

July 17, 2017

## **A Productivity Boom: A Response to Robert Gordon, Part I**

Robert J. Gordon is a well-known economist and a professor at Northwestern University. A member of the National Bureau of Economic Research, his most notable work is in the area of productivity. His 2016 book<sup>1</sup> argued that the best years of American productivity are behind us—highlighted by the introduction of steam power to industry, the mechanization and biological revolution in agriculture, the electrification of the country, the communications revolution of telegraph, telephone and television, and the transportation revolution of automobiles and airplanes. He suggests that the technology revolution would never be able to replicate the growth spawned from these events. Sadly, ecological damage, rapidly aging populations and the peaking of educational attainment mean that economic stagnation would be the order of the day for the Developed World economies.

We examined the geopolitical ramifications of Gordon's position in an earlier report.<sup>2</sup> Stagnation could easily lead to geopolitical problems. For example, industrialization and the spread of democracy occurred at nearly the same time; it is generally believed that democracy supports economic development but it is possible the direction of causality occurs in the opposite direction.

<sup>1</sup> Gordon, R. (2016). *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War*. Princeton, NJ: Princeton University Press.

<sup>2</sup> See WGR, [The Gordon Dilemma](#), 8/12/13.

If so, it may mean that a certain degree of economic growth is necessary to maintain democracy. If growth stagnates, it may become difficult to maintain societal order. In addition, it is intuitive that an expanding economy makes distribution issues easier; it's a lot more difficult to determine distribution if it appears to be a zero-sum environment. In such a world, one group improves only at the expense of others. That scenario creates conditions of conflict.

Michael Mandel and Bret Swanson recently published a paper<sup>3</sup> rebutting Gordon's position, suggesting that productivity is poised to expand and support stronger economic growth. In Part I of this report, we will examine the productivity issue, discuss Mandel and Swanson's analysis of the situation, and focus on their specific division of industries. Next week, we will look at six sectors of the economy that appear poised to digitize and how that could change the economy. We will also discuss the hurdles to Mandel and Swanson's projection. As always, we will conclude with market ramifications.

### **The Productivity Problem**

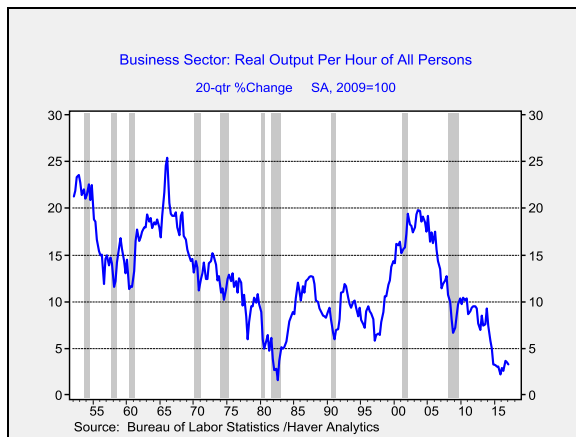
Economic growth can basically be distilled into two factors—hours worked times workforce productivity. Productivity, unfortunately, is perhaps the most complicated variable in economics. Essentially, a worker is surrounded by an environment of capital, management, infrastructure, legal and regulatory systems, human capital, training and even climate that determines how much output his hour of

<sup>3</sup><http://www.techceocouncil.org/clientuploads/reports/TCC%20Productivity%20Boom%20FINAL.pdf>

work will generate. Clearly, the lack of capital equipment will reduce productivity; so will a poor regulatory system. Bad public infrastructure will undermine output. A predatory state where bribes are necessary will sap productivity, as will antiquated methods and practices. Simply put, productivity is complicated.

It can be argued that environmental regulation can cut productivity. The additional costs and increased “non-productive” activities can curb output. However, at extreme levels, negative externalities<sup>4</sup> can undermine overall productivity. In China, for example, air pollution has become so pervasive that it is likely impacting worker health to the point that sickness may be dragging down growth. Much of what boosts productivity is finding the elusive “proper balance” between a number of factors, e.g., public safety and effective regulation.

In addition, history shows that the adoption rate of new technology can be quite lengthy. The widespread adoption of steam power took years. It’s arguable that electricity wasn’t fully utilized for five to seven decades. Personal computers were initially viewed as novelties.



<sup>4</sup> Economic “speak” for adverse side effects.

This chart shows the five-year rate of change in U.S. productivity. Note that productivity has been declining since 2004 and is near its lows set in the early 1980s.

Weak productivity has two adverse effects on the economy. First, it leads to weaker economic growth. A weak productivity environment requires a rising number of workers to generate growth. Second, low productivity tends to stifle wage growth.

Gordon’s view on the current state of the U.S. productivity situation (which is common throughout the West) is that our best years of productivity growth are behind us. The lack of blockbuster new technologies, coupled with stagnant educational attainment, ecological damage and an aging population condemns the West to slow productivity and thus weak growth. This condition creates rising social tensions as various groups vie for a nearly stable set of economic goods. This near zero-sum situation is a recipe for social and political unrest.

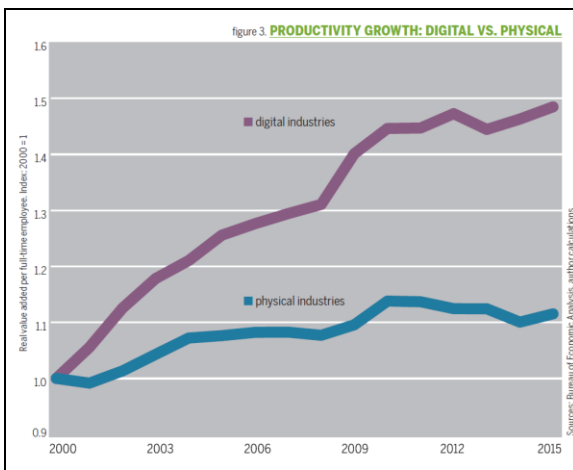
**The Mandel and Swanson Critique**

Mandel and Swanson argue that Gordon is underestimating the impact of the digital revolution and suggest that we are still in the early stages of the expansion of digital technology. They posit that digital technologies will revolutionize the entire economy in coming years, leading to stronger productivity and economic growth.

The two authors begin by dividing the economy into two spheres—the digital industries and the physical industries. The former includes industries where the output is primarily digital; these would be technology, media, financial and insurance, along with professional and technical services. The latter is mostly everything else, manufacturing, construction, mining,

wholesale/retail trade, utilities, health care, hospitality and transportation. Digital industries represent about 30% of the economy, while the physical industries account for 70% of output.

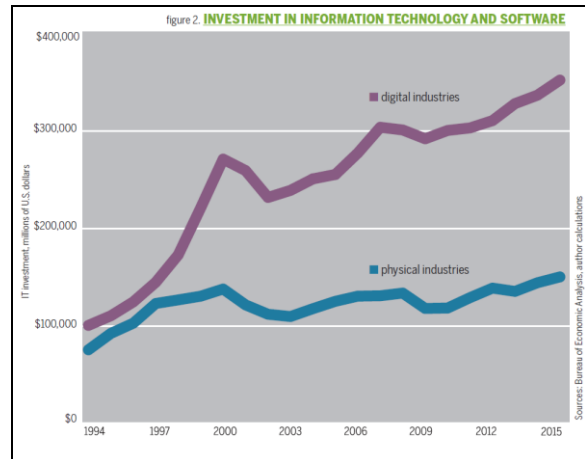
Using advanced data from the Bureau of Economic Analysis,<sup>5</sup> the authors examined productivity growth of the digital versus physical industries. The differences are clear.



(Source: Mandel and Swanson)

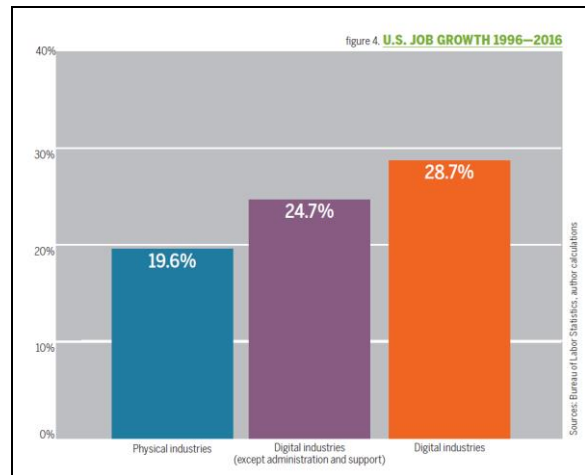
According to their research, since 2000, productivity growth in digital industries has risen nearly 50% compared to only just above 10% for physical industries. A big reason for this is that technology investment is biased toward digital industries.

<sup>5</sup>[https://bea.gov/scb/pdf/2015/09%20September/0915\\_integrated\\_industry\\_level\\_production.pdf](https://bea.gov/scb/pdf/2015/09%20September/0915_integrated_industry_level_production.pdf)



(Source: Mandel and Swanson)

Interestingly enough, job growth in the digital industries has risen faster despite the rise in productivity. It is commonly held that technology destroys jobs; the chart below partially refutes this argument although it says nothing about the training required.



(Source: Mandel and Swanson)

Thus, we have seen a divide in the economy; the digital revolution has led to high investment and rapid productivity in digital industries, while there has been less investment and slower growth in physical industries. Mandel and Swanson suggest that we are about to see the digital revolution spread to the physical industries,

where they expect a lift in productivity and growth for the lagging 70% of the economy.

### **The Spread**

A big reason why the digital industries adopted technology first was that their output was conducive to digitization. When the output of an industry is symbols, it is relatively easy to deliver the output in a digital format. For example, newspapers traditionally used the medium of paper to publish their output. Once that content was digitized, it could be transmitted at much lower cost and updated continuously. Other media, such as books and magazines, are similar. In fact, once a copy of an article is digitized, the marginal cost (the cost of the next unit) essentially falls to zero. Financial products are similar in nature. The proliferation of exchange traded products as investment vehicles is due, in part, to the ease of their creation and the ability to market them electronically. Perhaps the best way to think about digitization is that once a product is made or a task completed, it can

be replicated at virtually zero marginal cost. For example, a software package, once written, can be distributed in this fashion. Thus, a worker has enormous “leverage” in the digital industry. In other words, a digitized product can be produced almost infinitely at low cost; the most talented worker in the physical realm faces limits in multiplying his skill.

Physical industries are more difficult to digitize. However, Mandel and Swanson suggest that the rapid decline in the cost of computing power and storage (the cloud is a key part of this price decline) will allow increasingly complex tasks, jobs that previously could only be done by humans directly, to be digitized. The authors offer six industries poised for strong productivity growth, which we will cover in Part II.

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*This report was prepared by Bill O’Grady of Confluence Investment Management LLC and reflects the current opinion of the author. It is based upon sources and data believed to be accurate and reliable. Opinions and forward looking statements expressed are subject to change without notice. This information does not constitute a solicitation or an offer to buy or sell any security.*

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