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# [Technological Change & Its Implications for State and Local Governments & the Broader Economy](http://www.courtstreetgroup.com/commentary/2018/6/21/qo8nizfqdf7mwdb45zuknrhohpibhe)

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**The Court Street Group White Paper Series on Accelerating Technological Change and Its Implications for State and Local Governments**

**Volume I: Technological Change and The U.S. Economy: We Believe that Inflationary Pressures are Likely to Recede,**by Managing Partner, George Friedlander

Welcome to the first in our series of white papers on accelerating technological change (ATC) and how it is going to affect the U.S. economy, state and local governments, labor movements, and the municipal market as a whole.

These papers will delve into various components of ATC that, in our view, is happening faster than most analysts and strategists anticipate. We will cover the topics with the contributions of different experts and institutions over the course of the summer and into the fall—and perhaps beyond. We will begin in the coming weeks with an introductory paper that will lay out a broad scope of the potential implications for state and local governments—as we view them—in summary terms, and then we will break down a significant number of the key issues in subsequent discussions. Even before starting that, however, we would like to note a few of the key issues that, in our view, will shape economic patterns in coming years.

Our bottom-line views are that:

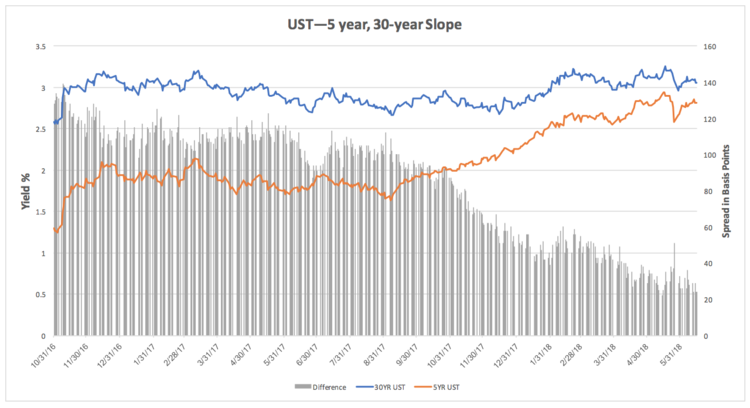
1)           Technological change is indeed beginning to accelerate sharply—what many futurists call “the bend in the hockey stick,” as change goes from slow to fast to very fast to “nearly vertical.”

2)           The implications of this pattern are going to be extraordinarily important for state and local governments, as we will discuss in future papers. In the meantime, however, we make the case that the imminent changes are going to have extremely important implications for productivity, inflation, monetary policy, and resultant interest rate cycles.

3)           In our view, based upon studies by a number of futurists and economists that we deeply respect, there is a strong possibility that: a) productivity will increase as ATC becomes further ingrained in our economy; b) at least some jobs will be replaced by automated solutions; c) in other cases, disposable income will come under pressure from such solutions, and median disposable incomes will recede as a consequence; and, d) that all of this will lead toward a growing “output gap;” whereby production increases faster than labor-based demand. During a period with a growing output gap, inflation tends to recede as companies find it more difficult to sell goods and services at increasing prices.

4)           If these patterns occur as we anticipate based upon considerable evidence from noted economists and futurists, there are likely to be some intriguing implications for monetary policy, interest rates, and the length of economic cycles. Namely, we believe that as we move more deeply into the bend in the hockey stick, trendline inflation will come under significant downward pressure, and monetary policy will be eased in response.

5)           A key result of an ATC-induced expansion of the output gap will be longer economic cycles Indeed, the long slow growth cycle we are currently in may well be the first such cycle that is being affected by reduced inflationary pressures as a result of soft labor cost growth, that is being affected in part by ATC and by connected global patterns. Indeed, while this view does not appear to be widespread, we would make the case that the extreme flatness of the back end of the Treasury yield curve, with the 30-year yielding only 24 basis points more than the 5-year (versus 66 basis points at the beginning of the year), may result in part because of the potential for dampened inflationary pressures in the “out years.” In our view, there is a real possibility—which we cannot claim to prove—that the dramatic flattening of the Treasury yield curve has resulted at least in part from the very early stages of an ATC-affected economy. One thing is already certain: the so-called “Phillips Curve” under which economic growth/labor costs and unemployment move inversely seems to be at least partly “broken”—could ATC be the cause? We will watch with interest for evidence one way or the other.



We end this summary with three comments related to this rapidly changing environment:

•            First, in our economy and in the capital markets, ATC is generating changes such that “the last time we were here” was **never**. Market observers who look at capital market patterns, economic patterns, monetary policy patterns, etc. as if we are just in the late stages of yet another cycle are, we believe, making serious mistakes—and we hope to provide ample evidence of this in upcoming papers.

•            Second, as the economists at the Dallas/Atlanta Fed conference note emphatically, ATC is **disruptive** change. In the sense of chaos theory, disruptive change is what you get when you “perturb” a nonlinear system, such as a major economic one. In such cases, we can see hints of what the outcomes will look like, but not certainty as to the outcome, or the timing. In federal, state, and local management and finance, we see the uncertainties related to such changes in Transportation as a Service (TaaS), Delivery of Healthcare, out-year monetary policies, and a wide range of other factors related to ATC.

•            Consequently, what we are looking at in some systems is a combination of inevitable changes and

“shadows.” As we explore many of these topics, we will try to identify the differences between the two — but know with a certainty that we will not always succeed. Round one of this discussion begins below, in terms of labor patterns, productivity, inflation, monetary policy, and interest rate trends. We hope that our readers find these discussions useful and helpful in understanding what happens when the hockey stick indeed starts to bend, and then for state and local governments, in understanding implications for demographic patterns and development strategies, as well as management, policy, and credit trends. We delve into the evidence for receding inflationary pressures a bit more below, and will expand the discussion on pressures on labor in future white papers.

**Technological Change and the U.S. Economy: Why We Believe That Inflationary Pressures are Likely to Recede**

**Item:** Citigroup Inc.’s (C.N) investment banking business could shed as much as half of its 20,000 technology and operations staff in the next five years due to automation, the Financial Times recently reported.

**Item**: [According to Quartz Daily](https://qz.com/1304987/amazon-has-already-begun-automating-its-white-collar-jobs/), “Algorithms have usurped Amazon’s retail decision-makers” in such a way as to reduce labor requirements.

“The e-commerce company once relied on humans to predict demand of certain products, such as anticipating and ordering a glut of the season’s hottest toys ahead of the holiday season. But a report from Bloomberg on June 13 shows that the decision-making process has slowly transitioned toward automated ordering and communication with manufacturers, leaving humans in the lurch. This trend isn’t surprising at an automation-minded company like Amazon, but it’s indicative of a wider trend in analytics-based jobs: the algorithms are coming. Whether it’s insurance adjusting or product buying like Amazon’s workers, there could be software that does an increasingly better job for a lower cost than a human salary.”

**Our added note:** Of course, these patterns do not yet take into account the implications of automation that are still a bit further down the road (to coin a phrase), but which will also have dramatic implications for employment, disposable incomes, income/wealth disparities, and regional economic forces. These, in our view, include the potential for substantial increases in the use of automated electric vehicles (cars **and** trucks) in ways that ultimately will compete with human workers, and strong competition for labor-intensive brick and mortar retail from low-labor online retail solutions.

**Item**: The Dallas and Atlanta Federal Reserves [recently held a two-day conference](https://www.dallasfed.org/research/events/2018/18ted)entitled: “Technology-Enabled Disruption: Implications for Business, Labor Markets and Monetary Policy”

As noted in the conference program, technology-enabled disruption means that workers are increasingly being replaced by technology. It also means that existing business models are being supplanted by new models, often technology-enabled, for more efficiently selling or distributing goods and services. In addition, consumers are increasingly able to use technology to shop for goods and services at lower prices with greater convenience—having the impact of reducing the pricing power of businesses. This reduced pricing power has, in turn, caused them to further intensify their focus on creating greater operational efficiencies. These trends appear to be accelerating.

The program also suggests that “it is likely that disruption is a factor in economic outcomes becoming more and more skewed by the educational attainment levels of workers. Increasingly, workers with lower levels of educational attainment are seeing their jobs restructured or eliminated. Unless they have sufficient math and literacy skills, or are retrained, these workers may see their productivity and incomes decline as a result of disruption. This may help explain the muted levels of wage gains and overall labor productivity growth we see in the U.S. as well as other advanced economies.”

The impact of technology-enabled disruption on the workforce is likely not susceptible to monetary policy—it requires structural reforms, including improving early childhood literacy and overall college readiness. (Note, this discussion also leads to a growing need for what is called life-long learning as a way to keep workers fully employable in well-paying jobs.)

“They would also include stepped-up efforts to increase middle-skills training in cities across the U.S. in order to improve employment, close the skills gap (not enough workers to fill skilled jobs), and raise worker productivity. Disruption may also help explain why companies, facing one or more disruptive competitors, have been more cautious about making capacity-expansion decisions as well as investing in major capital projects.”

The conference, we think, was noteworthy, especially in the sense that it shows that Fed economists are increasingly including the potential for employment disruptions and related economic changes in their projections for productivity, inflation, and GDP growth. This was, we believe, the most comprehensive Fed-sponsored conference on these key topics held to date.

We start below with a few thoughts on the above, and then a few thoughts on implications for interest rates and economic cycles.

**Some Thoughts on the Economic/Interest Rate Outlook: A Perspective from Technological Change**

First, we note that, as we have discussed in the past, a variety of factors related to technological change are going to lead to rapid transitions in the U.S. economy, with likely potential for disruption in trends of growth, sectoral strength, productivity, inflation, and so on. We also note with interest that, as in the Dallas/Atlanta conference, Fed economists are beginning to take these issues quite seriously in terms of their implications for monetary policy.

Almost simultaneously, there was a high-level conference at MIT, entitled EmTech NEXT, which was organized by MIT Technology Review. Without going into the ideas expressed at this conference in detail, we note the [article in Forbes](https://www-forbes-com.cdn.ampproject.org/c/s/www.forbes.com/sites/tomdavenport/2018/06/08/on-ai-and-jobs-we-are-all-augmentarians-now/amp/) that dealt with some of the issues addressed at the conference.

A key argument in the article is that many futurists are becoming “augmentarians,” who expect automation to **augment** employee output rather than replacing it. A key factor here is that, at least to date, productivity growth hasn’t increased in response to accelerating technological change. Well, for further discussion on that, we refer the reader to an [article by Erik Brynjolfsson and his team](http://www.nber.org/chapters/c14007.pdf), which deals with the issue as to why productivity growth has stayed so slow. As Brynjolfsson et al note, AI/Automation is a “general purpose technology,” (GPT) and GPTs take time to be integrated into the existing economy. That means more productivity growth over time, as the integration occurs. In our view, leaning on this excellent analysis, it makes little sense that the spectacular enhancements in AI and automation won’t lead to greater productivity growth over time.

A key concern discussed in the Forbes article is that robots and AI will further increase inequality, which is already substantial and growing. Translation: the number of jobs may not decline much, but, as we have been positing for a long time, and as Brynjolfsson and McAffee discussed in “[The Second Machine Age](http://books.wwnorton.com/books/the-second-machine-age/)” in 2014, mean disposable income is very likely to be dampened by competition from automated solutions.

The Forbes article also points out well the issue of the need to create pressures toward lifelong learning that currently do not exist. We also strongly believe that there is a very large demographic niche—40 and over, high school graduates—that may not adapt well to lifelong learning. That group is strongly under threat from automation, either in terms of job loss or income deterioration.

We have no doubt that many of the experts cited in the article are well ahead of us in terms of the aggregate job changes that are coming. Nevertheless, we disagree if they suggest, as summarized in the article, that there aren’t sectors where job replacement from automation comes before job augmentation or substitution. Driving and brick-and-mortar retail are high on our list, along with lower-tier technological jobs as described above.

The bottom line, for us, is that a path toward a growing output gap with higher productivity, lower inflation, lower average spendable wealth, and regional economic disruptions during the period of greatest transitions is still intact.

**Now, what does all of this mean for interest rates and economic cycles?** In our view, during upcoming periods of economic disruption (as defined by the Dallas/Atlanta Feds):

    •    Productivity will rebound

    •    Income growth will be dampened

    •    The “output gap”—the difference between aggregate supply and available demand coming from incomes — will grow

    •    Inflationary pressures will be dampened on a long-term, structural basis

    •    Central banks will have lessened need to tighten monetary policy to offset inflationary threats

As a consequence, we think, economic cycles will last longer—possibly much, much longer, and the need for central banks to tighten to offset excess demand will diminish. All of this, we think, suggests a reason why long-term rates aren’t rebounding significantly as the Fed tightens: Out-year monetary policy will not need to be tightened as in the past, and as a consequence, long-term interest rates are not discounting much higher short-term rates than are currently being projected for the next year or two.

There is much more to discuss on all of this, which we will do in our upcoming white papers, but we hope that the above discussion suggests to the reader how vast the implications of ATC are likely to be, including implications for state and local governments. Stay tuned.