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CREDIT OPINION
7 August 2023

Update

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RATINGS

Volkswagen Aktiengesellschaft

Domicile	Wolfsburg, Germany
Long Term Rating	A3
Type	LT Issuer Rating
Outlook	Stable

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

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Volkswagen Aktiengesellschaft

Update on Key Credit Considerations

Summary

Volkswagen Aktiengesellschaft's (Volkswagen, or VW) A3 long-term ratings are supported by its robust portfolio of highly recognizable brands (including Volkswagen, Audi and Porsche) and established market positions in Western Europe and China; its track record of successful and frequent model launches; its geographical diversification and good product offering that help shield the group's earnings and cash flow from local or regional demand cycles, which are inherent to the automotive industry; our expectation of sustainable, positive and robust free cash flow (FCF) generation, despite high investments; and the company's sizeable liquidity position and solid credit metrics.

VW has been able to restore its metrics in a favourable market environment, with strong customer demand leading to improved price and mix effects for automakers, but also depressed production volumes due to supply chain issues. As a result, VW's EBITA margin (Moody's adjusted, including at equity contribution from Chinese JVs) increased to 7.5% in 2022 (6.0% in 2020). Considering VW's remarkable track record of sustainable performance against most peers over the last few years, we expect margins to be sustained at a level of around 7%, notwithstanding some weakening we expect for 2023. The group's global reach across a multitude of brands and model types while simultaneously using its large scale to efficiently deploy and use resources should allow its sufficient operating leverage to quickly recover profitability, even at times of more difficult macroeconomic conditions.

VW's ratings are currently weakly positioned, given the following constraining factors: the high cyclicality of the automotive industry; the group's declining market share in China, its largest single market, where it has been a leader but it's market share declined to 15.1% (2022), from 19.3% in 2020; the significant divergence in profitability across passenger car brands, with particular weak margins at VW's brand group "Core" (3.6% return on sales in 2022, but 5.5% in 1H 2023), somewhat mitigated by strong margins at the premium brands Audi and Porsche; need for high investments to cope with globally increasing environmental standards and the transition to electric vehicles (including EV battery business), and to develop a group-wide vehicle software architecture; and high governance risks according to Moody's ESG criteria, due to the organizational complexity within the group, the global scale of VW, its multiple brands and product strategy.

Credit strengths

» Robust and diversified business profile, with strong positions in the global automotive market and a portfolio of highly recognizable brands

» Geographical diversification and good product offering

» Underlying profitability to benefit from VW's modular tool kit strategy and cost reductions

» Ability to offer attractive financing, which is a key component of VW's business model

» Sizeable liquidity position and solid credit metrics

Credit challenges

» Difficult market environment for the automotive industry globally, including its high cyclicality and a highly competitive market environment, including China, where VW has lost market share

» Strong divergence in profitability across passenger car brands

» Need for high investments to cope with globally increasing environmental standards, stricter emission regulation and electrification, to develop and produce alternative fuel vehicles (including BEVs) and to develop a group-wide vehicle software architecture that enables connectivity, driving assistance and autonomous driving features

» Corporate governance issues (according to Moody's ESG criteria), including highly complex group structure and history of high management turnover

» Remaining risks stemming from potential fines, penalties and ongoing lawsuits associated with the diesel emissions issue

» Credit metrics somewhat weaker than those of its peers

Rating outlook

The stable outlook reflects our expectation of continued recovery in global light vehicle sales in 2023, but with increasing challenges in the second half, once the existing order backlog has been executed. On the back of this volume recovery, and despite a weakening consumer sentiment, we expect VW to be able to achieve Moody's-adjusted EBITA margin of around 6.5%-7.0% (6.3% in LTM June 2023, including negative valuation effects from raw materials hedging), maintain debt/EBITDA (Moody's-adjusted) below 2.0x (1.5x in LTM June 2023) and generate positive FCF (Moody's-adjusted) within the next 12-18 months. The stable outlook further factors in our expectation of sustainable profitability improvements of the Volkswagen's brand group “Core” going forward.

Factors that could lead to an upgrade

We would consider upgrading VW's ratings if:

» VW demonstrates its ability to, at least, protect its market share in the major markets where it operates, especially in Western Europe and China, regardless of potential changes in global macroeconomic conditions,

» there is a significantly improved competitive position for the Volkswagen Passenger Cars brand and in the US market,

» there is a more consistent earnings pattern across its commercial vehicle brands as a result of the successful execution of its long-term plan for the division,

» more stringent corporate governance structures are implemented,

» VW generates robust cash flow on a sustained basis, despite elevated capital spending, with Moody's-adjusted FCF/debt of around 10%,

» VW's Moody's-adjusted EBITA margin is above 7% on a sustained basis

Factors that could lead to a downgrade

VW's ratings could be downgraded in case of an operational weakness or more aggressive financial policies resulting in:

» Moody's-adjusted EBITA margin below 7%,

» Moody's-adjusted debt/EBITDA to above 2.0x, or

» FCF/debt (Moody's-adjusted) falling below mid single-digit percentages for a prolonged period.

Also, an erosion in VW's market shares in its core markets, as well as its inability to enhance the profitability of Volkswagen's brand group “Core” to a more competitive level of above 5% on a sustained basis (5.5% in 1H 2023), delays in the transformation towards electrification as well as higher than expected R&D and capex requirements to achieve this, and a weakening of the company's liquidity profile could lead to a rating downgrade.

Key indicators

Exhibit 1
Volkswagen Aktiengesellschaft

	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	LTM Jun-23	12-18 month Forward View
EBITA Margin %	8.6%	8.3%	6.0%	6.9%	7.5%	6.3%	6.5%-7.5%
EBITA Margin % excl. JVs	6.9%	6.7%	4.5%	5.8%	6.5%	5.4%	5.5%-6.5%
Debt / EBITDA	2.0x	1.9x	2.8x	2.3x	1.4x	1.5x	1.0x-1.5x
Debt / EBITDA excl. JVs	2.3x	2.1x	3.2x	2.6x	1.5x	1.6x	1.1x-1.6x
(Cash + Marketable Securities) / Debt	63.0%	60.0%	63.7%	69.2%	124.5%	103.3%	100%-120%
RCF / Debt	31.0%	43.0%	21.1%	28.9%	14.7%	25.9%	25%-45%
FCF / Debt	-3.6%	15.9%	4.4%	14.8%	-17.8%	-23.8%	5%-10%
EBITA / Interest Expense	14.9x	10.4x	7.1x	9.2x	6.1x	5.8x	6.0x-8.0x

The 12-18 month Forward View represents Moody's forward view, not the view of the issuer
Source: Moody's Financial Metrics™

Profile

Volkswagen Aktiengesellschaft, headquartered in Wolfsburg, Germany, is Europe's largest car manufacturer in terms of passenger car unit sales, with a market share of 25% in 2022 in Europe (according to the European Automobile Manufacturers Association), and one of the two largest globally, marginally below Toyota Motor Corporation (A1/P-1 stable).

VW manufactures mass-market and premium vehicles under the Volkswagen Passenger Cars, SKODA, SEAT, Cupra, Audi, Bentley, Lamborghini and Porsche (VW share 75%) brands, as well as commercial vehicles under the Volkswagen Commercial Vehicles brands. VW also produces trucks and busses via its publicly listed subsidiary TRATON SE (Baa2 stable, VW share 89.7%), which produces vehicles under the MAN, Scania, Navistar and VW Truck & Bus brands. In addition, VW's subsidiary Audi has a 100% stake in the premium motorcycle manufacturer, Ducati.

In 2022, VW delivered 8.3 million vehicles to its customers (8.9 million in 2021). Volkswagen generates the vast majority of its unit sales in Europe and other regions (43% in last twelve months to March 2023) as well as Asia-Pacific (40%, predominantly China), followed by North America (11%) and South America (6%).

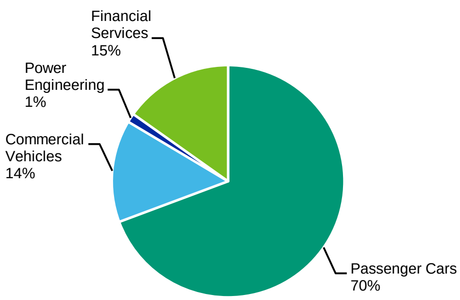
VW also provides a full range of banking, leasing, insurance and mobility services mainly through its subsidiaries Volkswagen Financial Services AG (A3/P-2 stable) and Volkswagen Bank GmbH (bank deposits A1, senior unsecured A3 stable, BCA baa2). Volkswagen Bank GmbH holds a banking licence and offers wholesale and retail banking services.

Detailed credit considerations

Robust and diversified business profile, with strong positions in the global automotive market

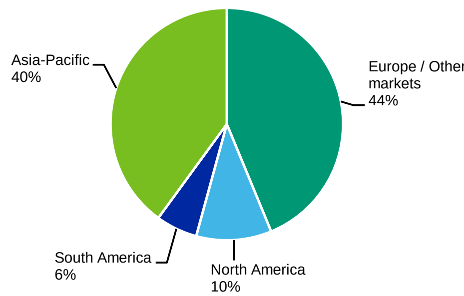
VW has a strong business profile, with leading and established market positions in Europe (number one position with around 24.7% market share in 2022, well before Stellantis N.V. (Baa2 positive), with a share of 18.2%, according to ACEA), China (number one position achieved through joint ventures [JVs] with local partners) and Brazil (second position, behind Stellantis and just before General Motors Company (Baa2 stable). Given its broad and attractive product and service offering (including the ability to provide customer financing), as well as a strong product pipeline, we expect the company to maintain a market share in Europe at the current level of around 23%-25% in the medium term.

Exhibit 2
Revenue breakdown by segment
Based on LTM June 2023 revenues



Does not include the Chinese joint venture revenue. Breakdown by sales revenue, excluding internal reconciliation
Source: Company and Moody's Investors Service

Exhibit 3
Vehicle sales by region
Based on LTM June 2023 unit sales



Does include the Chinese joint ventures.
Source: Company and Moody's Investors Service

VW's presence in both passenger cars and commercial vehicles brings a degree of diversification to its business risk profile. We expect cooperation between VW's commercial vehicle brands to increase. VW has bundled its commercial vehicle activities under its publicly listed subsidiary TRATON SE (Baa2 stable; VW share: 89.7% as of December 2022), comprising Scania, MAN, Navistar and VW Truck & Bus, which is expected to generate additional synergies over the long term, in addition to the turnaround of the MAN brand.

Difficult environment for the global automotive industry, which is highly cyclical and highly competitive

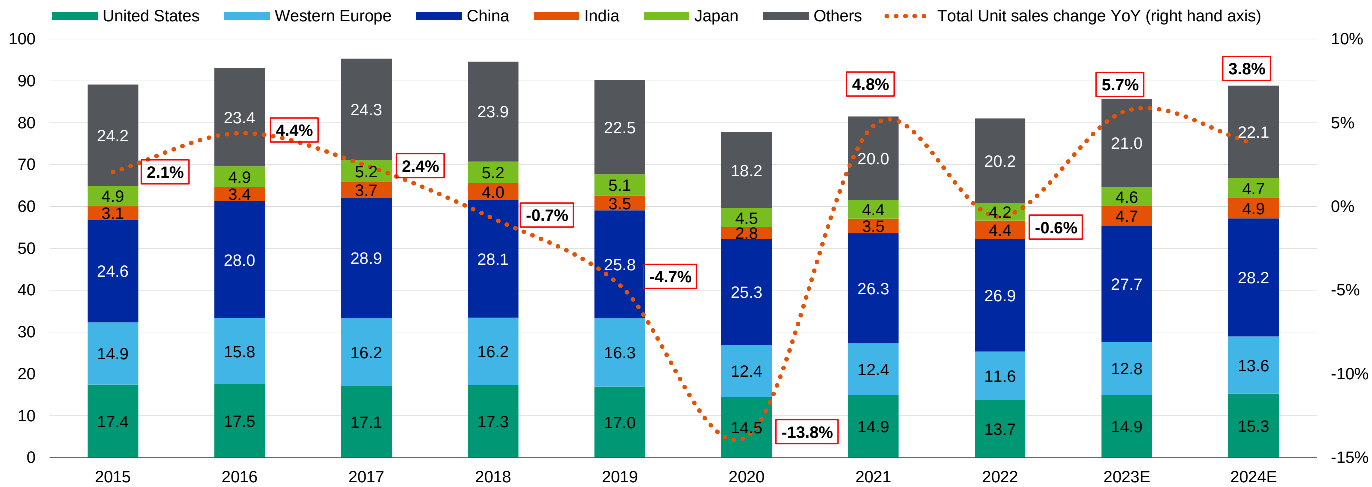
VW, like all major automakers, is exposed to the cyclicality of the global automotive industry. After several years of continuous growth since the beginning of the decade, global light vehicle sales peaked at around 95 million units in 2017-18. In 2019, global light vehicle sales declined by around 5% to around 90 million units, driven mainly by an 8% decline in China.

Global light vehicle sales plummeted 14% in 2020 because of the pandemic and recovered by only around 4% in 2021, as production was constrained by a global shortage of semiconductors. We estimate 2.1% global GDP growth for 2023 and 2.2% for 2024, as higher borrowing costs and tighter lending will slow global growth (see Global Macro Outlook 2023-24 [May 2023 Update]). For the auto sector, this means a more muted recovery path, with global light vehicle sales can still grow by around 5.7% growth in 2023 versus 2022, when production suffered from supply chain constraints (see our Global Automotive Industry Outlook, published June 2023). With this, global light vehicle sales will remain short of the 2019 sales level of 90 million units and much less (around 10%) than the peak of 95 million units in 2017.

Exhibit 4

Global sales are unlikely to recover to the previous peak levels until mid-2020s

Our projections for global light vehicle unit sales (in million units)



China unit sales represent auto sales, including those of both passenger and commercial vehicles

Source: ACEA, CAAM, LMC and Moody's Investors Service estimates

In 2022, where global light vehicles were flat, VW's vehicle unit sales decreased to 8.3 million, from 8.9 million and 9.3 million in 2021 and 2020 respectively. That level is still substantially (25%) below the peak 11.0 million in 2019. The ongoing low volumes have been driven by a sector-wide shortage in the supply of certain parts, especially semiconductors, since the end of 2020 as well as supply shortages in Europe following Russia's invasion of Ukraine in 2022 (e.g. for wiring harnesses).

In H1 2023 VW delivered 4.4 million vehicles (+12.8% vs. H1 2022), following the increasing availability of semiconductors in 2023 compared to supply shortages in Europe and covid-related slowdowns in China in H1 2022. Volumes in H1 2023 remained, however, negatively impacted by bottlenecks in logistics. We expect VW's deliveries to customers in 2023 to be substantially above 2022 levels, thanks to easing of supply chains, greater semiconductor availability and still some supply/demand mismatch during the year. VW expects deliveries of 9.0 million to 9.5 million in 2023, up 8% to 15% above 2022 level.

Profitability is expected to benefit from the group's modular tool kit strategy and cost reductions, despite significant investment requirements

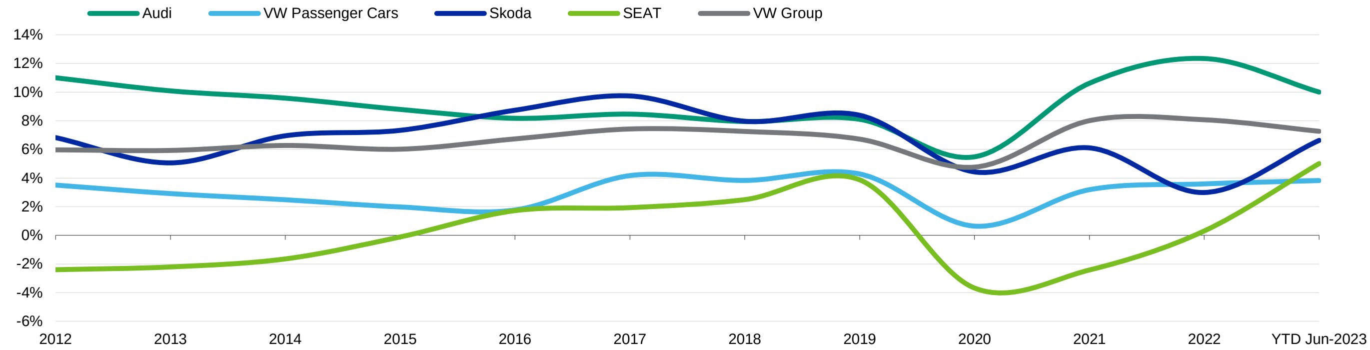
The ongoing strong consumer demand allowed VW, as well as its large peers, to maintain strong margins (including less price discounts) and successfully pass on increased production cost to customers. Moreover, VW has benefited from positive mix effects, as it allocated available semiconductors to the more profitable vehicles.

Therefore, VW's operating profit before special items amounted to €22.5 billion in 2022 (8.1% margin, company reported), exceeding pre-pandemic levels of €19.3 billion (7.6% margin in 2019) and substantially above the €10.6 billion (4.8% margin) in 2020. VW's operating margin in H1 2023 decreased to 7.3% in H1 2023 (H1 2022: 10.0%), largely driven by the valuation of derivatives outside hedge accounting, whose effect we expect to pass through in the short term. Adjusted for that, VW's margin amounted to 8.9% in H1 2023, almost at strong levels of 9.1% H1 2022.

VW is taking steps to improve its overall cost effectiveness. The group's ongoing strategy to drive economies of scale in unit cost through the global rollout of its MQB (Modularer Querbaukasten) platform will play a key role in enhancing the profitability of its mass-market brands. The effects of the strategy were, so far, most visible at the SKODA and SEAT/CUPRA brands, with their operating margins improving (as reported by VW) by around three and six percentage points, respectively, in 2013-19. This trend was interrupted in 2020, when the profitability of all brands was hurt by the pandemic, with Spain, where SEAT is located, being particularly hit.

Exhibit 5

Positive market conditions YTD June 2023 benefited manufacturers' profitability

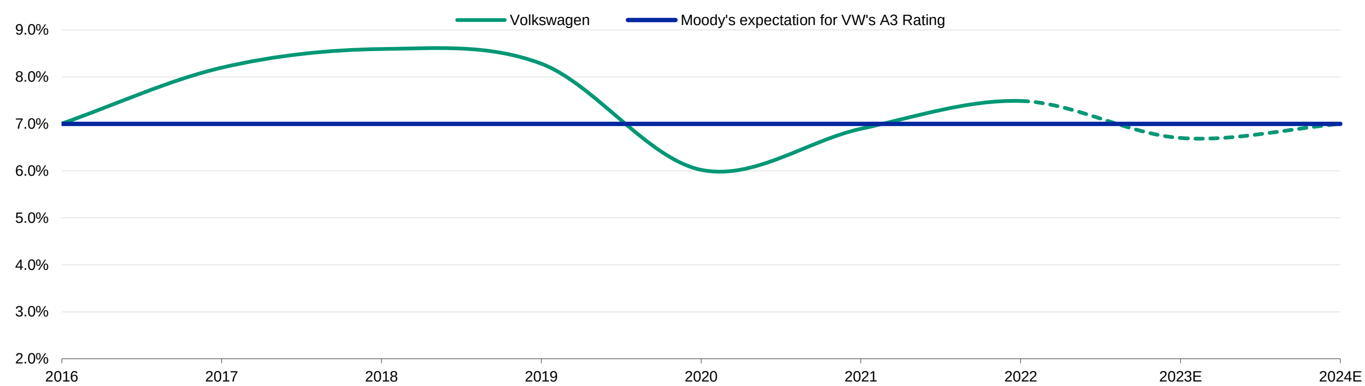


Excluding intercompany profit, special items and results from joint ventures; VW Group's operating margin before special items slightly increased to 8.1% in 2022 from 8.0% in 2021.
Source: Company and Moody's Investors Service

Volkswagen aims to gradually improve its profitability and announced a new strategic plan in June 2023. It includes a front-loaded investment plan in 2023 with investment ratio (R&D and capital expenditure) of around 14.5% in 2023, gradually declining to a maximum of 11% in 2027. It should support the continuous baseline development of the group's products (9%), with the remaining 5.5% supporting their brand competitiveness, software development (CARIAD) as well as battery supply availability and other strategic topics. The group also aims to cut overhead cost, reduce its total number of model variants, and streamline its modular architectures further, reducing them to four major variants. Therefore, VW plans to improve group margins to 8% to 10% in 2027 and 9% to 11% in 2030. For 2023, Volkswagen aims for a margin between 7.5% to 8.5% (before special items), from 8.0% in 2021 and 8.1% in 2022.

Exhibit 6

VW's profitability will come down slightly versus 2022, given the challenging and highly competitive automotive sector environment
EBITA margins (Moody's adjusted)



Including at equity contribution of Chinese JVs, in line with Moody's global standard adjustments
Source: Moody's Financial Metrics (MFM), Moody's Investor Service's estimates

We expect that VW's margins will fall slightly in 2023. The recovery in the automotive industry, improving supplies with semiconductors and lower raw material prices will support margins. However, price inflation of parts supplied and rising salaries will be constraining factors for VW's profitability. In addition, the high R&D expenses as well as the weakening consumer sentiment at times of high price inflation and increasing interest rates will weigh on mix and pricing effects, resulting in a slight decline of margins. We expect VW's EBITA margins to remain between 6.5%-7.0% in the next 12-18 months slightly below 2022 level of 7.5%. We also expect Moody's-adjusted debt/EBITDA to remain below 2.0x within the next 12-18 months (1.5x at the end of June 2023), a level also appropriate for its A3 rating.

Strong divergence in profitability across passenger car brands; profitability improvements targeted at brand group "Core"

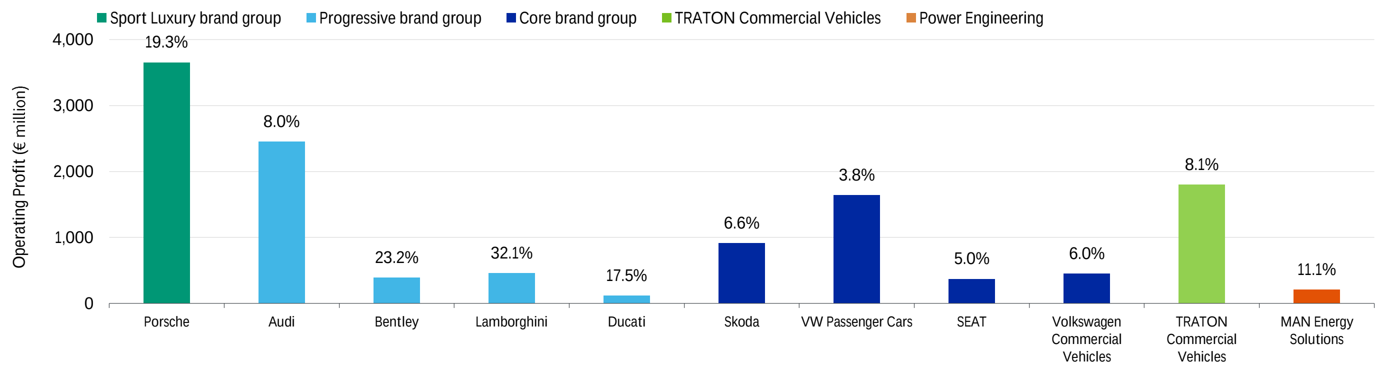
While VW's premium brands continue to drive earnings, higher profitability at the group's other brands is key to the group's objective of achieving a sustainable operating margin before special items of 8%-10% by 2027. In 2021 and 2022, the Audi and Porsche brands alone accounted for above 50% of the group's operating profit (excluding the intercompany profit, special items and results from JVs, and accounting for only 16% of the group's unit sales volumes in 2022), with an average operating margin of 12.7% and 14.6% in 2021 and 2022 respectively.

In 2022, Volkswagen's brand group "Core", comprising VW Passenger Cars, SKODA/Cupra, SEAT and VW Commercial Vehicles, reported operating margins (before special items) of only 3.6% (2021: 3.4%), in line with the profitability of the VW passenger car brand. In the first half of 2023, the profitability of brand group "Core" increased to 5.5%, driven by a strong improvements at SEAT and SKODA, while the profitability of the VW passenger car brand remained at just 3.8%.

Exhibit 7

Profitability of the Volkswagen Passenger Cars brand is key to achieving higher operating margins at the group level

Reported operating profit and margin by brand and business field YTD June 2023



Excluding intercompany profit, special items and results from joint ventures.
Margin of brand group Progressive: 10.0%, brand group Core: 5.5%
Source: Company and Moody's Investors Service

VW's strategy is to unlock the VW's brands competitive strengths and protect current high margins in the premium segments. Expected improvements of the group's return on sales are mainly driven by higher profitability targets for the brand group "Core", where return on sales should increase to around 8% by 2027. However, we note that VW has been attempting to improve the margins for the brand group "Core" for a long time with a very mixed track record so far.

The execution of the strategy, will, however, be a major challenge for Volkswagen and its main brand Volkswagen Passenger Cars, especially in light of the ongoing electrification of its product portfolio in a highly competitive market segment. Moreover, high investments into the software architecture will continue to weigh on profitability.

Emissions issue-related cost consumed significant amounts of capital, but most of the payments have already been made

Despite the substantial provisions to settle the diesel issue (as Exhibit 5 shows) and the difficult market conditions, we positively note the solid operating performance of the Volkswagen Group over the last years (predominantly driven by the Porsche and Audi brands). Special items in 2021 and 2022 were primarily related to the diesel issue and totaled around €0.8 and €0.4 billion respectively, significantly lower than the €2.3 billion in 2019 and €3.2 billion in 2018. Lawsuits in many regions worldwide are still ongoing, including the US, Canada, Germany, Italy and the Netherlands. In the US, the Ohio Supreme Court recently declined to dismiss certain claims brought by Ohio, and Volkswagen subsequently sought a review by the US Supreme Court. At this stage, most of the payments related to the diesel issue, totaling to cost of around €33 billion, were already made in 2016-20 (€28.8 billion). In 2021 and 2022, outflows amounted only to another €1 billion each.

Exhibit 8

VW's remediation and litigation overview

Year	Amount
2015	Legal €7.0 billion Other items €9.2 billion
2016	Mainly legal risks €6.4 billion
2017	Buyback/retrofit program + legal €3.2 billion
2018	Legal €3.2 billion (includes a fine imposed by the public prosecutor in Braunschweig and Munich)
2019	€2.3 billion (includes a fine imposed by the Stuttgart Public Prosecutor on Porsche AG of €0.5 billion and further additions to reserves for legal risks)
2020	€0.9 billion additional legal cost
2021	€0.7 billion special items
2022	€0.3 billion special items
H1 2023	no special items booked
Total	**€33.2 billion**

Source: Company and Moody's Investors Service

Given VW's sizeable liquidity position, we expect that remaining outflows for the diesel issue will remain manageable, assuming that the current level of provisions is sufficient. However, we believe that the funds paid to resolve the diesel issue otherwise could have been used for investments in future products or to strengthen the company's credit metrics.

IPO of Porsche led to substantial cash proceeds, but has made governance more complicated

The IPO of VW's subsidiary Dr. Ing. h.c. F. Porsche AG (Porsche AG) at the end of September 2022 and the sale of a minority stake to Porsche Automobil Holding SE (Porsche Holding) have lead to total proceeds of approximately €19.2 billion. Even after the payment of a special dividend of €9.6 billion in early 2023, the transaction has improved VW's financial flexibility, a credit positive. At the same time, credit negative factors are the increased organizational complexity of VW's governance, and the cash leakage within the group due to the new minority shareholders going forward, and the fact that there are now minority shareholders at the most profitable entity within the group. Moreover, Porsche's CEO was also appointed Volkswagen's CEO as of September 2022, which can lead to conflicts of interests between both roles. Our calculation of debt for the VW group does not include the debt that has been incurred at the Porsche Holding level (€7.0 billion, as of March 2023), but, at the same time, debt service at Porsche Holding will have to come primarily from dividend payments from both VW AG as well as Porsche AG.

Since 29 September 2022, Volkswagen's previously wholly owned subsidiary Porsche AG (Porsche) has been publicly listed at the Frankfurt stock exchange. Porsche has been fully embedded in the VW Group and is a technology leader in many categories that are later rolled out to the wider VW group. Porsche’s shares are split into 50% ordinary shares and 50% preference shares. 24.2% of the preference shares are owned by free float investors, and 25% plus one share of the ordinary shares are now owned by Porsche Automobil Holding SE (Porsche Holding), Volkswagen's main shareholder.

Strong emphasis on electrification will require ongoing high investments but should help to protect the group's strong market position and comply with stricter emission regulation

The global automotive industry is currently undergoing a structural transformation towards alternative fuel vehicles (AFVs), including battery electric vehicles (BEVs) and hybrid vehicles. In our report Electrification momentum is strong, automakers must invest to stay competitive, published April 2023, we forecast that the share of BEVs will approach about a third of global light vehicle sales in 2030 and around half by 2035, compared with only 10% in 2022.

Execution risk around the transition to electric vehicles continues to be significant. The global automotive industry remains at an early stage of a significant long-term transition to reduce carbon emissions by improving fuel efficiency and shifting to fully electric vehicles. Key risks for automakers, including Volkswagen, include a loss of market share, inability to earn adequate profits and returns on electric vehicles, as well as inability to manufacture vehicles due to potential constraints in the supply of critical materials.

Volkswagen's share of BEVs has increased sharply over the last three years, from less than 1% in 2019 (73,700 units), 2.5% in 2020, 5.1% in 2021, to 6.9% in 2022 (572,100 units). In the first half of 2023, BEV deliveries increased by 49% to 322 thousand vehicles, and accounted for 7.4% of the group's light vehicle deliveries. We believe that Volkswagen has a credible strategy to navigate the EV transition. The company aims to increase its BEV share to around 20% in 2025 and around 50% in 2030 (with a higher share of 60% in Europe).

Sourcing of batteries is key to Volkswagen's strategy. The group expects its EV battery demand to increase from around 100 GWh in 2023 to more than 150 GWh in 2025 and more than 450 GWh in 2030. The group currently sources from large battery suppliers such as LG Chem, Ltd. (A3 stable), Samsung SDI, SKI (Baa3 negative) and CATL (Baa1 stable). VW has recently set up its subsidiary "PowerCo", a battery supplier, which is bundling VW's global battery business across the entire value chain. PowerCo will develop sizeable own battery production and thus reduce VW's dependence on external battery supplies. However, ongoing high investments into R&D and capital spending will also weigh on Volkswagen's profit margins and cash flow generation.

PowerCo should cover around 50% of the EV battery demand in 2030. Volkswagen has already announced three own plant developments in Salzgitter/Germany (40GWh), Valencia/Spain (40GWh, with 20GWh extension option) and in St. Thomas/Canada (up to 90GWh). In addition, one plant with up to 40 GWh production capacity will be developed in a JV with its partner Northvolt in Sweden. Moreover, the group aims to recycle up to 95% of raw materials. Volkswagen also plans to develop a network of 18,000 fast-charging points in Europe with its partners.

The group is planning significant investments into R&D and capital spending of €180 billion for the years 2023-27, equivalent to 12% of sales on average over the period. This compares to around 14.5% planned for 2023 (6%-6.5% capex, 8%-8.5% R&D), 13.7% spend in 2022 (5.5% capex, 8.2% R&D) and 12.7% in 2021 (5.1% capex, 7.6% R&D) and exceeds the company's investment target of around 9%, seen as a continuous baseline, given temporary additional investments into competitiveness (around 1%), EV batteries (around 1%) and other strategic topics. The sizeable investments illustrate Volkswagen's strong commitment to electrification and to reduce emissions of its fleet, which is subject to increasingly stricter environmental regulation (see our separate ESG section).

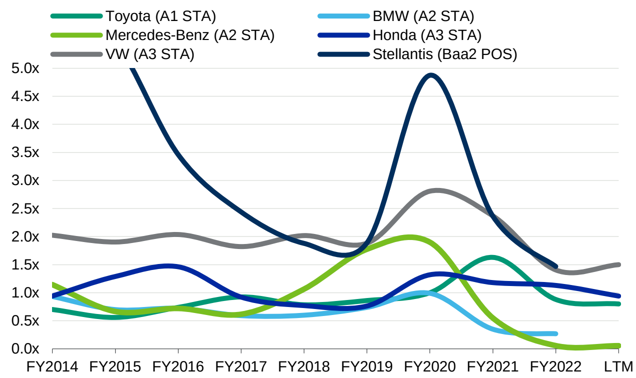
VW's ongoing high investment spending, including the 14.5% planned for 2023, indicate the need for substantial investment spending to implement the group's electrification and digitisation strategy, including high investments into software. VW's dedicated software subsidiary CARIAD was founded in 2020 and is pooling the group's software expertise to create a standardized operating system (VW.OS) for the group's vehicles. CARIAD, which employs 4,500 specialists, is responsible for the development of connectivity, infotainment, driver assistance and autonomous driving systems. CARIAD's solutions require high investments, and will be key to maintain the product appeal of the group's vehicles and defend its market positions. The process to develop such software has slowed down recently given the high complexity of the task.

Steady credit metrics, although somewhat weaker than those of its peers

VW's adjusted gross debt/EBITDA declined to 1.4x in 2022 on the back of increased profitability and decreased pension deficit from €40.1 billion as of 2021 to €26.8 billion as of 2022 due to higher interest rates. The pension adjustment is the largest adjustment we make to Volkswagen's gross debt which amounts €41.6 billion in total.

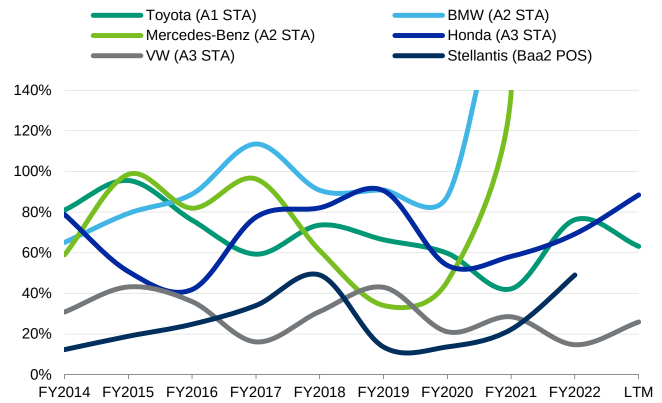
During the pandemic, the substantially weakened volumes and operating profitability resulted in a spike at 2.8x debt/EBITDA (Moody's adjusted) in 2020. VW remains somewhat higher levered compared to its single-A rating peers.

Exhibit 9
Peer comparison
Moody's-adjusted gross debt/EBITDA (capped at 5.0x)



Mercedes-Benz and Toyota are based on LTM that ended in March 2023, while VW on June 2023. Honda is based on LTM that ended December 2022. Stellantis' historical metrics until 2020 are based on FCA standalone.
Source: Moody's Financial Metrics™

Exhibit 10
Peer comparison
Moody's-adjusted retained cash flow/debt (capped at 140%)



Mercedes-Benz and Toyota are based on LTM that ended in March 2023, while VW on June 2023. Honda is based on LTM that ended December 2022. Stellantis' historical metrics until 2020 are based on FCA standalone.
Source: Moody's Financial Metrics™

In 2019, after two years of sizeable cash outflows for the diesel issue, the company's FCF generation turned around and improved by €11 billion to reach €8.8 billion. In 2020, despite the negative impact of the pandemic, VW still generated a sizeable positive FCF of €2.9 billion. Driven by the favorable market environment for automobile manufacturers and low litigation costs, VW improved its FCF generation to €9.2 billion in 2021. Free cash flow turned negative in 2022 to around -€8 billion due to the payment of €10 billion of special dividend as part of the Porsche IPO that we include according to our standard definition as outflow in our FCF calculation. Without this effect, Moody's-adjusted free cash flows amounted to around €2 billion in 2022, a level lower than 2021 mainly due to increase in capital expenditure by €4 billion to €22.5 billion in 2022.

We expect the cash flow generation to remain similar to 2022 and amount to around €3.0 billion in 2023 (after increased dividend payments and capex). We expect VW's FCF/Debt to remain between 7%-10% in our forward view.

Overall, the group has delivered fairly steady debt protection ratios in the last five years, although we consider the fact that these ratios are below those of other competitors that we rate in the single-A rating category such as Bayerische Motoren Werke Aktiengesellschaft (BMW, A2 stable) and Mercedes-Benz Group AG (A2 stable), as Exhibits 8 and 9 show.

Ability to offer attractive financing is a key component of VW's business model

VW's issuer rating incorporates our assessment of the company's captive finance operations because these operations represent an integral part of the group's business model as the availability of financing support is an important element in promoting product sales and maintaining its competitive position. Our approach is to analyse the finance business as a standalone entity and consider what capital or liquidity support may be necessary in a stress scenario, which is then considered in the context of VW's overall rating. As of 30 June 2023, the Financial Services division (including Scania Financial Services, Porsche Holding Salzburg Financial Services and Navistar Financial Services) had total assets of about €280 billion (48.2% of the broader group's assets) and an equity ratio of 15.4%, and generated an operating profit of €2.2 billion (1H 2023), down from €3.1 billion a year earlier driven by interest rates and an adverse effect from derivatives, that had contributed positively to 1H 2022 results.

In its leasing business, Volkswagen is exposed directly to residual value risk worldwide. In addition, Volkswagen also bears indirect residual value risk through the health of its dealerships. However, the continued solid operating and asset-quality performance of Volkswagen's Financial Services division will reflect Volkswagen's success in maintaining stable or growing levels of demand for and pricing power of its automotive brands. In addition, so far, residual values have not suffered significantly from the diesel-related issues and the transition to electric vehicles.

ESG considerations

Volkswagen Aktiengesellschaft's ESG Credit Impact Score is Highly Negative CIS-4

Exhibit 11
ESG Credit Impact Score

CIS-4
Highly Negative

NEGATIVE IMPACT
POSITIVE IMPACT

For an issuer scored CIS-4 (Highly Negative), its ESG attributes are overall considered as having a discernible negative impact on the current rating. The negative influence of the overall ESG attributes on the rating is more pronounced compared to an issuer scored CIS-3.

Source: Moody's Investors Service

VW's **CIS-4** indicates that the rating is lower than it would have been if ESG risk exposures did not exist. We downgraded VW to A3 when the Diesel issue emerged in 2015. Since then, the company has spent more than €30 billion for litigation and compensation payments, which otherwise could have been invested into the business. The main ESG risks relate to carbon transition and the high costs to manage it, and to company's relatively weak governance, which are both constraints to the rating.

Exhibit 12
ESG Issuer Profile Scores

ENVIRONMENTAL	SOCIAL	GOVERNANCE
E-4	S-4	G-4
Highly Negative	Highly Negative	Highly Negative

Source: Moody's Investors Service

Environmental
VW's **E-4** is driven by carbon transition, which is a high risk for the global auto sector in terms of stricter environmental regulation and the trend towards low and zero emission vehicles. VW has, however, taken mitigating actions by developing and successfully launching electrified vehicles (plug-in hybrids and battery electric vehicles) and investing sizeable amounts into future technologies. It also managed to reduce average fleet emissions in the EU substantially since 2020 and fully complied with the stricter targets since 2021.

Social
VW's **S-4** is driven by high risks in three categories: Human capital risks incorporate the strong reliance on a highly skilled workforce and high strike risks, given the high degree of unionization of production workforce. Responsible production risks are also high, given the complexity of the global supply chain and very high requirements for vehicle product quality. The high risks in terms of Demographic & Societal Trends include the heightened environmental awareness among consumers and the risk that brand loyalty among younger consumers might gradually fall.

Governance
VW's **G-4** is driven by the highly complex group structure, with multiple stakeholders, including the family owners, the German State of Lower Saxony and workers unions, and the existence of minority shareholders in key businesses, like Porsche AG, TRATON SE and the JVs in China. The history of high management turnover within the group, including the early replacement of the CEO in

September 2022, and the early replacement of the divisional CEO of Audi in June 2023, result in a weak management credibility and track record under Moody's ESG criteria, with the need to build credibility. These weaknesses are only partially mitigated by the company's conservative financial strategy and risk management.

ESG Issuer Profile Scores and Credit Impact Scores for the rated entity/transaction are available on Moodys.com. In order to view the latest scores, please click here to go to the landing page for the entity/transaction on MDC and view the ESG Scores section.

Carbon transition is Volkswagen's key environmental risk

We assess Volkswagen's environmental risks as high, in line with sector-wide risks of the automotive industry (see our environmental heat map, published October 2022). Environmental considerations are particularly relevant because these restrict the company's ability to reduce certain investments: Continued tightening of emissions standards and regulations across most major markets, because of environmental concerns, require investments into greater efficiency and electrification to maintain compliance and avoid fines or additional costs.

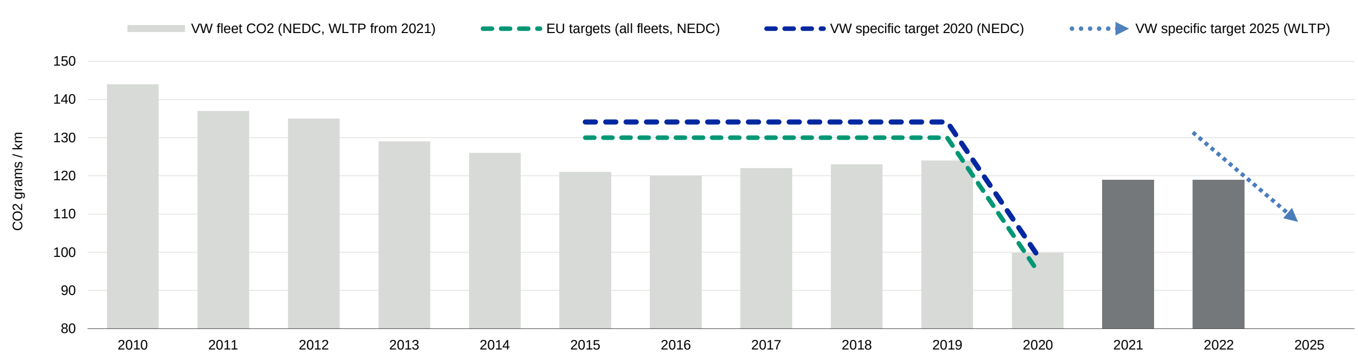
Volkswagen, like its competitors, faces stricter CO_2 emission targets set by the EU. Efforts to achieve these targets (as Exhibit 10 shows) and Volkswagen's aim of playing a leading role in the strategic areas for the future of connectivity, autonomous driving, mobility services and electric drive, as well as in the intelligent linking up of these areas, require substantial capital investments. We expect automotive manufacturers to continue to invest substantial amounts in R&D and capital spending to meet increasingly stringent hurdles imposed by CO_2 emissions regulations worldwide, as well as electrification expectations set by governments in the major automotive markets globally.

Committed to the Paris Agreement, Volkswagen has put in place a decarbonisation strategy, which includes a target of 30% CO_2 reduction over the life cycle of a vehicle by 2025, and 50% be 2030 versus 2018 and to be CO_2 neutral by 2050 at the latest in terms of both its products and its production. Within its €180 billion five-year investment plan for capital spending and R&D, Volkswagen has allocated a significant amount into the development of BEVs.

Since the beginning of this decade, Volkswagen managed to reduce CO2 emissions of the group's new passenger car fleet in the EU. In 2020, when the EU limit was lowered to 95 gram (g) CO per kilometre (km), implying Volkswagen's company-specific target of 99g/km, the company managed to reduce its fleet emissions by as much as 20%, missing the stricter target by only 0.8g/km. This significant improvement was driven by substantially higher sales of electrified vehicles (battery electric vehicles and plug-in hybrids), and lower sales volumes of conventional combustion engines during the pandemic.

In 2021, the calculation of CO2 emissions was changed from the old testing standard NEDC to the new standard WLTP. According to the WLTP standard, which typically leads to higher emissions, Volkswagen's emissions amounted to 119 g/km, and thus fully complied with the stricter regulatory maximum of 121 g/km. This was achieved due to various measures, including the continued launch of new electrified models (both, battery electric and plug-in electric vehicles), the launch of more efficient conventional models with internal combustion engines and the termination of production of older, inefficient models.

Exhibit 13
Volkswagen Group fleet CO_2 emissions complied with targets in 2022 but remained flat; further improvement needed for 2025



Sources: Company and Moody's Investors Service

As of 2025, the EU commission strives to reduce the CO_2 targets by another 15% versus 2021. VW's main driver to reduce fleet emissions is the launch of up to 70 new BEV (20 are already in production) and 60 PHEV models (more than half of there are in production) by 2030.

Liquidity analysis

In our theoretical scenario of no access to the capital markets for its manufacturing and financial services activities, Volkswagen had a coverage of more than 12 months of its corporate needs as of 30 June 2023. The group's liquidity position is supported by cash on balance sheet and short-term marketable securities (after a 20% haircut) of around €57.0 billion (as of 30 June 2023), as well as its cash flow generation in the next 12 months. In addition, VW has access to a significant amount of long-term committed credit facilities, totaling around €27.3 billion (as of December 2022). These credit facilities were partly drawn (€1.0 billion, well below 10%) as of the end of December 2022.

Methodology and scorecard

For the ratings of VW, we have applied our Automobile Manufacturer Industry rating methodology, published in May 2021. The historic scorecard-indicated outcome indicates Baa1, one notch below the actually assigned rating of A3. The historic scorecard outcome is negatively impacted by the one-time dividend following the Porsche IPO, leading to a Ca subfactor score for FCF/Debt.

On a 12-18 month forward view, the scorecard-indicated outcome is A3, in line with VW's actual rating assigned.

Exhibit 14
Rating Factors

Auto Manufacturer Industry Scorecard [1][2]	Current LTM 6/30/2023		Moody's 12-18 Month Forward View As of 8/2/2023 [3]	
Factor 1 : Business Profile (40%)	**Measure**	**Score**	**Measure**	**Score**
a) Trend in Global Unit Share Over Three Years	Baa	Baa	Baa	Baa
b) Market Position and Product Breadth/Strength	A	A	A	A
Factor 2 : Profitability and Efficiency (20%)				
a) EBITA Margin	6.3%	Ba	6.5% - 7.5%	Baa
Factor 3 : Leverage and Coverage (30%)				
a) Debt / EBITDA	1.5x	Aa	1x - 1.5x	Aa
b) (Cash + Marketable Securities) / Debt	103.3%	A	100% - 120%	A
c) RCF / Debt	25.9%	Baa	25% - 45%	Baa
d) FCF / Debt	-23.8%	Ca	5% - 10%	Ba
e) EBITA / Interest Expense	5.8x	Baa	6x - 8x	A
Factor 4 : Financial Policy (10%)				
a) Financial Policy	A	A	A	A
Rating:				
a) Scorecard-Indicated Outcome		Baa1		A3
b) Actual Rating Assigned				A3

[1] All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
[2] As of 6/30/2023.
[3] This represents Moody's forward view, not the view of the issuer, and unless noted in the text, does not incorporate significant acquisitions and divestitures. RCF and FCF are before payment of the special dividend for the Porsche IPO.
Source: Moody's Financial Metrics™

Ratings

Exhibit 15

Category	Moody's Rating
VOLKSWAGEN AKTIENGESELLSCHAFT	
Outlook	Stable
Issuer Rating	A3
Sr Unsec Bank Credit Facility -Dom Curr	A3
Senior Unsecured MTN -Dom Curr	(P)A3
Commercial Paper -Dom Curr	P-2
VOLKSWAGEN GROUP OF AMERICA FINANCE, LLC	
Outlook	Stable
Bkd Senior Unsecured	A3
Bkd Commercial Paper	P-2
VOLKSWAGEN FINANCIAL SERVICES AUSTRALIA LTD	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	A3
Bkd Commercial Paper	P-2
Bkd Other Short Term -Dom Curr	(P)P-2
VOLKSWAGEN INTERNATIONAL FINANCE N.V.	
Outlook	Stable
Bkd Senior Unsecured	A3
Bkd Jr Subordinate -Dom Curr	Baa2
Bkd Commercial Paper -Dom Curr	P-2
Bkd Other Short Term -Dom Curr	(P)P-2
VOLKSWAGEN FINANCIAL SERVICES JAPAN LTD.	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	A3
Bkd Commercial Paper -Dom Curr	P-2
Bkd Other Short Term	(P)P-2
VOLKSWAGEN FINANCIAL SERVICES N.V.	
Outlook	Stable
Bkd Senior Unsecured	A3
Bkd Commercial Paper -Dom Curr	P-2
VOLKSWAGEN FINANCIAL SERVICES AG	
Outlook	Stable
Issuer Rating	A3
Senior Unsecured	A3
Commercial Paper -Dom Curr	P-2
VW CREDIT, INC.	
Outlook	Stable
Bkd Commercial Paper	P-2
Bkd Other Short Term	(P)P-2
VOLKSWAGEN LEASING GMBH	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	A3
Bkd Commercial Paper -Dom Curr	P-2
Bkd Other Short Term -Dom Curr	(P)P-2
VW CREDIT CANADA, INC.	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	A3
Bkd Commercial Paper -Dom Curr	P-2
Bkd Other Short Term	(P)P-2
VOLKSWAGEN BANK GMBH	
Outlook	Stable
Bank Deposits	A1/P-1
Issuer Rating	A1
Senior Unsecured MTN -Dom Curr	(P)A1
Subordinate -Dom Curr	Baa1

Commercial Paper -Dom Curr	P-1
Other Short Term -Dom Curr	(P)P-1
TRATON FINANCE LUXEMBOURG S.A.	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	Baa2
PORSCHE HOLDING GESELLSCHAFT M.B.H.	
Outlook	No Outlook
Bkd Commercial Paper -Dom Curr	P-2
VOLKSWAGEN INTERNATIONAL LUXEMBURG S.A	
Outlook	No Outlook
Bkd Commercial Paper -Dom Curr	P-2
TRATON SE	
Outlook	Stable
Issuer Rating -Fgn Curr	Baa1
Issuer Rating -Dom Curr	Baa2
Senior Unsecured MTN -Fgn Curr	(P)Baa1
Senior Unsecured MTN -Dom Curr	(P)Baa2
TRATON TREASURY AB	
Outlook	Stable
Bkd Sr Unsec MTN -Fgn Curr	(P)Baa1
Bkd Sr Unsec MTN -Dom Curr	(P)Baa2
SKOFIN S.R.O.	
Outlook	No Outlook
Bkd Commercial Paper -Dom Curr	P-2
VOLKSWAGEN INTERNATIONAL BELGIUM S.A.	
Outlook	No Outlook
Commercial Paper -Dom Curr	P-2
VOLKSWAGEN GROUP CANADA, INC.	
Outlook	No Outlook
Bkd Commercial Paper -Dom Curr	P-2
VOLKSWAGEN GROUP OF AMERICA, INC.	
Outlook	No Outlook
Bkd Commercial Paper	P-2

Source: Moody's Investors Service

Appendix

Exhibit 16

Peer group

	Volkswagen AG A3 Stable			Toyota Motor Corporation A1 Stable			BMW AG A2 Stable			Mercedes-Benz Group AG A2 Stable			Stellantis N.V. Baa2 Positive		
	FYE	FYE	LTM	FYE	FYE	FYE	FYE	FYE	FYE	FYE	FYE	LTM	FYE	FYE	FYE
(in USD million)	Dec-21	Dec-22	Jun-23	Mar-21	Mar-22	Mar-23	Dec-20	Dec-21	Dec-22	Dec-21	Dec-22	Mar-23	Dec-20	Dec-21	Dec-22
Revenue	244,011	244,918	265,878	236,788	259,288	254,715	94,888	116,214	133,615	125,358	129,700	131,096	98,768	176,786	189,278
Total Debt	70,929	47,914	47,585	44,405	29,686	28,471	8,170	5,638	5,034	10,940	1,317	1,341	32,526	50,368	37,934
Cash + Marketable Securities	49,087	59,660	49,168	63,821	52,137	48,074	16,737	19,268	18,112	27,660	21,413	24,504	28,987	58,602	54,169
EBITA Margin %	6.9%	7.5%	6.3%	9.3%	11.3%	10.4%	3.0%	10.0%	10.0%	12.6%	14.5%	14.6%	2.3%	9.9%	10.9%
EBITA / Interest Expense	9.2x	6.1x	5.8x	34.5x	48.4x	35.8x	14.8x	72.2x	49.8x	43.5x	88.0x	144.8x	1.5x	13.2x	11.3x
(Cash + Marketable Sec.) / Debt	69.2%	124.5%	103.3%	143.7%	175.6%	168.9%	204.9%	341.7%	359.8%	252.8%	1625.9%	1827.7%	89.1%	116.3%	142.8%
Debt / EBITDA	2.3x	1.4x	1.5x	1.6x	0.9x	0.8x	1.0x	0.3x	0.3x	0.5x	0.1x	0.1x	4.9x	2.4x	1.5x
FCF / Debt	14.8%	-17.8%	-23.8%	10.2%	23.4%	29.1%	7.1%	94.9%	-8.9%	60.5%	232.7%	320.5%	-1.2%	6.7%	21.9%
RCF / Debt	28.9%	14.7%	25.9%	42.2%	76.2%	63.1%	87.7%	203.3%	187.4%	138.6%	858.8%	919.1%	13.6%	22.2%	49.0%

All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Source: Moody's Financial Metrics™

Exhibit 17

Moody's-adjusted debt breakdown

	FYE	FYE	FYE	FYE	FYE	LTM
(in EUR million)	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Jun-23
As Reported Total Debt	**12,683**	**10,280**	**12,831**	**14,402**	**10,918**	**9,743**
Pensions	32,866	38,195	44,853	40,750	26,916	26,916
Operating Leases	5,361	0	0	0	0	0
Hybrid Securities	6,298	6,332	7,857	7,220	7,061	6,957
Non-Standard Adjustments	2,364	574	0	0	0	0
Moody's Adjusted Total Debt	**59,572**	**55,381**	**65,541**	**62,372**	**44,895**	**43,616**

Source: Moody's Financial Metrics™

Exhibit 18

Moody's-adjusted EBITDA breakdown

	FYE	FYE	FYE	FYE	FYE	LTM
(in EUR million)	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Jun-23
As Reported EBITDA	**30,066**	**33,613**	**28,957**	**34,495**	**38,962**	**37,298**
Pensions	26	(23)	(91)	(2)	22	22
Operating Leases	1,690	0	0	0	0	0
Capitalized Development Costs	(5,234)	(5,171)	(6,473)	(7,836)	(9,723)	(10,158)
Unusual	2,971	1,237	900	(20)	2,676	2,676
Interest Expense - Discounting	0	(238)	0	0	0	0
Moody's Adjusted EBITDA	**29,519**	**29,418**	**23,293**	**26,637**	**31,937**	**29,838**

Source: Moody's Financial Metrics™

Exhibit 19

Summary financials

(in EUR million)	FYE Dec-18	FYE Dec-19	FYE Dec-20	FYE Dec-21	FYE Dec-22	LTM Jun-23
INCOME STATEMENT						
Revenue	201,067	212,473	182,106	206,237	232,385	253,888
EBIT	16,607	16,914	10,009	13,246	16,141	14,643
EBITA	17,279	17,596	10,966	14,221	17,401	15,903
EBITDA	29,519	29,418	23,293	26,637	31,937	29,838
BALANCE SHEET						
Cash & Cash Equivalents	37,545	33,225	41,725	43,165	55,901	45,067
Total Debt	59,572	55,381	65,541	62,372	44,895	43,616
CASH FLOW						
Capital Expenditures	(16,276)	(15,017)	(12,165)	(11,749)	(13,801)	(15,270)
Dividends	2,202	1,295	2,954	3,324	13,863	14,484
Retained Cash Flow (RCF)	18,487	23,795	13,817	17,997	6,593	11,303
RCF / Debt	31.0%	43.0%	21.1%	28.9%	14.7%	25.9%
Free Cash Flow (FCF)	(2,133)	8,821	2,893	9,205	(7,978)	(10,385)
FCF / Debt	-3.6%	15.9%	4.4%	14.8%	-17.8%	-23.8%
PROFITABILITY						
% Change in Sales (YoY)	2.7%	5.7%	-14.3%	13.3%	12.7%	21.9%
SG&A % of Sales	12.9%	12.8%	13.4%	12.6%	11.3%	11.0%
EBIT Margin %	8.3%	8.0%	5.5%	6.4%	6.9%	5.8%
EBITA Margin %	8.6%	8.3%	6.0%	6.9%	7.5%	6.3%
EBITDA margin %	14.7%	13.8%	12.8%	12.9%	13.7%	11.8%
INTEREST COVERAGE						
EBIT / Interest Expense	14.4x	10.0x	6.5x	8.6x	5.6x	5.3x
EBITA / Interest Expense	14.9x	10.4x	7.1x	9.2x	6.1x	5.8x
EBITDA / Interest Expense	25.5x	17.3x	15.1x	17.3x	11.1x	10.8x
(EBITDA - CAPEX) / Interest Expense	11.5x	8.5x	7.2x	9.7x	6.3x	5.3x
LEVERAGE						
Debt / EBITDA	2.0x	1.9x	2.8x	2.3x	1.4x	1.5x
Debt / (EBITDA - CAPEX)	4.5x	3.8x	5.9x	4.2x	2.5x	3.0x
LIQUIDITY						
(Cash + Marketable Securities) / Debt	63.0%	60.0%	63.7%	69.2%	124.5%	103.3%

All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Source: Moody's Financial Metrics™

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