

VOLKSWAGEN GROUP

AUTOMOTIVE

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COMPANY REPORT

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Growing after the emissions scandal

Entering into a "greener" market...

- Volkswagen Group is under a lot of pressure after the emissions scandal. First there is a liquidity concern, second the consequences in its market share.
- 2016 sales figures shown luxury cars demand has more than compensated the decrease in mass market VW Group cars triggered by the scandal.
- Commercial Vehicles business unit expects no considerable direct short-term effect of the scandal, protected by long term contracts with customers, which are mainly corporations.
- VW Group's Trucks expect to maintain and intensify their leader position in Europe, after the acquisition of MAN and Scania. Power Engineering business unit expects smooth sales decrease following the market trend.
- Passenger cars business unit has started to expand their portfolio to include more electric cars, in order to maintain sustainably their overall passenger cars market share.
- Volkswagen Group has started the "e-initiative" to invest and grow their still small market share in this electric cars' segment. It is expected CAPEX to revenues ratio of 7% for the following years to fund new production lines, which should be producing at least 30 full electrical car models by 2025.

Company description

Volkswagen Group is the second biggest automaker in the world, comprising more than 12 brands. Its automotive division includes production of passenger cars, light-commercial vehicles, trucks and power engineering. Besides the automotive division, Volkswagen Group also has a financial services division to potentiate and support financially the selling activity of its vehicles.

Recommendation: BUY

Price Target FY17: 204.37 €

Dividends Forecast FY17 9.77 € per share

Price (as of 6-Jan-17) 139.10 €

Bloomberg: VOW3:GR

52-week range (€) 92.70 - 143.10

Market Cap (€m) 70,842

Outstanding Pref. Shares (m) 206.205

Source: Bloomberg

(Values in € millions)	2015H	2016E	2017F
Revenues	213,292	223,810	230,229
EBITDA	14,383	32,338	33,742
Net Profit	(1,363)	9,901	9,004
EPS	-6.61	48.02	43.67
P/E		(19.99)	4.89

Source: Company Data, NOVA Research Team

THIS REPORT WAS PREPARED BY "STUDENT'S NAME", A MASTERS IN FINANCE STUDENT OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS, EXCLUSIVELY FOR ACADEMIC PURPOSES. THIS REPORT WAS SUPERVISED BY ROSÁRIO ANDRÉ WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (SEE DISCLOSURES AND DISCLAIMERS AT END OF DOCUMENT)

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Executive summary

VW Group's value comes mainly from the automotive division and we should look to the financial division as a complementary and non-operational division. VW Group have a considerable position in the Chinese automotive market. However, the company's presence in China is done mainly by three joint ventures that produce and sell the cars there. There are just a few sales in China from VW Group that are indeed produced by a fully owned subsidiary (mainly just luxury cars produced outside China). So almost 43% of the total VW Group's sales we can count to be visible just in these joint ventures, which are not consolidated into the company's financials. For that reason, they were valued separately and added in the end to the VW Group forecasted equity value.

Company Overview

Volkswagen Group is a public German multi-national car manufacturer company, which is present in the stock market with the tickers VOW (ordinary shares)¹ and VOW3 (preferred shares)². The group started first as a single car brand – Volkswagen – in 1937. Over the years, Volkswagen started to acquire other car, truck and motorcycle brands creating the Volkswagen Group. Nowadays, according to its 2016 third quarter figures, it is currently the second biggest automaker in the world, delivering almost the same number of vehicles as Toyota (the biggest automaker).

Although Volkswagen Group has operations all over the world, in approximately 150 countries³, its most important markets are Europe (43% of total sales) and Asia-Pacific (also 43% of total sales).

Business Structure

Volkswagen Group is organized into 2 divisions: Automotive and Financial Services. The first is responsible for the production, development and sale of vehicles and engines. This same division includes 2 different business units: Passenger Cars and Commercial Vehicles / Power Engineering.

In the passenger cars business unit VW Group has 9 brands: Volkswagen passenger cars, Audi, Lamborghini, Bugatti, Ducati, Skoda, SEAT, Bentley and Porsche. All these brands ensure a diversified product portfolio to VW Group in the passenger cars market, being present in the 3 most important segments: utilitarian,

¹ Ordinary shares have voting rights and normal dividends.

² Preferred shares have no voting rights but they have a € 0.06 higher dividend than normal dividends.

³ Taylor III, Alex (23 July 2012). "Das Auto Giant". *Fortune*. 166 (2): 150–155. Retrieved 28 July 2012.

luxury and sportive cars. The purchase of Ducati brand in 2012 shows that VW Group is continuing to diversify at most its portfolio, going even into the motorcycles market. In terms of revenue this is the biggest business unit of the group, representing almost $\frac{3}{4}$ of total revenues in 2016. In terms of Operating Result (EBIT) this business unit is also the second most profitable, counting with an expected margin of 5.4% in 2016.

In the Commercial Vehicles / Power Engineering business unit there are 3 brands: Volkswagen commercial vehicles, MAN and Scania, which are mainly dedicated to the production of light commercial vehicles, buses and trucks. VW Group has been looking to enforce its position on the market segment of heavy trucks, purchasing in the last 8 years MAN and Scania and becoming this way the largest heavy truck manufacturer in Europe. The Power Engineering is a small part of this business unit, which produces large-bore diesel engines, turbomachinery, compressors and other power systems and gear, mainly for marine and stationary applications. Being the Power Engineering a declining sector and the commercial vehicles a smaller market than passenger cars, this business unit is expected to represent just 14% of the total group revenue in 2016. Its operating result (EBIT) has the smallest margin of the group, expecting to be 3.3% in 2016. This is due to the higher depreciation & amortization costs than in the passenger cars business unit.

Finally, the second division (financial services) offers dealer & customer financing, leasing, direct bank, insurance, fleet management and mobility offerings. The aim of this division is to potentiate and support financially the selling activity of the automotive division. Its revenue is mainly income from interests and commissions and depends heavily on the sales of the automotive division. Being a non-operating division, it has the smallest weight on the total revenue of VW Group. However, in terms of result the financial services division has the good margin, expecting to generate 7.3% of EBT in 2016.

Besides these two divisions, the VW Group has significant equity investments in 4 joint-ventures and 5 associates. In the 4 joint-ventures, three of them – that represent more than 50% of the total investments value – are investments in passenger cars manufacturing and sales companies in China (FAW-Volkswagen Automotive Company, SAIC-Volkswagen Automotive Company and SAIC-Volkswagen Sales Company), and one is an investment in a Dutch company (Global Mobility Holding) that had the purpose of holding 100% of LeasePlan shares, which were entirely sold in 2016. LeasePlan is a financial services company that leases and manages fleet. The sale of this company to an international consortium of investors provided to the VW Group additional liquidity,

which was extremely valuable to face the emissions scandal. Moreover, the agreed sale price enabled the VW Group to get an income of € 0.2 billion with this operation. In the 5 associates, three of them are publicly traded (Sinotruk Hong Kong Ltd, Bertrandt, and Navistar International Corp.) and two are private (GT Gettaxi Limited - GETT, and There Holding). Sinotruk Hong Kong Ltd is a truck manufacturer in Hongkong, China and the objective of VW Group with this partnership is to potentiate VW Trucks exports to China in both volume and premium segment. Bertrandt is a German company that offers engineering services for the automotive/aviation industry. Navistar International Corp. is an American commercial vehicles manufacturer and VW Group is looking to buy 16.6% of its equity no later than the beginning of 2017. GT Gettaxi Limited - GETT is an on-demand mobility services company based in Israeli. Lastly, There Holding is a company based in the Netherlands and owns 100% the HERE Group, which develops and sells high resolution maps. All of these last four investments in associates were done to promote partnerships for strategic technology and supply cooperation.

All of these equity investments are not consolidated into the group's financials, amounting to the following values in the VW Group's balance sheet in the end of 2015:

Assets (under the name "Equity-accounted Investments")	Dec 31, 2015 (€ million)
<i>Joint-Ventures:</i>	
FAW-Volkswagen Automotive Company	2,918
SAIC-Volkswagen Automotive Company	2,754
SAIC-Volkswagen Sales Company	152
Global Mobility Holding	1,950
<i>Associates:</i>	
Sinotruk Hong Kong Ltd	318
Bertrandt	332
Navistar International Corp.	NA
GT Gettaxi Limited - GETT	NA
There Holding	668

Shareholder structure

In December 31, 2015 (last official disclosure about the group's shareholder structure), the biggest shareholder of Volkswagen Group was Porsche Automobil Holding SE, with 30.8% (of the subscribed capital). Although the Volkswagen Group is a German-based company, the second biggest group of shareholders is foreign institutional investors with 21.1%. Third, there is the Qatar Holding LLC with 14.6%. Then there is State of Lower Saxony with 11.8%. Lastly there is private shareholders/others with 19.4% and German institutional investors with 2.3%.

Comparing this structure with 2014 structure, we see that there was a transfer of equity from all the group of investors to private shareholders. In fact, the only “slice” of this chart increasing from 2014 to 2015 is the private shareholders, meaning all the other groups of investors transferred equity to this first group.

Economy and Industry Outlook

Starting by looking to the automotive industry globally we can identify several important recent events. First, with special importance in the European economy there is the Brexit (i.e. the possibility of the United Kingdom leaving the European Union). In June 23rd, 2016, there was a referendum in the UK to find out the will of the country to leave the EU and the result was a win for the “Yes” supporters. Being London the world finance centre, this result had a massive impact on the global markets. More specifically, the British pound fell dramatically, empowering the exports and slowing down the imports of the country. The main automotive manufacturing facilities in the UK belong to the companies: Toyota, Nissan, Tata Motors, BMW Group. Volkswagen Group has a small manufacturing facility in the UK for Bentley (brand for the luxury passenger cars segment), with a residual production compared to the other plants⁴. Thus, to buy non-luxury cars from Volkswagen Group, British citizens have to import the cars, which is now more expensive than buying cars that are produced in the country (due to the British pound devaluation). In other words, the Brexit brought competitive disadvantages for VW Group in the biggest car segments (e.g. economy, executive, premium). Furthermore, the fact Toyota is the second biggest automaker in the world with a major and stabilized presence in the British market⁵, reinforces the difficulty for Volkswagen Group to gain market share in the UK. Regarding the upcoming years, although there is still some uncertainty (i.e. it is still needed Parliamentary approval), the process for the UK’s exit from the EU is expected to be triggered in March 2017 and could be finalized by the end of 2018⁶.

Second, continuing in the European outlook, we have the negative interest rates of the European Central Bank that have considerable effects on the economy. Negative interest rate means you have to pay to deposit your money in the bank. That was exactly what the European Central Bank have done in March 2016, when set the depositary rates at -0.4%⁷. The main reason was to fight back the threat of deflation and push prices up to inflation again, stimulating economic growth. In fact, by penalizing who wants to hold excess cash, the ECB indirectly

⁴ Annual production of 10,014 cars, according to “Automotive Industry in the United Kingdom.” *Wikipedia*. Wikimedia Foundation, n.d. Web. 30 Dec. 2016

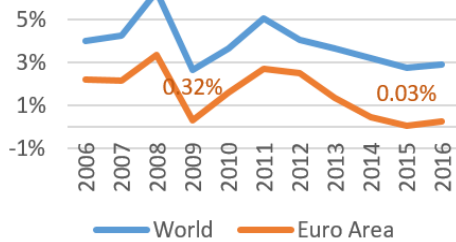
⁵ “Motor Industry Facts 2010” (PDF). *SMMT*. Archived from the original (PDF) on 27 November 2010. Retrieved 28 February 2011.

⁶ Foster, Alice. “EU Referendum 2016 Aftermath: All the Key Dates: When Will Britain Leave the EU?” *Express.co.uk*, 03 Nov. 2016. Web. 30 Dec. 2016.

⁷ Elvin Mirzayev. “The Negative Rates of Europe’s Central Banks.” *Investopedia*. N.p., 14 July 2016. Web. 30 Dec. 2016.

pushed that cash into the economy. This monetary policy made the loan rates and corporate bond yields to fall down, having a positive effect in VW Group by making cheaper debt financing (i.e. decreasing interest expenses).

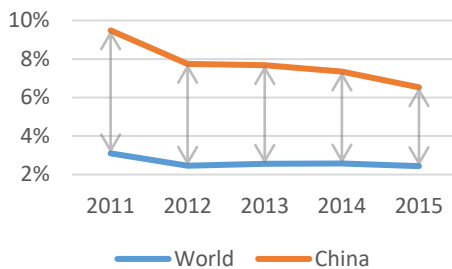
Figure 1: Annual Inflation Rate
(average consumer prices)



Source: International Monetary Fund

The IMF expects 0.3% of inflation for the Euro Area in 2016⁸, which is a really low value but still higher than 2015 inflation rate of 0.03% (figure 1). Among economists is commonly agreed that the deflation's impact in the economy is negative⁹: if prices are going down, people will postpone their consumption and purchases (so they pay less for the goods), slowing down the economy. In other words, with such a low inflation rate in 2016, Europe is threatened by an economic crisis, which would immensely impact VW Group. In fact, in 2016 the European market was responsible for around 43% of total vehicles sold by VW Group¹⁰. With this indirect increase in money supply promoted by the ECB, the IMF expects a recover in inflation to 1.3% in 2017, boosting the European economy and, thus, boosting significantly the VW Group sales.

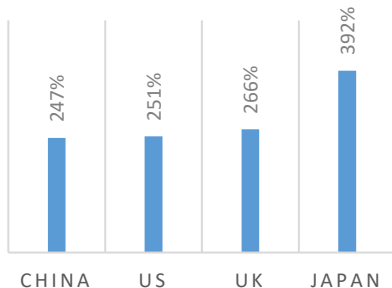
Figure 2: Real GDP Annual Growth Rates



Source: World Bank

Outside Europe, we have the Chinese economy slow-down, which affects transversely all manufacturing industries. China is the second biggest economy in the world in 2015 and it is expected to maintain that position in 2016¹¹. In the recent past this country has experienced extremely high GDP growth rates for many years (figure 2), which was possible by increasing exponentially debt levels. In fact, the Chinese Debt-to-GDP ratio raised from 160% in 2005 to 246.8% in 2015, being taken annually almost one third of the GDP just to service the debt¹².

Figure 3: Debt-to-GDP Ratio 2015



Source: Bloomberg

When compared to the United States, United Kingdom and Japan, this ratio is not that alarming, as you can see on the figure 3. However, if we look to the speed of this ratio increase, that is really alarming (i.e. +86.8% in 10 years). As result of such high and not sustainable growth rates, the Chinese economy growth is now slowing down, decreasing the usual high demand levels in China, reducing dramatically the global demand. Also because of this economy slow-down, the Chinese currency (Renminbi or Yuan) has devaluated brutally, promoting Chinese exports and slowing down the Chinese demand even more. This event is considerably dramatic for the global automotive industry, because China has the biggest automotive

⁸ International Monetary Fund, World Economic Outlook Database, October 2016

⁹ However, that classic interpretation of deflation's impact was challenged by a study in 2004 by Andrew Atkeson and Patrick Kehoe: "Deflation and Depression: Is There an Empirical Link?". According to: Root. "Deflation." Investopedia. N.p., 28 Sept. 2015. Web. 30 Dec. 2016.

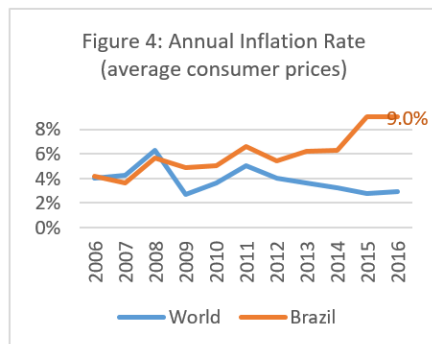
¹⁰ Volkswagen Group Interim Report Q3 2016

¹¹ In terms of nominal GDP, according to World Bank and to International Monetary Fund for 2015 and 2016, respectively. The biggest economy is U.S.

¹² Scott, Malcolm, and Cedric Sam. "China's Growing Debt Problem Isn't Quite What It Seems." Bloomberg.com. Bloomberg, 23 Aug. 2016. Web. 30 Dec. 2016.

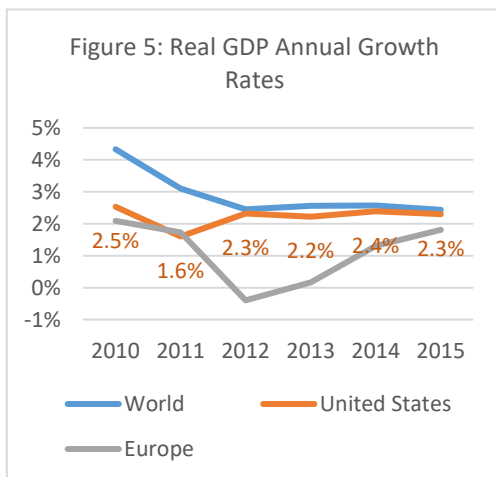
industry in the world since 2008. From 2009 on, China has exceeded Europe or US together with Japan in annual vehicles production¹³. Furthermore, being the Chinese market responsible for 40% of the total vehicles sold by VW Group in 2016¹⁴, this event has a considerable negative effect on this specific company's global revenue. The VW Group is also present in China through 3 Joint-Ventures, which increases even more the company's exposure to this economy growth slow-down. The negative effect on those joint-ventures is already visible in the short-term: their annual sales growth rate decreased from 13% in 2014 to 3.9% in 2015¹⁵.

Another important market that is currently in trouble is Brazil. Similarly to China, Brazil has experienced high growth rates in the past years. In Brazil's case, the country economy's risks have arisen from rampant inflation and corruption. In fact, in 2009 the Brazilian currency (Real) was considered the most overvalued currency around the world¹⁶. However, it was China's slow-down that was the key factor to trigger Brazil's recession. In 2013, Brazil's exports to China represented almost 50% of its entire exports¹⁷. In fact, this trading relationship was so intense, that the yuan's devaluation and the Chinese economy slow-down was enough to disturb the entire Brazilian economy in a domino effect. This event affects negatively VW Group because Brazil represents about 2.5% of its total vehicles sold in 2016¹⁸.



Source: International Monetary Fund

In North America, the United States is the most important market for VW Group, representing 6% of its total vehicles sold in 2016¹⁷. Thus, it is worth it to



Source: World Bank

take a look to this market and to its risks and opportunities. The United States has recovered from the 2008 global financial crisis better and quicker than Europe. Inflation is also higher than in Europe and in good shape: IMF expects 2.3% of inflation for 2017. Real GDP has also been increasing at a higher rate, as you can see on figure 5. As a result of rising inflation and a better situation for employment, FED has been considering a raise in the interest rate. However, if FED increases the interest rate too aggressively, is going to create a stock market crash as it happened in October 1987¹⁹. In fact, an increase in interest rates controls the inflation, avoiding speculative bubbles; but if it is not in line with global economic reality, it easily generates a crash. In December

¹³ "RIA Novosti - World - China becomes world's largest car market". *En.rian.ru*. Retrieved 2009-04-28. & "China emerges as world's auto epicenter - Politics- msnbc.com". *MSNBC*. 2009-05-20. Archived from the original on 19 May 2009. Retrieved 2009-05-25. & "More cars are now sold in China than in America". *The Economist*. 2009-10-23.

¹⁴ Volkswagen Group Interim Report Q3 2016

¹⁵ Volkswagen Group Annual Report 2015

¹⁶ Bloomberg

¹⁷ Sharma, Rakesh. "Brazil's Recession and Its Effect on the World Economy." *Investopedia*. N.p., 08 Sept. 2015. Web. 31 Dec. 2016.

¹⁸ Volkswagen Group Interim Report Q3 2016

¹⁹ Miner, Scott. "Fed Rate Rise History Reveals Familiar Dilemma." *Financial Times*. N.p., 14 Sept. 2015. Web. 2 Jan. 2017.

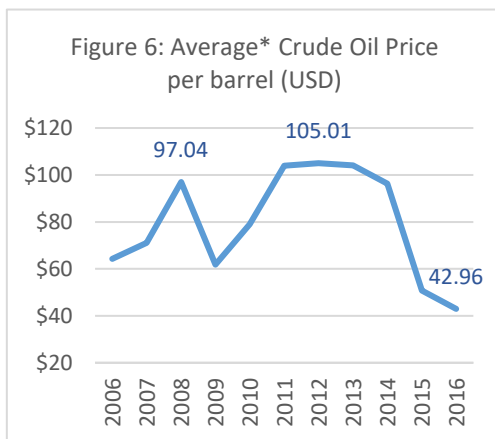
14th, 2016, it was announced that the FED has increased the interest rate by 25 basis point to 0.75%²⁰. Furthermore, it was forecasted three further increases in the interest rate for 2017, instead of just two. This forecast increase might have been influenced by the proposal of Donald Trump to “beef up the infrastructure spending and cut taxes”²¹. Based on this decision, we forecast stable inflation rates and also stable asset's prices (e.g. stock market) for the United States. At

corporate level, this will increase cost of capital. This is, we expect an increase in cost of debt and in cost of equity for the American market.

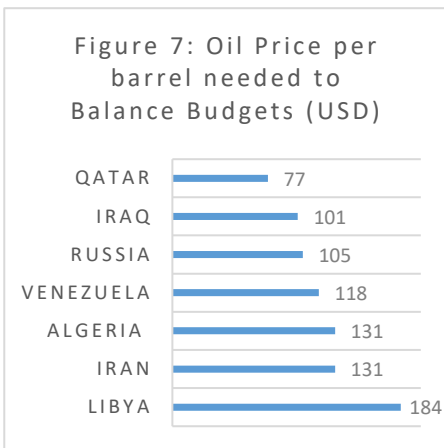
Globally, there is one more event relevant for the automotive division, which is the declining crude oil prices. In the recent past years, the crude oil has been decreasing as it never did, achieving historical minimums (figure 6). Like any commodity, crude oil prices are set by the law of demand and supply. With a decreasing demand in Europe and China²² (due to their economy slow-down), a constant supply by OPEC²³ (to keep their market share) and an increase in US oil production²⁴ (due to the more efficient way of extracting oil, called fracking), there was excess production of crude oil, which caused its accentuated price fall.

Since the crude oil is the main commodity in the global economy, this event affects negatively all industries around the world, including the automotive industry. In one hand, lower crude oil prices make citizens spending less money in transportation costs. In other hand, it disturbs the national budget and creates deficits in oil-dependent economies, such as OPEC members. In fact, some of those countries, with higher budgetary demands, needed an oil price per barrel much higher than the current one to have balanced budgets (figure 7). In the short term, IMF forecasts a considerable recover of crude oil prices in 2017, offsetting the -15% of 2016. In the long term, IMF forecasts a stable price increase of around 3% per year. However, crude oil prices above 100 USD per barrel, as it happened from 2011 to 2013, are not expected in the near future.

Being the highly use and dependence of crude oil in the global economy the main cause for the global warming, more and more alternative sources of energy are being developed in the current world. In the automotive industry, the global conscience about the risks of global warming has accelerated the demand for new alternative fuels and more efficient engines: such as electric engines, hybrid cars,



* simple average of three spot prices: Dated Brent, West Texas Intermediate, and the Dubai Fateh.
 Source: International Monetary Fund



Source: Deutsche Bank and IMF (2015).

²⁰ Media, Triami. "FED Federal Funds Rate, American Central Bank's Interest Rate." *Federal Funds Rate FED* - American Central Bank's Current and Historic Interest Rates. N.p., n.d. Web. 02 Jan. 2017.

²¹ Davidson, Paul. "What Led Fed to Bump up Rate-hike Forecast?" *USA Today*. Gannett Satellite Information Network, 02 Jan. 2017. Web. 02 Jan. 2017.

²² Investopedia. "What Causes Oil Prices to Fluctuate?" *Investopedia*. N.p., 27 Jan. 2015. Web. 03 Jan. 2017.

²³ OPEC stands for Organization of Petroleum Exporting Countries, comprising 13 countries, which are responsible for 40% of the world's oil supply.

²⁴ Bowler, Tim. "Falling Oil Prices: Who Are the Winners and Losers?" *BBC News*. BBC, 19 Jan. 2015. Web. 03 Jan. 2017.

ethanol, and natural gas. This change in mindset is also starting to contribute for a decrease in demand for crude oil, which makes down pressure on its prices. Nevertheless, this transition from traditional petroleum sourced engines to greener sources of energy is being smooth: in fact, there is a high historical dependence and reliability on crude oil as source of energy, which represents a road block for a faster transition. For example, in the automotive industry there are still much less battery power charging stations (for electrical cars) than gas stations, being more convenient for the drivers to continue using traditional petroleum-moved cars. Besides this infrastructure barrier, there are still considerable technology barriers to be overcome to turn these alternative electric cars sustainable for a normal daily driver: namely, the charging speed of the batteries and their electric range. The electric car brand that is the market leader for these two technologic features is Tesla Motors. This automaker is in the lead of this type of technology, being able to deliver electric cars that are 100% charged in 75 minutes (in specific Tesla supercharging stations, which are 769 globally²⁵) and with a battery range up to 506 kilometres (prices for this model start at 134,500 USD). A “more average model” of Tesla starts its price at 66,000 USD and has a battery range up to 320 kilometres²⁶. These figures are really good for the electric cars market but still really far behind a € 17.2k diesel car that fuels up in 2-3 minutes and has a fuel autonomy up to 1,500 kilometres (car considered is shown in figure 8)²⁷.

Figure 8: Peugeot 208 1.6L BlueHDI



All these barriers give some extra time to the automakers adapt to this new market trend and preferences, changing the most important component of their product: the engine and the source of energy of the car. In terms of cost for the driver, on one hand, the driver is directly and immediately compensated by the cheaper cost of electricity compared to petroleum-based fuels. On other hand, the price for an electric car is on average about 90% higher²⁸ than a traditional car moved by a petroleum-based fuel. However, bear in mind that the first effect is much lower (or almost null) in countries with low petroleum-based fuels prices, such as the US. Without any other type of incentive, it is extremely difficult the entry of this new type of vehicles in these markets. For that reason and to decrease air pollution several developed countries are already implementing government subsidies to buy electric cars: the United States implemented in 2013 a \$ 7,500 Federal Tax Rebate²⁹ and France has currently a € 6,300 ecologic bonus plus a € 3,700 conversion premium³⁰. Furthermore, to promote even more this change to greener

²⁵ "Supercharger." Supercharger | Tesla. N.p., n.d. Web. 03 Jan. 2017.

²⁶ Stoll, John D. "Tesla Unveils Electric-Car Battery With a 315-Mile Range." *The Wall Street Journal*. Dow Jones & Company, 23 Aug. 2016. Web. 03 Jan. 2017.

²⁷ "Découvrir Les Prix Et Finitions De La Peugeot 208 3 Portes." *PEUGEOT*, n.d. Web. 03 Jan. 2017.

²⁸ Calculations made using some of the cheapest economy cars available in Europe: Mitsubishi i-MiEV electriQ (19,950 € in France excluding government subsidies) and Dacia Sandero gasoline (10,300 € in France).

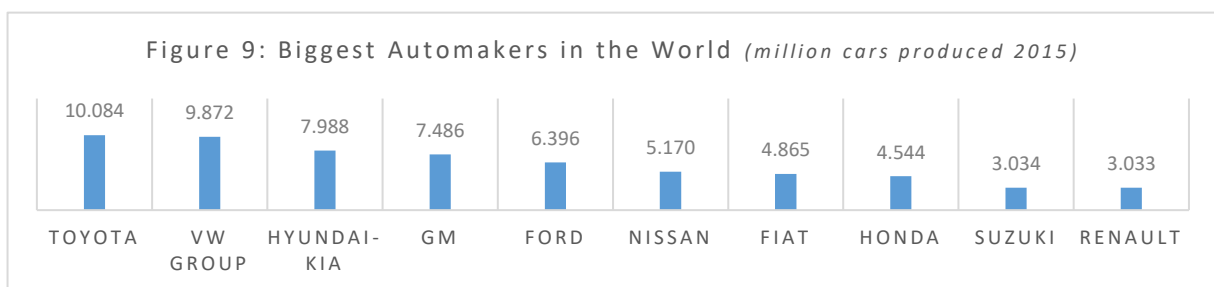
²⁹ Shahan, Zachary. "11 Electric Cars Cost Less Than Average New Car In US." *EV Obsession*. N.p., 08 Dec. 2013. Web. 03 Jan. 2017.

³⁰ "Mitsubishi I-MiEV ElectriQ." Mitsubishi I-MiEV - Véhicule électrique- I-MiEV ElectriQ. *Mitsubishi*, n.d. Web. 03 Jan. 2017.

cars, some governments already committed to ban the use of diesel cars in city centres by 2025, such as: Paris, Madrid, Mexico City and Athens³¹.

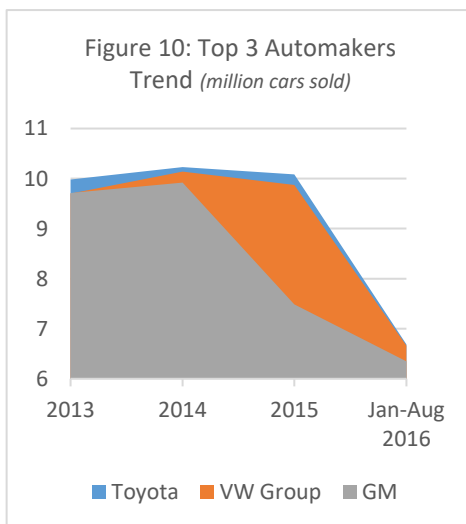
Market Analysis

The automotive industry started around 1890 with the first car being produced in 1886 by Carl Benz³². From then on, there were created several different car brands, shaping the automotive market into an extremely competitive and diverse market. In 2015, Toyota was the biggest automaker in the world, followed by VW Group in second place, with a considerable advance to the automaker in third place, as you can see in the figure 9:



Source: International Organization of Motor Vehicle Manufacturers

In 2012 Toyota got the first place as the biggest automaker in the world. Since then, VW Group has been getting closer and GM is kind of holding off (figure 10).



Source: Reuters, Forbes and Companies data.

During 2016, VW Group went back and forward, changing from 2nd to 1st place and vice-versa with its main rival: Toyota. If we look for the VW Group first semester 2016 sales performance, we can see that this group has become the biggest automaker in the world with 5.04 million cars delivered, passing Toyota with 5.02 million cars delivered³³. However, if we look from January to August in 2016, due to sudden increase in Toyota's sales in August, Toyota took back the position of the biggest automaker with 6.69 million cars delivered, with just more 23 thousand cars than VW Group³⁴.

For the next years, we do expect the VW Group to maintain its global market share in the passenger car business area of about 13%, with a decrease in 2016 specially due to a sales decrease in North America (US, Canada and Mexico). This sales decrease we forecast as a result of the diesel issue, which will be discussed on the next part of the report.

To maintain its global market share, VW Group will have to enter harder on the electric cars' segment. If we look to other automakers, we can say VW Group is kind of behind in this segment, losing market share in passenger cars as this

³¹ McGrath, Matt. "Four Major Cities Move to Ban Diesel Vehicles by 2025." *BBC News*. BBC, 02 Dec. 2016. Web. 03 Jan. 2017.

³² "Benz Patent Motor Car, the First Automobile (1885 – 1886)." Daimler. N.p., n.d. Web. 04 Jan. 2017.

³³ Reuters

³⁴ Schmitt, Bertel. "World's Largest Automakers 2016: Toyota Pulls Ahead Of Volkswagen -- By A Hair." *Forbes*, 28 Sept. 2016. Web. 04 Jan. 2017.

segment grows worldwide. In fact, with an ambitious forecast, the Wall Street Journal has published in November 2016: “By 2018, [electric vehicles] must account for 8% of the maker’s production, and the percentage will rise from there.” VW Group already took conscience of the importance of this electric cars segment and started to expand their electric cars portfolio by pursuing what they call a “e-mobility” initiative. With this adaption to the new market reality, we believe VW Group has sustainable competitive advantages capable of maintaining the automaker’s global market share in the long term.

In China, the Volkswagen passenger cars brand has the biggest market share in the passenger cars segment, selling almost the double of vehicles sold by the second biggest automaker in this segment, which is the brand Wuling³⁵. The VW Group cars sold in China are mainly sold through a joint-venture with FAW Group, called FAW-Volkswagen Automotive Company (which financials are not consolidated into the VW Group’s financials). However, the same FAW Group has other two 50-50 joint ventures with GM and Toyota, which have brands also in the top ten selling brands for passenger car segment in China. Furthermore, since these two companies also belong to the top four of the biggest automakers in the world, we can say this market is already kind of saturated with presence of major global players. Thus, there is not so much space for market penetration strategy (i.e. gaining market by penetrating in an existing market with existing products³⁶). We believe the sustainable strategy for VW Group in China would be product development, launching the green cars’ segment to this market. However, since these other two big automakers (GM and Toyota) are also producing vehicles for the green cars’ segment we do not expect massive variances in VW Group’s market share in China. Actually, the Chinese government is already “barring car makers that don’t have new-energy capabilities”³⁷.

Company’s Risks and Opportunities

The biggest recent risk VW Group is facing is its global emissions scandal triggered in September 2015 involving fraud in reporting the CO₂ emissions in two diesel engines produced by the Group. As result, two types of consequences were expected. First, direct financial consequences regarding car recalls, repurchases, reprogramming and lawsuits charges, which not only negatively affect the net income of the Group but also its liquidity. This first short-term consequence generated costs of € 16.2 billion in 2015 for the group. Second, more in the long-

³⁵ ChinaAutoWeb. China Passenger Car Association (CPCA), n.d. Web. 04 Jan. 2017.

³⁶ Following the principles of the Ansoff Matrix or Product/Market Expansion Grid.

³⁷ Schmitt, Bertel. “China To Automakers: ‘Make EVs, Or Die’.” *Forbes*. Forbes Magazine, 25 Nov. 2016. Web. 06 Jan. 2017.

term, it is also expected to be an indirect negative consequence on the sales performance, as the customers can easily lose its confidence in this car manufacturer. However after looking to the fact VW Group became the world largest automaker in the world in the first semester of 2016, we can conclude the first direct consequence is much more certain than the second. Thus, we can expect that this scandal is much more likely to produce only a short-term negative effect than a long-term one. This means, this scandal will have a residual impact in our company valuation as of 2017.

Valuation

To value the Volkswagen Group we have decided to divide the group into 2 parts: an operating one (including the automotive division, with the 2 business units of passenger cars and Commercial Vehicles / Power Engineering) and a non-operating one (including the Financial Services Division, the equity investments in Associates and Joint-Ventures, and some others non-operating assets & liabilities). Pursuing a “sum-of -parts” approach, we valued individually each part of the company and summed in the end their equity values to get the total VW Group equity value.

Weighted Average Cost of Capital

For the cost of debt, we have used a publicly traded long-term bond of the VW Group (figure 11). Since the Moody's long-term debt rating of VW Group is “A2”³⁸, which is within the superior credit quality level, we have assumed reasonable to consider zero probability of default of VW Group. Thus, we have used the market Yield to Maturity of a long-term actively traded bond of VW Group as proxy for the real cost of its debt. The specific bond chosen was “VW 5.500% 07Jun2024 Corp (EUR)”, being a 20-year bond in Euro with a 5.5% fixed annual coupon. With a bid price of 120.05€, this bond has a Yield to Maturity of 2.8%³⁹, which we have used as cost of debt for VW Group.

To estimate the cost of equity, we have considered a risk-free rate of 0.33% (Rf), using the 10-year AAA-rated Euro area central government bonds⁴⁰. For market risk premium, we have used 6.16%⁴¹, which has been considered reasonable by several

Figure 11: WACC Inputs

<i>20-year VW's Bond (2004-2024) 5.5% Annual Coupon</i>	
Bond's Bid price	120.05 €
(Bid) Yield to Maturity	2.78%
Moody's Long-term Debt Ratings of VW Group	A2
Cost of Debt	2.78%
Risk-free Rate	0.33%
Market Risk Premium	6.16%
Marginal Tax Rate	28.90%
Beta Levered (<i>all divisions</i>)	1.23
Beta Levered (<i>Automotive Divisions</i>)	1.23
VW Group Market Cap (€ million)	70,850
Historical D/V (<i>Automotive Divisions</i>)	18.46%
Beta Unlevered (<i>Automotive Divisions</i>)	1.06
Target D/V (<i>Passenger Cars business unit</i>)	15.00%
Beta Re-levered (<i>Passenger Cars business unit</i>)	1.19
Cost of Equity (<i>Passenger Cars business unit</i>)	7.67%
Long-Term WACC (<i>Passenger Cars business unit</i>)	6.82%
Target D/V (<i>Com. Veh. & Power Eng. business unit</i>)	13.00%
Beta Re-levered (<i>Com. Veh. & Power Eng. business unit</i>)	1.17
Cost of Equity (<i>Com. Veh. & Power Eng. business unit</i>)	7.54%
Long-Term WACC (<i>Com. Veh. & Power Eng. business unit</i>)	6.82%
Beta Levered (<i>Financial Services Division</i>)	1.17
Cost of Equity (<i>Financial Services Division</i>)	7.53%

³⁸ "Moody's Downgrades VW Financial Services' Long-term Debt Ratings to A2 from A1 and Upgrades VW Bank's Debt Ratings to Aa3 from A1." Moodys.com. N.p., 03 Aug. 2016. Web. 02 Jan. 2017.

³⁹ As of January 2nd, 2017. Source: "Bond Fact Sheet" in www.bondsupermart.com.

⁴⁰ Bank, European Central. "Euro Area Yield Curve." European Central Bank. N.p., n.d. Web. 02 Jan. 2017.

⁴¹ Damodaran, Aswath. "Damodaran Online" New York University Stern School of Business, Jan. 2017. Web. 04 Jan. 2017.

studies. The levered beta for VW Group of 1.23 was obtained by performing a regression between MSCI World Index (in Euro) and the VW Group stock itself with weekly prices for the last 3 years⁴². Since the automotive division represents the major part of this company's value, we assumed that the beta levered of the automotive division is the same as the levered beta of the entire company. The unlevered beta for the automotive division of 1.06 was obtained using its historical D/V ratio of 18.5%⁴³ (market values). Then, we have computed a specific re-levered beta for each business unit inside the automotive division, according to their specific target D/V ratio⁴⁴. The leveraging and un-leveraging operations were done using the equation: $B_U = B_L / [1 + (1 - T_c) \times (D/E)]$ ⁴⁵. After all this, we got a re-levered beta of 1.25 for the passenger cars business unit and a re-levered beta of 1.22 for the commercial vehicles and power engineering business unit. For the levered beta of the financial services division we have used 1.17, which was obtained by performing a regression between MSCI Europe Banks Index (containing comparable companies to this financial services division) and MSCI World Index for the last 5 years using monthly prices⁴⁶. Then, applying the Capital Asset Pricing Model (CAPM) formula ($R_E = R_f + B_L \times \text{Market Risk Premium}$)⁴⁷, we got three costs of equity: 8.01% for the passenger cars business unit, 7.87% for the commercial vehicles and power engineering business unit and 7.53% for the financial services division.

Finally, we have used these values to compute the WACCs for the two business units of the automotive division: 6.80% for passenger cars and 6.81% for commercial vehicles and power engineering. For these calculations we have used the formula: $WACC = D/V \times R_D \times (1 - T_c) + E/V \times R_E$ ⁴⁸.

Moving on to the next valuation step, in the operating part of the group, (the automotive division), we have opted to do two Discounted-Cash Flow models (one for each business unit), forecasting the free cash flow to the firm generated in the next 5 years (from 2017 until 2022), computing a terminal value on the 5th year and then discounting those values at the WACC. Summing these discounted cash flows and terminal value, we got the operating enterprise value of the two operating business units (Passenger Cars and Commercial Vehicles / Power Engineering), which after deducting the correspondent net debt gave us their equity value.

⁴² Reuters. As of December 30th, 2016, with a confidence interval [1.20-1.26] considering a confidence level of 95%.

⁴³ Using the book value for the debt value (which is considered a good proxy for market value in terms of debt) and using the market cap of € 70,850 million for the equity value (as of December 28th, 2016)

⁴⁴ Defined based on the 2015's ratios we got from dividing debt by the market enterprise value of that year (which we have estimated in our DCF's models).

⁴⁵ being "T_c" the marginal tax rate (28.9%), "D/E" the Debt to Equity ratio, and "B_U" and "B_L" the unlevered and levered beta, respectively.

⁴⁶ As of April 2016, with a confidence interval [0.91-1.43] considering a confidence level of 95%.

⁴⁷ Where R_E is the cost of equity, R_f the risk-free rate and B_L the beta levered.

⁴⁸ Where R_E is the cost of equity, D/V the debt to value ratio, R_D the cost of debt, T_c the marginal tax rate and E/V the equity to value ratio,

Passenger Cars

The passenger cars business unit was the most exposed business unit with the diesel emissions scandal in 2015. However, in 2016 a remarkable and quick sales recovery was verified. In fact, the mass market VW Group's brands suffered a considered decrease in sales, which was more than compensated by an increase in demand for cars of the premium brands Porsche and Audi. The VW Group's brand Skoda has contributed also to counteract against the sales decrease. So, we can conclude that the diesel scandal had a negative financially effect on VW Group mainly in the short-term, outperforming competitors in 2016 and not influencing negatively the overall car sales in the short term. However, as we get closer to the end of 2018, we have a negative and very likely event to happen: the exit of the UK from the European Union. Once this happens, the VW Group sales in the UK will depend on new trade agreements between UK and Europe, which are not outlined so far. Furthermore, the UK represents 17% of global VW Group's sales and VW Group only has a small plant in the UK for Bentley. So after the UK's exit, if there are applied protectionists measures, VW Group's sales will be highly affected. Based on this, we have forecasted a slower sales volume growth for 2017 (1%) and an annual 0.5% sales volume decrease in Europe for 2018 and 2019. After the European market has adjusted to this new reality, we expect a recovery in sales volume, achieving sales of 4.5 million passengers in 2020. For next years, 2021 and 2022, boosted by the ECB efforts in stimulating the European economy, we forecast annual growth rates of 1% and 2%, respectively.

With the win of Donald Trump for the Presidential election in the US in 2016, we expect a move into a much more protectionist economy already in 2017, penalizing the imports and stimulating the goods produced in the US. As VW Group only has 5% of its production facilities in North America⁴⁹, we consider this event will have a significantly negative effect on this company's sales in US (which represents more than 60% of VW Group's sales in North America⁵⁰). Thus, we expect a fall in sales in North America from 2017 to 2019, followed by a smooth and stable annual 0.5% growth from 2020 on.

For sales in Asia-Pacific we have assumed the same growth rate as the VW Group's Chinese joint ventures: a stable 4% annual growth rate from 2018 on (increasing smoothly in 2021 and 2022), based on the country's planners forecast⁵¹, which will be explained further in this report, in the equity-accounted investments' part.

⁴⁹ Volkswagen Group – 2015 Annual Report.

⁵⁰ Volkswagen Group – 2016 Interim Q3 Report.

⁵¹ This growth rate is analyzed and explained further in this report, in the equity-accounted investments part.

For the South America's sales, since Brazil accounts for more than 63% of this region's total sales⁵² and Brazil's economy deeply depends on China, it was forecasted a sales performance partially influenced by the Chinese economy. Thus, we expect it will grow over the years at a constant rate, achieving 600 thousand passenger cars sold in 2022, as you can see below in figure 12.

Figure 12.

Passenger Cars (PC) - Revenue Estimation				Brands: Volkswagen Passenger Cars, Audi, SEAT, ŠKODA, Bentley, Bugatti, Lamborghini, Porsche, Ducati						
Millions of Cars	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Passenger Car Sales Worldwide	67.24	70.66	72.37	74.31	75.59	77.69	79.85	82.07	83.68	85.84
Growth Rate Worldwide	-	5.1%	2.4%	2.7%	1.7%	2.8%	2.8%	2.8%	2.0%	2.6%
VW Group Pas. Car Sales (incl. Joint Ventures)	9.07	9.58	9.37	9.99	10.18	10.32	10.48	10.73	10.98	11.31
VW Group Market Share (incl. Joint Ventures)	13.5%	13.6%	13.0%	13.4%	13.5%	13.3%	13.1%	13.1%	13.1%	13.2%
VW Group Car Sales by Region:		5.8%	2.0%	5.1%	1.0%	-0.5%	-0.5%	1.1%	1.0%	2.0%
Europe	3.92	4.15	4.24	4.45	4.50	4.48	4.45	4.50	4.55	4.64
North America	0.84	0.82	0.88	0.93	0.90	0.88	0.87	0.88	0.88	0.88
South America	0.92	0.74	0.51	0.53	0.54	0.55	0.56	0.58	0.59	0.60
Asia-Pacific	0.25	0.61	0.29	0.31	0.32	0.33	0.35	0.36	0.38	0.39
VW Group Pas. Car Sales (excl. Joint Ventures)	5.94	6.33	5.92	6.22	6.26	6.24	6.24	6.31	6.39	6.51
Euro Inflation Rate	1.5%	0.5%	0.0%	0.3%	1.3%	1.6%	1.7%	1.8%	1.8%	1.8%
Average VW Group PC Price (€)	24,084	23,245	26,016	26,084	26,432	26,853	27,303	27,785	28,295	28,793
VW Group PC Sales Revenue (€ million)	142,961	147,080	153,964	162,266	165,485	167,670	170,300	175,426	180,781	187,555

Globally, with our revenue forecast for this business unit, we expect an slightly increase in VW Group's market share in 2017 in the passenger cars segment, followed by a decrease in 2018 and stabilizing at 13.1%-13.2% from 2019 on. This market share increase and sustainable stabilization forecast is also based on revealing company statements about significant investments projects to launch 30 new all-electrical models until 2025, which will turn VW Group more competitive in the "green" cars segment. This new repositioning of the company to focus on attractive and fast-growing market segments as a response to the scandal ensures to VW Group the ability to adapt to the current changing environment of the automotive industry, becoming more competitive.

Using the IMF forecast for the Euro inflation rate⁵³, we have adjusted annually the average VW Group passenger car price. Multiplying that adjusted car price by the forecasted number of cars sold we got the revenue forecast for this business unit, which was the starting point to forecast its income statement and its DCF model (figure 13).

⁵² Volkswagen Group – 2016 Interim Q3 Report.

⁵³ International Monetary Fund, World Economic Outlook Database, October 2016

Figure 13.

Passenger Cars - DCF Valuation

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
EBIT	8,538	9,358	(4,851)	8,796	8,464	11,080	10,768	11,187	11,688	12,588
Tax (@29.8%)	(2,544)	(2,789)	1,446	(2,621)	(2,522)	(3,302)	(3,209)	(3,334)	(3,483)	(3,751)
Adjustments & Deferred Tax	554	917	(142)	492	367	435	431	445	449	453
NOPLAT	6,548	7,486	(3,548)	6,666	6,309	8,213	7,990	8,298	8,653	9,290
Depreciation & Amortization	8,212	9,549	10,389	11,101	12,042	12,900	13,690	14,457	15,207	15,965
Impairment Losses	251	274	959	0	0	0	0	0	0	0
Cash Flow from Operating Activities	15,011	17,309	7,801	17,768	18,351	21,113	21,680	22,755	23,861	25,255
CAPEX (excluding capitalized dev. costs)										
in Property, Plant & Equipment	(8,661)	(9,143)	(10,201)	(12,486)	(12,844)	(13,153)	(13,475)	(13,970)	(14,489)	(15,115)
Δ Vehicles Leased Out	(1,156)	(1,192)	(1,352)	(1,425)	(1,453)	(1,472)	(1,495)	(1,540)	(1,587)	(1,647)
Capitalized Development Costs	(3,572)	(4,110)	(4,626)	(4,185)	(4,268)	(4,325)	(4,392)	(4,525)	(4,663)	(4,838)
Δ Operating Net Working Capital	NA	(598)	148	2,754	496	1,656	(57)	(196)	(273)	(322)
Δ Other Operating Assets/Liabilities	NA	2,373	337	275	129	107	132	160	162	176
Cash Flow from Investing Activities	(13,390)	(12,670)	(15,694)	(15,067)	(17,940)	(17,187)	(19,287)	(20,071)	(20,850)	(21,745)
Unlevered Free Cash Flow	1,622	4,639	(7,893)	2,701	410	3,926	2,393	2,684	3,010	3,510
WACC					6.8%					
Perpetual Growth rate										3.77%
Operating Enterprise Value		76,329	89,424	92,818	98,733	101,535	106,063	110,607	115,134	119,471
Net Debt		10,640	13,426	13,923	14,810	15,230	15,909	16,591	17,270	17,921
target D/V ratio (Market Values)		13.9%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Equity (Market Value)		65,690	75,998	78,895	83,923	86,305	90,153	94,016	97,864	101,551

NOPLAT means Net Operating Profit Less Adjusted Taxes and is the starting point for the unlevered free cash flow calculation. The NOPLAT was computed using the formula: $EBIT \times (1 - T_c) - \text{Adjust. \& Deferred taxes}$.

The unlevered free cash flow represents the cash flow to the firm (i.e. to shareholders and debtholders) and was computed using the formula: $UFCF = NOPLAT + \text{Non-cash Expenses (i.e. Dep. \& Amort. and Impairments)} + \text{Cash flow from Investing Activities (i.e. capital expenditures, change in vehicles leased out, capitalized development costs, change in operating net working capital and change in other operating assets/liabilities)}$.

In VW Group expects to increase its CAPEX to revenues ratio to 7%⁵⁴. VW Group is looking more and more to invest in new production lines and R&D for “greener” passenger cars models. This adjustment of the company products portfolio to the current more efficient and more restricted emissions reality implies a huge investment from the automaker. The fact that a lot of the production of passenger cars is automatized decreases personnel costs but it requires considerable upfront investments in machinery and equipment. We believe VW Group will considerably increase this investment in 2016 to recover its late entry in this “green” passenger cars segment, as discussed in the market analysis. With extra investment done in 2016, we expect that VW Group becomes competitive in this growing segment. Thus, we expect the CAPEX and capitalized development costs to stabilize, assuming from 2017 to 2020 a constant CAPEX & Capitalized Development Costs to Sales ratio. From 2020 on, after being done the required

⁵⁴ VW Group – 2015 Annual Report

investment for the “e-initiative”, we expect CAPEX to sales ratio to decrease smoothly to 6.9%.

For the terminal value (observable on the “operating enterprise value” row with the “2022 F” column), we have used the following perpetuity formula: $TV_T = \text{Unlevered Free Cash Flow}_T \times (1 + g) / (WACC - g)$, where “g” is the perpetual growth rate. For this growth rate, we have assumed the forecasted GDP growth rate⁵⁵, weighted by VW Group’s regional sales (of this specific business unit), which is 2.01%. In fact, there is empirical evidence that mature industries with a considerable weight on total GDP, such as the automotive industry, have a strong correlation with GDP growth⁵⁶. Assuming the RONIC⁵⁷ equal to the WACC and this 2.01% as a sustainable growth rate, we get an implied re-investment rate of 55%⁵⁸, which is reasonable when compared to the re-investment rate of 62% in 2022⁵⁹. In fact, in the long term, a sustainable RONIC has to be the same as WACC. Otherwise, new players will enter in the market until the RONIC lowers to the WACC level. Or to the other way, nobody will invest in this company, because the opportunity cost of capital (WACC) is higher than the investment return. Then, discounting that terminal value until 2017 and summing the additional five annual discounted cash flows we will get on that period, we got an operating enterprise value in 2017 of € 98,733 million.

Commercial Vehicles / Power Engineering

For the short term we expect this business unit to be much less affected by the emission scandal. In fact, the majority of customers of this VW Group’s business segment are companies, which usually have long term relationships and contracts with the stands. Thus, a shift from VW’s brands to others, due to the emissions scandal, would not be so immediate and easy as in the passenger cars. However, VW Group is not as strong on this market segment as in the passenger cars segment. This group has had for the past years a market share for light commercial vehicles always around 2.2%, which we have considered to be maintained in the long-term, after a slight decrease in 2016 of 0.1%, due to the emission scandal. Regarding trucks and buses, VW Group is stronger, having a market share of 6.4% in 2015. Actually, VW group has become the biggest truck producer in Europe after having acquired the brands MAN and Scania. Europe represents 74% of VW Group

⁵⁵ World Bank

⁵⁶ EU SME Centre 2015. “The Automotive Market in China”.

⁵⁷ RONIC stands for return on new invested capital and is computed by the formula: $NOPLAT / IC$, where $IC = \text{Invested Capital} = \text{Operating Assets} - \text{Operating Liabilities}$

⁵⁸ Sustainable growth rates are computed using the formula: $\text{re-investment rate} \times \text{RONIC}$.

⁵⁹ Re-investment rates are computed using the formula: $(CAPEX - \text{Dep. \& Amort.}) / NOPLAT$.

truck's sales. Since truck sales are really dependent on manufacturing industries, whom are facing lower growth with the Brexit and low inflation, we have forecasted a smoother sales grow of just 0.5% for 2016, followed by a slow recovery until it achieves 2% sales growth in 2021.

For the power engineering business, based on VW Group's expectations, we assumed that its small sized sales volume will decrease annually 2.5% until 2019 and then remain constant, reflecting the declining status of this market segment. Based on these assumptions, adding the Euro inflation to the average unit price and multiplying we got the following revenues forecast for this business unit (figure 14).

Figure 14.

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Trucks & Power Eng. Sales Rev.	23,440	21,863	20,914	21,073	21,535	22,068	22,709	23,395	24,199	25,019
Light Commercial Vehicles Sales Revenue	8,602	8,595	9,057	8,838	9,544	10,418	10,888	11,388	11,825	12,343
Total Business Unit Revenue	32,042	30,458	29,971	29,911	31,079	32,486	33,597	34,782	36,024	37,362
Growth Rate		-4.9%	-1.6%	-0.2%	3.9%	4.5%	3.4%	3.5%	3.6%	3.7%

With this revenue forecast, we have forecasted the income statement of this

Figure 15.

business unit and built the following DCF model (figure 15).

Commercial Vehicles & Power Engineering - DCF Valuation

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
EBIT	1,267	1,421	(1,456)	988	1,028	1,692	1,746	1,879	2,027	2,222
Tax (@29.8%)	(378)	(424)	434	(294)	(306)	(504)	(520)	(560)	(604)	(662)
Adjustments & Deferred Tax	(310)	(190)	(414)	96	64	78	78	81	84	87
NOPLAT	579	807	(1,436)	789	786	1,266	1,303	1,401	1,507	1,647
Depreciation & Amortization	2,487	2,494	2,522	2,675	2,819	2,954	3,081	3,207	3,336	3,469
Impairment Losses	56	57	199	0	0	0	0	0	0	0
Cash Flow from Operating Activities	3,123	3,358	1,284	3,464	3,605	4,220	4,384	4,608	4,842	5,116
CAPEX (excluding capitalized dev. costs)										
in Property, Plant & Equipment	(1,941)	(1,893)	(1,986)	(2,431)	(2,500)	(2,560)	(2,623)	(2,719)	(2,820)	(2,942)
Δ Vehicles Leased Out	(259)	(247)	(263)	(263)	(273)	(285)	(295)	(305)	(316)	(328)
Capitalized Development Costs	(801)	(851)	(900)	(815)	(847)	(885)	(915)	(947)	(981)	(1,018)
Δ Operating Net Working Capital	NA	(226)	(2)	399	(188)	72	(159)	(74)	(60)	(15)
Δ Other Operating Assets/Liabilities	NA	346	(70)	(65)	64	90	68	43	44	34
Cash Flow from Investing Activities	(3,001)	(2,871)	(3,221)	(3,175)	(3,744)	(3,568)	(3,925)	(4,003)	(4,134)	(4,268)
Unlevered Free Cash Flow	122	487	(1,937)	290	(139)	651	459	605	708	847
WACC					6.8%					
Perpetual Growth rate										3.73%
Operating Enterprise Value		17,314	20,431	21,533	23,140	24,065	25,246	26,362	27,450	28,474
Net Debt		2,203	2,614	2,799	3,008	3,129	3,282	3,427	3,569	3,702
target D/V ratio (Market Values)		12.7%	12.8%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%
Equity (Market Value)		15,111	17,817	18,734	20,132	20,937	21,964	22,935	23,882	24,772

In this business unit, we expect over the years the same CAPEX & Capitalized Development Costs to Sales ratio as the passenger cars business unit. Also, the change in vehicles leased out depends entirely on the vehicles sold.

For the terminal value (observable on the "operating enterprise value" row with the "2022 F" column), we have used the same formulas as in the passenger cars business unit. For the growth rate, by the same reasons, we have assumed again the GDP growth rate, weighted by VW Group's regional sales (of this specific business unit), which is 1.97%. Assuming RONIC is equal to the WACC, we get the same implied re-investment rate as the passenger cars: 55%, which is also reasonable when compared to this business unit's re-investment rate of 49% in 2022. Then, discounting that terminal value until 2017 and summing the additional

five annual discounted cash flows we got an operating enterprise value in 2017 of € 16,273 million for this business unit.

Financial Services

This division is a complementary division to the automotive division, being responsible to potentiate the automotive division's sales by financing services. Additionally, this division has been responsible for innovation on the new type of services provided (e.g. Carsharing) and new integrated end-to-end solutions, string growth in emerging markets, where there is a lot of potential for market penetration (e.g. China). The investment in the GT Gettaxi Limited (GETT) is a perfect example of that, which ensures a sustainable growth to this division. To forecast the revenue of this division, since its mission is to potentiate and support financially the sales of the automotive division, we have assumed as a percentage of the number of cars sold by the automotive division. This percentage we have assumed to vary accordingly to the interest rate movements and financing fees changes. For interest rate we have assumed a 0.2% annual increase from 2017 on, assuming these ECB decisions about low interest rates will slowly invert as the European economy grows. For the financial services division, due to its non-operating nature, we have opted for a Cash Flow to Equity model, forecasting the cash flows this division will generate for equity holders in the same time horizon (5 years), computing its terminal value on the 5th year, and discounting those values at the Cost of Equity (Re). Summing these discounted cash flows to equity, we directly got an equity value of the financial services division for 2017 of negative € 78,737 million. This might seem strange but it makes sense if you consider this division has to keep all the cars leased out in their balance sheet, affecting negatively their cash flow, as you can see in figure 16.

Figure 16.

Financial Services - FTE Valuation

€ million	Years ended Dec 31,										
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F	
EBIT	1,864	1,916	2,236	2,406	1,526	767	185	(47)	(133)	18	
Tax (@29.8%)	(555)	(571)	(666)	(717)	(455)	(229)	(55)	14	39	(5)	
Adjustments & Deferred Tax	176	(44)	109	86	92	98	104	110	156	183	
NOPLAT	1,485	1,301	1,679	1,775	1,164	637	234	77	63	195	
Depreciation & Amortization	3,798	4,521	5,543	6,373	7,862	9,177	10,337	11,388	12,344	13,234	
Impairment Losses	39	46	163	0	0	0	0	0	0	0	
Cash Flow from Operating Activities	5,321	5,869	7,384	8,147	9,026	9,814	10,571	11,466	12,407	13,430	
Δ Property, Plant & Equipment	(458)	(523)	(613)	(661)	(703)	(744)	(786)	(840)	(896)	(961)	
Δ Vehicles Leased Out	(10,508)	(12,659)	(16,665)	(17,409)	(17,591)	(17,645)	(17,672)	(17,912)	(18,142)	(18,506)	
Δ Accounts Receivables	NA	(13,423)	(9,040)	(9,211)	(8,205)	(7,879)	(8,184)	(10,366)	(10,936)	(12,541)	
Δ Accounts Payables	NA	256	61	138	123	118	123	156	164	188	
Δ Ongoing Operating Provisions	NA	891	(89)	645	233	522	257	440	483	604	
Δ Other Operating Assets/Liabilities	NA	465	(1,227)	(186)	(251)	(235)	(246)	(333)	(354)	(418)	
Cash Flow from Investing Activities	(10,966)	(24,993)	(27,574)	(26,684)	(26,394)	(25,863)	(26,508)	(28,856)	(29,681)	(31,634)	
Unlevered Operating Free Cash Flow	(5,645)	(19,124)	(20,190)	(18,537)	(17,368)	(16,049)	(15,937)	(17,390)	(17,274)	(18,205)	
Δ other non-operating assets/liabilities	NA	1,223	5,450	(1,442)	109	(136)	(124)	(129)	(173)	(193)	
Total Unlevered Free Cash Flow	(5,645)	(17,901)	(14,740)	(19,979)	(17,259)	(16,185)	(16,061)	(17,519)	(17,447)	(18,398)	
target D/V ratio (Book Values)	88.6%	87.7%	86.9%	88.0%	88.0%	88.0%	88.0%	88.0%	88.0%	88.0%	
Net Debt	109,027	124,395	138,623	160,084	176,256	190,834	204,971	220,249	235,375	251,421	
Δ Net Debt	NA	15,368	14,228	21,460	16,173	14,578	14,137	15,278	15,126	16,046	
Interests	130	(169)	(110)	(125)	(138)	(149)	(160)	(172)	(183)	(196)	
Tax Shields	(39)	50	33	37	41	44	48	51	55	58	
Free Cash Flow to Equity	(5,554)	(2,651)	(589)	1,393	(1,183)	(1,711)	(2,037)	(2,362)	(2,450)	(2,489)	
Cost of Capital for Equity (Re)					7.5%						
Perpetual Growth rate										3.76%	
Equity Value					(78,737)	(77,146)	(75,252)	(73,056)	(70,778)	(68,463)	

The main drivers for this negative value for the financial services division are the changes in vehicles leased out and in accounts receivables, which are expectable due to the non-operating and complementary nature of this division. For the terminal value we have used the same formula as in the automotive division and we have assumed for the growth rate an average of the growth rates assumed in the automotive division, weighted with the business units' specific equity value.

Equity-Accounted Investments

Regarding the equity investments on the 4 joint-ventures and 5 associates, we have opted for different valuing approaches in each one, depending on their investment size and on how much of their financial data is publicly available. Starting by the joint-ventures, these were the approaches chosen:

Joint-venture	Method used
FAW-Volkswagen Automotive Company	Simplified DCF model
SAIC-Volkswagen Automotive Company	Simplified DCF model
SAIC-Volkswagen Sales Company	Simplified DCF model
Global Mobility Holding	Estimated Fair value (<i>using as reference the sale price of LeasePlan shares</i>)

Figure 17: WACC Inputs

D/V	0.0%
Cost of Debt	0.0%
Country Risk Premium	2.6%
Risk-free rate	0.3%
Unlevered Beta	0.84
Market Premium	6.2%
Long-Term WACC	7.6%

Looking deeper into the three first joint-ventures, which are the most significant, we can see by their few financial data publicly available that practically none of them have debt. Also, all of them are located in China (Changchun and Shanghai) and have the same business activity: develop, produce and sell passenger cars. To compute a specific WACC for these Chinese joint-ventures we have considered a country specific risk premium of 2.55%⁶⁰, which was added to the market risk premium of 6.16%⁶¹ (used also for VW Group's WACC estimation) to reflect a specific adjusted market risk premium for China. For the risk free rate, it was considered the European risk-free rate of 0.33%⁶² (used also for VW Group's WACC estimation). Then, we have used an average unlevered beta for large caps in the automotive industry in China of 0.84⁶³, which we consider to be comparable to these three companies. To be able to use this beta in the CAPM model we had to lever it, using again the formula: $B_U = B_L / [1 + (1 - T_c) \times (D/E)]$ ⁶⁴. Applying the CAPM model (already shown before) we got the cost of equity, which was used as input in the WACC formula (already shown before) to get a final cost of capital for these 3 Chinese joint-ventures of 7.6% (figure 17). Note that the fact that the tax rate is different in each of the 3 companies does not

⁶⁰ Damodaran, Aswath. "Country Default Spreads and Risk Premiums." New York University Stern School of Business, July 2016. Web. 04 Jan. 2017.

⁶¹ Damodaran, Aswath. "Damodaran Online" New York University Stern School of Business, Jan. 2017. Web. 04 Jan. 2017.

⁶² 10-year AAA-rated Euro area central government bonds

⁶³ WACC Expert Index

⁶⁴ being " T_c " the marginal tax rate (28.9%), " D/E " the Debt to Equity ratio, and " B_U " and " B_L " the unlevered and levered beta, respectively.

produce any effect on their WACC computations, because they do not have any debt.

Looking for the sales of these joint ventures, we can see the Chinese economy slow-down effect: their annual sales growth rate decreased from 12% in 2014 to -1.4% in 2015, representing the initial reaction to this new economic scenario. We forecast on the short-term (for 2016) a sales growth recovery, to correct what we consider an over-reaction in 2015 allied with a higher demand for luxury cars (specially Audi). On the long term, we forecast a stable 4% annual growth rate in vehicles sold, as targeted by the country's planners⁶⁵, after the Chinese automotive industry having adjusted to this new and long-term economic scenario. Through a product development strategy (explained already in the market analysis), starting to sell "greener" cars in this market, we expect these joint ventures to be able to sustainably maintain their market share in China. This annual growth rate from 2017 on seems to be reasonable when compared to the 5.4% average GDP real growth rate for China⁶⁶. Actually, we expect the automotive industry to continue to expand in the Chinese economy, but slightly decreasing its weight on GDP. In 2014, by each 1,000 Chinese people there was just 105 cars, which is lower than the global average of 140 cars⁶⁷. So the penetration rate is low, but there are high barriers to increase that, such as the low purchasing power of the population and incentives from the government to use public transportation instead. This sales growth is also backed by the recovered economic growth of China, which is supporting a growing demand for luxury passenger cars (such as Audi and Bentley). To answer to the market specific needs, VW Group has specific models for China, using as base others already developed models. The Audi A6L is the classic example where VW Group takes the European model A6 as base and modifies it to meet Chinese market demands (in this case it stretches the car and includes additional luxurious features). There is also a growing demand in China for electric cars, which VW Group is fulfilling by its "e-mobility" initiative. These actions are supported by the valuable partnerships (associates & joint ventures) in China, which help to tailor the imported models according to the Chinese market and to produce locally some specific models for this market.

Figure 18.

Finally, using the inflation rate forecast of IMF for Euro, we got the total revenue forecast for the three joint ventures present in figure 18.

FAW + SAIC VW Automotive & Sales Companies (1 + 2 + 3)

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Vehicles Sold (thousands)		3,135	3,506	3,456	3,773	3,924	4,081	4,244	4,414	4,590	4,792
Growth Rate			11.8%	-1.4%	9.2%	4.0%	4.0%	4.0%	4.0%	4.2%	4.4%
Average Unit Price (€)		26,245	26,501	27,927	27,999	28,373	28,825	29,309	29,825	30,373	30,908
Euro Inflation Rate		1.5%	0.5%	0.0%	0.3%	1.3%	1.6%	1.7%	1.8%	1.8%	1.8%
Revenue		82,279	92,913	96,515	105,641	111,334	117,631	124,389	131,645	139,426	148,122

⁶⁵ Schmitt, Bertel. "China To Automakers: 'Make EVs, Or Die'" *Forbes*. Forbes Magazine, 25 Nov. 2016. Web. 04 Jan. 2017.

⁶⁶ World Bank (estimates from 2017 to 2022).

⁶⁷ EU SME Centre 2015. "The Automotive Market in China".

Then for each joint-venture we have allocated the revenue using its correspondent historical weight on the total 3 joint-ventures revenue. To get the EBIT in each joint venture we have assumed a decreasing average operating margin until it achieves a margin of 15%, which we consider sustainable in the Chinese automotive industry. For the CAPEX level in 2016 for the three companies we have used the level expected by Volkswagen Group in their 2015 Annual report: “€ 4B stable investment” in 2016”. For the next years (2017-2019), we expect an annual 2% increase of the CAPEX to Sales ratio, reflecting the extra investment needed to expand the product portfolio into a “greener” one (i.e. create new production facilities to incorporate a bigger production of electric and hybrid cars). However, we forecast this ratio increase to be smoother and smoother until it becomes constant in 2021, after the production adaptation to this new green market trend be finalized. With this data we were able to get the unlevered free cash flow for each joint-venture.

To get their terminal value we have used again the perpetuity formula: $TV_T = \text{Unlevered Free Cash Flow}_T \times (1 + g) / (WACC - g)$, where we assumed for “g” the forecast GDP growth rate for China: 4.4%. These growth rates were achieved by computing the average between the growth rates of the unlevered free cash flows in the period 2018-2022. Since they were quite stable over the past and there is limited availability of financial details for these companies, we believe that using the historical average is a reasonable assumption.

Finally, discounting the unlevered free cash flows and the terminal value at the WACC we got the respective enterprise value, from which was deducted the net debt (in all these 3 companies is negative because there is cash but no debt - assuming a constant debt to enterprise value ratio, which is 0% in these cases) to get the total equity values of € 26,728 million, € 77,629 million and € 19,880 million, for FAW-VW Automotive Company, SAIC-VW Automotive Company and SAIC-VW Sales Company, respectively. For the full DCF model disclosure please go to appendix 1. Adjusting these total equity estimated values for the VW Group’s equity interest in each company (40%, 50% and 30%, respectively) we got a total value for VW Group’s shares in these 3 companies of € 55,570million.

For the fourth joint-venture (Global Mobility Holding) we have assumed a residual value of € 100 million because this holding has sold in 2016 its shares on LeasePlan, which was its main purpose, and no further details are available. This value was obtained by deducting the VW Group’s part of the total sale price (i.e.

50% of € 3.7 billion⁶⁸) to this joint-venture book value in VW Group balance sheet, as you can see also in appendix 1.

For the associates, the chosen approaches were:

Associate	Method used
Sinotruk Hong Kong Ltd.	Market Share Price
Bertrandt	Market Share Price
Navistar International Corp.	Market Share Price
There Holding	Multiples (<i>using the industry EV / EBIT ratio</i>)
GT Gettaxi Limited - GETT	Estimated Fair Value (<i>using as reference the market value consensus</i>)

With these approaches we got a total value for this 5 associates of € 1,973 million, as you can see in appendix 2. Besides all this, there are still some other non-operating assets and liabilities that were valued on the following way:

Non-operating Asset	Method used
Investment Property (<i>apartments rented out and leased dealerships</i>)	Fair value (<i>based on noncancelable lease payments minus operating expenses</i>)
Other Equity Investments (<i>shares representing an ownership interest <20%</i>)	Market Share Price (<i>for the public traded companies</i>) and Estimated Fair Value
Other Financial Assets (<i>Derivatives, Marketable Securities, Profit Participation rights, and others</i>)	Fair Value
Marketable Securities (<i>short-term fixed-income quoted securities</i>)	Market Share Price
Non-operating Liability	Method used
Deferred Tax Liabilities (<i>coming from temporary differences in non-operating assets and liabilities</i>)	Book Value
Long-term Operating & Non-Operating Provisions after tax (<i>mainly provisions for pensions</i>)	Book Value
Put Options & Compensation Rights granted to noncontrolling interests shareholders	Present Value of the cash settlement (<i>valuation audited by external firms and by the court-appointed auditor of the agreement</i>)

Finally, summing the equity value of the 2 divisions plus the equity values of the equity-accounted investments and the non-operating assets minus the non-operating liabilities, we got the final total equity value of the VW Group. Using the current market share price for the ordinary shares, we got a price for the preferred shares of 156.65€, which with dividends of 9.46€, gives a growth in shareholder's wealth of 19.4%, as you can see in figure 19.

⁶⁸ VW Group Interim Report Q3 2016

Figure 19.

Equity value - Aut. Division	104,055
Equity value - Financial Services Division	(78,737)
<i>Non-Operating Assets:</i>	
Investment Property	738
Associates	2,119
Joint-Ventures	55,570
Other Equity Investments	974
Other Financial Assets	16,818
Marketable Securities	15,008
<i>Non-Operating Liabilities:</i>	
Deferred Tax Liabilities	4,433
Long-term Operating & Non-Operating Provisions (after tax)	21,850
Put Options & Compensation Rights granted to noncontrolling interests shareholders	3,933
Equity Value - VW Group	86,329
Number of Ordinary Shares (million)	295
Number of Preferred Shares (million)	206
Ordinary Share Price (VOW) (Market Price)	143.25 €
Preferred Share Price (VOW3)	213.66 €
Total Variation Equity in Cash during 2017	4,886
per ordinary share	9.40 €
per preferred share	9.46 €
Total Shareholder's wealth in the end of 2017	223.12 €
Preferred Share Price (VOW3) in the beginning of 2017	139.10 €
Capital Gain in 2017	60.4%
Recommendation	BUY

Multiples

Looking at the market multiples of the main competitors of VW Group we can understand whether the stock the group is under or overvalued in the market. This valuation method is easier and simpler. However, it implies huge unrealistic assumptions about the companies considered. In fact, to be able to compare two companies 100% accurately using multiples they needed to have the exact same divisions, composition and structure, which is practically impossible.

Figure 20.

Nevertheless, for complementary purposes of our valuation exercise, we have performed the following twelve trailing months multiples analysis⁶⁹ (figure 20).

Trailing Twelve Months	Market Cap (USD Billion)	EV / Revenue	EV / EBITDA	P / E
Toyota (TM)	174.74	1.18	8.08	10.29
General Motors (GM)	53.20	0.68	5.93	3.98
Hyundai (HYU.DE)	23.99	0.70	8.10	4.13
Ford (F)	48.20	1.05	10.43	5.72
Nissan (NSANY)	39.83	0.91	9.07	9.74
Fiat Chrysler Automobiles (FCAU)	14.34	0.17	2.12	8.22
Honda (HMC)	53.71	0.75	9.71	15.58
Groupe PSA (UG.PA)	12.49	0.14	1.52	8.87
Renault (RNO.PA)	24.95	1.08	11.05	7.93
BMW (BMW.F)	58.02	1.56	11.36	8.52
Daimler (DAI.DE)	76.15	1.09	10.18	9.31
Mazda (MZDAY)	9.97	0.35	4.18	10.78
Mitsubishi (MMTOF)	8.76	0.17	3.41	(3.16)
Industry Average	46.03	0.76	7.32	7.69
Volkswagen Group (VOW3.DE)	70.30	0.85	8.20	(19.99)

In this analysis, we have picked the 13 biggest automakers in the world (after VW Group), which have a considerable presence in Europe (main market for VW Group) and we consider to have a reasonably comparable business structure with VW Group. Although the VW Group's Price to Earnings ratio (P/E) is negative (because earnings of VW Group considered on this multiple are still

negative), we can see VW Group is trading at premium, getting higher Enterprise value to Revenue and Enterprise Value to EBITDA ratios than the industry average. This conclusion reinforces that the market expects VW Group to grow at a higher rate than the industry in the future. However, do not forget the main part of VW Group's sales in China is not considered in revenues nor EBITDA of the company, because its Chinese joint-ventures' financials are not consolidated into the groups' financials. This makes VW Group looking more overvalued in these multiples than it really is.

Scenario Analysis

The growth rate chosen in the perpetuity formula plays a major role in the final valuation output. Also, the fact the Automotive sector is indeed cyclical, increases the uncertainty and potentiates the volatility of VW Group's cash flows. To mitigate at most that uncertainty, we have pursued a scenario analysis with three different possible realities regarding chosen growth used rate in the terminal value formula: the base scenario, the blue-sky scenario and the bad scenario.

Starting by the base case scenario, this is the valuation scenario described above on this report, which is the starting point to get to the other two scenarios. This scenario is based on the assumptions mentioned in our forecasts, predicting an increase in shareholders' wealth of 61%. This was achieved assuming the growth rate of GDP, which is considered a good proxy for big and stabilized industries, such as the automotive industry. Using this growth rate we are assuming VW Group maintains its market share and that the automotive industry maintains its weight on global GDP in the long term. Since this is our most sure scenario, we have gave a probability/weight of 80%.

⁶⁹ As of December 2nd, 2017. Source Yahoo Finance and Capital IQ for EV/EBITDA computations.

The blue-sky scenario as the name indicates is the most optimistic. Here we have assumed VW Group is going to maintain its market share but the automotive industry has been capable of adapting to the new market trends in such a positive and quick way that is going to grow at a higher rate than the global GDP. In fact, there is a small probability in which the automotive industry converts so quickly to this new greener economy and overcomes all the technologic barriers in such an outstanding way (cheaper and faster ways of transportation by car) that enables this industry to outperform the growth in some other transport industries (e.g. aviation industry, threatened by the terrorism). To forecast this growth rate, we have assumed the average growth rate of the 5 years prior to 2022 of the automotive industry. This is, we have computed an average growth rate for each market segment, based on its past sales volume performance in 2022. For the passenger cars, we can observe a sales volume steady growth of 2-3% worldwide from 2018 to 2022, which we have used as an input in our average growth rate (adding also the Euro inflation). For commercial vehicles and power engineering we have done the same procedure, doing a weighted average between sales volume of commercial vehicles, sales volume of trucks and sales volume of power engineering worldwide. This last one is expected to decrease 2.5% per year from 2016 to 2022, lowering the final weighted growth rate. For financial services division, the growth rate is a weighted average between the automotive division business units, as we have done before. This scenario forecasts a shareholders' total wealth of € 256.93 (per share). For this scenario, we have attributed just 5% of probability, assuming is not very likely and sustainable to get higher growth rates than the GDP in the long term.

For the bad scenario, it was considered a reality where there is a continuous slow-down in the Chinese economy allied with a not fully recovered European economy. The first event in the Chinese economy would affect the GDP of all the others regions, decreasing in 0.5% their real growth rates. The second event we considered that would decrease an extra 0.5% to the European real GDP growth rate. These effects all together, weighted by the business unit's regional sales, gave us a growth rate of 3.3% for passenger cars and 3.2% for commercial vehicles and power engineering, giving a weighted growth for financial services of 3.3%, as we have done before. For this scenario, it was given 15% of probability, considering all the risks inherent, which are not fully mitigated.

Computing the weighted average with the correspondent probabilities, we have got a final target preferred share price for the Volkswagen Group of € 204.37 with a dividend of € 9.77 per share, which gives to the shareholder a target wealth growth of 53.9% from now until the end of 2017, as you can see in figure 21.

Figure 21.

Scenario	Weight	Perpetual Growth Rate			Pref. Share		Shareholders' Wealth	Δ
		Pas. Cars	Com. Veh & P.E.	Fin. Serv.	Price	Dividend		
Blue-Sky	5%	4.3%	3.9%	4.3%	246.91 €	10.02 €	256.93 €	84.7%
Base	80%	3.8%	3.7%	3.8%	213.66 €	9.78 €	223.44 €	60.6%
Bad	15%	3.3%	3.2%	3.3%	140.64 €	9.62 €	150.26 €	8.0%
Weighted Average					204.37 €	9.77 €	214.14 €	53.9%

Financial Statements

INCOME STATEMENT - CONSOLIDATED

€ million	Years ended Dec 31,										
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F	
Sales Revenue (after reconciliation)	197,007	202,458	213,292	223,810	230,229	235,771	241,535	250,413	259,717	270,932	
Growth Rate	-	2.8%	5.4%	4.9%	2.9%	2.4%	2.4%	3.7%	3.7%	4.3%	
Cost of Sales (excluding Impairments, Dep. & Amort.)	157,710	161,548	173,099	171,732	176,216	180,186	184,305	190,308	196,581	204,014	
Impairment Losses (net of reversals)	346	377	1,320	0	0	0	0	0	0	0	
Gross Profit	38,951	40,533	38,873	52,078	54,013	55,585	57,230	60,104	63,135	66,918	
Distribution Expenses (excluding Dep&Amort)	11,422	11,036	13,575	14,215	14,583	14,894	15,218	15,735	16,277	16,936	
Administrative Expenses (excluding Dep&Amort)	3,974	3,541	3,647	2,802	2,858	2,915	2,973	3,033	3,094	3,155	
Depreciation	11,785	13,588	15,532	17,151	19,634	21,850	23,834	25,683	27,417	29,093	
Amortization	2,712	2,976	2,922	2,998	3,089	3,181	3,273	3,370	3,470	3,575	
Depreciation & Amortization	14,497	16,564	18,454	20,149	22,723	25,031	27,108	29,052	30,887	32,668	
Other Operating Income	9,956	10,298	12,905	9,285	9,425	9,558	9,640	9,876	10,123	10,429	
Reversal of Valuation Allowances on Receivables and othe	547	559	737	704	714	726	734	756	779	807	
Reversal of Provisions and Accruals	2,532	2,348	2,871	(47)	1	(0)	0	(0)	0	(0)	
Foreign Currency Hedging Derivatives	1,785	1,181	1,560	1,491	1,510	1,537	1,554	1,601	1,648	1,708	
Foreign Exchange Gains	1,758	2,323	3,859	3,688	3,736	3,801	3,845	3,959	4,078	4,225	
Sale of Promotional Material	256	357	427	390	387	386	384	383	382	382	
Cost Allocations	909	1,005	1,308	1,195	1,184	1,183	1,175	1,173	1,171	1,169	
Investment Property	17	8	10	9	9	9	9	9	9	9	
Asset Disposals and the reversal of impairment losses	233	134	188	(3)	0	(0)	0	(0)	0	(0)	
Miscellaneous other Operating Income	1,919	2,383	1,945	1,859	1,883	1,916	1,938	1,995	2,055	2,129	
Other Operating Expenses	7,344	6,993	20,173	12,008	12,255	8,764	8,873	9,140	9,419	9,761	
Valuation Allowances on Receivables and other Assets	1,442	1,150	1,674	1,655	1,709	1,743	1,788	1,847	1,908	1,982	
Foreign Currency Hedging Derivatives	985	1,003	5,083	5,025	5,191	1,577	1,512	1,558	1,609	1,672	
Foreign Exchange Gains	2,486	1,972	3,260	3,223	3,329	3,395	3,482	3,597	3,715	3,860	
Cost Allocations	408	566	695	658	665	665	670	672	673	674	
Termination Agreements	76	193	502	8	0	0	0	0	0	0	
Disposal of Noncurrent Assets	151	105	106	2	0	0	0	0	0	0	
Miscellaneous other Operating Expenses	1,796	2,004	8,853	1,438	1,361	1,384	1,420	1,466	1,515	1,574	
Operating Result (EBIT)	11,670	12,696	(4,071)	12,189	11,019	13,539	12,698	13,020	13,582	14,827	
Share of Profits & Losses of Equity-Accounted Investments	3,588	3,988	4,387	3,946	4,054	4,313	4,553	4,844	5,155	5,498	
Net Interest Income & Other Financial Result	(2,831)	(1,890)	(1,620)	(2,989)	(2,978)	(3,107)	(3,259)	(3,414)	(3,571)	(3,727)	
Earnings Before Taxes (EBT)	12,427	14,794	(1,304)	13,145	12,082	14,745	13,992	14,450	15,166	16,598	
Income Tax Income/Expense	(3,283)	(3,726)	(59)	(3,244)	(3,078)	(3,783)	(3,557)	(3,670)	(3,831)	(4,223)	
Current	(3,733)	(3,632)	(2,859)	(3,917)	(3,600)	(4,394)	(4,170)	(4,306)	(4,519)	(4,946)	
Deferred	449	(94)	2,800	673	523	612	612	636	689	723	
Net Income	9,144	11,068	(1,363)	9,901	9,004	10,963	10,435	10,780	11,335	12,375	

BALANCE SHEET - CONSOLIDATED

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
ASSETS											
Intangible Assets		59,243	59,934	61,146	63,148	65,173	67,202	69,236	71,339	73,513	75,793
Property, Plant & Equipment		42,389	46,169	50,171	55,153	59,819	64,143	68,179.16	72,151	76,089	80,112
Lease Assets		22,259	27,585	33,173	45,776	56,887	66,610	75,115	82,771	89,684	96,082
Investment Property		427	485	504	447	404	371	347	328	315	305
Equity-accounted Investments		7,934	9,874	10,904	10,085	10,562	12,369	14,964	17,835	20,908	24,912
Other Equity Investments		3,941	3,683	974	974	974	974	974	974	974	974
Financial Services Receivables		51,198	57,877	63,185	68,084	72,458	76,653	81,010	86,532	92,358	99,039
Other Financial Assets		7,040	6,498	6,730	6,730	6,730	6,730	6,730	6,730	6,730	6,730
Other Receivables		1,456	1,654	1,340	1,386	1,416	1,443	1,471	1,509	1,550	1,596
Tax Receivables		633	468	395	418	416	421	428	434	443	453
Deferred Tax Assets		5,622	5,878	8,026	7,469	7,519	7,329	7,189	7,010	6,784	6,522
<i>from which operating/recurring</i>		<i>1,807</i>	<i>1,843</i>	<i>2,020</i>	<i>1,568</i>	<i>1,835</i>	<i>1,837</i>	<i>1,907</i>	<i>1,950</i>	<i>1,997</i>	<i>2,042</i>
Total Noncurrent Assets		202,142	220,105	236,548	259,669	282,357	304,244	325,642	347,612	369,346	392,518
Inventories		28,653	31,466	35,048	36,739	37,742	38,599	39,490	40,888	42,352	44,125
Trade Receivables		11,133	11,472	11,132	11,793	12,283	12,732	13,199	13,844	14,522	15,318
Financial Services Receivables		38,385	44,398	46,888	50,544	53,817	56,959	60,222	64,353	68,710	73,706
Other Financial Assets		6,591	7,693	10,043	10,044	10,044	10,044	10,044	10,044	10,044	10,044
Other Receivables		5,030	5,080	5,367	5,686	5,922	6,138	6,364	6,674	7,001	7,385
Tax Receivables		729	1,010	1,029	1,090	1,135	1,177	1,220	1,280	1,342	1,416
Marketable Securities		8,492	10,861	15,008	15,008	15,008	15,008	15,008	15,008	15,008	15,008
Cash, Cash Equivalents & Time Deposits		23,178	19,123	20,871	23,402	22,518	22,851	23,197	23,729	24,288	24,961
<i>from which Operating Cash</i>		<i>12,595</i>	<i>10,784</i>	<i>13,679</i>	<i>13,429</i>	<i>13,814</i>	<i>14,146</i>	<i>14,492</i>	<i>15,025</i>	<i>15,583</i>	<i>16,256</i>
Total Current Assets		122,191	131,103	145,386	154,305	158,469	163,508	168,744	175,820	183,268	191,962
Total Assets		324,333	351,208	381,934	413,975	440,826	467,752	494,386	523,432	552,614	584,479
EQUITY											
Subscribed Capital		1,191	1,218	1,283	1,512	1,636	1,752	1,896	2,046	2,199	2,369
Reserves		12,199	12,535	10,177	11,995	12,977	13,895	15,042	16,230	17,442	18,791
Retained Earnings (<i>excluding other compreh. inc.</i>)		72,341	71,197	69,040	81,371	88,035	94,260	102,039	110,104	118,326	127,478
Equity attributable to VW AG hybrid capital investors		2,004	5,041	7,560	9,260	9,966	10,635	11,540	12,468	13,421	14,496
Noncontrolling Interests		2,304	198	210	203	226	247	263	282	300	319
Total Equity		90,039	90,189	88,270	104,340	112,840	120,789	130,780	141,130	151,689	163,453
LIABILITIES											
Long-term Debt		63,822	72,370	79,193	91,928	99,103	106,144	113,196	120,763	128,257	136,144
Other Liabilities		4,527	4,238	4,905	5,008	5,114	5,223	5,334	5,447	5,563	5,681
Deferred Tax Liabilities		7,894	4,774	4,433	4,433	4,433	4,433	4,433	4,433	4,433	4,433
Provisions for Pensions		21,774	29,806	27,534	27,534	27,534	27,534	27,534	27,534	27,534	27,534
<i>of which unfunded pension funds</i>		<i>20,929</i>	<i>26,957</i>	<i>25,118</i>	<i>27,534</i>	<i>27,534</i>	<i>27,534</i>	<i>27,534</i>	<i>27,534</i>	<i>27,534</i>	<i>27,534</i>
Provisions for Taxes		3,674	3,215	3,940	5,398	4,962	6,055	5,746	5,934	6,228	6,816
Other Provisions		13,981	15,910	25,170	19,226	20,309	21,153	21,812	22,423	22,976	23,526
<i>of which operating (or recurring)</i>		<i>13,981</i>	<i>15,910</i>	<i>17,860</i>	<i>19,226</i>	<i>20,309</i>	<i>21,153</i>	<i>21,812</i>	<i>22,423</i>	<i>22,976</i>	<i>23,526</i>
Total Noncurrent Liabilities		115,672	130,313	145,175	153,527	161,455	170,543	178,056	186,535	194,992	204,134
Put Options & Compensation Rights granted to noncontrolling interests shareholders		3,638	3,703	3,933	3,933	3,933	3,933	3,933	3,933	3,933	3,933
Short-term Debt		64,513	73,207	82,662	94,851	103,676	111,754	119,672	128,208	136,661	145,603
Trade Payables		18,023	19,530	20,460	21,434	22,001	22,483	22,984	23,779	24,612	25,622
Tax Payables		218	256	330	346	355	363	371	384	397	414
Other Liabilities		11,004	14,143	14,014	14,389	14,684	14,965	15,253	15,604	15,965	16,366
<i>of which customer advances</i>		<i>3,785</i>	<i>3,402</i>	<i>3,994</i>	<i>4,191</i>	<i>4,311</i>	<i>4,415</i>	<i>4,523</i>	<i>4,689</i>	<i>4,863</i>	<i>5,073</i>
Provisions for Taxes		2,869	2,791	1,301	1,783	1,638	2,000	1,897	1,960	2,057	2,251
Other Provisions		18,360	17,075	25,788	19,372	20,244	20,924	21,439	21,899	22,308	22,703
<i>of which operating (or recurring)</i>		<i>18,360</i>	<i>17,075</i>	<i>18,298</i>	<i>19,372</i>	<i>20,244</i>	<i>20,924</i>	<i>21,439</i>	<i>21,899</i>	<i>22,308</i>	<i>22,703</i>
Total Current Liabilities		118,625	130,705	148,488	156,107	166,531	176,421	185,550	195,767	205,932	216,892
Total Liabilities		234,297	261,018	293,663	309,634	327,986	346,964	363,606	382,302	400,924	421,027

Appendix

Appendix 1. Joint Ventures

1. FAW-Volkswagen Automotive Company

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Revenue	37,500	42,812	40,462	44,288	46,675	49,314	52,148	55,190	58,452	62,097
EBIT	5,458	6,677	6,489	6,387	6,731	7,358	7,781	8,235	8,722	9,266
Interest Income	57	84	64	99	131	177	237	303	372	439
Tax rate	26.2%	26.2%	23.7%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%	25.4%
Current Assets (excluding cash & equiv.)	5,045	6,385	6,720	7,355	7,752	8,190	8,661	9,166	9,708	10,313
Current & others Liab. (excl./financial liab.)	11,238	13,020	12,746	13,951	14,703	15,535	16,427	17,385	18,413	19,561
Δ NWC	NA	442	(609)	570	355	393	422	453	486	543
Depreciation & Amortization	820	861	1,033	1,237	1,633	2,205	2,954	3,782	4,641	5,482
Property, Plant & Equipment	5,226	6,913	7,997	9,576	12,646	17,066	22,869	29,282	35,929	42,439
CAPEX	NA	(2,548)	(2,117)	(2,816)	(4,703)	(6,625)	(8,757)	(10,195)	(11,288)	(11,992)
FCF		3,682	3,256	3,756	2,308	1,463	425	185	346	946
Dividends	3,833	3,500	5,425	4,402	4,657	1,857	283	33	35	37
Perpetual Growth rate										4.4%
				WACC	7.6%					
				EV	23,868	24,229	25,656	27,432	29,182	30,466
Debt	11	3	100	0	0	0	0	0	0	0
Cash & Cash equivalents	6,964	7,681	5,954	5,208	2,860	2,466	2,607	2,759	3,071	3,979
Equity					26,728					
Equity Interest	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Estimated Fair Value of VW Shares in this Joint-Venture					10,691					

2. SAIC-Volkswagen Automotive Company

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Revenue	20,897	23,142	26,018	28,478	30,013	31,710	33,532	35,488	37,586	39,930
EBIT	3,654	4,626	4,576	4,724	4,679	4,785	4,976	5,266	5,577	5,925
Interest Income	94	99	79	102	115	136	167	202	238	274
Tax rate	24.9%	25.4%	19.3%	23.2%	23.2%	23.2%	23.2%	23.2%	23.2%	23.2%
Current Assets (excluding cash & equiv.)	1,063	1,704	3,426	3,750	3,952	4,176	4,415	4,673	4,949	5,258
Current & others Liab. (excl./financial liab.)	6,950	7,812	8,888	9,728	10,253	10,833	11,455	12,123	12,840	13,640
Δ NWC	NA	221	(646)	516	322	356	382	411	440	492
Depreciation & Amortization	529	764	907	935	1,054	1,255	1,538	1,857	2,192	2,520
Property, Plant & Equipment	5,025	6,402	6,345	6,541	7,375	8,780	10,758	12,994	15,334	17,629
CAPEX	NA	(2,141)	(850)	(1,131)	(1,888)	(2,660)	(3,516)	(4,093)	(4,532)	(4,815)
FCF				3,950	3,082	2,627	2,226	2,220	2,384	2,749
Dividends	2,114	2,656	4,096	3,206	3,184	3,269	3,416	3,632	3,830	2,631
Perpetual Growth rate										4.4%
				WACC	7.6%					
				EV	71,060	73,864	77,282	80,969	84,772	88,502
Debt	0	0	27	0	0	0	0	0	0	0
Cash & Cash equivalents	6,964	7,681	5,954	6,671	6,569	5,927	4,737	3,325	1,879	1,996
Equity					77,629					
Equity Interest	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Estimated Fair Value of VW Shares in this Joint-Venture					38,815					

3. SAIC-Volkswagen Sales Company

€ million	Years ended Dec 31,									
	2013	2014	2015	2016 E	2017 F	2018 F	2019 F	2020 F	2021 F	2022 F
Revenue	23,882	26,959	30,035	32,875	34,647	36,606	38,709	40,967	43,389	46,095
EBIT	457	773	871	690	727	768	813	860	911	968
Interest Income	0	0	14	5	6	7	9	10	12	14
Tax rate	25.1%	25.0%	25.2%	25.1%	25.1%	25.1%	25.1%	25.1%	25.1%	25.1%
Current Assets (excluding cash & equiv.)	3,692	3,851	3,110	3,404	3,588	3,790	4,008	4,242	4,493	4,773
Current & others Liab. (excl./financial liab.)	3,849	4,052	3,321	3,635	3,831	4,048	4,280	4,530	4,798	5,097
Δ NWC	NA	44	10	20	12	14	15	16	17	19
Depreciation & Amortization	2	3	4	4	5	6	7	9	11	12
Property, Plant & Equipment	391	450	486	535	619	738	896	1,080	1,282	1,497
CAPEX	NA	(62)	(40)	(53)	(89)	(125)	(165)	(193)	(213)	(227)
FCF				488	473	470	465	476	497	530
Dividends	310	343	477	385	406	429	454	482	511	543
Perpetual Growth rate										4.4%
				WACC	7.6%					
				EV	13,755	14,336	14,967	15,634	16,332	17,051
Debt	0	0	0	0	0	0	0	0	0	0
Cash & Cash equivalents	6,964	7,681	5,954	6,057	6,125	6,166	6,177	6,172	6,157	6,144
Equity					19,880					
Equity Interest	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Estimated Fair Value of VW Shares in this Joint-Venture					5,964					

4. Global Mobility Holding

€ million	2013	2014	2015	2016 E	2017 F
Equity Interest	50%	50%	50%	50%	50%
Estimated Fair Value of VW Shares in this Joint-Venture					100
Value reported on B.S.	1,716	1,835	1,950		

Appendix 2. Material Associates

1. Sinotruk Hong Kong Ltd

Bloomberg ticker: 3808:HK

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F
Equity Interest		25%	25%	25%	25%	25%
Market Cap (HKD million)					14,026	15,986
Hong Kong Stock Market (HSI) (points)					22,000	21,300
Exchange rate (HKD to EUR)					0.12	0.12
Market Price of VW Shares in this Associate			317	251	421	487
Value reported on B.S.		298	309	318		

Activity: Truck Manufacturer

Headquarters: Hongkong, China

Aim of the Partnership: Potentiate VW Trucks exports to China (volume & premium segment)

2. Bertrandt

Bloomberg ticker: BDT:GR

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F
Equity Interest			29%	29%	29%	29%
Market Cap (EUR million)					961	989
Germany DAX30 Stock Market Index (points)					10,600	10,300
Market Price of VW Shares in this Associate			338	327	279	287
Value reported on B.S.			334	332		

Activity: Engineering services for the Automotive/Aviation industry.

Headquarters: Ehningen, Germany

Aim of the Partnership: Get engineering services & solutions.

3. There Holding

Not publicly traded

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F
Equity Interest				33.3%	33.3%	33.3%
Sales		915	970	1,028	1,090	1,155
Operating Result (EBIT)				98	104	110
Industry (Telecom. Services) EV/ EBIT ratio					19.21	19.21
Estimated Fair Value of VW Shares in this Associate					631	669
Value reported on B.S.				668		

Activity: Owns 100% of the HERE Group, which develops/sells high resolution maps

Headquarters: the Netherlands

Aim of the Partnership: Have as a partner the strongest player in mapping services for the automotive industry.

4. GT Gettaxi Limited (GETT)

Not publicly traded

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F
Equity Interest					28.1%	
Estimated Fair Value of VW Shares in this Associate					281	281
Value reported on B.S.					264	

Activity: On-demand mobility services

Headquarters: Israeli-based

Aim of the Partnership: Expand these services as a part of a joint growth strategy.

5. Navistar International Corp. (to do no later than the beginning of 2017)

Bloomberg ticker: NAV:US

€ million	Years ended Dec 31,	2013	2014	2015	2016 E	2017 F
Equity Interest					16.6%	16.6%
Market Cap (USD million)					2,286	2,514
Dow Jones Industrial Stock Market Index (points)					18,700	18,100
Exchange rate (USD to EUR)					0.94	0.95
Market Price of VW Shares in this Associate					357	395
Share Price					15.76	
Total Purchase Price					300	

Activity: Commercial Vehicles Manufacturer

Headquarters: US-based

Aim of the Partnership: Strategic technology & supply cooperation, and a procurement joint-venture.

Disclosures and Disclaimer

Research Recommendations

Buy	Expected total return (including dividends) of more than 15% over a 12-month period.
Hold	Expected total return (including dividends) between 0% and 15% over a 12-month period.
Sell	Expected negative total return (including dividends) over a 12-month period.

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