A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance from the NOVA – School of Business and Economics.

BMW Group Equity Research – A Shift in Gear

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A Project carried out on the Master in Finance Program, under the supervision of:

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Abstract: This Work Project consists of an Equity Research, focused on the intrinsic valuation of the company BMW AG. A sum of the parts valuation model is used to quantify the value of the firms' businesses that range from car and motorcycle manufacturing to financial services. Although BMW enjoys a strong branding power, challenges in the form of innovative competition in the EVs segment, production disruption due to a shortage of semiconductor chips and possible government intervention in key regions severely decrease growth possibilities. We forecast a sales growth in the region of 1.2%-3.0% after 2022 and slightly increasing margins. Our result yields a HOLD recommendation with 5.1% shareholder return for FY2022.

Keywords: Electric Vehicles, Automotive Industry, PHEVs, ICEs

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This report is part of the BMW Equity Research Report (Annexed) and should be read has an integral part of it.

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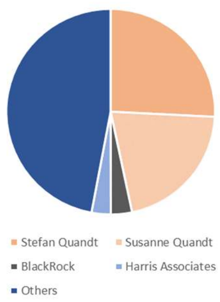
Company Overview

Corporate Governance

In what regards Corporate Governance, shareholders exert their rights in the Annual General Meeting, to decide on the application of unappropriated profit, ratification of acts of the members of the Board of Management and Supervisory Board, nomination of the external auditor, amongst other formalities. The Supervisory Board is composed by 10 shareholder representatives, and 10 employee representatives (which implies higher friction in assurance of job conditions and job retention purposes, which unavoidably were impacted during COVID-19). Board of Management is responsible for managing BMW Group. Three share-based programmes were created for incentive-alignment purposes (for entitled employees, for high-ranking heads of departments and for members of the Board of Management) (BMW Group, 2020). Oliver Zipse replaced Harald Krüger in 2019 as the new CEO of the group, and we predict him to heavily invest in “new products, new drive technologies and in digitalisation” (BMW Group, 2020) to underscore BMW’s innovation leader position and increase the brand’s market share around the globe.

Shareholder Structure



Graph 1 – Shareholder structure by 2020
Source: Bloomberg, Analyst calculations

On the 31st of December 2020, BMW Group had a subscribed capital of €659.684.500, split into 601.995.196 shares of common stock (91.3%) and 57.689.304 shares of non-voting preferred stock (8.7%), both with par value of €1.53, of which 3% are free float (shareholders below 5%). The remaining shares are concentrated in Quandt Family members (46.7% of fixed holding shares) (BMW Group, 2020). Upon Herbert Quandt´s death (1982), his shares were transferred to his wife (Johanna Quandt), son (Stefan Quandt) and daughter (Susanne Klatten). Later on, with Johannes death, in 2015, her shares were passed to her descendants, which together own 46.7% of BMW Group, with Stefan Quandt owning 25.8% (25.6% through AQTON SE and 0,2% in his name) and Susanne owning 20.9% of total shares (20.7% through Susanne Klatten Beteiligungs GmbH and 0.2% in her name). Amongst other investors (free float), BlackRock Institutional Trust Company, N.A owns 3.3%, Harris Associates L.P. owns 3.0%, and the remaining shareholders all own less than 2.0% of BMW Group. Parallelly to BMW’s vision, we firmly believe BMW will continue to adapt to the fast-changing industry, assure profitability, and to create long-term value, even if it involves short-term sacrifices.

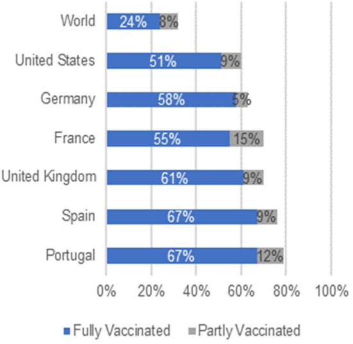
Industry Overview & Outlook

Macroeconomic Environment

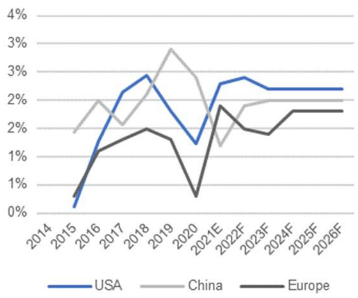
Graph 2 – GDP growth projections Euro Area vs World
Source: IMF, Analyst calculations

Global economies and markets have been ravaged by a global pandemic in the past year, resulting in extreme measures from policy makers, ranging from unprecedent packages of fiscal stimulus to accommodative monetary policies, aimed at targeting the widespread volatility in capital markets. World GDP is estimated to have contracted -3.2% YoY in 2020, with projections for the next two years offsetting this number, and then some, with +6.0% and +4.9% growth, respectively. Long term projections point to a global growth of +3.3% (IMF, 2021). The so-called “V” shaped recovery is already a reality for some major economies, with few already at levels above pre-pandemic numbers, as is the case of China and the UK, as industries re-open and supply meets the newly boosted demand for goods, and later services. Even still, uncertainty still

Graph 3 – GDP growth projections US vs World
Source: IMF, Analyst calculations



Graph 4 – Share of population Vaccinated against Covid-19 virus
Source: IMF, ECB, Analyst calculations



Graph 5 – Inflation expectations for the USA, China, and Europe
Source: IMF, ECB, Analyst calculations

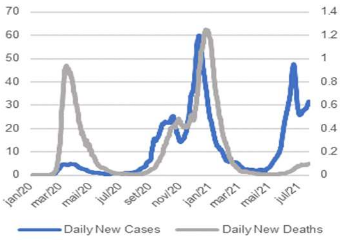
"By inflation, we mean year after year after year prices go up. If something is a one-time price increase… you wouldn´t react to something that is likely to go away" – *Jerome Powell, FED*

looms in the horizon, even as vaccine rollouts hit industrial dosage numbers and total number of vaccinated people inches higher, mainly in the western and developed regions. New mutations that can prove to be more resilient and transmissive, as is the case of the delta variant, represent an ambiguous and constant risk. On another note, market participants have shown growing concern with inflation levels, reaching higher than expected numbers by Central Banks, which could prompt interest rates hikes. Although we believe these to be transitory levels of high inflation, and not sustainable in the medium to long run-in advanced economies, we still stress our forecasted price to changes in WACC and the growth rate, to assess the impact of an increase in rates. Furthermore, it is expected that the Financial Services business unit to perform slightly better in a higher interest rate environment and thus act as an organic hedge of the Group to these movements. Non-energy commodity prices have been increasing sharply in 2021, which has negatively impacted the supply chain, creating bottlenecks and restricting output growth in several industries. In the automotive sector, the most prominent shock has been the semiconductor chip shortage. However, these price pressures and disruptions should moderately decrease and gradually disappear thereafter (ECB, 2021).

In the United States, the administration of newly elected President Biden has brought forward unprecedented fiscal stimulus packages and long-term spending targeting infrastructure and social benefits, with the Senate having recently approved the long-awaited $1 trillion infrastructure bill to rebuild deteriorating roads, bridges and incentivize investments biased towards green energy, positively driving demand for Battery Electric Vehicles (BEVs) and Plug-in Hybrids (PHEVs), making the connection with the automotive segment. These will most likely be financed via higher corporate taxes (from 21% to a targeted 28%) (FT, 2021). In the monetary front, the FED has been reiterating its accommodative policies started back in the beginning of the pandemic. However, the speech of members and chairman Jerome Powell, has gradually become more hawkish in recent weeks, hinting to short-term tapering of monthly asset purchases, followed by an interest rate hike to control possible runaway inflation levels. Continued expressed optimism regarding economic growth and rising inflation worries, have prompted early tapering talks in the last FED meeting, as per the minutes. (CNBC, 2021) The infamous Jackson Hole summit, also hosted several speeches that were broadly in line with this view. We interpret this as a clear signal that asset purchases should start decreasing throughout the present year and that the first-rate hike should come in 2023 at the very latest, maybe even by late 2022, ceteris paribus. The success of the vaccination rollout means 60% of the population is already vaccinated, with at least one dosage, by mid-August (OWD, 2021). Output is expected to grow +7.0% and +4.9% (IMF, 2021) in the next two years respectively, as it recovers from last year's contraction, with unemployment rates steadily decreasing and expected to bottom at 4.2% in 2022. Consumer prices are expected to increase considerably to +2.3% at years end, but our belief in transitory base effects for the broader advanced economies holds. We find these numbers to be in-line with our view of broadline economic activity for the short to medium term, and a long-term real growth of +1.5% (IMF, 2021).

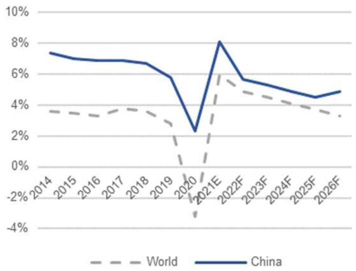
In the Eurozone, vaccination efforts trailed those of the US by the end of the first semester of the year, however vaccine availability and wide acceptance by the population led the region to surpass its western counterpart in some countries such as Portugal, Spain, Denmark, France, and Germany. Signs are broadly positive, with all countries adopting some sort of easing of restrictions. Output is expected to recover around +4.4% YoY, on average, in the next two years, with Germany slightly below average (+3.6%) and France leading (+5.8%) (ECB & IMF, 2021).

The unemployment rate is set to increase slightly in the short-term but remain around the 8% figure. Regarding monetary policy, the situation in the region is different to what we witness in the US, with lower levels of inflation spikes and a much more elongated period of low interest rate environment. Still, the ECB has changed its forward guidance this year, to allow inflation to run slightly above the +2.0% target, without hiking rates. The special pandemic purposed asset purchases (PEPP) are expected to keep running until March 2022, as initially stipulated. Rate hikes do not seem to be part of the plan in the near term, with projections aiming to 2024-25 for the continued and persistent level of desired inflation of +2.0%. In the short-term, Inflation is expected to exhibit some volatile behaviour, with HCIP inflation spiking at +1.9% in 2021 and slowing down to +1.5% in 2022 (ECB,2021). The short-term interest rates, as measured by the 3-month EURIBOR are not expected to change and remain at the -0.5% level (ECB,2021), after which we reiterate our belief of lower inflation and gradually expect a price increase of +1.5% for the long term. The U.K. is, in our view, the best positioned country in the reopening effort, with an economy with virtually no restrictions. At this time, it is the world's best proxy for a pre-pandemic level of economic activity in a post-pandemic reality. Henceforth, we pay special attention to the data coming from the region, as we optimistically anticipate a decoupling between the number of cases and the number of hospitalizations and deaths for the rest of the developed world, in the short-term, and overall, in the medium-term. Expected projections point to slightly higher output growth than the rest of Europe, around +7.0%. In the monetary space, the situation is very much identical to that of the old continent.



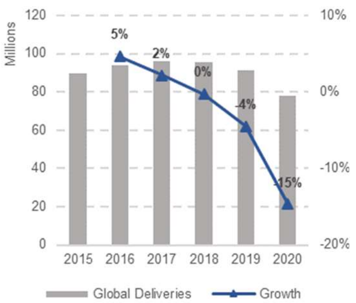
Graph 6 – Number of Daily New Cases vs Daily New Deaths of Covid-19 in the UK
Source: Our World in Data

In Asia, mainly in China, we witnessed the fastest economic recovery, with the country never entering a technical recession in 2020 and expected to grow +8.1% and +5.7% in the next two years. Long term real GDP projections fall in the +4.9% range, slightly below the EM average. (IMF,2021). The main risk we point to in this region is the recent government crackdown on several sectors of the economy, including education and technology, tightening the capitalist freedom Chinese firms seemed to enjoy in the past few decades, and creating a cloud of uncertainty for other sectors. Tech giants Alibaba, Tencent Holdings and Didi, amongst several others, were the target of government fines and enforced regulations on antitrust grounds (Bloomberg, 2021). We interpret these actions as being a clear signal of show of strength, as companies grow bigger and become more indispensable to Chinese society, especially big tech firms, the government is tightening its control over the economy, and that the leverage big western firms enjoy cannot be replicated in the region. There looks to be no immanent planned intervention in the automotive sector, however it is well known that local firms enjoy more favourable policies and are keener of consumers preferences (CNBC, 2021). But the reality is that the crackdown comes as a reminder to investors and companies, that the Chinese market is not a truly free capitalist space. Henceforth, we are of the opinion that this carries a relevant amount of risk for every investor and company in the region.



Graph 7 – GDP growth projections China vs World
Source: Our World in Data

Overall, we favour what we consider as being a bullish view on the development of global economies, grounded on a post-vaccination reopening with widespread immunization by years end, backed by accommodative monetary and fiscal policies, increased savings and disposable income, and a very residual probability of new variants with relevant detrimental implications to the continued recovery and growth of the economy. During 2020 it is estimated that savings have increased +7 p.p. of income in the Eurozone, whilst household bank deposits increased +12.5% of disposable income in the U.S., Canada, and Japan, and by +10.0% in the UK (Deloitte Insights, 2021).

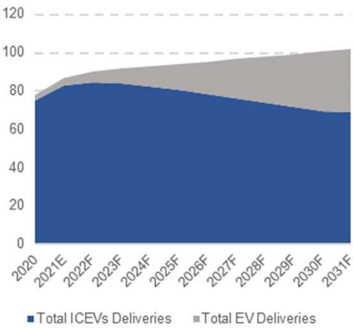


Graph 8 – Evolution of Global Deliveries, in millions.
Source: OICA

Sector Analysis

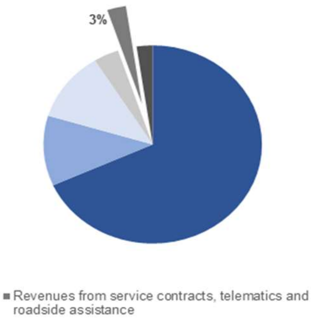
The automotive industry is one of the largest industries by revenue, with global numbers having been estimated around 5,315 bn US dollars in 2017 and projected to grow around +68% by 2030, which represents a +4.07% CAGR over 13 years (Statista, 2017). It is unquestionably one of the most important sectors of the economy in several developed and emerging markets. It also finds itself in a critical conjuncture with fast paced changes, both in the goods and services departments.

Electrified Vehicles



Graph 9 – Global Deliveries Powertrain Mix, in millions.
Source: OICA, Statista, Analysts Calculations

The most widely adopted trend by manufacturers and policy makers seeks to tackle the problem of nefarious gas emissions linked with traditional sources of energy. Road transportation emissions, stemming from the burning of petrol and diesel fuels was estimated to have accounted for 11.9% of global emissions in 2020, of which 60% relate to passenger travel (Our World in Data, 2020). World organizations, together with their member States, have been working to lay down the right incentives for a smooth and quick transition to Alternative Fueled Vehichles (AFV), which includes fines for manufacturers if a particular emission target is not met, and also subsidies per electrified vehicle manufactured that meets a set of pre-specified criteria. We believe this set of factors to, not only raise awareness for the end consumer, and shifting its preferences, but also trim margins for traditional ICEVs and less efficient PHEVs, whilst slightly enlarging those of EVs, over the short to medium term. This results in added pressure for auto manufacturers, as they are forced to innovate and search for alternative options in the electrification of vehicles. The sub-sector market for BEVs and PHEVs has enjoyed exponential growth in the number of global deliveries reaching 3.24mn in 2020, which results in a CAGR of +20.0% since 2015 (McKinsey & EVWSD, 2020). We expect this trend to continue further, with the consequences of the pandemic being short-lived, in our opinion, as production accelerates to meet demand, in the broad spectrum of the market. Also, as manufacturers improve the technology and production efficiency of EVs, it will allow BMW and other legacy carmakers to switch from rolling out these powertrains, purely to meet emissions targets, to achieve better margins and profitable volumes, although we only expect to see a margin similar to ICE around 2024-25, as costs of Lithium-ion batteries decrease -30.0%, in comparison with prices today, which sit at around 130 USD/kWh and are set to decrease to 100 USD/kWh by 2025 (Bloomberg, 2021), and conditional on the average amount of subsidies available per vehicle produced. Nevertheless, as new technologies of batteries challenge the status quo of the electrification of vehicles, as is the case of Solid-State Batteries, it promises to keep competition in the industry high and demand for cheaper vehicles equally high, increasing deliveries, at the turn of the second half of the decade. (Bloomberg, 2021). Risks to this approach include a possible spike in prices of input materials that make up the composition of commonly used battery cells, like nickel, lithium, and cobalt. Recent studies have found that efforts to recycle lithium contents from batteries are primitive and inefficient, and if changes are not implemented soon, a shortage of the element can happen between 2021 and 2023 (Sonoc. et al, 2014). This could greatly impact the battery costs previsions for the short-to-medium term, and thus negatively impact margins on EVs. We estimate a global EV to total deliveries ratio of 14.5% by 2025 and 32.93% by the end of our forecasting period in 2031.

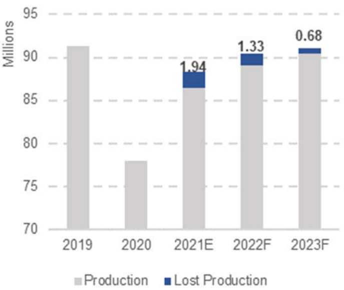


Graph 10 – Shares of Revenues from Telematics, in 2020
Source: BMW 2020 Annual Report

Disruptive Trends

Electrification is not the sole growing trend in this fast-changing sector, as areas like shared mobility, connectivity services, autonomous driving and feature upgrades become more popular, and potentially disruptive to the current business model of Autos, almost purely focused on number of deliveries, as focus shifts from hardware to software of these products. Connected vehicles are expected to account for 100% of the market, 10% of all vehicles should be fully autonomous, 15% of urban trips are expected to result from shared mobility, all of this by 2035 (BCG,2020). These recurring revenues are expected to grow to upwards from +30% of new automotive revenues until 2030, representing a +4.4% p.a. growth. (Mckinsey, 2016). Although we see the potential for most of these technologies, we believe these figures to be overly optimistic, given the recent Covid-19 pandemic and the impact it will leave on society for some time, specially to what regards shared mobility, and the investment needed to move forward with these technologies. However, we do believe these increasingly important features to have a slight, yet material impact on the amount of revenue extracted by manufacturers from each vehicle sold. We forecast a positive contribution from the recurring income stemming from subscription-based services from clients and third-party companies. For instance, the opportunity to monetize application software development, like companies such as Apple and Google do, to run on the embedded car software, or sign exclusivity contracts with providers of this service. BMW currently has a partnership with Amazon in which that car's software system connects to the myBMW app, which allows Amazon A.I. personal assistant Alexa, to access and facilitate several uses of the application. On another hand, for instance, instead of using the application through your phone, like myBMW or Spotify, you could access it directly through the car's system. In the long term we believe this to be a value proposition worth investing in, however we expect it to have little implications in the medium term.

Semiconductor Shortage

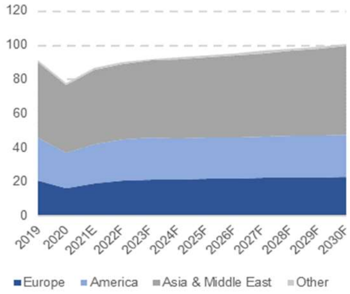


Graph 11 – Lost Production due to the Impact of Chip Shortage, in millions
Source: Analysts Computations

Toyota cut production for the month of September by 40%. Ford and VW are also expecting cuts

The pandemic induced economic shock has created many supply and demand mismatches across industries and the automotive sector is no exception. A disruption in the supply chain has resulted in a shortage of semiconductor chips worldwide, giving rise to bottlenecks across all geographies and production plants. It is expected that this disruption could cost up to $110 bn in revenue to the auto industry (AlixPartners, 2021). On average, there are more than a thousand chips in a regular vehicle, and this number can only increase in proportion with the complexity and advancement of autonomous driving and other assisting technologies (CNBC, 2021). It is also estimated that the semiconductor auto industry is set to double by 2025 to $75.5bn. The supply demand imbalance has driven IDMs (Integrated Device Manufacturers) to increase their Capex to catch up with demand. However, forecasts point to the combined CAPEX growth of top five IDMs to be flat to negative until 2023 (Goldman Sachs, 2021), as they are taking a conservative approach in adding new in-house capacities, as chip demand for the automotive industry only accounts for 9% of total demand, and manufacturers don't want to heavily invest in what they fear to be only a temporary situation. As a consequence, it is expected the outsourcing of 80% of incremental business to foundry, however, as currently foundry exposure to auto semi is very low, the combination of longer-term visibility and strong demand make us believe that this is a situation that will not be solved so rapidly. Several OEMs have announced production cuts during the first semester of the year, most recently Toyota, the largest auto manufacturer in the world, said it would cut production for the month of September by 40% from the previous plan. Ford and Volkswagen followed suit, issuing statements saying that production may need to be cut further, above initial projections. BMW's Board Member, Dr. Milan Nedeljkovic, said that lost production as a result of the shortage totalled 30,000 units, representing a roughly -2.3% headwind relative to last year's numbers corresponding to the same period. As there was insufficient numerical data to accurately measure the impact of this event, we based our computations on the statements of BMW's board of management. We extrapolated these values for the whole year, as there aren't any expectations of improvement neither deterioration of this situation, and for the industry as a whole. More concretely, we forecast the impact of -2.3% on global deliveries (30.000x2)/(1.339.047x2) for 2021. We use this calculation as a proxy for the impact of the disruption on production and deliveries across markets for the standing year of 2021, and we gradually decrease this impact until 2024 under our base case, year when it is expected for the industry to fully recover from this shock.

Geographic Analysis

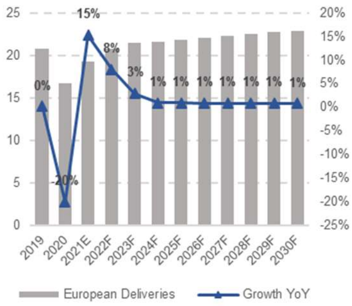


Graph 12 – Global Deliveries by Geography, in millions.
Source: OICA, Analysts Calculations

In this section, we make a more granular analysis of the most relevant geographic markets to BMW Group. Being a premium segment-oriented brand, the relevant regions to the company diverge heavily from the distribution of total deliveries worldwide.

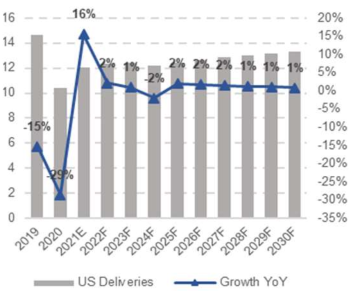
Europe

The European market has been for a great deal of time, the main exporter of different automotive manufacturers, ranging from premiums to luxury segments, with brands such as Audi, BMW, Mercedes, Ferrari, and several others, climbing to the market spotlight over the years. Recently, it seems that trend is set to reverse, as electrification opened the doors to those who were willing and seized the opportunity of gaining a first movers' advantage, such as the North American Tesla. In the continent, the registrations of new vehicles declined almost -20.0%, as was expected (OICA, 2021), however the market is showing signs of strong recovery, as demonstrated by the 1Q results of the leading German manufacturers, with Mercedes increasing deliveries by 108k and BMW by 160k. The fears related with the possibility of imposition of tariffs following a no Brexit deal in the beginning of the year have been subdued, as even the new election of President Biden brought a certain stability to international trade. On the other hand, considering the impacts of the semi-conductor shortage on these numbers, we remain relatively optimistic on the recovery numbers, and expect deliveries to increase roughly +15.0% relative to the previous year and +7.5% in 2022, albeit with some degree of uncertainty in the short-term. In the long-term, we expect production to steadily converge to -50 bps below the level of real GDP growth forecast of the region across all major countries. More specifically in Germany and the U.K., the biggest markets catered by BMW, we don't see signs of idiosyncratic risk, and expect an evolution in line with the rest of Europe, adjusted to the country's respective projections of GDP growth.

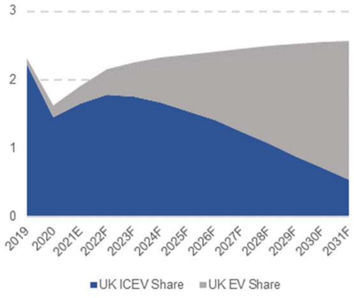


Graph 13 – European Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts Calculations

In terms of adoption of EVs, Europe falls just behind China in respect to growing popularity, as incentives will have to continue being brought forward by EU governments, if they want to meet medium-term pollution goals (Bloomberg, 2021). The European Union issued a regulation in 2020 which set target levels for EU fleet-wide Carbon dioxide emissions, which were fixated at 95 g CO2/Km for cars and 147 g CO2/km for vans. Starting from 2025 to 2030, targets get even more strict, shifting from a universal metric to a manufacturer specific percentage of the target achieved previously in 2021, which are 25% reduction from 2025 onwards and 37.5% from 2030 for passenger cars. Not only are there penalties for manufacturers that fail to meet their target emissions, totalling €95 per g/km, but there are also incentive schemes in place for zero and low-emission vehicles (ZLEV) (Europa.eu, 2021). Combining tax credits, charging grid installation free-of-charge and direct subsidies on purchases, amounts average around 3,000 USD per EV in the EU (IEA, 2021). Moreover, the European Union proposed an effective ban on sales of ICE and PHEV vehicles by 2035, in order to fasten the transition towards a zero-emission fleet



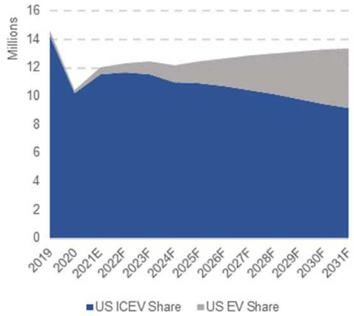
Graph 14 – US Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts Calculations



Graph 15 – UK Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations

(Reuters, 2021). In the U.K., the government announced its intentions of banning sales of ICEVs by 2030 (Bloomberg, 2021). We believe these regulations set very aggressive targets for manufacturers and the industry. This will require a lot of spending on infrastructure to allow for all demands of a fully electrified fleet to be met. We stand relatively sceptical in relation to the actual compliance of the targets. Nevertheless, this will only further boost the segment in the region. We predict a +45.0% growth relative to 2020 and forecast double digit growth up until 2030, when EVs will make up roughly 50% of total deliveries and with countries like Norway and the U.K. reaching almost full electrification of sales.

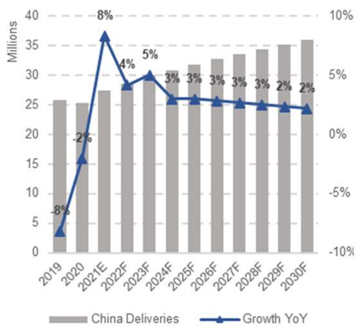
America



Graph 16 – US Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations

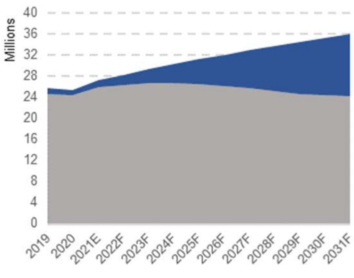
In the American continent, mainly in the United States, sales of newly registered vehicles also fellh close to -20.0% as a result of the pandemic situation. We forecast a growth of +13.8% for total deliveries in 2021 and a convergence to the long-term forecast of real GDP growth, with sharp declines in 2024 and 2025 relative to the forced transition to the EVs to meet with the stipulated targets.

The new Biden administration has been a defendant advocate of alternative sources of energy and put forward more aggressive green initiatives, after the country taking a less supportive stance on the subject in 2020 relative to Europe and China. The plan includes an expansion of tax credit to EVs and a target of 50% of sales being zero-emission capable, meaning BEVs and PHEVs and an instantiation of development of long-term fuel efficiency and emission standards (Reuters, 2021). Forecasts pointed to a sales ratio of EVs of 11% in 2025, 25% in 2030 and 35% in 2035 before the plans release. Although less ambitious than the targets set by the EU, these are more in line with the numbers brought forward by OEMs, BMW included. Federal tax credits of up to 7,500 USD per BEV sold were also available in 2020 and extended to 2021, but only up to the first 200,000 units sold by OEMs (IEA, 2021). For the EV segment in the U.S. we predict +97.8% growth in the year of 2021 and a +38.5% growth in the following year, with double digit growth up until the end of our forecasting period with roughly an EV to total deliveries mix of 33%. Although this executive order represents a clear sign of commitment, we believe the country to be one of the most dependent on fossil fuels and return on the invested funds on infrastructure to only start paying off at the turn of the decade.



Graph 17 – China Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts

Asia



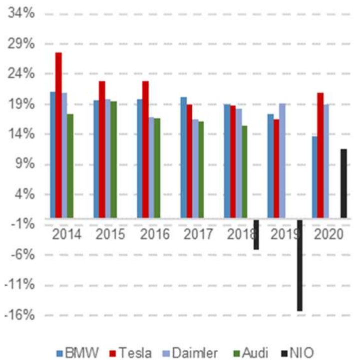
Graph 18 – China Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations

The Asian market, more specifically the Chinese market, was the backbone of the automotive industry throughout the pandemic in the past year, sustaining a slight decline of only -2.0% in total number of deliveries, brought forward by the recovery of the second semester. Despite China's rapid growth in deliveries from 2014 to 2018, its automotive market has been facing a decreasing trend from 2018 onwards. The decrease from 2018 to 2019 can be explained due to the industry's recent revolution towards lower emission cars, new energy vehicles and higher production standards, the trade war with the US (which heavily affected exports from domestic manufacturers) and the reduction of subsidies for EVs. Moreover, we expect heavy trade barriers and import tariffs in Biden Era, in order to privilege local suppliers. But above all, it's the structural changes that will have the most impact on the Chinese automotive industry. The massive expansion of urban areas in China favoured the use of metropolitan and subway networks, very rapid and efficient methods of dislocation. The well-known road congestion in China's largest cities makes the idea of buying a car little attractive. Also, the expansion of used-car trade, aligned with the explosion of ride-hailing services, have negatively impacted the industry. Finally, residents in smaller cities struggle financially to be able to buy a new car, so, aren't perceived as target customers. Although most of the recovery from the pandemic situation as already been factored in, we are optimistic in what regards the automotive sector, as Chinese consumers grow fonder of EVs, which will help the country get closer to its emissions targets, and transform a niche part of the markets, into a mass production industry holy grail (Bloomberg, 2021). In 2021 we expect a growth of +7.8% decreasing to +2.0% the following year and remaining around this value for the remainder of the forecasted period

Boosted by emission targets and local OEMs sold 1.1mn units of electrified vehicles in 1H2021, half of total global EV sales during the period

Boosted by emission targets and local OEMs supply in Nio, Li Auto and Xpeng, the country sold 1.1mn units of electrified vehicles in the first semester of the year, approximating half of total global EV sales during the period (Goldman Sachs, 2021). Targets set out by the country point to a sales mix of over 20% of EVs by 2025 and 50% by 2035, to reach the so desirable carbon neutrality by the year of 2060 (IEA, 2021). China cut subsidies for EVs by 20% in 2021 (to 13.000 yuans between 300 and 400 kms range and 18.000 yuans for more than 400 kms range), after extending the subsidy by more two years than predicted to mitigate COVID-19 effect (it is planned to end in 2022) although new incentives are sure to be implemented to commit to the targets set. For this segment of the market, we estimate a growth of +48% for 2021 and to persist on the double-digit growth up until 2030, with a sales penetration rate of EVs of 35% in the chines market, roughly bellow the presented target.

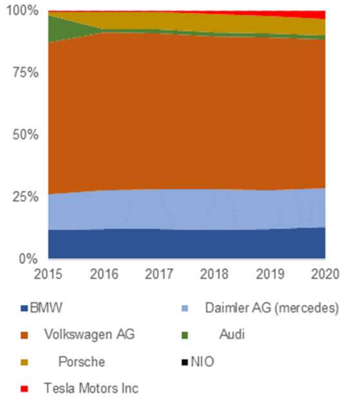
Competition Analysis



Graph 19 – Gross Margin of BMW and Competitors
Source: Bloomberg, Analysts Calculations

The automotive industry has seen a great deal of structural changes in recent years, as the need to innovate changed the landscape of the industry dramatically. Amid its swift shift in attention towards electrification, powerful players emerged having as corner stones of their foundation an orientation solely focused on this topic which, in our view, has given them a powerful lead, compared with legacy carmakers, whose electrified products are still mainly an adaptation of vehicles originally designed to be powered by a combustion engine. The result is frivolous competition levels, has incumbent and new entrants fight to lure clientele in a newly created environment. The difference in the production nature and number of years doing so, coupled with investment, results in shortcomings for late adopters, regarding characteristics that we believe end consumers value, such as battery cost relative to size, charging speed and autonomy, just to name a few. Tesla, undisputedly, leads the automotive market to what regards electrification technology, with the best software and hardware and battery development, although we see growing convergence of legacy carmakers, mainly VW, whose targets are far more ambitious than more premium brands like BMW and Daimler.

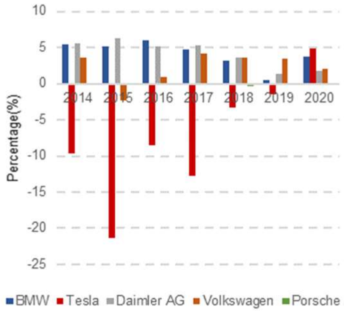
Profitability



Graph 20 – Premium Market Share Evolution, Global
Source: Bloomberg, Analysts Calculations

We believe it is possible for premium and even luxury carmakers to achieve competitive margins in the short to medium run, albeit with the help of subsidies granted by governments. Ferrari's SF90 is a PHEV with 48% EBITDA margin developed in the past year (Bloomberg, 2021) and fully electric Chinese brand NIO is expected to reach 20% gross margin by the end of the present year, albeit considering government credits provided. We expect BMW to be much less efficient than "natural born" EVs car makers in the short to medium term, but gradually pick up its share, behind VW and closely following Daimler. In what regards the level of competition, it has been a downward sloping trend for most of the legacy manufacturing car companies, with margins sliming as the need to innovate requires levels of capex at ever higher rates of revenues, and as

Foxcon, the largest manufacturer of iPhones, to make its debut in the EVs segment through a JV partnership in 2023



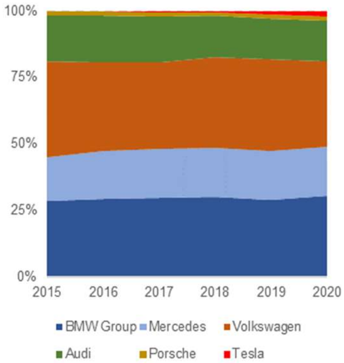
Graph 21 – ROIC of BMW and Competitors
Source: Bloomberg, Analysts Calculations

costs for the newly built EVs remain high enough, with battery costs making up an estimated 45% of the cost of these vehicles in 2020. We expect this number to converge to the value of combustion engines in vehicles nowadays by the end of our forecasted period in 2031. (Goldman Sachs, 2021). BMW has seen its margin decrease in the period considered between 2014 and 2020, from 21% to 14%, falling behind most of its competitors. A ROIC analysis tells a similar story in what regards a decreasing level of profitability, with BMW presenting an average of roughly 4% in the past 5 years, in line with direct competitor Daimler. New entrants are forced to enter the industry at negative levels of ROIC, as is naturally associated to a capital-intensive sector such as the automotive industry but have gained traction quickly and should soon become profitable for its investors, with Tesla reaching positive levels of ROIC for the first time in 2020 at 4.93%. We interpret this development as a clear sign of threat for incumbent firms, as entrants bring in more flexible capital and adjusted to the fast-paced changes of the industry. This scenario stresses the impossibility for the market share to remain static amongst market players, and we expect this to suffer changes. We forecast a slight increase in profitability, mainly driven by the new models coming out in the next few years, which represent a strong bet in the EVs segment, and the gradual improvements of cost margins due to reductions in battery prices. It is our view that this scenario, although slightly affected in the past year due to the pandemic, is likely to improve as mass production results in economies of scale and governments aid with more production incentives in the form of subsidies.

As the industry transforms quickly, and more importance is transferred to electronics and software development, as we previously mentioned, connectivity and automation gain increased relevance and open the doors to new entrants. Foxcon, a Chinese electronics manufacturing company, who is currently the largest manufacturer of iPhones, is set to make its debut in the EVs segment through a JV partnership in the year of 2023. (FT News Briefing, 2021). This perfectly illustrates the competitive environment and the need to maintain capital intensive projects to protect profitability levels.

Market Share

The premium automotive segment has seen considerable change in its composition of market share, with German manufacturers being represented in big numbers. The industry is also in the middle of a major transitive period, with the mass adoption and productions of EVs. New entrants, like Tesla, were able to take some share of the market at the expense of incumbents, like BMW and Daimler, although German manufacturers also show resilience in defending their positions and still experienced growth of +11.0%, or 250,000 units, during the considered period of 2017-2019 (Bloomberg, 2021). We support the idea that Tesla and other core electric manufacturers are growing and taking share, capitalizing on the electrification of fleets, however, not solely at the expense of BMW and other German manufacturers, as data suggests.



Graph 22 – Premium Market Share Evolution, Europe
Source: Bloomberg, Analysts Calculations

In Europe, although electrification has gained a lot of traction, Tesla and other new entrants have had a very difficult time in establishing a foothold in the old continent, with European manufacturers making most of the market share. We believe this to be a structural barrier difficult to overcome, as some of these brands command a higher premium in this geography and benefit from having construction plants indoors and better marketing and selling structures. We expect this trend to remain broadly unchanged in the short-term, as most companies announce new ranges of models to compete at different stages of the segment. BMW recently launched three fully electrified models, marking the start of the second phase of the electrification of the fleet, and expanding the mix for the next couple of years. The BMW i4 is hailed as the direct competitor to the widely popular Tesla Model S and the yet to be released Mercedes EQS in the premium electric sedan segment. The Volkswagen group also rolled up its contender in the new Porsche Taycan. Although with some competition, we see this new mix addition to be very favourable to BMW in the region and we believe they will be able to add in the next few years and maintain an historical level of high market share supported by branding power, new model rollout, quality products and customer loyalty.

In the United States, market share has been declining over recent years, with the major driver of sales being the heavily locally produced SUVs (Bloomberg, 2021). In this segment, BMW launched two new models in the iX and iX3, with a new launch of the BEV version of model X1 planned for the next year of 2022. This is a direct competitor to Tesla's Model X, Audi e-Tron and Mercedes EQC. BMW comes somewhat late in this segment compared with peers and in the American EV premium market, Tesla's dominance is unquestionable, and we forecast this to remain being the case due to strong presence in the region and superior distribution channels. Taking market share and facing off against other OEMs, with models already rolling, will prove difficult for BMW. We forecast slight decreases in this respect, as we believe Audi, Daimler and mainly Tesla to be better positioned and see very few possible opportunities to be exploited. We expect a small decrease in share, in line with previous years but stabilizing at 2.0% in 2025.

Chinese President Xi Jinping, vowed to adjust the excessive disparity of income in the country

In China, where we see most efforts being concentrated, as legacy carmakers and new entrants prepare for fierce competition in the coming decade. Domestic manufacturers, like Li Auto, BYD, Great Wall and NIO pose an added challenge, with the latter growth prospects screening a positive forecast, with an increase of roughly 20k units in deliveries, which translates to a growth of +423.0% YoY in the 1Q21 (NIO Inc., 2021) and an increase in margin to 21.1%. We expect competition in the Chinese market to be very aggressive, as firms try to reap the benefits of the above average growth and the electrification transition potential. Moreover, recent statements from Chinese President Xi Jinping, claiming that the excessive disparity of income in the country ought to be adjusted, in order to promote common prosperity to society as a whole, can heavily impact sales of premium car brands in the region (FT, 2021). In our view, this adds yet another layer of uncertainty for BMW, as China becomes increasingly more important for the OEM's business. We reiterate our conservative views, stemming from the macroeconomic environment and government decisions. We believe the foothold BMW has in the Brilliance JV will help in defending its position. However, knowing how protective the government and consumers are of local manufacture (CNBC, 2021), together with the growing uncertainty of government crackdowns and forced regulation, adding the extra competition, we forecast a decrease in market share of BMW over the forecasted period bottoming at around 2.65% in 2031. The still less developed Spotlight JV should also aid in this effort.

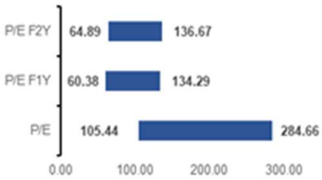
Sensitivity Analysis

Share Price		g				
		-0,50%	-0,25%	0,00%	0,25%	0,50%
COST OF CAPITAL	-0,50%	87,12	91,67	96,63	102,05	108,01
	-0,25%	80,39	84,51	88,98	93,85	99,17
	0,00%	74,16	77,91	81,95	86,34	91,12
	0,25%	68,39	71,80	75,47	79,44	83,75
	0,50%	63,02	66,13	69,48	73,08	76,98

Table 4 – Sensitivity analysis
Source: Analyst calculations

We performed a sensitivity analysis with the objective of measuring the impact of the terminal growth rate (*g*) and discount rate (*r*) in the share price. We calculated this variation for the group and for each segment specifically. We varied *g* and *r* using a delta of 0.25%. Note that for the automotive BU, variations in *r* and *g* led to variations of share price of that BU between -27.3% and 39.2%. Also, in the share price by BU, we can understand that the Automotive and Motorcycle Segments are the main drivers of total share price, especially the Automotive Unit.

Multiples



Graph 59 – Forward Looking P/E Multiples Analysis
Source: Bloomberg, Analyst calculations

We triangulate our forecasted price with a multiple analysis of the Groups peers. However, the results were of little help to the analysis, as many resulted in unrealistically wide intervals of valuation metrics. We attribute this to partially the covid crisis, which heavily depressed valuations, disrupting the continuous relation between earnings and Enterprise Value of firms and the sharp recovery that ensued, exacerbating earnings and valuation metrics, that lead several indices, including the S&P 500, to reach all time high levels of P/E, comparable only to the levels witnessed in the late 90´s - early 20´s boom (Bloomberg, 2021). On the other hand, we also note that the sector is itself stretched when it comes to valuation metrics, with firms with forward P/E ratios of 279x (Li Auto) and 99x (Tesla). Although we recognize that growths are not totally comparable between firms, they are still direct competitors and thus we do not totally exclude them from the analysis. The Price-to-Earnings ratio presents the best results, with forward looking metrics best positioned for analysis, since trailing 12-months earnings is heavily biased by the sudden reopening of the economy and full depletion of full inventories. Results are broadly in line with our valuation, but still reflect a wide interval for the valuation. We take this as complementary, but the most important take-in is how stretched valuations in the industry are.

Final Recommendation

Taking every aspect concerning our evaluation into account, we reached our final target share price of 81.51€. We believe BMW's fast recovery after Covid-19 will be followed on the one hand by the reinforcement of its European foothold, but on the other by the struggle in other key markets, such as China and the US. Moreover, our case of the brand's incompliance with CO_2 emissions in the short term aligned with EV margins slow-paced growth don't ease profitability increases. Therefore, our recommendation to investors is that they HOLD shares of BMW Group. For these reasons, and the ones we covered throughout the report, which were reaffirmed by the multiples analysis, that confirmed our recommendation, we predict an annualized return on the stock of 5.1%.

Appendix

MASTER IN FINANCE

BAYERISCHE MOTOREN WERKE AG

COMPANY REPORT

AUTOMOTIVE INDUSTRY

7 SEPTEMBER 2021

STUDENTS: JOÃO TOCHA, GONÇALO GANHÃO 29182@novasbe.pt, 28852@novasbe.pt

Equity Research

Industry pressures threaten future results

- **Strong results in the 1H2021, but several challenges ahead –** Group revenues were up +28.1%, relative to the same period last year, driven by economic reopening and good operational performance, albeit mainly due to base effects. Automotive EBIT margin reaches 13.0%.

- **EVs rollout at critical stage to meet targets –** With the release of three new all electric models this year, BMW is starting to make up for lost time. We expect margins to gradually increase, but only catch up to ICEVs by 2026. EVs mix in line with projections by 2030 at 50%.

- **Semiconductor chip shortage threatens recovery –** We expect shocks to the supply chain to hold back -2.2% of global production in 2021, with lasting impact up to 2024.

- **Key Chinese market presents structural challenges –** Increased level of competition and government crackdowns to derail growth prospects in the region. Expect growth of +3.5% in 2023 and decreasing thereafter.

- **Failure to meet EU emission targets results in fines –** We expect fines of €942mn and €306mn in 2021 and 2022 for failing to comply to the 95 g/km target set by the EU.

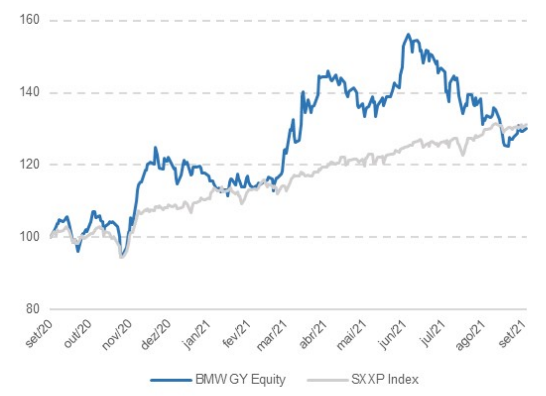
- **We recommend to HOLD –** Our sum of the parts valuation returns a common share price of 81.51€ for FY2022.

Recommendation:	**HOLD**
Vs Previous Recommendation	*BUY*
Price Target FY22:	**81.51 €**
Vs Previous Price Target	*92.00 €*
Price (as of 21-Oct-21)	**79.85 €**

Reuters: BMW DE, Bloomberg: BMW GY

52-week range (€)	57.25-96.39
Market Cap (€m)	51,933.4
Outstanding Shares (m)	602.0
YTD Change/%	7.62/10.55%

Source: Bloomberg



BMW GY vs Stoxx 600 Index 1-year Return, Source:Bloomberg

(Values in € millions)	2020	2021E	2022F
Revenues	98,990	102,460	109,423
EBIT	4,830	6,809	7,872
Net Profit	3,019	5,520	6,418
EPS	4.58	9.17	10.66
P/E	12.61x	8.7x	7.48x

Source: BMW Annual report, Analysts calculations

Company description

Bayerische Motoren Werke Aktiengesellschaft (BMW) is a German manufacturer and retailer of cars and motorcycles. The firm offers customers a wide range of models, mainly in the premium and luxury segments, through its brands BMW, MINI and Rolls-Royce. It also offers financial services to end costumers and dealerships worldwide.

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY GONÇALO GANHÃO AND JOÃO TOCHA, MASTER IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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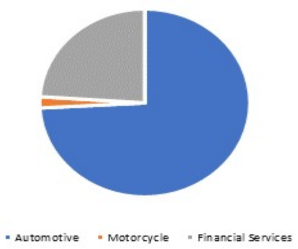
Company Overview

History

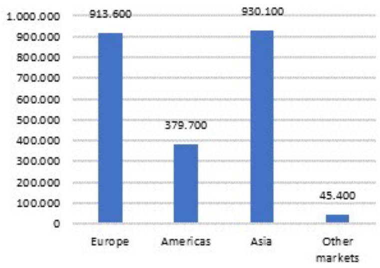
The start of Bayerische Motoren Werke's (BMW) history traces us back to 1916, when Flugmaschinefabrik Gustav Otto merged into Bayerische Flugzeug-Werke (BFW). The company started firstly as a manufacturer of aircraft-engines, having switched, after WWI, to the fabrication of railway brakes and inboard engines, due to a ban of army-related fabrications following the Treaty of Versailles. In fact, the motorcycle manufacturing started in 1923, while car manufacturing only started in 1928. During WWII, BMW constructed armaments, war materials and jet airplane engines to supply Germany's air force. Many factories were bombed during the war, and soon after, the Allies temporarily banned BMW from producing automotive and motorcycles (thus shifting production to household appliances). After that, the company attempted to shift into the small car market but was unable to effectively compete due to overwhelming prices. As a consequence, by 1959, BMW was on the brink of bankruptcy and received a restructuring offer by Daimler-Benz. However, BMW's workforce and small shareholders opposed and successfully stop the takeover. Simultaneously, the Quandt Group had increased their holdings in BMW and acquired controlling interest in the firm (2/3 in 1960), having maintained the ownership in BMW ever since. BMW managed to recover from the financial crisis it was facing and establish its identity as a premium manufacturer of sports sedans with the launch of the renowned BMW New Class (Encyclopaedia Britannica, 2021). Ever since, BMW introduced innovative and successful models and still maintains this reputation. However, BMW did not corroborate a successful acquisition strategy, as the acquisition of Roger Group (at the time composed by Rover, Land Rover, MINI and MG) was a disappointment. In 2000, after incurring significant losses, Rover and MG were sold to Phoenix Consortium and Land Rover was acquired by Ford. However, they maintained the rights to MINI, promoting its re-launch in 2001, which turned out to be a success story. Additionally, in 1998, BMW purchased naming and brand rights for Rolls-Royce motor cars, a renowned luxury brand still owned today by the BMW Group (Wikipedia).

Nowadays, Bayerische Motoren Werke Aktiengesellschaft (BMW AG) designs, fabricates, and sells automobiles, motorcycles, spare-parts, accessories, and complementary services related with these products. It focuses exclusively on the premium segment at a global scale. BMW AG is headquartered in the city of Munich and is the parent of not only all the subsidiaries over which BMW AG has either direct or indirect control, but also BMW Group, which owns 3 well known premium brands (BMW, MINI, and Rolls-Royce).

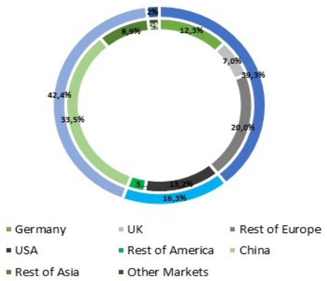
Operating Segmentation



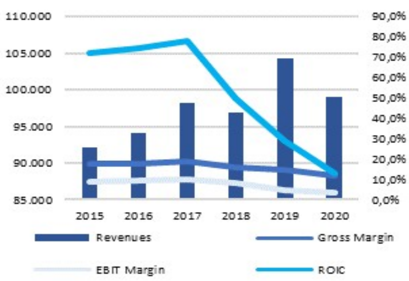
Graph 1 - Revenue per segment of BMW in 2020
Source: BMW Report, Analyst calculations



Graph 2 - Revenue per segment of BMW in 2020
Source: BMW Report, Analyst calculations



Graph 3 – Deliveries per Region of the Automotive Segment in 2020
Source: BMW Report, Analyst calculations



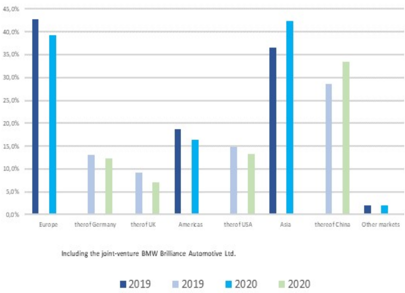
Graph 4 – Evolution of Gross Margin, EBIT Margin and ROIC from 2015 to 2020
Source: BMW Report, Analyst calculations

Regarding BMW's business structure, the Group can be divided into three main operating segments and two of minor importance to the context of the group.

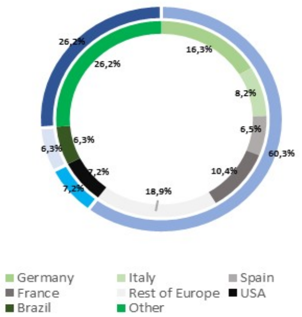
The Automotive segment is the most relevant of the three. In 2020, it employed 90% of the total workforce. Also, it registered +71.4% of the three main operating sector's revenues (with a CAGR of +1.22% from 2014 to 2020, decreasing from a CAGR of +4.0% from 2014 to 2019, due to COVID-19) with total automotive revenues decreasing by -11.8% from 2019 to 2020. Both Gross and EBIT margins verified a similar trend, upwards between 2015 and 2017 and downwards from 2017 to 2020 (2020: 11.6% and 3.4%, respectively). The metric for the year is deceiving as, for example, we can observe a solid recovery in Gross and EBIT Margins from the first to the second semester of 2020. Amongst these periods, gross margin increases from 6.31% to 15.26% and EBIT margin increases from -0.04% to 7.3%, following the end of lockdown period in many countries. As of 1H2021, the automotive segment revenues registered an increase of +45.3% relatively to the homologous period. Gross and EBIT margins improved significantly to 18.2% and 13.0% respectively.

In the electrified vehicle (EV) market, BMW deliveries recorded 8.29% of total automotive deliveries in 2020, against 5.76% in 2019 (which still yield low margins). Moreover, in the 1H2021 only, BMW's share of EVs by total deliveries was, roughly 80% of total EVs sold in the previous year. Thus, it is vital for BMW to diversify sources of income stream and increase customer experience and connectivity (BMW builds on this via its subsidiaries, offering car-sharing, driving services). However, we are still not convinced that BMW will thrive in shared mobility, at least in the short and medium term, as we will cover later in this report.

Another key metric for this segment is Return on Capital Invested (ROIC), which measures BMW Group's profitability and capital efficiency. Regarding ROIC, it has been falling significantly, from 77.7% in 2017 to 49.8% in 2018 (BMW Group, 2020), mainly due to the higher investments in the electrification of BMW's vehicle fleet, development of production network and digitalisation.



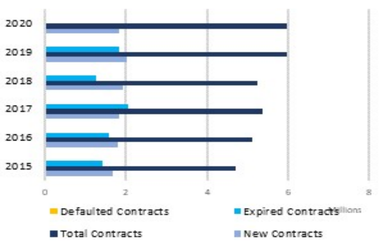
Graph 5 – Evolution of % of Automotive sales per region from 2019 to 2020, including BMW-Brilliance
Source: BMW Report, Analyst calculations



Graph 6 – Deliveries per Region of the Automotive Segment in 2020

Source: BMW Report, Analyst calculations

Graph 7 – Evolution of Gross Margin, EBIT Margin and ROIC from 2015 to 2020
Source: BMW Report, Analyst calculations



Graph 8 – Evolution in number of contracts from 2015 to 2020
Source: BMW Report, Analyst calculations

Then, ROIC fell from 49.8% to 29.0% in 2018 (BMW Group, 2020) due to the lower EBIT, increase in capital expenditure (CAPEX) and recognition of right-of-use assets (IFRS 16), which contributed to an increase of capital employed. Finally, in 2020, the sharp decrease to 12.7% is justified by the decrease in EBIT caused by COVID-19.

Geographically, Europe lost its position in leading region in terms of deliveries, as it represented 39.3% in 2020 against Asia's 42.4%. China represents 77.4% of Asia's deliveries, having a major role to play in this continent. We believe this growing trend is likely to keep its pace in the short-term, as BMW Group is increasingly present in the region (BMW plans to increase its stake in the joint venture BMW Brilliance Automotive Ltd (BBA) to 75%, and entered in the Spotlight joint venture, highlighting its commitment). In the remaining regions, we believe BMW will undergo a strong recovery in deliveries in 2021, following the trend of the first semester of the year, with very positive numbers, then decelerating to milder growth rates. It is important to highlight that BMW is shifting its fleet mainly to EVs, as they expect to have 50% fleet composed by EVs in 2030 and are planning to launch 25 electrified models by 2023.

The Motorcycle segment represented 2.0% of the three main operating sector's revenues, with a CAGR of +5.3% between 2014 to 2020. With 169,272 deliveries in 2020, representing a decrease of -3.4% relatively to 2019, this value marks the interrupt of a 9-year series of positive growth. In the first semester of 2021, revenues increased +50.2% relatively to the homologous period. Europe leads this market with 60.2% of total deliveries. Gross and EBIT margins verified a constant trend until 2019, with a sharp decrease from 2019 to 2020, from 19.3% to 15.0% and from 7.9% to 4.4%, respectively (BMW Group, 2020). In the first half of 2021, we verify a strong recovery relatively with 2020, with a Gross and EBIT margin of 24.5% and 17.5%, respectively.

Regarding ROIC, it had been evolving stably throughout time and above the long-term target of 26%, however, with COVID-19 it decreased from 29.4% to 15.0%, which we believe is an unrealistic value in the context of BMW. We predict this segment to return to prior pandemic normal growth values in 2022.

The Financial Services segment involves many business areas, offered in almost 60 countries worldwide, such as insurance, fleet business, customer deposit, retail costumer and dealer financing. However, leasing and credit financing are the most relevant. The total percentage of vehicles leased or financed stands at 49.8%, a significant value highlighting the importance of

Graph 9 – Evolution of Gross Margin, EBIT Margin and ROIC from 2015 to 2020
Source: BMW Report, Analyst calculations

Graph 10 – Evolution of Credit Loss Ratio from 2015 to 2020
Source: BMW Report, Analyst calculations

this segment, even though it is very dependent on the Automotive segment's performance, which is why it should be analysed together with the latter. Revenues wise, financial services are the second most important segment. It represented 26.5% of the three main operating sector's revenues, with a CAGR of 6.5% from 2014 to 2020. As of the first semester of 2021, revenues increased 13.0% relatively to the 1H2020. Around 1.9 million credit financing and leasing new contracts were celebrated in 2020, 67.1% corresponding to credit financing and 32.9% to leasing business, corresponding to an overall -7.9% decrease. Still, leasing business dropped -11.1% comparing with 2019, while credit financing just 6.2%.

Return on Equity (ROE) decreased from 15.0% to 11.2% (BMW Group, 2020) from 2019 to 2020 due to the deterioration of earnings caused by pandemic increase in risk provisions. Regarding risk profile across this segment, it was shaped by the volatility linked with COVID-19, however, credit loss ratio improved and decreased from 0.26% to 0.21% from 2019 to 2020 due to government measures.

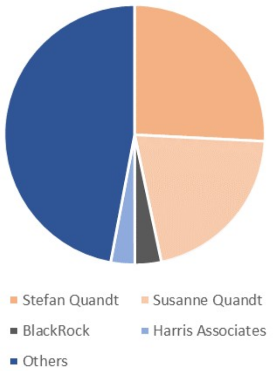
The two other segments in the financial statements are Other Entities, that comprise holding companies and Group financing companies, and Eliminations, that consists of inter-segment items in the reconciliation with the Group.

Corporate Governance

In what regards Corporate Governance, shareholders exert their rights in the Annual General Meeting, to decide on the application of unappropriated profit, ratification of acts of the members of the Board of Management and Supervisory Board, nomination of the external auditor, amongst other formalities. The Supervisory Board is composed by 10 shareholder representatives, and 10 employee representatives. Board of Management is responsible for managing BMW Group. Three share-based programmes were created for incentive-alignment purposes (for entitled employees, for high-ranking heads of departments and for members of the Board of Management) (BMW Group, 2020). Oliver Zipse replaced Harald Krüger in 2019 as the new CEO of the group, and we predict him to heavily invest in "new drive technologies and in digitalisation" (BMW Group, 2020) to underscore BMW's innovation leader position and increase the brand's market share globally.

Shareholder Structure

On the 31st of December 2020, BMW Group had a subscribed capital of €659.684.500, split into 601.995.196 shares of common stock (91.3%) and



Graph 11 – Shareholder structure of 2020
Source: BMW Report, Analyst calculations

57.689.304 shares of non-voting preferred stock (8.7%), both with par value of €1.53, of which 3% are free float (shareholders below 5%). The remaining shares are concentrated in Quandt Family members (46.7% of fixed holding shares) (BMW Group, 2020). Upon Herbert Quandt´s death (1982), his shares were transferred to his wife (Johanna Quandt), son (Stefan Quandt) and daughter (Susanne Klatten). Later on, with Johannes death, in 2015, her shares were passed to her descendants, which together own 46.7% of BMW Group, with Stefan Quandt owning 25.8% (25.6% through AQTON SE and 0,2% in his name) and Susanne owning 20.9% of total shares (20.7% through Susanne Klatten Beteiligungs GmbH and 0.2% in her name). Amongst other investors (free float), BlackRock Institutional Trust Company, N.A owns 3.3%, Harris Associates L.P. owns 3.0%, and the remaining shareholders all own less than 2.0% of BMW Group. Parallelly to BMW's vision, we firmly believe BMW will continue to adapt to the fast-changing industry, assure profitability, and to create long-term value, even if it involves short-term sacrifices.

Graph 12 – GDP growth projections Euro Area vs World
Source: IMF, Analyst calculations

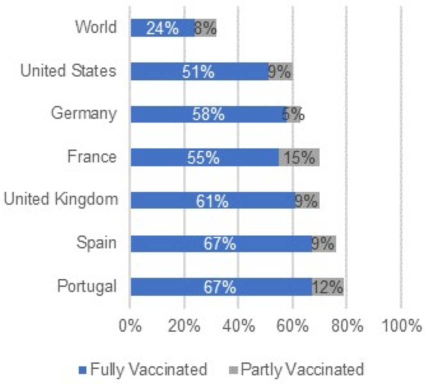
Industry Overview & Outlook

Macroeconomic Environment

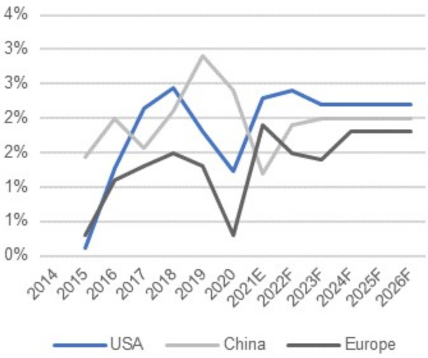
Global economies and markets have been ravaged by a global pandemic in the past year, resulting in extreme measures from policy makers, ranging from unprecedent packages of fiscal stimulus to accommodative monetary policies, aimed at targeting the widespread volatility in capital markets. World GDP is estimated to have contracted -3.2% YoY in 2020, with projections for the next two years offsetting this number, and then some, with +6.0% and +4.9% growth, respectively. Long term projections point to a global growth of +3.3% (IMF, 2021). The so-called "V" shaped recovery is already a reality for some major economies, with few already at levels above pre-pandemic numbers, as is the case of China and the UK, as industries re-open and supply meets the newly boosted demand for goods, and later services. Even still, uncertainty still looms in the horizon, even as vaccine rollouts hit industrial dosage numbers and total number of vaccinated people inches higher, mainly in the western and developed regions. New mutations that can prove to be more resilient and transmissive, as is the case of the delta variant, represent an ambiguous and constant risk. On another note, market participants have shown growing concern with inflation levels, reaching higher than expected numbers by Central Banks, which could prompt interest rates hikes. Although we believe these to be transitory levels of high inflation, and not sustainable in the medium to long run-in advanced economies, we still stress our forecasted price to changes in WACC and the

Graph 13 – GDP growth projections Us vs World
Source: IMF, Analyst calculations

growth rate, to assess the impact of an increase in rates. Furthermore, it is expected that the Financial Services business unit to perform slightly better in a higher interest rate environment and thus act as an organic hedge of the Group to these movements. Non-energy commodity prices have been increasing sharply in 2021, which has negatively impacted the supply chain, creating bottlenecks and restricting output growth in several industries. In the automotive sector, the most prominent shock has been the semiconductor chip shortage. However, these price pressures and disruptions should moderately decrease and gradually disappear thereafter (ECB, 2021).



Graph 14 – Share of population Vaccinated against Covid-19 virus
Source: Our World in Data

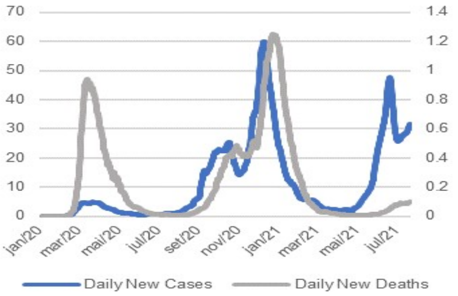


Graph 15 – Inflation expectations for the USA, China, and Europe
Source: IMF, ECB, Analyst calculations

"By inflation, we mean year after year after year prices go up. If something is a one-time price increase… you wouldn´t react to something that is likely to go away" – *Jerome Powell, FED Chairman*

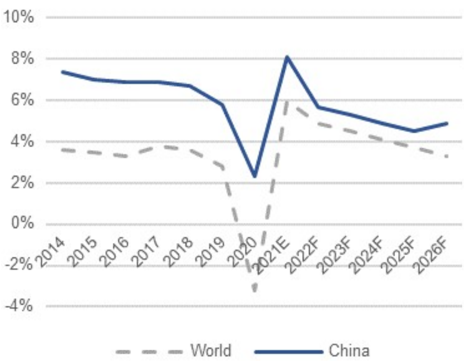
In the United States, the administration of newly elected President Biden has brought forward unprecedented fiscal stimulus packages and long-term spending targeting infrastructure and social benefits, with the Senate having recently approved the long-awaited $1 trillion infrastructure bill to rebuild deteriorating roads, bridges and incentivize investments biased towards green energy, positively driving demand for Battery Electric Vehicles (BEVs) and Plug-in Hybrids (PHEVs), making the connection with the automotive segment. These will most likely be financed via higher corporate taxes (from 21% to a targeted 28%) (FT, 2021). In the monetary front, the FED has been reiterating its accommodative policies started back in the beginning of the pandemic. However, the speech of members and chairman Jerome Powell, has gradually become more hawkish in recent weeks, hinting to short-term tapering of monthly asset purchases, followed by an interest rate hike to control possible runaway inflation levels. Continued expressed optimism regarding economic growth and rising inflation worries, have prompted early tapering talks in the last FED meeting, as per the minutes. (CNBC, 2021) The infamous Jackson Hole summit, also hosted several speeches that were broadly in line with this view. We interpret this as a clear signal that asset purchases should start decreasing throughout the present year and that the first-rate hike should come in 2023 at the very latest, maybe even by late 2022, ceteris paribus. The success of the vaccination rollout means 60% of the population is already vaccinated, with at least one dosage, by mid-August (OWD, 2021). Output is expected to grow +7.0% and +4.9% (IMF, 2021) in the next two years respectively, as it recovers from last year's contraction, with unemployment rates steadily decreasing and expected to bottom at 4.2% in 2022. Consumer prices are expected to increase considerably to +2.3% at years end, but our belief in transitory base effects for the broader advanced economies holds. We find these numbers to be in-line with our view of broadline economic activity for the short to medium term, and a long-term real growth of +1.5% (IMF, 2021).

In the Eurozone, vaccination efforts trailed those of the US by the end of the first semester of the year, however vaccine availability and wide acceptance by the population led the region to surpass its western counterpart in some countries such as Portugal, Spain, Denmark, France, and Germany. Signs are broadly positive, with all countries adopting some sort of easing of restrictions. Output is expected to recover around +4.4% YoY, on average, in the next two years, with Germany slightly below average (+3.6%) and France leading (+5.8%) (ECB & IMF, 2021). The unemployment rate is set to increase slightly in the short-term but remain around the 8% figure. Regarding monetary policy, the situation in the region is different to what we witness in the US, with lower levels of inflation spikes and a much more elongated period of low interest rate environment. Still, the ECB has changed its forward guidance this year, to allow inflation to run slightly above the +2.0% target, without hiking rates. The special pandemic purposed asset purchases (PEPP) are expected to keep running until March 2022, as initially stipulated. Rate hikes do not seem to be part of the plan in the near term, with projections aiming to 2024-25 for the continued and persistent level of desired inflation of +2.0%. In the short-term, Inflation is expected to exhibit some volatile behaviour, with HCIP inflation spiking at +1.9% in 2021 and slowing down to +1.5% in 2022 (ECB,2021). The short-term interest rates, as measured by the 3-month EURIBOR are not expected to change and remain at the -0.5% level (ECB,2021), after which we reiterate our belief of lower inflation and gradually expect a price increase of +1.5% for the long term. The U.K. is, in our view, the best positioned country in the reopening effort, with an economy with virtually no restrictions. At this time, it is the world's best proxy for a pre-pandemic level of economic activity in a post-pandemic reality. Henceforth, we pay special attention to the data coming from the region, as we optimistically anticipate a decoupling between the number of cases and the number of hospitalizations and deaths for the rest of the developed world, in the short-term, and overall, in the medium-term. Expected projections point to slightly higher output growth than the rest of Europe, around +7.0%. In the monetary space, the situation is very much identical to that of the old continent.



Graph 16 – Number of Daily New Cases vs Daily New Deaths of Covid-19 in the UK
Source: Our World in Data

In Asia, mainly in China, we witnessed the fastest economic recovery, with the country never entering a technical recession in 2020 and expected to grow +8.1% and +5.7% in the next two years. Long term real GDP projections fall in the +4.9% range, slightly below the EM average. (IMF,2021). The main risk we point to in this region is the recent government crackdown on several sectors of the economy, including education and technology, tightening the capitalist freedom Chinese firms seemed to enjoy in the past few decades, and creating a cloud of uncertainty for other sectors. Tech giants Alibaba, Tencent Holdings and



Graph 17 – GDP growth projections China vs World
Source: Our World in Data

Graph 18 – Evolution of Global Deliveries, in millions.
Source: OICA

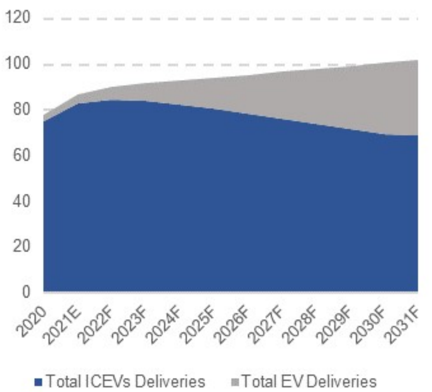
Didi, amongst several others, were the target of government fines and enforced regulations on antitrust grounds (Bloomberg, 2021). We interpret these actions as being a clear signal of show of strength, as companies grow bigger and become more indispensable to Chinese society, especially big tech firms, the government is tightening its control over the economy, and that the leverage big western firms enjoy cannot be replicated in the region. There looks to be no immanent planned intervention in the automotive sector, however it is well known that local firms enjoy more favourable policies and are keener of consumers preferences (CNBC, 2021). But the reality is that the crackdown comes as a reminder to investors and companies, that the Chinese market is not a truly free capitalist space. Henceforth, we are of the opinion that this carries a relevant amount of risk for every investor and company in the region.

Overall, we favour what we consider as being a bullish view on the development of global economies, grounded on a post-vaccination reopening with widespread immunization by years end, backed by accommodative monetary and fiscal policies, increased savings and disposable income, and a very residual probability of new variants with relevant detrimental implications to the continued recovery and growth of the economy. During 2020 it is estimated that savings have increased +7 p.p. of income in the Eurozone, whilst household bank deposits increased +12.5% of disposable income in the U.S., Canada, and Japan, and by +10.0% in the UK (Deloitte Insights, 2021).

Sector Analysis

The automotive industry is one of the largest industries by revenue, with global numbers having been estimated around 5,315 bn US dollars in 2017 and projected to grow around +68% by 2030, which represents a +4.07% CAGR over 13 years (Statista, 2017). It is unquestionably one of the most important sectors of the economy in several developed and emerging markets. It also finds itself in a critical conjuncture with fast paced changes, both in the goods and services departments.

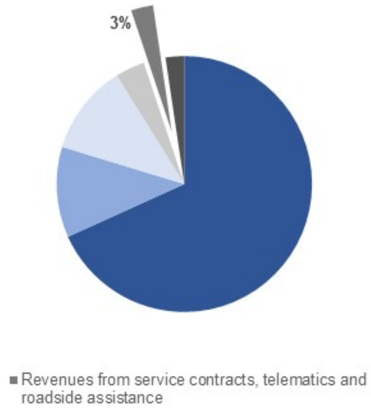
- Electrified Vehicles



Graph 19 – Global Deliveries Powertrain Mix, in millions.
Source: OICA, Statista, Analysts Calculations

The most widely adopted trend by manufacturers and policy makers seeks to tackle the problem of nefarious gas emissions linked with traditional sources of energy. Road transportation emissions, stemming from the burning of petrol and diesel fuels was estimated to have accounted for 11.9% of global emissions in 2020, of which 60% relate to passenger travel (Our World in Data, 2020). World organizations, together with their member States, have been working to lay down the right incentives for a smooth and quick transition to Alternative Fueled

Vehichles (AFV), which includes fines for manufacturers if a particular emission target is not met, and also subsidies per electrified vehicle manufactured that meets a set of pre-specified criteria. We believe this set of factors to, not only raise awareness for the end consumer, and shifting its preferences, but also trim margins for traditional ICEVs and less efficient PHEVs, whilst slightly enlarging those of EVs, over the short to medium term. This results in added pressure for auto manufacturers, as they are forced to innovate and search for alternative options in the electrification of vehicles. The sub-sector market for BEVs and PHEVs has enjoyed exponential growth in the number of global deliveries reaching 3.24mn in 2020, which results in a CAGR of +20.0% since 2015 (McKinsey & EVWSD, 2020). We expect this trend to continue further, with the consequences of the pandemic being short-lived, in our opinion, as production accelerates to meet demand, in the broad spectrum of the market. Also, as manufacturers improve the technology and production efficiency of EVs, it will allow BMW and other legacy carmakers to switch from rolling out these powertrains, purely to meet emissions targets, to achieve better margins and profitable volumes, although we only expect to see a margin similar to ICE around 2024-25, as costs of Lithium-ion batteries decrease -30.0%, in comparison with prices today, which sit at around 130 USD/kWh and are set to decrease to 100 USD/kWh by 2025 (Bloomberg, 2021), and conditional on the average amount of subsidies available per vehicle produced. Nevertheless, as new technologies of batteries challenge the status quo of the electrification of vehicles, as is the case of Solid-State Batteries, it promises to keep competition in the industry high and demand for cheaper vehicles equally high, increasing deliveries, at the turn of the second half of the decade. (Bloomberg, 2021). Risks to this approach include a possible spike in prices of input materials that make up the composition of commonly used battery cells, like nickel, lithium, and cobalt. Recent studies have found that efforts to recycle lithium contents from batteries are primitive and inefficient, and if changes are not implemented soon, a shortage of the element can happen between 2021 and 2023 (Sonoc. et al, 2014). This could greatly impact the battery costs previsions for the short-to-medium term, and thus negatively impact margins on EVs. We estimate a global EV to total deliveries ratio of 14.5% by 2025 and 32.93% by the end of our forecasting period in 2031.

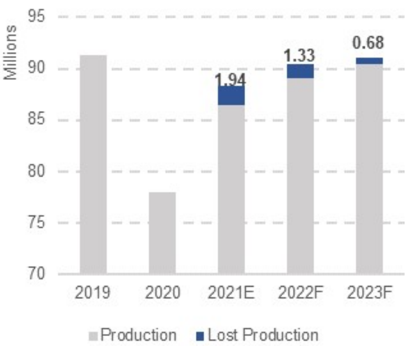


Graph 20 – Shares of Revenues from Telematics, in 2020
Source: BMW 2020 Annual Report

- Disruptive Trends

Electrification is not the sole growing trend in this fast-changing sector, as areas like shared mobility, connectivity services, autonomous driving and feature upgrades become more popular, and potentially disruptive to the current business model of Autos, almost purely focused on number of deliveries, as focus shifts from hardware to software of these products. Connected vehicles are expected to account for 100% of the market, 10% of all vehicles should be fully autonomous, 15% of urban trips are expected to result from shared mobility, all of this by 2035 (BCG,2020). These recurring revenues are expected to grow to upwards from +30% of new automotive revenues until 2030, representing a +4.4% p.a. growth. (Mckinsey, 2016). Although we see the potential for most of these technologies, we believe these figures to be overly optimistic, given the recent Covid-19 pandemic and the impact it will leave on society for some time, specially to what regards shared mobility, and the investment needed to move forward with these technologies. However, we do believe these increasingly important features to have a slight, yet material impact on the amount of revenue extracted by manufacturers from each vehicle sold. We forecast a positive contribution from the recurring income stemming from subscription-based services from clients and third-party companies. For instance, the opportunity to monetize application software development, like companies such as Apple and Google do, to run on the embedded car software, or sign exclusivity contracts with providers of this service. BMW currently has a partnership with Amazon in which that car's software system connects to the myBMW app, which allows Amazon A.I. personal assistant Alexa, to access and facilitate several uses of the application. On another hand, for instance, instead of using the application through your phone, like myBMW or Spotify, you could access it directly through the car's system. In the long term we believe this to be a value proposition worth investing in, however we expect it to have little implications in the medium term.

- Semiconductor Shortage



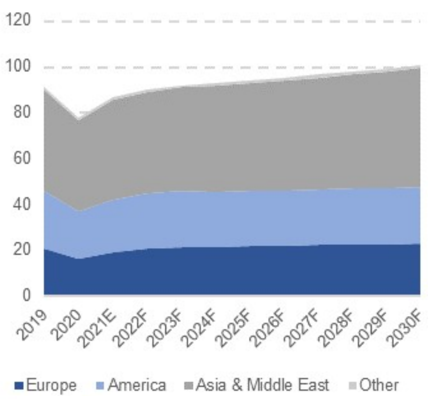
Graph 21 – Lost Production due to the Impact of Chip Shortage, in millions
Source: Analysts Computations

The pandemic induced economic shock has created many supply and demand mismatches across industries and the automotive sector is no exception. A disruption in the supply chain has resulted in a shortage of semiconductor chips worldwide, giving rise to bottlenecks across all geographies and production plants. It is expected that this disruption could cost up to $110 bn in revenue to the auto industry (AlixPartners, 2021). On average, there are more than a thousand chips in a regular vehicle, and this number can only increase in proportion with the complexity and advancement of autonomous driving and other assisting technologies (CNBC, 2021). It is also estimated that the semiconductor auto industry is set to double by 2025 to $75.5bn. The supply demand imbalance has driven IDMs (Integrated Device Manufacturers) to increase their Capex to catch up with demand. However, forecasts point to the combined CAPEX growth of top five IDMs to be flat to negative until 2023 (Goldman Sachs, 2021), as they are taking a conservative approach in adding new in-house capacities, as chip demand for the automotive industry only

Toyota cut production for the month of September by 40%. Ford and VW are also expecting cuts

accounts for 9% of total demand, and manufacturers don't want to heavily invest in what they fear to be only a temporary situation. As a consequence, it is expected the outsourcing of 80% of incremental business to foundry, however, as currently foundry exposure to auto semi is very low, the combination of longer-term visibility and strong demand make us believe that this is a situation that will not be solved so rapidly. Several OEMs have announced production cuts during the first semester of the year, most recently Toyota, the largest auto manufacturer in the world, said it would cut production for the month of September by 40% from the previous plan. Ford and Volkswagen followed suit, issuing statements saying that production may need to be cut further, above initial projections. BMW's Board Member, Dr. Milan Nedeljkovic, said that lost production as a result of the shortage totalled 30,000 units, representing a roughly -2.3% headwind relative to last year's numbers corresponding to the same period. As there was insufficient numerical data to accurately measure the impact of this event, we based our computations on the statements of BMW's board of management. We extrapolated these values for the whole year, as there aren't any expectations of improvement neither deterioration of this situation, and for the industry as a whole. More concretely, we forecast the impact of -2.3% on global deliveries (30.000x2)/(1.339.047x2) for 2021. We use this calculation as a proxy for the impact of the disruption on production and deliveries across markets for the standing year of 2021, and we gradually decrease this impact until 2024 under our base case, year when it is expected for the industry to fully recover from this shock.

Geographic Analysis

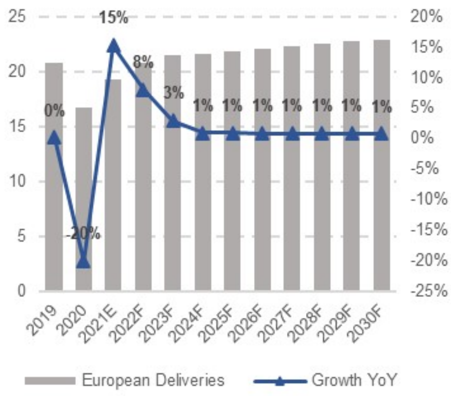


Graph 22 – Global Deliveries by Geography, in millions.
Source: OICA, Analysts Calculations

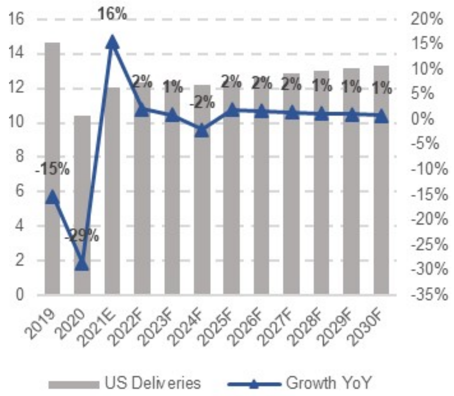
In this section, we make a more granular analysis of the most relevant geographic markets to BMW Group. Being a premium segment-oriented brand, the relevant regions to the company diverge heavily from the distribution of total deliveries worldwide.

- Europe

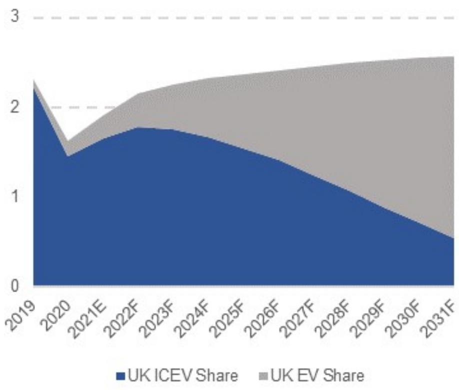
The European market has been for a great deal of time, the main exporter of different automotive manufacturers, ranging from premiums to luxury segments, with brands such as Audi, BMW, Mercedes, Ferrari, and several others, climbing to the market spotlight over the years. Recently, it seems that trend is set to reverse, as electrification opened the doors to those who were willing and seized the opportunity of gaining a first movers' advantage, such as the North American Tesla. In the continent, the registrations of new vehicles declined almost -20.0%, as was expected (OICA, 2021), however the market is showing signs of strong recovery, as demonstrated by the 1Q results of the leading German



Graph 23 – European Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts Calculations



Graph 24 – US Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts Calculations

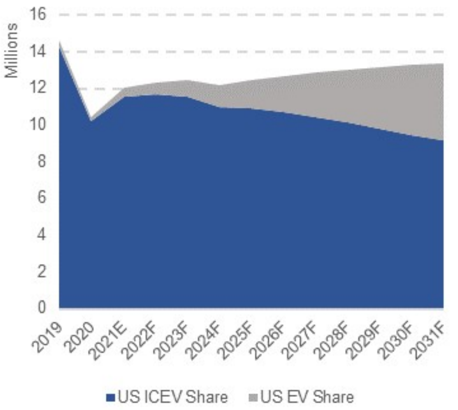


Graph 25 – UK Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations

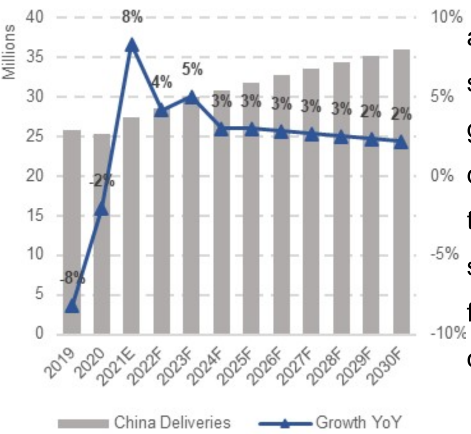
manufacturers, with Mercedes increasing deliveries by 108k and BMW by 160k. The fears related with the possibility of imposition of tariffs following a no Brexit deal in the beginning of the year have been subdued, as even the new election of President Biden brought a certain stability to international trade. On the other hand, considering the impacts of the semi-conductor shortage on these numbers, we remain relatively optimistic on the recovery numbers, and expect deliveries to increase roughly +15.0% relative to the previous year and +7.5% in 2022, albeit with some degree of uncertainty in the short-term. In the long-term, we expect production to steadily converge to -50 bps below the level of real GDP growth forecast of the region across all major countries. More specifically in Germany and the U.K., the biggest markets catered by BMW, we don’t see signs of idiosyncratic risk, and expect an evolution in line with the rest of Europe, adjusted to the country’s respective projections of GDP growth.

In terms of adoption of EVs, Europe falls just behind China in respect to growing popularity, as incentives will have to continue being brought forward by EU governments, if they want to meet medium-term pollution goals (Bloomberg, 2021). The European Union issued a regulation in 2020 which set target levels for EU fleet-wide Carbon dioxide emissions, which were fixated at 95 g CO2/Km for cars and 147 g CO2/km for vans. Starting from 2025 to 2030, targets get even more strict, shifting from a universal metric to a manufacturer specific percentage of the target achieved previously in 2021, which are 25% reduction from 2025 onwards and 37.5% from 2030 for passenger cars. Not only are there penalties for manufacturers that fail to meet their target emissions, totalling €95 per g/km, but there are also incentive schemes in place for zero and low-emission vehicles (ZLEV) (Europa.eu, 2021). Combining tax credits, charging grid installation free-of-charge and direct subsidies on purchases, amounts average around 3,000 USD per EV in the EU (IEA, 2021). Moreover, the European Union proposed an effective ban on sales of ICE and PHEV vehicles by 2035, in order to fasten the transition towards a zero-emission fleet (Reuters, 2021). In the U.K., the government announced its intentions of banning sales of ICEVs by 2030 (Bloomberg, 2021). We believe these regulations set very aggressive targets for manufacturers and the industry. This will require a lot of spending on infrastructure to allow for all demands of a fully electrified fleet to be met. We stand relatively sceptical in relation to the actual compliance of the targets. Nevertheless, this will only further boost the segment in the region. We predict a +45.0% growth relative to 2020 and forecast double digit growth up until 2030, when EVs will make up roughly 50% of total deliveries and with countries like Norway and the U.K. reaching almost full electrification of sales.

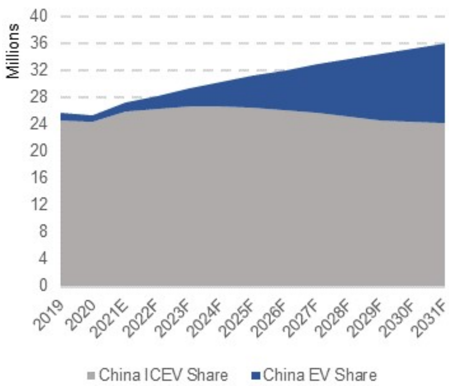
- America



Graph 26 – US Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations



Graph 27 – China Deliveries and Growth Rate, in millions
Source: OICA, Statista, Analysts Calculations



Graph 28 – China Deliveries and EVs Mix Forecast, in millions
Source: OICA, Statista, Analysts Calculations

In the American continent, mainly in the United States, sales of newly registered vehicles also fell close to -20.0% as a result of the pandemic situation. We forecast a growth of +13.8% for total deliveries in 2021 and a convergence to the long-term forecast of real GDP growth, with sharp declines in 2024 and 2025 relative to the forced transition to the EVs to meet with the stipulated targets.

The new Biden administration has been a defendant advocate of alternative sources of energy and put forward more aggressive green initiatives, after the country taking a less supportive stance on the subject in 2020 relative to Europe and China. The plan includes an expansion of tax credit to EVs and a target of 50% of sales being zero-emission capable, meaning BEVs and PHEVs and an instantiation of development of long-term fuel efficiency and emission standards (Reuters, 2021). Forecasts pointed to a sales ratio of EVs of 11% in 2025, 25% in 2030 and 35% in 2035 before the plans release. Although less ambitious than the targets set by the EU, these are more in line with the numbers brought forward by OEMs, BMW included. Federal tax credits of up to 7,500 USD per BEV sold were also available in 2020 and extended to 2021, but only up to the first 200,000 units sold by OEMs (IEA, 2021). For the EV segment in the U.S. we predict +97.8% growth in the year of 2021 and a +38.5% growth in the following year, with double digit growth up until the end of our forecasting period with roughly an EV to total deliveries mix of 33%. Although this executive order represents a clear sign of commitment, we believe the country to be one of the most dependent on fossil fuels and return on the invested funds on infrastructure to only start paying off at the turn of the decade.

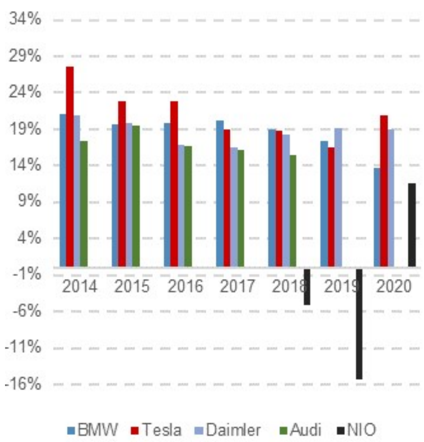
- Asia

The Asian market, more specifically the Chinese market, was the backbone of the automotive industry throughout the pandemic in the past year, sustaining a slight decline of only -2.0% in total number of deliveries, brought forward by the recovery of the second semester. Despite China's rapid growth in deliveries from 2014 to 2018, its automotive market has been facing a decreasing trend from 2018 onwards. The decrease from 2018 to 2019 can be explained due to the industry's recent revolution towards lower emission cars, new energy vehicles and higher production standards, the trade war with the US (which heavily affected exports from domestic manufacturers) and the reduction of subsidies for EVs. Moreover, we expect heavy trade barriers and import tariffs in Biden Era, in order to privilege local suppliers. But above all, it's the structural changes that will have the most impact on the Chinese automotive industry. The massive expansion of urban areas in China favoured the use of metropolitan and subway networks, very rapid and efficient methods of dislocation. The well-known road congestion in China's largest cities makes the idea of buying a car little attractive. Also, the expansion of used-car trade, aligned with the explosion of ride-hailing services, have negatively impacted the industry. Finally, residents in smaller cities struggle financially to be able to buy a new car, so, aren't perceived as target customers. Although most of the recovery from the pandemic situation as already been factored in, we are optimistic in what regards the automotive sector, as Chinese consumers grow fonder of EVs, which will help the country get closer to its emissions targets, and transform a niche part of the markets, into a mass production industry holy grail (Bloomberg, 2021). In 2021 we expect a growth of +7.8% decreasing to +2.0% the following year and remaining around this value for the remainder of the forecasted period

Boosted by emission targets and local OEMs sold 1.1mn units of electrified vehicles in 1H2021, half of total global EV sales during the period

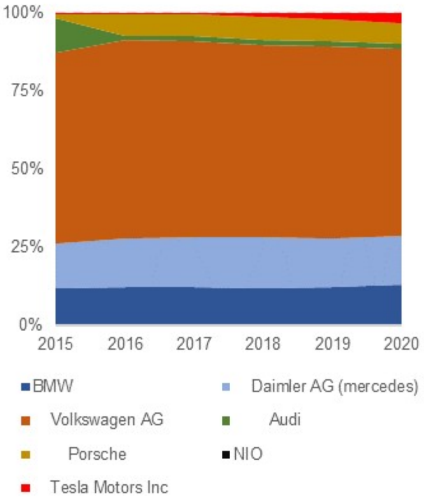
Boosted by emission targets and local OEMs supply in Nio, Li Auto and Xpeng, the country sold 1.1mn units of electrified vehicles in the first semester of the year, approximating half of total global EV sales during the period (Goldman Sachs, 2021). Targets set out by the country point to a sales mix of over 20% of EVs by 2025 and 50% by 2035, to reach the so desirable carbon neutrality by the year of 2060 (IEA, 2021). China cut subsidies for EVs by 20% in 2021 (to 13.000 yuans between 300 and 400 kms range and 18.000 yuans for more than 400 kms range), after extending the subsidy by more two years than predicted to mitigate COVID-19 effect (it is planned to end in 2022) although new incentives are sure to be implemented to commit to the targets set. For this segment of the market, we estimate a growth of +48% for 2021 and to persist on the double-digit growth up until 2030, with a sales penetration rate of EVs of 35% in the chines market, roughly bellow the presented target.

Competition Analysis



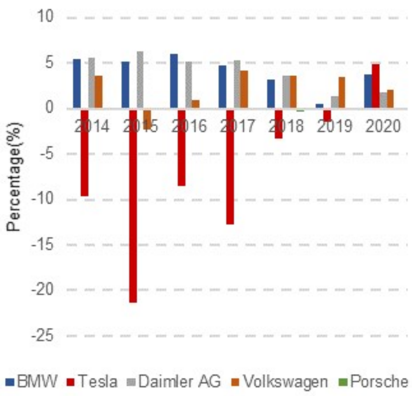
Graph 29 – Gross Margin of BMW and Competitors
Source: Bloomberg, Analysts Calculations

The automotive industry has seen a great deal of structural changes in recent years, as the need to innovate changed the landscape of the industry dramatically. Amid its swift shift in attention towards electrification, powerful players emerged having as corner stones of their foundation an orientation solely focused on this topic which, in our view, has given them a powerful lead, compared with legacy carmakers, whose electrified products are still mainly an adaptation of vehicles originally designed to be powered by a combustion engine. The result is frivolous competition levels, has incumbent and new entrants fight to lure clientele in a newly created environment. The difference in the production nature and number of years doing so, coupled with investment, results in shortcomings for late adopters, regarding characteristics that we believe end consumers value, such as battery cost relative to size, charging speed and autonomy, just to name a few. Tesla, undisputedly, leads the automotive market



Graph 30 – Premium Market Share Evolution, Global
Source: Bloomberg, Analysts Calculations

Foxcon, the largest manufacturer of iPhones, to make its debut in the EVs segment through a JV partnership in 2023



Graph 31 – ROIC of BMW and Competitors
Source: Bloomberg, Analysts Calculations

to what regards electrification technology, with the best software and hardware and battery development, although we see growing convergence of legacy carmakers, mainly VW, whose targets are far more ambitious than more premium brands like BMW and Daimler.

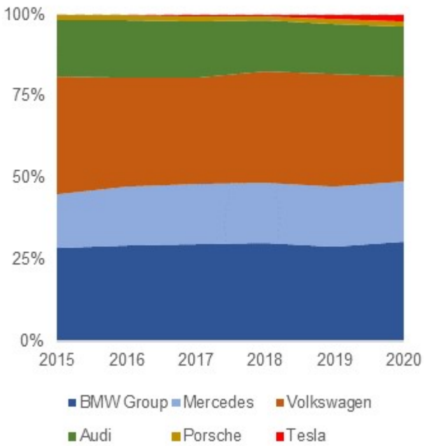
Profitability

We believe it is possible for premium and even luxury carmakers to achieve competitive margins in the short to medium run, albeit with the help of subsidies granted by governments. Ferrari's SF90 is a PHEV with 48% EBITDA margin developed in the past year (Bloomberg, 2021) and fully electric Chinese brand NIO is expected to reach 20% gross margin by the end of the present year, albeit considering government credits provided. We expect BMW to be much less efficient than "natural born" EVs car makers in the short to medium term, but gradually pick up its share, behind VW and closely following Daimler. In what regards the level of competition, it has been a downward sloping trend for most of the legacy manufacturing car companies, with margins sliming as the need to innovate requires levels of capex at ever higher rates of revenues, and as costs for the newly built EVs remain high enough, with battery costs making up an estimated 45% of the cost of these vehicles in 2020. We expect this number to converge to the value of combustion engines in vehicles nowadays by the end of our forecasted period in 2031. (Goldman Sachs, 2021). BMW has seen its margin decrease in the period considered between 2014 and 2020, from 21% to 14%, falling behind most of its competitors. A ROIC analysis tells a similar story in what regards a decreasing level of profitability, with BMW presenting an average of roughly 4% in the past 5 years, in line with direct competitor Daimler. New entrants are forced to enter the industry at negative levels of ROIC, as is naturally associated to a capital-intensive sector such as the automotive industry but have gained traction quickly and should soon become profitable for its investors, with Tesla reaching positive levels of ROIC for the first time in 2020 at 4.93%. We interpret this development as a clear sign of threat for incumbent firms, as entrants bring in more flexible capital and adjusted to the fast-paced changes of the industry. This scenario stresses the impossibility for the market share to remain static amongst market players, and we expect this to suffer changes. We forecast a slight increase in profitability, mainly driven by the new models coming out in the next few years, which represent a strong bet in the EVs segment, and the gradual improvements of cost margins due to reductions in battery prices. It is our view that this scenario, although slightly affected in the past year due to the pandemic, is likely to improve as mass production results in economies of scale and governments aid with more production incentives in the form of subsidies.

As the industry transforms quickly, and more importance is transferred to electronics and software development, as we previously mentioned, connectivity and automation gain increased relevance and open the doors to new entrants. Foxcon, a Chinese electronics manufacturing company, who is currently the largest manufacturer of iPhones, is set to make its debut in the EVs segment through a JV partnership in the year of 2023. (FT News Briefing, 2021). This perfectly illustrates the competitive environment and the need to maintain capital intensive projects to protect profitability levels.

Market Share

The premium automotive segment has seen considerable change in its composition of market share, with German manufacturers being represented in big numbers. The industry is also in the middle of a major transitive period, with the mass adoption and productions of EVs. New entrants, like Tesla, were able to take some share of the market at the expense of incumbents, like BMW and Daimler, although German manufacturers also show resilience in defending their positions and still experienced growth of +11.0%, or 250,000 units, during the considered period of 2017-2019 (Bloomberg, 2021). We support the idea that Tesla and other core electric manufacturers are growing and taking share, capitalizing on the electrification of fleets, however, not solely at the expense of BMW and other German manufacturers, as data suggests.



Graph 32 – Premium Market Share Evolution, Europe
Source: Bloomberg, Analysts Calculations

In Europe, although electrification has gained a lot of traction, Tesla and other new entrants have had a very difficult time in establishing a foothold in the old continent, with European manufacturers making most of the market share. We believe this to be a structural barrier difficult to overcome, as some of these brands command a higher premium in this geography and benefit from having construction plants indoors and better marketing and selling structures. We expect this trend to remain broadly unchanged in the short-term, as most companies announce new ranges of models to compete at different stages of the segment. BMW recently launched three fully electrified models, marking the start of the second phase of the electrification of the fleet, and expanding the mix for the next couple of years. The BMW i4 is hailed as the direct competitor to the widely popular Tesla Model S and the yet to be released Mercedes EQS in the premium electric sedan segment. The Volkswagen group also rolled up its contender in the new Porsche Taycan. Although with some competition, we see this new mix addition to be very favourable to BMW in the region and we believe they will be able to add in the next few years and maintain an historical level of high market share supported by branding power, new model rollout, quality products and customer loyalty.

In the United States, market share has been declining over recent years, with the major driver of sales being the heavily locally produced SUVs (Bloomberg, 2021). In this segment, BMW launched two new models in the iX and iX3, with a new launch of the BEV version of model X1 planned for the next year of 2022. This is a direct competitor to Tesla's Model X, Audi e-Tron and Mercedes EQC. BMW comes somewhat late in this segment compared with peers and in the American EV premium market, Tesla's dominance is unquestionable, and we forecast this to remain being the case due to strong presence in the region and superior distribution channels. Taking market share and facing off against other OEMs, with models already rolling, will prove difficult for BMW. We forecast slight decreases in this respect, as we believe Audi, Daimler and mainly Tesla to be better positioned and see very few possible opportunities to be exploited. We expect a small decrease in share, in line with previous years but stabilizing at 2.0% in 2025.

Chinese President Xi Jinping, vowed to adjust the excessive disparity of income in the country

In China, where we see most efforts being concentrated, as legacy carmakers and new entrants prepare for fierce competition in the coming decade. Domestic manufacturers, like Li Auto, BYD, Great Wall and NIO pose an added challenge, with the latter growth prospects screening a positive forecast, with an increase of roughly 20k units in deliveries, which translates to a growth of +423.0% YoY in the 1Q21 (NIO Inc., 2021) and an increase in margin to 21.1%. We expect competition in the Chinese market to be very aggressive, as firms try to reap the benefits of the above average growth and the electrification transition potential. Moreover, recent statements from Chinese President Xi Jinping, claiming that the excessive disparity of income in the country ought to be adjusted, in order to promote common prosperity to society as a whole, can heavily impact sales of premium car brands in the region (FT, 2021). In our view, this adds yet another layer of uncertainty for BMW, as China becomes increasingly more important for the OEM's business. We reiterate our conservative views, stemming from the macroeconomic environment and government decisions. We believe the foothold BMW has in the Brilliance JV will help in defending its position. However, knowing how protective the government and consumers are of local manufacture (CNBC, 2021), together with the growing uncertainty of government crackdowns and forced regulation, adding the extra competition, we forecast a decrease in market share of BMW over the forecasted period bottoming at around 2.65% in 2031. The still less developed Spotlight JV should also aid in this effort.

Valuation

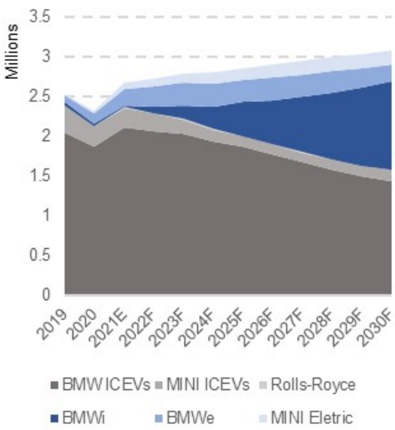
To value the operations of BMW Group, we conducted a "sum of the parts" analysis on the main sectors of the company. We grouped the automotive and motorcycle operating businesses in a broader industrial segment, due to their operational similarities and applied a DCF model to arrive at its fair Enterprise Value. In the financial services segment, we opted for a Cash Flow to Equity valuation model, due to its banking-like business operations. We also conduct an independent valuation for the BMW Brilliance JV, given its relevance for the business and availability of information.

Graph 33 – BMW global deliveries per Geography and Growth Rate, in millions
Source: BMW Annual Report, Analysts Calculations

Automotive

This segment consists of the global sales of cars and other associated income relating to the units, such as repairing, assistance and telematics, expect deliveries produced and sold in Chinese territory (JV business). Comprises the brands of MINI, BMW and Rolls-Royce.

▪ Revenues

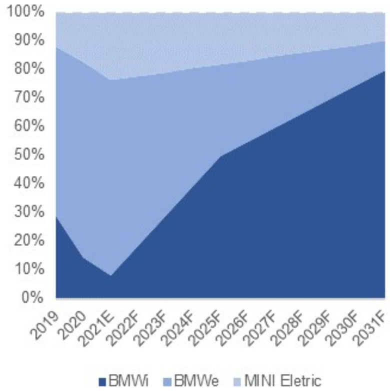


Graph 34 – BMW global deliveries per model, in millions
Source: BMW Annual Report, Analysts Calculations

Revenues model is based on a price times quantity approach, where inputs are the revenues per units, and total deliveries

Our model is based on a price times quantity approach, where the proxy for both these inputs are the revenues per units, and total deliveries, respectively. We further extend the analysis by segregating between the different brands, those being MINI, BMW and Rolls-Royce, and propulsion powertrains, those being BMWi and MINI Eletric (mainly comprising BEVs) and BMWe (comprising only PHEVs), to better capture the inherent differences in contribution to revenues and margins. One key assumption of the model is that production equals the number of deliveries made for that year. We believe this to be a fair assumption, grounded on the average gap between these two figures in the previous years.

Deliveries of both BMW and Rolls-Royce brands had been steadily increasing up until last year, where group deliveries tanked -8.4%, decreasing revenues by -5.0% that year. The MINI brand struggled to increase its deliveries numbers, even prior to the pandemic, however, we believe the launch of the new MINI Electric will boost deliveries for this segment in the future. We forecast BMWs to sell more relative to the other two brands in the next two years due to the three new all electric models (iX, iX3 and i4) becoming available this year and the subsequent launches of new models, after which we assume a 90% ratio to total deliveries of the group. The Rolls-Royce brand is expected to remain at a fixed percentage of total deliveries, given the luxurious and niche characteristics of the target market. MINI deliveries are forecasted to slightly decrease over time. We forecast an increase of total deliveries for 2021 of +15.2%, where contributions come from a little of all regions, as we expect a worldwide economic recovery. In the following years we forecast more moderate growth, after the effect of the

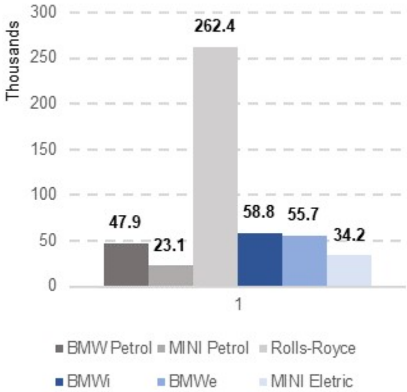


Graph 35 – BMW Share of Electrified deliveries per model, in millions
Source: BMW Annual Report, Analysts Calculations

recovery disappears, and market approaches a steady state long run growth of the real economy.

The growth of the EVs models broadly follows that of the industry, and we expect BMW to naturally face a downward market share evolution, as the global EV market becomes the industry standard, and other brands not belonging to the premium market, are able to mass produce EVs and dwarf the premium segment when compared to the whole market. We forecast the totally electric branch of BMWi to massively increase its share of electrified sales of the group, currently at 8.4%, with a two-fold increase in product mix until 2023, slowly taking away from the PHEVs in BMWe, that currently account for the majority of electrified sales. MINI Electric should trend towards the level of mix of the overall brand, as BMW estimates to make it an all-electric brand by 2030. We believe this objective to be feasible. We estimate deliveries of aggregate PHEVs and BEVs of all brands to comprise 32% of sales by 2025 and roughly 50% by 2030. These are in line with BMW's objective of 25% pure BEVs by 2025 and 50% by 2050. We consider this forecast to be optimistic but reflecting our views of the market developments.

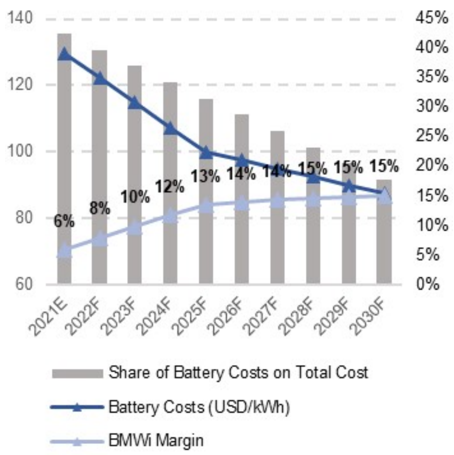
To estimate the revenue contribution per model and powertrain, we conducted a weighted average distribution of the revenues of the segment, using a relative weighting of the prices of the models available on the website for each brand. The underlying assumption of this approach is that the extracted revenue per model is directly proportional to its initial price. A repair or service of a Rolls-Royce model should be roughly as many times more expensive, as the difference in the initial price, when compared to a BMW or MINI model. The revenues per delivery are forecasted to increase in line with inflation levels expected for the Euro Area, a pricing strategy grounded on pricing power leverage and a connectivity premium associated with the increased monetization of recurring income features per delivery, such as application exclusivity and others, which are expected to account for 7.5% of total revenue for premium brands by 2030 (Mckinsey, 2021)



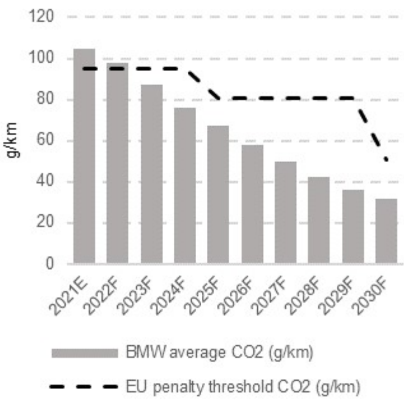
Graph 36 – BMW Model's Revenue per Delivery (2020), in thousands
Source: BMW Annual Report, MINI.com, BMW.com, Rolls-Royce.com, Analysts Calculations

- ### Margins and other costs

We forecast margins based on our expectation of the evolution efficiency in production and level of competitiveness within the industry. We assume an average of gross margins recently observed for all ICEVs models, expect Rolls-Royce models, for which we assume a 50% gross margin contribution, grounded on the luxurious nature of the brand and the premium it commands. To better approximate the true value of this number, we used the gross margin of recent years of close competitor Ferrari (Bloomberg, 2021). We expect Rolls-Royce margin to remain constant throughout the forecasted period, however we predict



Graph 37 – EVs Margin and Battery Prices Evolution, in USD/kWh
Source: Analysts Calculations



Graph 35 – BMW Average EU Emissions vs EU target, in g/kmGraph 38 – BMW Average EU Emissions vs EU target, in g/km
Source: BMW.com, Analysts Calculations

a slight decrease in the ICEVs of the premium segment, due to government and social disincentives, supply driven alterations as the entire supply chain of the industry shifts towards electrification, and capital inefficiencies from transitioning to full EV production.

For electrified vehicles, we assume a margin 12% below regular ICEVs, reflecting average costs and profitability reported by the industry (Goldman Sachs, 2021). We don't believe BMW to have a significant competitive advantage in the costs of production of BEVs that allows them to have much better margins than the industry average at this point, outsourcing all its battery cells for their electrified models. To allow for the possibility of incorporating the dynamic evolution of margins of EVs, we assumed that the main divergence between the cost of production of a BEV and ICEV relates with the costs of batteries and traditional engines, with all other inputs remaining relatively constant to what regards the total cost structure of a vehicle (FT, 2021). To measure the yearly impact on the margin of EVs, we used a generic total cost function for a given unit made up of a fixed cost component and an electric battery cost contribution. We arrive at the impact on total costs by multiplying the share of battery costs in total costs and the decrease in the pricing of batteries. By extension, we can calculate the impact on the margin function, by multiplying the instant rate of change of the costs variable times the impact of the falling battery prices on costs. Using the same rationale, we further incorporate the impact of a subsidy of +1,000 euros per electrified vehicle sold in 2021, given information gathered from subsidies and incentives from governments around relevant geographies, and gradually decreasing thereafter, grounded on the assumption that governments will gradually take back these subsidies as the industry matures, during the length of the forecasted period. After which, we assume the industry to have matured enough to not command the need to be given the subsidies. The total gross margin for the automotive sector slightly increases during the period, reflecting economies of scale and maintained strength in the branding power.

- Emissions

In what regards compliance with the target emission set by the EU, we try to forecast the emission levels for the BMW European fleet by using as drivers the share of each vehicle on total deliveries (ICE, PHEV and EV) and the average emission on each type of vehicle. For ICE vehicles, we use as proxy the average emissions of BMWs most sold model, the Series 3 Berlina base version. We average the emission of the 318d (diesel model) and 320i (gasoline model), to arrive at an average combined emission rate of 140 g/km for ICEV models (BMW, 2021). For the PHEVs, we use 30% of this value, as we assume most of the use of hybrid cars to be inside the city, and 0 emissions for EVs. According to our forecasts, we predict that BMW will go over the emission limit stipulated by the EU (95 g/km) for the years of 2021 and 2022, with an average of 104.8 and 97.8 g/km, respectively. This will cost the German manufacturer 942 million euros and 306 million euros in fines.

For the penalties by antitrust agencies, we assume that in 2021 BMW will pay a fine of 373 million euros, due to the restriction of competition in emission cleaning for new Diesel passenger cars alongside Volkswagen, in a total fine of 875.19 €, 373 million € of which to be paid by BMW.

- Key financial metrics

Graph 39 – BMW Revenues and Operating Margin, in billion EUR
Source: BMW Annual Report, Analysts Calculations

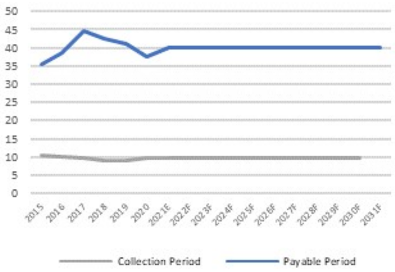
After a considerable decline in the Net Operating Profit, net of adjusted taxes (NOPLAT) in 2020 of -63.6%, we expect a robust recovery of +200.0% for the end of 2021, with 4,442 million euros, and a reversion to the mean in 2022F with a slight decline of -2.0% to 4,331 million. After which, we forecast a positive increase throughout the forecasting period, albeit with some erratic behaviour to the start of the decade, reflecting the industry dynamics and transition to electrification. In the last year of our forecast (2030), we extend our analysis further one more year into the future to derive what we think will be the long-term growth of the operating profit in the industry, essentially reflecting the mobility and transportation demands of the global economy, which will be independent of the types of powertrains offered in the market, since from the perspective of consumers, BEVs and ICEVs are not fundamentally different. In essence, they are the same product, using different technologies, and as such, the market will grow independently from the type of vehicles offered. We forecast a perpetual growth rate of +1.33%, to which we arrive structurally through, the macro and micro economic inputs fed to model, including the long-term growths of the economy, of the industry and perceived market share. In terms of free cash flow (FCF), we estimate a result of 3,626 million at the end of 2021 and 2,123 million in 2022. ROIC levels have been decreasing from past years, and we expect this trend to continue, reflecting increasing capital needs and competition, stabilizing by 2026F at levels of 13.5%.

- Working Capital

Despite the volatility caused by the outbreak of the coronavirus pandemic, the results of operations, financial position and net assets of the BMW Group remained stable throughout the financial year, thanks to a raft of measures that were immediately implemented, including focused working capital management, strict investment and fixed cost management and targeted liquidity management.

Graph 40 – Evolution of inventories and holding period from 2015 to 2031
Source: BMW Report, Analyst calculations

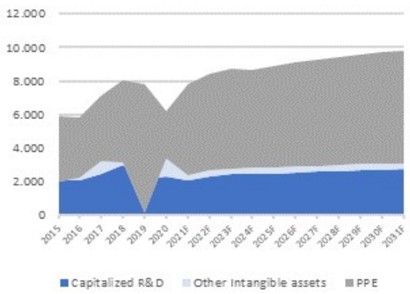
So, we forecast collection and payable periods to remain in line with previous years. This is not, however, the case of holding period. Increasingly faster digitalised processes and lean structures are key prerequisites for consistently leveraging efficiencies. During the coronavirus pandemic year 2020, for example, advances in digitalisation enabled the BMW Group to maintain direct contact with its customers, despite lockdowns worldwide. Digitalisation is helping to shorten the process of developing new vehicle models by up to one-third (Goldman Sachs, 2021). Allied to this, the chip shortage effect has also congested car deliveries, as previously mentioned. Therefore, we believe that holding period is expected to mildly decrease during the forecasted period to the minimum of the previous years, and then returning to normal values in 2025 (average of the past years). Overall, Net Working Capital values remain negative from 2021 to 2024, becoming positive from 2025 onwards.



Graph 41 – Evolution of capitalized R&D, Other Intangible assets and PPE from 2015 to 2031
Source: BMW Report, Analyst calculations

- Capex

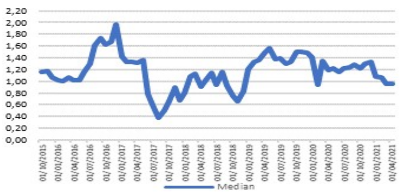
The period in question for the automotive industry requires big outlays of cash in order to get a better strategic positioning in the industry. The group defines its total capex metric as comprising capitalised expenses of R&D, capitalisation of Property, Plant & Equipment and other intangible assets. We find this metric to be the key driver in discerning capital expenditures of the group, fuelled by its sales proportion. Over recent years, total capex has been oscillating between 5.0% and 7.0% of total revenues of the group, with the sharpest decline coming from the recent pandemic shutdowns, after several investments were delayed and postponed indefinitely, which helped maintain free cash flows in positive territory for the year (Nicolas Peter, 2019). However, the situation has now shifted dramatically, and most car manufacturers are now racing against time to come up with new models to increase their EV market share, and those investments will vary in form and shape, from investments in production facilities, to software and app development for better connectivity services. Furthermore, BMW introduced the concept of "one architecture serves all" powertrain derivatives starting from 2025, meaning the body of all cars manufactured will be compatible with all energy sources for propulsion, ICEVs, PHEVs and BEVs, and further committed to introduce an architecture uniquely designed for BEVs. This investment translates into higher capex in the coming years before economies of scale and appropriate infrastructure are completed and in full effect. Henceforth, we believe competition levels will require high levels of capex, like those presented before the pandemic. BMW targets a long-term capex to sales ratio between 5.0% and 5.5% (BMW Presentation, 2021). However, given the future competitive ness in the industry, we expect capex to grow considerably in the first



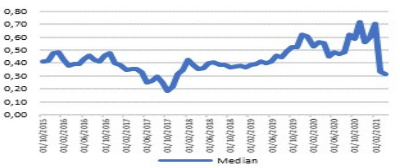
Graph 42 – Evolution of capitalized R&D, Other Intangible assets and PPE from 2015 to 2031
Source: BMW Report, Analyst calculations

half of the decade, then converging to a ratio slightly over 6.0% of revenues.

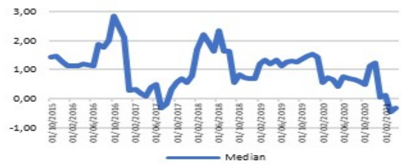
Cost of Capital



Graph 43 – Median unlevered Beta of Industrial Segment from 2015 to 2021
Source: Bloomberg, Analyst calculations



Graph 44 – Median unlevered Beta of Financial Services Segment from 2015 to 2021
Source: Bloomberg, Analyst calculations



Graph 45 – Median unlevered Beta of BMW-Brilliance Segment from 2015 to 2021
Source: Bloomberg, Analyst calculations

INDUSTRIAL SEGMENT COMPARABLES	
Company Name	Unlevered Beta
BAYERISCHE MOTOREN WERKE AG	1,34
VOLKSWAGEN AG-PREF	2,63
STELLANTIS NV	1,78
PORSCHE AUTOMOBIL HLDG-PRF	1,85
ASTON MARTIN LAGONDA GLOBAL	0,07
DAIMLER AG-REGISTERED SHARES	2,30
RENAULT SA	2,25
TESLA INC	1,16
HONDA MOTOR CO LTD	0,71
FERRARI NV	0,84
HARLEY-DAVIDSON INC	0,68
CONTINENTAL AG	1,41
MAZDA MOTOR CORP	1,39
PEUGEOT INVEST	1,12
PIAGGIO & C. S.P.A.	0,88
XPENG INC - ADR	2,06
FAW JIEFANG GROUP CO LTD	1,42
YULON NISSAN MOTOR CO LTD	0,86
CHONGQING SOKON INDUSTRY G-A	2,04
ZOTYE AUTOMOBILE CO LTD-A	0,48
BRILLIANCE CHINA AUTOMOTIVE	0,93
LI AUTO INC - ADR	3,66

Table 1 – Industrial Segment comparables for equity beta
Source: Bloomberg, Analyst calculations

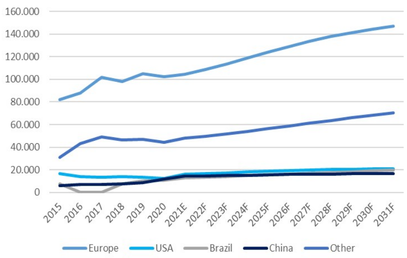
As we are valuing BMW Group as the sum of parts, we calculate different costs of capital to discount Free Cash Flows. For the Automotive and Motorcycle segments, as both focus on the premium market segment, we decided that a common WACC would be adequate. So, the first step to reach the cost of equity was to measure the company's risk relatively to the market (Beta of Equity). To calculate a forward-looking beta for BMW Group, we examined not only BMW but also its industry peers (of both segments), as betas can be affected by unexpected market events, so adding peers diminishes the effect of idiosyncratic shocks. Monthly returns were chosen as more frequent time periods incorporate systematic biases and we chose between 6 and 7 years for our time series, as we believe for such a rapidly changing industry the period before 2014 is irrelevant. We regressed each pear's close price against STOXX600 on a rolling basis (suitable as a large percentage of shareholders are European), using a 1-year lag, and calculated the monthly unlevered rolling beta for each peer, so then we could plot the average and median by time period in order to capture the evolution of the Betas throughout time. Both metrics were considerably unstable, varying between 2.01 and 1.41, so, we decided to use the median to avoid outliers. We then re-levered the Beta using our model Debt to Equity Ratio (long-term ratio) and a βd=0.3 (proxy spread between investment-grade corporate debt and government debt), yielding a 1.93 beta. We used the 10-year German bunds as a proxy for risk-free rate and a market risk premium of 7.30% (PwC, Bloomberg, 2021). Using CAPM, we reached a 9.89% cost of equity. For the cost of debt, we used as proxy the Yield to Maturity (YTM), so, we used a promised rate of return for a company's debt and assuming that all coupons and debt are fully paid and on time, a fair assumption for a firm like BMW (Moody's A2 credit rating). In the case of an investment-grade firm like BMW, with very low probability of default, we found it reasonable to consider the YTM of the long-term, option-free bonds as its cost of debt, using an after-tax basis. For BMW, there was no need to incorporate in the equation the probability of default neither loss given default as their product approximates to 0.0%. So, we calculate the average YTM on a portfolio of bonds of BMW´s peers, with medium/high maturity (around 10Y to maturity to maintain a level of consistency with the risk-free rate) and with a similar credit rating. Then, by adding the marginal tax-rate (30.8%) and D/E ratio we calculated the WACC (6.8%). For BMW-Brilliance Segment, we used the Flow to Equity (FTE) to discount the FCFs, for simplicity purposes,

FINANCIAL SERVICES SEGMENT COMPARABLES	
Company Name	Unlevered Beta
BAJAJ FINANCE LTD	0,96
CREDIT ACCEPTANCE CORP	0,82
SUNDARAM FINANCE LTD	0,40
MAHINDRA & MAHINDRA FIN SECS	0,23
YULON FINANCE CORP	0,27
YIXIN GROUP LTD	0,84
QNB FINANS FINANSAL KIRALAMA	0,82
MUANGTHAI CAPITAL PCL	1,07
FUYO GENERAL LEASE CO LTD	0,34
ALLY FINANCIAL INC	0,77
ALD SA	0,54
NATIXIS	0,35
UBS GROUP AG-REG	2,61
HSBC HOLDINGS PLC	1,11
UNICREDIT SPA	0,62
BANCO SANTANDER SA	0,57
ING GROEP NV	0,90

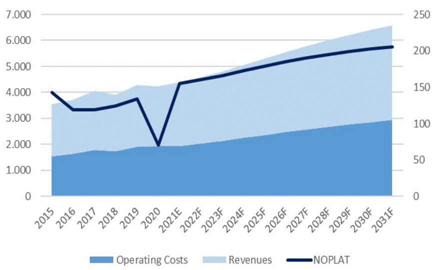
Table 2 – Financial Servies Segment comparables for equity beta
Source: Bloomberg, Analyst calculations

BMW-BRILLIANCE SEGMENT COMPARABLES	
Company Name	Unlevered Beta
GEELY AUTOMOBILE HOLDINGS LT	0,98
YADEA GROUP HOLDINGS LTD	0,85
BAIC MOTOR CORP LTD-H	-1,52
BAIC BLUEPARK NEW ENERGY -A	0,86
JIANGSU XINRI E-VEHICLE CO-A	1,17
PORSCHE AUTOMOBIL HLDG-PRF	1,82
STELLANTIS NV	2,10
GUAGZHOU AUTOMOBILE GROUP-H	0,34

Table 3 – BMW-Brilliance Segment comparables for equity beta
Source: Bloomberg, Analyst calculations



Graph 46 – Evolution of Motorcycle deliveries by region from 2015 to 2031
Source: Analyst calculations



Graph 47 – Evolution of Operating costs, Revenues and Noplat from 2015 to 2031
Source: Analyst calculations

since no adjustments to the DCF value for nonoperating assets, debt, or capitalized operating leases are required, as they are embedded as part of the equity cash flow. So, an estimation of cost of equity was required, but with different peers (Chinese Automotive Manufacturers). We used the same approach for the Unlevered Beta of Equity (0.92), so then we could re-lever the Beta (1.14). The MRP (7.3%) and the MRF (-0.4%) were the same, but we added a country risk premium, as an extra compensation for investing in an emerging economy as China is required (1.5%). The Cost of Equity was 9.70%. Again, the same procedure was followed for the Financial Services' Segment. We estimated FCFs using the FTE, as WACC-based models' prime companies or units with stable D/E ratios, which is not the case for financial institutions. As capital structure is embedded in the operations, an equity-based model is more suitable. Again, by maintaining the assumptions for market risk premium and risk-free rate, we reached 11.7% as the final cost of equity.

Motorcycles

In 2020, BMW sold 143.773 million units, reporting a CAGR of 4.3% between 2015 and 2020. In the first half of 2021, however, BMW registered a +140.3% increase relatively to the homologous period, in other words, BMW delivered 63.6% of total deliveries of the prior year. In our previsions, we were relatively more optimistic that the data we've collected, especially for 2021. Note that with COVID-19, the diverse product portfolio, to which it was added 13 new models, aligned with dealerships' efforts, caused total deliveries to only decrease -3.4% in 2020, considered a positive result given the circumstances, as it registered the second-best result in deliveries in history. We believe that the success of boxer models (represent nearly 80% of total deliveries) to maintain its popularity, as stated by BMW press, which gives primacy to the new launches of the 1800cc displacement R18 engine (Trincheiras, 2021). Also, the mid-range segment is expected to reassure its position with the success of the F900R and F900XR models. Alternatively, measures such as conduct of digital consultation, sales talks via stream, contactless vehicle pick up or delivery, increasing presence on social media, were key factors to increase customer experience (Statista, 2021).

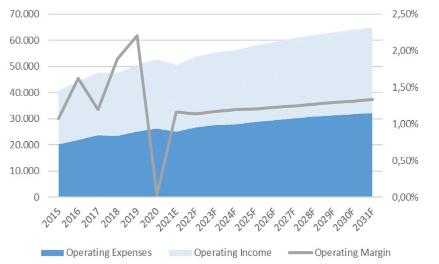
For the projection of the Motorcycle BU, we did not go as in depth as the Automotive BU, as this segment does not nearly represent the same importance for the group. Still, we used the same drivers for revenue forecast. That is, we calculated total deliveries and revenue per delivery. In total deliveries, the estimation method was the same as in the car segment, meaning that we forecast the global motorcycle deliveries per region and then the market share for BMW in each region. Overall, we foresee a strong recovery in 2021, maintaining the trend of the first half of the year, and a mild growth from 2022 onwards until 2031, ending the series with a growth rate equal to the real GDP growth rate. Overall, we assumed a market growth rate of +46.5% from 2020 to 2021, and afterwards, a CAGR of +3.8% from 2022 to 2031. We predict deliveries to fully recover from COVID-19 by 2021, in spite of the chip shortage effect, that we also include in the motorcycle analysis. By 2031, we forecast the market to reach over 75 billion deliveries. Regarding market share, we are bullish in some markets where BMW is very well established, mainly in Europe, and bearish in regions where other brands dominate the market, in which a penetration by BMW is almost impossible, such as China and the US. Note that, being BMW a premium brand, it is normal that its market share has risen considerably in almost all regions in 2020, so the implied market share is inflated in 2020, and thus we expect it to suffer a correction in the near future. So, we can be bullish and still be predicting a BMW market share inferior to 2020's. Concerning gross margin, we used the average values from 2015 to 2019, as it is very stable throughout time, assuming a slight continuous increase until 2031, derived from efficiency increases resulting from R&D investments. All in all, NOPLAT is increasing stably from 2026 onwards, registering a perpetual growth of +1.4% in 2031.

Financial Services

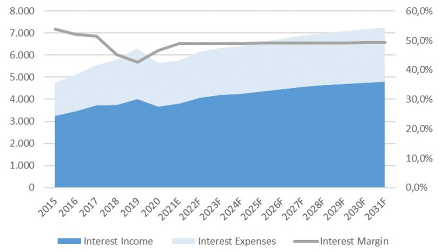
"In today's cars, software, hardware and services work together in an integral way. This is how we are laying the technological foundation that will enable us to offer our customers new functions on an ongoing basis" – *by Oliver Zipse*

COVID-19 has accelerated customer adoption for digital and online channels (KPMG, 2020). Nowadays, we believe that in online sales, companies must offer a perfect customer experience to retain customers, as consumer retention rates are decreasing as buyers always look for new opportunities derived to the excessive time attached to technology devices (McKinsey & Company, 2020). So, the offering of new flexible products and services, that meet new generation's needs, such as (McKinsey & Company, 2020) shorter duration contracts, pay-as-you go models and complementary services (such as maintenance and insurance), will need to be developed not only to capture demand, but also to overcome competition. BMW is exploring the digital potential in this segment, following its investment of hundreds of millions annually to guarantee a seamless digital experience for customers. It is our belief that, being BMW an innovation leader, it will continuously be reinventing its core business around data and digital. So, we expect BMW to incur more selling and administrative expenses (that we assumed to be the highest value of the last 7 years, 3.0% of Leased Products to the whole forecasting period) as well as operating expenses (83.6% of Financial Services Revenues) to succeed in this market.

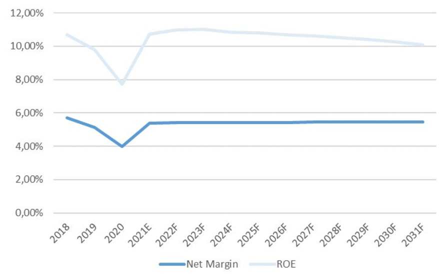
In the Financial Services segment, BMW faces competition of traditional commercial banks, leasing companies and other small credit providers whose



Graph 48 – Evolution of Operating expenses, Operating Income and Operating margin in the FS Segment from 2015 to 2031
Source: Analyst calculations



Graph 49 – Evolution of Interest Income, Interest Expenses and Interest margin in the FS Segment from 2015 to 2031
Source: Analyst calculations



Graph 50 – Evolution of Net Margin and ROE in the FS Segment from 2015 to 2031
Source: Analyst calculations

business scope involves small enough loans for car financing and contracts for leases. However, a large part of the value derived from this segment is intrinsically connected to the automotive and to the motorcycle segments, since the total value of financing and leasing contracts is correlated to the number of deliveries in any given year.

For the Operating part of this segment, we used as main driver the total Leased Products, which in turn are dependent on total Revenues from Automotive and Motorcycle segments. For the Operating Expenses, we used the Operating Income as driver, meaning that we assumed a constant operating margin for the future, which we believed to be a fair assumption, as the operating expenses from 2015-2020 as a percentage of operating income varied only between 92% and 93%.

On the other hand, Interest Income is partly derived from the total leased products, but also from the collected spread from deposits, which in turn fluctuates alongside with interest rates. However, as this is not the core business of BMW, we decided not to attribute much emphasis to the quantification of this spread, thus assuming it to remain constant throughout time. As a result, Interest Income is only dependent on Leased Products. Interest expenses are calculated as a percentage of financial liabilities and are assumed to be equal to last 6 year's average, a good proxy for the future, as values are very stable.

All in all, Net Income from 2015 to 2019 grows at a CAGR of +5.1%, then decreasing 21.1% from 2019 to 2020. We formulate a more optimistic opinion regarding the future of the Segment. Our previsions forecast a growth of +23.9% from 2020 to 2021 and CAGR of +2.15% in the growth of net income.

Overall, this unit represents a value of operations of 12,194mn €. It is common practise in this industry to analyse the Return on Equity indicator as a measure of performance and profitability. We can observe that over the last years the RoE of BMW has remained relatively stable and in line with what is expected for a financial subsidiary of this sort. In 2021, RoE was 10.8%, decreasing very slowly until the end of the forecasting period, to 10.1% in 2031. The reason behind this value is that Financial Services' pay-out ratio is not high enough to offset the net income increase, causing equity to increase at a faster pace than net income.

Other Entities and Eliminations

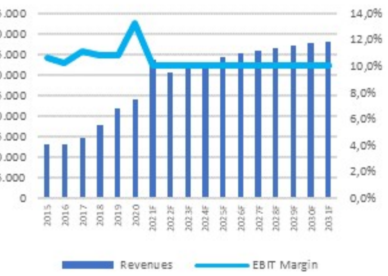
The Other Entities Segment comprises mainly holding companies and Group financing companies and the Eliminations Segment are used for reconciliation purposes between the Automotive and Financial Services Segments. They do not, however, affect the value of the firm.

BMW-Brilliance Joint Venture

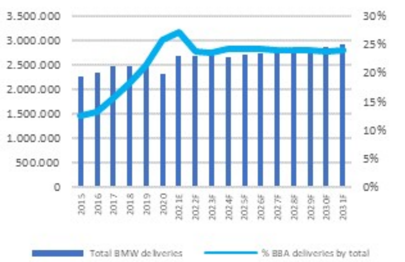
Graph 51 – Evolution China global sales and implied market share of BBA from 2015 to 2031
Source: Analyst calculations

BMW-Brilliance (BBA) is a joint venture (JV) between BMW Group and Brilliance China Automotive Holdings. It employs about 20,000 workers, and comprises a leading worldwide production base, the Shenyang Plant, where six BMW models are manufactured. BMW is currently expanding its Tiexi and Dadong plants to meet deliveries' growth, as well as developing a second battery centre in China (Bloomberg, 2021). The BMW Group plans to increase the share in BMW Brilliance (BBA) in an additional +25% in 2022 (still subject to regulatory approval), through an already signed agreement (in 2018) between the 2 parts, with further planned extension in 2040.

Still, some recent events have generated some controversy around the JV acquisition by BMW. Brilliance Automotive's parent company, Huachen Automotive Group, a state-backed company, has defaulted on bond payments, being unable to repay a 5.3% 1 billion yuan (131 million €) private placement corporate bond. The parent company eventually undergone bankruptcy and restructuring. Brilliance Automotive, having insufficient assets to pay all of its debt, saw its creditors having no choice but to recognize bankruptcy. Still, the firm is expected to bounce back after restructuring and cover some of the losses. The firm is purely dependent on BBA, its only profitable business. However, it is important to highlight that, despite the recent turmoil around Brilliance Automotive (namely the possible acquisition by FAW for 7.2 billion $, or even the privatisation of the company by Chinese state-backed investors), this will not affect the JV with BMW. This is because, according to the contract terms, Brilliance's share of BBA is not directly held by the Chinese manufacturer, but through two-layer entities that are 100% owned by Brilliance and its subsidiary, so, BBA's operations are always safeguarded, according to Shi Ji (analyst of Huachen). We share the analyst's view, believing the increase in stake will take place, therefore, we included it in our projections. BMW-Brilliance's deliveries have been steadily rising from the beginning of our analysis period (2014). As of 2021, BBA is verifying a positive performance in China, with a +69.0% increase in deliveries in the first quarter of 2021 (COVID-19 effect), comparing with the homologous period. Having forecasted the global China's automotive market and BBA's market share, we were able to forecast total deliveries. For 2021, we expect total JV deliveries to reflect a strong recovery following a COVID-19, and then decelerate slightly until 2031. Regarding EBIT margins, we believe they are inflated and are not sustainable in the long-term, as they are significantly higher that the Industrial Segment. So, despite efforts to reduce costs, we expect margins to still decrease until 2023, mainly due to end of subsidies for EVs in

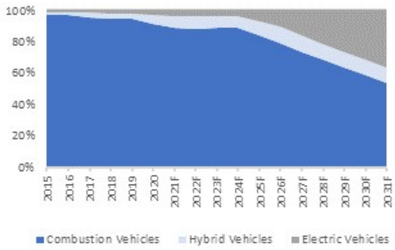


Graph 52 – Evolution of Revenues and Net Margin of BBA from 2015 to 2031
Source: Analyst calculations



Graph 53 – Evolution of total deliveries of BBA and % of BBA deliveries by total from 2015 to 2031
Source: Analyst calculations

2022, and then slowly growing as a result of R&D development until 2031. Note that BMW expects 25% of sales in China to be EVs by 2025. We forecast this number to be 21.2%, broadly in line with the manufacturer's prediction, due to increase in model mix and strong regional focus and production. Also, BMW holds equity on Spotlight Automotive Limited and Great Wall Motors.



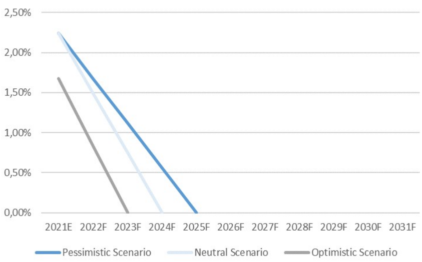
Graph 54 – Evolution car-mix in BBA from 20115 to 2031
Source: Analyst calculations

On a broad view, BMW is making a huge investment on the Chinese market, which might lead us to anticipate the brands position in the country. However, one must take into account that this is the most disputed market around the globe. We do not believe BMW to outstandingly strive in China, due to the structural issues in the Chinese automotive industry and broad economy, as mentioned previously, and the fierce competition.

Scenario Analysis

For the computation of the share price, we build 3 different scenarios (pessimistic, neutral and optimistic), attributed probabilities of occurrence to each one, and then calculated the expected share price based these probabilities and scenario's share price. In the optimistic scenario, we represent light improvements from our previsions, thus less likely to happen in our view, and represent the upside risks in the valuation related to our base case. On the other hand, on the pessimistic view, we consider the downside risks of our valuation. We will thoroughly go through every variable in which we considered different scenarios.

Firstly, we incorporate chip shortage in our scenario analysis, both for Automotive and Motorcycle BUs. With less cars produced, number of deliveries will also be reduced, on a 1-to-1 scale, according to our model's assumptions, which will ultimately impact revenues. As there is uncertainty in the resolution of demand pressure for chips, incorporated this in our analysis So, in 2021 we assumed the +2.2% impact on all scenarios for 2021, with the return to the normal (end of effect on production) in 2023, 2024 and 2025 in the optimistic, base and pessimistic scenario, respectively. A smooth decrease in the chip shortage effect from the beginning to the end of the periods was assumed in all cases.

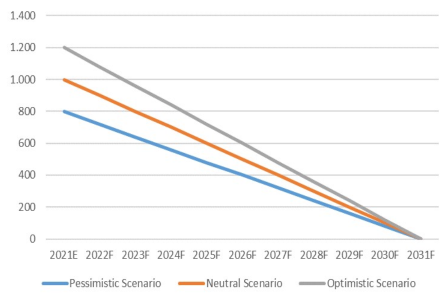


Graph 55 – 3 Chip Shortage Scenarios impact of global deliveries
Source: Analyst calculations

Firstly, in the cash conversion cycle (CCC), we analyse the time (in days) that the company takes to convert cash into inventory, then into sales, and finally into cash again. Ideally, the lower value the better, as it implies the working capital is not tied up for long. We decompose this metric into collection period, holding period and payable period for the Automotive and Motorcycle BUs, and the collection period for the Financial Services BU, and use each one to forecast trade receivables, inventories and trade payables, respectively. The firm's liquidity and working capital management is crucial in driving operational performance and varies accordingly with economic shocks to the vertical supply chains of any business. Henceforth, we believe that a scenario analysis incorporating these variables adds value to the prediction by broadening the possible outcomes. In the base case, we forecasted each driver based on the average of the past seven years. Relatively to our base case, for this optimistic scenario we assumed the lowest verified collection and holding period and highest payable period in the last seven years. Alternatively, in the pessimistic scenario, we assume a higher CCC, thus the highest collection and holding periods and lowest payable period in our historical period.

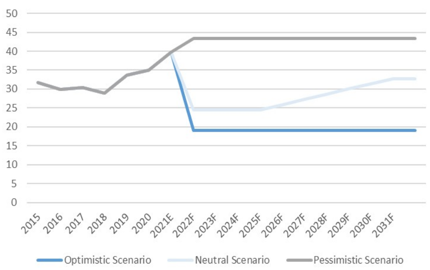
Graph 56 – 3 CCC Scenarios from 2015 to 2031
Source: Analyst calculations

After this, in the Automotive BU, we integrated three scenarios for subsidies, as this is a very important topic to consider in margins' calculations, and also because it is a totally exogenous variable, solely dependent on government decisions and political orientations, thus it can vary widely. The margins in the Motorcycle BU were calculated differently. As there is little information on the future of subsidies to be paid to automakers, and they are very dependent not only on the region but also on the macro-economic situation, we based our predictions on research papers. For our pessimistic case, we assume 800 euros in subsidies are distributed, whereas in the optimistic scenario, we start with a total subsidy of 1,200 euros per EV sold, and gradually decrease this number until the end of the forecasted period, in line with the base case rationale.



Graph 57 – 3 Subsidy Scenarios per car delivered, in €, from 2015 to 2031
Source: Analyst calculations

Finally, we constructed a 3-case scenario for the Capex, assuming a sceptical position in regard to the levels BMW forecasts to be sufficient in order to drive growth, and derive a critical insight from the change to this variable. Note that we just varied the PPE portion of the Capex only, not total values. In our base scenario, we imply a PPE Capex-to-total sales ratio of 4.8% in 2021, maintaining this proportion until 2031. As we believe the industry is facing a crucial era in disputing market share in the EV market, we assume BMW to invest accordingly to its published target ratio in the annual reports. Therefore, we expect an aggressive move in terms of Capex by BMW (as well as of other players). Our pessimistic scenario implies that for the same results, BMW will need extra investments as return of investments would not be promising (5.3%), and our optimistic scenario assumes that for that result, BMW would not need to invest as much as in the base case (4.3%), for the period until 2031.



Graph 58 – 3 CAPEX scenarios from 2015 to 2031
Source: Analyst calculations

Share Price		g				
		-0,50%	-0,25%	0,00%	0,25%	0,50%
COST OF CAPITAL	-0,50%	87,12	91,67	96,63	102,05	108,01
	-0,25%	80,39	84,51	88,98	93,85	99,17
	0,00%	74,16	77,91	81,95	86,34	91,12
	0,25%	68,39	71,80	75,47	79,44	83,75
	0,50%	63,02	66,13	69,48	73,08	76,98

Table 4 – Sensitivity analysis
Source: Analyst calculations

Sensitivity Analysis

We performed a sensitivity analysis with the objective of measuring the impact of the terminal growth rate (*g*) and discount rate (*r*) in the share price. We calculated this variation for the group and for each segment specifically. We varied *g* and *r* using a delta of 0.25%. Note that for the automotive BU, variations in *r* and *g* led to variations of share price of that BU2 between -23.1% and +31.8%. Also, in the share price by BU, we understand that the Automotive and Motorcycle Segments are the main drivers of total share price, especially the Automotive Unit.

Multiples

We triangulate our forecasted price with a multiple analysis of the Groups peers. However, the results were of little help to the analysis, as many resulted in unrealistically wide intervals of valuation metrics. We attribute this to partially the covid crisis, which heavily depressed valuations, disrupting the continuous relation between earnings and Enterprise Value of firms and the sharp recovery that ensued, exacerbating earnings and valuation metrics, that lead several indices, including the S&P 500, to reach all time high levels of P/E, comparable only to the levels witnessed in the late 90´s - early 20´s boom (Bloomberg, 2021). On the other hand, we also note that the sector is itself stretched when it comes to valuation metrics, with firms with forward P/E ratios of 279x (Li Auto) and 99x (Tesla). Although we recognize that growths are not totally comparable between firms, they are still direct competitors and thus we do not totally exclude them from the analysis. The Price-to-Earnings ratio presents the best results, with forward looking metrics best positioned for analysis, since trailing 12-months earnings is heavily biased by the sudden reopening of the economy and full depletion of full inventories. Results are broadly in line with our valuation, but still reflect a wide interval for the valuation. We take this as complementary, but the most important take-in is how stretched valuations in the industry are.

Graph 59 – Forward Looking P/E Multiples Analysis
Source: Bloomberg, Analyst calculations

Final Recommendation

Taking every aspect concerning our evaluation into account, we reached our final target share price of 81.51€. We believe BMW's fast recovery after Covid-19 will be followed on the one hand by the reinforcement of its European foothold, but on the other by the struggle in other key markets, such as China and the US. Moreover, our case of the brand's incompliance with CO_2 emissions in the short term aligned with EV margins slow-paced growth don't ease profitability increases. Therefore, our recommendation to investors is that they HOLD shares of BMW Group. For these reasons, and the ones we covered throughout the report, which were reaffirmed by the multiples analysis, that confirmed our recommendation, we predict an annualized return on the stock of +5.1%.

Appendix

Income Statement Consolidated

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
Revenues	104.210	98.990	102.460	109.423	112.836	114.161	117.658	120.492	122.970	125.085	126.900	128.508	130.028
Cost of Sales	86.147	85.408	84.145	90.437	93.208	94.041	96.434	98.681	100.598	102.199	103.558	104.784	106.002
Gross Profit	**18.063**	**13.582**	**18.315**	**18.986**	**19.627**	**20.120**	**21.224**	**21.811**	**22.372**	**22.887**	**23.342**	**23.724**	**24.026**
Selling and administrative expenses	9.367	8.795	9.845	10.522	10.849	10.981	11.324	11.600	11.845	12.056	12.238	12.396	12.543
Other Operating Income	1.031	916	820	820	820	820	820	820	820	820	820	820	820
Other Operating Expenses	-2.316	-873	-2.481	-1.413	-1.001	-813	-746	-459	-890	-1.111	-1.261	-1.367	-1.337
Profit/loss before financial result	**7.411**	**4.830**	**6.809**	**7.872**	**8.598**	**9.147**	**9.974**	**10.573**	**10.457**	**10.540**	**10.664**	**10.782**	**10.966**
Financial Result	-293	392	671	894	637	658	682	687	808	810	783	771	811
Profit/loss before tax	**7.118**	**5.222**	**7.480**	**8.766**	**9.235**	**9.805**	**10.657**	**11.259**	**11.264**	**11.350**	**11.446**	**11.553**	**11.777**
Income taxes	-2.140	-1.365	-1.960	-2.347	-2.489	-2.650	-2.883	-3.056	-3.045	-3.059	-3.078	-3.102	-3.165
Profit/loss from continuing operations	**4.978**	**3.857**	**5.520**	**6.418**	**6.746**	**7.155**	**7.774**	**8.203**	**8.220**	**8.291**	**8.368**	**8.451**	**8.612**
Loss from discontinuing operations	44	0	0	0	0	0	0	0	0	0	0	0	0
Net Profit / loss	**5.022**	**3.857**	**5.520**	**6.418**	**6.746**	**7.155**	**7.774**	**8.203**	**8.220**	**8.291**	**8.368**	**8.451**	**8.612**

Balance Sheet Consolidated

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
ASSETS													
Intangible assets	11.729	12.342	12.779	13.354	13.965	14.532	15.059	15.570	16.091	16.612	17.149	17.737	18.298
Property, Plant and Equipment	23.245	21.850	23.030	24.450	25.852	27.128	28.390	29.587	30.670	31.604	32.380	33.030	33.592
Leased products	42.609	41.995	40.219	43.046	44.353	44.831	46.207	47.301	48.252	49.057	49.740	50.339	50.901
Investments accounted for using the equity method	3.199	3.585	3.485	6.152	6.912	7.704	8.521	9.366	10.233	11.119	12.021	12.936	13.871
Other investments	703	735	624	624	624	624	624	624	624	624	624	624	624
Receivables from sales financing	92.437	84.277	85.358	90.088	93.593	96.480	100.262	103.913	107.561	111.208	114.882	118.620	122.471
Financial assets	7.325	7.752	8.547	8.547	8.547	8.547	8.547	8.547	8.547	8.547	8.547	8.547	8.547
Deferred tax	2.194	2.459	2.276	2.431	2.507	2.535	2.324	2.379	2.428	2.470	2.505	2.537	2.567
Other assets	12.939	10.326	10.202	10.236	9.887	10.023	10.306	10.560	10.780	10.968	11.129	11.271	11.404
Inventories	15.891	14.896	12.912	13.894	16.240	16.384	16.808	17.199	17.532	17.808	18.041	18.249	18.453
Trade receivables	2.518	2.298	2.694	2.878	2.968	3.007	3.101	3.178	3.245	3.303	3.352	3.396	3.437
Current tax	1.209	606	1.943	1.997	2.065	2.123	2.254	2.317	2.378	2.435	2.485	2.527	2.559
Cash and cash equivalents	12.036	13.537	4.349	4.635	4.784	4.844	4.991	5.114	5.222	5.315	5.396	5.469	5.538
Assets held for sale	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS	**228.034**	**216.658**	**208.419**	**222.332**	**232.296**	**238.761**	**247.393**	**255.655**	**263.563**	**271.069**	**278.250**	**285.281**	**292.262**
EQUITY AND LIABILITIES													
Equity attributable to shareholders of BMW	59.324	60.891	63.321	68.145	73.011	78.015	83.368	88.991	94.534	100.099	105.759	111.462	117.447
Minority interest	583	629	676	734	794	857	923	993	1.062	1.132	1.202	1.274	1.348
Equity	**59.907**	**61.520**	**63.997**	**68.879**	**73.805**	**78.872**	**84.291**	**89.983**	**95.596**	**101.230**	**106.962**	**112.736**	**118.795**
Pension provisions	3.335	3.693	3.183	3.215	3.319	3.428	3.539	3.655	3.769	3.886	4.008	4.133	4.262
Other provisions	13.209	13.982	14.015	14.994	15.449	15.611	13.855	14.180	14.461	14.699	14.900	15.076	15.241
Deferred tax	632	509	-161	-192	-189	-179	300	314	328	343	357	372	387
Financial liabilities	116.740	106.376	94.096	97.512	97.043	98.566	101.166	102.553	103.770	104.755	105.455	106.037	106.290
Other liabilities	23.066	21.187	22.393	26.513	31.140	30.636	32.132	32.601	33.047	33.380	33.636	33.854	34.076
Current tax	963	747	1.202	988	989	989	990	990	991	991	992	992	992
Trade payables	10.182	8.644	9.694	10.423	10.740	10.838	11.119	11.379	11.600	11.785	11.941	12.081	12.219
Liabilities in conjunction with assets for sale	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Provisions and Liabilities	**168.127**	**155.138**	**144.423**	**153.453**	**158.491**	**159.889**	**163.102**	**165.672**	**167.967**	**169.839**	**171.288**	**172.545**	**173.468**
TOTAL EQUITY AND LIABILITIES	**228.034**	**216.658**	**208.419**	**222.332**	**232.296**	**238.761**	**247.393**	**255.655**	**263.563**	**271.069**	**278.250**	**285.281**	**292.262**

FCF Map Automotive

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
Noplat Automotive	4.064	1.479	4.442	4.331	4.496	4.726	5.219	5.392	5.573	5.752	5.914	6.042	6.123
Gross Cash Flow Automotive	9.912	7.447	10.451	10.630	11.119	11.658	12.423	12.905	13.386	13.879	14.326	14.654	14.962
Operating Current Assets	52.958	51.076	48.418	46.971	45.544	45.981	47.348	48.433	49.368	50.150	50.807	51.381	51.923
Operating Current Liabilities	51.382	49.692	49.828	47.503	44.171	44.568	43.607	44.582	45.418	46.115	46.700	47.211	47.699
Operating Working Capital Automotive	1.576	1.384	-1.409	-532	1.373	1.413	3.740	3.851	3.950	4.035	4.107	4.170	4.224
Change in operating working capital	1.389	-192	-2.793	878	1.904	40	2.327	111	99	85	73	62	54
Net CAPEX	7.489	2.779	5.332	5.719	5.908	5.982	6.176	6.334	6.471	6.589	6.690	6.779	6.864
Investment in Intangible Assets	2.475	2.408	2.284	2.521	2.672	2.742	2.768	2.842	2.901	2.952	2.995	3.032	3.064
Investment in Leased Products	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Other Operating Assets	-3.052	654	2.003	-610	-279	-94	-291	-229	-198	-166	-139	-122	-114
Gross Investment Automotive	-8.301	-5.649	-6.826	-8.507	-10.206	-8.670	-10.981	-9.057	-9.273	-9.460	-9.618	-9.752	-9.868
Core FCF Automotive	1.611	1.797	3.626	2.123	913	2.988	1.443	3.847	4.113	4.419	4.708	4.902	5.095

Flows to Equity Brilliance JV

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
NOPLAT BRILLIANCE	446	259	560	731	555	578	596	617	634	648	660	670	679
GROSS CASH FLOW	446	259	560	731	555	578	596	617	634	648	660	670	679
INV	-379	924	-100	2.667	760	792	817	845	867	886	902	916	934
	825	-665	660	-1.936	-206	-213	-221	-228	-233	-238	-242	-245	-255
Net Income	1.947	2.560	2.227	2.027	2.114	2.181	2.256	2.317	2.369	2.414	2.451	2.482	2.512
Depreciation and Amortization	651	707	995	908	947	978	1.012	1.039	1.063	1.084	1.101	1.116	1.129
Gross Cash Flow	2.598	3.267	3.222	2.935	3.061	3.158	3.268	3.356	3.433	3.497	3.551	3.598	3.641
Change of Non-Current Assets	-534	-44	-3.140	-2.442	-2.108	-1.721	-1.311	-1.347	-1.378	-1.405	-1.427	-1.446	-1.464
Change of Current Assets	-811	-278	-1.926	585	-264	-203	-228	-184	-160	-136	-114	-99	-92
Change in Provisions	-1.156	-853	-2.912	1.068	-481	-370	-416	-336	-292	-248	-208	-180	-167
Change in Excess Cash	-83	2.160	-1.434	-2.101	-718	-372	82	37	11	-15	-38	-55	-55
Change in Financial Liabilities	822	-426	231	79	105	85	69	68	68	68	68	68	69
Cash Flow to Equity	836	3.826	-5.958	124	-404	577	1.462	1.593	1.681	1.762	1.832	1.886	1.932

FCF Map Motorcycle

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
Noplat Motorcycle	134	71	155	160	166	173	179	185	190	195	199	202	205
Depreciation of PPE	74	78	82	85	90	93	98	102	107	112	117	121	125
Depreciation of Leased Products	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Amortisation	20	24	15	16	17	17	18	19	19	19	20	20	20
Gross Cash Flow Motorcycle	227	172	252	261	272	284	294	305	316	326	336	343	350
Operating Current Assets	877	913	814	851	893	941	987	1.033	1.077	1.118	1.158	1.194	1.228
Operating Current Liabilities	701	797	760	743	726	670	704	736	767	796	824	850	874
Operating Working Capital Motorcycle	176	116	55	108	167	270	284	297	310	322	333	344	354
Change in operating working capital	63	-60	-61	54	59	103	14	13	13	12	11	11	10
Net CAPEX	82	72	104	112	115	117	121	124	127	129	131	133	135
Investment in Intangible Assets	52	52	20	23	24	25	25	25	26	26	26	27	27
Investment in Leased Products	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Other Operating Assets	-71	51	-67	-28	-32	-36	-35	-34	-33	-31	-29	-27	-25
Gross Investment Motorcycle	-125	-115	4	-160	-167	-209	-124	-128	-132	-136	-140	-144	-147
Core FCF Motorcycle	102	58	256	101	105	75	171	177	184	190	196	199	203

Flow to Equity Financial Services

in € million	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F
NOPLAT	1.600	1.269	1.572	1.676	1.734	1.761	1.818	1.868	1.912	1.951	1.985	2.017	2.047
Depreciation of PPE	16	15	9	9	10	10	11	11	12	12	13	13	13
Depreciation of Leased Products	11.066	11.981	8.732	9.345	9.629	9.733	10.032	10.269	10.476	10.650	10.799	10.929	11.051
Total Amortisation	60	58	87	92	98	103	106	110	112	115	116	116	118
Gross Cash Flow	12.742	13.323	10.400	11.123	11.471	11.608	11.967	12.258	12.511	12.728	12.913	13.074	13.230
Operating Current Assets	49.583	46.049	44.170	47.210	48.671	49.229	50.739	51.959	53.025	53.933	54.712	55.401	56.051
Operating Current Liabilities	52.255	43.641	47.535	50.641	52.164	52.682	54.269	55.520	56.601	57.509	58.274	58.942	59.570
Operating Working Capital	-2.672	2.408	-3.365	-3.431	-3.493	-3.453	-3.530	-3.561	-3.577	-3.576	-3.562	-3.541	-3.519
Change in operating working capital	-3.753	5.080	-5.773	-66	-62	40	-77	-31	-16	1	14	21	23
Net CAPEX	75	4	-21	12	13	13	13	14	14	14	14	14	15
Investment in Intangible Assets	46	46	101	110	116	120	122	126	128	131	133	134	135
Investment in Leased Products	15.300	10.392	7.724	12.701	11.181	10.301	11.665	11.567	11.605	11.606	11.609	11.640	11.719
Change in Other Operating Assets	-40	-6.330	3.235	-479	1.115	2.020	1.257	1.652	1.911	2.179	2.430	2.650	2.831
Change in investments	-315	-356	709	0	0	0	0	0	0	0	0	0	0
Gross Investment	-11.313	-8.836	-5.974	-12.279	-12.363	-12.495	-12.981	-13.327	-13.642	-13.931	-14.200	-14.459	-14.722
Free Cash Flow	1.429	4.487	4.426	-1.156	-892	-887	-1.014	-1.069	-1.130	-1.203	-1.288	-1.385	-1.492
Change in Debt	231	-2.198	-1.878	2.091	2.029	2.105	2.211	2.234	2.423	2.575	2.667	2.826	2.830
Change in Equtiy Equivelents	-799	-1.030	-50	138	79	35	76	65	58	51	45	41	40
Flows to equity holders	861	1.259	2.498	1.073	1.216	1.253	1.272	1.230	1.351	1.423	1.424	1.482	1.377

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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