The promise of innovation— a credit perspective

FRANKLIN TEMPLETON THINKS™ | FIXED INCOME MARKETS

FEBRUARY 2019

Top down views

The productivity paradox— more innovations, less growth

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Bottom up views

Reinventing cars— risks and rewards on the transformation highway

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In this Issue

We live in an age of tremendous technology disruptions. Yet, according to labor productivity statistics, this disruption has done surprisingly little to produce more outputs from an hour's work. Looking forward, we think artificial intelligence (AI) is reaching a tipping point. Technologies like work automation and autonomous cars that promise to reshape society and economies, are creating significant risks and opportunities across credit markets.

Top down views

- **Labor productivity growth rates have been falling globally across developed and emerging economies, raising concerns about future standards of living. Some economists think low productivity is here to stay, but we're not in that pessimistic camp.**
- **We think productivity is already rising among leading global companies, but it's currently masked at the aggregate level due to lagging firms. We expect labor productivity growth will reignite in five to 10 years, fueled largely by technologies like machine learning and work automation.**

Bottom up views

- **New mobility technologies are reshaping how cars are powered, driven and used for years to come. We see three mega-trends—electrification, autonomous mobility and ride-hailing services—upending the old world order.**
- **As credit analysts, we recognize the payoffs and profitability of new mobility technologies are still years away for many companies in the auto sector. We favor firms that can still generate tangible near-term cash flows, while transitioning toward the new world order.**

Top down views

The productivity paradox—more innovations, less growth

We live in an age of fantastic and frustrating paradoxes. On one hand, inventions like self-driving cars, artificial intelligence (AI) and quantum computing aren't science fiction any longer. They're here, and very real. On the other hand, we're in the midst of a labor productivity slowdown that threatens our standard of living. That's not hyperbole.

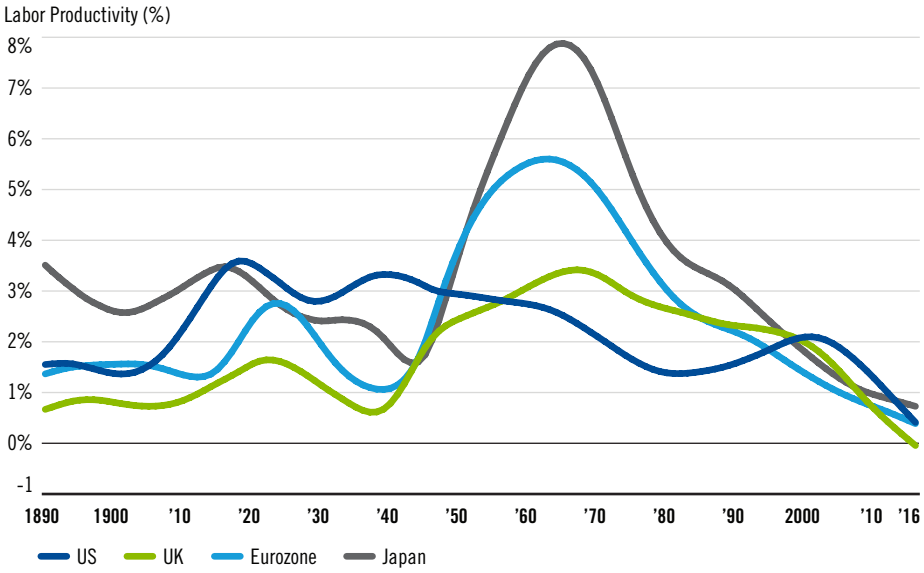
Productivity growth, after all, is more than output per hours worked. For many economists it also measures the pace of improvement in our standard of living. Weak growth in labor productivity can therefore be a major challenge for an economy's sustainability.[1] For example, if we still had the productivity growth rate from the decade before the global financial crisis (GFC), the US standard of living could double in a generation. It may take a century at today's rate, according to the US Federal Reserve.[2]

This slowdown isn't just a US phenomenon, unfortunately. Labor productivity growth rates have been falling across developed economies for well over a decade, and emerging economies since the GFC.[3] Long-term data presented by economist Gilbert Cette in Exhibit 1 illustrates how labor productivity has been trending downward across developed economies, although the US saw an uptick in the late 1990s when the "new economy" ushered in the internet and mobile phones to the masses.

1. Source: Leubsdorf, B. Aug 9, 2016. "Productivity Slump Threatens Economy's Long-Term Growth." *The Wall Street Journal.*
2. Source: Chien, Y. Morris, P. March 2017. "Slowdown in Productivity: State vs. National Trend." Federal Reserve Bank of St Louis.
3. Source: The Conference Board Total Economy Database 2018.

LABOR PRODUCTIVITY WAVES

Exhibit 1: Slower productivity growth as ongoing secular trend
From 1890 to December 31, 2016



Source: Bergeaud, A., Cette, G. and Lecat, R. (2016): "Productivity Trends in Advanced Countries between 1890 and 2012." *Review of Income and Wealth*, vol. 62(3), pages 420–444.

With dim prospects for standards of living, there's been a lively debate in academic circles about what's driving low labor productivity growth and the current technological paradox. Some pessimistic economists, like Robert Gordon, think low productivity growth is here to stay largely because all the big and consequential innovations have already been made.[4] Compared to innovations like electricity, indoor plumbing and cars, smartphones are inconsequential. Economist Alan Blinder takes that position a step further, raising the possibility that digital technologies like emails and smartphones might be making us all less productive. Considering all the hours the average person spends staring into their phone, Blinder does have a point.

But don't count us in that pessimistic camp. We think productivity gains from technology are already happening all around us. They're just masked at the aggregate data level. Examining the previous waves of innovation and labor productivity can help to shed light on why this is happening, and how long it may take before labor productivity reignites at the aggregate level.

Reading the tea leaves of timing

History shows us it can take decades before a newly discovered technology manifests itself in productivity metrics. Consider electricity, the internal combustion engine and computers. Each technology was fundamental in driving labor productivity, but not at their inception. As economist Erik Brynjolfsson explains, a range of complementary coinventions needed to appear before widespread productivity gains could take hold.[5] Core technologies eventually filter through the economy to boost productivity with enough time and experimentation.

Consider the impact of portable power, which combines the transformative effects of electrification and the internal combustion engine. Historian Paul David notes that nearly half of US manufacturers remained unelectrified until 1919—decades after Thomas Edison built the first commercial power plant in 1882.[6] Once electrified, factories could switch from using a single central source of power to giving each machine its own electric motor. This change gave managers the flexibility to rearrange machinery into assembly lines. Though many stuck with old habits, some embraced new manufacturing processes that drove down costs, as Henry Ford famously did in 1913 with his Model T car.

Economist Chad Syverson provides an updated illustration of how productivity gains can lag innovations in Exhibit 2.[7] He overlays US labor productivity gains during the portable power era (1890–1940) with today's information technology (IT) revolution, starting in 1970. Both eras started with relatively slow productivity growth over a long stretch, before seeing decade-long accelerations spanning 1915–1924 for portable power and 1995–2004 for IT.

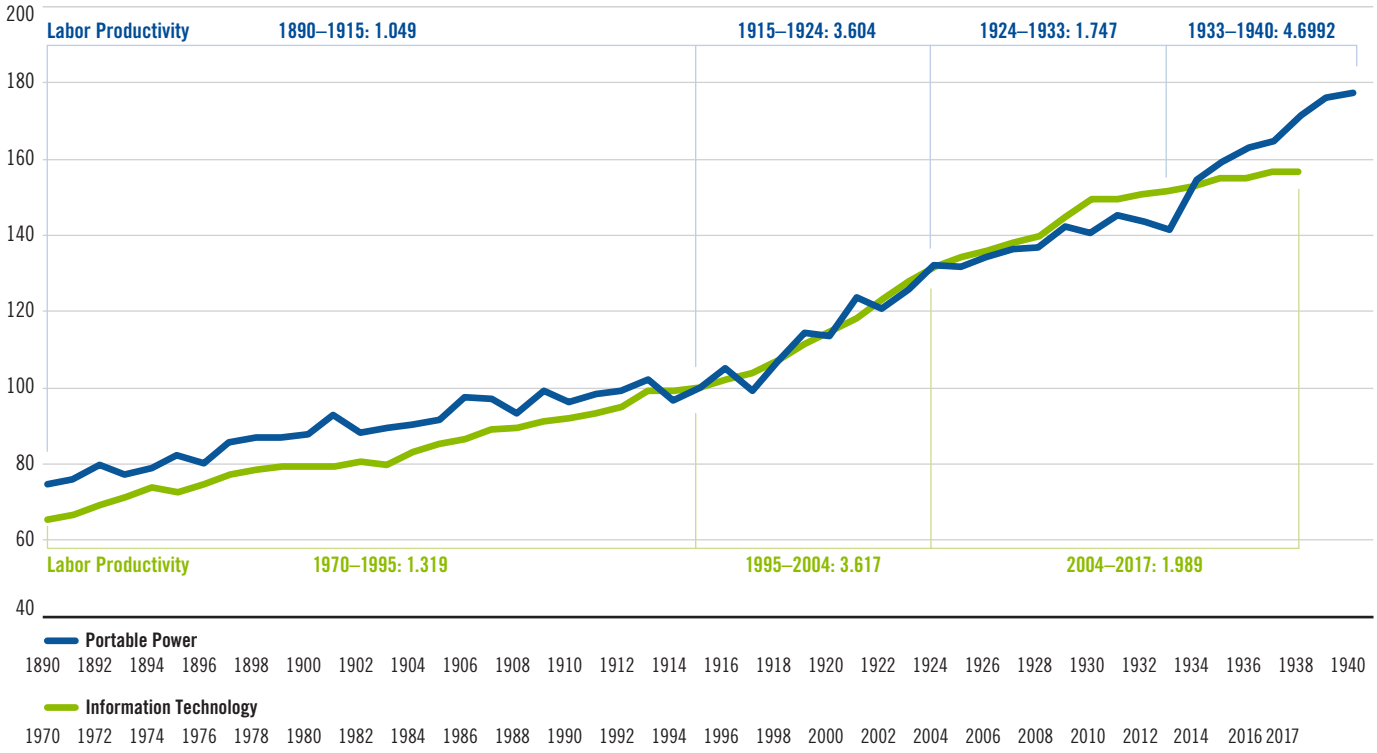
In the case of portable power, it took engineers and organizational architects like Frederik Taylor, who developed Henry Ford's assembly lines, to redesign factories so they could harness the new electricity technology and the internal combustion engine more effectively. Boosting productivity therefore required conceptual changes in the ways production tasks were defined and organized on the factory floor. In other

4. Gordon, R. 2015. "The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War." Princeton, NJ: Princeton University Press.
5. Brynjolfsson E., Rock D., Syverson C. December 2017. "Artificial Intelligence and the Model Productivity Paradox: A Calsh of Expectations and Statistics." National Bureau of Economic Research working paper No. 24001.
6. David, P. 1991. "Computer and Dynamo: The Modern Productivity Paradox in a Not-Too-Distant Mirror." In: *Technology and Productivity: The Challenge for Economic Policy*, Paris: OECD Publishing: 315–47.
7. Syverson, C. 2013. "Will History Repeat Itself? Comments on 'Is the Information Technology Revolution Over?'" *International Productivity Monitor*, 25: 37–40.

US LABOR PRODUCTIVITY ACROSS TWO ERAS

Exhibit 2: Portable power (1890–1940) and information technology (1970–2017)

Portable Power indexed to 100 in 1915, Information Technology indexed to 100 in 1995



Source: Syverson, C. 2013. "Will History Repeat Itself? Comments on 'Is the Information Technology Revolution Over?'" *International Productivity Monitor*, 25: 37–40.

words, the productivity came from significantly changing the way workers performed their jobs. After much trial and error, a wave of robust labor productivity finally kicked off in 1915.

The computer productivity paradox

Fast-forward to this era's IT revolution (computer chips, software and telecommunications) and we see a similar productivity trend in Exhibit 2. The first commercial computer debuted in the 1950s, followed by Apple's mass-market personal computer, the Macintosh, in 1984. And yet, labor productivity growth remained anemic through the early 1990s. This apparent contradiction was coined the "computer productivity paradox," and famously summarized by Robert Solow in 1987—"you can see the computer age everywhere but in the productivity statistics."[8]

So why did labor productivity growth reignite in 1995? Harvard professor Dale Jorgenson points to two factors: a rise in IT manufacturing productivity, followed by massive investments by US firms in cheaper IT hardware and software.[9] The growth phase started with the doubling of computer chip density every 18–24 months, known as "Moore's Law." Companies' costs to invest in computer hardware and software saw spectacular declines, since the same manufacturing inputs (labor) could now produce more computer processing outputs. US firms responded by making massive capital investments in newly affordable IT, followed by complimentary changes in business organization and human capital, impacting how they deployed the new technology to suit the business.

The promise of work automation

Growth in US labor productivity tapered off again after 2004, following computer integration into virtually every industry and economic sector. Looking forward, we believe work automation will eventually spark another wave of labor productivity globally, similar to the portable power era noted in Exhibit 2. Back then, labor productivity reaccelerated between 1933 and 1940 in the build up to World War II.

We think rapid developments in machine learning and robotics is making it easier for leading global firms to boost productivity. Consider the world's

8. Solow, R. July 12, 1987. *New York Times* Book Review, page 36.
9. Jorgenson D., Mun H., and Stiroh K. Winter 2008. "A Retrospective Look at the U.S. Productivity Growth Resurgence" *Journal of Economic Perspectives*—Volume 22, Number 1—Pages 3–24.

first fully automated warehouse in Shanghai for leading e-commerce giant, JD.com. It started operations this past June with twenty industrial robots picking, transferring and packing orders for online shoppers. Warehouses of comparable size in China typically employ 400–500 workers, but JD.com only needs five, mainly to service the machines. The technology relies on a team of "robot controllers" developed by Mujin, a Japan-based technology start-up. Using camera systems and motion planning software, the controllers teach the robotic arms how to master tasks like grasping and moving packages, without the need for manual instruction from humans.

Mujin's American cofounder and chief technology officer, Rosen Diankov, thinks automation technology has reached a turning point. More companies are concluding they can earn attractive returns with robotic systems as the costs of robotics continue to fall.

Another example of significant manufacturing changes from work automation is Adidas. It opened "Speedfactory," a heavily automated manufacturing facility in Germany in late 2015, which is the first manufacturing facility Adidas built on German soil in over 30 years. Last year Adidas opened its second Speedfactory in the US near the city of Atlanta, Georgia.

Each Adidas Speedfactory pairs a relatively small human workforce with technologies that include 3D printing, robotic arms, and computerized knitting to make the same running shoes it produces in China, Indonesia and Vietnam, only much faster. Adidas understands many shoppers expect same-day deliveries and customization. By placing its newly automated Speedfactories closer to its consumers, Adidas avoids production delays from its overseas factories.

The output from Adidas' new robot factories, however, is quite small compared with its Asian supply chains. Its two Speedfactories are on track to produce one million shoes annually by 2020—about one day's worth of the 403 million shoes Adidas produced last year in Asia.[10] But there are other benefits to these innovative manufacturing facilities. By testing and refining the use of robots in its Speedfactories, Adidas plans on integrating its AI manufacturing processes into its Asian supply chain—helping an already massive manufacturing operation become faster, better and cheaper. Reducing the hours of human labor involved will also increase Adidas' labor productivity.

Productivity pioneers

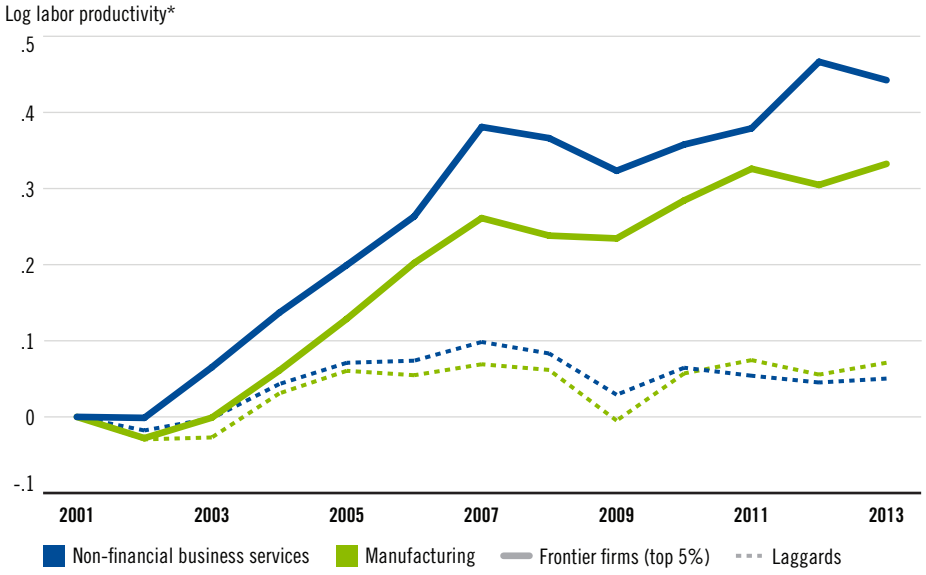
With global companies increasing productivity through work automation, why aren't we seeing a bigger surge in productivity growth? Research from the Organization for Economic Co-operation and Development (OECD) shows that slow productivity of the "average" firm masks the fact that a small cadre of "frontier" firms like Amazon and Apple are already seeing robust gains, as shown in Exhibit 3.[11] By investing in 3D printing and robotics, companies like Adidas are positioning themselves to lower labor costs and squeeze out better margins, and gain market share with improved customer services.

Although frontier firms are pushing the envelope on work automation, these

GLOBAL FRONTIER FIRMS OUTPERFORM LAGGARDS

Exhibit 3: Frontier = top 5% of manufacturing and services firms measured by labor productivity*

2001 through December 31, 2013



Source: Andrews, D., Criscuolo, C., and Gal, P. (September 2016) "The Global Productivity Slowdown, Technology Divergence and Public Policy: A Firm Level Perspective." Hutchins Center at Brookings Working Paper #24.

*Note: The global frontier is measured by the average log labor productivity for the top 5% of companies with the highest productivity levels. Laggards capture the average log productivity of all the other firms. Unweighted averages are shown for manufacturing and services, normalized to 0 in the starting year. The vertical axes represent log differences from the starting year: for instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher in productivity in 2013 compared to 2001.

10. Source: Wiener, A. November 2017 "Inside Adidas' Robot-Powered, On-Demand Sneaker Factory." *Wired.*
11. Andrews D., Criscuolo C., and Gal P. 2016 "Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries." Hutchins Center at Brookings Working paper #24.

investments are still costly and not yet easy to implement for some firms. Therefore, we don't see the productivity benefits trickling down to a wider swath of firms quite yet.

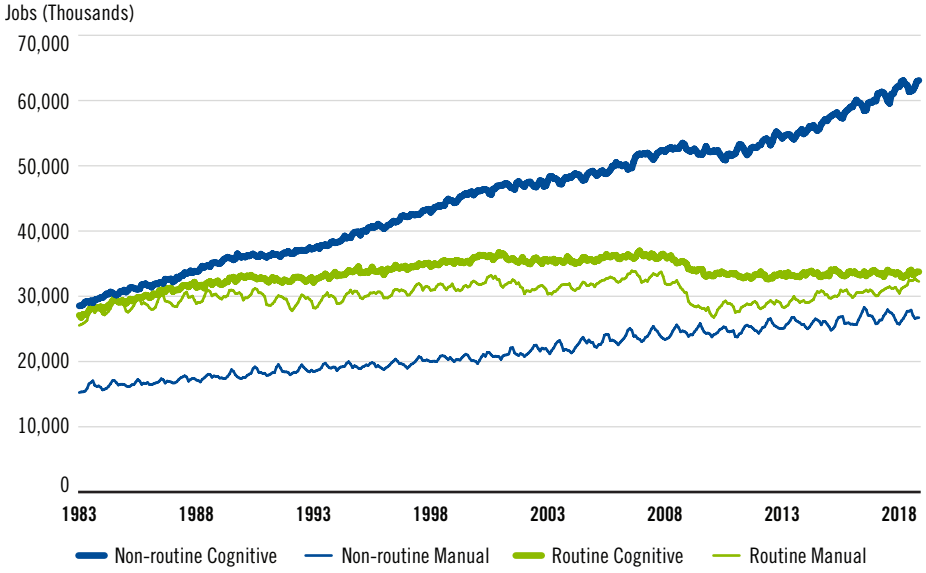
The new face of manufacturing

As the costs of machine learning and robotics decrease and spread beyond leading frontier firms, we expect aggregate labor productivity growth will rebound in five to 10 years to levels seen before the GFC. Through work automation, we see productivity growth coming mostly from reduced human hours worked—i.e., smaller labor input for a given output. One problem for workers displaced by robotic arms or driverless cars is they'll need to acquire new and perhaps higher skills fairly quickly, or make do with lower pay.

This labor displacement is already underway in many developed countries. Since the mid-1990s middle-skill jobs typically found in manufacturing industries have declined, while low-skill and high-skill jobs are rising. In effect, the workforce is bifurcating into two groups doing non-routine work that machines currently can't replicate: highly paid, skilled workers (such as architects) and low-paid, unskilled workers (such as cleaners). We believe the jobs most vulnerable to the next wave of automation are "routine" jobs, as US labor statistics from the US Federal Reserve show in Exhibit 4.

NON-ROUTINE JOBS ARE GROWING

Exhibit 4: Routine work types remain flat for US employment
1983 through November 1, 2018



Sources: US Bureau of Labor Statistics; Federal Reserve Economic Data (FRED). Federal Reserve Bank of St Louis.

This potential dystopian outlook, however, isn't predetermined. Indeed, in terms of self-driving cars, our auto analysts are more sanguine. In the following section we explain how the arrival of autonomous ride-hailing vehicles could jumpstart productivity and boost standards of living.

Bottom up views

Reinventing cars—risks and rewards on the transformation highway

It has been 106 years since the Model T rolled off Henry Ford's new assembly line in Highland Park, Michigan. Ford's mass production did more than bring lower prices to consumers and higher profits to Ford. It helped kick-start a consumer love affair with cars.

Fast forward to 2019, and the auto industry is at a new crossroads. Regulatory changes and "new mobility" technologies are reshaping how cars will be powered, driven and utilized for years to come. We see three mega-trends—electrification, autonomous mobility and ride-hailing services—as offering meaningful long-term benefits to societies and economies. These trends are also driving significant investment risks and opportunities across credit markets.

In this section we provide our perspective on where we think the auto industry is headed, and the credit qualities we look for from companies in the rapidly shifting auto industry. Expensive technology like electrification may disrupt the old world order for the better, but payoffs and profitability are still years away in many cases.

Cleaner cars and profit pressures

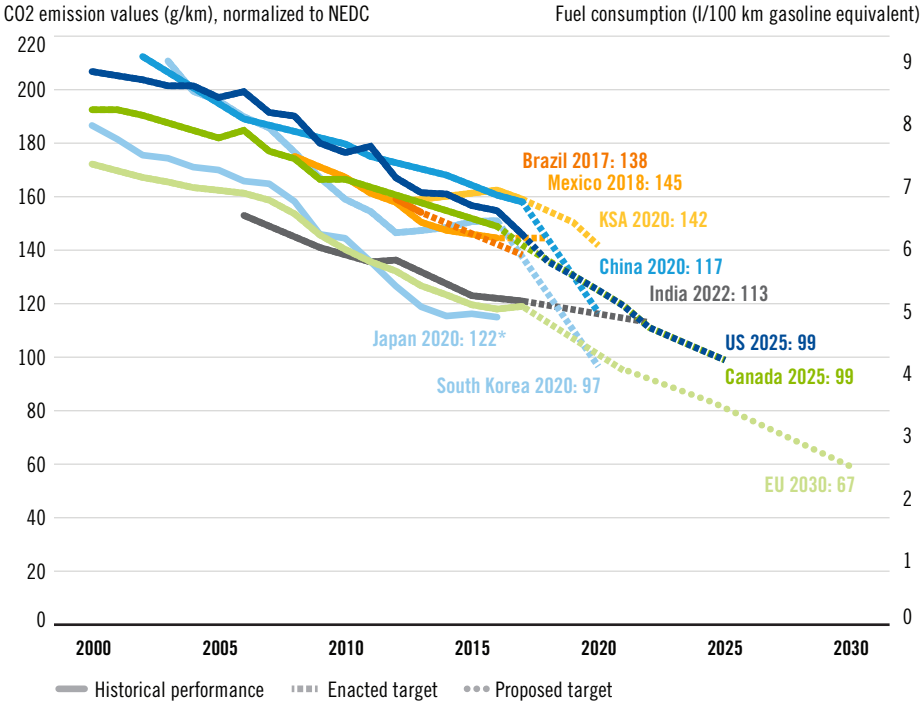
Governments around the world continue to work toward reducing pollution from vehicle emissions, as shown in Exhibit 5. While the efficiency of the internal combustion engine (ICE) has improved over time, tightening global emissions regulations will require greater sales of hybrids and full battery electric vehicles (BEVs). Some industry analysts are predicting BEVs could reach 20% of the US market, 30% of the European market and 35% of the Chinese market by 2030.[12]

As a relative newcomer to the industry, Tesla has led the market in BEVs. The rest of the auto industry is now working feverishly to catch up, spending billions to develop and launch a slew of electric vehicles in the coming years. This is pressuring near-term margins, while future investment returns remain uncertain due to high production costs and intense competition. As the Chief Executive Officer of France's largest automaker, Peugeot, recently told Reuters, "What everyone needs to realize is that clean mobility is like organic food—it's more expensive."[13]

Automakers aren't the only ones evolving. Auto parts suppliers with significant exposure to traditional ICE powertrains need to shift their product portfolios to serve electric vehicles (EVs). In some cases, companies are divesting business segments tied to powertrain components, as Honeywell recently did by spinning off Garrett Motion. Delphi Automotive split itself into two separate businesses—Delphi Technologies, which is a powertrain parts supplier, and Aptiv, which provides electronic and active safety products, and smart mobility technology.

GLOBAL PASSENGER CAR CO2 EMISSIONS AND FUEL CONSUMPTION

Exhibit 5: Targets are normalized to New European Driving Cycle (NEDC)
2000 through April 2018



Source: The International Council on Clean Transportation (ICCT) April 2018. There is no assurance that any estimate or projection will be realized.

*Note that Japan has already met its 2020 statutory target as of 2013.

12. Source: The AlixPartners Global Automotive Outlook, June 2018.
13. Source: Morris C. October 2018 "European automakers fear EVs will eat into auto industry profits." Reuters.

> “Our industry is going to change more deeply in the coming 10 years than in the 100 years before.”
>
> **— Volkswagen, May 2017**

We expect ICE powertrains to be around for years to come, but the auto supply chain will face burdens from the regulatory push to EVs. Over the long term this is environmentally positive. Our responsibility as credit analysts, however, is to ensure the costs of new technology don’t materially degrade a company’s credit profile, and are appropriately reflected in valuations.

Automating the automobile

Along with cleaner cars, the auto industry is deploying vehicle automation technology to make driving safer. Cars with collision warning, automatic emergency braking and lane-keeping assistance are already on the road, thanks to innovations in vehicle perception and sensing capabilities. Improving car safety not only saves lives, but also offers meaningful benefits to the economy. According to the National Highway Traffic Safety Administration (NHTSA), US motor vehicle crashes in 2010 cost a staggering US$242 billion in economic activity, including US$57.6 billion in lost workplace productivity, and an additional US$594 billion due to loss of life and decreased quality of life due to injuries. Volvo’s vision for 2020 is that no one should be killed or seriously injured in a new Volvo.

Three mega-trends rolled in one

As vehicle automation technology advances from driver assistance features to fully autonomous driving, self-driving cars have the potential to upend the auto industry, but not likely as privately owned vehicles. For economic reasons, we believe self-driving cars will most likely be electric and primarily used through ride-hailing services.

The rise of ride-hailing players like Uber, Lyft and Didi Chuxing has already had a profound impact on personal mobility by creating a new business model of transportation as a service (TaaS). When viewed on a cost per mile basis, however, ride hailing is currently more expensive than private car ownership. That equation could change when fully autonomous cars remove the cost of human drivers.

Fleets of self-driving “robotaxis” could also be better equipped to recover the cost of expensive sensor technology needed to navigate streets. Whereas the average private car sits idly parked much of the day, autonomous taxis will be busy moving passengers and collecting fees all day long. Ride sharing by multiple customers would further reduce trip costs, while additional cost reductions could come from using electric engines. BEVs offer the potential for better fuel economy, as well as lower maintenance costs and a longer engine life given fewer moving engine parts.

All in, robotaxis have the potential to offer consumers a lower-cost alternative to vehicle ownership, in our view, by integrating these three mega-trends—electrification, autonomy and ride hailing. Academic studies estimate a shared autonomous vehicle could potentially replace up to 11 privately owned cars in dense urban areas. Once robotaxis are viable and deployed at scale, some automotive consultants and investment banks estimate private car sales may drop anywhere from 5% to 32% by 2030.[14] The Boston Consulting Group estimates fleets of robotaxis will account for nearly 25% of all auto passenger miles traveled in the US by 2030.[15]

Automakers spring into action

The potential seismic implications of this shift away from private car ownership haven’t gone unnoticed by auto manufacturers. General Motors (GM), for example, purchased the Autonomous Vehicle (AV) start-up Cruise Automation for US$1 billion in 2016. Since then, Cruise has grown its staff from 40 to over 1,000 and plans to roll out a commercial fleet of automatous taxis in San Francisco in 2019.[16] GM’s efforts got a huge vote of confidence from Japan’s SoftBank, which invested US$2.25 billion in Cruise.

Competition is fierce though, as a host of technology start-ups are all racing to develop AV technology, including Google’s Waymo division, and lesser-known players like Aurora, or Ford’s start-up partner Argo AI. It’s too

14. Sources: Lesne D. September 2017 “How disruptive will a mass adoption of robotaxis be?” UBS Evidence Lab. Allianz Partners January 2018. “Robotaxis set to change the automotive industry of the future.” AlixPartners, June 2018 Global Automotive Outlook.
15. Source: Collie B., Rose J., Choravia R., Wegseider A. December 2017 “The Reimagined Car.” Boston Consulting Group.
16. Source: Waters R., November 2018 “General Motors president to control Cruise self-driving unit.” *Financial Times.*

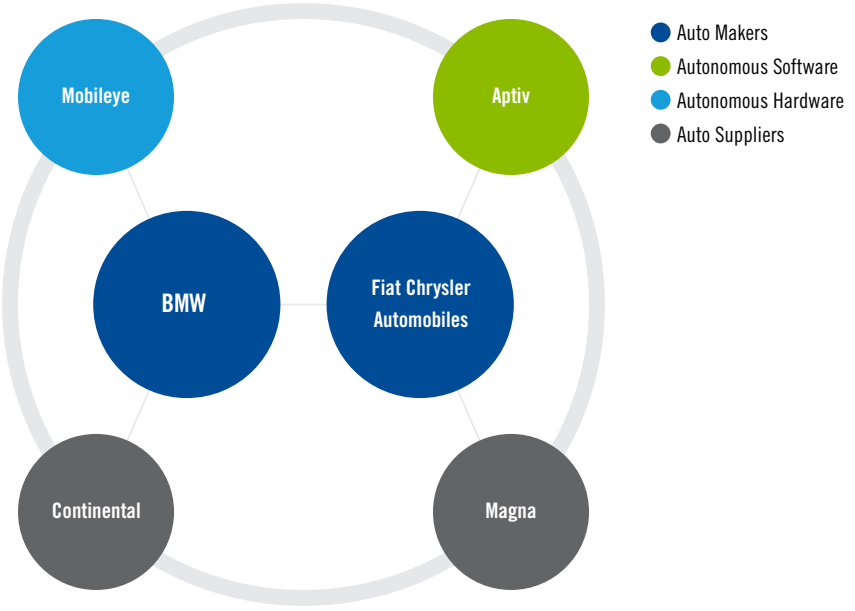
soon to say who the eventual winners will be, but we see substantial investment spending taking place to address these auto mega-trends.

This November, CEO Herbert Diess announced VW would increase spending to US$50 billion on technologies for electric cars, autonomous driving and ride sharing over the next five years.[17] The global consultant AlixPartners calculates that by 2023, a whopping US$255 billion earmarked for electric vehicles will be deployed, with another US$61 billion for AV technologies.[18] AlixParters notes more than 50 major companies globally are now working on AV systems, operating in a wild-west environment that most likely will yield a few big winners, and many disappointed losers.

Some industry players are partnering to spread costs and accelerate their speed to market, given all the technical challenges and heavy investment requirements. BMW, for example, has partnered with computer vision company Mobileye, Fiat Chrysler Automobiles (FCA), and suppliers Aptiv, Magna, and Continental, as shown in Exhibit 6. Toyota is investing US$500 million with Uber to help develop autonomous driving technology. Semiconductor companies have entered the fray as evidenced by Intel's 2017 acquisition of Mobileye for US$15 billion, while Nvidia has emerged as a key AV technology supplier through its autonomous driving platform. All of these players have an eye on participating in a future autonomous ride-hailing market.

BMW's AUTONOMOUS DRIVING CONSORTIUM

Exhibit 6: Joining forces to deliver a self-driving platform



Source: BMW.

Safer cars, productive society

The challenge to commercialize fully autonomous driving technology is monumental. But so too are the potential benefits to society and the economy, in our view. According to NHTSA, 94% of serious automobile crashes are caused by human error. In a world dominated by autonomous vehicles, it's possible to see reductions in fatalities, medical expenses, and collision and repair costs, as well as insurance costs as claims decline. Economic productivity could benefit from commute time that isn't wasted, while underutilized parking lots could be redeployed to higher-value purposes. Researchers at the University of Texas have estimated the US economic benefits of shared AVs could be US$1.2 trillion, or approximately US$4,000 on a per capita basis.[19] While these types of estimates are of course difficult to make and include many key assumptions, they illustrate the magnitude of what may be some profound impacts across the economy.

Participating in the mega trend

When we evaluate the investment landscape as credit analysts, we look for automotive companies that we believe can participate in these mega trends without enduring the risks of a volatile, binary outcome. Some cutting-edge leaders in ride hailing and BEVs are highly leveraged. Facing challenges on the horizon, they don't currently offer the improving credit profiles we prefer. Instead, we favor companies like auto parts supplier Aptiv. Since spinning out of GM 20 years ago, Aptiv has evolved into a formidable tech company specializing in autonomous driving software. Boasting a staff of 15,000 scientists and engineers and a range of patents, Aptiv has expertise in vehicle electrical systems, active safety and connectivity products that its customers in Europe and North America are already using today.

17. Source: McGee P., November 2018 "VW pledges to spend Euro 44 billion on new technologies." *Financial Times.*
18. Source: AlixPartners June 2018 Global Automotive Outlook.
19. Source: Clements, L., Kockelman, K., 2017 "Economic Effects of Automated Vehicles" *Transportation Research Record.*

With an eye toward future mega trends, Aptiv has been developing autonomous driving capabilities, and it recently launched a fleet of 30 autonomous vehicles in Las Vegas in a partnership with Lyft. Through December 2018, Aptiv's vehicles have completed over 25,000 paid autonomous rides to more than 1,600 destinations. We see this as a key milestone for potential future growth in AVs, though still years away. In the meantime, Aptiv's existing product portfolio is generating double digit revenue and cash flow growth, funding ongoing investment in autonomous mobility and driving a strong credit profile.

Navigating the road ahead

We believe the automobile sector is poised to see meaningful shifts in product composition, as emissions regulations force a transition from the ICE to electrified powertrains. While this transformation should be great for the environment, it will likely come at a cost initially born by the industry and hopefully recovered in future revenues. Automation stands to improve vehicle safety and potentially lead to shifts in vehicle ownership, furthering the rise of the TaaS model. Navigating these secular trends through business cycle ebbs and flows creates investment risks and opportunities for actively managed portfolios over the long term. If there is one certainly about the auto industry, it's that the road forward will be a dynamic one.

Big trucks and shifting cycles

The three mega trends transforming today's auto industry portend a dynamic future. We believe these trends could bring more disruptive changes than anything seen since Henry Ford's Model T. Importantly, however, we are also mindful of the cyclical nature of the automobile sector and the near-term implications for credit fundamentals.

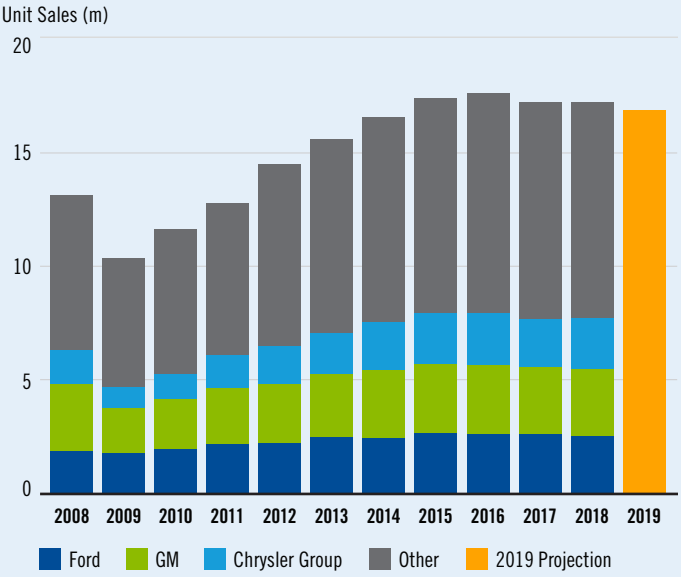
Autos are of course a consumer discretionary item, sensitive to employment, income and interest rates. Following the GFC, the US auto industry enjoyed a strong rebound in overall unit sales, as shown in Exhibit 7. It also witnessed a marked shift in consumer preferences—away from cars and toward the more profitable segment of trucks and SUVs, where US automakers are well-positioned.

The pent-up demand that fueled sales coming out of the GFC has given way to flat to modestly lower sales of late. Investment spending on future mega trends, coupled with rising commodity costs, have pressured industry profitability. For automakers like Ford, margin and cash flow pressures have weighed negatively on bond values, despite its strong position in the truck market.

Last year Ford announced it plans to discontinue manufacturing and selling most of its sedans in the US—a move that FCA made much earlier in 2016. FCA repositioned itself to benefit from the increased US consumer demand for trucks and SUVs by winding down production of the Chrysler 200 and Dodge Dart sedans and focusing instead on Jeep SUVs and Ram trucks. As a result, FCA has enjoyed rising profits and a strengthening balance sheet, which has been good for bond values.

US AUTO CYCLE

Exhibit 7: Sales are shifting to a lower gear
2008 through December 2018



Source: CMIG, Edmunds, NADA.

Franklin Templeton Thinks: Fixed Income Markets highlights the team's ongoing analysis of global economic trends, market cycles and bottom up sector insights. Each quarterly issue spotlights the team's thinking on different macro forces, and particular sector views that drive our investment process.

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