

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

AUTOMOTIVE EQUITY RESEARCH REPORT
BMW GROUP AG

FRANCISCO LEBRE PEREIRA - 44145

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

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Abstract

This Equity Research report examines BMW Group's position as one of the leading premium automakers with the main goal of assessing whether investors should buy, hold, or sell BMW's shares. Upon analyzing the potential impacts from future trends and current business risks on BMW's core operations, our valuation yields a price target of €91.35 for 2022, resulting in a return of 5.32% and thus, a HOLD recommendation.

Keywords (up to four)

BMW Group, Automotive, Valuation, Equity Research

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This report is part of the ... report (annexed) and should be read as an integral part of it.

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Executive Summary

The purpose of this research consists of determining the BMW Group's current enterprise value, projecting its future performance, and making recommendations on possible investment methods to take advantage of the company's current stock price. The automobile sector is likely to experience a significant shift in the future years, both due to recent technological developments and to growing awareness of the need for sustainable practices. Business risks, such as supply chain and environmental hazards, as well as sector trends, such as autonomous driving, connection, electrification, and shared mobility (ACES), will undoubtedly affect the company.

BMW sold 2.53 million automobiles in 2021, which represents an increase of 8.61% over the number delivered in 2020. This was predictable, as the pandemic and the subsequent social distancing measures had a detrimental influence on consumer spending and thus on the demand for new vehicles in 2020. Nonetheless, the company had a strong performance in terms of the number of vehicles supplied and automotive sales since 2015, reaching a total revenues CAGR of 1.99%. According to our projections, worldwide car demand will increase annually by 1% to 2% until 2030, implying that the company's performance will improve every year. This is primarily due to the global economy's recovery from COVID-19 and the growing popularity of electric vehicles. BMW estimates that by 2030, electric vehicles will account for half of the company's total vehicle deliveries.

From 2022 to 2030, China's demand for passenger cars is expected to increase at the fastest rate (0.57% CAGR). BMW's profitability should also improve in the future years, as expenses connected with BEV production will decrease due to declining battery costs. As the cost of manufacturing BEVs falls and the sustainability trend rises, demand for BEVs is expected to rise through 2030, boosting BMW's profit margins. The EBIT margin is expected to be between 8.5% and 10.5% until 2030. Regarding BMW's industrial segment, we project the long-term growth rate to be 0.75%, and the WACC to be 3.80%. The segment's ROIC and RONIC is forecasted to be around 10.13% and 5.67% in 2030, respectively. Its Financial Services segment is expected to have a terminal growth rate of 0.75% and a Cost of Equity of 8.43%, while its ROIC is expected to be 13% in 2030.

The forecasted share price of BMW AG for December 2022 is €91.35, which will yield a shareholder return of 5.32%, as the current share price is €89.11.

Company Overview

Company Description

The beginnings of BMW can be traced back to 1916 with the merger of an aircraft manufacturer named Flugmaschinenfabrik Gustav Otto into Bayerische Flugzeug-Werke AG (BFW AG). In 1917, the Rapp Motorenwerke company became Bayerische Motoren Werke GmbH, which was converted into a public limited company (an AG) in 1918. BMW AG's engine construction operations, together with the company and brand name, were transferred to BFW AG in 1922. Following a post-war ban on the production of aero-engines, BMW was forced to shift its focus elsewhere, with its first venture in road mobility being announced in 1923, with the development

of the R32 motorcycle. BMW only became an **automobile manufacturer in 1928** with the purchase of the company known as Fahrzeugfabrik Eisenach.

Currently, BMW Group is one of the most successful companies in the premium mobility segment through three of the most well-known brands in the industry: **BMW, Rolls-Royce, and MINI**. The Group's business is segmented into three main business units: **Automotive, Motorcycles, and Financial Services**. The Other Entities segment accounts for the Group's holding and financing companies while the Eliminations segment is used to allocate inter-segment transactions.

Business Units

The Group segments its business across three main areas: **Automotive, Motorcycles, and Financial Services**. In addition to these segments, there is also the Other Entities segment, which comprises the Group's holding and financing companies. In 2021, the segment is estimated to generate total revenue of around €77 billion, representing almost 70% of the Group's total revenue. The European market is the main target for BMW's automotive segment, more specifically Germany and the United Kingdom, with more than half of the total units delivered going into this market. We expect this to change in the future due to the recent sales growth in the Chinese market that is expected to continue. Additionally, the growing EV market in which BMW is strongly investing, planning to have BEVs available for 90% of the current line-up by 2023, will drive revenues in the coming years. While EV sales are characterized by their lower margins due to higher production costs when compared to ICE models, they will provide the Group with a new market opportunity and generate revenue in otherwise saturated markets.

The motorcycles segment includes the BMW Motorrad brand, which specializes in the premium motorcycles segment. It is expected to generate a small amount of the Group's revenue in 2021 (approximately €3 billion), accounting for almost 3% of the company's total revenue. The European market is once again the main source of demand, in this case for motorcycles, representing practically half of the segment's deliveries. We expect the Group's market share to remain stable in our forecast, as BMW Motorrad is the leading manufacturer of premium motorcycles.

The financial services segment comprises leasing and credit financing operations, insurance, and banking products. This is a crucial segment for the BMW Group, accounting for almost 28% of total revenue in 2021. The sources of revenue for this segment are income from lease instalments, interest payments on loan financing and finance leases, and from the sales of previously leased products to customers. We forecast that BMW will have a total of 5,619,868 contracts under management at the end of 2021, along with a penetration rate of 50.70%, generating a total revenue of around €30 billion. We estimate that the penetration rate will grow slightly in the coming years due to rising prices and the increasing demand for car-sharing and car rental services.

Supervisory Board & Management Board

BMW's corporate governance is based on the European model (also known as Continental or German model), in which there is a Supervisory Board and a Management Board. The Supervisory Board is elected by the General Meeting of Shareholders (10 members) and the

employees (10 members), under the German Co-determination Act (*Mitbestimmungsgesetz*). It controls the Management Board, which in turn manages the corporation, and its chairman is DR. Norbert Reithofer. As for the Management Board, it is formed by 7 members, and in 2019 it suffered considerable changes, as Oliver Zipse was appointed as the new chairman and 3 new members joined the Board.

Shareholder Structure

According to its Half-Year 2021 Report, as of 30 June 2021, the number of shares of common stock issued by BMW AG is 601,995,196 shares (each share at a par value of 1€). As for the preferred stock, 57,689,304 shares were outstanding (each share at a par value of 1€) on that same date. After the death of Herbert Quandt in 1982, majority owner at the time, his holdings of BMW AG stock were split by two of his direct descendants: Stefan Quandt and Susanne Klatten. Stefan Quandt is a Deputy Chairman of the Supervisory Board of BMW AG and the major individual stakeholder of BMW AG, with a total holding of 25.8%, which is split between a 0.2% personal holding and a 25.6% holding through controlled companies whose voting rights are attributed to himself. Susanne Klatten is the second-largest individual shareholder, with a total equity stake of 20.9%. The remaining equity stake is publicly traded and represents 53.2% of total shares outstanding (Free-Float). Furthermore, when it comes to geographical distribution, institutional equity investors are majorly from Europe (53.3%) and North America (40%), while Asia and other regions represent a small fraction (4.8% and 1.9%, respectively).

Macroeconomic outlook & Market analysis

Global Outlook

Global real GDP grew at a generally steady rate until the end of 2019, shortly before the Covid-19 epidemic, then it fell by 3.10% in 2020. By 2021, the IMF expects real GDP growth to rebound to its highest level since 2015 (5.90%), which is realistic given the expectation of at least a partial global recovery from the recent crisis. Real GDP is predicted to continue expanding, but at a slower rate, from 2022 to 2030, before stabilizing in 2025. Inflation in the world followed a similar path to that of real GDP growth, remaining constant until 2019. There was no deflation in 2020, but inflation was lower than the year before (2.70% and 3.80%, respectively). It is predicted to be substantially higher in 2021 (4.80%), because of the increase in real GDP, and then gradually decrease until 2030 (3%). The automobile industry is vulnerable to these shifts, and it was no different in 2018 and 2019, as Real GDP growth slowed, and passenger car sales fell (-3.86% in 2018 and -12.35% in 2019). Passenger car sales decreased by 16.42% in 2020, as Real GDP declined. Surprisingly, electric vehicle sales climbed in 2020, a watershed year for the industry. According to Statista, passenger car sales will recover in 2021 (a 23.38 percent gain), then steady between 1% and 2% growth from 2026 to 2030, as inflation and Real GDP growth stabilize. These considerations result in a 0.23% CAGR in passenger car sales from 2022 to 2030.

United States of America

Unlike the rest of the world, USA's Real GDP growth increased from 2017 to 2018 (2.30% to 2.90%), but in 2019 it eventually went down to 2.30% again. Due to the pandemic, the USA saw its Real GDP decreasing more than what was registered worldwide (3.40% and 3.10%, respectively), but the IMF expects it to recover faster in 2021, with a 6.00% forecasted growth against the 5.00% worldwide. This situation is also expected in 2022, but from 2023 until 2030, this tendency inverts, as the forecasts suggest that the Global Real GDP will increase at a higher pace than the USA's. From 2015 to 2019, the USA's inflation rate was higher than the Real GDP growth rate, but such a phenomenon did not occur in 2020 and 2022. The IMF and the Federal Reserve estimate that, from 2022 to the end of the decade, the inflation rate will be higher than the real GDP growth rate. Such prediction is based on the progress on vaccinations and the fact that the supply chain constraints are easing, which will contribute to Real GDP Growth and a reduction in inflation in the long term. The US automotive industry suffered a heavy impact in 2020, but passenger car sales had been declining since 2017. Manufacturers should not expect their sales to reach pre-covid levels any time soon, as car prices continue to rise along with inflation, and the trend will persist as a \$1.2 trillion infrastructure bill was recently announced. The EV industry can expect a \$7.5 billion injection whose purpose is to develop a nationwide network of EV charging stations, thus promoting the acceptance of electric vehicles in years up to 2030. All these factors will contribute to an estimated USA Passenger Car Sales CAGR, between 2022 and 2030, of -0.27%.

Europe

Due to the implementation of harsher, longer-duration Covid-19 restrictions, Europe's economy suffered the most significant hit out of all the continents in 2020. Europe's real GDP declined by 5.60% in 2020, and the IMF expects it to be one of the slowest to recover in 2021 (5.10%), falling behind both the Chinese and USA's economies have better growth prospects. Europe's economic growth will only surpass the US's in 2024 (1.90% and 1.70%, respectively), and from then until the end of the decade, the IMF expects both economies to grow at approximately the same rate (1.70% per year). However, the International Monetary Fund does not expect Europe's real GDP growth to surpass or even match China's during that same period. The European inflation rate has presented a relatively similar evolution to the continent's real GDP growth, as when the latter increased, so did inflation. It varied from 1.50% to 3% from 2015 to 2019, then fell to 1.10% in 2020, before rising to 3% by the end of 2021, according to the IMF. Nonetheless, European inflation is predicted to remain stable at roughly 2% until 2030. Its automotive industry has been in a modest downturn since 2018, but 2020 proved to be the most difficult year since 2015, with passenger car sales falling 19.39%. On the other hand, the industry is likely to rebound at a considerably faster rate than the rest of the world (13.2 9% growth in passenger car sales in 2021). One of the key reasons for this is that Europe, like China, is a market whose consumers' preferences are linked with the adoption of electric mobility, which, as previously noted, had its best year ever in terms of car sales in 2020, and this trend is expected to continue. As a result, the increase in EV sales will help the European car industry recover. Furthermore, in response to the pandemic's detrimental effects on the automotive sector, European governments introduced several long-term subsidies for electric vehicle sales, enticing consumers to purchase this type of vehicle. These efforts were taken in favour of the old continent's continued rise in the integration

of electric vehicles. Taking into account all the aforementioned considerations, the predicted CAGR for European passenger car sales from 2022 to 2030 is -0.34%.

Germany

Since the financial crisis of 2008, the German economy has been steadily expanding, with a growth of 2.7% in 2017. However, in 2019, it was on the verge of entering a recession and was anticipated to remain stagnant as exports fell and trade tensions between the US and China rose. This conflict was devastating to the manufacturing sector because both nations are significant markets for the German car industry and other manufacturing industries. The United States imposed taxes on imports of European steel and aluminium, and trade tensions *harmed China's economy, resulting in a drop in German exports. The economy was kept stable due to strong private spending, low unemployment, and accessible credit. However, its recent record of stability was unable to withstand the pandemic of 2020. The country's real GDP fell by 4.60%, more than the United States and China, but still less than Europe's decline. Nonetheless, researchers at the International Monetary Fund forecast that the economy would recover 3.1% in 2021, 4.6% in 2022, and stabilize by 2025 until 2030. Germany's inflation has consistently been stable, never exceeding 2% from 2015 to 2021. (IMF Forecast). It dropped to 0.4% in 2020, rising to 2.9% in 2021 before dropping to pre-covid levels by 2022. The impact in passenger car sales was higher than what was experienced in UK, USA, Europe, and China, declining by 22.68%. However, it is expected to stabilize in the following years, as from 2022 until 2030, Germany's Passenger Car Sales CAGR is expected to be -0.45%.

United Kingdom

The United Kingdom was prospering after the 2008 financial crisis, but in June 2016 the UK voted in a referendum to abandon the EU. The decision impacted the following year's growth (1.70%), as inflation rose considerably from 0.70% to 2.70%, decreasing private consumption. Furthermore, the political and economic uncertainty relating to the outcome of the negotiations between the UK and EU resulted in business investments being delayed. But 2018 was not a good year, as the economy only grew by 1.30%, the slowest growth since 2012. Inflation remained high at 2.50%, declining in the following two years. The year 2020 was particularly tough on the UK's economy, as it recessed by 9.80%, more than double the impact in the Great Recession. Having suffered one of the worst impacts, the IMF expects it to recover particularly fast, as forecasts point to a 6.80% growth in Real GDP, along with an expectable rise in inflation in comparison to 2020 (0.90% to 2.20%). The following year should be a positive one for the country, as the IMF expects the UK's real GDP to keep growing at a high pace (5%) and stabilize around the 1.50% mark from 2022 until 2030. The UK's automotive industry has been declining since 2017 until 2020, seeing its passenger car sales diminish by more than 7% from 2017 to 2018. However, the industry took the biggest hit in 2020, mainly due to the pandemic, as passenger car sales decreased by -20.64%. Nonetheless, it is expected that the UK's automotive industry recovers rapidly in 2021 and that around 1.63 million passenger cars are sold (21.37% increase from 2020). Passenger car sales in the UK are expected to keep growing until the end of the decade, but never reaching pre-2017 levels, as it is expected that, in 2030, 2.2 million units are sold. A UK's Passenger Car Sales CAGR of -0.17%, from 2022 to 2030, is forecasted by Statista.

China

The Chinese economy was growing at an increasing pace since the early 2000s, only slowing down from the 2008 Great Recession (9.70% Real GDP growth in 2008) onwards. Since 2015, its growth had been declining, mainly due to the trade war with the USA. However, it remained higher than in other major economies, such as the US and the EU. Growth slowed down considerably in 2020 (from 6% to 2.30%), as China was the epicentre of Covid-19. The IMF estimates that the economy will recover rapidly in 2021, but the figures won't be as good as they could be. China's zero-Covid policy contributed to an economic slowdown, impacting consumer spending. The Chinese President, Xi Jinping, intends to cut its economic reliance on the real estate sector (accounts for up to 25% of the country's GDP, including related industries) to reduce financial risks, by slowing the lending pace to the sector. The deterioration of China Evergrande Group's financial health is one of China's major problems, and heavily impacted the real estate industry, and thus the GDP growth. The outlook is not very positive, as an energy crisis is starting to hit the world, and China won't be safe from it. Natural gas, crude oil, and coal are the main commodities prices increased significantly and are leading to high inflation as energy-intensive metals like steel and silicon are seeing their prices being pushed up. The tendency is for inflation to increase in 2022 and stabilize at the 2% mark until the end of the decade. The soaring prices of such commodities are causing an electricity shortage throughout the world, and China's slower growth is putting at risk the exporters of inputs to the country's manufacturing sector. If the shortage of semiconductors and the cut in production of aluminium are considered, the automotive industry in China is being put under severe pressure. According to Statista, passenger car sales should rise by 12.55% in 2021 and 14.50% in 2022, stabilizing the growth rate from 2023 until 2030 between 1% and 2%, and having a CAGR, between 2022 and 2030, of 0.89%.

Mobility industry

Business risks

Supply chain risks

Several businesses have had to reduce output since the COVID-19 epidemic began, since chip manufacturing factories were forced to shut down. The semiconductor chip shortfall is anticipated to cost the global automobile sector roughly \$210 billion in 2021. According to most estimates, this problem will not be resolved until mid-2023 at the earliest. The BMW Group has been impacted as well, with production figures in 2021 being significantly lower than in previous years, and BMW recently stated that some models would no longer be able to be fitted with a touchscreen. BMW will only be able to recover to pre-shortage production levels by 2023 at the earliest, according to our estimates.

Another concern is the recent spike in raw material prices, which is particularly significant to EV manufacturers. Essential materials for the battery manufacturing process, like lithium, nickel, and cobalt, have seen considerable price increases in 2021, particularly after November. Lithium, for example, has seen a roughly 400% rise. Because battery prices account for between 20% to 40% of the entire car cost, this has a significant impact on automakers' profits in the manufacture of EVs. Due to the usage of financial derivative instruments, we anticipate BMW to be well protected against short-term fluctuations in raw material costs; but, if these difficulties persist beyond 2023,

BMW's margins are projected to suffer, particularly due to the shift in product mix to a greater percentage of BEV sales.

Environmental risks

OEMs face heavy fines for breaking regulatory measures, as well as the risk of alienating a significant portion of the market if they make no effort to reduce their environmental impact. Regulatory pressure from governments in major key markets, as well as consumer preference for sustainable products, pose a challenge for OEMs.

While the ongoing replacement of internal combustion engines with battery and fuel cell electric technologies will reduce vehicles' environmental footprint by eliminating CO₂ emissions due to the lack of exhaust emissions, BEVs may be more polluting than ICE counterparts due to the additional metal mining and processing required to produce batteries. To achieve environmental balance, OEMs must concentrate on reducing waste during manufacturing, increasing the use of recycled components, improving drivetrain efficiency, and collaborating with suppliers to enhance the environmental standards of those providing crucial raw materials.

As part of its commitment to reach climate neutrality before 2050, BMW Group will reduce its carbon emissions by at least one third over the entire life cycle, from the supply chain to the end-of-life phase. To hit this goal, BMW Group is expected to maintain its current levels of R&D investments and Capital Expenditure to expand and improve its electric mobility offerings and its manufacturing processes.

We also estimate that the electrification of all models will allow BMW Group to avoid fines related to the emissions of its new vehicles sold. The development of CO₂ emissions of new vehicles sold in the EU by BMW Group has been reducing at a high rate in the past years going from 127 g/km CO₂ in 2019 to 99 g/km CO₂ in 2020 and with the additional EV models that will be introduced in the coming years we expect this value to decrease even further.

Trends

Autonomous driving

The advancement in autonomous capabilities is one of the most significant changes expected to happen in the long-term horizon for the mobility industry. Within the SAE scale of driving automation, most solutions on the market feature either Level 1 technology or a more advanced Level 2 system where the car is allowed to manage speed and steering but requires that the driver is prepared to suddenly seize control. Full automation benefits are related to Level 5 automation where the vehicle can perform all driving functions no matter the surrounding conditions. The pursuit of autonomous driving technologies has huge significant upfront R&D expenses, having gathered the most investment out of all ACES trends, a total of \$106 billion since 2010. Even though there are optimistic estimates that Level 5 autonomous driving technology will be safe and reliable by 2025, additional testing for regulatory approval is expected to delay the launch of fully autonomous vehicles to at least 2030.

Together with Daimler AG, BMW Group AG is involved in a joint venture (THERE) dedicated to the development of the next generation of mobility, with the location-based services from the HERE joint venture providing the basis for new assistance systems with the end goal of

developing a fully automated driving technology. This partnership would create two main benefits for the participating companies, allowing for the high R&D costs associated with autonomous driving technologies to be split between them and would provide access to a higher pool of connected automobiles, generating valuable data for the R&D department. Currently this partnership has been put on hold after both BMW Group and Daimler concluded that the timing is not right due to the expense involved in creating a shared technology platform.

Even if this relationship were to continue at some point in the future, there are serious reservations about BMW's ability to gain a competitive edge in this new market. The fact that Tesla already has a significant advantage in terms of circulating cars with semi-autonomous capabilities, allowing it to advance more quickly in its research, the potential entry of big tech companies such as Apple, and the high upfront R&D costs are reasons to doubt whether BMW Group's pursuit of autonomous technologies will create value.

Connectivity

Connectivity services have significant potential regarding cost and revenue benefits to most players involved in the mobility industry such as OEMs, suppliers, dealers, insurers, automotive tech companies, etc.

The percentage of connected vehicles sold is predicted to rise significantly through 2030, reaching roughly 95% of all new vehicles sold. This rise, along with the fact that connected vehicles generate massive amounts of data (about 30 terabytes per day), presents OEMs with a potential to tap into a new income stream related to automotive data-enabled services. By 2030, this new sector is anticipated to be worth USD 450-750 billion, and OEMs will be able to earn revenue from automobile data in three different ways. The first is that connected automobiles enable the creation of recurring income streams by providing products, features, and services to customers throughout the vehicle life cycle. The second source of revenue is the selling of big data to other parties, as well as the use of automotive data to create targeted advertising for clients. The third and final value creation opportunity is connected to the possibility that automobile data may help OEMs reduce costs by improving R&D efficiency.

Regarding connectivity, we believe BMW Group is in a great position since they are expected to have the largest fleet capable of over-the-air upgrades among the competition at the end of 2021, with around 2.5 million connected vehicles in circulation. This will allow them to push their updates and services to a wider customer base through its ConnectedDrive and CarData brands where they offer a range of services and apps on offer to customers. We expect BMW Group to invest in improving its connectivity services to increase its recurring revenue throughout the vehicle's life cycle and counteract the decreasing margins from a change in the product mix. In addition to this, they also provide solutions for business partners, cities, and municipalities looking to make their mobility more efficient through their joint venture with Daimler AG under the name YOUR NOW, where they provide four different services through four different apps. With the REACH NOW and FREE NOW apps customers have access to a ride-hailing and trip planning service. SHARE NOW provides car-sharing services allowing customers to choose from a large selection of cars. CHARGE NOW develops and offers public charging stations for electric vehicles.

Electrification

The electrification of the car fleet occurring in current times and expected to intensify in the coming years will heavily change the automotive landscape. Changes in regulatory measures and consumer behaviour in the main automotive markets together with the advancement in EV technology have been the major drivers of EV adoption.

We assume that the European market will be the fastest to electrify due to strong regulatory pressure and positive consumer trends. The European Union has the strictest fleet emission targets set at 95g/km CO₂ from 2021 onwards. If breached, the automaker will be subject to a fine of 95€ per gram of CO₂ over the limit, multiplied by the number of cars sold in 2020 and 2021. Boosted EV subsidies from major European governments as part of the economic stimulus in the aftermath of the COVID-19 pandemic will also serve as a catalyst especially since electric vehicles are considerably more expensive due to battery costs that account for 30% of the manufacturing costs. The Chinese market is also expected to have a strong growth in electrification despite the elimination of EV subsidies after 2022 due to the government's dual-credit policy that encourages OEMs to add electric models to their portfolio and strong increase in consumer demand. In the United States, the 50% electrification target set for 2030 by the Biden administration together with the \$7.5 billion investment in charging infrastructure as part of the \$2 trillion infrastructure plan and more strict emission limits will increase EV adoption rates. However, the United States market will still be significantly behind the European and Chinese markets as these already have a considerable head start with an EV adoption rate in new car sales of around 10% and 5.7% respectively, while the United States is still at a 2% market share for EVs in 2020.

We estimate electric models to increasingly take a bigger share of BMW Group's sales throughout our forecast, going from a representation of 7% of total unit sales in 2022 to 50% in 2030. This change in product mix will impact not only influence the average prices set by BMW but also its gross margins.

Shared mobility

In the automobile business, the shared mobility industry has grown to be a considerable market. Improvements in connection and digitization have been the key enabling elements for services like e-hailing to emerge initially, followed by new forms of shared mobility like vehicle sharing and micro-mobility, mostly involving e-scooters. According to McKinsey, the shared mobility industry is presently estimated at \$130 billion to \$140 billion, with e-hailing accounting for around 90% of the market, followed by shared micro-mobility and car-sharing services, which account for less than 10% of the market. As new services such as Robo-taxis and shuttles join the market, the shared mobility industry is predicted to increase significantly by 2030, becoming three to four times larger and reaching a consumer spending potential of \$300 billion to \$500 billion.

While the increase in usage of shared mobility services will have a negative impact in the sales volume of private vehicles, we estimate that BMW Group will be able to offset this impact by increasing its sales volume in developing countries. We also believe that BMW Group will be able to capture some of the growth in this market increasing its revenue from connectivity services, especially in the e-hailing and car sharing sectors through their joint venture with Daimler AG under the name YOUR NOW. The two main services provided under this joint venture related to shared mobility is offered through their FREE NOW and REACH NOW apps which offer ride-hailing and trip planning service respectively and the SHARE NOW app related to car sharing where customers can choose a vehicle from a large selection of cars.

BAYERISCHE MOTOREN WERKE AG

AUTOMOTIVE INDUSTRY

FRANCISCO PEREIRA & VASCO MORAIS

COMPANY REPORT

17 DECEMBER 2021

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Leading the charge for sustainability

Declining margins as electrification ramps up

- Despite the economic uncertainty following the Covid-19 pandemic, BMW's sales are expected to have a strong recovery in the coming years and are estimated to reach 2.44 million units by 2030, having an associated CAGR of 0.54% between 2022 and 2030.
- The transition from ICE to electricity-based powertrains remains a focal point of BMW's strategy. By 2030, BEV models are estimated to account for 50% of BMW's automotive unit sales. This change in product mix will have an impact on the Group's profitability margins.
- High investments in R&D in conjunction with significant capital expenditures will be vital in assuring the successful transition into electric powertrains. Thus, we expect BMW to maintain its position as one of the leading manufacturers in the premium automotive market, despite the challenges posed by new competitors and traditional automakers.
- The acquisition of an additional 25% of the joint venture BMW Brilliance Automotive (BBA) means the Group will have a 75% stake and full control over it. This will strengthen BMW's position in the Chinese market, benefiting from lower production costs and exemption of import duties.

Company description

BMW AG is a German multinational manufacturer of luxury vehicles and motorcycles headquartered in Munich, Germany. With a workforce of 120,726 employees, 31 production facilities in over 15 countries, and a global sales network present in over 140 countries, the Group has a strong worldwide presence through three leading premium brands: BMW, Rolls-Royce, and MINI.

Recommendation: **HOLD**

Vs Previous Recommendation **HOLD**

Price Target FY22: **91.35 €**

Vs Previous Price Target **0.00 €**

Price (as of 20-Feb-2021) **89.11 €**

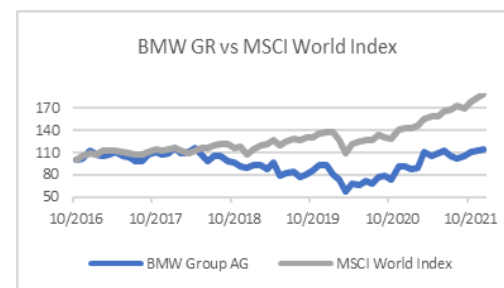
Bloomberg: BMW.GR

52-week range (€) 68.21-96.39

Market Cap (in million €) 57,716

Outstanding Shares (in million shares) 601.995

Source: Bloomberg



Source: Bloomberg

(Values in € millions)	2020	2021E	2022F
Revenues	98,99	110,30	111,73
Automotive Sales	1,722	1,856	1,884
Gross Margin (%)	13.72	19.63	19.01
Gross Profit	13,583	21,653	21,241
EBIT Margin (%)	4.88	12.51	10.46
EBIT	4,830	13,796	11,691
Net Income	3,857	12,792	10,875
EPS (in €)	6	21	18
P/E	12.6x	4.21x	4.93x
Core FCF	4,176	10,057	-6,386
Dividends per share (€)	1.90	2.50	2.50

Source: Analyst estimates

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Executive Summary

The purpose of this research consists of determining the BMW Group's current enterprise value, projecting its future performance, and making recommendations on possible investment methods to take advantage of the company's current stock price. The automotive industry is likely to experience a significant shift in the future years, both due to recent technological developments and to growing awareness of the need for sustainable practices. Business risks, such as supply chain and environmental hazards, as well as sector trends, such as autonomous driving, connection, electrification, and shared mobility (ACES), will undoubtedly affect the company.

BMW sold 2.53 million automobiles in 2021, which represents an increase of 8.61% over the number delivered in 2020. This was predictable, as the pandemic and the subsequent social distancing measures had a detrimental influence on consumer spending and thus on the demand for new vehicles in 2020. Nonetheless, the company had a strong performance in terms of the number of vehicles supplied since 2015, reaching a total revenues CAGR of 1.99%. According to our projections, worldwide car demand will increase annually by 1% to 2% until 2030, implying that the company's performance will improve on a yearly basis. This is primarily due to the global economy's recovery from COVID-19 and the growing popularity of electric vehicles. BMW estimates that by 2030, electric vehicles will account for half of the company's total vehicle deliveries.

From 2022 to 2030, China's demand for passenger cars is expected to increase at the fastest rate out of all of BMW's key markets (0.57% CAGR). BMW's profitability should also improve in the future years, as expenses connected with BEV production will decrease due to declining battery costs. As the manufacturing costs of BEVs fall and the sustainability trend rises, demand for BEVs is expected to rise through 2030, boosting BMW's profit margins. The EBIT margin is expected to be between 8.5% and 10.5% until 2030. Regarding BMW's industrial segment, we project the long-term growth rate to be 0.75%, and the WACC to be 3.80%. The segment's ROIC and RONIC is forecasted to be around 10.13% and 5.67% in 2030, respectively. Its Financial Services segment is expected to have a terminal growth rate of 0.75% and a Cost of Equity of 8.43%, while its ROIC is expected to be 13% in 2030.

The forecasted share price of BMW AG for December 2022 is €91.35, which will yield a shareholder return of 5.32%, as the current share price is €89.11.

Company Overview

Company Description

BMW AG only became an automobile manufacturer in 1928

The beginnings of BMW can be traced back to 1916 with the merger of an aircraft manufacturer named Flugmaschinenfabrik Gustav Otto into Bayerische Flugzeug-Werke AG (BFW AG). In 1917, the Rapp Motorenwerke company became Bayerische Motoren Werke GmbH, which was converted into a public limited company (an AG) in 1918. BMW AG's engine construction operations, together with the company and brand name, were transferred to BFW AG in 1922. Following a post-war ban on the production of aero-engines, BMW was forced to shift its focus elsewhere, with its first venture in road mobility being announced in 1923, with the development of the R32 motorcycle. BMW only became an **automobile manufacturer in 1928** with the purchase of the company known as Fahrzeugfabrik Eisenach.

Currently, BMW Group is one of the most successful companies in the premium mobility segment through three of the most well-known brands in the industry: **BMW, Rolls-Royce, and MINI**. The Group's business is segmented into three main business units: **Automotive, Motorcycles, and Financial Services**. The Other Entities segment accounts for the Group's holding and financing companies while the Eliminations segment is used to allocate inter-segment transactions.

Business Units

BMW Group Revenue by Region
(in million €)

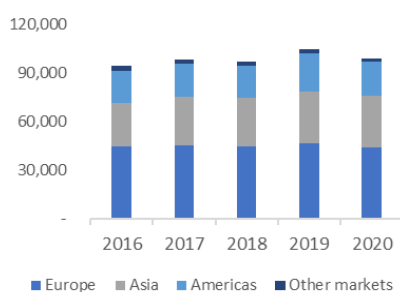


Figure 1: BMW Group revenues by region
Source: BMW Group annual reports

The Group segments its business across three main areas: **Automotive, Motorcycles, and Financial Services**. In addition to these segments, there is also the Other Entities segment, which comprises the Group's holding and financing companies. In 2021, the automotive segment is estimated to generate total revenue of around €77 billion, representing almost 70% of the Group's total revenue. The European market is the main source of revenue for BMW's automotive segment, more specifically Germany and the United Kingdom, with more than half of the total units delivered going into this market. We expect this to change in the future due to the recent sales growth in the Chinese market that is expected to continue. Additionally, the growing EV market in which BMW is strongly investing, planning to have BEVs available for 90% of the current line-up by 2023, will drive revenues in the coming years. While EV sales are characterized by their lower margins due to higher production costs when

compared to ICE models, they will provide the Group with a new market opportunity and generate revenue in otherwise saturated markets.

The motorcycles segment includes the BMW Motorrad brand, which specializes in the premium motorcycles segment. It is expected to generate €3 billion in revenue in 2021, accounting for almost 3% of the company's total revenue. The European market is once again the main source of demand, in this case for motorcycles, representing practically half of the segment's deliveries. We expect the Group's market share to remain stable in our forecast, as BMW Motorrad is the leading manufacturer of premium motorcycles.

The financial services segment comprises leasing and credit financing operations, insurance, and banking products. This is a crucial segment for the BMW Group, accounting for almost 28% of total revenue in 2021. The sources of revenue for this segment are income from lease instalments, interest payments on loan financing and finance leases, and from the sales of previously leased products to customers. We forecast that BMW will have a total of 5,619,868 contracts under management by the end of 2021, along with a penetration rate of 50.70%, generating €30 billion in revenue. We estimate that the penetration rate will grow slightly in the coming years due to rising prices and to the increasing demand for car-sharing and car rental services.

BMW Group Revenue by Segment
(in million €)

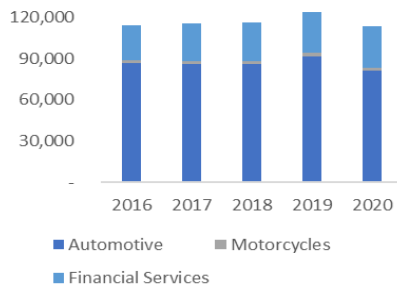


Figure 2: BMW Group revenues by segment
 Source: BMW Group annual reports

Supervisory Board & Management Board

BMW's corporate governance is based on the European model (also known as Continental or German model), in which there is a Supervisory Board and a Management Board. The Supervisory Board is elected by the General Meeting of Shareholders (10 members) and the employees (10 members), under the German Co-determination Act (*Mitbestimmungsgesetz*). It controls the Management Board, which in turn manages the corporation, and its chairman is DR. Norbert Reithofer. As for the Management Board, it is formed by 7 members, and in 2019 it suffered considerable changes, as Oliver Zipse was appointed as the new chairman and 3 new members joined the Board.

Shareholder Structure

According to its Half-Year 2021 Report, as of 30 June 2021, the number of shares of common stock issued by BMW AG is 601,995,196 shares (each share at a par value of 1€). As for the preferred stock, 57,689,304 shares were

Geographical Distribution of Institutional Equity Investors

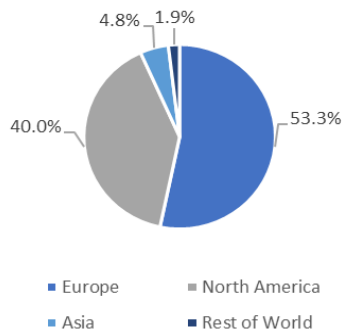


Figure 4: Geographical distribution of institutional equity investors

Source: BMW Investor relations

outstanding (each share at a par value of 1€) on that same date. After the death of Herbert Quandt in 1982, majority owner at the time, his holdings of BMW AG stock were split by two of his direct descendants: Stefan Quandt and Susanne Klatten. Stefan Quandt is a Deputy Chairman of the Supervisory Board of BMW AG and the major individual stakeholder of BMW AG, with a total holding of 25.8%, which is split between a 0.2% personal holding and a 25.6% holding through controlled companies whose voting rights are attributed to himself. Susanne Klatten is the second-largest individual shareholder, with a total equity stake of 20.9%. The remaining equity stake is publicly traded and represents 53.2% of total shares outstanding (Free-Float). Furthermore, when it comes to geographical distribution, institutional equity investors are majorly from Europe (53.3%) and North America (40%), while Asia and other regions represent a small fraction (4.8% and 1.9%, respectively).

Macroeconomic outlook & Market analysis

Global Outlook

Global real GDP grew at a generally steady rate until the end of 2019, shortly before the Covid-19 epidemic, then it fell by 3.10% in 2020. By 2021, the IMF expects real GDP growth to rebound to its highest level since 2015 (5.90%), which is realistic given the expectation of at least a partial global recovery from the recent crisis. Real GDP is predicted to continue expanding, but at a slower rate, from 2022 to 2030, before stabilizing in 2025. Global inflation followed a similar path to that of real GDP growth, remaining constant until 2019. There was no deflation in 2020, but inflation was lower than the year before (2.70% and 3.80%, respectively). It is predicted to be substantially higher in 2021 (4.80%), because of the increase in real GDP, and then gradually decrease until 2030 (3%). The automotive industry is vulnerable to these shifts, and it was no different in 2018 and 2019, as Real GDP growth slowed, and passenger car sales fell (-3.86% in 2018 and -12.35% in 2019). Passenger car sales decreased by 16.42% in 2020¹, as Real GDP declined. Surprisingly, electric vehicle sales climbed in 2020, a watershed year for the industry. According to Statista, passenger car sales will recover in 2021 (a 23.38 percent gain), then steady between 1% and

Global Passenger Car Sales

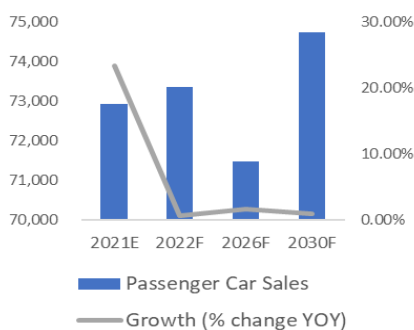


Figure 5: Global passenger car sales

Source: Statista

Global Macroeconomic outlook

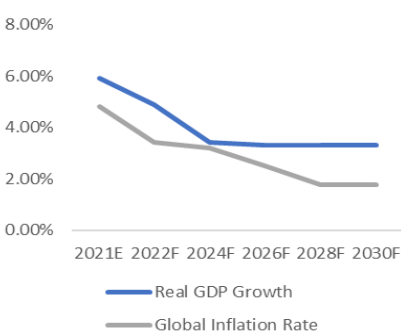


Figure 6: Global macroeconomic outlook

Source: IMF

¹ (Statista 2021)

2% growth from 2026 to 2030, as inflation and Real GDP growth stabilize². These considerations result in a 0.23% CAGR in passenger car sales from 2022 to 2030.

United States of America

United States Macroeconomic outlook

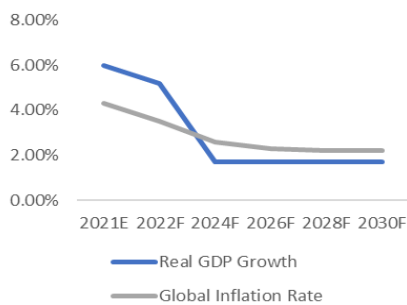


Figure 7: United States macroeconomic outlook
Source: IMF

United States Passenger Car Sales

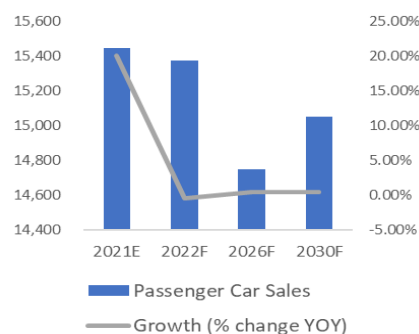


Figure 8: United States passenger car sales
Source: Statista

Unlike the rest of the world, USA's Real GDP growth increased from 2017 to 2018 (2.30% to 2.90%), but in 2019 it eventually went down to 2.30% again. The USA saw its Real GDP decrease more than what was registered worldwide (3.40% and 3.10%, respectively), but the IMF expects it to recover faster in 2021, with a 6.00% forecasted growth against the 5.00% worldwide³. This situation is also expected in 2022, but from 2023 until 2030, this tendency will invert, as the forecasts suggest that the Global Real GDP will increase at a higher pace than the USA's. From 2015 to 2019, the USA's inflation rate was higher than the Real GDP growth rate, but such a phenomenon did not occur in 2020 and 2022. The IMF and the Federal Reserve estimate that, from 2022 to the end of the decade, the inflation rate will be higher than the real GDP growth rate. Such prediction is based on the progress on vaccinations and the easing of supply chain constraints, which will contribute to Real GDP Growth and a reduction in inflation in the long term. The US automotive industry suffered a heavy impact in 2020, but passenger car sales had been declining since 2017. Manufacturers should not expect their sales to reach pre-covid levels any time soon, as car prices continue to rise along with inflation, and the trend will persist as a \$1.2 trillion infrastructure bill was recently announced. The EV industry can expect a \$7.5 billion injection whose purpose is to develop a nationwide network of EV charging stations, thus promoting the acceptance of electric vehicles in years up to 2030⁴. All these factors will contribute to an estimated USA Passenger Car Sales CAGR, between 2022 and 2030, of -0.27%.

Europe

Due to the implementation of harsher, longer-duration Covid-19 restrictions, Europe's economy suffered the most significant hit out of all the continents in 2020. Europe's real GDP declined by 5.60% in 2020, and the IMF expects it to be one of the slowest to recover in 2021 (5.10%), falling behind both the Chinese and

² (International Monetary Fund 2021)

³ (International Monetary Fund 2021)

⁴ (Savannah, Garrison and King 2021)

Europe Macroeconomic outlook

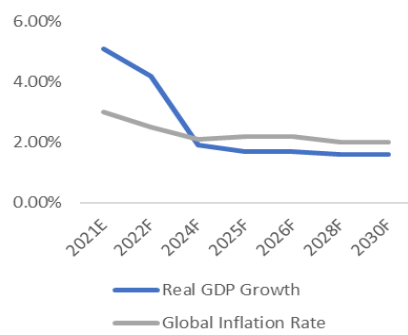


Figure 8: Europe macroeconomic outlook
 Source: IMF

Europe Passenger Car Sales

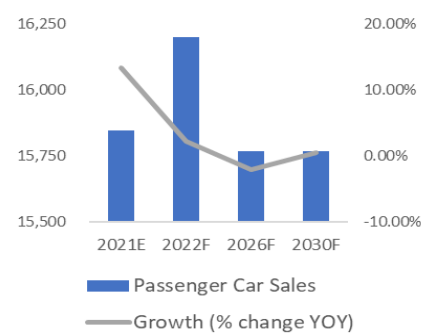


Figure 10: Europe passenger car sales
 Source: Statista

USA economies. Europe's economic growth will only surpass the US's in 2024 (1.90% and 1.70%, respectively), and from then until the end of the decade, the IMF expects both economies to grow at approximately the same rate (1.70% per year). However, the International Monetary Fund does not expect Europe's real GDP growth to surpass or even match China's during that same period. The European inflation rate has presented a relatively similar evolution to the continent's real GDP growth, as when the latter increased, so did inflation. It varied from 1.50% to 3% from 2015 to 2019, then fell to 1.10% in 2020, before rising to 3% by the end of 2021, according to the IMF. Nonetheless, European inflation is predicted to remain stable at roughly 2% until 2030⁵. Its automotive industry has been in a modest downturn since 2018, but 2020 proved to be the most difficult year since 2015, with passenger car sales falling 19.39% from the previous year. On the other hand, the industry is likely to rebound at a considerably faster rate than the rest of the world (13.29% growth in passenger car sales in 2021)⁶. One of the key reasons for this is that Europe, like China, is a market whose consumers' preferences are aligned with the adoption of electric mobility, which, as previously noted, had its best year ever in terms of car sales in 2020, and this trend is expected to continue. As a result, the increase in EV sales will help the European car industry recover. Furthermore, in response to the pandemic's detrimental effects on the automotive sector, European governments introduced several long-term subsidies for electric vehicle sales, enticing consumers to purchase this type of vehicle⁷. These efforts were taken in favour of the old continent's continued rise in the integration of electric vehicles. Considering all the factors stated above, the predicted CAGR for European passenger car sales from 2022 to 2030 is -0.34%.

Germany Macroeconomic outlook

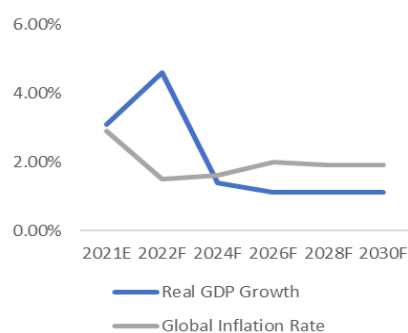


Figure 10: Germany macroeconomic outlook
 Source: IMF

Germany

Since the financial crisis of 2008, the German economy has been steadily expanding, with a growth of 2.7% in 2017⁸. However, in 2019, it was on the verge of entering a recession and was anticipated to remain stagnant as exports fell and trade tensions between the US and China rose. This conflict was devastating to the manufacturing sector because both nations are significant markets for the German car industry and other manufacturing industries⁹. The United States imposed tariffs on imports of European steel and aluminium, and trade tensions

⁵ (International Monetary Fund 2021)

⁶ (Statista 2021)

⁷ (International Energy Agency 2021)

⁸ (International Monetary Fund 2021)

⁹ (Fairless, Hua and Bojan 2020)

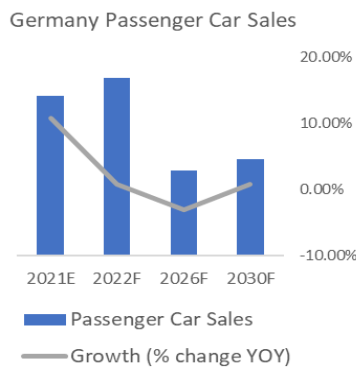


Figure 11: Germany passenger car sales
 Source: Statista

harmed China's economy, resulting in a drop in German exports. The economy was kept stable due to strong private spending, low unemployment, and accessible credit¹⁰. However, its recent record of stability was unable to withstand the pandemic of 2020. The country's real GDP fell by 4.60%, more than what was registered in the United States and China, but still less than Europe's decline. Nonetheless, researchers at the International Monetary Fund forecast that the economy would recover 3.1% in 2021, 4.6% in 2022, and stabilize by 2025 until 2030. Germany's inflation has been stable, never exceeding 2% from 2015 to 2021 (IMF Forecast). It dropped to 0.4% in 2020, rising to 2.9% in 2021, before dropping to pre-covid levels by 2022¹¹. The impact in passenger car sales was higher than what was experienced in the UK, USA, Europe, and China, declining by 22.68%. However, it is expected to stabilize in the following years, as from 2022 until 2030, Germany's Passenger Car Sales CAGR is expected to be -0.45%.

United Kingdom

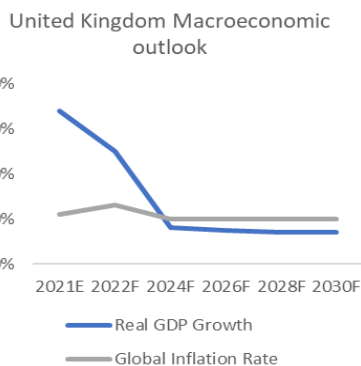


Figure 13: United Kingdom macroeconomic outlook
 Source: IMF

The United Kingdom was prospering after the 2008 financial crisis, but in June 2016 the UK voted in a referendum to abandon the EU. The decision impacted the following year's growth (1.70%), as inflation rose considerably from 0.70% to 2.70%¹², decreasing private consumption. Furthermore, the political and economic uncertainty related to the outcome of the negotiations between the UK and the EU resulted in business investments being delayed¹³. But 2018 was not a good year, as the economy only grew by 1.30%, the slowest growth since 2012. Inflation remained high at 2.50%, declining in the following two years. The year 2020 was particularly tough on the UK's economy, as it recessed by 9.80%. Having suffered one of the worst impacts, the IMF expects the UK to recover particularly fast, as forecasts point to a 6.80% growth in Real GDP, along with an expectable rise in inflation in comparison to 2020 (0.90% to 2.20%). The following year should be a positive one for the country, as the IMF expects the UK's real GDP to keep growing at a high pace (5%) and stabilize around the 1.50% mark from 2022 until 2030¹⁴. The UK's automotive industry declined from 2017 until 2020, seeing its passenger car sales diminish by more than 7% from 2017 to 2018. However, the industry took the biggest hit in 2020, mainly due to the pandemic, as passenger car sales decreased by -20.64%. Nonetheless, it is

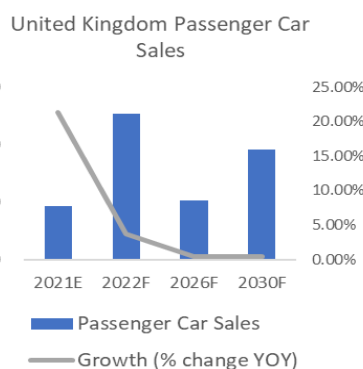


Figure 14: United Kingdom passenger car sales
 Source: Statista

- ¹⁰ (Ewing 2019)
¹¹ (International Monetary Fund 2021)
¹² (International Monetary Fund 2021)
¹³ (Trentmann 2017)
¹⁴ (International Monetary Fund 2021)

expected that the UK's automotive industry recovers rapidly in 2021 and that around 1.63 million passenger cars are sold (21.37% increase from 2020). Passenger car sales in the UK are expected to keep growing until the end of the decade, but never reaching pre-2017 levels, as it is expected that, in 2030, 2.2 million units are sold¹⁵. A UK's Passenger Car Sales CAGR of -0.17%, from 2022 to 2030, is forecasted by Statista.

China

The Chinese economy was growing at an increasing pace since the early 2000s, only slowing down from the 2008 Great Recession (9.70% Real GDP growth in 2008) onwards. Since 2015, its growth had been declining, mainly due to the trade war with the USA. However, it remained higher than in other major economies, such as the US and the EU. Growth slowed down considerably in 2020 (from 6% to 2.30%), as China was the epicentre of Covid-19. The IMF estimates that the economy will recover rapidly in 2021, but the figures won't be as good as they could be¹⁶. China's zero-Covid policy contributed to an economic slowdown, impacting consumer spending¹⁷. The Chinese President, Xi Jinping, intends to cut its economic reliance on the real estate sector (accounts for up to 25% of the country's GDP, including related industries) to reduce financial risks, by slowing the lending pace to the sector¹⁸. The deterioration of China Evergrande Group's financial health is one of China's major problems, and heavily impacted the real estate industry, and thus the GDP growth. The outlook is not very positive, as an energy crisis is starting to hit the world, and China won't be safe from it. Natural gas, crude oil, and coal are the main commodities whose prices increased significantly and are leading to high inflation as energy-intensive metals like steel and silicon are seeing their prices being pushed up¹⁹. The tendency is for inflation to increase in 2022 and stabilize at the 2% mark until the end of the decade. The soaring prices of such commodities are causing an electricity shortage throughout the world, and China's slower growth is putting at risk the exporters of inputs to the country's manufacturing sector. If the shortage of semiconductors and the cut in production of aluminium are considered, the automotive industry in China is being put under severe pressure. According to Statista, passenger car sales should rise by 43.70% in 2021, stabilizing the

China Macroeconomic outlook

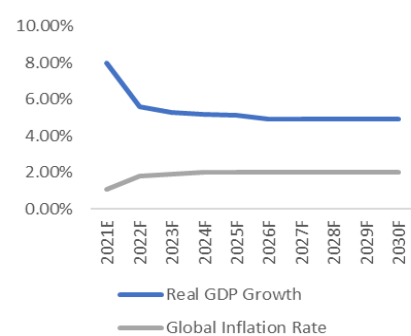


Figure 14: China macroeconomic outlook
Source: IMF

China Passenger Car Sales

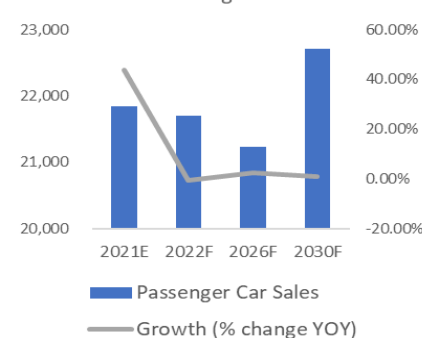


Figure 15: China passenger car sales
Source: Statista

¹⁵ (Statista 2021)

¹⁶ (International Monetary Fund 2021)

¹⁷ (Hale 2021)

¹⁸ (Hancock, et al. 2021)

¹⁹ (Christopher 2021)

growth rate from 2025 until 2030 between 1% and 2%, having a CAGR of 0.57% between 2022 and 2030.

Mobility industry

Business risks

Supply chain risks

Several businesses have had to reduce output since the COVID-19 epidemic began, since many chip manufacturing factories were forced to shut down. The semiconductor chip shortfall is anticipated to cost the global automotive industry roughly \$210 billion in 2021. According to most estimates, this problem will not be resolved until mid-2023 at the earliest. The BMW Group has been impacted as well, with production figures in 2021 being significantly lower than in previous years, and BMW recently stated that some models would no longer be able to be fitted with a touchscreen. BMW will only be able to recover to pre-shortage production levels by 2023 at the earliest, according to our estimates.

Another concern is the recent spike in raw material prices, which is particularly significant to EV manufacturers. Essential materials for the battery manufacturing process, like lithium, nickel, and cobalt, have seen considerable price increases in 2021, particularly after November. Lithium, for example, has seen a roughly 400% rise in price. Because battery prices account for between 20% to 40% of the entire car cost, this has a significant impact on automakers' profits in the manufacturing of EVs. Due to the usage of financial derivative instruments, we anticipate BMW to be well protected against short-term fluctuations in raw material costs; but, if these difficulties persist beyond 2023, BMW's margins are projected to suffer, particularly due to the shift in product mix to a greater percentage of BEV sales.

Environmental risks

OEMs face heavy fines for breaking regulatory measures, as well as the risk of alienating a significant portion of the market if they make no effort to reduce their environmental impact. Regulatory pressure from governments in major key markets, as well as consumer preference for sustainable products, pose a challenge for OEMs.

While the ongoing replacement of internal combustion engines with battery and fuel cell electric technologies will reduce vehicles' environmental footprint by

eliminating CO₂ emissions due to the lack of exhaust emissions, BEVs may be more polluting than ICE counterparts due to the additional metal mining and processing required to produce batteries²⁰. To achieve environmental balance, OEMs must concentrate on reducing waste during manufacturing, increasing the use of recycled components, improving drivetrain efficiency, and collaborating with suppliers to enhance the environmental standards of those providing crucial raw materials.

As part of its commitment to reach climate neutrality before 2050, BMW Group will reduce its carbon emissions by at least one third over the entire life cycle, from the supply chain to the end-of-life phase. To hit this goal, BMW Group is expected to maintain its current levels of R&D investments and Capital Expenditure to expand and improve its electric mobility offerings and its manufacturing processes.

We also estimate that the electrification of all models will allow BMW Group to avoid fines related to the emissions of its new vehicles sold. The development of CO₂ emissions of new vehicles sold in the EU by the BMW Group has been reducing at a high rate in the past years, going from 127 g/km CO₂ in 2019 to 99 g/km CO₂ in 2020, and with the additional EV models that will be introduced in the coming years, we expect this value to decrease even further.

Trends

Autonomous driving

The advancement in autonomous capabilities is one of the most significant changes expected to happen in the long-term horizon for the mobility industry. Within the SAE scale of driving automation²¹, most solutions on the market feature either Level 1 technology or a more advanced Level 2 system where the car is allowed to manage speed and steering but requires that the driver is prepared to suddenly seize control. Full automation benefits are related to Level 5 automation where the vehicle can perform all driving functions no matter the surrounding conditions. The pursuit of autonomous driving technologies has huge significant upfront R&D expenses, having gathered the most investment out of all ACES trends (a total of \$106 billion since 2010)²². Even though there are optimistic estimates that Level 5 autonomous driving technology will be safe and

²⁰ (Congressional Research Service 2020)

²¹ (SAE 2021)

²² (Holland-Letz, et al. 2021)

reliable by 2025, additional testing for regulatory approval is expected to delay the launch of fully autonomous vehicles to at least 2030²³.

Together with Daimler AG, BMW Group AG is involved in a joint venture (THERE) dedicated to the development of the next generation of mobility, with the location-based services from the HERE joint venture providing the basis for new assistance systems with the end goal of developing a fully automated driving technology. This partnership would create two main benefits for the participating companies, allowing for the high R&D costs associated with autonomous driving technologies to be split between them and would provide access to a higher pool of connected automobiles, generating valuable data for the R&D department. Currently, this partnership has been put on hold after both the BMW Group and Daimler concluded that the timing is not right due to the high cost inherent to creating a shared technology platform²⁴.

Even if this relationship were to continue at some point in the future, there are serious reservations about BMW's ability to gain a competitive edge in this new market. The fact that Tesla already has a significant advantage in terms of circulating cars with semi-autonomous capabilities, allowing it to advance more quickly in its research, the potential entry of big tech companies such as Apple²⁵, and the high upfront R&D costs are reasons to doubt whether BMW Group's pursuit of autonomous technologies will create value.

Connectivity

Connectivity services have significant potential regarding cost and revenue benefits to most players involved in the mobility industry such as OEMs, suppliers, dealers, insurers, automotive tech companies, etc.

The percentage of connected vehicles sold is predicted to rise significantly through 2030, reaching roughly 95% of all new vehicles sold. This rise, along with the fact that connected vehicles generate massive amounts of data (about 30 terabytes per day), presents OEMs with a potential to tap into a new income stream related to automotive data-enabled services. By 2030, this new sector is anticipated to be worth USD 450-750 billion²⁶, and OEMs will be able to earn revenue from automobile data in three different ways. The first is that connected automobiles enable the creation of recurring income streams by providing

²³ (VTPI 2021)

²⁴ (BMW Group AG 2020)

²⁵ (Gurman 2021)

²⁶ (Bertoncello, et al. 2021)

products, features, and services to customers throughout the vehicle life cycle. The second source of revenue is the selling of big data to other parties, as well as the use of automotive data to create targeted advertising for clients. The third and final value creation opportunity is connected to the possibility that automobile data may help OEMs reduce costs by improving R&D efficiency.

Regarding connectivity, we believe the BMW Group is in a great position since they are expected to have the largest fleet capable of over-the-air upgrades amongst the competition at the end of 2021, with around 2.5 million connected vehicles in circulation. This will allow them to push their updates and services to a wider customer base through its ConnectedDrive and CarData brands where they offer a range of services and apps to customers. We expect the BMW Group to invest in improving its connectivity services to increase its recurring revenue throughout the vehicle's life cycle and counteract the decreasing margins from a change in the product mix. In addition to this, they also provide solutions for business partners, cities, and municipalities looking to make their mobility more efficient through their joint venture with Daimler AG under the name YOUR NOW, where they provide four different services through four different apps. With the REACH NOW and FREE NOW apps customers have access to a ride-hailing and trip planning service. SHARE NOW provides car-sharing services allowing customers to choose from a large selection of cars. CHARGE NOW develops and offers public charging stations for electric vehicles.

Electrification

The electrification of the car fleet occurring in current times and expected to intensify in the coming years will heavily change the automotive landscape. Changes in regulatory measures and consumer behaviour in the main automotive markets, together with the advancement in EV technology, have been the major drivers of EV adoption.

We assume that the European market will be the fastest to electrify due to strong regulatory pressure and positive consumer trends. The European Union has the strictest fleet emission targets set at 95g/km CO₂ from 2021 onwards. If breached, the automaker will be subject to a fine of 95€ per gram of CO₂ over the limit, multiplied by the number of cars sold in 2020 and 2021. Boosted EV subsidies from major European governments, as part of the economic stimulus in the aftermath of the COVID-19 pandemic, will also serve as a catalyst, especially since electric vehicles are considerably more expensive due to battery costs that account for 30% of the manufacturing costs. The Chinese market is also expected to have a strong growth in electrification despite the elimination of EV

subsidies after 2022. This is due to the government's dual-credit policy that encourages OEMs to add electric models to their portfolio and to the strong increase in consumer demand. In the United States, the 50% electrification target set for 2030 by the Biden administration, together with the \$7.5 billion investment in EV charging infrastructures and stricter emission limits, will increase EV adoption rates. However, the United States market will still be significantly behind the European and Chinese markets, as these already have a considerable head start with an EV adoption rate in new car sales of around 10% and 5.7% respectively. The United States is still at a 2% market share for EVs in 2020²⁷.

We estimate electric models to increase their share on the product mix throughout the forecast period, going from a representation of 7% of total unit sales in 2022 to 50% in 2030. This change in product mix will impact not only influence the average prices set by BMW, but also its gross margin.

Shared mobility

In the automotive business, the shared mobility industry has grown to be a considerable market. Improvements in connection and digitization have been the key enabling elements for services like e-hailing to emerge initially, followed by new forms of shared mobility like vehicle sharing and micro-mobility, mostly involving e-scooters. According to McKinsey, the shared mobility industry is presently estimated at \$130 billion to \$140 billion, with e-hailing accounting for around 90% of the market, followed by shared micro-mobility and car-sharing services, which account for less than 10% of the market. As new services such as Robo-taxis and shuttles join the market, the shared mobility industry is predicted to increase significantly by 2030, becoming three to four times larger and reaching a consumer spending potential of \$300 billion to \$500 billion²⁸.

While the increase in usage of shared mobility services will have a negative impact in the sales volume of private vehicles, we estimate that BMW Group will be able to offset this impact by increasing its sales volume in developing countries. We also believe that BMW Group will be able to capture some of the growth in this market, increasing its revenue from connectivity services, especially in the e-hailing and car sharing sectors through their joint venture with Daimler AG under the name YOUR NOW. The two main services provided by this joint venture and that are related to shared mobility are offered through their

²⁷ (Cornet, et al. 2021)

²⁸ (Heineke, et al. 2021)

FREE NOW and REACH NOW apps. They offer ride-hailing and trip planning service, respectively.

Intrinsic Valuation

We use a sum of the parts valuation to assess BMW Group's value since the business divisions have considerable disparities in their intrinsic operations. This valuation method was split into two halves. In the first part, we follow the discounted cash flow approach for the industrial segment, which comprises the automotive and motorcycle sub-segments. The free cash flow to equity approach was used for the second part, which includes the Financial Services segment. We choose this method since it is the most widely acknowledged method for valuing institutions that primarily provide financial services.

Industrial Segment

Sales forecast

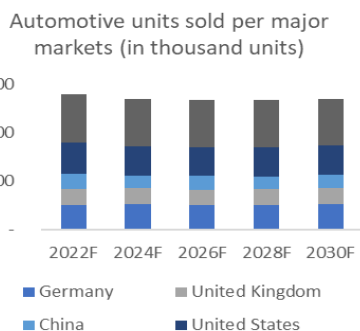


Figure 16: Forecast of automotive units sold per each major market

Source: Analyst estimates

To perform a sales forecast for the automotive sub-segment, two approaches are put into practice. Firstly, through a top-down by region approach, we calculate BMW's historical market share in each region (BMW's units sold divided by total region units sold). The main objective of this approach is to calculate the total number of units delivered by the BMW Group across all three brands. Following this, a bottoms-up approach is followed, splitting BMW Group's automotive product range into three types of vehicles: Internal Combustion Engine (ICE), Plug-In Hybrid Vehicle (PHEV), and Battery Electric Vehicles (BEV). This separation is necessary as all three types of vehicles have different market prices and their respective share in the product mix will significantly change in the forecasted period due to the company's strategy of transitioning into an electricity-based vehicle line-up.

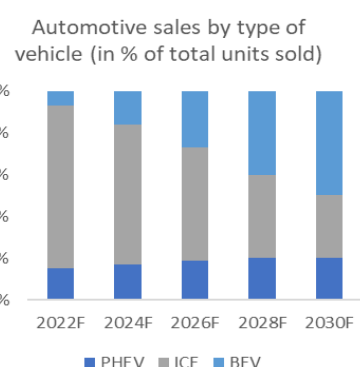


Figure 17: Forecast of automotive sales by type of vehicle (in % of total units sold)

Source: Analyst estimates

The BMW Group is expected to deliver 1,967 million automobiles in 2030, implying a CAGR of 0.54% (since 2022). Our projections indicate that the Chinese automotive market will expand considerably and that it will be the main driver of the increase in vehicle deliveries. China's domestic demand for passenger car vehicles is expected to increase significantly, and an improvement in the company's market share until 2030 is forecasted, as we expect an increase in the demand for luxury vehicles in the region. BMW's vehicle deliveries in China are projected to represent 16.01% of the company's total deliveries in 2030. Additionally, we believe that the focus on electrifying its line-up will allow BMW

Group to slightly increase its market share in other key markets such as Germany, United Kingdom, and Rest of Europe, where electric models are quickly gaining relevance. In the United States, where electrification is expected to occur at a slower pace than in European countries, we estimate a small decline in market share in the coming years. Furthermore, we assume that the company's market share in the remaining regions will be stable throughout the forecast period.

To forecast the share of each vehicle type in the product mix, we consider the projections developed by the BMW Group's management team to be reasonable. In their December 2021 Investor Presentation, it is stated that by 2025, BEV models will account for 25% of total automobiles delivered and that by 2030, they will represent half of all units delivered²⁹.

To estimate the average selling price for each type of vehicle, we compare the ICE models and their BEV/PHEV equivalents, using the 2021 market prices practiced in Portugal³⁰. For BEV models, the average markup is 22.5%, and it can be obtained by comparing certain BEV models to their ICE equivalents (i4 vs 4 series; iX3 vs X3). For PHEV models, the implicit markup is 12.5%, which can be determined through the same method as for BEVs. The differences in prices can be explained by the additional costs incurred in the production of these models due to the inclusion of battery packs. While we believe the average selling price of ICE models will increase by the inflation rate in key geographical markets, we project that PHEVs and BEVs will decrease in price due to an improvement in battery technology and consequently, a decrease in production costs. For PHEVs, we assume that their average selling price will always remain higher than its ICE equivalents, while BEVs are estimated to reach price parity with their ICE counterparts by 2026. By 2030, the average selling price per vehicle is predicted to be 56,202€, implying a CAGR of 1.44% from 2022 to 2030.

We expect connectivity-related revenues to increase in the following years due to a strong improvement in vehicle connectivity. This will allow BMW to further monetize the lifecycle of the vehicle by offering subscription services and over-the-air upgrades. By the end of 2021, the company is expected to have the largest fleet capable of over the air upgrades, with a total of 2.5 million vehicles, and we estimate that every vehicle sold in the forecast period will have this functionality. In the initial phase of the forecast period, we estimate connectivity revenues to have high growth rates, before stabilizing towards the end of the decade.

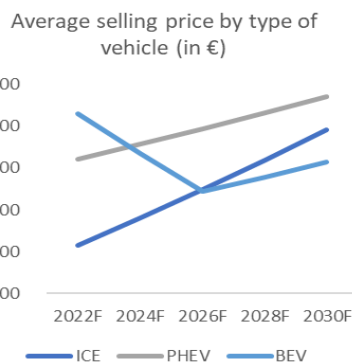


Figure 18: Average selling price forecast by type of vehicle (in €)

Source: Analyst estimates

²⁹ (BMW Group AG 2021)

³⁰ (BMW 2021)

BMW Motorcycles Revenue and Units sold



Figure 19: BMW motorcycles revenue and units sold forecast

Source: Analyst estimates

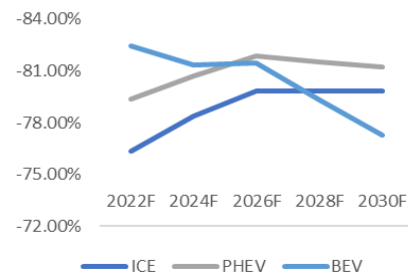
By using the projected average price per automotive and total units sold together with the expected connectivity revenues, we estimate that BMW Group's automotive revenues will be 110,529€ million in 2030, representing a CAGR of 1.99% (2022 to 2030).

For the motorcycles sub-segment, a similar approach is put into practice. Given BMW Group's leading position in the premium motorcycle market, through its BMW Motorrad brand, we believe the company will maintain its current market share in all major markets throughout the forecast period. By 2030, we estimate that the company will sell a total of 291 thousand motorcycles, implying a CAGR of 5.72% from 2022 to 2030. The average selling price per motorcycle is expected to increase by 1% per year due to inflationary pressure, implying that, by 2030, it will approximately be €19,476. Therefore, the motorcycles segment's revenues are expected to be 5,659 million in 2030, representing a CAGR of 6,78% since 2022.

Gross Margin forecast

As previously stated, the ACES trends will have a significant influence on the profitability of the company. Transitioning from traditional ICE models to electric powertrains, advances in autonomous technology that require additional components, and stricter environmental regulations which compels automakers to rethink their manufacturing procedures have all contributed to a reduction of profit margins for automakers.

The emergence of more advanced autonomous driving systems is changing customer preferences and increasing manufacturing costs. Now more than ever, due to the possibility of customers being driven, the interior of the automobile will gain significant relevance in providing a good customer experience. This can be explained by the additional customer demand in being entertained while being driven to their location with features such as better infotainment platforms, improved internet access, and other interior improvements being vital in assuring a good customer experience. All these features involve additional costs in electronic components, software development and in interior surfaces materials. In addition to these, autonomous driving technologies are also dependant on sensors, telecommunication devices, cameras, software developments and additional electronic components such as semiconductors that will increase the costs incurred in production, contributing negatively to BMW Group's profit margins.

Cost of sales as % of
 revenue by type of vehicle

Figure 20: Cost of sales as % of revenues by type of vehicle

Source: Analyst estimates

The transition from ICE powertrains to electric-based powertrains such as PHEV and BEVs will also contribute negatively to the segment's profit margin, as it carries additional costs related to battery production when compared to ICE models. According to McKinsey's report on electric vehicles, electric cars cost around \$12,000 more than their ICE equivalents, mostly due to battery pack costs. In 2021, BEV battery packs cost \$118/kw/h, but prices are expected to fall throughout the forecast period as battery technology continues to improve. Improvements in manufacturing methods, new chemistries, and innovations in cell and pack design will cause the decline of average battery prices per kw/h by 58% from 2020 to 2030³¹. As the share in BEV's increases in the product mix, the profit margin will decrease while battery prices are still above the threshold that would make BEV's as profitable as ICE's. Only after 2026 when battery prices reach almost half of their current prices will the profit margin start to return to the historical values when ICE models were the main core of the business.

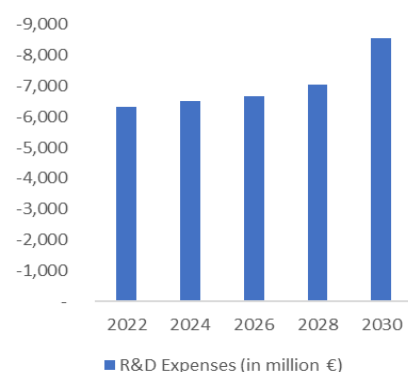
The additional environmental pressure from governments and customers is also something to consider, as BMW Group will have to adjust their manufacturing processes to be more environmentally friendly, increasing complexity and costs in manufacturing.

Connectivity revenues will help to offset some of these increases in production costs since connectivity services have low variable costs. Therefore, as revenues from connectivity services increase throughout the forecast period, the gross margin is expected to hit 62.5% in 2030, which is considerably higher than the 2020 Connectivity Gross Margin of 48.93%.

R&D costs are also significantly relevant, especially due to the ACES changes mentioned in the Trends chapter. To keep up with the competition and to meet the demands of tomorrow's world, BMW has an international R&D network, with a total of research and development locations, the main hub for innovation is the Munich Research and Innovation centre. By 2025, BMW will invest more than €30 billion in R&D, and this investment is expected to be related to the development of additional electric models, improved connectivity services, and autonomous driving technology. Due to this, we estimate that R&D expenses (as a % of revenues) are expected to increase for the forecast period.

Overall, these changes will have an impact on the automotive segment's gross margin, which is estimated to decrease from 17.25% in 2021 to around 14.37% in 2026, before recovering to 15.42% in 2030.

R&D Expenses forecast


Figure 21: R&D expenses forecast

Source: Analyst estimates

³¹ (BloombergNEF 2021)

For the motorcycle segment, we expect the gross margin to remain at 20.91%, which is the same as historical values from 2015 to 2020, as significant changes to the production methods of motorcycles are no expected.

Capital Expenditures

The main driver for capital expenditures in current times is the transition from ICE powertrains to electricity-based powertrains such as BEVs or PHEVs. In 2020, capital expenditures decreased significantly from 25% of revenues in 2019 to 16%. This was done to improve the company's situation regarding costs following the Covid-19 pandemic. We estimate that in the following years, capital expenditures will return to pre-pandemic levels of around 19% of total revenues. This is due to BMW continuing to invest in all current manufacturing plants to be able to manufacture both ICE and electric vehicles, with capex expected to stabilize at around 20% by 2027.

Financial Services Segment

Revenue and Gross Margin Forecast

Financial Services Revenue
Forecast



Figure 22: Financial Services revenue forecast
Source: Analyst estimates

The main source of revenues of this segment are leasing and financing contracts, and these are forecasted by multiplying the number of contracts under management by the average income per contract. The first one is obtained by adding the new contracts to the previous year's total contracts under management and subtracting the number of contracts terminated. As for the average income per contract, we assume that it will grow by 1% per year. We expect the number of contracts under management to decrease until 2026, but to rise until 2030, by the time which we estimate it to be 4,908,044. However, since we expect the average income per contract to increase annually (expected to be €6,277 in 2030), revenues will decrease initially until 2025, but rise from then until 2030 to €30,805 million. Furthermore, the Penetration rate (% of new leased and financed deliveries in terms of total car deliveries) is forecasted by adding 1 percentual point every year from the 2021E value until 2030. By the end of the decade, the Penetration rate is expected to be 59.7%.

Regarding the Gross Margin, we expect it to remain at around 14% until 2030, which implies that the 2030's Gross Profit for the Financial Services segment is projected to be €4,320 million. In fact, the Gross Profit increases every year from 2025 onwards, as the variation in revenues is higher than the change in cost of sales in that period.

BBA Joint Venture Consolidation

BBA JV Units Sold (in thousand units)

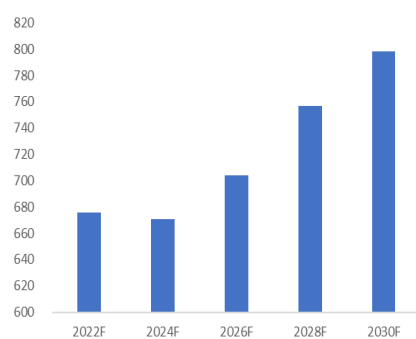


Figure 23: BBA Joint Venture units sold forecast (in thousand units)

Source: Analyst estimates

BMW Brilliance Automotive Ltd. was founded in 2003 and consists of a joint venture between the BMW Group and the Chinese automobile manufacturer Brilliance Auto Group Holdings Co. Ltd. The BMW Group currently owns 50% of the joint venture, but it plans to acquire a further 25% stake in the JV in 2022, as previously announced in 2018. This operation will cost the BMW Group €3.6 billion and give it control of BBA. Furthermore, it is expected to happen in the first quarter of 2022, when China will lift its restriction of foreign owners not being able to have a stake of more than 50% in local companies³². BBA's production facility in Shenyang is the largest among the worldwide production network that the BMW Group possesses. It includes two vehicle plants, a Powertrain Plant, and an R&D Centre. The Tiexi and Dadong vehicle plants are undergoing significant expansions, which will increase BBA's total annual production capacity to 650.000 units. As of today, it manufactures the BMW 1 Series Sedan, BMW 3 Series, BMW 5 Series long wheelbase and its plug-in hybrid version, BMW X1 long wheelbase, and the corresponding plug-in hybrid variant, BMW X2, BMW X3, and the BMW iX3³³. The announcement regarding the purchase of an extra 25% equity stake in the JV did not affect BMW's share price, and thus we believe that this operation will not add value to the company. Therefore, we don't include the value of its core operations in the calculation of BMW's price per share.

Cost of capital

To discount the future cash flows for the industrial segment, a Weighted Average Cost of Capital (WACC) discount rate is computed. The reason why we opt for discounting the Future Free Cash Flows through the WACC instead of the unlevered cost of equity (which would correspond to the APV method) is the fact that companies whose capital structure is expected to remain relatively stable throughout the forecast period should be valued through a WACC based DCF, and the BMW Group's capital structure is an example of that. To calculate the WACC value, we are required to compute the cost of debt and the cost of equity, as well as the weight of each financing source in the company's capital structure. The cost of debt is calculated following the bond yield approach, using the €500 million Face Value BMW bond maturing in 10 years with a yield of 0.842% and

WACC Calculation for Industrial Segment	
Capital Structure	
Debt to total capitalization	40%
Equity to total capitalization	60%
Debt / Equity	0.667
Cost of Equity	
Risk Free Rate	-0.14%
Equity Risk Premium	7.00%
Peers Levered Beta	0.88
Cost of Equity	5.99%
Cost of Debt	
Cost of Debt	0.75%
Tax Rate	30.80%
After Tax Cost of Debt	0.52%
WACC	3.80%

Figure 24: WAAC Calculation for Industrial Segment

Source: Analyst estimates

³² (Sun and Julie 2020)

³³ (BMW Brilliance 2021)

issued by BMW Finance N.V. Given BMW's A2 credit rating attributed by Moody's, the probability of default is set at 1.64% and the recovery rate is 56.50%. The after-tax cost of debt for BMW is estimated to be 0.52%. As for the cost of equity, it is calculated using the Capital Asset Pricing Model (CAPM). According to this model, the cost of equity is equal to the risk-free rate plus the company's Beta multiplied by the Market Risk Premium (MRP). For the risk-free rate, we assume it could be the -0.14% yield of the 10-year German Government Bond, as it is perceived as one of the safest investments available. Investors perceive this bond as the closest to a risk-free security, such that they are willing to receive less from the bond payments (Coupons + Face Value) than what they paid for it initially. Thus, the yield of the bond is negative. As for the Market Risk Premium (MRP), and according to PwC's eValuation Data Germany – Automotive website, it is estimated to be in the range between 6% and 8%, thus we assume it to be of 7%³⁴. To determine the industrial segment's beta, we compute an unlevered median beta for its peer group³⁵ (0.60) and then we re-lever the beta using the target capital structure of 0.67 Debt to Equity ratio. This yields a levered beta of 0.88. Thus, the cost of equity is 5.99%. Following all the calculations mentioned before, we reach a WACC value of 3.80%.

Cost of Equity calculation FS segment	
Capital Structure	
Debt to total capitalization	90%
Equity to total capitalization	10%
Debt / Equity	8.922
Cost of Equity	
Risk Free Rate	-0.14%
Equity Risk Premium	7.00%
Peers Levered Beta	1.23
Cost of Equity	8.43%
Cost of Debt	
Cost of Debt	0.75%
Tax Rate	30.80%
After Tax Cost of Debt	0.52%

Figure 25: Cost of Equity calculation for Financial Services segment

Source: Analyst estimates

The Financial Services Equity is computed through the Free Cash Flow to Equity (FCFE) method, in which Future Cash Flows are discounted at the cost of equity rate. The appropriate valuation approach to any nonfinancial company is the discounted free cash flow method, as operating and financing decisions are separated. But for financial institutions, operations cannot be valued separately from the interest income and expense since these constitute its core operations. Thus, it is required to value the free cash flow to equity, which includes both the operational and financial cash flows. The cost of equity is 8,43%, which is computed by multiplying the levered beta (1.23) of the Financial Services segment by the Market Risk premium (7%) and adding the yield of a 10y German Bond (-0.14%).

Summary

³⁴ (PwC 2021)

³⁵ Source: Bloomberg

After discounting the future free cash flows associated with the industrial segment at the respective WACC, we reach an Industrial Enterprise Value of €87,435 million in December 2022. The FCFE method results in a present value of FS Equity equal to €22,099 million. If this amount is summed with the present value of the Industrial EV and then subtracted by the Net Financial Assets, which represent €52,359 million, it equals a BMW Group Equity value of €57,176 million. The Book Value of Non-core line items is not considered for valuation purposes, as Non-Core Operations are constituted by the Other Entities segment, which comprises the Group's holding and financing companies. By dividing BMW's Equity Value by the total number of common shares outstanding (601,995,196), we reach the December 2022 expected price per common share of €94.98, with a €2.50 dividend per share.

Scenario Analysis

A best-case and worst-case scenario is established in addition to the previously determined base case, assuming opposing perspectives of how the company, industry, and economy will change in the future. With a chance of 65%, the base case scenario previously outlined is the most likely to occur. A 20% likelihood is assigned to the generated worst-case scenario, which is somewhat greater than the best-case scenario's probability of occurrence (15% likelihood). This is due to the persistent uncertainty surrounding the new Omicron Covid-19 variant and existing supply chain concerns, both of which pose a danger to the ongoing economic recovery.

The worst-case scenario implies a smaller market share in the Chinese market due to the entrance of new Chinese automakers with strong electric line-up and the emergence of shared mobility services. Manufacturing costs are also expected to increase, causing the gross margin to worsen in this scenario due to the expectation that supply chain issues will extend beyond 2023. Average prices are expected to decrease under this scenario due to the emergence of new competition in the electric mobility space forcing BMW Group to decrease its prices to remain competitive. In this scenario, larger R&D expenses and capital expenditures are also expected as BMW attempts to remain competitive not only among traditional automakers but also among new entrants in the EV space. Taking everything into account, the worst-case scenario implies a price per share of €69.44 for the BMW Group.

The best-case scenario implies an improvement in the average selling price of its automotive models. This is due to a higher-than-expected economic growth rates

Best-Case Scenario	
Probability	15%
Implied price per share	€ 104.84
Base-Case Scenario	
Probability	65%
Implied price per share	€ 94.98
Worst-Case Scenario	
Probability	20%
Implied price per share	€ 69.44
Final Price per share	€ 91.35

Figure 26: Scenario Analysis
 Source: Analyst estimates

following the Covid-19 pandemic which will have a positive influence in the average price of units sold when compared to the base-case scenario. Additionally, battery prices are also expected to decrease at a higher rate than previously estimated, positively influencing the gross margin for the industrial segment. Taking everything into account the best-case scenario implies a price per share of €104.84 for the BMW Group.

After considering the individual probabilities of occurrence for each scenario (Worst, Base, and Best), the performed scenario analysis yields a share price of €91.35 for BMW Group.

Sensitivity Analysis

Since our valuation was performed as a sum of the parts, it was not possible to calculate a common growth rate for the Industrial and Financial Services segments. Thus, the sensitivity analysis was conducted separately between segments and a total of three analyses were developed. In the Industrial segment, we computed an EV Sensitivity Analysis to WACC and terminal growth rate changes, and a WACC Sensitivity Analysis to Beta and after-tax Cost of Debt variations. When the WACC remains constant and the long-term growth rate increases, the EV increases. For a WACC of 2.50% and a terminal growth rate of 2%, the Industrial EV is €583,959 million. When the long-term growth rate remains constant and the WACC increases, the EV decreases. If the terminal growth rate is 1% and the WACC is 4.50%, then the Industrial EV will be €79,914 million. Furthermore, we conducted a WACC Sensitivity Analysis, testing the impact of Beta and After-tax Cost of Debt variations. If the Beta remains constant and the After-tax Cost of Debt increases, the WACC increases, and the same effect is observed if the Beta increases and the After-tax Cost of Debt remain unchanged. For an After-tax Cost of Debt of 0.2% and a Beta of 0.8, the WACC is 2.30%. But if the first independent variable is 1% and the second is 1.60, the WACC significantly increases to 5.02%.

As for the Financial Services segment, we conducted an analysis that focused on the changes in equity attributable to the segment itself. We test the effect of changes in the Cost of Equity and the terminal-growth rate on the Financial Services (FS) Equity value. Assuming the long-term growth rate remains constant and the Cost of Equity increases, the FS Equity value decreases, as the Free Cash Flows to Equity holders are discounted at a higher rate, leading to a lower present value of Equity. However, if the Cost of Equity doesn't change and the terminal growth rate increases, the FS Equity value increases considerably.

EV (in million €)		WACC				
		2.80%	3.30%	3.77%	4.20%	4.90%
Growth rate	0.45%	87,964 €	71,911 €	61,197 €	53,835 €	44,855 €
	0.60%	93,413 €	75,467 €	63,723 €	55,759 €	46,159 €
	0.75%	99,659 €	79,441 €	66,500 €	57,851 €	47,558 €
	0.90%	106,892 €	83,912 €	69,566 €	60,132 €	49,061 €
	1.05%	115,364 €	88,979 €	72,971 €	62,631 €	50,681 €

Figure 27: Industrial EV Sensitivity Analysis
 Source: Analyst estimates

Industrial WACC		Cost of Debt (after tax)				
		0.20%	0.40%	0.52%	0.80%	1.00%
Beta	0.50	2.10%	2.18%	2.22%	2.34%	2.42%
	0.70	2.94%	3.02%	3.06%	3.18%	3.26%
	0.97	4.07%	4.15%	4.20%	4.31%	4.39%
	1.20	5.04%	5.12%	5.16%	5.28%	5.36%
	1.40	5.88%	5.96%	6.00%	6.12%	6.20%

Figure 28: Industrial WACC Sensitivity Analysis
 Source: Analyst estimates

For a Cost of Equity of 10% and a long-term growth rate of 0.4%, the FS Equity is €14,280 million. But if the Cost of Equity is equal to 7% and the terminal growth rate has a value of 2%, the FS Equity is €31,130 million.

Relative Valuation

The chosen approach to the relative valuation of the BMW Group is the Trading Multiples valuation. To get to a final price per share, we split the valuation in two parts. The first part consists of computing the contribution of the industrial segment to the company's share price. From various options to choose from to compare to BMW in the automotive industry, we identify and select four companies based on factors such as EBIT margin, Product Range, and sales growth rate. Those are Daimler AG, Volkswagen AG, Honda Motor Co., and General Motors Company. After retrieving Bloomberg's 2021 estimates for the companies' Forward P/E, Forward EV/EBITDA, Net Income and EPS, we compute their average, minimum, 25% Quartile, median, 75% Quartile, and maximum values in 2021. The median is the most realistic measure as it eliminates outlier effect, thus it is the chosen measure. The 4.2x Forward EV/EBITDA multiple is the most indicated out of all the retrieved multiples since it focuses on valuating the core operations and does not consider A&D expenses. Furthermore, it provides the most consistent results, as it embeds future expectations, and when multiplied by BMW's 2022 EBITDA (€15,286 million), results in an industrial segment contribution to the price per share of €21. For the Financial Services segment, we identify the Deutsche Bank and Commerzbank as adequate financial institutions to compare the segment to (same country of origin as BMW, and they represent two of the main retail banking institutions in Europe). After retrieving Bloomberg's estimates for the institutions' 2021 Forward Price to Earnings ratio, and calculating the median, we reach a value of 10.8x. This results in a Financial Services Share Price contribution of €37, which is calculated by multiplying the segment's 2021 Net Income (€2,081 million) by the median Forward P/E and dividing this by the number of shares outstanding. When both segments' contributions are summed, we reach a BMW AG price per share of €58 in December 2022.

BMW Group Relative Valuation	
Industrial Segment (using Fwd EV/EBITDA)	
Average	35
Minimum	31
25% Quartile	25
Median	21
75% Quartile	81
Maximum	127
Financial Services Segment (using Fwd P/E)	
Average	37
Minimum	33
25% Quartile	35
Median	37
75% Quartile	39
Maximum	42
BMW Group AG Share Price	
Average	72
Minimum	2
25% Quartile	10
Median	58
75% Quartile	120
Maximum	168

Figure 29: BMW Group Relative Valuation and price per share contribution of each segment

Source: Analyst estimates

Final Recommendation

We project BMW's revenues to increase until the end of the decade and the gross margin to improve in a later stage of the forecast period, as high R&D and Capex investments associated the ACES trends will drive the costs in an initial phase, decreasing over the period. From 2023 onwards, the industrial cash flows are estimated to be positive, and from 2024 until 2030, they will increase every year, eventually maturing at a 0.75% long-term growth. The intrinsic valuation proves to be more accurate than the trading multiples method, as the implicit December 2022 price per share of the first approach is considerably closer to the share's price on December 17th, 2021, than the second method (€91.35 and €58, respectively). Thus, BMW Group AG's appropriate **target price for December 2022 is €91.35**, resulting in a **5.32% shareholder return** (considering a dividend of €2.50) in comparison to the present stock price of €89.11 and a **"HOLD"** recommendation.

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Appendix

Financial Statements

Income Statement

Fiscal Year Ending 31 Dec (Items in million €)	2015A	2016A	2017A	2018A	2019A	2020A	2021E	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	
Core Business Items																	
Industrial Segment																	
Sub-Segment 1 - Automotive																	
Automotive Sales Revenue (in million €)		85,536	86,424	84,005	83,062	88,862	78,090	90,397	87,875	88,838	88,680	87,368	89,400	90,760	92,369	94,028	95,720
	Growth (% change YOY)		1.04%	-2.80%	-1.12%	6.98%	-12.12%	15.76%	-2.79%	1.10%	-0.18%	-1.48%	2.33%	1.52%	1.77%	1.80%	1.80%
Cost of sales		- 64,357	- 64,661	- 62,401	- 64,754	- 70,469	- 64,356	- 69,587	- 67,958	- 69,600	- 70,315	- 70,123	- 72,138	- 72,994	- 73,903	- 74,746	- 75,554
Connectivity Revenue		-	-	1,737	2,784	2,820	2,763	2,604	2,734	2,871	3,015	3,135	3,261	3,391	3,493	3,563	3,598
Connectivity cost of sales		- 1,771	- 2,018	- 2,081	- 1,844	- 1,641	- 1,411	- 1,465	- 1,504	- 1,507	- 1,507	- 1,489	- 1,467	- 1,356	- 1,397	- 1,336	- 1,349
R&D Expenses		- 4,271	- 4,294	- 4,920	- 5,320	- 5,952	- 5,689	- 5,905	- 6,479	- 6,557	- 6,556	- 6,471	- 6,625	- 6,732	- 6,854	- 7,514	- 8,194
Gross Profit		15,137	15,451	16,340	13,928	13,620	9,397	16,045	14,669	14,045	13,317	12,420	12,430	13,069	13,708	13,994	14,221
	Gross margin		17.70%	17.88%	19.06%	16.22%	14.86%	11.62%	16.19%	15.31%	14.52%	13.72%	13.41%	13.88%	14.30%	14.34%	14.32%
Selling and Administrative expenses		- 7,219	- 7,604	- 7,927	- 7,880	- 7,762	- 7,237	- 6,991	- 7,579	- 7,671	- 7,669	- 7,570	- 7,750	- 7,875	- 8,018	- 8,163	- 8,307
Other operating income		317	404	449	483	494	623	927	580	587	587	579	593	602	613	624	635
Other operating expenses		- 503	- 437	- 591	- 435	- 410	- 608	- 489	- 544	- 550	- 550	- 543	- 556	- 565	- 575	- 586	- 596
EBIT		7,732	7,814	8,271	6,096	5,942	2,175	9,492	7,126	6,411	5,684	4,887	4,717	5,231	5,728	5,871	5,954
	EBIT margin		9.04%	9.04%	9.85%	7.34%	6.69%	2.79%	8.11%	7.22%	6.41%	5.59%	5.28%	5.76%	6.20%	6.24%	6.22%
Statutory taxes		- 2,374	- 2,399	- 2,539	- 1,878	- 1,830	- 670	- 2,923	- 2,195	- 1,974	- 1,751	- 1,505	- 1,453	- 1,611	- 1,764	- 1,808	- 1,834
Core Tax Adjustments		- 2	- 76	- 876	- 25	- 476	- 43	- 235	- 9	- 8	- 7	- 6	- 6	- 6	- 7	- 7	- 7
Profit/loss from discontinued operations		-	-	-	- 33	- 44	-	-	-	-	-	-	-	-	-	-	-
Other comprehensive income		-	-	-	- 420	- 80	- 136	- 39	-	-	-	-	-	-	-	-	-
Total Core Result (Automotive)		5,356	5,339	4,856	3,790	4,712	1,598	6,843	4,923	4,428	3,926	3,376	3,258	3,614	3,957	4,055	4,113
Sub-Segment 2 - Motorcycles																	
Revenues		1,990	2,069	2,272	2,173	2,368	2,284	2,903	3,347	3,582	3,824	4,152	4,561	4,883	5,178	5,439	5,659
	Growth (% change YOY)		3.97%	9.81%	-4.36%	8.97%	-3.55%	27.10%	15.31%	7.01%	6.75%	8.59%	9.84%	7.06%	6.05%	5.04%	4.03%
Cost of sales		- 1,542	- 1,639	- 1,798	- 1,738	- 1,911	- 1,941	- 2,296	- 2,648	- 2,833	- 3,024	- 3,284	- 3,607	- 3,862	- 4,096	- 4,302	- 4,475
Gross Profit		448	430	474	435	457	343	607	700	749	800	868	954	1,021	1,083	1,137	1,183
	Gross margin		22.51%	20.78%	20.86%	20.02%	19.30%	15.02%	20.91%	20.91%	20.91%	20.91%	20.91%	20.91%	20.91%	20.91%	20.91%
Selling and Administrative expenses		- 239	- 256	- 256	- 263	- 264	- 240	- 246	- 353	- 378	- 403	- 438	- 481	- 515	- 546	- 574	- 597
Other operating income		-	- 27	- 4	- 4	- 2	- 2	- 3	- 8	- 8	- 9	- 10	- 11	- 11	- 12	- 13	- 13
Other operating expenses		- 27	- 14	- 15	- 1	- 1	- 2	- 2	- 11	- 12	- 12	- 13	- 15	- 16	- 17	- 18	- 18
EBIT		182	187	207	175	194	103	362	344	368	393	426	468	501	532	558	581
	EBIT margin		9.15%	9.04%	9.11%	8.05%	8.19%	4.51%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%
Statutory taxes		- 56	- 57	- 64	- 54	- 60	- 32	- 111	- 106	- 113	- 121	- 131	- 144	- 154	- 164	- 172	- 179
Core Tax Adjustments		- 1	- 4	- 1	- 9	- 4	- 6	- 23	-	-	-	-	-	-	-	-	-
Total Core Result (Motorcycles)		127	134	144	130	138	77	274	238	254	272	295	324	347	368	386	402
Total Core Result (Industrial segment)		5,483	5,473	5,000	3,920	4,850	1,675	7,117	5,160	4,683	4,198	3,670	3,582	3,960	4,325	4,442	4,515
Financial Services Segment																	
Revenues		23,739	25,681	27,567	27,705	29,598	30,044	32,252	29,228	27,407	26,289	25,563	25,452	25,637	26,062	26,658	27,385
	Growth (% change YOY)		8.18%	7.34%	0.50%	6.83%	1.51%	7.35%	-25.12%	-23.56%	-22.60%	-21.97%	-21.88%	-22.04%	-22.40%	-22.91%	-23.54%
Cost of sales		- 20,586	- 22,135	- 23,986	- 24,089	- 25,938	- 26,958	- 27,078	- 25,129	- 23,564	- 22,602	- 21,978	- 21,882	- 22,042	- 22,407	- 22,919	- 23,544
Gross Profit		3,153	3,546	3,581	3,616	3,660	3,086	5,174	4,099	3,844	3,687	3,585	3,570	3,596	3,655	3,739	3,841
	Gross margin		13.28%	13.81%	12.99%	13.05%	12.37%	10.27%	14.02%	14.02%	14.02%	14.02%	14.02%	14.02%	14.02%	14.02%	14.02%
Selling and Administrative expenses		- 1,164	- 1,294	- 1,370	- 1,362	- 1,341	- 1,326	- 1,307	- 1,320	- 1,238	- 1,188	- 1,155	- 1,150	- 1,158	- 1,177	- 1,204	- 1,237
Other operating income		46	35	96	42	73	34	33	47	44	42	41	41	41	42	43	44
Other operating expenses		- 54	- 103	- 113	- 124	- 80	- 73	- 57	- 78	- 73	- 70	- 68	- 68	- 69	- 70	- 71	- 73
EBIT		1,981	2,184	2,194	2,172	2,312	1,721	3,843	2,747	2,576	2,471	2,403	2,392	2,410	2,450	2,506	2,574
	EBIT margin		8.34%	8.50%	7.96%	7.84%	7.81%	5.73%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%	9.40%
Interest and similar income		4	11	12	12	4	3	3	6	6	6	5	5	5	5	6	6
Interest and similar expenses		- 7	- 24	- 10	- 14	- 7	- 4	- 2	- 8	- 7	- 7	- 7	- 7	- 7	- 7	- 7	- 7
Other financial result		- 3	- 5	11	- 27	- 37	5	68	17	16	16	15	15	15	16	16	16
Financial result		- 6	- 18	13	- 29	- 40	4	69	16	15	14	14	14	14	14	14	15
EBT		1,975	2,166	2,207	2,143	2,272	1,725	3,912	2,763	2,591	2,485	2,417	2,406	2,424	2,464	2,520	2,589
Statutory taxes		- 606	- 665	- 678	- 660	- 700	- 531	- 1,205	- 851	- 798	- 765	- 744	- 741	- 747	- 759	- 776	- 797
Core Tax Adjustments		- 78	- 276	- 2,518	- 152	- 28	- 75	- 326	- 128	- 120	- 115	- 112	- 111	- 112	- 114	- 116	- 120
Total Core Result (Financial services segment)		1,447	1,777	4,047	1,635	1,600	1,269	3,033	2,040	1,913	1,835	1,784	1,776	1,789	1,819	1,860	1,911
Total Core Business Result		6,930	7,250	9,047	5,555	6,450	2,944	10,150	7,200	6,595	6,032	5,454	5,359	5,750	6,143	6,302	6,426
Non-Core Business Items																	
Revenues		7	6	7	6	5	3	4	4	4	4	4	4	4	4	4	4
Selling and Administrative expenses		- 30	- 30	- 27	- 79	- 24	- 26	- 37	- 37	- 37	- 37	- 37	- 37	- 37	- 37	- 37	- 37
Other operating income		610	322	356	453	655	433	542	542	542	542	542	542	542	542	542	542
Other operating expenses		- 314	- 434	- 705	- 321	- 2,050	- 387	- 301	- 301	- 301	- 301	- 301	- 301	- 301	- 301	- 301	- 301
Result from equity accounted investments		518	441	739	632	136	920	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811
Interest and similar income		1,504	1,510	1,435	1,745	1,936	1,405	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082	1,082
Other financial result		- 451	- 136	- 237	- 78	- 72	- 191	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045	- 1,045
Result before taxes		1,844	1,951	2,042	2,514	586	2,157	4,146	4,146	4,146	4,146	4,146	4,146	4,146	4,146	4,146	4,146
Statutory taxes		- 566	- 599	- 627	- 774	- 180	- 664	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277	- 1,277
Non-Core Tax Adjustments		- 493	- 550	- 608	- 738	- 209	- 726	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157	- 1,157
Other Comprehensive Income		- 1,852	- 1,545	- 757	- 786	- 320	- 1,447	- 1,556	-	-	-	-	-	-	-	-	-
Non-Core Business Result		3,623	357	1,266	3,264	295	772	5,582	4,026	4,026	4,026	4,026	4,026	4,026	4,026	4,026	4,026
Financial Items																	
Interest and similar expenses		- 1,845	- 1,681	- 1,518	- 1,684	- 2,164	- 1,848	- 1,359	- 1,286	- 970	- 958	- 958	- 954	- 986	- 984	- 1,006	- 1,024
Result before taxes		- 1,845	- 1,681	- 1,518	- 1,684	- 2,164	- 1,848	- 1,359	- 1,286	- 970	- 958	- 958	- 954	- 986	- 984	- 1,006	- 1,024
Statutory taxes		- 566	- 516	- 466	- 519	- 667	- 569	- 420	- 397	- 299	- 296	- 296	- 294	- 304	- 304	- 311	- 316
Financial tax adjustments		- 566	- 516	- 469	- 474	- 667	- 569	- 419	- 396	- 299	- 295	- 295	- 294	- 304	- 303	- 310	- 315
Other																	

Balance Sheet

Fiscal Year Ending 31 Dec (Items in million €)	2015	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Core Business																
Industrial Segment																
Sub-Segment 1 - Automotive																
Property, plant and equipment	17,416	17,566	18,050	19,372	22,749	21,371	20,787	21,746	21,093	22,649	24,255	25,482	26,362	27,800	27,716	27,809
Inventories	10,611	11,344	12,103	12,462	14,404	13,391	13,861	11,443	12,128	13,099	13,477	13,848	14,439	14,405	16,032	16,786
Intangible assets	6,866	7,672	8,948	10,439	11,179	11,776	11,791	13,591	16,508	16,670	16,618	17,184	17,635	18,135	18,647	19,864
Goodwill	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Trade receivables	2,453	2,502	2,354	2,287	2,228	1,979	2,162	2,218	2,245	2,244	2,215	2,268	2,304	2,346	2,389	2,431
Trade payables	- 6,856	- 7,483	- 8,516	- 8,360	- 8,814	- 7,365	- 8,281	- 8,303	- 8,704	- 8,999	- 9,179	- 9,651	- 9,976	- 10,333	- 10,743	- 11,169
Operating Cash	119	144	215	259	272	286	412	320	324	324	320	327	333	339	345	351
Other Assets	23,842	25,604	26,795	27,101	35,695	36,608	35,577	41,025	41,606	41,683	41,224	42,291	43,057	43,927	44,809	45,693
Other Liabilities	- 25,656	- 27,007	- 28,369	- 32,185	- 42,831	- 42,100	- 40,827	- 38,783	- 38,861	- 38,466	- 37,587	- 38,098	- 38,324	- 38,630	- 38,933	- 39,226
Other provisions	- 8,539	- 9,757	- 10,885	- 10,799	- 12,567	- 13,228	- 12,435	- 11,994	- 12,018	- 11,896	- 11,624	- 11,782	- 11,852	- 11,947	- 12,041	- 12,131
Current and deferred tax assets	5,354	5,310	3,571	3,661	4,451	3,538	3,526	3,470	3,547	3,582	3,571	3,692	3,789	3,897	4,007	4,118
Current and deferred tax liabilities	- 1,239	- 1,510	- 2,330	- 1,949	- 1,247	- 1,234	- 2,631	- 1,383	- 1,400	- 1,399	- 1,381	- 1,414	- 1,437	- 1,463	- 1,489	- 1,516
Core Invested Capital (Automotive)	24,404	24,418	21,969	22,321	25,552	25,055	23,975	33,384	36,501	39,523	41,941	44,180	46,365	48,510	50,770	53,043
Sub-Segment 2 - Motorcycles																
Property, plant and equipment	313	365	388	399	407	401	411	498	629	671	729	801	857	909	955	993
Inventories	453	492	580	568	679	687	555	937	1,003	1,070	1,162	1,277	1,367	1,450	1,523	1,584
Intangible assets	48	46	57	95	127	155	164	227	243	259	282	310	331	351	369	384
Trade receivables	139	144	160	167	186	219	121	321	343	367	398	437	468	497	522	543
Trade payables	- 263	- 303	- 355	- 348	- 413	- 378	- 314	- 492	- 526	- 562	- 610	- 670	- 718	- 761	- 799	- 832
Operating Cash	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Assets	25	30	37	35	37	35	33	49	52	56	60	66	71	75	79	82
Other Liabilities	- 449	- 498	- 606	- 693	- 752	- 841	- 729	- 951	- 1,018	- 1,086	- 1,180	- 1,296	- 1,387	- 1,471	- 1,545	- 1,608
Other provisions	- 221	- 193	- 200	- 171	- 186	- 174	- 199	- 284	- 304	- 325	- 353	- 387	- 415	- 440	- 462	- 480
Core Invested Capital (Motorcycles)	45	83	61	52	85	104	42	304	422	451	489	538	576	610	641	667
Financial Services Segment																
Property, plant and equipment	30	29	33	30	89	78	63	51	48	46	45	44	45	46	47	48
Inventories	7	5	24	17	808	818	396	281	264	253	246	245	247	251	257	264
Intangible assets	93	74	78	56	42	31	27	62	58	56	55	54	55	56	57	58
Goodwill	331.00	331.00	347.00	347.00	347.00	346.00	347.00	347	347	347	347	347	347	347	347	347
Trade receivables	158	178	152	91	103	100	136	140	131	125	122	121	122	124	127	131
Trade payables	- 630	- 702	- 849	- 950	- 943	- 892	- 1,002	- 874	- 820	- 787	- 765	- 762	- 767	- 780	- 798	- 819
Leased products	41,148	45,134	44,285	46,427	50,348	48,759	51,254	49,688	46,593	44,691	43,457	43,268	43,583	44,305	45,318	46,554
Receivables from sales financing	70,043	78,260	80,434	86,783	92,486	84,334	85,357	89,145	83,593	80,182	77,966	77,628	78,194	79,488	81,306	83,523
Other investments	2	3	2	1	1	20	20	7	6	6	6	6	6	6	6	6
Other Assets	7,009	8,510	8,413	9,046	8,457	8,881	8,236	8,748	8,203	7,868	7,651	7,617	7,673	7,800	7,978	8,196
Financial assets	1,590	1,725	1,707	1,463	1,148	773	843	1,418	1,329	1,275	1,240	1,235	1,244	1,264	1,293	1,328
Financial Liabilities	- 39,068	- 45,086	- 42,672	- 44,875	- 45,108	- 42,908	- 44,530	- 45,520	- 42,685	- 40,943	- 39,812	- 39,639	- 39,928	- 40,589	- 41,517	- 42,649
Other Liabilities	- 65,116	- 72,852	- 74,055	- 80,321	- 90,468	- 84,675	- 84,601	- 82,103	- 76,989	- 73,847	- 71,807	- 71,496	- 72,017	- 73,208	- 74,883	- 76,925
Other provisions	- 831	- 952	- 905	- 875	- 401	- 534	- 546	- 771	- 723	- 694	- 675	- 672	- 677	- 688	- 704	- 723
Operating Cash	41	91	56	60	62	86	99	73	68	66	64	64	64	65	67	68
Current and deferred tax assets	259	433	497	562	596	614	714	538	504	484	470	468	472	480	490	504
Current and deferred tax liabilities	- 6,381	- 7,010	- 4,535	- 4,819	- 3,988	- 3,004	- 2,751	- 5,011	- 4,699	- 4,508	- 4,383	- 4,364	- 4,396	- 4,469	- 4,571	- 4,695
Core Invested Capital (Financial Services)	8,685	8,171	13,012	13,043	13,579	12,827	14,062	16,217	15,228	14,621	14,227	14,166	14,267	14,497	14,821	15,216
Total Core Invested Capital	33,133	32,672	35,042	35,416	39,217	37,986	38,079	49,905	52,151	54,595	56,657	58,884	61,207	63,617	66,233	68,926
Non Core Business																
Other assets	67,647	71,902	72,591	82,731	#####	94,485	95,635	91,749	91,275	90,487	89,184	90,959	92,381	94,155	96,072	98,081
Other liabilities	- 13,906	- 13,963	- 13,365	- 13,763	- 23,273	- 22,808	- 23,878	- 22,908	- 22,789	- 22,593	- 22,267	- 22,710	- 23,066	- 23,509	- 23,987	- 24,489
Financial assets	8,551	9,258	9,132	6,359	6,258	7,042	6,848	6,570	6,536	6,479	6,386	6,513	6,615	6,742	6,879	7,023
Intangible assets	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trade receivables	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
Trade payables	- 24	- 24	- 11	- 11	- 12	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9	- 9
Other investments	11,113	11,780	12,145	11,503	11,991	11,649	12,119	11,627	11,566	11,467	11,302	11,526	11,707	11,931	12,174	12,429
Assets held for sale	-	-	-	461	-	-	-	-	-	-	-	-	-	-	-	-
Investments accounted for using the equity method	2,233	2,546	2,769	2,624	3,199	3,585	4,971	4,971	4,971	4,971	4,971	4,971	4,971	4,971	4,971	4,971
Pension provisions	- 3,000	- 4,587	- 3,252	- 2,330	- 3,335	- 3,693	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029	- 2,029
Other provisions	- 39	- 16	- 9	- 9	- 55	- 46	- 17	- 16	- 16	- 16	- 16	- 16	- 16	- 17	- 17	- 17
Current and deferred tax assets	1,309	1,157	927	697	209	331	432	414	412	409	403	411	417	425	434	443
Current and deferred tax liabilities	- 436	- 97	- 55	- 39	- 109	- 96	- 154	- 148	- 147	- 146	- 144	- 146	- 149	- 152	- 155	- 158
Liabilities in conjunction with assets held for sale	-	-	-	62	-	-	-	-	-	-	-	-	-	-	-	-
Eliminations	- 15,869	- 17,054	- 18,096	- 17,292	- 17,784	- 16,541	- 16,678	- 16,000	- 15,918	- 15,780	- 15,553	- 15,862	- 16,111	- 16,420	- 16,754	- 17,105
Non Core Invested Capital	57,581	60,904	62,778	70,871	80,702	73,900	77,241	74,222	73,853	73,241	72,229	73,608	74,713	76,091	77,580	79,142
Total Invested Capital	90,714	93,576	97,820	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
Financial Activities																
Minority interest	- 234	- 255	- 436	- 529	- 583	- 629	- 714	- 714	- 714	- 714	- 714	- 714	- 714	- 714	- 714	- 714
Financial liabilities	- 53,913	- 53,858	- 52,481	- 58,859	- 71,713	- 63,531	- 60,078	- 45,311	- 44,776	- 44,786	- 44,558	- 46,055	- 45,968	- 47,000	- 47,842	- 48,796
Excess of Cash	5,963	7,645	8,768	10,660	11,701	13,165	17,112	-	-	-	-	-	-	-	-	-
Net Financial Assets	- 48,184	- 46,468	- 44,149	- 48,728	- 60,595	- 50,995	- 43,680	- 46,025	- 45,490	- 45,500	- 45,272	- 46,769	- 46,682	- 47,714	- 48,556	- 49,510
Equity attributable to shareholders of BMW AG	42,530	47,108	53,671	57,559	59,324	60,891	71,640	78,102	80,515	82,335	83,614	85,722	89,238	91,994	95,257	98,555

Cash Flow Statement

Fiscal Year Ending 31 Dec (Items in million €)	2015	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F
Core Business																
Industrial Segment																
Sub-Segment 1 - Automotive																
NOPLAT	5,356	5,339	4,856	3,790	4,712	1,598	6,843	4,923	4,428	3,926	3,376	3,258	3,614	3,957	4,055	4,113
Depreciations and amortisations	- 4,559	- 4,702	- 4,699	- 4,982	- 5,853	- 5,978	- 6,052	- 6,007	- 6,735	- 7,043	- 7,321	- 7,642	- 7,881	- 8,228	- 8,305	- 8,539
Operational Cash Flow (Automotive)	9,915	10,041	9,555	8,772	10,565	7,576	12,895	10,930	11,163	10,969	10,697	10,901	11,495	12,185	12,360	12,652
PP&E and Intangible Assets	24,282	25,238	26,998	29,811	33,928	33,147	32,578	35,338	37,601	39,319	40,873	42,666	43,998	45,935	46,363	47,673
Gross Investment	- 956	- 1,760	- 2,813	- 4,117	- 781	- 569	- 2,760	- 2,760	- 2,263	- 1,718	- 1,554	- 1,793	- 1,332	- 1,938	- 428	- 1,310
Net Capex	- 5,658	- 6,459	- 7,795	- 9,970	- 5,197	- 5,483	- 8,767	- 8,767	- 8,998	- 8,761	- 8,875	- 9,435	- 9,213	- 10,166	- 8,732	- 9,849
Change in Goodwill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Changes in Net Working Capital	- 180	- 351	- 492	- 1,442	- 200	- 137	- 2,476	- 315	- 675	- 165	- 41	- 308	- 343	- 1,265	- 376	-
Change in Other Assets	- 1,762	- 1,191	- 306	- 8,594	- 913	- 1,031	- 5,448	- 581	- 77	- 459	- 1,067	- 766	- 870	- 882	- 884	-
Change in Other Liabilities	- 1,351	- 1,362	- 3,816	- 10,646	- 731	- 1,273	- 2,044	- 78	- 395	- 880	- 511	- 226	- 306	- 304	- 293	-
Change in Other Provisions	- 1,218	- 1,128	- 86	- 1,768	- 661	- 793	- 441	- 24	- 122	- 272	- 158	- 70	- 95	- 94	- 91	-
Change in current and deferred tax assets	- 44	- 1,739	- 90	- 790	- 913	- 12	- 56	- 77	- 35	- 11	- 122	- 97	- 107	- 110	- 112	-
Change in current and deferred tax liabilities	- 271	- 820	- 381	- 702	- 13	- 1,397	- 1,248	- 17	- 0	- 18	- 33	- 23	- 26	- 26	- 26	-
Core invested capital changes (Automotive)	- 4,716	- 2,250	- 5,334	- 9,084	- 5,480	- 4,972	- 15,416	- 9,852	- 10,065	- 9,740	- 9,881	- 10,066	- 10,373	- 10,565	- 10,812	-
Core Free Cash Flow (Automotive)	5,325	7,305	3,437	1,481	2,096	7,923	4,486	1,311	904	957	1,020	1,428	1,812	1,794	1,840	-
Sub-Segment 2 - Motorcycles																
NOPLAT	127	134	144	130	138	77	274	238	254	272	295	324	347	368	386	402
Depreciations and amortisations	- 69	- 75	- 88	- 97	- 110	- 119	- 183	- 160	- 193	- 206	- 223	- 245	- 263	- 279	- 293	- 305
Operational Cash Flow (Motorcycles)	196	209	232	227	248	156	457	398	447	477	518	569	610	646	679	706
PP&E and Intangible Assets	361	411	445	494	534	556	575	725	872	931	1,011	1,110	1,189	1,261	1,324	1,377
Gross Capex Investment	- 50	- 34	- 49	- 40	- 22	- 19	- 150	- 150	- 147	- 59	- 80	- 99	- 78	- 72	- 64	- 53
Net Capex	- 125	- 122	- 146	- 150	- 141	- 202	- 310	- 310	- 340	- 265	- 303	- 345	- 341	- 351	- 356	- 358
Changes in Net Working Capital	- 4	- 52	- 2	- 65	- 76	- 166	- 404	- 54	- 55	- 75	- 94	- 74	- 68	- 60	- 50	-
Change in Other Assets	- 5	- 7	- 2	- 2	- 2	- 2	- 16	- 3	- 4	- 5	- 6	- 5	- 4	- 4	- 3	-
Change in Other Liabilities	- 49	- 108	- 87	- 59	- 89	- 112	- 222	- 67	- 69	- 93	- 116	- 91	- 84	- 74	- 62	-
Change in Other Provisions	- 28	- 7	- 29	- 15	- 12	- 25	- 85	- 20	- 21	- 28	- 35	- 27	- 25	- 22	- 19	-
Core invested capital changes (Motorcycles)	- 113	- 66	- 88	- 143	- 138	- 121	- 423	- 311	- 234	- 262	- 294	- 301	- 313	- 323	- 330	-
Core Free Cash Flow (Motorcycles)	196	96	166	139	105	58	336	25	137	243	256	276	309	333	356	376
Core Free Cash Flow (Industrial Segment)	5,421	7,471	3,576	1,586	2,154	8,259	4,511	1,448	1,148	1,213	1,296	1,737	2,145	2,150	2,216	-
Financial Services Segment																
Net income	1,447	1,777	4,047	1,635	1,600	1,269	3,033	2,040	1,913	1,835	1,784	1,776	1,789	1,819	1,860	1,911
Depreciations and amortisations	- 8,686	- 9,606	- 9,992	- 10,122	- 11,142	- 12,054	- 11,014	- 11,009	- 10,323	- 9,902	- 9,628	- 9,587	- 9,656	- 9,816	- 10,041	- 10,315
Free Cash Flow (Financial Services)	10,133	11,383	14,039	11,757	12,742	13,323	14,047	13,049	12,236	11,737	11,412	11,363	11,446	11,635	11,901	12,226
PP&E, Intangible Assets and Leased Products	41,271	45,237	44,396	46,513	50,479	48,868	51,344	49,801	46,699	44,793	43,556	43,367	43,683	44,406	45,422	46,660
Gross Capex Investment	- 3,966	- 841	- 2,117	- 3,966	- 1,611	- 2,476	- 1,543	- 3,102	- 3,102	- 1,905	- 1,238	- 189	- 316	- 723	- 1,016	- 1,239
Net Capex	- 13,572	- 9,151	- 12,239	- 15,108	- 10,443	- 13,490	- 9,466	- 7,221	- 7,996	- 8,391	- 9,398	- 9,972	- 10,539	- 11,057	- 11,553	-
Changes in goodwill	-	- 16	-	-	- 1	- 1	-	-	-	-	-	-	-	-	-	-
Changes in Net Working Capital	- 3	- 190	- 165	- 813	- 82	- 483	- 9	- 24	- 15	- 9	- 1	- 2	- 6	- 8	- 9	-
Change in other investments	- 1	- 1	- 1	- 19	-	-	- 13	- 0	- 0	- 0	- 0	- 0	- 0	- 0	- 0	-
Changes in Financial Assets	- 135	- 18	- 244	- 315	- 375	- 70	- 575	- 88	- 54	- 35	- 5	- 9	- 21	- 29	- 35	-
Changes in Financial Liabilities	- 6,018	- 2,414	- 2,203	- 233	- 2,200	- 1,622	- 990	- 2,835	- 1,742	- 1,131	- 173	- 289	- 661	- 929	- 1,132	-
Change in Receivables from sales financing	- 8,217	- 2,174	- 6,349	- 5,703	- 8,152	- 10,233	- 3,788	- 5,553	- 3,411	- 2,215	- 338	- 566	- 1,294	- 1,818	- 2,217	-
Change in Other Assets	- 1,501	- 97	- 633	- 589	- 424	- 645	- 512	- 545	- 335	- 217	- 33	- 56	- 127	- 178	- 218	-
Change in Other Liabilities	- 7,736	- 1,203	- 6,266	- 10,147	- 5,793	- 74	- 2,498	- 5,114	- 3,141	- 2,040	- 311	- 521	- 1,192	- 1,675	- 2,042	-
Change in Other Provisions	- 121	- 47	- 30	- 474	- 133	- 12	- 225	- 48	- 30	- 19	- 3	- 5	- 11	- 16	- 19	-
Change in current and deferred tax assets	- 174	- 64	- 65	- 34	- 18	- 100	- 176	- 33	- 21	- 13	- 2	- 3	- 8	- 11	- 13	-
Change in current and deferred tax liabilities	- 629	- 2,475	- 284	- 831	- 984	- 253	- 2,260	- 312	- 192	- 125	- 19	- 32	- 73	- 102	- 125	-
Core invested capital changes (Financial Services)	- 9,093	- 14,832	- 10,153	- 11,679	- 11,302	- 12,249	- 13,164	- 9,335	- 9,295	- 9,234	- 9,526	- 9,757	- 10,047	- 10,364	- 10,709	-
Core Free Cash Flow (Financial Services)	2,290	- 793	1,604	1,063	2,021	1,798	115	2,901	2,442	2,178	1,836	1,688	1,588	1,537	1,516	-
Total Core Free Cash Flow	7,711	6,678	5,180	2,649	4,176	10,057	4,626	4,349	3,589	3,392	3,132	3,426	3,733	3,687	3,733	-
Non Core Business																
Non Core Result	357	1,266	3,264	295	772	5,582	4,026	4,026	4,026	4,026	4,026	4,026	4,026	4,026	4,026	4,026
Non Core invested capital changes	- 3,323	- 1,874	- 8,093	- 9,831	- 6,802	- 3,341	3,019	368	612	1,012	- 1,379	- 1,106	- 1,378	- 1,489	- 1,561	-
Non Core Free Cash Flow	- 2,966	- 608	- 4,829	- 9,536	- 7,574	- 2,241	7,045	4,395	4,638	5,038	2,648	2,921	2,648	2,537	2,465	-
Core + Non Core FCF	4,745	6,070	351	- 6,887	11,750	12,298	2,419	8,744	8,228	8,430	5,780	6,346	6,381	6,224	6,198	-
Financial																
Financial Result	- 372	- 220	- 2,699	- 2,725	- 1,256	- 1,298	- 1,285	- 969	- 957	- 958	- 953	- 985	- 983	- 1,005	- 1,023	-
Change in Net Financial Asset	- 1,716	- 2,320	- 4,579	- 11,867	- 9,600	- 7,315	- 2,345	- 535	- 11	- 228	- 1,497	- 87	- 1,032	- 841	- 954	-
Transactions with shareholders	- 2,657	- 3,530	- 2,232	- 2,255	- 893	- 3,685	- 3,480	- 7,240	- 7,281	- 7,245	- 6,324	- 5,275	- 6,431	- 6,061	- 6,129	-
Financing Free Cash Flow	- 4,745	- 6,070	- 351	- 6,887	- 11,750	- 12,298	- 2,419	- 8,744	- 8,228	- 8,430	- 5,780	- 6,346	- 6,381	- 6,224	- 6,198	-

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Report Recommendations

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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