1958 and 1972 on reducing transport costs, the daily effort saved carrying water by the creation of water utilities, and how AT&T’s monopoly between 1912 and 1983 largely explains the slow progress of the telephone.⁶

Was the ‘Second’ Industrial Revolution the Last?

The acceleration of productivity growth between 1920 and 1970, largely due to increased capital profitability, originated in the technological innovations of the second industrial revolution. The key difference of this second version vis-à-vis the first resides in innovations resulting from scientific developments and experiments. Possible starting points include Liebig’s chemical laboratory (1845) or the 1856 invention of the Bessemer process for manufacturing steel. Gordon mainly focuses on the ‘macro-inventions’⁷ of this second wave, even on what could be described as ‘mega-inventions’: essentially the technology of electricity (including its applications: radio, the telegraph, the telephone and television) and the internal combustion engine. He lends particular emphasis to several features involved in their development (the efforts deployed by Thomas Edison to design a commercially viable

⁶ In 1940, a 3-minute call between New York and London cost the astronomical amount of \$18.5, the equivalent of \$312 in today’s money.

⁷ A term introduced by Joel Mokyr in: *Lever of Riches, Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1990).

filament light bulb for instance)⁸, the necessary period of adjustment until technical systems are upgraded to make an innovation effective (the 40 years' lag between the first electric generating station opening in New York and the creation of a network able to supply electricity throughout the City), and, finally, the significance of successive 'incremental' improvements making it possible to generalize these innovations and make them more user-friendly. 'Secondary innovations' were particularly numerous in the maturing phase of these new technologies between 1920 and 1940 (as patent statistics attest) and account for the boost to the productivity growth of capital in this period. As Evsey Domar (1914-97) another fellow economist put it, "without technical progress, capital accumulation would amount to piling wooden plows on top of existing wooden plows."



The 'Master 85' Chevrolet (2nd model, 1940), the first modern car according to Gordon

To Gordon, an innovation is considered important insofar as it is likely to benefit the largest number of people and the author never loses sight of the question of cost, accessibility, and circulation. He seems to always have the Sears & Roebuck catalogue (1888-2005) at hand to check prices and then convert them in purchasing power terms. He notes that falling prices only partially reflect the boon to consumers in terms of product quality improvements. Furthermore, while it has long been held that it was World War Two which put an end to the depression of the 1930s, his observation that the achievements of the 'Arsenal of Democracy' during 1941-45 fostered a lasting increase in productive performance, is a novel conclusion and one supported by the indicators: the rise in real wages prompted by New Deal reforms led firms to substitute capital to labour, and private investment was bolstered by the government's war effort (50% of gross domestic capital formation).

⁸ The reader can verify, as he famously said, that "Genius" is indeed "one percent inspiration and 99 percent perspiration".

Socialism by Another Name

As other authors have noted, progress in the standard of living and quality of life in the twentieth century depended first and foremost on the implementation of collective technologies making public 'goods' (public utilities and services) available to the 'common man': sewage systems, water utilities, gas, electricity and telephone networks, health care institutions which thrived – indeed were dependent – on scale economies. Thanks to a partly unintentional alliance between market forces and local authorities, the transition towards the 'modern home' took place in the space of 50 years (between 1890 and 1940) for the bulk of the US population (ethnic minorities had to wait longer). The modern home was henceforth 'networked' (i.e. connected to various networks): material comfort was made available to individuals on the condition that it was offered collectively. Gordon documents in detail the decrease in housing costs for working-class households in the years before and immediately after the First World War.⁹ This brought deep transformations to the everyday life of families, as the spread of electrical appliances would not have been possible without these networks. Despite their mechanization, domestic chores remained in the preserve of women (especially mothers) and the only perceptible gain was in the total number of weekly hours devoted to them rather than in the proportion that household work befell them. This reduction allowed them to enter the workforce from the 1920s onwards but, as Gordon notes, until the 1970s, those who did so 'found themselves cordoned off into female occupations' and subjected to 'the unforgiving discipline of fixed and long hours of work and daily rites of subservience' (p. 287).

The reader could be forgiven for thinking that the bleak years of the 1930s Great Depression (GDP fell by 30% between 1929-33) put a stop to the process of modernization. And yet, according to the author, this was not the case; quite the contrary, in fact:

The Great Depression did not cause housing units to become unplugged from the electricity, water, and sewer networks; the appliances purchased before 1929 still worked to improve the standard of living; and the decade of the 1930s witnessed a sharp increase in the diffusion of electric refrigerators and washing machines. (p. 96).

The American Way of Government Intervention

Like any good (Chicago) economist, R. J. Gordon focuses first of all on market forces and their dynamics, but he is also careful to 'give credit where credit is due'. Reading between

⁹ He draws here mainly on the returns of the 1940 U.S. *Census of Housing* and on the Lynds' detailed study of the small town of Muncie (Indiana) in 1923-1924. See Robert S. and Helen M. Lynd, *Middletown. A Study in Contemporary American Culture* (New York: Harcourt, Brace and Co. 1929).

the lines, the reader can sense a certain admiration for the Republican administrations of the late nineteenth century, whose sense of the common good led them to rein in the market power of large corporations (1890 Sherman Act), introduce federal funding for educational institutions (1890 Morrill Act) or encourage technical progress in agriculture (1906 Pure Foods Act). Economic historians have generally heaped criticism on the ill-inspired policies introduced in the 1930s (especially in trade, banking and monetary policies). By contrast Gordon gives credit to the instigators of the New Deal, even though he points out that some of the outcomes were not part of their original intention: what interests him is that some of the Roosevelt administration's decisive measures contributed to improving the long-term productivity of the American economy, while their aim was mainly to relieve the strain on the classes of the population most affected by the crisis. This was the case, for example, of the so-called Wagner acts (National Labor Relations Acts of 1935 and Fair Labor Standards Act of 1938). By encouraging unionization and introducing pay floors, the 8-hour working day and unemployment benefit, these measures greatly limited the fall in money wages and thereby encouraged companies to replace labour with capital, thus extending mechanization and boosting productivity (no tax on robots then!).

The Age of Diminished Expectations?

Technological progress is never acquired once and for all: the author's calculations show total factor productivity (TFP) growing at 1.89% per year from 1920 to 1970 but then falling to 0.57% between 1970-1994, before recovering to 1.03% from 1994 to 2004 and slumping to 0.4% in the next decade (it was apparently flat in 2013). Since 1999, this deceleration has had repercussions on income growth. The author observes that, if productivity had been as rapid after 1970 as it had been between 1920 and 1970, real GDP per person would be double today's level, or \$97,000 rather than \$50,600 (p. 562). For all politicians' proclamations about innovation, these seem to be sorely insufficient to prop up economy-wide productivity.

Has the 'new economy' produced all its effects or did it simply generate a tidal wave of 'gadgets'? It is still possible that we may witness radical new discoveries in the fields of artificial intelligence or biology but, as Gordon shows, truly radical transformations affect everyday life and particularly the working place or working methods: from this point of view, the era of progress is behind us. With falling educational performance, the mechanical reduction of working hours, and the weight of public and private debt, rising income inequality figures among the four powerful 'headwinds' putting a brake on future productivity growth. Here the author reaches the same conclusion as T. Piketty and E. Saez in their

observations of fiscal and census data.¹⁰ Unlike them, however, he fears that a drastic increase in taxation would lead to more tax evasion and create a risk for the vitality of the few growth hubs still present in the United States.

The author devotes a postscript to the policy options that might overcome these obstacles. Taking inspiration from the New Deal, he remains convinced, like most liberal Americans, that tax reform is necessary (higher tax rates for the top incomes, further tax breaks for those at the bottom of the scale), that the minimum wage should be raised substantially (in real terms, it currently stands at less than what it was in 1940!), that the Federal government should fund investment in the educational system, as it did at the end of the nineteenth century, and that green cards should be granted automatically to foreign-born graduates. Many of his proposals found their way in Bernie Sanders' platform during the last presidential campaign. However, in view of the outcome of that election, it is doubtful that the United States will be taking this path in the coming years.

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¹⁰ For an introduction to their plentiful work, see T. Piketty and E. Saez, "Income Inequality in the United States, 1913-1998," NBER working paper (<http://www.nber.org/papers/w8467>)