

## Mitchell's Musings 7-28-14: Productive Impressions or Official Data?

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In recent times, much has been said about technology being “disruptive” as if this was a new idea. Yet the modern era has been characterized by a stream of innovations that led to disruptions. Look at pictures from the 19<sup>th</sup> century of city streets and you will see horse-drawn vehicles. Then the automobile came along and the horses disappeared. One could go on and on: electricity, steam power, broadcasting, movies, airplanes, the telegraph, railroads, etc.

One explanation for the impression that we are living in a time of unprecedented technological disruption is that the particular disruption we are having involves information and, more specifically, publishing. Journalists write about their own predicament caused by the Internet. The myriad telephone operators who were displaced by dial phones didn't have a platform on which to publicize their predicament.<sup>1</sup>

There are measures of productivity available. I'm not going to argue here that such measures are without flaws. In fact, if anything, what flaws there are probably tilt toward methodologies that exaggerate current productivity relative to the past. Government statisticians do not operate in isolation. If politicians and commentators just “know” that productivity is rising particularly fast nowadays – “Look at my cell phone!,” they might say – efforts are made to take account of the latest innovations.

As a practical matter, no one goes back to make sure that the historical productivity data properly accounted for, say, tubeless and then radial tires. But old timers like me can tell you that experiencing a tire blowout in a tube tire car was an experience not worth having. No one goes back and looks at whether the indexes properly accounted for FM, TV, color TV, long-playing records, or polio vaccine.

Anecdote: When I was about eleven years old, someone gave me a “portable” radio. Portable is in quotes because to use this vacuum tube/wooden cabinet radio with batteries required two large 45 volt batteries and two large 4.5 volt batteries. With the batteries in it, the radio was like a heavy suitcase in weight. In fact, the radio had a leather handle which broke under the strain. Moreover, the batteries were expensive and wore out quickly because vacuum tubes represented a significant drain. In those days, although car radios were common, parking your car and leaving the radio going would kill your car battery after a few hours. Then transistors

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<sup>1</sup> <https://www.youtube.com/watch?v=CIDw75mUI6c>. At the time, the displacement of telephone operators by dial services was seen as a sign of how disruptive technology could be.

came along and suddenly portable radios could fit in your pocket and were cheap to operate. Car radios no longer killed car batteries.

Even in old Hollywood movies from the 1930s, and certainly in modern films that take place back then, if someone turns on a radio, it comes right on. But vacuum tube radios did not come right on. Rather they would hum for awhile as the tubes heated up. Then the sound would fade in. Transistors changed all that so radios do turn on instantly. But in Hollywood films, no one wants to waste a minute or so waiting for radios to warm up, hence the fiction that they always could operate immediately.

I was reminded of all of this recently when someone sent me a YouTube link to the first Telstar satellite broadcast. Until the early 1960s, although voice could be sent across the ocean by phone cable or shortwave broadcast, moving pictures could not be transmitted. Telstar was a breakthrough that changed the situation.

Telstar was a satellite capable of receiving and forwarding TV signals. It was not geosynchronous and so as it orbited the Earth, there were only brief intervals during which a signal across the Atlantic was possible. When it was launched and readied in 1962, two demonstration broadcasts were arranged. One was a U.S. broadcast to Europe showing such scenes as the Statue of Liberty, Mount Rushmore, and the Golden Gate Bridge. You can see it at [https://www.youtube.com/watch?v=0IX7vC4Ts\\_A](https://www.youtube.com/watch?v=0IX7vC4Ts_A).<sup>2</sup> Then, after an interval allowing the satellite to come back into range, there was a Europe-to-U.S. broadcast. (Unfortunately, I couldn't find that one on YouTube.)

The Telstar satellite was seen as so remarkable that a hit instrumental record entitled "Telstar" topped the charts with sound effects that were intended to sound like a rocket taking off: <https://www.youtube.com/watch?v=Q5TB3kUdw-0>.<sup>3</sup> Decades later, Walter Cronkite, one of the TV newscasters on the original Telstar broadcast, talked about the event on NPR: <https://www.youtube.com/watch?v=FgplIWibv4Q>. By the end of the 1960s, the U.S. had succeeded in putting a man on the Moon. Those who are convinced that technical advance is

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<sup>2</sup> The first ten or eleven minutes of the video consist of reminiscences by a technician from the North Dakota TV station that was responsible for the Mount Rushmore segment. You can skip ahead if that doesn't interest you to the actual broadcast. All did not go entirely smoothly. There was supposed to be a side-by-side image of the Statue of Liberty and the Eiffel Tower but it didn't work. In some spots, there were other technical difficulties, notably a tendency for the horizontal hold to break as the scene shifted from one location to another.

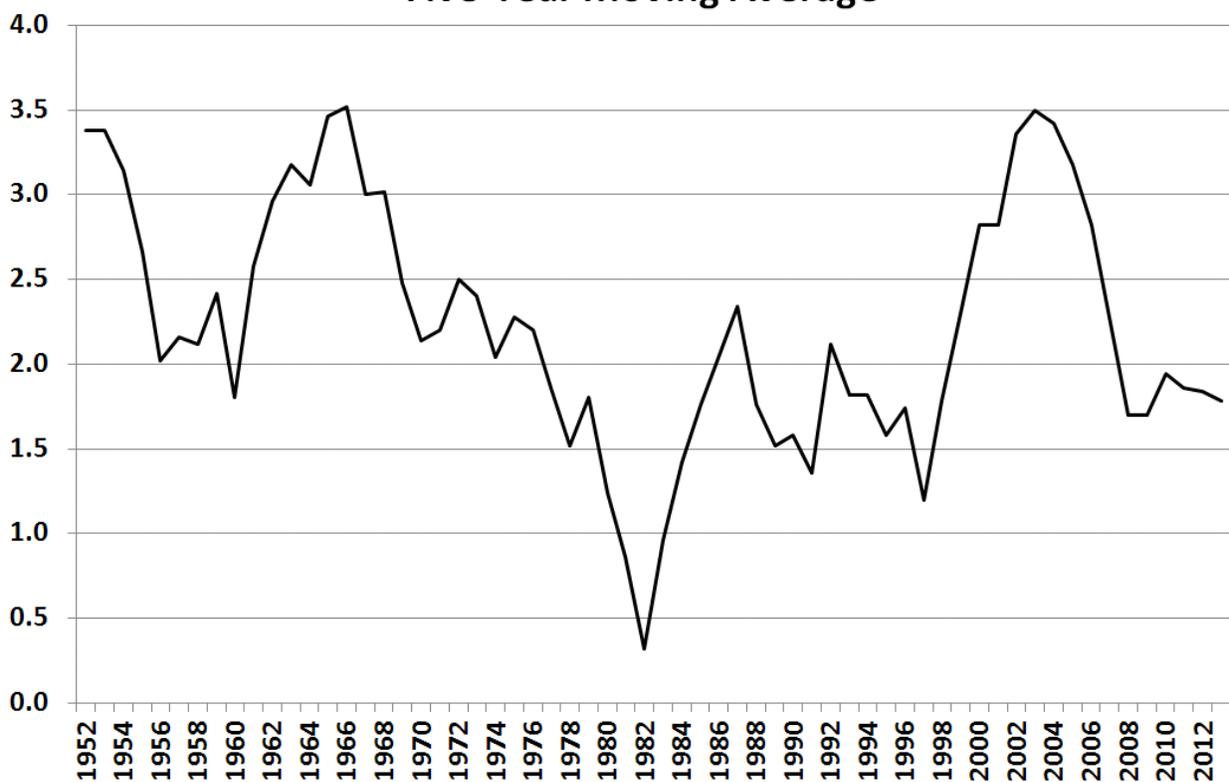
<sup>3</sup> Later, lyrics were added and the record was released under the title of "Magic Star."

<https://www.youtube.com/watch?v=xtubEdQUJZO> I used to play the instrumental Telstar music at the beginning of my labor markets class while I set up the computer equipment. Students asked what the tune was and I said it would be revealed later in the class. When we got to the technology and productivity unit of the course and traced through the advances mentioning Telstar, I would note that a hit record was released related to the event which everyone in the class had heard and then play it. The secret was revealed.

very recent might ask themselves whether the U.S. today could put someone on the Moon without a great deal of re-learning.

We started out with a reference to official data on productivity. One commonly-used measure is the Bureau of Labor Statistics' index of output-per-hour, where the "hour" refers to labor hours. When people talk about productivity, this is the standard index. Output-per-hour is erratic and highly sensitive to the business cycle. To smooth out the growth of the index, the chart below uses a five-year moving average although even that degree of smoothing doesn't entirely eliminate the cyclical effects.

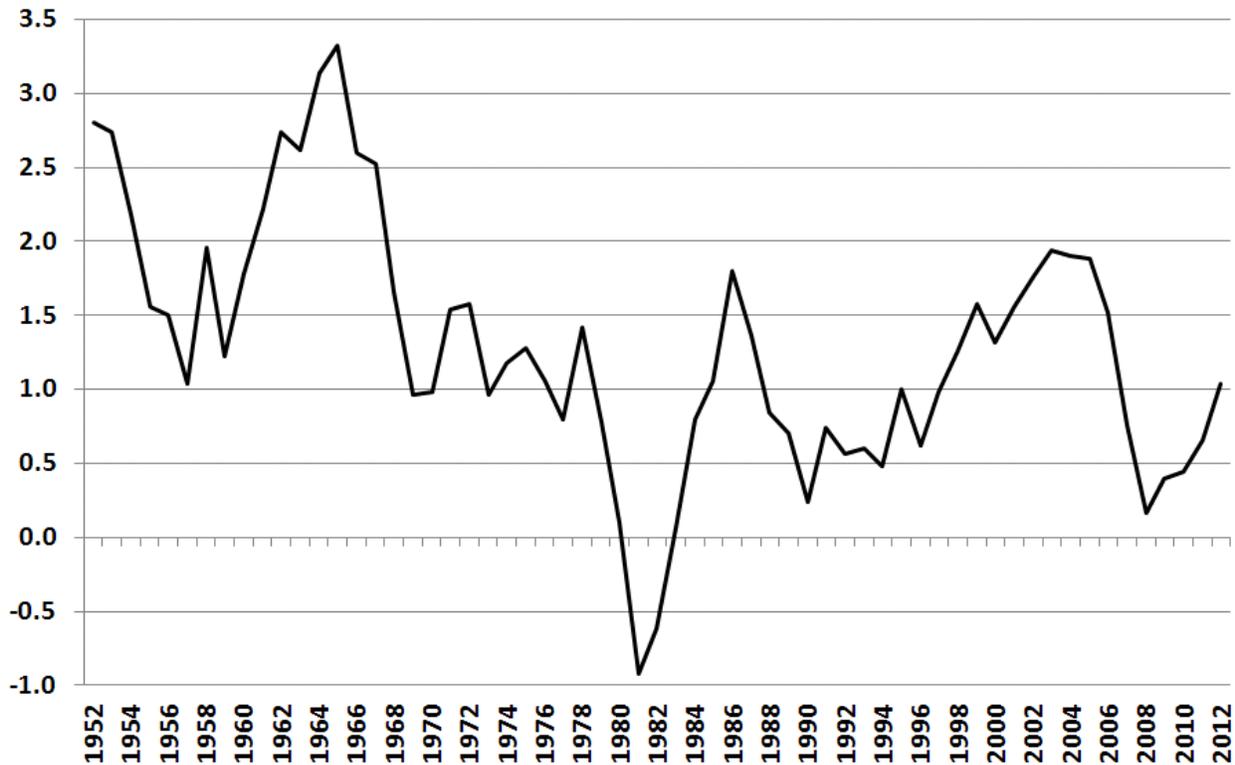
### Nonfarm Business Annual Change in Productivity: Five-Year Moving Average



If you dismiss the most recent years in which productivity growth seems to lag as due to the Great Recession and its aftermath, there is indeed a productivity spike in the early 2000s. But it is comparable to an earlier spike in the 1960s, the Telstar era. The early 1950s seem to have productivity growing almost as fast. By this measure, anyway, we do not seem to be living in a time of unprecedented productivity growth. And – as noted earlier – if anything the official numbers tend to boost recent figures relative to the past.

It is often pointed out that productivity, when measured by output-per-hour omits the contribution of capital equipment. Technological advance should be what remains after you subtract out the gains in output that result from use of both labor and capital. The Bureau of Labor Statistics thus has a “multifactor” productivity index that takes account of the contribution of both factors of production. You can find a chart below using that index.

**Multifactor Private Business Annual Change in Productivity:  
Five-Year Moving Average**



Using the multifactor index in fact puts the Telstar era ahead of the early 2000s. So in fact the official data do not suggest that we are living in a period of technological disruption unlike any other. Unless you have better evidence that just pointing to your cell phone, that is the take away of this musing which, of course, was produced with technology that didn't exist in the Telstar era, five decades ago. The point, however, is that Telstar was produced by technology that didn't exist five decades before it was launched, too. Fifty years before Telstar, you couldn't transmit voice by radio, let alone images. And so it goes.