



CUBIC ASSET MANAGEMENT, LLC

2017 1st Quarter Stock Market Commentary

RETURN OF THE LUDDITES

“My father worked for the same firm for twelve years. They fired him. They replaced him with a tiny gadget - *this big* – that does everything my father does, only it does it much better. The depressing thing is, my mother ran out and bought one.”

- Woody Allen

I remember in grade school learning the names of some of the inventors who helped make the Industrial Revolution possible: James Watt invented the steam engine, Eli Whitney patented the cotton gin and Elias Howe invented the sewing machine. Or at least that is what I thought until I read an article about Barthelemy Thimonnier who, in 1830 (sixteen years earlier than Howe’s U.S. patent), was granted a patent by the French government for a sewing machine using a barbed needle and made almost entirely of wood.

Thimonnier received a contract to build a batch of machines and use them to sew uniforms for the French army. In less than 10 years after the granting of his patent Thimonnier had a factory running with 80 machines. But, not surprisingly, Parisian tailors feared that sewing machines would soon take over from hand sewing, putting the tailors out of work. Late one night a group of tailors stormed the factory and destroyed every machine. Thimonnier was forced to flee for his life. With a new partner, he started again, produced a vastly improved machine and looked set to go into full-scale production; but the tailors attacked again. With France in the grip of revolution, Thimonnier received no help from the police or army and fled to England with the one machine he was able to salvage. While Thimonnier produced the first practical sewing machine, was the first man to offer machines for sale on a commercial basis, and ran the first garment factory, he died in the poor house in 1857.

Protests against the use of machines to replace human labor were not uncommon at the dawn of what has been renamed the First Industrial Revolution. In 1799 a weaver named Ned Ludd who lived near Leicester, England is reputed to have smashed two stocking frames (mechanical weaving machines), although there is no evidence this actually occurred. In 1812 when roving bands of weavers went on a rampage smashing stocking frames, the attacks were attributed to King Ludd, and the word Luddite became synonymous with anyone opposed to new technology. In the same era, Dutch shoemakers supposedly protested the rise of automation by throwing their

wooden shoes, known as sabots, into the machinery. This is reputed to have been the etymology of the word sabotage, although, this story too seems to be apocryphal.

The First Industrial Revolution was characterized by the use of steam power to mechanize production. The Second Industrial Revolution, a century later, used electric power to replace steam. The so-called Third Industrial Revolution involved the use of computers and information technology to automate production. And, according to nearly every speaker at the recent World Economic Forum in Davos, Switzerland, we are now in the midst of the Fourth Industrial Revolution, in which previously distinct technologies, like artificial intelligence, automation, bio-technology and nano-technology are fused, blurring the lines between disciplines.

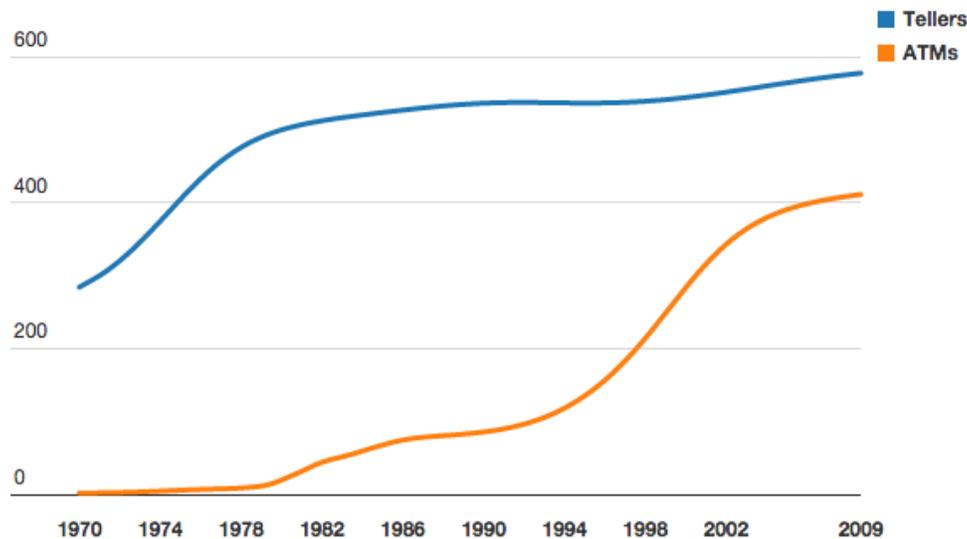
There is little doubt that we are in the midst of an era of dramatic change in the workplace. Robots, for example, have been used for fifty years on the factory floors of automobile factories to pour molten metal into die cast, weld chassis together, and precisely move payloads too heavy to be easily moved by humans. They never get bored, work with great precision, and never call in sick or go on strike. As the price of smaller industrial robots has dropped, they have begun to be used by small manufacturers to perform tasks requiring dexterity in industries like food processing or pharmaceutical manufacturing. The incorporation of artificial intelligence has given rise to what has been dubbed collaborative robotics, in which humans and robots are side-by-side.

Amazon is currently experimenting with the use of drones to deliver some of the millions of packages currently carried by UPS and FedEx drivers. Every major car company is working on the development of autonomous vehicles, which could imperil the livelihood of the nearly 3.5 million Americans who earn their living driving a truck (2.4 million), bus (660,000), taxi (180,000) or Uber car (160,000).

But the biggest threat will likely come from artificial intelligence, which offers the ability to eliminate higher-paying knowledge work, such as that found in call centers or human resource departments. A recent McKinsey study estimates that roughly half of the time that workers spend on their jobs could be supplanted through the use of artificial intelligence tools and automation that already exists. In the recent past many jobs were lost to workers in foreign countries willing to work for lower wages, a practice called “off-shoring.” The current trend has been dubbed “no-shoring,” in which back-office tasks are brought back to the home country in which a company is headquartered, but without bringing back any jobs since technology is substituted for human capital.

But the doom and gloom suggested for the middle class by the rise of technology paints a future somewhat darker than is likely. It is instructive to consider an example to see why this might be. In 1960 an inventor named Luther Simjian convinced one bank in New York to purchase a machine he had invented called the Bankograph, a machine to accept deposits automatically. Customers were reluctant to use the machine, fearful that it would not record each transaction, despite the fact that the machine gave depositors a photo of each check deposited. Nine years later a Dallas inventor named David Wetzel produced a machine which not only accepted deposits but dispensed cash. Customers used a plastic card as identification. He convinced Chemical Bank to use the machine. Within a few years, ATM machines were ubiquitous. Bank

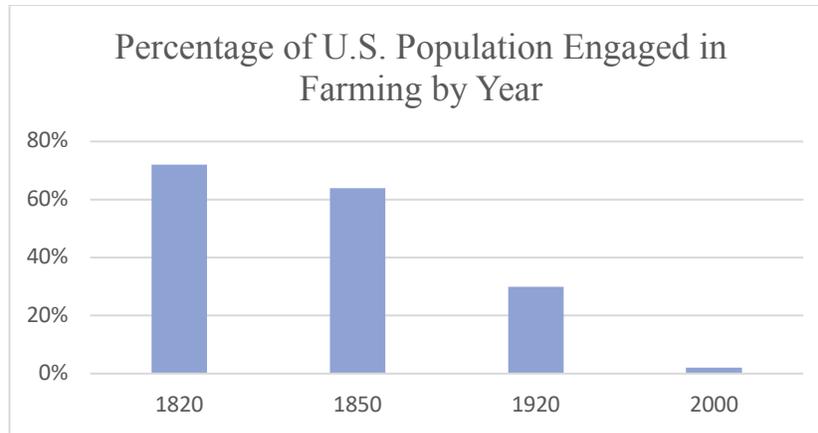
executives almost unanimously predicted a sharp decline in the number of bank tellers. So what happened?



The number of bank tellers essentially doubled since the introduction of the ATM. Even more recently the number of tellers has grown faster than the growth in the labor force overall. Prior to the invention of the ATM a typical bank branch in an urban area employed 23 tellers. Currently, only 13 tellers are required. This reduction in the labor cost of maintaining a branch allowed banks to open many more branches to get closer to their customers. While each branch required fewer workers, in aggregate banks require more tellers today.

Another example of how technology has simultaneously eliminated some jobs while creating others can be found by looking at the explosive growth in the number of apps since the introduction of the first iPhone in June, 2007. When Apple launched its App Store there were 800 apps available for download. Worldwide, there are now an estimated two million apps. Worldwide revenue generated by apps is estimated by AppAnnie at \$40 billion last year, forecast to grow to over \$100 billion by 2020, with most of the revenue generated by games. Slightly over 40% of that amount is within the Apple ecosystem. There are currently an estimated 1.6 million app developers and approximately 800,000 people per year join their ranks. While 60% of them earn below the “app developer poverty line” of \$500/month, 10% earn \$10,000 or more per month. At least in the case of smart phones, technology has been responsible for the creation of a large number of high paying jobs.

Perhaps the most dramatic example of the impact of new technology on employment has occurred in agriculture. At the time of the Revolutionary War it is estimated that more than 90% of the population lived on farms. After the introduction of machinery during the first Industrial Revolution that figure had dropped to 73%. The work was arduous, requiring manual labor that limited the size of the farm that one farmer could manage. Today, with modern farming equipment, farms are huge, and only 2% of the population lives on farms. But they are able to produce far more food with far fewer people.



It might seem that any technology which eliminates the jobs held by 90% of the population would have a devastating effect on employment. But, somehow, nearly all the displaced farmers have managed to find jobs as cable TV installers, software engineers, or medical technicians, to cite just a few of the occupations which did not exist at the time of the writing of the Declaration of Independence.

The introduction of new, disruptive technologies has profound implications for the investment process. Consider a company like Medallion Financial, a small-cap specialty finance company which finances taxi medallions. The value of its collateral is problematic given the competition posed by Uber and Lyft. Cumulus Media, a radio broadcaster, is struggling to compete with Pandora and Spotify. It is not surprising that both stocks are down nearly 80% from their highs last year. Contrast that with a company like NCR (the original National Cash Register, founded in 1884) which has reinvented itself as a world leader in self-service kiosks and ATMs. Similarly, IBM, originally a manufacturer of adding machines and punch card readers, has had to re-invent itself many times over the past 125 years. It morphed into the world's largest mainframe computer maker, but the microprocessor decimated that business. It has responded by building a large cloud services business, and has staked its future on the commercialization of its artificial intelligence expertise (think Watson, the Jeopardy champion computer).

The threat that automation poses for jobs has been constant for hundreds of years. Yet somehow agricultural job losses were replaced with manufacturing job gains. More recently manufacturing job losses have been replaced with jobs in the service sector. But the Neo-Luddites now warn that the current incursion of technology into the service sector will cause job losses for which there are no easy substitutes.

But the Cassandras are missing a key point. Technology increases productivity (defined as the ability to produce more with fewer workers), which in turn increases overall wealth. Increased wealth gets allocated within society to create additional demand, which in turn requires additional workers. The wealth from increased productivity can be shared by all in the form of lower prices for goods and services. It can be distributed to remaining employees in the form of higher wages. It can accrue to shareholders in the form of higher profits. Our goal as a society should be to ensure that the wealth created by new technologies is shared as broadly as possible, rather than to be concentrated in a fortunate few. But resisting technological progress is as futile as trying to hold back the tides.