Ford Motor Company's Business In Comparison With Gm And Toyota

Ford Motor Company is a multinational automotive manufacturer, primarily operating in the US with operations, manufacturing facilities and joint ventures in global locations. In this review, I intend to look predominantly at the US operations of the business in comparison with GM and Toyota.

Ford is currently the second-largest automotive supplier in the US with 14.35% of the market, behind market leader GM and marginally ahead of Toyota. Ford has maintained between 14% and 15% of the market for almost 10 years although a decline from its 2011 high of 16.77%. In comparison, GM has consistently lost market share from its 2008 high of 22.15% to a forecast low of 15.56% in 2020 and a continuing downwards trend.

Ford and GM demonstrate stable US demand when reviewing forecast data out to 2026, with Ford volumes remaining flat at 2.3MM vehicles. Toyota however is forecast to grow global volumes from 10.4MM in 2018 to 11.8MM in 2026 a growth of 14%. Toyota's growth is predicated upon increasing demand within developing economies, (Asia excluding Japan) where Toyota has a strong presence, a notable gap for Ford whose joint venture operations in China have been a relative failure when compared to both GM and Toyota.

Ford’s US vehicle sales represent 50.2% of its total business in 2018, a far higher single market exposure than either GM or Toyota. Ford, therefore, has a comparatively bigger exposure to macroeconomic shifts in this single economy than GM or Toyota whose regional exposure is more balanced.

Toyota is by far the largest OEM in terms of both revenues and operating income. Toyota revenues are on average 50~60% higher than GM or Ford in the data set, however, operating income ranges anywhere from 20% higher, an anomaly in 2015, to 7 times higher in the case of Ford during 2018. Ford generated $3.2BN operating income and $3.6BN in net income in 2018 against sales revenues of $160.3BN, and gross profit of 10%. Comparatively, Toyota generated net income of $23.45Bn in 2018 against sales of $276.25BN a gross profit of $51BN or 23%, highlighting the disparity between Ford and Toyota. GM operates in a similar gross profit space as Ford, however, performs significantly better in net income, generating $8BN in net income against 2018 sales of $147BN, however, restructuring and one-time costs are notable in the financials of both Ford and GM.

Ford did however have the best-selling vehicle in the world during 2018, the Ford F-Series, which was also the best-selling car or light truck in the US, outselling the Toyota Corolla. The F-Series is also one of the highest profitability vehicles in the US, generating an estimated per vehicle profit of $10K, generating 90% of Ford’s profit, an outlier in an industry typically linked to vehicle profitability between $750 and $2.7K per vehicle.

Ford is in the process of addressing its product offer in terms of both power train and market segment to better address the evolving needs of the consumer, having announced its exit from the car (sedan) market to focus on SUV and crossover vehicles, similar to the market-leading

pickup F-Series.

Average vehicle prices in the US have increased from $28.8K in 2008 to $34.67K in 2018, reflecting growth in GDP, and will be discussed in more detail as Ford reconciles its product offer to address shifting consumer tastes.

Automotive OEM profit margins have been difficult to identify, however, in this snapshot between January and June of 2016 we can see an indication of profit margins where Ford was the leading global OEM achieving 8.6%, closely followed by GM at 8.5% and Toyota at 8%, and as such supernormal profits for the industry which averages 5%.

Global vehicle sales have increased from 50MM vehicles in 2006 to just under 80MM vehicles in 2018 with a projected volume of 110MM vehicles in 2026, demonstrating 2-3% growth per year through the next 8 years, primarily driven by increased demand in developing economies.

On a global basis, Ford is the 5th largest OEM with just under 6% of global sales, however, demonstrating steady decline from 2015, which is being mirrored by GM. Toyota and the Renault-Nissan-Mitsubishi global market share is remaining flat whilst VW is forecasting growth through 2020 .

Ford's revenues demonstrate consistent growth after 2009, similar to Toyota and GM, however, this is not manifest in improved bottom-line financial performance suggesting operational issues that need to be addressed in order to continue to achieve and maintain super-normal profits.

Global net income for Ford rides a precarious wave, mirrored by GM, as the costs of restructuring and resizing the business impacted financial performance, however, from 2015, we can begin to see a little more consistency as restructuring activities and one-time costs are reduced. It is key to highlight the net income losses in 2007/8 as macroeconomic factors impacted vehicle sales.

Ford is continuing to undertake restructuring activities announcing a further staff reduction of 3K employees in 2019. Comparatively, Toyota has grown its workforce from 325K in 2012 to 369K in 2018 to address continuing growth requirements, however, within a relatively stable growth framework without the erratic variation seen by both Ford and GM.

As an automotive manufacturer, Ford operates within an oligopoly, in that there are few dominant players, significant market barriers to entry and monopolistic competition conditions.

I will look at key components that comprise Fords', and the broader industries, macroeconomic exposure, reviewing the impacts and vulnerabilities of the company to shifts in these components as they inform operations and performance. Key to this review will be the identification of best practice and or potential mitigating strategies.

Components for consideration include:

1. Fixed Costs / Quasi-Fixed Costs
2. Input Costs
3. Price Elasticities
4. Complementary products

5. GDP
6. Barriers to Entry
7. Competition
8. Government activity

Automotive manufacturers have high fixed / quasi-fixed costs in the form of plants, production lines, skilled labor (unionized) and R&D costs, and as such are exposed to type 1 vulnerabilities. High fixed and inflexible fixed costs expose the industry to shifts in demand. Demand impacts are influenced by and not limited to, changes in complementary product pricing (petrol), shifts in technologies (powertrain/electronics), income or substitution effects, GDP movements or changes in consumer tastes,

The short run average cost curve in the automotive industry demonstrates that changes in quantity, sub-optimal levels, have a pronounced effect on average total costs and therefore the financial operations of the business. Shifts in demand from optimal levels at Q1 to sub optimal levels Q0 or Q2 (inefficient fixed asset utilization and overhead absorption), impact average total costs, as seen at C0 and C2. Substitution effects prevent transmitting cost structure changes to the customer in the form price increases thereby impacting the financial operation of the business. Minimum efficient scale and manufacturing at optimal levels are a key considerations for Ford when identifying macroeconomic exposure.

Toyota has designed their mfg plants and vehicle platforms to be flexible in terms of production possibilities, and as such is better able to react to market demand shifts led by changes in consumer tastes compared to GM and Ford. Ford and GM plants were defined to manufacture limited product offers to drive operational efficiencies through specialization, however, when consumer tastes changed they were less able to shift production to different vehicle types. This legacy constraint manifest in 2008/9 when petrol price increases resulted in the demand for more fuel efficient vehicles, both Ford and GM were not agile enough to address the change in consumer tastes. Toyota however was able to shift production to these vehicle types more easily than GM / Ford due to production flexibility.

Toyota had also developed a broader powertrain product offer, ranging from small low-cost energy-efficient vehicles to hybrid solutions, meaning they were somewhat insulated from petrol price shocks and could better shift manufacture to address consumer requirements as needs evolved.

In a simplified diagram, Toyota is operating on, or close to, the optimal production possibility frontier (PPF), allowing greater production flexibility than both Ford and GM, who are operating under the optimal PPF curve and as such less agile to reallocate resources as market requirements change. Toyota plant flexibility therefore helps offset fixed asset utilization exposure through optimal asset configuration, closer to optimal levels, a notable constraint for both GM and Ford. Through additional investment or increases in efficiency, it is possible to shift the PPF curve outwards (PPF to PPF2). The result of increased capacity supports shifting the long and short run aggregate supply curves outwards thereby reducing average total costs.

The key complementary product to the automotive industry is petrol. Changes in the pricing of a complementary good shift the demand curve inwards exacerbating challenges associated with high fixed cost industries like automotive, a notable impact during the 2008/9 financial crisis.

Automotive firms are also exposed to type 2 input cost vulnerabilities, such as the cost of steel. If steel prices increase, the cost curve would move from F1 to F2 resulting in costs C1 and C2, which if not addressed in pricing would impact profitability. As input costs are typically industry wide impacts, the question becomes how those input cost shifts are managed and the exposure the company provides to the end customer so as not to drive substitution effects. To address type 2 vulnerabilities, automakers enter into long term material contracts, however, most suppliers include the right to renegotiate prices should costs increase significantly, so are typically only insulated up to shifts of 10% in underlying costs.

Short-run price elasticities tend to be higher in the automotive industry, in that a price change (5-10%) in one suppliers product offer will result in an increase (decrease) in demand for a competitive product. In this sense, the firms can be considered mutually interdependent and if firms fail to react, they could be driven out of business. The identified price elasticity may however result in a kinked demand curve (fig 1), where price increases may not be matched, however, price decreases will be. The point between A and B representing the discontinuous MR.

The automotive market is relatively transparent, in that vehicle prices are available immediately so pricing activity can be monitored and responded to. The automotive market is well regulated meaning the concept of collusion, or price fixing is not really viable, although large systematic incidences of price fixing have been identified in the supply chain.

Porters 5 force model helps to analyze the attractiveness of an industry for market entry and its potential profitability, based around 5 key tenets:

- a. Competitive Rivalry - High

Ford must compete against excellent competitors constantly bringing new products to the market. There are also high exit costs, so firms prefer to stay in the market and compete against Ford rather than exiting the industry, which increases competition.

- b. Buyer Power - Moderate

With low switching costs, Ford must excel in creating value for its customers given the impact of demand shifts on the financial operation of the business.

- c. Supplier Power - Moderate

Suppliers are less able to leverage power against Ford due to limited forward vertical integration and the fact that Ford owns a significant portion of key inputs into vehicle manufacture. Automakers are notorious for wielding power over there suppliers.

- d. Substitution Effects - High

These effect should not only be limited to other vehicle manufacturers but can also be extended to public transportation, bicycles and ride-share technologies which are disrupting current vehicle ownership paradigms.

- e. New Entry Threats – Low (short term)

Changes in manufacturing ownership and variablisation models are changing the current standard fixed cost entry barrier, but an evolving development.

From the above analysis and given automotive is a mature market requiring large minimum capital investments, market entrants, notably from China, are content to burn $BN's in the short-term to secure super-normal profits in the long term, as evidence of global long term aggregate supply opportunities exists in new technologies and emerging markets. If implementing manufacturing in developing low cost economies, in SE Asia for example, the market entrant may also be able to take advantage of total factor productivity (TFP) gains if supported by strong management practices.

Given price elasticities and potential substitution effects, Ford must differentiate its product in the market to address this "strategic hell". The automotive industry is relatively well insulated from market entrants as the barriers to entry not only manifest in significant fixed costs, but also the creation of brand.

In 2018 Ford was ranked the 4th most valuable automotive brand in the world, behind Toyota, Mercedes Benz and BMW, with a valuation of $12.7BN, less than half that of Toyota at $29.9Bn. GM is a notable exception from the list as their values are based around brands like Chevrolet and Buick rather than GM as a whole. GM spent $3.45BN on advertising in 2017 compared to $2.45BN for Ford and $1.78BN for Toyota. Brand creation requirements represent a deterrent to market entry, as market entry costs are not limited to physical capital but the somewhat intangible creation of brand. During 2008/9 both GM and Ford advertised to "Buy American" as a means to shift demand to domestic brands, away from Japanese OEM's as a brand strategy, which did impact Toyota as sales US sales volumes fell in the proceeding years from 2010-2012.

Although minimum efficient scale exists as a barrier to entry as a function of fixed costs, over-capacity does exist in the market. Market entrants are attempting to circumvent fixed cost ownership by leasing capacity from established manufacturers who effectively act as contract manufacturers for new entrants. JAC a Chinese OEM provides open capacity to new energy vehicle brand NIO, however, this is somewhat experimental and thus far NIO has losses of $2.1BN, which might simply be an accurate reflection of the short run average costs of entering the automotive industry, however an interesting market development and potential evolving variablisation model. Significant to note in these entrants are the likes of Tesla or BYD. BYD, a battery manufacturer for cell phones, expanded into automotive and is currently the largest new energy vehicle supplier in the world.

Income effects impact the auto industry as when consumer purchasing power reduces, often linked to GDP contractions and tightening of finance markets, so too does the discretionary purchase of vehicles. During 2008/9, following negative GDP, neither Ford nor GM had a low cost product offer to address the reduction in purchasing power, with Ford revenue streams, dropped $28BN in 2009, taking until 2013 to recover.

To address GDP contractions and reinvigorate the economy, the government embarked upon a number of fiscal injections into the economy to in the form of stimulus packages to drive consumption. The American Recovery and Reinvestment Act (ARRA) enacted in 2009 added $787BN to the economy. Expansionary fiscal policy in the form of low cost financing to automakers, a $3bn industry subsidy (cash for clunkers) and vehicle tax reductions helped

promote the purchase of new vehicles. These actions effectively shifted the demand curve for vehicles outwards, helping move the OEM's back towards optimal output levels whilst they developed a product offer to meet evolving consumer needs. ARRA also targeted reducing unemployment by 7MM people, thereby stimulating consumption. Government expansionary fiscal policy is subject to a multiplier effect and as such was able to revitalize the economy and the auto industry. 2008/9 highlighted the importance and impact of fiscal and monetary policy to manipulate GDP and stimulate growth.

The potential impacts of inflation increases includes income purchasing power reduction which in turn reduces consumption amplifying the challenges faced in the auto industry.

The 2008/9 financial crisis was an unprecedented global event that highlighted the need for a fundamental shift in business practices within Ford and the Big 3. Ford had not been effective in addressing macroeconomic exposures.

Components of the crisis affecting Ford included:

1. Complementary product pricing - Petrol
2. Credit market contraction
3. High fixed and quasi-fixed overheads
4. Diseconomies of Scale
5. Low manufacturing agility
6. Over exposure to a single market
7. Government actions

In 2006 Ford CEO Alan Mullaly recognized that Ford needed to shrink before it could grow again, creating $24BN in lines of credit and financing to help support that activity. Although Ford recognized the need to change, legacy constraints made it difficult to do so quickly. Entrenched management had lost sight of the evolving needs of the market until a market correction in 2008/9 nearly resulted in bankruptcy. If the industry was not "too big to fail", it would have, and without government funding would have taken a number of tiered suppliers by extension into bankruptcy. The 2008/9 crisis also resulted in a significant number of consolidations within the supply chain as over-exposure to a single automaker resonated throughout the industry.

Ford did however fare better than both GM and Chrysler. GM filed for bankruptcy, June 1st 2009 and Chrysler was forced to partner with Fiat forming FCA, whereas, Ford were able to maintain operations without declaring bankruptcy, however, stock traded at $1 compared to a 1998 high of $31, now trading at $10.38.

Whilst the Big 3 continued to develop large engine "gas guzzlers", global OEMs had developed smaller energy-efficient vehicles, which had demonstrated success in their home markets, allowing them to better adapt to exposures to petrol pricing. The Toyota Prius came to market in 1997 a prescient development given automotive price sensitivities to the petrol market. Ford had not developed the breadth of powertrain options to insulate it from shifts in complementary product pricing a key failure.

Before 2008/9, credit was readily available to support vehicle purchases, when lines of credit disappeared so did demand. Ford Credit was founded in 1959 and as such financing options were available, however, without a viable product, demand crashed and Ford struggled to

maintain its fixed / quasi-fixed overhead costs resulting in significant layoffs and restructuring.

Due to demand decreases and poor capital utilization, Ford had to reevaluate its operations, making sizeable reductions in plants and employees. Between 2007 and 2012 employees were reduced from 246K to 171K and operations reduced to focus on global centers of excellence.

Legacy large scale expansions to create a global power resulted in diseconomies of scale and a bloated organization that was not managing contribution levels effectively, thereby driving up long term average costs. Without significant resizing of the business, meaning closing plants and layoffs, Ford would not have survived without taking on significant government debt or bankruptcy. Ford needed to sell brands which were no longer viable, removing the Premium Auto Group, comprising Jaguar, Land Rover, Volvo and Lincoln, with Lincoln being retained as a premium brand. The sale of these brands generated $10.38BN and allowed Ford to focus on its continuing restructuring efforts.

Ford had not effectively developed emerging economies, resulting in over exposure to a single market, the US, persisting today with Ford Global (excluding US) generating losses. Over-reliance on a single market heightens exposure to macroeconomic risk and is not easily rectified without concerted efforts across all business functions.

Ford has again recently restructured, involving the reduction of staff from a 1997 high of 364K people to just under 200K in 2018 a 3K reduction from 2017, thereby reducing quasi-fixed cost exposure. Forecast vehicle sales do not deviate significantly from 2002 volumes, suggesting automation activities have been successful and essentially Ford are doing the same with less, which is a positive indicator.

Debt to equity ratio for automotive manufacturers is a good gage of performance. An increasing D/E shows the company is being financed by creditors rather its own equity, so we look for a lower relative D/E ratio when compared to its competitors. In 2018 Ford debt to equity ratio was 2.82, GM 1.71 and Toyota 0.53. This gearing calculation shows Ford still has a significant amount of work to undertake in order to close the gap to its competitors, and has too much debt to suggest a good investment opportunity, however, is moving in the right direction.

Inventory turnover ratio is another key indicator in the auto industry and a warning sign would be dealerships carrying more than 60 days stock. Toyota inventory turnover for the 3 months ending December 31st was 2.49, compared to Ford’s 2.75 and GM’s 2.84, suggesting relative stability in demand across the 3 competitors and on hand inventory of between 30-35 days.

Ford has exited the car (sedan) market, identifying that future industry demand will center around SUV and crossover vehicles with new energy drive trains, at the higher end of the profitability range. By using a more homogenized platform base, manufacturing plants should be better equipped to operate closer to the optimal production possibility frontier, being more agile to consumer shifts in taste, thereby offsetting potential demand shocks. A simpler base platform also lends itself to differentiation through branding and marketing activities, tapping into the design requirements of the consumer at a more superficial level, skin changes on a standard skeleton, and reducing major R&D activities. Ford volumes are not showing significant forecast growth and as such focus needs to be on operational excellence and flexibility, following the Toyota model.

To address R&D costs, Ford and GM have developed powertrains together, thereby sharing capital expenditure and reducing fixed/quasi-fixed costs. A recent $500MM investment in Rivian highlights Ford's willingness to partner with new energy vehicle leaders and again achieve economies of scale in R&D expenditure, GM are also suggested to be investors. Ford has also undertaken an agreement with VW to develop trucks, again sharing development costs and reducing product offer to increase efficiencies of scale and achieve super normal profits. Ford has also committed to speed investments in self driving vehicles.

Ford has struggled to develop China and other developing economies markets where middle incomes are growing and the demand for cars is increasing. The Ford product offer was not in line with market requirements and joint ventures were unable to achieve substantive growth. A new product offer coupled with advanaced power trains may help to make Ford a more effective competitor in these markets, and reduce over-reliance on a single market.

Ford is attempting to become leaner, leaving the heavy truck business in South America and closing plants in Russia. Competitiveness in Europe remains an issue having posted a $398MM loss in 2018, however posting a $57M profit through the first 3 months of 2019 demonstrating progress. Restructuring costs in Europe will likely result in a negligible profit in Europe for 2019, a significant again, an improvement from multi-year losses.

Ford is exploring more innovative ways to generate revenue, one such way could be from consumer data, linking listening habits to consumption of other goods. With 100M Ford vehicles in the market, the data set would be extremely valuable for marketing purposes. Ford also recently acquired Spin, an electric scooter company, where the value of the business may not be in the scooter but in the data it provides. Diversification of revenue streams, albeit to a limited level, indicates Ford is innovating and looking to expand its presence through multiple market channels.

I believe Ford is moving in the right direction to reduce exposure to both type 1 and type 2 vulnerabilities, and through the development of new energy powertrains are positioning itself to respond to the needs of the market. Ford is becoming a leaner more agile player in an evolving market space, and I believe this smaller organization is better prepared to deal with macroeconomic shocks, and although not there yet, will start to see improving fortunes in the mid-term as restructuring activities start to deliver results.