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ANALYST NOTE

What's Driving the U.S Auto Industry's Financial Performance?

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Despite U.S. automakers' near record auto sales and healthy profit levels, Wall Street appears skeptical regarding their prospects, as evidenced by their recent stock prices. For example, GM and Ford are highly profitable, yet are cutting jobs or expenses or both. Even Toyota, which has long been a global leader in both sales and profits, is cutting costs.

These apparent conundrums can be explained by two driving forces. First, overall demand is declining modestly as the pent-up demand from the 2007-2009 Great Recession (which resulted in record 2015 and 2016 sales) is apparently exhausted; sales are now declining from those record levels.

Second, and more importantly for the future, the auto industry now faces what could be an existential crisis due to innovations in technology and business models, namely from upstarts such as Tesla and Uber, as well as potential new, deep-pocketed competitors such as Google and Apple. The industry is responding to these changes, although Wall Street remains skeptical regarding the efficacy of the industry's reaction.

As a result, and as illustrated by the firing of Ford's CEO Mark Fields, the legacy automakers are now under tremendous pressure to invest in new technologies and redefine their business strategies to enable them to thrive in this new era.

Although the automakers appear to be blaming, in part, their struggles on strong fuel economy standards, our analyses LINK find that strong standards are good for the industry; the current standards provide the regulatory certainty necessary to stimulate investment in advanced technologies, such as EVs, that are necessary for automakers' long-term financial health, especially given oil price volatility. In fact, fuel economy in general and electrification in particular are critical to automakers' success in this new era; given the importance of operating costs, fuel efficiency and electrification will drive growth in ride sharing and autonomous fleets.¹ Investors are also sending a clear signal that they value forward looking investment in advanced technologies.

We conclude that current fuel economy standards have not negatively affected the legacy automakers' financial performance, and that, given the major trends affecting the industry going forward, weakening the current fuel economy standards would in fact be detrimental to the future competitiveness of U.S. automakers and their suppliers.

Auto Industry in Transition to Modestly Declining Sales; Wall Street's and Automakers' Response

The U.S. auto industry achieved all-time record sales in 2015 and 2016. These sales were the culmination of seven years of growing sales from the industry trough experienced in 2009 as the Great Recession cut demand to the lowest level since 1982.

¹ Autonomous vehicles are synergistic with electrification since the computing power for autonomous functions are consistent with electrified powertrains (both are driven by electronic rather than mechanical control).

While the *overall economy* continues to experience modest growth (low inflation, stable job picture, positive GDP growth), we appear to be at the top of the *U.S. auto sales* cycle. But most forecasts (including ours) do not expect a dramatic drop and expect U.S. sales to remain above 16 million for at least the next three years. Furthermore, North American production has been growing and is expected to continue to grow from a strong 17.4 million units this year to 19 million units by 2021 (much of the growth is backing out imports and for exports) as new capacity is added (primarily among automakers not based in the U.S.), particularly in Mexico.

Yet even with strong sales, the auto industry (including but not limited to the Detroit Three), face many questions, particularly from Wall Street. GM's stock price after several years of strong profits has increased only slightly from its November 2010 IPO price of \$33, and is far below the Dow average so far this year. Even with this weakness in stock price, GM is targeting 9 to 10% global profit margins vs. 7.5% achieved last year. GM's profit margin in North America was 11.7% in the first quarter and 12.2% in the second quarter of 2017.

Ford's pretax earnings for 2017 are expected to come in at \$9 billion, which is down from \$10.4 billion in 2016. These results are strong, but Ford's stock is at \$11 a share as compared to just under \$18 in mid-2014 and down almost 10% since the beginning of 2017. Ford's operating margin in North America was a strong 9% in the second quarter (albeit down from 11.3% a year ago). The results were slightly higher than the first quarter, which came in at 8.6% (compared to 12.9% a year earlier). Ford has replaced its CEO Mark Fields in large part as a reaction to these financial results and Wall Street's view that Fields' strategy was not likely to result in stock price increases.

Toyota is deepening its relationship with Mazda in order to share the costs of both product development and \$1.6 billion for additional plant capacity in North America, and Toyota recognizes that Mazda's SkyActiv technology (useful in powertrain and chassis) can provide an advantage even for Toyota, which is certainly an industry leader with respect to finances, technology, and fuel economy.

While automakers' profit and earnings figures are quite positive, particularly considering that sales are flattening (and will decline somewhat going forward), there is much negative sentiment on Wall Street and automakers are cutting expenses as a result of the need to enable strong capital expenditures in new technologies and preserve capital as sales slow. Cost cutting activities are in place at Ford in the form of \$3 billion annually, Toyota of \$1 billion in the short term and VW of \$4 billion by 2021.² Furthermore, earlier this year Ford announced salaried layoffs of 1,400 in North America and Asia while maintaining a high level of new product development. GM has already cut costs by \$3 billion in the last two years, and has sold Opel/Vauxhall to PSA and in recent years has withdrawn from Russia, Indonesia, and more recently India and South Africa.

On the product side, most automakers, including the Detroit Three, are cutting back on cars in favor of crossovers and, to a lesser extent, framed trucks (pickups and rear wheel drive sport utility vehicles) in light of what most expect is a long-term shift in demand to crossovers. GM has cut shifts affecting 3300 workers in Fairfax, KS (Malibu and Lacrosse), Lansing, MI (Cadillac cars and Camaro and larger crossovers) and Lordstown, OH (Cruze), while FCA has terminated production of the Dart and 200 and is revamping a number of its assembly plants to increase capacity for some of its Jeep and Ram products. Ford abandoned construction of a new Mexican plant in order to save an estimated \$1.6 billion and is moving Focus production to China given reduced North American demand. These changes were of course due in large part to market conditions which have seen **car share plunge from 49% in 2012 to 37% this year**. (The fuel economy standards automatically become less stringent as truck share increases.)³

Automakers cut staff dramatically during the Great Recession, but have since added both production and salaried staff. They continue to need people with specific technical skills (battery development, software engineers, electronics, autonomy specialists, etc.), but will cut some of their business staff functions to shift funds to product development. With respect to their production staff, production will remain at high levels although the fact that many workers are temporary and/or Tier 2 workers (those paid based on a lower wage and benefit scale than higher seniority workers) will allow them to more easily prune these workers as required without significant upfront costs.

² GM's Q2 drop in profits is primarily associated with the sale of its European operations, as well as slower U.S. sales.

³ There are different standards for cars and trucks.

The Auto Industry is Facing Disruption by Shared Mobility, Autonomous Driving and New Business Models

Major issues facing the industry include trends such as shared mobility, semi- and full autonomy, continued growth rate in electronic content, infotainment, connectivity, improved fuel economy including various forms of electrification, and improvements in safety. Of course, many of these developments are synergistic; autonomous technologies are optimized on electrified platforms, and shared mobility platforms provide additional incentives for greater fuel economy and electrification efforts. At the same time, many automakers are making investments in flexible global platforms that are designed to reduce costs but require upfront investment to bring to fruition. Note that the shift to global platforms is in part designed to address improved fuel economy, which becomes less costly as platforms consolidate.

Will car sharing reduce vehicle demand as consumers decide they need fewer vehicles since they can use shared vehicles on demand? Or will demand increase since vehicles are likely to be used more hours in the day and underserved groups like the young and old enjoy mobility and vehicles serve more consumers? If at least some of these vehicles become autonomous, then the cost of operation for these fleets plunges and demand increases further. In any event, the full implications of this new era— even with a plethora of available predictions and reports— is unknown. However, the need to be proactive in the face of this uncertain future is clear. As a result, we are seeing an increasing number of alliances between automotive and technology companies, including a variety of new players including many firms from outside the “traditional” auto industry.

Car and ride sharing is a particularly complex area, with at least the following issues in play:

- Increased importance of autonomy
- New and complicated partnerships with specialized service and technical providers⁴
- Competition and cooperation with players from outside the industry
- The need for and scarcity of people with the necessary skills and expertise
- Requirements for regulatory approval and the problem of multiple requirements between states and/or countries
- Income streams for vehicle owners, which would allow owners to make money from their vehicles when not in use.

The question of competition or cooperation among and between OEMs and suppliers (including those from the technology industry that have different business mindsets) is new terrain for automakers. As a result, a wide variety of partnerships are being formed which lead to different approaches among the various players. Is a provider of key software a competitor or a valued supplier? Yes. Should that valued supplier be acquired to ensure that technology is available only for a specific OEM? That has indeed happened (e.g., GM buying Cruise Automation, Ford investing in Argo AI), but automakers and their suppliers are taking a variety of approaches.

Besides the changes that these disruptions could portend in the use of vehicles, they have an even bigger impact upon the industry. They could change the underlying business models of the automakers by moving from a model where a vehicle is sold to a consumer every few years with a “lumpy” revenue stream to a potential method where automakers collect service revenue over an extended period of time. The potential implications on cash flow are dramatic as are the investment requirements.

While the impact of disruption in North America could be significant, it could be even more disruptive in other markets because:

⁴ For example, GM is partnering with Lyft on the use of self-driving Bolts, which are slated to go into service in 2018; in the meantime, it is renting Bolts to drivers for Lyft, Uber and other on-demand services, and has launched the Maven car sharing service. Ford has acquired the ride-sharing service Chariot.

- Car sharing and/or electrification is best suited for dense urban areas where average distance traveled is modest; markets in Western Europe and Asia may be more suited to these approaches
- Car sharing may be an entrée to vehicle use for many consumers (such as those in developing countries) where average incomes are only now increasing to the point where individual ownership may become common; this will potentially lead to growth in automotive demand
- Success in the car sharing arena could be critical to individual sales as it will introduce vehicle features and brands to new consumers (similar to how fleet sales to rental companies are used to introduce products).

Cost of operation is critical to making ride sharing economic. While eliminating the driver (via autonomy) would be a big factor, reduced vehicle operating costs are also essential. The reduced maintenance costs of a fully electric vehicle as well as the much lower operating costs of electric and/or higher mileage internal combustion vehicles (including hybrids and plug in hybrids) make this application particularly appropriate for vehicles with these powertrains.

Thus, automakers must aggressively address both technology demands and the changes in their business models that these trends portend. The financial community is concerned that traditional automobile companies are not in the best position to do so, particularly as sales in developed markets (which represent most of the current profit stream) may be declining. While the automakers in general and the Detroit Three in particular attest that they have cut costs and can thus weather even a significant downturn, the markets are withholding their support until the facts prove this contention.

We now turn to the importance of fuel economy and electrification and how they are drivers of corporate strategy rather than merely regulatory requirements that force corporate strategies.

Fuel Economy and Electrification, Driven by Strong Standards, are Essential Investments

Federal regulations have been an important driver of improved fuel economy, and California's Zero Emissions Vehicle (ZEV) Program has had a significant influence on the specific development of electric vehicles. The ZEV Program mandates that automakers meet a set of requirements through sales of a combination of fuel cell vehicles, battery electric vehicles, and plug in hybrids based on company-wide sales or the purchase of credits. In addition, nine other states have adopted California's ZEV program, which in total represent almost one-third of national sales. While some automakers are unhappy with the Program, the California Air Resources Board has recently reaffirmed its commitment to the Program, which has been a key driver of the development of EVs.

While the improvement of fuel economy and reduction in greenhouse gas emissions is mandated by governments across the globe, it is demanded by consumers and of course positively affects operating costs and will help automakers thrive in the face of the broad industry changes described above. While the federal clean car and fuel economy standards for model years 2022-2025 are under review and a number of auto companies and their trade associations are seeking to weaken existing standards, many global automakers recognize the importance of investing in fuel economy improvement in order to meet market demand and corporate marketing goals, and contribute to a better environment. Of course, these trends are global with countries and large cities around the world (including China, India, France and the UK) setting or considering policies that will incentivize in some cases and require in others high mileage and/or electric vehicles. As a result, weakening the U.S. standards will inhibit U.S. automakers' ability to compete on the global stage.

Specific Automaker Strategies

This section illustrates that the major global automakers are all moving forward with respect to improved fuel economy in general and electric vehicles in particular, although their approaches are of course unique to their particular strengths. In general, the current regulatory environment with respect to fuel economy in the U.S. and beyond is consistent with these strategies, but a weakening of the U.S. standards could weaken the global competitiveness of the U.S. auto industry.

Toyota has a long history of leadership in fuel economy as it launched the Prius in 1997. The vehicle is now in its fourth generation and the technology is being used in a wide variety of vehicles. In addition, Toyota is a leader in fuel cell technology although the lack of a fueling infrastructure has been problematic. As a result, Toyota is now working to “catch up” in full electric vehicles while moving forward (albeit somewhat belatedly) in turbocharging and CVTs. It is now working on an electric car powered by all-solid-state batteries (enabling it to be recharged in just a few minutes as well as a longer range), and may soon launch an EV in China. Ironically, the fuel economy standards have disadvantaged Toyota as competitors have improved their fuel economy; to reclaim their crown, they are utilizing new approaches, such as the partnership with Mazda.

Luxury brands like Audi, BMW, and Mercedes-Benz have the advantage of selling higher priced vehicles that can more readily absorb the cost of fuel economy improvement including electrification. These automakers have demonstrated this capability by offering a wide range of plug in and electric vehicles with many more planned in the short-term;⁵ as noted above, their EV models are likely to increase as autonomous vehicles become more common.

Ford has taken a different approach to electrification compared to many of its competitors; it has not focused on a specific technology but rather a range of technologies from conventional hybrids (including stop/start technology) to plug-in hybrids and full electrics. Ford is ahead of its domestic competitors in the use of start/stop technology and in the medium term, 48 volt batteries, which allow for greater electronic content (e.g. infotainment, computer controlled powertrains and remote updates, all of which are critical to fuel savings and as noted above consistent with greater electrification of the fleet). In addition, it has been a leader in improving fuel economy with its EcoBoost technology (including turbocharging) and lightweighting (e.g., aluminum body in the F-150 and Super Duty Pickup), which has allowed it to make fuel efficiency gains ahead of many of its competitors.

That said, it has not committed itself to any particular electrification strategy, but is focused upon improvement across the board with a \$4.5 billion investment in electrified vehicles solutions (including hybrids) by 2020 including the addition of technical staff in Dearborn with prototype and series production of a number of electrified products planned for its plant in nearby Flat Rock. Ford hasn't kept up with rivals in the fully electric car market, but seeks to address that shortcoming with the Model E crossover, which is slated for production in 2020 (which is designed in part to compete with the Chevrolet Bolt).

While GM's fuel economy strategy has in many ways been less aggressive than Ford and some of its other competitors, it has been a leader in developing electric vehicles; both the Volt and the Bolt are very impressive technically, although they have underperformed with respect to sales (due to lack of adequate marketing and availability). The Bolt has been specifically designed to be part of and enable the development of autonomous fleets (with early production allocated for testing of the technology).

GM has also been more conservative with respect to the use of turbocharging, start/stop technology, and material substitution (although they are an industry leader in combining multiple materials for performance, fuel economy and weight saving). That said, they are utilizing the underlying technology of the Volt and Bolt across a broader set of vehicles.

VW has of course suffered financial and reputational damage from the diesel engine debacle. It has responded with a variety of cost cutting plans, but most importantly has focused on autonomy and ride sharing and electrification as its calling card for the future of the company. In fact, they have set a goal of 2-3 million electric vehicles by 2025 representing 25% of total sales, with a wide variety of products available by 2020 that will enable this volume. While it has taken a huge financial hit, it remains a strong player that can exert an impact on not only its own products, but that of the industry as a whole.

While Hyundai/Kia have produced a number of hybrid and plug in electric vehicles in the past, they are now bringing to market a broad range of products based on a new platform that includes hybrids to plug ins to full

⁵ Mercedes is introducing a sub-brand, Mercedes-Benz EQ, which will sell only EVs.

electrics under the Hyundai Ioniq (hatchback) and Kia Niro (crossover) nameplates in an attempt to compete with Toyota and further establish Hyundai's standing as a leader in the automotive market.

Regulatory Certainty Drives and Protects Investments

The strategies of the automakers are of course a response to the major trends described above. Their agreement to the fuel economy standards in 2012 was due in part to their request for regulatory certainty in North America and their desire for harmonization nationally and globally. This certainty is also critical for Tier One suppliers who must make major investments and are providing the majority of fuel-saving technology in research, development, and production capacity. While companies may prefer to not be "required" to meet specific targets (and penalized if they do not), it is clear that the standards are in fact consistent with their business goals as defined by the factors described herein.

The world's automakers are making decisions on which their futures – and therefore the future earnings of their stockholders, bondholders, employees, and communities – depend. Several dozen global Tier One suppliers (encompassing hundreds of facilities across the country) are reacting to automakers' decisions to increase fuel economy by pouring resources into R&D, adding production capacity, and issuing purchase orders to hundreds of *their* suppliers. Within the auto industry and increasingly in the tech industry, several hundred thousand workers and many communities across the nation depend on automakers and their suppliers making prudent decisions. In fact, increased demand for suppliers will lead to higher volumes and cost savings that will improve the financial performance of both automakers and their suppliers.

Automotive Technology Suppliers are Key Innovators and Beneficiaries of Standards

As noted above, suppliers are particularly critical in the area of fuel economy where automakers rely upon suppliers for key componentry and content (including software). In fact, suppliers make up a significantly larger portion of the U.S. economy and of U.S. employment than do the automakers. While automakers employ over 200,000 people in the U.S., makers of auto parts employed well over 500,000 (and these figures understate supplier employment given the limitations of the federal data gathering system).

Stronger standards lead to increased supplier revenue because as much as 80% of the over \$1,300 in additional compliance costs estimated to be required due to the fuel economy regulations from 2014 to 2025 are sourced from suppliers. Our analysis predicts that over the 12-year period 2014-25 with the 2025 National Program standards left in place, automakers (not just the Detroit Three) will spend well over \$110 billion in fuel-saving technology, about \$90 billion of which will be paid to suppliers.

Simple economics tells us that if demand for fuel economy declines as a result of weakened standards, the piece price for these products will rise, which will be costly to OEMs and eventually hurt consumers as well.

Industry Global Competitiveness Enhanced by Strong Standards

By requiring automakers to field a more fuel-efficient fleet than they otherwise might, based in part on the current low level of fuel prices, the fuel economy standards provide a form of insurance for automakers and their suppliers against future market share loss in the event of a return to high fuel prices. The current standards also keep the Detroit Three focused on the car and crossover platforms that are key to their **global** success. In 1985, more than two-thirds of Detroit Three unit sales were in North America; by 2025, we project that only one-third will be as the automakers focus their expansion efforts on China, India, other parts of Asia, and Eastern Europe. As noted above, China and India are providing incentives and requirements that global automakers must meet, and the European Union is also moving forward. A product line that is consistent with global demands, rather than short-term North American preferences, will enable this shift. Of course, China represents the largest market in overall sales and is pushing hard for improvements in both fuel economy and electrification. In fact, the government has established a goal for electric vehicles of 12% of sales by 2020, 20% of sales by 2025, and as high as 40% by 2030. India has

stated that all sales by 2030 should be electric, and France and the UK have set a 2040 deadline for the end of internal combustion engine sales.

Some automakers argue that the current National Program standards impose an economic burden under low fuel prices because they cannot pass on all of their compliance costs. However, that burden may be partially, fully, or even more than fully offset because retaining the standards provides automakers with an effective “insurance policy” against higher fuel prices in the future. The current standards can act as an insurance policy because they provide an incentive for the Detroit Three to field a fleet of vehicles throughout the 2020s that can reduce their risk of lost market share and profits in the event that fuel prices rise sharply between now and then and the demand for less fuel efficient framed trucks declines.

Conclusion

The auto industry is undergoing tremendous change and facing myriad new challenges, but the current fuel economy standards will serve to help rather than hinder the industry in addressing these challenges. While automakers have suggested that the fuel economy standards should be weakened or the timing extended in response to lower fuel prices and changing market segmentation, in fact the standards drive changes that will empower the industry to thrive in this new era.

Thus, the fuel economy standards, as well as the California ZEV Program are in fact consistent with the investment and product requirements and changes in business models that the industry faces. The globalization of the industry (particularly the Detroit Three which are catching up on new global opportunities, particularly in Asia, that many of their competitors have already embraced) along with movement to electrification, connectivity, and autonomy will shape the industry for years to come. Companies that embrace these developments will succeed, and the fuel economy standards, as well as the ZEV program, are a critical part of that future.

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About the Author

Alan Baum is Principal of Baum & Associates, an automotive forecasting and research consultancy. Prior to its launch, he was an analyst and forecaster with the state of Michigan, IRN, and The Planning Edge. This analysis was commissioned by Ceres.

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