Droidonomics

IPO BOOMS, ECONOMIC DISLOCATION, AND FUNDAMENTALLY ALTERED FED POLICY: WELCOME TO THE ROBOTICS REVOLUTION

By Randy Bateman, CFA

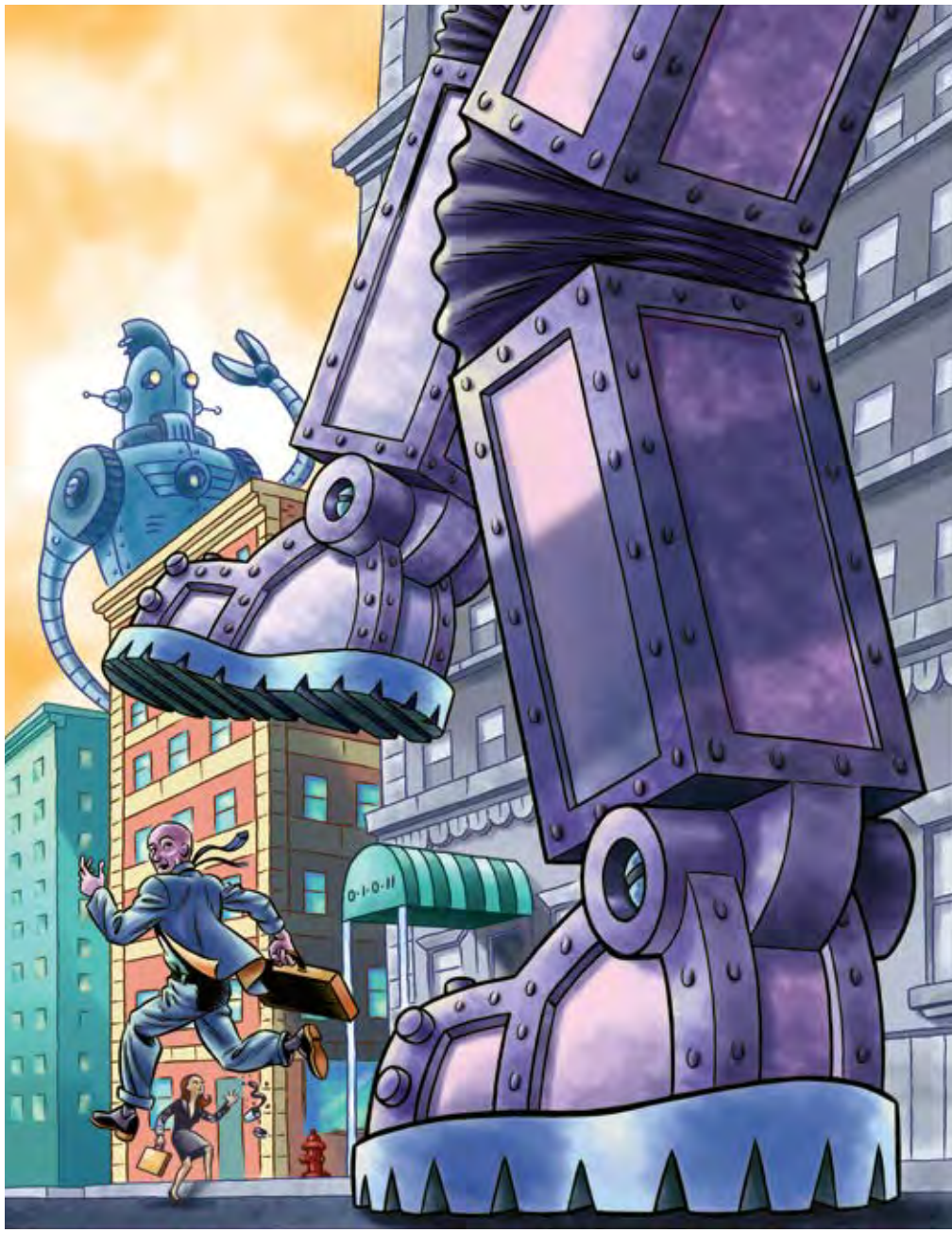

Illustration by Kelly Alder

Trends in information technology, artificial intelligence, and robotics will combine to have a revolutionary economic impact, and changes will hit home sooner than many would like to believe. Investment professionals need look no further than the rise of robo-advisers for confirmation that no industry or sector can be considered safe from the coming robotics-driven transformation. But to comprehend the broader significance for investors and policymakers, the starting point is understanding the implications for Federal Reserve policy. [*Editor's note: For more on the impact of robo-advisers, see the article on page 49.*]

With the passage of the Federal Reserve Act of 1913 and the subsequent creation of the Federal Open Market Committee, the Federal Reserve Board was chartered to develop and maintain monetary policies for two purposes: to promote the pursuit of maximum employment and to restrain both inflation and interest rates. Control over the money supply has been the Fed's primary tool in achieving these goals, and with minor exceptions, the Fed has been successful despite depressions, recessions, international conflicts, market crises, and other economic maladies over the decades. Since the Fed's dual mandate includes employment, however, the task may become much more difficult in the coming years because the meaning of the term "maximum employment" is likely to change.

CHALLENGES FOR ECONOMIC FORECASTING

NAIRU is the acronym for the non-accelerating inflation rate of unemployment. Conversely, "full employment" refers to periods when there is no cyclical or deficient-demand-led unemployment. Both are fancy terms for how many eligible people are actually drawing a paycheck at any point in time. In fact, a perceptional change in the "acceptable" level of unemployment has already begun. In the 1960s, full employment was estimated to be around 4%. For 1988–1997, the OECD estimated that full employment for the US was 5.8%; from 2010 to 2013, it rose to 6.1%.

These changes are the result of many factors, including changing demographics, underemployment, labor force growth rates, the "hidden" economy, participation rate changes, immigration,

and the increase in labor productivity. The uncertain employment picture will be complicated by the growing sophistication of robotics and the labor substitution that robotics may present. Moreover, this economic transformation will have immense implications for Fed policy and monetary actions in the near future.

An old economics rule of thumb says the intrinsic rate of GDP growth can be predicted by taking the expansion of the labor force together with increases in productivity. Obviously, contemporaneous factors will undoubtedly influence seasonal and cyclical growth figures, but historically, the equation has proven fairly accurate over the long term. This forecasting technique could be in jeopardy if robotic automation leads to significant substitution for human labor. In the US, where the youngest members of the baby boom generation (70 million) have reached age 55, labor statistics are already becoming a major economic concern.

As businesses continue to expand profit margins by adding to capital, the productivity portion of the equation will certainly increase—but this shift will come at the expense of the labor portion. Keep in mind that, unlike the human labor force, robots don't spend money, seldom wish to take vacations, never need a Starbucks latte to get started in the morning, don't need to buy homes and automobiles, and eat nothing but electricity. Therefore, any significant expansion of robotics into the service sector could carry GDP implications that transcend the mere improvement of productivity statistics.

IMPACT ON THE SERVICE INDUSTRY

In the late 1960s, manufacturing accounted for approximately one-third of the US work force. In the 1970s, however, a series of catalysts (including environmental regulations, labor costs, the development of a global economy, inflation, and interest rates) forced manufacturers to look offshore to more effectively control production costs. Entire industries virtually disappeared from US soil because manufacturers either couldn't compete with foreign suppliers or moved operations to locales with cheap labor and fewer restrictions. The impact was so significant that by 2005 the proportion of US labor devoted to manufacturing fell to near-single digits. Much of the loss of production labor was reallocated to the service sector and had little impact on GDP statistics. Interestingly, the US is experiencing something of a rebirth in domestic manufacturing, but this trend depends on the use of clean, efficient robotics to be competitive internationally.

There is a fear that the growing sophistication of robotics and robot-like devices will make significant inroads into the service industry. Already, robots are doing various types of domestic work, including vacuuming, security, pool maintenance, and outdoor maintenance. The US Navy is using unmanned patrol vessels to protect fleet components. Drones are rapidly replacing piloted aircraft. Tesla and Google are both racing to provide driverless automobiles. The da Vinci endoscopic robot has become a commercial success for its inventor, Intuitive Surgical. A hamburger-cooking robot is lying in wait for a rise in the minimum wage, and some checkout staff in stores are being replaced by automated self-checkout machines.

Japanese Prime Minister Shinzō Abe recently noted that he expects Japan's robotics market to triple by 2020 and believes that health care robotics will overtake industrial-use robotics within 10 years. Because robots can operate with greater precision, accuracy, predictability, and safety than humans—and without the physical and emotional limits or complications of human labor—the growth of service-based robotic applications will rapidly intensify.

REVOLUTION AND DISRUPTION

Throughout history, periods of significant technological advances (such as the agricultural revolution, the industrial revolution, and the internet revolution) have led to short-term labor dislocations. Fears of machines making human labor obsolete have always been misplaced. In fact, the International Federation of Robotics (IFR) has reams of statistics indicating that the robotics industry will continue to contribute incremental jobs to the economy. The IFR's expectations may be true regarding manufacturing and industrial applications; however, the rapid movement of robotics into service applications may change those perceptions. Over the short term, there will be a growing need for engineers, computer programmers, and scientists who can provide the "creative" structure and protocol in the early stages of robotics development.

This phase is analogous to the early days of the dot-com era and is likely to lead to the same sort of investor excitement and IPO flurry as in those heady days of the late 1990s. Even so, with the geometric leaps that have been occurring in computer processing and biomechanical sophistication, numerous menial and professional careers are likely to be supplanted by robotics. Most professional service careers are involved in some way with problem solving and solution satisfying. Given the advantages of robots equipped with artificial intelligence and database recollection that can encompass every conceivable computation presented by any problem, machine labor can outperform human workers in problem solving. An article in *Forbes* by Mark P. Mills ("In The Future, Will Only Robots Celebrate Labor Day?," 25 August 2014) focused on lawyers, pharmacists, health care professionals, and other "knowledge worker" careers that are in jeopardy. With the added sophistication that will emerge from this new branch of science, the potential for robotic incursions into virtually every occupation is strong.

THE FED AND AN ECONOMIC PANDORA'S BOX

To come full circle with this analysis, how will the "robotics revolution" affect the Federal Reserve and its functional duties in the next 10 years and beyond? Recently, the US economy has been improving on the labor front as monetary policy has stimulated job growth and economic activity. But economists and investors are increasingly raising concerns about a social and economic conundrum: the persistently high underemployment rate and the low labor force participation rate. In the aftermath of the 2008 recession, the underemployment rate jumped from a trend line of approximately 9%–17% to the current steady rate of 11.5%. The

labor force participation rate is 62.8%, down from a longer-term rate of 66%. Both statistics are likely a result of permanent job replacement, possibly from capital investment (i.e., robotic) sources. As the economy continues to expand and the labor force is depleted as a function of demographics, any labor shortages may accelerate and promote the acceptance of robotics as a solution.

This opening of an economic Pandora's box will have pronounced and profound implications for policymakers. Lower-echelon jobs will be eliminated, and job creation for skilled technical employment will be accelerated. Consequently, society's haves and have-nots will become more divided. Traditional white-collar jobs may also be in jeopardy. This change could skew the perceptions of people who are secularly unemployed and could have implications for tax rates and social-cost transfer payments. The Fed may need to redefine "labor force" as a "functional force," with capital investment completely supplanting some sections of the employment base.

Because our economy depends so heavily on consumer spending, which is highly dependent on employment, the robotics revolution will pose certain challenges for the future economy. The potential significance of the threat can already be seen. For example, over the past year, one of the most closely watched economic statistics has been the weekly jobless report simply because of its reflection of consumer health. Given the strong potential for service-sector labor replacement, the implications for consumer behavior will need to be reexamined.

If a robotics revolution means that both demand *and* production costs will decline, the Fed will likely not have a problem maintaining its inflation-control responsibilities. But the implications for the Fed's mandate to pursue maximum employment would be more serious. If the concept of "full employment" has to be adjusted to reflect the secular change in the economy and the work force, the Fed's monetary policy mandates may have to be redirected to accommodate this secular shift. Other policy areas would face profound challenges, including (but not limited to) the solvency of Social Security, the change in GDP growth driven by consumer behavior (as already discussed), the shifting of GDP components away from consumers and toward corporations, and a complete transformation of the income tax code.

THE IMPACT OF THE ROBOTICS REVOLUTION ON THE ECONOMY WILL GENERATE EVEN GREATER EXCITEMENT AND INVESTMENT OPPORTUNITIES THAN DID THE INTERNET/DOT-COM ERA IN TERMS OF IPOS, COTTAGE INDUSTRIES, AND CREATIVE THOUGHT.

In terms of forecasting, another difficulty is determining at what point robotics ceases to be a contributor to employment and starts to diminish the labor force significantly. Technological advances have become so geometrically expansionary that time horizons can be radically constricted. Consider the fact that the technology associated with the fracking boom has allowed the US to supersede the oil production of Saudi Arabia in the span of a few years.

THE OUTLOOK FOR INVESTORS AND POLICYMAKERS

Although my crystal ball is a bit cloudy, and wiser economists may come to different conclusions, I expect the robotics revolution to have a major impact in 15 key areas:

(1) The impact of the robotics revolution on the economy will generate even greater excitement and investment opportunities than did the internet/dot-com era in terms of IPOs, cottage industries, and creative thought.

(2) The accuracy of decision making in every line of business and profession will expand geometrically.

(3) Injuries and deaths in dangerous occupations will decline or be virtually eliminated.

(4) The property and casualty insurance industry will be dramatically altered as auto claims and lawsuits diminish.

(5) Inflation will be relatively low, with a possibility of deflation.

(6) With robots performing many household tasks, people will have more time for entertainment and leisure pursuits.

(7) Corporate profit margins will advance; however, a secondary revenue trade-off may occur as consumer spending is restricted by rising unemployment.

(8) Corporate tax revenues will have to be increased to offset the revenue lost from declining personal income taxes in order to fund the government. In fact, corporations will play an increasingly important role as a source of tax revenue and political influence.

(9) "Labor" unions will resist the robotics revolution and may eventually be replaced by "social" unions whose goal is to support permanently unemployed masses.

(10) Social Security will have to draw from corporate sources to maintain its solvency as the number of laborers supporting the retired population shrinks.

(11) Robots in the armed forces, which will have neither a conscience nor compassion, will have to be strictly controlled in order to avoid military coups or the rampage of a rogue third party.

(12) China and other nations that have relied on the advantage of cheap labor to export goods to wealthier nations will no longer have that advantage; thus, the emerging economies' current demographic advantage in the global economy will likely turn into a demographic disaster.

(13) The advent and expansion of 3D printing will facilitate the robotics movement and may allow robots to clone or repair themselves.

(14) Both fiscal and monetary economic policies will have to be redesigned to accommodate an environment that presents vastly altered sources of governmental revenue, social disruptions, and international trade.

(15) An equilibrium point will need to be established whereby the demand for robotic production and services will match the ability of an altered consumer force to finance such purchases.

The history of dire economic predictions is instructive. In the 18th century, Thomas Robert Malthus famously failed to foresee the agricultural revolution and said that the world would starve. In the 19th century, William Stanley Jevons calculated that England would run out of coal and the population would freeze. The lesson is clear: Speculations about future events and evolutions are just that—speculations.

The era of robotics will undoubtedly have significant and unforeseeable consequences for every individual on the planet, including investment professionals. Investors know that it is never good to be too early or too late regarding an investment theme; timing is everything in our business. However, it can't be too soon to begin thinking about the implications for investment prospects, the decision-making process, portfolio management, fiscal and monetary policy, and more. Already, some day-trading brokerage firms are touting "robotic" analysis and execution. Certainly, changes driven by robotics will have an impact on our whole industry, for better or worse. But the changes will come with significant investment opportunities that may exceed those of the dot-com era and the current social media phenomenon. Who knows what robotic innovation may be incubating even now in some teenager's basement that will provide investors with a new Facebook, Google, or eBay?

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