

# COMPARISON OF MARKET VALUE ADDED - THE CASE OF THE AUTOMOTIVE INDUSTRY IN SELECTED EU COUNTRIES

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## Abstract

Our research focuses on the MVA of the Czech automotive industry, which is compared with the results of Slovakia and Germany - the countries for which the automotive industry is the most important for the national economy between EU-27 countries. In all three countries, the largest automotive producers are companies that are part of the Volkswagen Group. Our interest is in determining comparability in the ways the automotive industry generates value for owners in these three economies. The parameter in question is market value added (MVA). There are two attitudes towards MVA measurement - ex post and ex ante. In this paper, an ex ante approach based on the economic added value method (EVA) is used for the purpose of quantifying the MVA. We analyse the development of the key financial value drivers of almost 5 000 automotive companies based in Germany, the Czech Republic and Slovakia and subsequently assume their rate of growth. The aim is to quantify the MVA of the automotive industry of the countries in question as a present value of economic value added (EVA) expected to be created by the industry in the future and to identify the differences in the way local businesses generate value for their owners.

**Key words:** value drivers, value creation, market capitalization, EVA, MVA

**JEL Code:** F37, F47, G32

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## Introduction

As explained in Čížinská and Neset (2020a), the market value added (MVA) is the difference between the market value of a company at the valuation date and the capital employed (net operating assets). MVA can be calculated using the ex post and ex ante approaches. The ex post approach is based on the knowledge of the share price (market price). MVA is then quantified as a difference between the market capitalization of a company and its net operating assets (book value of equity and interest-bearing debt) at the valuation date. Market

value of the company is the sum of the capital contributed by the creditors (interest-bearing debt) and its market capitalization. MVA per share is the difference between the share price and the book value of equity per share. Ex ante is based on the income-based valuation approach (so called forward-looking valuation), in which the value of the company is determined based on the discounted amount of the expected future benefits. These benefits are expressed by different economic parameters, usually either by cash flows available for the shareholders (and creditors) or by a certain category of profit.

In this paper, an ex ante approach based on the economic added value method (EVA) is used for the purpose of quantifying the MVA. The amount of the MVA is quantified as the present value of EVA expected to be created in the future. EVA is quantified as an after-tax operating profit exceeding the costs of equity and interest-bearing debt. Our research focuses on the MVA of the Czech automotive industry, which is compared with the results of Slovakia and Germany - the countries for which the automotive industry is the most important for the national economy between EU-27 countries. In the automotive industry of all three countries, Volkswagen Group plays a crucial role from the perspectives of revenue and number of employees. The biggest local company in Germany is Volkswagen AG with a 30 % share of total revenue in the industry (in 2019). In Slovakia, the biggest local company in the industry is Volkswagen Slovakia, a.s. with a 34 % share of total industry revenue (in 2019). In the Czech Republic, the biggest company, with a 35 % share of the total industry revenue (in 2019), is ŠKODA AUTO, a.s. – a wholly owned subsidiary of the Volkswagen Group.

In this paper, we update the analysis and results of (Čižinská and Neset, 2020a), having prolonged the research by approximately one year (2019). The year 2020, in which the automotive industry was affected by Covid-19 pandemic, is not included in the research since the accounting data are not available at the date of submission. This paper adds new perspective to our previous research (Čižinská and Neset, 2020b), (Krabec and Čižinská, 2020). Value creation in the automotive industry is among others analyzed by (Brandenburg, 2016), (Dietl et al., 2009), (Pavelková et al., 2018) and (Pavlínek and Ženka, 2015).

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## 1 Data and Methodology

For this paper, we used publicly available information only. Our primary sources are the database of Damodaran (<http://people.stern.nyu.edu/adamodar/>) and the Orbis database of European companies and other entities (published by Bureau Van Dijk / A Moody's Analytics Company). We used selected available financial information about 4 989 active companies that largely operate in the following industries: manufacture of motor vehicles (NACE Rev. 2 – 291), manufacture of bodies (coachwork) for motor vehicles, manufacture of trailers and semi-trailers (NACE Rev. 2: 292), and manufacture of parts and accessories for motor vehicles (NACE Rev. 2: 293). The results of individual companies (742 companies in Czechia, 3 401 companies in Germany, 846 companies in Slovakia) were summed up for each country and represent the key performance indicators of local automotive industry in each country in question.

To assess MVA we used the EVA valuation method (income-based valuation approach), the detailed methodology of which is described, for example, by Mařík et al., 2018. Within this method, MVA is mathematically equal to the present value of the stream of EVA expected to be generated in the future of a company. In this article we adopted the simplified assumption, that the companies in question will have a perpetual life (i.e. going concern) and that their key value drivers will grow at a constant growth rate for the whole future period. Taking these assumptions into consideration, MVA at a valuation date ( $t - 1$ ) can be calculated as a share of  $EVA_t$  and the difference between WACC and  $g$  ( $WACC - g$ ).

$EVA_t$  is a company's EVA for any year  $t$  and it is equal to cost of capital subtracted from the net operating profit after tax created at the year  $t$  ( $NOPAT_t$ ). Cost of capital is a result of a multiple of capital employed at the beginning of the year  $t$  ( $CE_{t-1}$ ) and the weighted average cost of capital at the year  $t$  ( $WACC_t$ ). Weighted average cost of capital represents the required rate of return expected by the shareholders and creditors. We use the share of interest paid on non-current liabilities and loans to assess the before-tax cost of debt. For the cost of equity, we use the Capital Asset Pricing Model (CAPM) based on Damodaran's data files for the time period in question. Cost of equity is the return that shareholders require for investing in a business. It equals the sum of the risk-free rate ( $r_f$ ) and the premium expected for risk. Risk premium is a product of levered industry beta ( $\beta_L$ ) and the current risk premium for a mature equity market ( $ERP_{AAA}$ ). To reflect the country risk, we add country risk premium ( $CRP_{Rating}$ ) which is a product of Moody's Rating-based Default Spread and relative equity market volatility.

$$r_E = r_f + \beta_L ERP_{AAA} + CRP_{Rating} \quad (1)$$

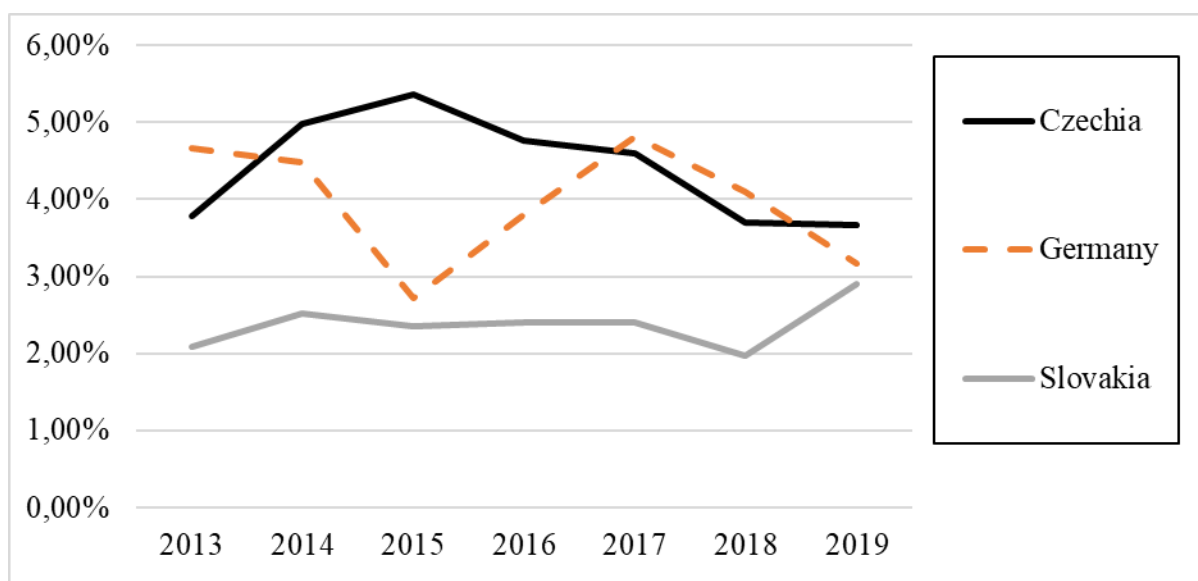
Unlevered industry beta ( $\beta_U$ ) is determined as a weighted average of unlevered beta of the auto and truck industry and the auto parts industry in the region of Western Europe according to Damodaran's data for the time period in question. To compute levered beta ( $\beta_L$ ) we apply the conventional approach, according to which beta of equity can be written as a function of the unlevered beta and the debt-equity ratio:

$$\beta_L = \beta_U \left( 1 + (1 - t_{ef}) \frac{D}{E} \right) \quad (2)$$

## 2 Results and Discussion

In this paper, we used non-adjusted accounting data presented in the Orbis database. For NOPAT estimation, we used after-tax EBIT as recorded by the Orbis database. Though potential for minor error can exist here, this attitude was chosen because the Orbis database lacked relevant information inputs for the modification of the accounting operating profit to NOPAT. We used effective tax rate ( $t_{ef}$ ) measured from the share of profit after tax (EAT) and profit before tax (EBT). Figure 1 represents the after-tax operating profit margin calculated as the share of NOPAT and operating revenue (sales) in the period 2013 – 2019. The after-tax operating profit margin ranges between 2,0 % and 5,4 %. In all three countries, the negative trend is apparent in 2018 and also in 2019, with Slovakia being the exception. Initially, Germany and Czechia reached the high end of the margin while Slovakia achieved approximately half the level of Czech and German results. However, within the last two years in question there was apparent convergence of the results to a comparable level around 3 %.

**Fig. 1: After-tax operating profit margin of automotive industry in selected countries**



Source: authorial computation based on Orbis database

Czechia and Slovakia can be described as integrated peripheries of the current world automotive industry that are part of the global production network. The position of the automotive industry in these countries reflects their specific involvement in global automotive production networks, where foreign direct investments play a key role (Pavlínek, 2017). The importance of the automotive industry for the German economy is determined by different factors than in the Central and Eastern European countries. Germany focuses on the luxury (premium) segment, where revenues are higher than in other segments; therefore, local automotive companies generally achieve higher operating profit margins in Germany than in other European countries. Currently, German automotive controls 75% of the premium segment of the world market (Bormann et al., 2018). German premium cars has also been largely exported to China, which has not been the case in Czechia and Slovakia (see Maiza and Bustillo, 2018 in Pavlínek, 2020). Germany has also the dominant position in the vertical global production network where local automotive companies, through ownership control in the above-mentioned integrated peripheries, promote and control the focus on high value-added production (Pavlínek and Ženka, 2015). Two thirds of German automotive sales are conducted abroad, as well as one third of the German industry in total (Bormann et al., 2018).

Capital employed (CE) consists of equity (E) and interest-bearing debt (D). From the perspective of assets, it equals to the sum of long-term assets (LTA) and net working capital (NWC). Given the nature of the information available from the Amadeus database, all calculations are based on the assumption that all fixed assets and net working capital items can be considered necessarily required for the normal operations of a business in question.

Net working capital is calculated as the sum of cash and equivalents, receivables, inventories and other current assets minus the current liabilities.

The development of indicators of assets turnover is shown in the table 3. Turnover ratios reflect the share of invested capital (or fixed assets or net working capital) on sales and express the amount of sales generated from one monetary unit of capital employed. Slovakia automotive has the highest values of turnover ratios. It needs the lowest volume of fixed and NWC to generate sales. In addition, NWC has been negative in the years 2017 and 2018. This means that short-term non-interest-bearing liabilities cover not only current assets but also part of the fixed assets. This aggressive strategy is efficient since it reduces the absolute amount of the cost of capital employed. On the contrary, Germany has the lowest values of turnover ratios. The operation of companies in the automotive industry is particularly demanding, especially on the fixed assets.

**Tab. 2: Turnover ratios of automotive industry in selected countries**

Country	Ratio	2013	2014	2015	2016	2017	2018	2019
Czechia	Total Assets Turnover	1,67	1,77	1,84	1,85	1,88	1,90	1,94
	Fixed Assets Turnover	3,59	3,89	4,28	4,49	4,65	4,33	4,26
	NWC Turnover	15,63	16,33	11,72	10,16	12,77	14,43	17,83
Slovakia	Total Assets Turnover	2,54	2,45	2,53	2,45	2,22	2,36	2,37
	Fixed Assets Turnover	5,20	5,12	5,49	5,35	4,49	4,72	4,71
	NWC Turnover	222,41	36,99	44,05	47,32	-241,33	-471,23	101,73
Germany	Total Assets Turnover	0,76	0,76	0,77	0,72	0,73	0,68	0,66
	Fixed Assets Turnover	1,23	1,25	1,29	1,26	1,31	1,24	1,13
	NWC Turnover	n/a	n/a	9,12	8,42	10,43	20,62	28,43

Source: authorial computation according to Amadeus database

Table 3 displays WACC and EVA created by automotive industry companies in the period 2016 – 2019. Table 3 also shows the debt ratio, which is by far the highest in the German automotive industry. It is interesting that the WACC of Germany is the lowest from the countries in question (5,16 % compared to more than 7 % of Slovakia and Czechia). Companies in the German automotive industry use a significantly higher share of debt in their capital structure, and additional financial risk increases cost of equity through leveraged beta. However, the effect of beta levered in the cost of equity of German automotive was also more than offset by adding low cost debt to the capital structure. At the same time, Germany got the best rating over the whole period (AAA according to Moody's). Rating of Czechia (A1) and

Slovakia (A2) resulted in additional country risk premium (0,84 % – 1,21 %). All three countries also benefit from the significant decrease of total equity risk premium and the risk free rate, which is a general trend in European financial markets. The EVA of the Czech and Slovak automotive industries reflect the opposing trend compared to Germany in the period in question. In 2017 and 2019, the EVA of automotive companies in Czechia and Slovakia increased, whereas Germany reported a declining trend. In the year 2018, German automotive companies recorded mild recovery while the EVA of Czechia and Slovakia decreased. When it comes to absolute values of EVA, the most important finding is that German automotive companies generate negative economic profit in the long run. In the year 2019, when EVA reached almost minus 14 mld. EUR, the situation was the worst since the beginning of the period in question. The highest values of EVA are reported by the automotive industry in the Czech Republic, where the EVA is more than two times higher than the EVA of the Slovakian automotive industry. At the same time, the operating revenue of the Czech automotive industry is about 1,7 times higher than the operating revenue of the Slovak automotive companies. The lead of Czech automotive companies is shortening significantly (e.g. in the year 2018 Czech automotive generated more than five times higher EVA than Slovak automotive).

**Tab. 3: Cost of capital employed and EVA of automotive industry in selected countries**

Country	Ratio	2016	2017	2018	2019
Czechia	Debt / Capital Employed	13,5%	13,2%	16,5%	15,6%
	Levered cost of equity	10,23%	10,14%	9,31%	7,89%
	Pre-tax cost of debt	3,20%	3,36%	3,35%	3,66%
	WACC	9,21%	9,17%	8,22%	7,12%
	EVA (th. EUR)	940 896	1 064 806	679 041	812 148
Slovakia	Debt / Capital Employed	27,2%	24,7%	22,9%	21,0%
	Levered cost of equity	11,73%	11,47%	9,99%	9,12%
	Pre-tax cost of debt	2,11%	1,91%	2,44%	2,63%
	WACC	8,95%	9,00%	8,09%	7,75%
	EVA (th. EUR)	203 920	158 218	129 194	394 061
Germany	Debt / Capital Employed	59,53%	57,09%	56,21%	58,49%
	Levered cost of equity	13,43%	13,65%	11,68%	11,39%
	Pre-tax cost of debt	2,52%	2,36%	1,81%	1,29%
	WACC	6,62%	7,02%	5,78%	5,16%
	EVA (th. EUR)	-6 913 099	-6 471 795	-4 834 115	-13 982 593

If we assume the stability of relationships between key value drivers in the future as well as the stability of WACC, then MVA as of 12/2019 reaches the values displayed in table 4. The values are based on the assumption of constant rate of growth of sales, EBIT and capital employed from -1 % to 2 %. The growth rate of operating turnover in 2019 was very negligible (0,08 % in Czechia, -0,64 % in Germany and 0,63 % in Slovakia). Moreover the operating profit (EBIT) of German automotive decreased about 20,25 % in 2019. Therefore, we work also with the assumption of negative trend for the future.

Based on this assumption, the MVA of both Czech and Slovak automotive industries range around single multiple of the book value of equity. It means that, taking the future earnings potential of the Czech automotive companies into consideration, half of the total value of the automotive industry was created so far and half of the value will be created in the future. On the other hand, the results of the German automotive industry indicate that the value for the owners is not created in the long run and that if the companies continue their operations in the future, the value of the previous investments of the shareholders (i.e. book value of equity) will be eliminated. This finding is in accordance with the findings of Brandenburg (2015) who concluded that the European automotive industry, in the long run, struggles with significant performance deteriorations and considerable value losses. This finding is also in accordance with the market opinion. Shares of three biggest German Automotive companies (Volkswagen Group, Daimler AG and Bayerische Motoren Werke AG) are publicly traded and the key valuation ratio price-to-book (P/B) reaches the value below one in the whole period in question. P/B compares the market capitalization (market value of equity) to the book value of equity. Therefore, apparently, even MVA measured ex post is negative. Market capitalization reflects the earning capacity of the company in question as estimated from the perspective of investors. The book value of equity is mostly determined by the historic cost of assets. According to investors at the markets, these companies are not able to cover historic cost of assets by future earnings.

**Tab. 4: Market value added as of 12/2018 compared to the book value of equity**

Country	Expected rate of growth	MVA (th. EUR)	Book value of equity (th. EUR)
Czechia	-1%	10 204 005	12 988 163
	0%	11 911 124	



Country	Expected rate of growth	MVA (th. EUR)	Book value of equity (th. EUR)
	1%	14 176 547	
	2%	17 327 701	
Slovakia	-1%	4 039 962	5 438 425
	0%	4 676 764	
	1%	5 502 206	
	2%	6 614 684	
Germany	-1%	-278 511 218	345 317 615
	0%	-327 246 105	
	1%	-399 421 639	
	2%	-517 304 626	

## Conclusion

In this paper, the ex ante MVA of automotive industry is calculated as the present value of future EVA generated by the companies operating in the industry. The Czech Republic has the highest EVA, about two times higher than the EVA of the Slovak automotive industry. In the previous year, the situation of the Czech automotive companies was even better thanks to the high operating profit margins. However, the Slovak automotive industry is decreasing the lead of Czechia significantly. The operating profit margins are increasing in Slovakia and also local companies use their fixed assets and net working capital more efficiently compared to the Czech Republic. Our key finding relates to the EVA of Germany, which is negative in the long run. As a result, MVA is also negative and if the 2% rate of growth of sales, EBIT (NOPAT) and capital employed is assumed, it more than eliminate the book value of equity. German automotive companies seem to be destroying the value of previous shareholder investments. The low efficiency of asset utilization (according to the capital employed turnover) outweighs relatively high level of operating profit margin and low cost of capital reached thanks to the utilization of the high share of low cost debt in the capital structure.

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