

July 24, 2017

## A Productivity Boom: A Response to Robert Gordon, Part II

Last week, we began an analysis of Michael Mandel and Bret Swanson's paper<sup>1</sup> which is a response to Robert Gordon's argument that the West is doomed to a prolonged period of slow productivity growth.

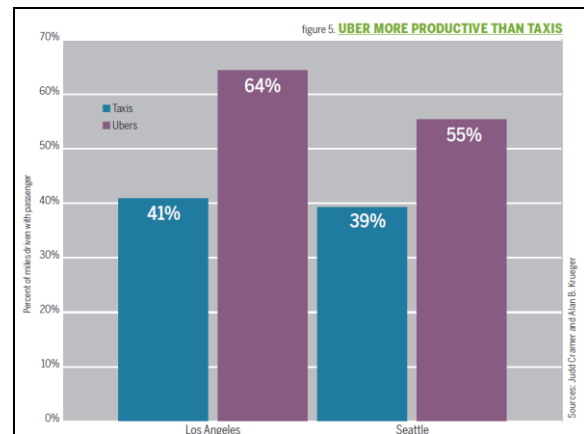
In [Part I](#) of this report, we examined the productivity issue and discussed Mandel and Swanson's analysis of the situation, focusing on their specific division of industries. This week, we will look at six sectors of the economy that appear poised to digitize and how that could change the economy. We will also discuss the conditions necessary for Mandel and Swanson's position to be correct. As always, we will conclude with market ramifications.

### The Six Sectors

Mandel and Swanson's six sectors are transportation, energy, education and training, retail and wholesale distribution, manufacturing and health care. We will discuss them in that order.

**Transportation:** Personal transportation has been assisted by the application of Global Positioning Satellites which, combined with smartphones, have become the maps of choice for drivers. However, ridesharing is becoming increasingly important. The taxi industry has been rocked by the advent of Uber and Lyft. These firms have created the rideshare industry by addressing two factors.

First, the use of smartphone apps has made it much easier for riders to use the service; it even automates tipping. Second, both firms have been remarkably successful in overcoming local regulations that constrained the taxi industry. A study by Judd Cramer and Alan Kruger showed that rideshare firms are more efficient than taxis.



(Source: Mandel and Swanson<sup>2</sup>)

However, the next step in personal transportation is likely to be even more significant. The Bureau of Labor Statistics estimates that 15.8% of household spending goes toward the service and maintenance of motor vehicles; for a middle-income household, the number is 18.2%.<sup>3</sup> Most of the time, motor vehicles sit idle in garages and parking lots. There have been tests of car owners lending out their vehicles to drivers who use apps to gain access to them. However, if cars become autonomous, the cost to households for procuring personal transportation could plummet. That alone could free up purchasing power for other items.

<sup>1</sup><http://www.techcouncil.org/clientuploads/reports/TCC%20Productivity%20Boom%20FINAL.pdf>

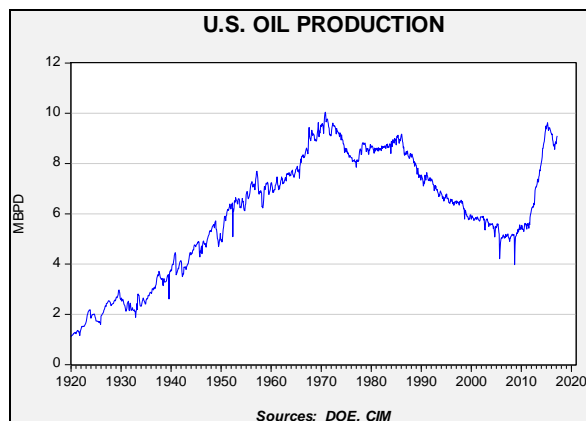
<sup>2</sup> <http://www.nber.org/papers/w22083>

<sup>3</sup> Mandel and Swanson, op cit., page 11.

And, at the same time, it almost certainly will eliminate jobs. The two areas most vulnerable are livery drivers and autoworkers. Autonomous vehicles will eliminate the need for drivers. If cars are used more continuously and intensively, the number of vehicles produced each year will likely decline as well. Simply put, we may not own cars anymore, but instead only use them as needed.

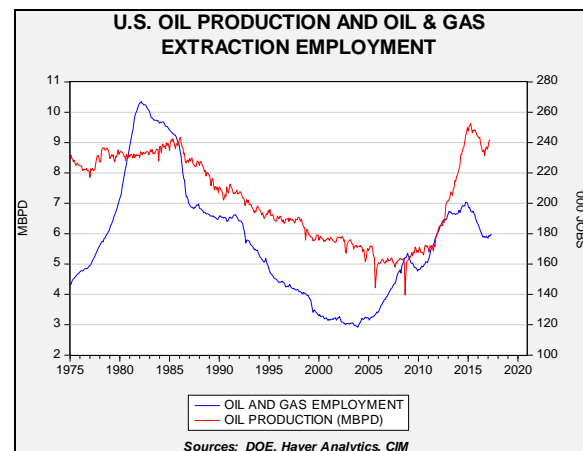
Although drivers and car manufacturing jobs may be lost, other positions will emerge. Obviously, the need to continuously upgrade software and protect cars from hacking will become critical. Since they will be used more intensively, maintenance will become much more important. Breakdowns will require fast responses to keep these cars on the road and to boost the return on the asset. This will boost demand for specially trained mechanics.

**Energy:** This revolution is already underway. Shale oil production and fracking have been utilized for some time. U.S. oil production, once thought to be in permanent decline, has recovered to levels not seen since the early 1970s.



This chart shows daily oil production. After touching 4.0 mbpd in late 2009, production has jumped since. However, what is most important is that even after prices dropped

from over \$100 per barrel into the high \$20s per barrel area, the drop in production was quite modest. That's because the oil industry is aggressively digitizing, using high-powered data tools to find and produce oil from a smaller number of wells. When Saudi Arabia boosted output to reduce oil prices, part of the goal was to cripple the U.S. shale industry. The kingdom failed; in fact, costs are continuing to fall.<sup>4</sup> This development not only insulates the U.S. from significant geopolitical risk, but it has become a source of jobs and investment.



This chart shows the level of oil production and the number of workers in oil and gas extraction. Note that current production is just over 9.0 mbpd; when this level was last touched in 1984, the industry employed 240k workers. It's now producing that much with 180k workers. On the other hand, employment troughed in 2003 just below 120k. Thus, the new technology has created more employment.

**Education and Training:** Education costs are a major concern for society. Higher education costs are creating major debt burdens for students and their parents, resulting in constant fear of spending lots of money only to see low returns on

<sup>4</sup> <http://mobile.reuters.com/article/idUSKCN10828Q>

investment. Gordon and others have noted that educational attainment has slowed, in part, because the time required to complete a degree is taking too long.

Online courses and degrees offer the promises of reducing the cost and increasing the efficiency of education but, so far, returns have been slow to develop. Mandel and Swanson argue that the economy and its workers will require constant retraining. Lifelong learning will become the norm as opposed to separating one's life into school then work. However, merely putting lectures on a computer won't necessarily address the problem. Research suggests that, so far, online courses are not as effective as in-person lectures, at least at the community college level.<sup>5</sup>

However, it does appear that students with more extensive academic backgrounds have better success at current online courses. It appears that if a student has “learned to learn,” then online courses can be valuable. The authors also note that the fixation on degrees will likely need to change, with the potential for lesser “credential” accomplishments to have a greater impact. In addition, manual training might include augmented reality glasses to guide the student through a procedure.<sup>6</sup> In my own experience, online courses can be quite effective, especially for learning specific tasks.<sup>7</sup> Boosting the human capital of workers is a critical issue if Mandel and Swanson's productivity revolution occurs.

<sup>5</sup><https://www.usnews.com/news/articles/2015/04/27/studies-online-courses-unsuccessful-at-community-colleges>

<sup>6</sup> Mandel and Swanson, op cit., page 14.

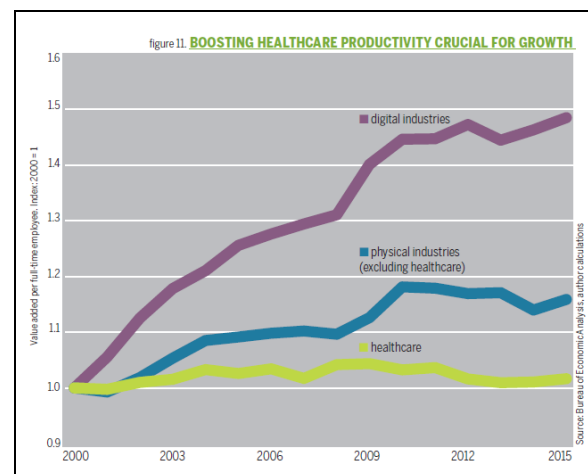
<sup>7</sup> I am a fairly accomplished cook. I was able to trim and finish a beef tenderloin by watching a YouTube video. On the other hand, an inexperienced cook would likely struggle to find success in this manner.

### Retail and Wholesale Distribution:

Interestingly enough, this industry was a productivity star until the middle of the last decade. The authors argue that the productivity bottleneck in distribution has been the “last mile” problem. The delivery of goods eventually falls to a truck dropping off a package. This isn't the most efficient way of delivering goods; in fact, a physical store where customers shop was a way to reduce the cost of the last mile by shifting the cost to the consumer. The authors don't have much to say on how technology could improve this situation other than to offer that drones may deliver packages and software may allow customers to order directly from the manufacturers, bypassing retail storefronts completely.

**Manufacturing:** Although manufacturing is generally considered more productive than services, the authors argue that technology industries (the digital industries) are responsible for most of the productivity gains. They see manufacturing adding technology rapidly via robots and better data management.

**Health care:** This is an industry that is showing almost no productivity growth.



(Source: Mandel and Swanson)

Health care productivity has been flat since 2000. Thus, to meet growing demand, workers have been added but these employees have limited productivity gains, so the cost to the economy steadily rises.

The authors argue that the application of “big data” in early diagnosis will help reduce costs. An example is wearable technology linked to smartphones that can warn physicians of early problems so that medical events can be treated sooner, with lower costs and better outcomes. In addition, biotechnology and genetics offer the potential for lower cost, customized care. Remote care, using robotic devices tied to doctors in distant places, will allow the productivity of physicians to increase. Essentially, medicine should move from focusing on care after a medical crisis to preventing one in the first place.

### **The Hurdles**

Mandel and Swanson make a plausible argument for boosting productivity. However, there are hurdles to their projected productivity boom. Here are the major constraints:

**Rent-seeking behavior:** In a slow growth world, economic actors try to grow their profitability and income through rent seeking. This comes in many forms. It includes regulatory capture that prevents new competition. Copyrights and patents can slow the proliferation of new techniques and keep their costs elevated. Union rules can prevent new worker entrants; although blue collar unions have dwindled, other forms of labor supply constraints have emerged. For example, doctors and dentists protect their employment by regulations that require their presence to perform a task that could be done by a lesser trained technician. The hair braiding industry has become a

“poster child” for regulation run amok.<sup>8</sup> Some cities have prevented or impeded ride-sharing, which protects the taxi industry. Some new entrants into automobile production want to forgo a dealer network, which is mostly unnecessary in a high-tech world where customization is more common. But a myriad of state regulations protects auto dealers. In periods of faster growth or high inflation, firms and workers can be persuaded to give up their rents. However, in periods of slow growth and low inflation, these rents become precious. Thus, the government would need to aggressively act to undermine rent-seeking behavior, which is politically risky.

**Concentration:** The mythology of the technology industry is that monopoly power can be destroyed by “a guy in a garage.” There is a clear element of truth to this position. The tech world is littered with firms that once dominated but no longer have much power. However, we have noticed lately that the large tech firms, which are holding heavy cash positions, are buying up small firms that could become future competitors. It isn’t clear whether this activity will stifle future innovation but the potential exists. We note the first car phone network was tested in St. Louis in 1946 and the first cell network a year later in New York.<sup>9</sup> Broader adoption would likely

<sup>8</sup><http://www.npr.org/templates/story/story.php?storyId=243476281>

<sup>9</sup><https://books.google.com/books?id=ULmg1grduBMC&pg=PA3&lpg=PA3&dq=This+service+originated+with+the+Bell+System,+and+was+first+used+in+St.+Louis+on+June+17,+1946.&source=bl&ots=liLbhvBJb&sig=2BhfJIQROmSfIA6mmVbcz46Uw8A&hl=en&sa=X&ved=0ahUKEwjjokZn--DUAhVC4oMKHbXvBWQQ6AEILjAB#v=onepage&q=This%20service%20originated%20with%20the%20Bell%20System%2C%20and%20was%20first%20used%20in%20St.%20Louis%20on%20June%2017%2C%201946.&f=false>

have occurred sooner if AT&T wasn't a monopoly.

**The political environment:** Although the authors might dispute this assertion, it appears that the U.S. has been relatively deregulated since 1978, at least compared to the period from 1932 to 1977. Mandel and Swanson are arguing for even more disruption in a period where workers feel less secure. Simply put, populism is a movement against what the authors are seeking.

### **Jumping the hurdles**

Can these obstacles be overcome? It will be difficult but not impossible. Essentially, the first problem to solve is job and income insecurity. There has been a lot of discussion about expanding the earned income tax credit to help the working poor and perhaps even a basic national income. Expanding training and educational opportunities through the integration of technology and learning needs to occur at the same time. Once the political situation is stabilized, enlightened regulation could then work on curtailing rent-seeking behavior and industry concentration.

### **Ramifications**

At this point, the odds of such a revolution appear long. However, when the U.S. and Britain embarked on deregulation and globalization in 1978, those movements appeared unlikely to succeed. When conditions become dire, policymakers and the public become open to policy adjustments they had previously shunned.

Mandel and Swanson have offered policymakers a general path forward. In their paper, they don't address the current political problem of worker insecurity. However, one could imagine a situation in which a tradeoff between income support, lifetime retraining and increased digitization is embraced. If such an outcome occurs, we would expect a full-fledged secular bull market in equities to develop, one that is driven by earnings, hope and optimism instead of unconventionally accommodative monetary policy.

Bill O'Grady  
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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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