



MINERVA Investment Management Society

Milan, 31st March 2019

Volvo Group

Equity Research

Key Points:

Business. The Truck Manufacturing industry has always been quite cyclical and strictly related to the policies of the countries, especially those regarding the emissions of CO₂. When valuating cash flows related to these companies, it must be considered that some production standards have to be respected by law and that investments in innovation are fundamental to keep a competitive hedge and a positive growth over time. As a consequence, we also decided to include in the Investment Risk section some of the most relevant risks that could be faced when investing in companies in this sector.

Valuation. Our analysis is mainly concentrated on the DCF valuation model. We decided to implement a two-stage model as the company is a mature one. Firstly, we computed the fundamental components of the cost of equity (including specific country risk premium), the cost of debt and found the D/E ratio for Volvo. As no preferred stocks are issued, we computed the WACC that we used to discount both FCFO and Terminal Value. Assumptions about the revenues were related the industry forecast made by major analysts and financial institutes. In particular, we considered a constant growth rate to smooth the cyclicity of this industry. Furthermore, some of the most important ratios were kept constant in order to not overestimate the cash flows. Adding surplus assets, subtracting minority interests and net financial position, we computed the Equity Value and the share price. However, in order to have different valuation methods, we also computed three asset-side and one equity side market multiples of some of Volvo's competitors. However, we noticed that the valuation ranges are quite scattered and, henceforth, we decided to rely mainly on the DCF.

Recommendation: HOLD. Given the results of our valuation and the analysis of the economic and financial characteristics of Volvo, we recommend holding the shares and, in order to take a more thoughtful decision, wait for the earnings call of the 4th of April.

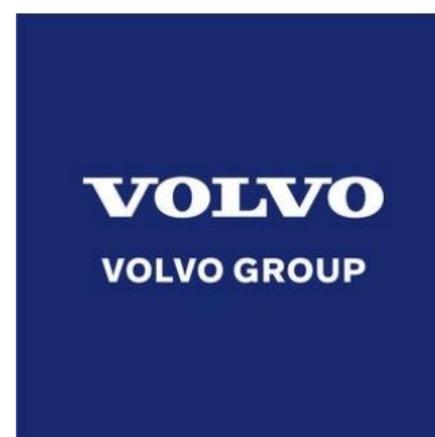
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Volvo Group (VOLV-AB)
STO – Currency in SEK

Price Target: SEK 141.05 – SEK 150.23

Key Statistics:

Sector	Heavy Machineries & Vehicles
Industry	Truck Manufacturing
Revenue	390,834 Th
Market Cap	306.44 Bn
Shares out.	2.128 Bn



Volvo Overview

The Volvo Group is a Swedish multinational whose core activity is the production, distribution and sale of trucks, buses and construction equipment. Volvo also supplies marine and industrial engines and financial services. The Group is among the top players in the industry, being the world's second largest manufacturer of heavy-duty trucks and largest manufacturer of heavy diesel engines.

Volvo's focus follows from its mission: "driving prosperity through transport solutions". Actually, many of its products and services are necessary every day for various purposes and in order to classify these uses, the company has set four business lines: on the road, in the city, at the site and at the sea. Each business line represents the corresponding class of products.

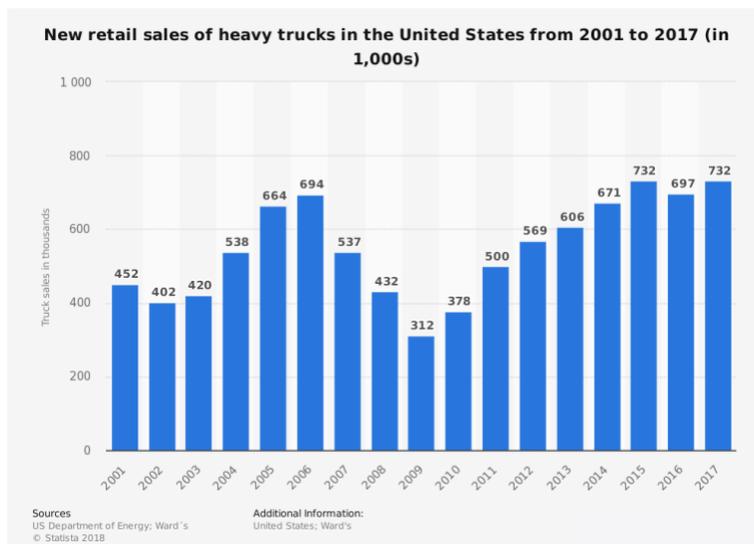
The organization is shaped around ten different business areas, with a deep focus on the trucks' manufacturing (the widest) which is further divided into three divisions: Technology, Operations and Purchasing.

Volvo have a variegate brand portfolio, which allows the company to serve different customers and markets each with peculiar growth opportunities.

Industry Overview

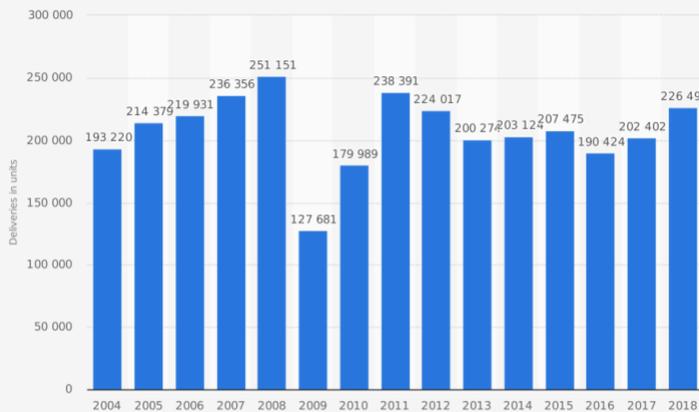
The main core business of Volvo Group is definitively the production, distribution and sale of trucks, buses and construction equipment. Two years ago, Volvo was the world's second largest manufacturer of heavy-duty trucks but, in order to better understand the dynamics of the company, an analysis of the industry is fundamental.

First, a general overview of what kind of products does the company produce must be introduced. Trucks market can be classified as light, medium and heavy based on their dimensions and load capacity. In particular, heavy trucks market is solely dependent on the industrial progress in a country as it is used in carrying the raw materials for the industries as well as the finished goods from manufacturing location to its intended market. The logistics industry includes transportation modes in land, air and waterways. Land transport is further segmented into rail transport and road transport. Concerning especially the consumer goods, they are mostly transported by heavy trucks and this is where Volvo plays the vast majority of its role.



Heavy trucks market suffered downturns during economic recession in the U.S. and Europe wherein their industrial processes, especially automobile manufacturing suffered severe setbacks. However, as it can be seen in the graph on the left, the U.S. has emerged out of its recessionary period and making swift advancements in its industries. Europe, on the other hand is recovering from Euro-zone crisis and its heavy trucks market is expected to recover in future years, but in a slower way rather than the North American market. Heavy trucks with diesel engines account for the largest market among their types based on fuel consumption.

Volvo Group's truck deliveries from FY 2004 to FY 2018 (in units)



Source: Volvo © Statista 2019
Additional Information: Worldwide

Notice how in these two graphs it is easy to appreciate that the trend for Volvo Group actually follows the one experienced by the U.S., again confirming that this is the prevailing market.

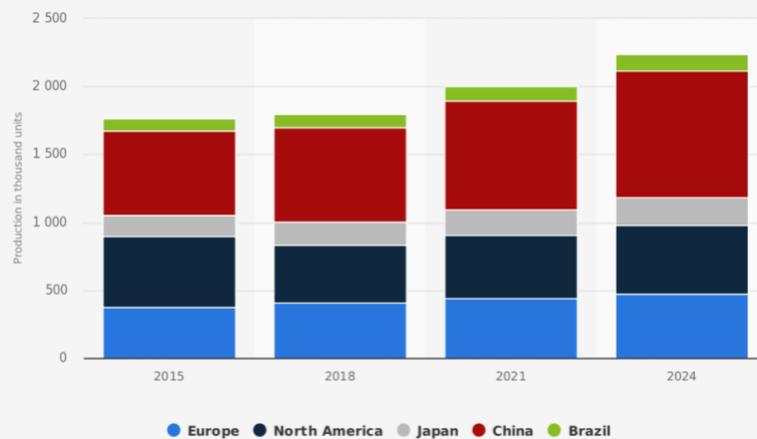
On the other hand, the increase in raw material prices is one of the biggest hurdles for truck industry where the soaring iron and steel prices are compelling the truck manufacturers to increase prices of their final product. The economically volatile environment and unstable crude oil prices are restraining fleet owners (who are basically the consumers for truck industry) to buy new trucks. Deteriorating road infrastructure in the developing countries has been a

prevailing challenge for the manufacturing market, which is making the trucking activities difficult and subject to frequent breakdowns. As a consequence, the global heavy truck manufacturers have been increasing the number of their service stations in order to build customer relationships which are dependent on servicing facilities provided by the companies.

From the geographical standpoint, commerce and trade are developing at a fast pace in Brazil and the Middle East countries. The increasing number of vendors for the components of truck is providing ample growth opportunities for the truck manufacturing market. The fast pace of industrial development in China is boosting the production and sales of heavy trucks market in the country. Indian heavy truck market is also growing at a fast pace due to increasing demand for consumer goods on account of rising population.

Among the regions, Asia Pacific accounted for the largest share in the global heavy trucks market, followed by Europe and North America. In the bar chart it is possible to see some estimates for the heavy-duty trucks in the future years, basically respecting the already described trend (being only a bit conservative regarding Brazil because it remains a BRICS country and, hence, riskier to consider).

Heavy-duty vehicle production from 2015 to 2024, by major market (in 1,000 units)



Sources: Various sources; Credit Suisse © Statista 2018
Additional Information: Worldwide; Various sources (Credit Suisse; EU; EPA; China Ministry)

Moreover, there are several expenses that affect the profitability of trucking companies. Labor costs have a considerable impact on earnings. Trucking companies require a deep roster of qualified drivers and freight handlers. The supply of available drivers often tends to be slim, resulting in intense competition for qualified talent. Companies need to offer competitive wages and benefits to attract the best employees (who then possess strong negotiating leverage and the possibility of labor strife is a risk). Nonunion workers offer lower labor costs, but they might not be as dependable. Other significant

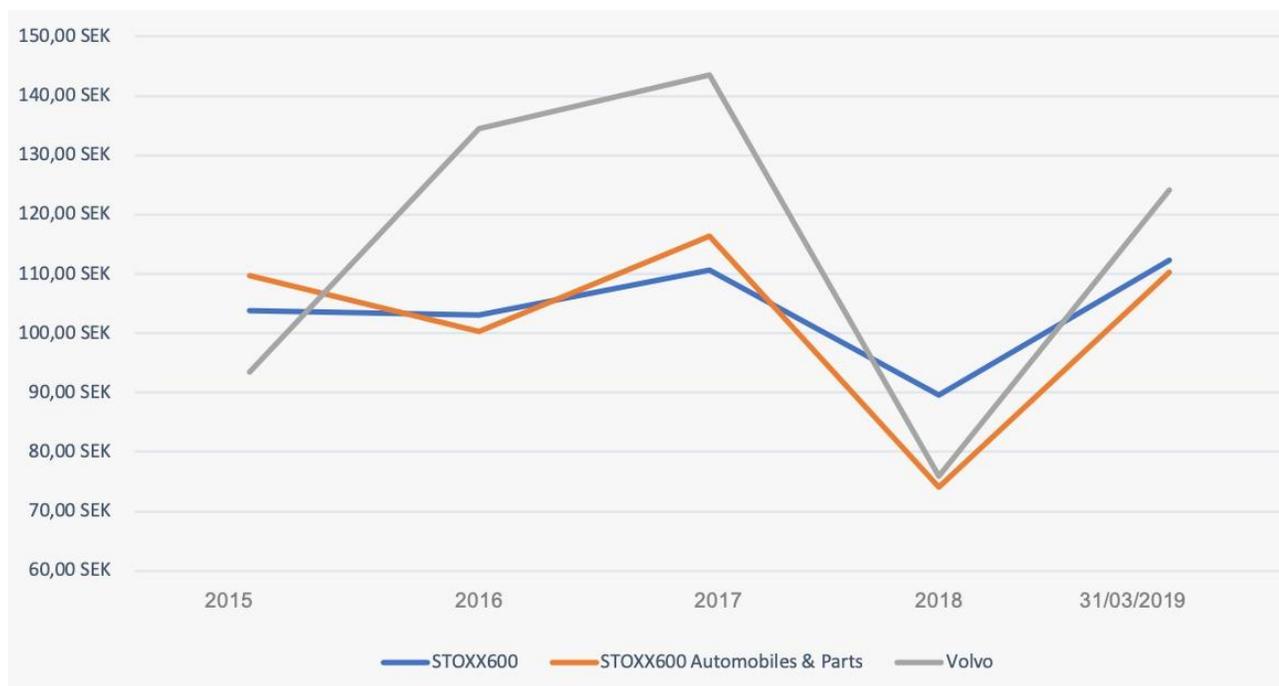
labor-related costs include pension expense and workers' compensation.

Fuel is one other expense that must be managed carefully. Very long trips, heavy loads and large engines keep tractor-trailer fuel consumption high. Most of the cost of diesel fuel is passed on to customers through surcharges. But, if fuel prices rise quickly, there may be a lag in recouping all of the related outlays, thus hurting a trucker's short-term profitability. Most companies prefer to rely on surcharges rather than long-term fuel-contract hedging.

To briefly recap what we saw during this overview, when conducting the valuation, we always need to consider three main features of this industry. First, it has experienced a significant downturn during '08 crisis and the process of comeback is still in place, occurring differently from region to region. Second, the industry shows margins of increase in production especially in China and emerging countries. Finally, the asset-centric characteristic of the industry increases the costs that companies have to sustain, both from the point of view of labor and raw material.

STOCK PERFORMANCE

Volvo Group is listed on the Nasdaq Stockholm, Sweden stock exchange. There are 2 types of share: A share with one vote at Annual General Meetings and B share carries 1/10 of a vote.



The graph compares the change in the cumulative total stockholder return on our common stock, both A and B (assuming reinvestment of dividends into common stock at the date of payment) with the cumulative total return on STOXX600 and the cumulative total return on the STOXX600 Automobiles & Parts over the preceding five-year period.

VOLVO PENTA

Over time Volvo sought to diversify itself horizontally and in order to do this, it entered a niche in the engine's market: the sea's one. Volvo Penta is an old brand within the group and from 1935 it serves

sea's customers through this brand. In terms of net sales, this business is not as fundamental as others (such as Trucks and Construction Equipment). In fact, in 2018 net sales of Volvo Penta accounted only for the 3,51% of the entire group. What is surely important to notice is that this segment of the market provide an adjusted operating margin of 17.0, which is 63,5% higher than the average of the group. Volvo Penta is a strategic brand for the group because not only makes the company able to exploit the benefits of diversification, but also gives the possibility to do it with a very high marginality: now Volvo is a leading supplier of engines and complete power systems for marine and industrial applications. The ability to make these premium products is given by the continuous innovation, the safety and environmental care and the performance-oriented attitude.

Into the segment "at sea", Volvo Group have made a division driven by the type of customers and the uses it serves: the marine leisure time's segment and the marine commercial's one.

The first line of products provides basically diesel engines, for which it is the biggest producer in the world. It is also the leading developer of various marine propulsion systems which aim to improve the performance and experience of a trip in a leisure boat. The main concept is "Easy Boating" that means to find solutions for the entire boat that make boating easy, enjoyable and more fun. An example is the IPS, Inboard Performance System. The marine leisure market continued to grow during 2018 and gained new customers, such as large yachts' owners.

The Marine commercial line focuses its business in drive systems and engines for propulsion, auxiliary equipment and complete marine generator sets for sea and river transport, coastguards, passenger transportation and wind farming vessels. It is the oldest line of production, which has always been characterized by constant innovation aimed at achieving a certain threshold of efficiency. This market showed a development in some sub-segment, such as offshore energy in Asia.

The uniqueness of Volvo Penta is provided by the continuous efforts in R&D which in February 2019 led to the development of ACP- Active Corrosion Protection. This is another step achieved in the way of "Easy Boating". It is an item that measures the drive's potential and acts in order to maintain a constant level of protection against the corrosion of the drive. The group is the first boat engine supplier to offer this kind of product.

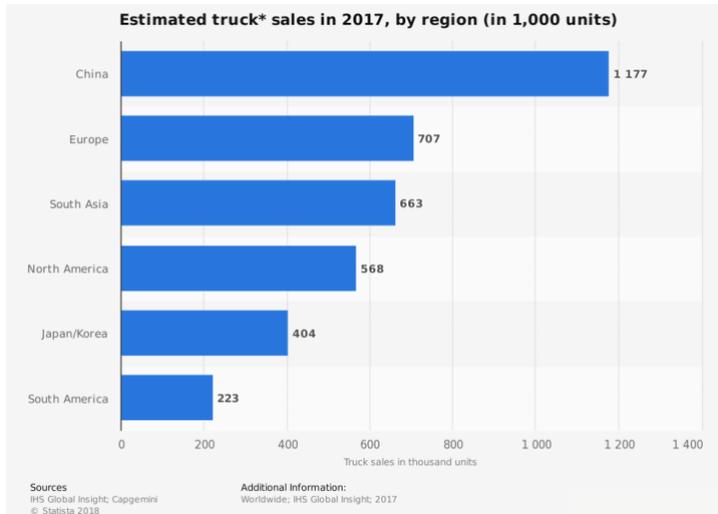
It is increasingly clear that the target selected by Volvo in the leisure time marine sector is a limited clientele that wants to satisfy the need for ease in using the boat, in order to waste less time but at the same time to obtain better performance. Among boaters, there is also an increasing interest in connectivity that have to be satisfied, because customers want to be connected with their boat whenever they want. These clients are willing to pay a lot for this type of innovations and it is on this that the group aims to reach its highest margins.

Some big challenges have been taken also in the sea transportation, trying to lower the emission in order to meet the necessity expressed by the commuting network. Volvo Penta will introduce the powered electric ferry service into the Gothenburg's ElectriCity transport ecosystem. This kind of innovation is typical in the transportation's industry, which is increasingly trying to rethink this business in order to reduce the impact on climate. Volvo Penta-powered electric vessel is the first fully-electric ferry able to complete longer multi-stop routes along the river. In this case, engineers took the multi-years expertise developed with electric buses, 'bringing the benefits of proven technology into a new context'.

Volvo Group is trying to bring to the sea business the changes that have previously been implemented in land transportation and it is able to do this as a 'first mover', thanks to its developed R&D departments and the peculiar integration of costumers in the value chain, that allow to easily understand what are their needs and what they are sensitive to.

CHINA'S EXPANSION

The brand portfolio of Volvo Group is currently composed of twelve different brands involved in the several fields in which the company operates in. However, something that must be underlined is the strong presence of the company in the Chinese market thanks to Joint Venture and Strategic Alliances



with well-established Chinese brands. This expansion seems to favor the company in a significant way because, as already stated in the industry overview, Asia Pacific accounts for the largest share in the global heavy trucks market. After registering a stunning 52% increase in sales to an all-time high of 1.1 million units in 2017 (graph on the left), sales of heavy-duty trucks increased another 15% in the first six months of 2018. While sales of heavy-duty trucks slowed in July and August, China's truck makers once again produced and sold more than one million heavy-duty trucks in the last year, making China the largest truck market in the world by a wide margin, almost doubling Europe.

Volvo seems to fully join this expansion thanks to the partnerships with Dongfeng Trucks and SDLG, showing that the company wants to exploit these opportunities for both the trucks and construction equipment business.

Dongfeng Trucks

This is one of the oldest leading truck brands in China. The company is now expanding globally and is gradually establishing its global sales & service networks. Dongfeng Trucks has its own R&D and production resources in China. The product range covers heavy and medium duty trucks, for demanding operations in long haul, regional and local distribution and for tough construction, mining and off-road operations.

Dongfeng Trucks develops and manufactures all main truck components such as: engines, gearboxes, axles, cabs and chassis. The production capacity is approximately 200,000 trucks a year. The trucks are designed for professional operators with demanding operations in a modern society with clean and efficient transportation.

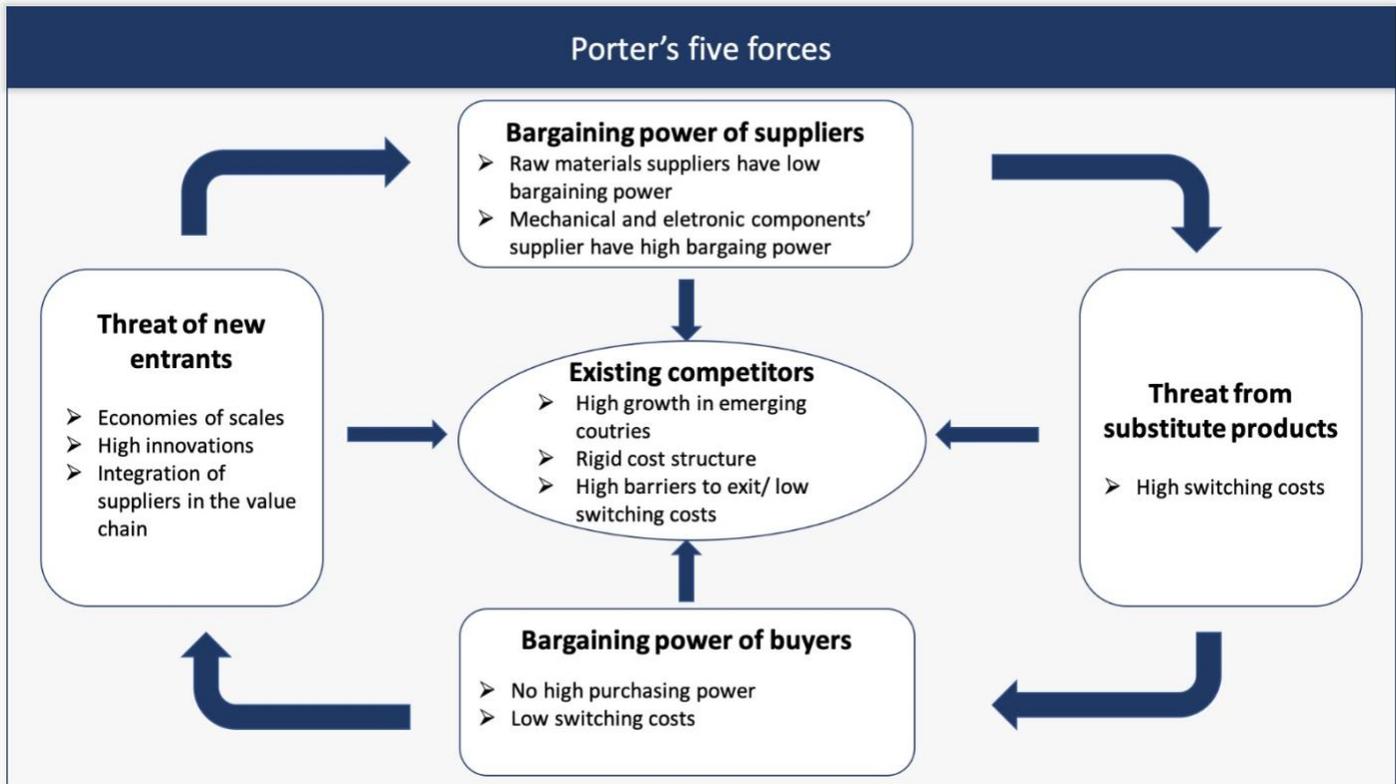
Moreover, the partnership between Dongfeng and Volvo is not only based on the synergies that could be gained because of the better knowledge of the market. In fact, this broad truck offering will be combined with aftermarket solutions including maintenance, finance and soft products, so as to find a new way to develop the business under the changing market trend.

SDLG

If Dongfeng represents the joint venture that allows Volvo to consolidate the trucks business in China, SDLG's partnership was agreed to exploit the possibility to sell and produce also construction equipment. SDLG is one of the most important manufacturers of construction, machinery and mining

equipment. In particular, the business regards diesel engines and industrial gas turbines in China, with equipment exports to Brazil and in some countries in Africa.

To sum up, it is true that older trucks are replaced with newer, more fuel-efficient models and hence the rapid growth of China's heavy-duty truck sector over the past two years will certainly slow down a bit. However, the size and growth of the country's economy, in combination with a large land mass, will ensure that China remains the largest market in the world for commercial vehicles and Volvo Group has been able to consolidate this position especially during the last years.



Porter's Five Forces

In order to better understand the industry in which Volvo Group operates, it is useful to assess it through the Porter's analysis. We have decided to focus our attention in the trucks manufacturing industry, because it is the main sources of revenues for the company.

Threat of New Entrants (HIGH)

It is difficult to enter this market claiming to have immediately high profits; in fact, in order to compete with companies already in the market it is needed the ability of exploiting economies of scale (probably the only way to enter the market without losses could be offering very highly customized products to a niche of clients). In the present competitive context it is crucial to have capabilities and means to continuously introduce innovations, which are increasingly required by customers.

Another important threat for new entrants is the competitive advantage achieved with high integration of suppliers in the value chain, which isn't normally easy to obtain rapidly. In particular, it is difficult to create economies of scale in purchasing of raw materials and long lasting leases with crucial high technology's suppliers.

Threat from substitute products (LOW)

The major markets served by this industry are wholesale/retail sector, exports, service and manufacturing sector, construction, utilities and Government. As substitute goods there are all those means of transport other than trucks and buses that fulfill the same function for these customers, for examples trains and ferries. However, there are some switching costs: for example in many cases changing means of transportation implies rethink the outgoing-logistics of a company or the construction of new infrastructures.

Bargaining power of suppliers (MEDIUM - HIGH)

It is useful to identify two different suppliers:

- Raw material's supplier: they basically supply a commodity (steel, aluminium) and they are quite numerous, easily replaceable and cannot really control the market. Recently, however, there have been strong speculations on raw materials due to the increased demand from China and India.
- Mechanical and electronic components' supplier: there is low concentration, because there are surplus suppliers compared to truck manufacturing companies. There is a low diversification of the markets served because they usually fail to supply other sectors due to their high specialization. The switching costs from a supplier are very high because the suppliers are involved from the first phases of product engineering and replacing them involves high costs. In order to be competitive in this industry and to afford high-volume markets it is necessary to build long-term relationships with suppliers of technologically advanced components. The aim is to secure the best possible commercial offer and to control the quality (and the responsible and sustainable behaviour of suppliers) when purchasing any product, component or service.

Bargaining power of buyers (MEDIUM)

Customers have different cost structures and, therefore, want different offers depending on their location and the type of transport work they carry out. Consumers individually do not hold much purchasing power because they do not buy large volumes of product (except in some cases, as that of public transportation system that buy all the buses circulating in a country) and therefore their contractual strength is weak towards the manufacturers. The switching costs are quite low and in order to increase them, it is necessary to offer to customers an appealing, fuel-efficient and sustainable product. This is possible if there is an effective value chain integration between customers and enterprise.

Existing competitors (MEDIUM)

In the industry there is a high level of market share concentration because the top 20 manufacturers account for about 95% of total revenues. In the Truck & Bus Manufacturing in US Daimler AG, PACCAR Inc., The Volvo Group and Navistar International Corporation made the 75.8% of revenue in 2018. Market growth is affected by different issues such as economic trends and environmental concerns which lead to an increased interest in electro-mobility and renewable fuels (the Environmental Protection Agency (EPA) depict a second phase of emissions standards in 2017). As a result, truck manufacturers experienced increased demand for vehicles compliant with these standards. Digitalization and technological transformation is a key element to maintain an high competitive position in the developed country. Many players have expanded internationally, with a particular focus on Asian and South

American markets; above all, they have increasingly targeted emerging markets. Here, manufacturers are growing faster than in North America and Western Europe. Companies of this industry have rigid cost structure due to the presence of considerable fixed costs, so when the market decreases on a regular basis, the competition increases to keep the company's profitability unchanged. Barriers to exit are high, due to the difficulty of decommissioning the plants and union rigidity, thus increasing competition. Finally, as mentioned above, switching costs for customers are usually low, so the competition becomes greater.

SWOT Analysis	
<p>STRENGTHS</p> <ul style="list-style-type: none"> ➤ Already affirmed expansion in China, India and emerging markets ➤ Horizontal diversification (Volvo Penta) ➤ Well diversified sources of revenues from the geographical point of view ➤ In line with the new environmental standards ➤ Broad variety of services offered in addition to the mere vehicles and machines (rental services, preventive maintenance ...) 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> ➤ Strength of competitors and difficulties to compete in business different from trucks and construction equipment ➤ Financial services carry a heavy weight (deviation from the core activity) ➤ Possible lack of experience when diversifying in different businesses and, as a consequence, higher formation and external costs
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> ➤ Exploit the new emerging markets in South America ➤ Ultimately consolidate the position in Asia ➤ Being first in the autonomous vehicle effective usage in the autonomous vehicle effective usage in the business of trucks ➤ Balance the cyclicity between trucks and construction equipment sales thanks to stronger services business ➤ Exploit financial services even more 	<p>THREATS</p> <ul style="list-style-type: none"> ➤ Increasingly severe environmental policies ➤ Tax reforms in European Automotive Market ➤ "Being left behind" from the technology standpoint ➤ Increase in raw materials' prices ➤ Geopolitical issues ➤ Risk of deteriorating infrastructure influencing the business ➤ Resource scarcity ➤ Drivers shortage due to lack of change in generation

Financial Statements

BALANCE SHEET

Reclassified Balance sheet (SEK Millions)	2015	2016	2017	2018
Assets				
Cash and Short term Investments	24.392	25.172	36.270	47.093
Net Accounts receivable	98.591	106.317	108.185	121.595
Total Inventory	44.390	48.287	52.701	65.783
Other Current Assets, Total	3.314	525	51	204
Total Current Assets	170.687	180.301	197.207	234.675
Property, Plant, Equipment (PPE) – Total	169.801	181.973	193.618	206.420
Accumulated Depreciation – Total	(83.935)	(91.440)	(98.712)	(107.671)
Property, Plant, Equipment (PPE) – Net	85.866	90.534	94.907	98.749
Goodwill – Gross	22.088	23.438	22.853	24.135

Accumulated Goodwill amortization	0	(71)	(71)	0
Goodwill – Net	6.081	23.366	22.781	24.135
Intangibles – Gross	47.664	52.561	53.375	57.633
Accumulated Intangible amortization	(33.336)	(38.011)	(40.263)	(43.664)
Intangibles - Net	14.328	14.550	13.112	13.969
Long term investments	12.333	12.453	11.255	11.902
Note Receivables – Long Term	55.380	63.233	67.602	76.180
Other Long Term Assets - Total	13.483	14.479	12.146	15.053
Total Assets	374.165	398.916	419.010	474.663

Reclassified Balance sheet (SEK Millions)	2015	2016	2017	2018
Liabilities				
Accounts Payable	55.648	55.264	65.346	73.630
Accrued Expenses	27.376	28.933	29.242	32.528
Notes Payable – Short Term Debt	0	20.971	0	0
Current Port. Of LT Debt/Capital Leases	57.331	34.809	53.442	48.238
Other Current Liabilities, Total	29.681	26.558	32.469	39.246
Total Current Liabilities	170.036	166.535	180.499	193.472
Long Term Debt	75.276	84.551	72.924	85.677
Capital Lease Obligation	-	-	857	761
Total Long Term Debt	75.276	84.551	73.781	86.438
Total Debt	132.607	140.331	127.223	134.676
Deferred Income Tax	3.495	5.270	5.116	4.128
Minority Interest	1.801	1.703	1.941	2.452
Other Liabilities, Total	39.748	44.796	51.812	64.794
Total Liabilities	290.356	302.855	313.149	351.284
Shareholders' Equity (SEK Millions)				
Preferred Stock – Non redeemable, Net	-	-	-	-
Common Stock, Total	2.554	2.554	2.554	2.554
Additional Paid In Capital	-	-	-	-
Retained Earnings (Accumulated Deficit)	81.930	88.677	101.296	116.610
Unrealized Gain (Loss)	307	251	-	1
Other Total Equity, Total	(982)	4.579	2.011	4.215
Total Equity	83.809	96.061	105.861	123.379
Total Liabilities & Shareholders' Equity	374.165	398.916	419.010	474.663

INCOME STATEMENT

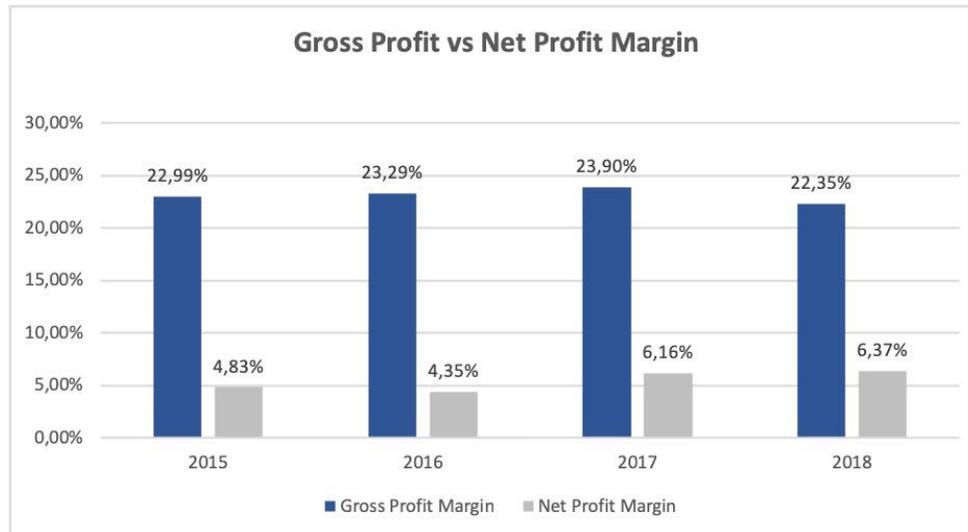
Income Statement (in millions of SEK)	2015	2016	2017	2018
TOTAL REVENUES	312.515	301.914	332.738	390.834
COGS	240.653	231.602	253.220	303.578
Gross Profit	71.862	70.312	79.518	87.356
Selling/General &Admin.	35.284	33.560	35.212	38.251
R&D	15.368	14.631	16.098	15.899
Other Op. Expense	824	498	132	(1)
Operating Income	23.318	20.729	29.678	34.478
Extra-ordinary expense	(3.071)	1.162	(60)	710
EBIT	20.247	19567	29.618	33.768
Interest inc. (Exp)	(232)	(217)	(178)	(142)
Other non-operating inc (exp)	0	0	0	78
EBT	20.015	19.350	29.940	33.548
Taxes	5.320	6.008	6.818	6.785
Net income before extra-ord. Items	15.098	13.222	20.787	25.363
Extra-ordinary items	0	0	0	0
NET INCOME	15.098	13.222	20.787	25.363

Ratio analysis

This section aims at analysing Volvo group's key financials by examining its balance sheet through some indicators. The study assesses the firm performances in four clusters: profitability, liquidity, efficiency and leverage. The computation of some key financial ratios is accompanied by the comparison with industry standards and stakeholders' expectation. The source of external information (e.g. median industry performances) are CSI market and Reuters. At the end of the session the reader should have a depicted the overall situation of Volvo Group's consolidated financial statements.

PROFITABILITY

At first glance, the profitability of the company appears strong. Over the last four years, revenues have grown at a CAGR of 5,75%, while the net profit almost tripled this figure registering a CAGR of 13,4%. In order to understand what were the leverages of this improved profitability, it is important to compute the gross and net profit margin. The former allows to understand what percentage of sales was transformed into Gross Margin, the latter what portion was transformed in income available to be paid out to shareholders. The following shows the trend of these two ratios over past years.



As evidenced, overall gross margin evolution was almost stable while the net profitability increased over time, with a sharp peak in 2017 in which net profit margin rose by more than 20% in 2017. These numbers are even more positive when compared to industry average of respectively 12,49% and 3%. However, they are below the industry median of 38% and 7%.

A step further in the analysis is to check whether Volvo ability to make profits satisfies the required return by investors. As shown in the following table, Volvo is creating value for its claimants. Indeed, ROCE in 2018 is higher than the WACC of the company and ROE is higher that the equity cost of capital.

	2015	2016	2017	2018	Expected Return (2018)
ROCE	11,42%	8,92%	12,44%	12,26%	10,72%
ROE	17,97%	13,69%	19,35%	20,18%	9,78%

LIQUIDITY ANALYSIS

This part is concerned with determining whether the company is able to meet its short-term financial obligations. The two ratios computed are the current ratio and the acid test (also called quick ratio). Both are computed as current assets over current liabilities, but while the former takes into account all assets, the latter excludes those, which are immediately transformable into cash or cash equivalents (e.g. inventories). Theoretically, it would be better for both to be higher than zero, but this condition may depend on the features of the industry concerned. Once again, for this reason, it is important to compare Volvo's results with the industry average:

	2015	2016	2017	2018	Industry median (2018)
Current Ratio	1,00	1,08	1,09	1,21	1,62
Acid Test	0,74	0,79	0,80	0,87	1,07

As evidenced Volvo has strengthened its short-term solvency over the past years, bur remains slightly below the industry median. For this reason, Volvo appears solvent and it is not likely that the company will encounter any issue in meeting its short-term obligations.

EFFICIENCY RATIOS

Given the strong Volvo profitability and liquidity, we have to analyse its efficiency in carrying its operations, generating revenue and facing working capital needs.

First, we computed the asset turnover ratio as Net Sales over Capital Employed. Over the past four years this indicator has always been in line and slightly below the industry trend. This ratio explains for each euro invested in assets, what amount is transformed in yearly revenue. As shown below, for example, in 2018 Volvo generated 0,82 cents for each euro invested in assets.

Then, it is important to assess the company ability to manage inventory, key competence in the automotive industry. To this purpose we analysed the Inventory turnover ratio which can be interpreted as the number of times in a year that Volvo's inventory is turned over (i.e. sold). This ratio can't be compared with the industry average and depends a lot on several factors like the number of business, the operations, the type of products. Moreover, even if we computed an industry average it would be a misleading data affected by many outliers. However, as reported below, Volvo Inventory Turnover has remained stable over last years, thus demonstrating management effectiveness in achieving the intended level of efficiency with respect to inventories.

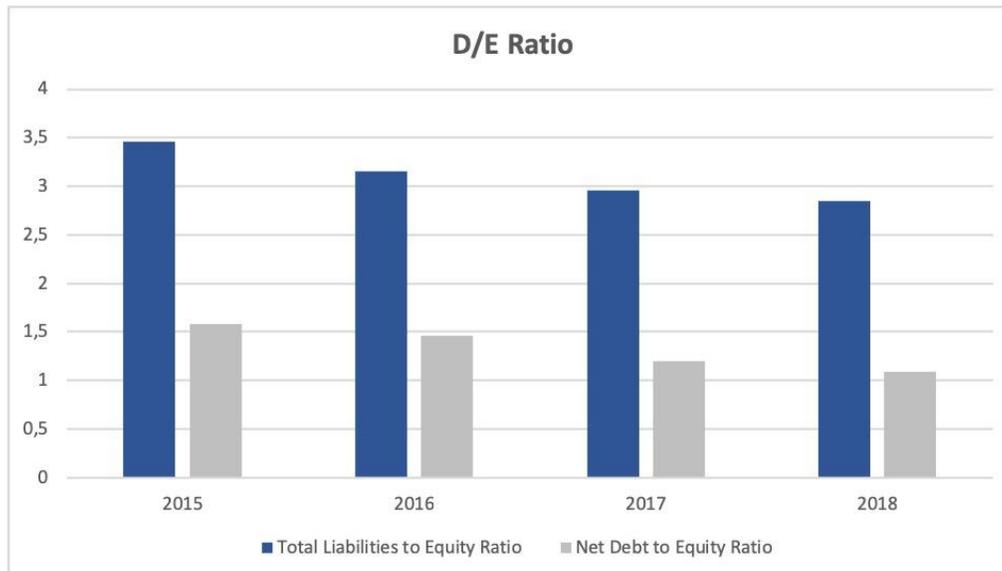
Last, we computed Inventory Days, Days Payables and Days Receivables, the leverages which are typically used by managers to reduce as much as possible working capital needs and a consequent cash flow absorption. The results, typically, also reveal the bargaining power of the firm towards its clients and suppliers. From the figures below, we can understand that the company collects sales little less than four months and pays its suppliers in two months. This does not reflect an important bargaining power, but it is also due to the features of auto and trucks industry, which typically concedes generous incentives to clients in form of delayed payments and constant instalments to pay the product. However, the overall cash cycle is shorter for Volvo in 2018 (105 days) against the industry median (118 days).

The following table summarizes all the figures described above.

	2015	2016	2017	2018	Industry median (2018)
Asset turnover	0,84	0,76	0,79	0,82	0,9
Inventory Turnover	N.A.	6,52	6,59	6,60	3,5
Inventory Days	51,13	57,58	57,02	60,59	
Days Payables	64,10	65,90	70,70	67,82	
Days Receivables	113,57	126,77	117,05	112,00	
Cash cycle	100,60	118,45	103,37	104,77	118,2

LEVERAGE RATIOS

The financial structure evolution of the company is reported below:



Volvo's net debt to equity ratio has decreased over the past four years by about 45%. This is mainly due to the reduction in net financial position that has been carried out by the management. The financial structure appears sustainable even if more than triple the industry median of 0,31.

To assess whether this financial structure is sustainable we also computed the Interest coverage ratio as operating income over interest expenses. In 2018 it is equal to 10,4 and emphasizes the sustainability of this long-term debt. Indeed, this ratio emphasizes not only the company's ability to pay the interest due, but also to exploit the interest tax shields and increase shareholders' wealth.

Valuation

The auto industry showed signs of a peak in sales in 2017, while earnings and stock prices continued to increase. The industry is in the midst of a race to develop revolutionary new technology that could change the industry dramatically over the next decade. We tried to capture these trends in the valuation by following two main approaches:

1. An intrinsic valuation concerning the DCF model (FCFO)
2. A relative valuation with market multiple of companies we considered to be the best fit for our company

1. FREE CASH FLOW TO OPERATION APPROACH: DCF MODEL

The approach used in the discounted cash flow has been a Free Cash Flow to Operation (or unlevered free cash flow) model. The main reason is that, in an asset-centric industry as automobile manufacturing,

we would like to show how the company is effectively operating to satisfy all its stakeholders. Proceeding step by step the first thing we did is to calculate the WACC, computing:

- Cost of debt
- Cost of equity
- Cost of preferred stock (we do not have any preferred stock)

The cost of Equity and Cost of Debt

The main assumptions and components used to compute the cost of equity are an essential part of our DCF model. For our computation we decided to use:

- Risk free rate: 10 years European Government bonds yields as an average of the values of the last month (2.34%) instead of the 30 years because we have considered the 10 years to be more liquid and less risky, even if in a “theoretical approach” the 30 years yield is the one that better represent a perpetuity income.
- The Equity Risk Premium (5,96%) which represent the premium an investor will to receive to invest in the stock market instead of a risk free.
- The β as the specific risk of a company

We considered the cost of debt to be equal to 4,5% which is the average cost of debt reported in 2018 by Volvo in its Annual Report.

Beta Computation

We used different approaches for the β computation and we obtained three potential values for the cost of equity. The approaches used to compute β are as follows:

1. Regression of Volvo returns vs. STOXX600
2. Comparables (average and median)

Average Beta		Median Beta		Regression Beta	
Raw Beta	1,08813049	Raw Beta	0,83208752	Raw Beta	1,33910488
Blume Adjusted Beta	1,05875366	Blume Adjusted Beta	0,88805835	Blume Adjusted Beta	1,22606992
Risk free	2,34%	Risk free	2,34%	Risk free	2,34%
Equity Risk Premium	5,9600%	Equity Risk Premium	5,9600%	Equity Risk Premium	5,9600%
CRP Europe (41%)	1,5137%	CRP Europe (41%)	1,5137%	CRP Europe (41%)	1,5137%
CRP South America (5%)	3,5561%	CRP South America (5%)	3,5561%	CRP South America (5%)	3,5561%
CRP North America (28%)	0,0000%	CRP North America (28%)	0,0000%	CRP North America (28%)	0,0000%
CRP Asia (20%)	0,8339%	CRP Asia (20%)	0,8339%	CRP Asia (20%)	0,8339%
CRP Australia & Africa (6%)	1,8615%	CRP Australia & Africa (6%)	1,8615%	CRP Australia & Africa (6%)	1,8615%
Weighted λ	0,01076888	Weighted λ	0,01076888	Weighted λ	0,01076888
Cost of Equity	9,7256%	Cost of Equity	8,7082%	Cost of Equity	10,7228%

In all the three cases the cost of equity has been adjusted for an amount equal to 1,076888% to account for the country risk premium. The amount has been obtained by weighting the country risk premium of

each geographical area in which Volvo operates by the percentage of revenues in that geographical area.

At the end we used the regression β , in our cost of equity computation given its high significance and proximity to the overall industry β . The resulted cost of equity was also in line with the average cost equity of the industry (10%)

STOXX600 Automotives & Parts vs. STOXX600	
Adjusted R Squared	0,647568493
Intercept	-0,000123428
Beta	1,589444725
P-Value	5,71254E-15

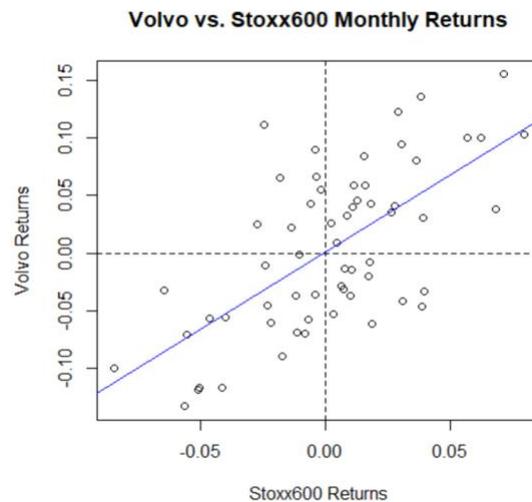
Regression Volvo vs. STOXX600

We run a regression regression of Volvo's returns vs. stox 600, with an estimation period of 5 years and monthly observations. We decided to use monthly 5 years returns instead of years weekly returns because of the higher the adjusted R Square.

Regression Statistics	
Multiple R	0,654410863
R Square	0,428253577
Adjusted R Square	0,41839588
Standard Error	0,053664377
Observations	60

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0,125111641	0,125111641	43,44357308	1,41975E-08
Residual	58	0,167032191	0,002879865		
Total	59	0,292143832			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	0,000745895	0,00694705	0,107368568	0,914867133	-0,013160136	0,01465193	-0,01316014	0,014651925
STOXX M %Chg	1,339104879	0,203166371	6,591173877	1,41975E-08	0,932423201	1,74578656	0,9324232	1,745786557



Comparables

Firm	Currency	Market Cap	Debt	Raw Beta	Debt/Equity	Marginal Tax Rate	Unlevered Beta
Paccar	USD	23380,72	9950,5	0,82705174	0,426	21,90%	0,621
Caterpillar	USD	75879,55	36594	0,82213306	0,482	23,04%	0,600
Daimler	EUR	53909,11	146288	1,68728866	2,714	28,40%	0,573
SinoTruk	CNY	42702,38	6662,51	1,43591808	0,156	19,47%	1,276
Komatsu	JPY	2487507,92	1048653	1,28298148	0,422	29,61%	0,989

To compute the β we choose 5 competitors using the following criteria:

- Industry and core business
- Publicly Traded
- Geographical areas in which Volvo is present

Firstly, we computed the Raw beta of comparables by doing a regression between each firm's returns and the STOXX600 index. The regression period was set at 5 years with monthly observations. In this case monthly observations have been preferred instead of weekly observations because of the higher adjusted R squared.

Then, we calculated the specific debt equity ratio of each comparable and the marginal tax rate depending on the country in which the firm has its headquarter. For the D/E ratio is important to notice that, even if a market value of debt should be the best choice, it is actually really difficult to know the exact composition of the debts (and relative interest rates) of each company, so we considered the book value to be a good proxy for the market value. Hence, we unlevered the raw betas of each company and we computed the average unlevered β and the median unlevered β .

Lastly we relevered the β considering Volvo's D/E ratio and marginal tax rate.

Average		Median	
Unlevered Beta	0,81173777	Unlevered Beta	0,6207315
Volvo		Volvo	
Debt/Equity	46,64%	Debt/Equity	46,64%
Tax Rate	27,00%	Tax Rate	27,00%
Levered Beta	1,08813049	Levered Beta	0,83208752

FCFF: Computation and Assumptions

For the revenues we assumed a growth rate equal to the mean between the average historical revenues growth and the average forecast for revenue growth by different analysts (4.975%). However, we decided to adjust this estimate and to lower it to 2.5% to better reflect current expectations of stable demand in the industry, as well as some imminent challenges. Among the great risks that could hurt sales there are trade and tariff disputes, rising interest rates and higher fuel prices.

Volvo's growth rate has been historically cyclical with some years of negative growth followed by years of double digit growth and, therefore, we decided to use the adjusted average in order to even out the cyclicalities implied in the revenues.

Data in SEK (thousands)	2018	2019	2020	2021	2022	2023
Revenues	390834,00	400604,85	410619,97	420885,47	431407,61	442192,80
YoY Growth %	16,755%	2,500%	2,500%	2,500%	2,500%	2,500%
Operating Margin %	8,822%	8,213%	8,213%	8,213%	8,213%	8,213%
EBIT	34478	32901,635	33724,176	34567,280	35431,462	36317,248
+ Amortization	3024	3024	3024	3024	3024	3024
EBITA	37502	35926	36748	37591	38455	39341
Forecasted Tax Rate	21%	27%	27%	27%	27%	27%
NOPAT	27237,62	26225,71	26826,17	27441,63	28072,49	28719,11
Non-Cash Charges	27459	28538,05	29527,69	30576,71	31688,68	32867,36
Depreciation	15415	16494,05	17483,69	18532,71	19644,68	20823,36
Other Non-Cash items	12044	12044,00	12044,00	12044,00	12044,00	12044,00
CAPEX	20868	22328,76	23668,49	25088,59	26593,91	28189,55
Working Capital	31390	32174,75	32979,12	33803,60	34648,69	35514,90
Δ Working Capital	-	784,75	804,37	824,48	845,09	866,22
FCFF		31650,25	31881,01	32105,28	32322,16	32530,71

The other assumption we made are the following assumptions:

- Operating margin: average of the last 3 years operating margin;
- Depreciation and CAPEX growing at 7% in 2019 and 6% there on due to the CEO's forecast and the company's intention on keeping an increasing CAPEX;
- Other non-cash charges constant;
- Working capital constant in % of revenues.

Final result

Scenario 1	
WACC	9,38%
Terminal Value Growth Rate	1,5%
Terminal value	418.935,97
Present value of TV	267.563,70
NPV of the FCFO	123.471,53
Enterprise Value	391.035,23

- NCI (Book Value)	2.452,00
+ Surplus Asset (Book Value)	11.135,00
+ Total Cash (Book Value)	38.804,00
- Total Debt (Market Value)	138.308,00

Equity Value	300.214.231.224,74
N° shares outstanding	2.128.420.220,00

Target Price	141,05 SEK
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Scenario 2	
WACC	9,38%
Terminal Value Growth Rate	2,0%
Terminal value	449.516,70
Present value of TV	287.094,83
NPV of the FCFO	123.471,53
Enterprise Value	410.566,36

- NCI (Book Value)	2.452,00
+ Surplus Asset (Book Value)	11.135,00
+ Total Cash (Book Value)	38.804,00
- Total Debt (Market Value)	138.308,00

Equity Value	319.745.362.235,70
N° shares outstanding	2.128.420.220,00

Target Price	150,23 SEK
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Our choice for the growth rate for the TV was driven by the increasing focus on strict policies regards emission reduction, the ever-changing customer preferences, the bottom-line and cash flow pressures and continual technological innovations.

Because of these dramatic changes that will affect the industry in the next years like we decided to project two different scenarios. In the first scenario we assumed a TV growth rate of 1,5% while in the second scenario we assumed a TV growth rate of 2%. In this way we tried to capture future uncertainty and obtained a target price range between 141,05 SEK and 150,23 SEK.

2. MARKET MULTIPLES ANALYSIS

In order to double check the results obtained through the DCF analysis, we have performed a market multiple analysis. As a consequence, the aim of this method is to have a counter-proof of the target price identified in the previous section.

Thanks to the data collected through Thomson Reuters we took the market multiples of the same set of comparables that have been selected for the computation of the Beta.

In particular, we focused on the: 25th-percentile, median and 75th-percentile of the following multiples:

- EV/Sales
- EV/ EBIT

for the asset-side, and:

- P/E

for the equity-side.

In order to be consistent with our analysis we have considered, as denominator, projections of the drivers for 2019, rather than historical ones. In fact, unlike backward-looking multiples, forward-looking multiples are consistent with the principles of valuation — in particular, that a company's value equals the present value of future cash flow, instead of past profits and sunk costs.

Comparables	25 th – percentile	Median	75 th - percentile	Applicable company figure (VOLVO) – in thousands
EV/Sales	0,9x	1,2x	1,3x	410.283
EV/EBIT	10,4x	11,0x	11,3x	33.697
EV/EBITDA	5,5x	7,6x	7,8x	54.248
P/E	8,1x	10,0x	12,0x	28.814

After having applied the relative figures of Volvo (EBIT for EV/EBIT, Volvo Sales for EV/sales) to obtain the set of EV for each multiple and each range, we have adjusted it to obtain the set of implied equity values of Volvo.

Ultimately, dividing the equity value by the number of diluted outstanding shares of Volvo, we have been able to identify a set of prices for Volvo for each multiple.

P/E	25 th – percentile	Median	75 th - percentile
Equity value (in thousands)	231.952,70	287.995,93	345.768
Diluted shares outstanding	2128	2128	2128
Implied share price	109,00€	135,34€	162,48€

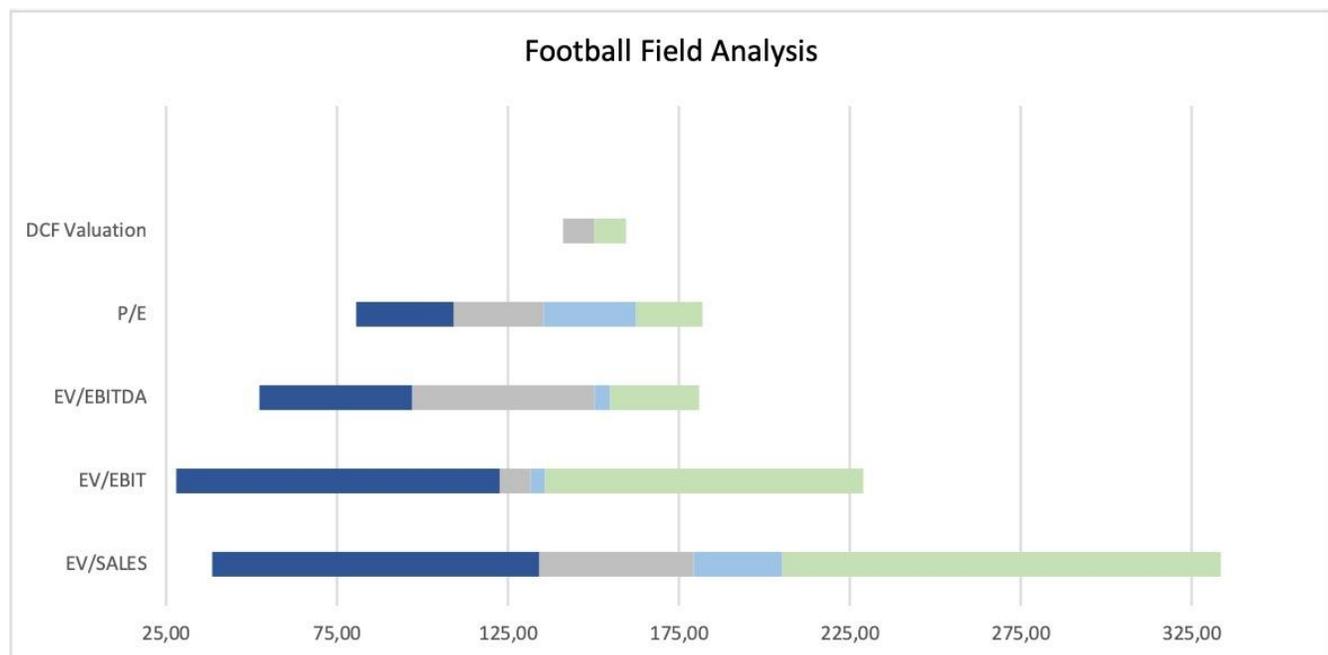
EV/SALES	25 th – percentile	Median	75 th - percentile
Enterprise Value (in thousands)	376.435	471.826	527.214
Plus: cash & cash equivalents	38.804	38.804	38.804
Plus: equity investments	11.135	11.135	11.135
Plus: other non-core assets	0	0	0
Plus: net operating losses	0	0	0
Less: Total debt	138.308	138.308	138.308
Less: preferred stock	0	0	0
Less: non-controlling interests	2.452	2.452	2.452
Implied Equity value	285.614	381.005	436.393
Diluted shares outstanding	2128	2128	2128
Implied share price	134,22€	179,04€	205,07€

EV/EBIT	25 th – percentile	Median	75 th - percentile
Enterprise Value (in thousands)	351.791,90	370.998,90	379.491,50
Plus: cash & cash equivalents	38.804	38.804	38.804
Plus: equity investments	11.135	11.135	11.135
Plus: other non-core assets	0	0	0
Plus: net operating losses	0	0	0
Less: Total debt	138.308	138.308	138.308
Less: preferred stock	0	0	0
Less: non-controlling interests	2.452	2.452	2.452
Implied Equity value	260.971	280.178	280.771
Diluted shares outstanding	2128	2128	2128
Implied share price	122,64€	131,66€	135,70€

EV/EBITDA	25 th – percentile	Median	75 th - percentile
Enterprise Value (in thousands)	297.729	410.657,40	420.422
Plus: cash & cash equivalents	38.804	38.804	38.804
Plus: equity investments	11.135	11.135	11.135
Plus: other non-core assets	0	0	0
Plus: net operating losses	0	0	0
Less: Total debt	138.308	138.308	138.308
Less: preferred stock	0	0	0
Less: non-controlling interests	2.452	2.452	2.452
Implied Equity value	206.458	319.836,40	329.601
Diluted shares outstanding	2128	2128	2128
Implied share price	97,02€	150,30€	154,89€

Football Field Analysis

Through the Football Field Chart, we ultimately gave a better overview of the market multiple analysis and we can notice that the results are consistent with the target price that we have found through the DCF method.



Investment Risk

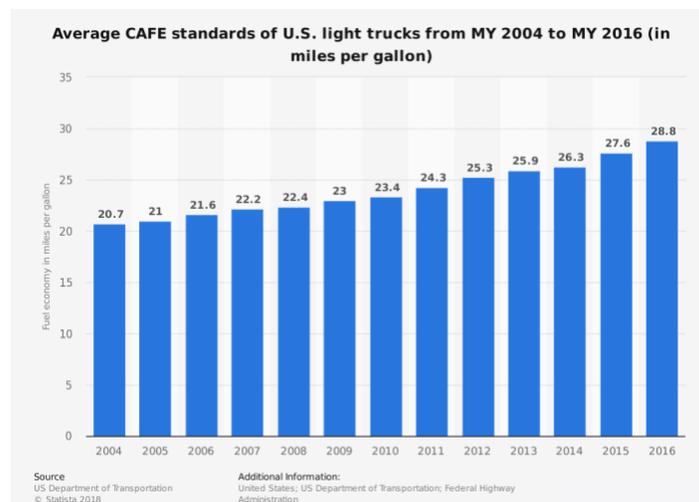
In this section we will analyze the main uncertainties and risks that investors should face when investing in Volvo and in general when considering Volvo Group. Of course, these uncertainties could give the possibility to the company to exploit specific opportunities related to its strategy. On the other hand, external circumstances and sector-specific events could tragically impact both the core and the accessory business of the company. Sometimes Volvo can influence the probability that a risk ends up being favorable for the business. However, in other instances this is not the case and the possible negative impact must be considered when investing in this company.

The situation being introduced, we have identified four main risks that should be taken into account: regulation and compliance, income tax treatment, technology and finally a general changing trend in the automotive market.

First of all, environmental regulation and compliance with new rules must be analyzed. As already mentioned during the initial part of the report, the new administration in the U.S. has increased the fuel efficiency standards, targeting more and more the business. The CAFE Standards sharpened significantly during the last ten years and during the new administration they will do that even more. Asking the main automakers what the drawback of this reform could be is the simplest way to understand the consequences: one million jobs in the industry put in discussion, increased complexity in the organizational day-by-day activity and additional operation costs. Both the society and the company would suffer this regulatory burden, mainly because North America represents the most prestigious market for the Swedish multinational.

However, it must be mentioned that, during one of the last meetings, Volvo claimed that they are relatively scared about this. Undoubtedly, the new standards could generate these problems. Nevertheless, analysts suggest that lowering emission targets might benefit automakers by helping them sell more light trucks and, being trucks in general one of the most relevant part of the business, increase revenues in the U.S.

To conclude this aspect, the environmental view is dynamic and thus also Europe has proposed new standards for the fuel efficiency that could lead to the same consequences experienceable after the U.S. reform, affecting the second largest market for the company.



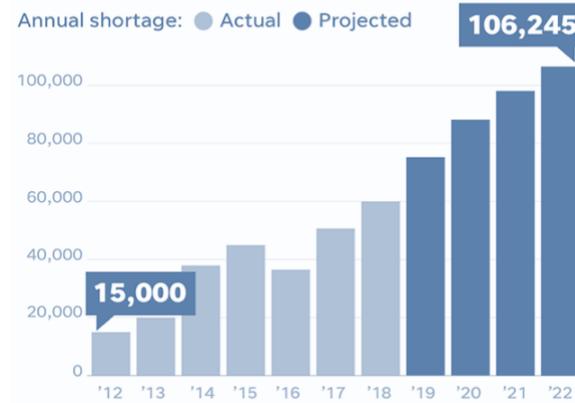
Very similar to the environmental issue is the income tax treatment's risk. This risk can be further

developed into two branches: accounting effect and policy effect. From the accounting point of view, it must be said that a new interpretation of the IAS 12 Income Taxes has been introduced. For the Volvo Group this implies a changed classification for identified income tax-related risks that have previously been recognized as a provision for tax charges that are probable to regulate the obligation. Going forward, uncertain income tax treatments are reported as tax liabilities. This is basically a change from an income statement item to a balance sheet one. This tends to boost the final net income, because less costs are subtracted. Could this lead to an overvaluation of the real performance? The answer is: it depends. If the value of this items is negligible, of course not. If this value is significant, precautionous scrutinize must be undertaken before investing.

However, the aforementioned reason is just accounting-based. The real issue related to tax is the new policy and the possible World Trade occurring between the U.S. and the NAFTA's participating states. The continuing debates are not helping European companies like Volvo in dealing with their daily activities in the correct way. Trump's proposed border tax, for example, would harm automakers that do not use a majority of U.S.-sourced auto parts or build vehicles within the U.S. Given that Volvo is not one of the companies producing the majority of their vehicles within the U.S. (like Ford or Honda could be), they would suffer this in a remarkable way. It is also important to note that hurting European and Asian car companies may end up costing a significant amount of jobs in North America, as these companies employ tens of thousands of people in their dealerships, from Canada to Mexico. Is it safe to invest in a company that shows so much volatility when facing these events?

Moreover, when investing in companies that are particularly subject to new trends in technology, the risk of the latter affecting the core business must be mentioned. However, the main core business of the company actually represents a repellent for this kind of investment risk. Even if car sharing and self-driven vehicles are already in place and will develop a lot in the future, substituting trucks used to transport goods, raw material and similar seems still a utopic behavior. The same can be said for construction equipment, another relevant field in which Volvo operates in. This being explained, it is also fundamental to underline that competitors are already investing millions of euros in the R&D addressing autonomous vehicle technology. Ford has tripled its investments in this field and is testing new models in California. BMW has recently obtained a partnership with an advanced driver assistant company. These are all signs that the market is evolving. Even if it may seem that Volvo is skeptical about these changings (mainly because the core business seems to be unattachable from this point of view), it must be said that in the recent weeks Volvo signed an agreement with Brønnøy Kalk AS in Norway to provide its first commercial autonomous solution transporting limestone from an open pit mine to a nearby port. In general, the company is reacting well in order to be in line with competitors from the technology standpoint.

Fewer drivers: The trucking industry projects a shortage of more than 100,000 drivers by 2022



SOURCE American Trucking Associations

Finally, the risk of the new generation. The average age of the American and European truckers is 56 years old. Even if we consider the rising wages or signing bonuses for new drivers, trucking owners and operators have struggled to sell the trucking lifestyle (which involves long, lonely and sedentary hours on the road) to younger people. In addition, an older workforce usually comes with higher prevalence of health issues and higher utilization of employee benefits, which drives up those costs for employers as well. The driver shortage also means more pressure on veteran drivers to put in extra runs and more hours on the road per day in order to make deliveries on time, leading to fatigue and an increased likelihood of an accident. These are all signs that the industry is not going through a good period and that forecast for the future should also take these aspects into account. If we consider tax issues, environmental and this trend arising, the signals are all going to the same direction: reduced demand, excess of supply and price going down.

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