

# American Axle & Manufacturing



## December 2022 Analysis



*Yingying Cai*

*Professor Chris C. Droussiotis*

*Professor Stuart D. Shelly*

**Evaluation Result**

**\$ 24.59**

**Recom. BUY**



# Content

*P.S. Directory hyperlink is available.*

<b>Company Profile</b> -----	<b>3</b>
Company Overview -----	3
Product Description -----	3
Stock Performance -----	4
V.S. Market -----	4
V.S. Main Competitors -----	4
Enterprise Valuation Summary -----	5
<b>Financial Analysis</b> -----	<b>6</b>
Income Statement Analysis -----	6
Balance Sheet Analysis -----	7
Cash Flow Statement -----	9
Ratio Analysis & Competitor Ratios -----	10
Trend Analysis & Industry Trends -----	12
<b>Projections &amp; Valuations</b> -----	<b>13</b>
Assumptions -----	13
Projection Analysis -----	14
Valuation Analysis -----	15
Method#1. Market Value -----	15
Method#2. Average EBIT Industry Trading Multiples -----	16
Method#3. Discount Cash Flow Valuation -----	18
Discussion & Results -----	19
<b>Technical Analysis</b> -----	<b>20</b>
<b>Appendix</b> -----	<b>21</b>












# Company Profile

## Company Overview

American Axle & Manufacturing (AAM) is a leading global Tier 1 Automotive and Mobility Supplier. AAM designs, engineers and manufactures Driveline and Metal Forming technologies to support electric, hybrid, and internal combustion vehicles. Headquartered in Detroit with nearly 85 facilities in 18 countries.

-  **Headquartered in Detroit, MI**
-  **Founded in 1917**
-  **David C. Dauch  
Chairman & CEO**
-  **Auto Parts Industry**
-  **~20,000 Employees**
-  **18 countries (2022)**
-  **Nearly 85 Locations**

AAM was co-founded by automotive industry veteran Richard E. Dauch on March 1, 1994, when he acquired some Driveline and Forge Business units from *General Motors Corporation (GM)* with investors. On January 29, 1999, AAM joined the New York Stock Exchange (NYSE) as a publicly traded company, with the ticker symbol: AXL.

The company is a primary supplier to *General Motors Company (GM)*, *Stellantis N.V. (Stellantis)*, and *Ford Motor Company (Ford)* for driveline components and products from its Metal Forming segment. In 2021, sales to *GM*, *Stellantis*, and *Ford* were approximately 37%, 19%, and 12% of its net sales respectively. AAM primarily serves the largest and fastest-growing segments in the automotive space, including Trucks, SUVs, and Crossover Vehicles. Its concentration in the 3 major automotive manufacturers is mitigated by its new joint ventures with various Chinese manufacturers.

AAM operates through Driveline and Metal Forming segments. It supplies products that take the power unit to axles and wheels so the company is agnostic to the form of the powertrain systems, which is beneficial. It doesn't matter whether the ultimate vehicle manufacturers power their automobiles with internal combustion, hybrid, or electric hydrogen. Besides, AAM doesn't have to spend much money on the development of new technologies related to powertrain systems because it could just take what the ultimate automotive manufacturers are using and bolt together its products to the power unit.

## Product Description

American Axle & Manufacturing (AAM; NYSE: AXL) delivers exceptional products, processes, and systems. AAM designs, engineers and manufactures **Driveline and Metal Forming** technologies to support electric, hybrid and internal combustion vehicles.



**Driveline** AAM's Driveline product portfolio optimizes mass and increases efficiency and NVH without sacrificing performance. Examples of advanced product, process, and systems technologies includes EcoTrac® AWD disconnecting systems, hybrid and electric driveline solutions and QUANTUM™ technologies.



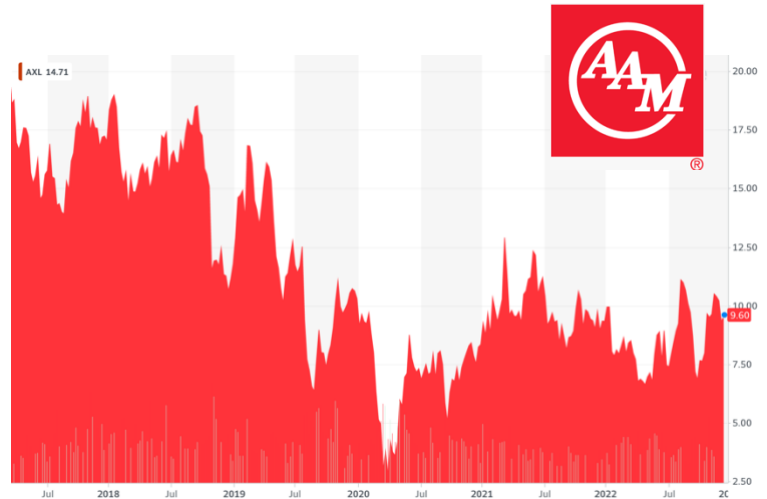
**Metal Forming** AAM's Metal Forming business provides engine, transmission, driveline and safety-critical components for traditional ICE and electric vehicle architectures including light vehicles, commercial vehicles and off-highway vehicles, as well as products for industrial markets.



## Stock Performance

### V.S. Market

The stock price of American Axle & Manufacturing Holdings, Inc. (AXL) is 9.60 USD with a market cap of \$1.105B on Dec.12. The 52-week trading range is \$6.36 to \$11.96. During the last five years, AAM's stock price has dropped by almost half. The unexpected disruption in light vehicle production and economic uncertainty cost AAM a lot. Over the past year, AXL shares are down 7.5%, versus a loss of 16.1% for the broader market. AAM achieved 2021 with \$5.2 billion in sales and \$833 million in adjusted EBITDA. AAM's financial results reflect resilience, recovery, and resurgence in recent years.



### V.S. Main Competitors

AAM competes in the auto parts industry. Its competitor peer group mainly includes Adient plc, Autoliv Inc., BorgWarner Inc., Dana Incorporated, Lear Corporation, Modine Manufacturing Company, and Tenneco Inc. This report focuses on Dana Incorporated(DAN) and Modine Manufacturing Company(MOD) as examples.

#### [ Dana Incorporated (DAN) ]



Dana Incorporated (DAN) engineers, manufactures, and distributes power-conveyance and energy-management solutions for vehicles. Based in Maumee, Ohio, and founded in 1904, the company reported sales of \$8.9 billion in 2021 with 40,000 associates in 32 countries across six continents and shipped to 14,000 customers in 141 countries.

The stock price of DAN is 16.04 USD as of 01:30 PM EST, Dec.12. During the last five years, the change in DAN's stock price shows a similar trend to AAM's.

#### [ Modine Manufacturing Company (MOD) ]



Modine Manufacturing Company (MOD) designs, manufactures and tests heat transfer products for a wide variety of applications and markets. Founded in 1916 and headquartered in Racine, WI, the company achieved \$2.1 billion in sales in 2021

The stock price of MOD is 16.04 USD as of 01:30 PM EST, Dec.12. MOD's beta is 2.30, similar to AAM's which is 2.23, but overall, in the last 5 years, the sensitivity of the movement of MOD's stock price is higher than AAM's.



## Enterprise Valuation Summary

ENTERPRISE VALUATION ANALYSIS							
	Enterprise Value (\$000)	Total Debt (\$000)	Cash (\$000)	Equity Value (\$000)	Shares Outstanding (000)	Stock Price	Recom.
METHOD #1 - Market Value / Using the Stock Price	3,440,680	2,813,300	472,300	1,099,680	114,550	\$ 9.60	
METHOD #2 - Average EBITDA Industry Trading Multiples	5,742,513	2,813,300	472,300	3,401,513	114,550	\$ 29.69	BUY
METHOD #3 - Discount Cash Flow Valuation Analysis	4,573,846	2,813,300	472,300	2,232,846	114,550	\$ 19.49	BUY
Average of METHOD #2 & METHOD#3	5,158,180	2,813,300	472,300	2,817,180	114,550	\$ 24.59	BUY

In this report, the three methodologies above are used to value AAM(AXL). The detailed analysis is included in the later *Valuation Analysis* Section in the **Projections and Valuations**.

According to the valuation results in the above form, we highly recommend **BUY** AXL. The three valuation methodologies indicate that the stock price of AAM is now significantly underestimated.

The current stock price of AAM (AXL) is \$9.60 with an enterprise value of \$3.4B and an Equity value of \$1.1B. Based on the average EBITDA Multiple of industry peers, Method#2 results in the highest enterprise value of \$5.7B for AAM. Therefore, this Trading Comparables methodology provides the highest stock value of \$29.69, about three times its current stock price. Method#3 provides an enterprise value of \$4.6B based on the net present value of future cash flows. This DCF methodology results in a \$19.49 stock value. These two methods yield an average stock price of \$24.59, which is 150% of the current stock price of \$9.6.

Therefore, we recommend investors buy AXL. Although this company has been hard hit by the Global Covid Pandemic and the lowered market expectations, this company is resiling, recovering, and resurging with huge potential to grow further.



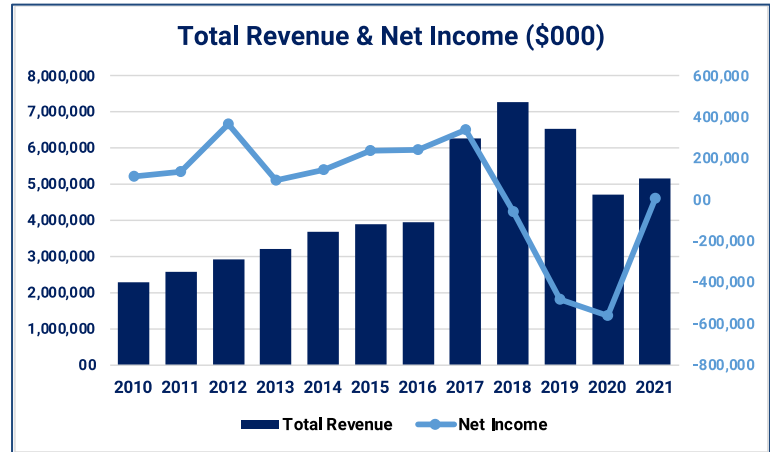


## Financial Analysis

### Income Statement Analysis

AAM's revenues have generally exhibited strong growth from year to year, outside the effects of the Global Covid Pandemic (GCP).

In 2017, AAM acquired two businesses, Metaldyne Performance Group, Inc. (MPG) and USM Mexico Manufacturing LLC (USM Mexico), accounting for an increase in revenues from 2016 of \$3.9B to \$6.2B, which impact was fully reflected in the sales in 2018, in which year AAM achieved sales of \$7.3B.



INCOME STATEMENT	GCP					
		Sep 30	Dec 31	Dec 31	Dec 31	Dec 31
	(\$000's)	2022	2021	2020	2019	2018
<b>Total Revenue</b>		<b>5,644,800</b>	<b>5,156,600</b>	<b>4,710,800</b>	<b>6,530,900</b>	<b>7,270,400</b>
Cost of goods sold		4,967,100	4,433,900	4,128,100	5,628,300	6,130,000
Gross Profit		677,700	722,700	582,700	902,600	1,140,400
Total Operating Expenses		420,000	430,000	400,500	460,100	485,100
EBIT (Operating Income or Loss)		257,700	292,700	182,200	442,500	655,300
Interest Expense		176,700	195,200	212,300	217,300	216,300
EBT & Other Income/Expenses		81,000	97,500	-30,100	225,200	439,000
Other Income/Expenses Net		81,300	96,300	580,200	758,200	552,900
EBT		-300	1,200	-610,300	-533,000	-113,900
Income Tax Expense		-4,400	-4,700	-49,200	-48,900	-57,100
<b>Net Income</b>		<b>4,100</b>	<b>5,900</b>	<b>-561,100</b>	<b>-484,100</b>	<b>-56,800</b>

In 2018, AAM finished its 2016 global restructuring program focused on creating a more streamlined organization in addition to reducing its cost structure and preparing for acquisition and integration activities. To better align its business units, this restructuring program included the sale of its Castle segment and Former Powertrain segment. AAM incurred severance charges totaling \$2.8 million and implementation costs totaling \$29.6 million since the 2016 restructuring program.

In 2019, AAM initiated a new global restructuring program to further the integration of MPG. The combination of asset impairments of restructuring assets, the restructuring itself, and the effect of the segments' revenues being sold resulted in a sales decline from \$7.3B (2018) to \$6.5B (2019). Also in this year, AAM's full-sized truck sales reduced sharply resulting from the insourcing by its largest customer of a portion of a replacement program that launched in the second half of 2018. Net sales were also impacted by customer downtime as a result of program changeovers, and lower volumes on certain crossover vehicle programs in 2019.

The Company was further affected by the overall economic downturn caused by the GCP, which affected the entire automotive sector, the sole market which AAM sells into. All these factors associated with further restructuring led to decreasing total revenue from 2019 to 2022. Since the economic recovery from the GCP exhibited by the automotive sector, AAM has grown to \$5.2B in revenues, reflecting a comparable sales growth of 9.5% since 2020, after the acquisitions, restructuring GCP, and subsequent economic recovery. Gross Margins have remained between 10-15% throughout the period from 2018, and through the GCP and recovery to date.



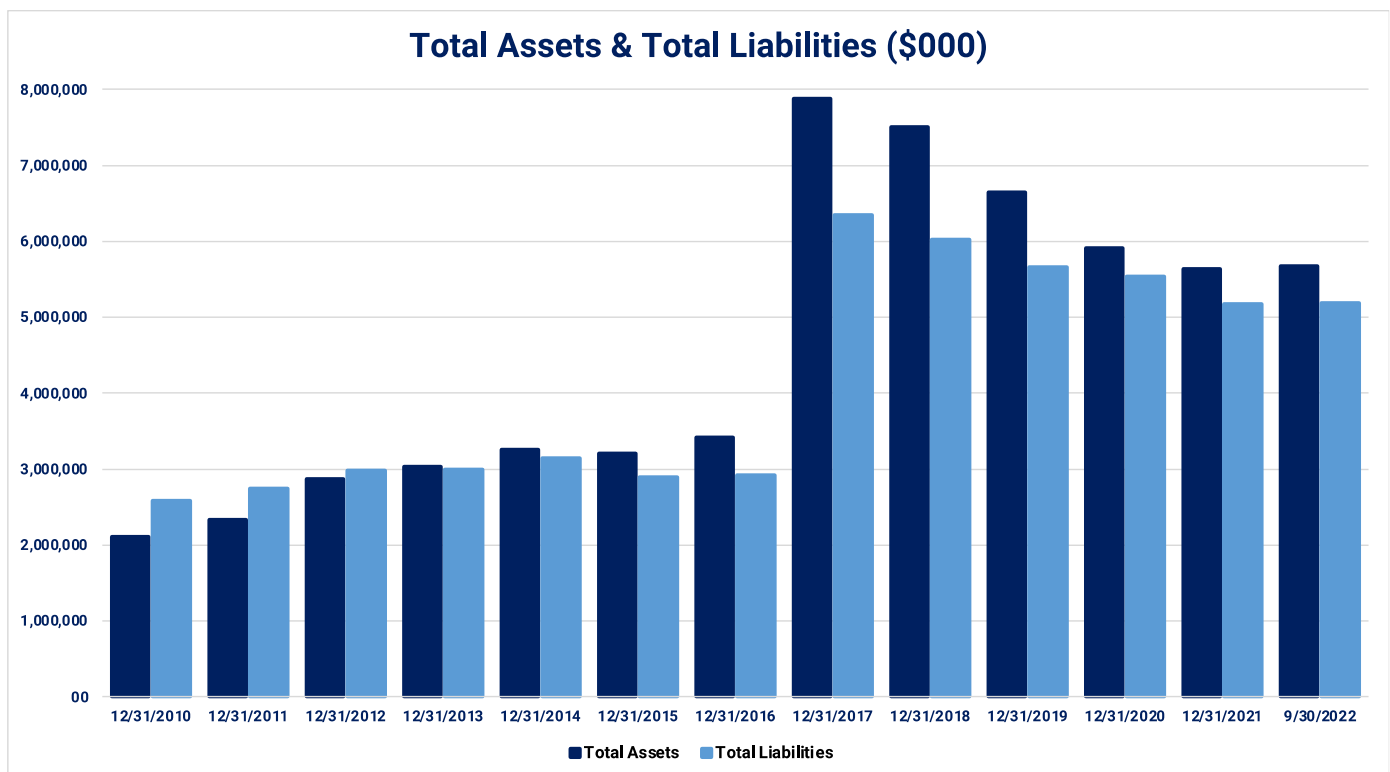
## Balance Sheet Analysis

BALANCE SHEET STATEMENT		GCP				
		Sep 30	Dec 31	Dec 31	Dec 31	Dec 31
	(\$000's)	2022	2021	2020	2019	2018
<b>Assets</b>						
<b>Current Assets</b>						
Cash And Cash Equivalents		472,300	530,200	557,000	532,000	476,400
Total Cash		472,300	530,200	557,000	532,000	476,400
Accounts Receivable, net		974,600	762,800	793,200	815,400	966,500
Inventory, net		446,800	410,400	323,200	373,600	459,700
Prepaid Expenses and other		161,800	152,600	203,600	136,800	127,200
<b>Total Current Assets</b>		<b>2,055,500</b>	<b>1,856,000</b>	<b>1,877,000</b>	<b>1,857,800</b>	<b>2,029,800</b>
<b>Non-current assets</b>						
Gross property, plant and equipment		3,624,100	4,705,500	4,572,200	4,447,300	4,431,000
Accumulated Depreciation		-1,583,100	-2,585,700	-2,291,800	-2,088,900	-1,916,600
Net property, plant and equipment		2,041,000	2,119,800	2,280,400	2,358,400	2,514,400
Goodwill		00	183,800	185,700	699,100	1,141,800
Intangible Assets		815,500	697,300	780,700	864,500	1,111,100
Other long-term assets		767,600	778,800	792,500	864,800	713,600
<b>Total non-current assets</b>		<b>3,624,100</b>	<b>3,779,700</b>	<b>4,039,300</b>	<b>4,786,800</b>	<b>5,480,900</b>
<b>Total Assets</b>		<b>5,679,600</b>	<b>5,635,700</b>	<b>5,916,300</b>	<b>6,644,600</b>	<b>7,510,700</b>
<b>Liabilities</b>						
<b>Current Liabilities</b>						
Accounts Payable		779,600	612,800	578,900	623,500	840,200
Accrued liabilities		363,100	160,400	169,800	200,900	171,700
Other Current Liabilities		52,400	247,900	216,900	173,300	223,300
Current Portion of Long Term Debt		19,200	18,800	13,700	28,700	121,600
<b>Total Current Liabilities</b>		<b>1,214,300</b>	<b>1,039,900</b>	<b>979,300</b>	<b>1,026,400</b>	<b>1,356,800</b>
<b>Non-Current Liabilities</b>						
Long Term Debt		2,794,100	3,085,700	3,441,300	3,612,300	3,686,800
Deferred Revenue and Income Taxes		85,000	108,300	104,200	103,300	170,200
Other Non-current Liabilities		919,700	944,000	1,018,300	922,200	810,600
<b>Total Non-current Liabilities</b>		<b>3,798,800</b>	<b>4,138,000</b>	<b>4,563,800</b>	<b>4,637,800</b>	<b>4,667,600</b>
<b>Total Liabilities</b>		<b>5,193,100</b>	<b>5,177,900</b>	<b>5,543,100</b>	<b>5,664,200</b>	<b>6,024,400</b>
<b>Stockholders' Equity</b>						
Common Stock		1,300	1,300	1,200	1,200	1,200
Other Equity		483,900	770,400	691,800	730,600	781,600
Retained Earnings		1,300	-313,900	-319,800	248,600	703,500
<b>Total stockholders' equity</b>		<b>486,500</b>	<b>457,800</b>	<b>373,200</b>	<b>980,400</b>	<b>1,486,300</b>
<b>Liabilities &amp; Stockholders Equity</b>		<b>5,679,600</b>	<b>5,635,700</b>	<b>5,916,300</b>	<b>6,644,600</b>	<b>7,510,700</b>
Error		00	00	00	00	00



AAM's financial results reflect resilience, recovery, and resurgence in recent years. As mentioned in the *Income Statement Analysis*, from 2018 to 2021, AAM's operations and financial results were continuously affected by the impact of its Restructuring program and the GCP. The impact can be indicated from AAM's balance sheet.

In 2017, AAM's total assets and total liabilities soared mainly due to its acquisition. Alpha SPV I, Inc., a wholly-owned subsidiary of AAM, merged with and into Metaldyne Performance Group Inc. (MPG), with MPG as the surviving corporation in the merger. The acquisition of MPG aimed to diversify AAM's global customer base and end markets. As a result of its acquisition of MPG, AAM recognized \$1,223.1 million of amortizable intangible assets for customer platforms, customer relationships, developed technology, and licensing agreements, as well as increased total liabilities including a \$100.0 million Term Loan A Facility, a \$1.55 billion Term Loan B Facility and a \$900 million multi-currency revolving Credit Facility.



From 2018 to 2019, AAM continuously impaired its long-lived assets, including Powertrain and Casting segments, and Metal Forming segments. The impairment charges are \$485.5 million and \$665.0 million respectively, largely causing the decrease in total assets. Besides, in 2018 and 2019, AAM prepaid some of the outstanding principals on both Term Loan A Facility and Term Loan B Facility associated with its acquisition of MPG, which led to a lowering trend of total liabilities since 2017.

In 2020, the reduction in global automotive production volumes caused by the impact of GCP pushed AAM to impair its Goodwill of Driveline and Metal Forming reporting units and further impaired its Driveline reporting unit in 2021. As a result, AAM's accumulated goodwill impairment losses were \$1,435.5 million on Dec.31, 2021.

During 2021 and 2022, the automotive industry continues to experience significant disruption in the supply chain, including a shortage of materials, increased costs, and labor issues. As a result, AAM incurred increased volatility in its production schedules, resulting in lower cash levels.

All these factors discussed above led to decreasing total assets and total liabilities from 2018 to 2021. According to AAM's 3Q report, AAM is expanding its business in 2022. We believe the full impact, or contribution, of restructuring programs and business acquisition in the past 5 years would be fully reflected in the future.





## Cash Flow Statement

<b>CASH FLOW STATEMENT</b>					
	Sep 30	Dec 31	Dec 31	Dec 31	Dec 31
(\$000's)	2022	2021	2020	2019	2018
<b>Operating Activities</b>					
<b>Net Income (loss)</b>	<b>50,400</b>	<b>5,900</b>	<b>-561,100</b>	<b>-484,100</b>	<b>-56,800</b>
Depreciation and Amortization	367,100	544,300	521,900	536,900	528,800
Impairment charges	00	00	510,000	667,900	515,500
Deferred Income Taxes	-13,200	-27,200	-34,100	-94,600	-35,000
Stock-based compensation	13,700	18,200	19,400	22,400	27,900
Pensions and other postretirement benefits	-7,000	19,900	-15,700	-8,800	-9,900
Loss (gain) on sale of business	00	2,700	1,000	10,500	-15,500
Loss (gain) on disposal of PPE, Net	-1,800	5,800	20,600	4,100	-3200
Unrealized loss (gain) on equity securities	24,000	-24,400	00	00	00
Gain on bargain purchase of business	-13,000	00	00	00	00
Debt refinancing and redemption costs	6,000	34,000	7,900	8,400	4,000
Changes in operating assets and liabilities					
Accounts receivable	-205,500	23,100	28,900	63,900	56,100
Inventories	-11,900	-87,700	53,700	56,100	-83,100
Accounts payable and accrued expenses	167,100	62,700	-37,100	-97,700	7,500
Deferred revenue	-13,800	13,300	5,500	-17,900	10,700
Other assets and liabilities	-61,700	-52,200	-66,200	-107,500	-175,500
<b>Net cash provided by operating activities</b>	<b>300,400</b>	<b>538,400</b>	<b>454,700</b>	<b>559,600</b>	<b>771,500</b>
<b>Investment Activities</b>					
Purchases of PPE	-117,900	-181,200	-215,600	-433,300	-524,700
Proceeds from sale of PPE	4,300	2,000	1,700	5,000	4,900
Proceeds from sale of business, Net	00	1,000	00	141,200	47,100
Acquisition of business, Net	-88,300	-4,900	00	-9,400	-1,300
investment in affiliates	00	-1,100	00	-9,200	-3,700
Other investing activities	4,500	23,100	-4,500	-900	-500
<b>Net cash used in investing activities</b>	<b>-197,400</b>	<b>-161,100</b>	<b>-218,400</b>	<b>-306,600</b>	<b>-478,200</b>
<b>Financing Activity</b>					
Proceeds from issuance of long-term debt	222,000	634,700	408,000	356,300	509,600
Payments of long-term debt	-368,800	-1,017,600	-607,200	-544,400	-681,200
Debt issuance costs	-4,400	-9,200	-11,000	-3,300	-6,900
Purchase of treasury stock	-1,900	-4,300	-2,700	-7,500	-3,700
Other financing activities	5,300	-5,000	-1,600	-1,100	-2,300
<b>Net cash used in financing activities</b>	<b>-147,800</b>	<b>-401,400</b>	<b>-214,500</b>	<b>-200,000</b>	<b>-184,500</b>
Effect of exchange rate changes on cash	-13,100	-2,700	3,200	100	-6,700
Net decrease (increase) in cash and cash equivalents	-57,900	-26,800	25,000	53,100	102,100
<b>Cash and cash equivalents at beginning of period</b>	<b>530,200</b>	<b>557,000</b>	<b>532,000</b>	<b>478,900</b>	<b>376,800</b>
<b>Cash and cash equivalents at end of period</b>	<b>472,300</b>	<b>530,200</b>	<b>557,000</b>	<b>532,000</b>	<b>478,900</b>



In 2020, like much of the global auto industry, AAM was impacted by the GCP, starting with China, followed by Europe and North America. The majority of its customers are in these locations and ceased or significantly reduced production. Therefore, AAM generated less operating cash flow.

In 2021, the semiconductor shortage impacted the whole automotive industry. As a result of volatility in production schedules and unexpected downtime at certain manufacturing facilities, AAM's inventory levels increased and its year-over-year cash flow from its operating activities decreased. Overall, AAM gained \$538M cash flow from operations and generated an adjusted free cash flow of \$423 million, which allowed the company to reduce its outstanding long-term debt by \$350 million. AAM made several voluntary prepayments of its long-term debt in 2021; thus AAM ended 2021 with a total \$401M financing cash flow.

In 3Q 2022, AAM gained \$45.8M in adjusted free cash flow. In general, the company can generate enough cash to sustain the business and pay off existing debts.

## Ratio Analysis & Competitor Ratios

FINANCIAL RATIO ANALYSIS	GCP					4-year Average
	Sep 30 2022	Dec 31 2021	Dec 31 2020	Dec 31 2019	Dec 31 2018	
EBITDA (\$ 000's)*	624,800	833,300	719,800	970,300	1,183,900	926,825
<b>LIQUIDITY RATIOS</b>						
Current Ratio	1.7x	1.8x	1.9x	1.8x	1.5x	1.8x
Quick Ratio	1.2x	1.2x	1.4x	1.3x	1.1x	1.2x
Cash Ratio	0.4x	0.5x	0.6x	0.5x	0.4x	0.5x
Accounts Receivable Turnover	6.5x	6.6x	5.9x	7.3x	7.3x	6.8x
Accounts Receivable - Days	56.17	55.07	62.32	49.79	50.26	54.36
<b>SOLVENCY RATIOS</b>						
Total Debt / Total Capitalization (Cap Ratio)	85.3%	87.1%	90.3%	78.8%	71.9%	82.0%
EBITDA/ Interest (Coverage Ratio)	3.5x	4.3x	3.3x	4.5x	5.5x	4.4x
Total Debt / EBITDA (Leverage Ratio)	4.5x	3.7x	4.8x	3.8x	3.2x	3.9x
<b>ACTIVITY RATIOS</b>						
Inventory Ratio	11.6x	12.1x	11.8x	13.5x	14.4x	12.7x
Inventory Ratio - Days	31	30	31	27	25	29
<b>PROFITABILITY RATIO</b>						
Gross Profit	12.0%	14.0%	12.4%	13.8%	15.7%	14.0%
EBITDA Margin	11.1%	16.2%	15.3%	14.9%	16.3%	15.6%
ROA*	0.1%	0.1%	-8.9%	-6.8%	-0.7%	-2.5%
ROE*	0.9%	1.4%	-82.9%	-39.3%	-3.8%	-13.9%

\*When calculated 4-year average ROE, the author dropped ROE(2020) and calculated 3-year average to eliminate the impact of GCP.

Currently, AAM's liquidity ratios look good. The company can generate enough cash to sustain the business. The increase in account receivable turnover in 2021 is also a good sign.

Similar to other companies in the automotive industry, AAM has lots of debt, with a 4-year average Cap ratio of 82.0% and a 4-year average Leverage Ratio of 3.9x.



BRINGING THE FUTURE  
FASTER

AAM's Return on Equity (LTM) is 0.9% with a high debt level. Its ROE is very low. However, compared with DAN, which is its main competitor with a negative ROE, AAM is not too bad. AAM hasn't recovered from the combined impact of its restructuring programs and the GCP.

AAM competes in the auto parts industry. Its competitor peer group mainly includes Adient plc, Autoliv Inc., BorgWarner Inc., Dana Incorporated, Lear Corporation, Modine Manufacturing Company, and Tenneco Inc. The financial ratios of Dana Incorporated(DAN) and Modine Manufacturing Company(MOD) are listed below to conduct a comparative analysis.



Competitors Ratios (TTM)	AXL	DAN	MOD
<b>LIQUIDITY RATIOS</b>			
Current Ratio	1.7x	1.5x	1.6x
Quick Ratio	1.2x	0.1x	0.8x
Cash Ratio	0.4x	0.8x	0.1x
<b>SOLVENCY RATIOS</b>			
Total Debt / Total Capitalization (Cap Ratio)	85.3%	71.6%	47.6%
EBITDA/ Interest (Coverage Ratio)	3.5x	3.9x	12.4x
Total Debt / EBITDA (Leverage Ratio)	4.5x	5.8x	1.7x
<b>ACTIVITY RATIOS</b>			
Inventory Ratio	11.6x	6.5x	5.7x
Inventory Ratio - Days	31	56	64
<b>PROFITABILITY RATIO</b>			
ROA*	0.1%	1.7%	5.9%
ROE*	0.9%	-5.2%	29.8%

During the trailing twelve months, AAM's Cap Ratio is the largest among the three companies. It holds lots of debt. However, this is not a sign of concern because AAM's Current Ratio and Quick Ratio are also the largest among these companies. In general, AAM is able to sustain the business and pay off existing debts. After fully recovering from its restructuring programs and GCP, AAM could be able to gain more profits.



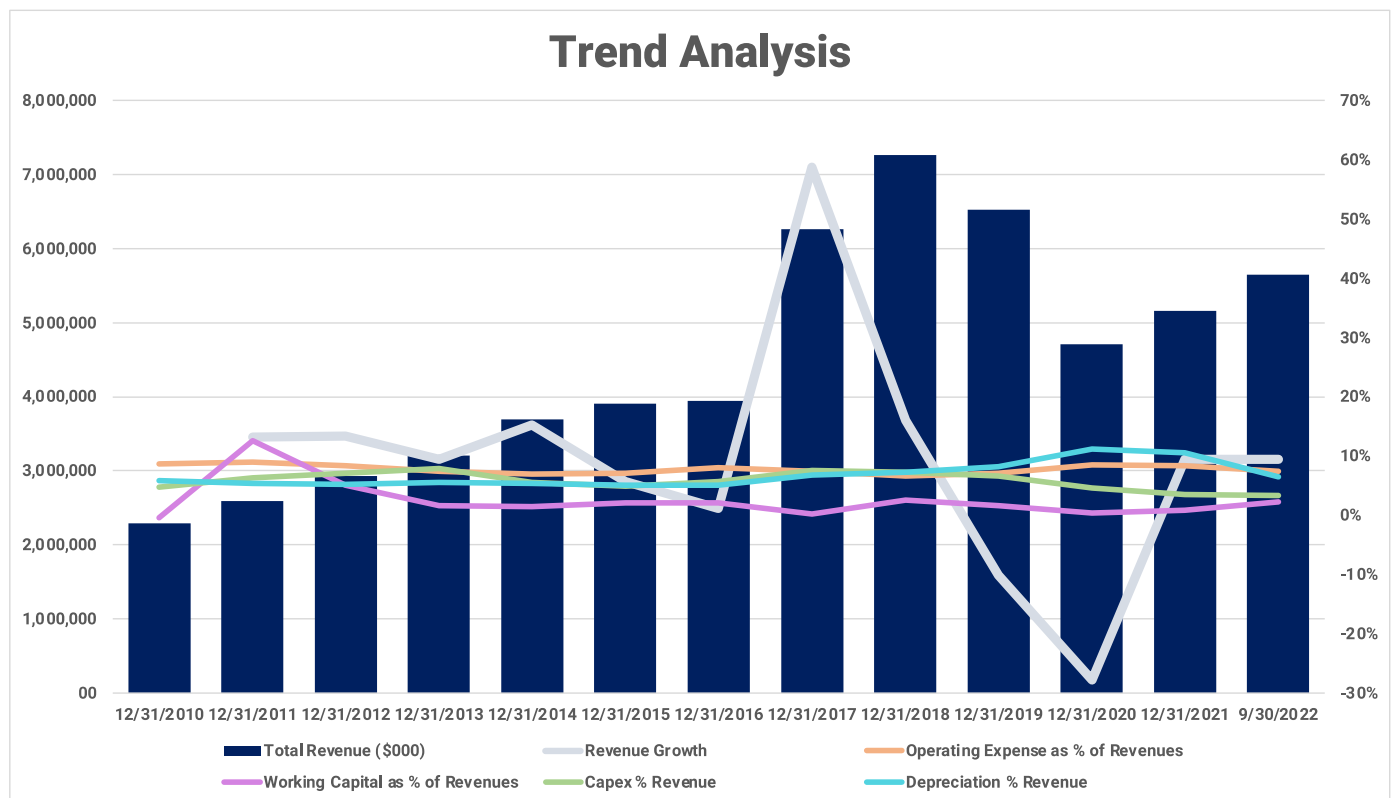


## Trend Analysis & Industry Trends

TREND ANALYSIS	GCP					4-year Average
	Sep 30 2022	Dec 31 2021	Dec 31 2020	Dec 31 2019	Dec 31 2018	
EBITDA (\$ 000's)*	624,800	833,300	719,800	970,300	1,183,900	926,825
Revenue Growth	9.5%	9.5%	-27.9%	-10.2%	16.0%	5.1%
Cost of Revenue as % of Revenues	88.0%	86.0%	87.6%	86.2%	84.3%	85.5%
Operating Expense as % of Revenues	7.4%	8.3%	8.5%	7.0%	6.7%	7.4%
Working Capital as % of Revenues	2.2%	0.8%	0.3%	1.6%	2.5%	1.6%
Capex % Revenue	3.2%	3.5%	4.6%	6.6%	7.2%	5.8%
Depreciation % Revenue	6.5%	10.6%	11.1%	12.2%	7.4%	10.0%

In general, AAM grows steadily, except when the Global Covid Pandemic happened. The company ended 2020 with a negative revenue growth rate of -27.9% mainly because the GCP impacted the production of itself and its major OEM customers. They also had long shutdowns of operations for program changeovers. Similar to other companies in the automotive industry, AAM went through a hard time since 2020. However, its recent financial results show a good sign of its recovery. On Sep.30, 2022, AAM's revenue has grown 9.5% with an operating expense of 7.4% revenues. These are all good trends that indicate that AAM is now expanding with good management of its operating costs.

AAM's operations are cyclical because they are directly related to worldwide automotive production, which is cyclical and dependent on general economic conditions and other factors. The automotive industry should normalize over the next couple of years. AAM remains aligned with the cyclical nature of the automotive industry now and will continue to benefit from a prioritization of higher-margin SUVs and light trucks in the future.





## Projections & Valuations

### Assumptions

#### Revenues:

AAM's revenues have generally exhibited strong growth from year to year, outside the effects of the Global Covid Pandemic (GCP).

In 2017, AAM acquired two businesses, accounting for an extremely high revenue growth rate of 58.7% from 2016, which impact was fully reflected in the sales in 2018, in which year AAM further achieved 16.0% Revenue Growth. In 2019, AAM initiated a new global restructuring program, which combined with the effect of the segments' revenues being sold resulted in a sales decline from \$7.3B (2018) to \$6.5B (2019).

In 2020, the favorable impact of restructuring actions was offset by the overall economic downturn caused by the GCP, which affected the entire automotive sector. Since the economic recovery from the GCP exhibited by the automotive sector, AAM has grown to \$5.2B in revenues, reflecting a comparable sales growth of 9.5% since 2020, after the acquisitions, restructuring GCP, and subsequent economic recovery. Gross Margins have remained between 10-15% throughout the period from 2018, and through the GCP and recovery to date.

Considering the cyclical nature of the automotive industry and the reduced demand in global automotive market segments, **we assume AAM's revenue growth in 2023 is -5% for the expected recession.** The lagging effect of its restructuring programs could be fully reflected in 2024.

**Therefore, We believe the company will be able to achieve a Revenue Growth rate of 10% in 2024 and grow at 8% per year starting in 2025.**

#### Cost of Revenue:

AAM managed well its Cost of Revenue from year to year, even including the effects of GCP. **Thus,**

**we used the average Cost of Revenue as % of Revenue from 2010 to 2022, which is 84% to project its Cost of Revenue starting in 2022.**

#### Total Operating Expense:

Taking the effects of GCP and restructuring programs, **we assume AAM's Operating Expense as % of Revenues will be 8% in 2022, decreasing to 7.5% in 2023 and 7.3% in 2024. Starting in 2025, we believe the Company will be able to achieve an Operating Expense ratio of 7%,** which is consistent with 2019 after it fully recovers from the GCP.

#### Total Debt:

**We estimate this year's Debt Repayment is 5% of outstanding debt on Dec.31, 2022.** Taking the mixed effects of recent chip-related headwinds, production volatility, and passive expectation, **we forecast a recession in 2023.**

When the predicted recession ended in 2025, **we believe AAM could pay back its total debt at 5% per year, which is the same as LTM.**

#### Other Assumptions:

**Working Capital as % of Revenue, Capex as % of Revenue, and Depreciation as % of Revenue are all shown as the average of the last ten years, excluded 2020, which is the GCP year.**

#### EBITDA:

EBITDA historically has wavered because of the combined impact of restructuring programs, business acquisitions, and GCP. The LTM EBITDA is still lower than pre-covid 2019 levels. With all the ratio assumptions, **we expect AAM will be able to achieve its pre-covid EBITDA level and expand fast starting in 2024.**



BRINGING THE FUTURE  
FASTER

## Projection Analysis

	HISTORICAL		LTM	PROJECTED						
	...	Dec 31	Sep 30	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31
	(\$000's)	2021	2022	2022	2023	2024	2025	2026	2027	2028
<b>Total Revenue</b>		5,156,600	5,644,800	5,801,175	5,511,116	6,062,228	6,547,206	7,070,983	7,636,661	8,247,594
<i>Revenue Growth</i>		9.5%		12.5%	-5.0%	10.0%	8.0%	8.0%	8.0%	8.0%
Cost of Revenue		4,433,900	4,967,100	4,873,304	4,629,639	5,092,603	5,500,011	5,940,012	6,415,213	6,928,430
Gross Profit		722,700	677,700	927,871	881,477	969,625	1,047,195	1,130,970	1,221,448	1,319,164
<i>Gross Profit Growth</i>		14.0%		16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
<b>Total Operating Expenses</b>		430,000	420,000	464,094	413,334	439,512	458,304	494,969	534,566	577,332
<b>EBIT (Operating Income or Loss)</b>		292,700	257,700	463,777	468,143	530,113	588,890	636,002	686,882	741,832
<b>Interest Expense</b>		195,200	176,700	211,882	204,699	201,199	194,463	184,740	175,503	166,728
EBT & Other Income/Expenses		97,500	81,000							
Other Income/Expenses Net		96,300	81,300							
EBT		1,200	(300)	251,895	263,444	328,914	394,427	451,262	511,379	575,105
Income Tax Expense		(4,700)	(4,400)	(55,417)	(57,958)	(72,361)	(86,774)	(99,278)	(112,503)	(126,523)
<b>Net Income</b>		5,900	4,100	307,311	321,402	401,275	481,201	550,539	623,882	701,628
Depreciation		544,300	367,100	346,936	329,589	362,548	391,552	422,876	456,707	493,243
Working Capital		(40,800)	(123,000)	(116,024)	(110,222)	(121,245)	(130,944)	(141,420)	(152,733)	(164,952)
Capital Expenditure		(181,200)	(183,300)	(369,295)	(350,831)	(385,914)	(416,787)	(450,130)	(486,140)	(525,031)
Current Portion of Long Term Debt		18,800	19,200							
Long Term Debt		3,085,700	2,794,100							
<b>Total Debt</b>		3,104,500	2,813,300	2,949,275	2,899,275	2,849,275	2,706,811	2,571,471	2,442,897	2,320,752
<b>OPERATING ASSUMPTIONS</b>		Dec 31	Sep 30	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31
		2021	2022	2022	2023	2024	2025	2026	2027	2028
<b>EBITDA (\$ 000's)</b>		833,300	624,800	810,713	797,733	892,662	980,443	1,058,878	1,143,588	1,235,075
Revenue Growth		9.5%		12.5%	-5.0%	10.0%	8.0%	8.0%	8.0%	8.0%
COGS		8.15%								
Cost of Revenue as % of Revenue		86.0%		84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%
Operating Expense as % of Revenue		8.3%		8.0%	7.5%	7.3%	7.0%	7.0%	7.0%	7.0%
Working Capital as % of Revenue		0.8%		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Capex as % Revenue		3.5%		6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
Depreciation as % Revenue		10.6%		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
<b>Total Debt</b>		3,104,500	2,813,300	2,949,275	2,899,275	2,849,275	2,706,811	2,571,471	2,442,897	2,320,752
Debt Repayment \$				155,225	50,000	50,000	142,464	135,341	128,574	122,145
Estimated Debt Repayment % last year Outstanding Debt				5.0%	1.7%	1.7%	5.0%	5.0%	5.0%	5.0%
<b>Interest Expense</b>		195,200		211,882	204,699	201,199	194,463	184,740	175,503	166,728
		6.0%		7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%

The Projection Analysis is based on the past ten years. Due to space constraints, the historical information only shows 2021.



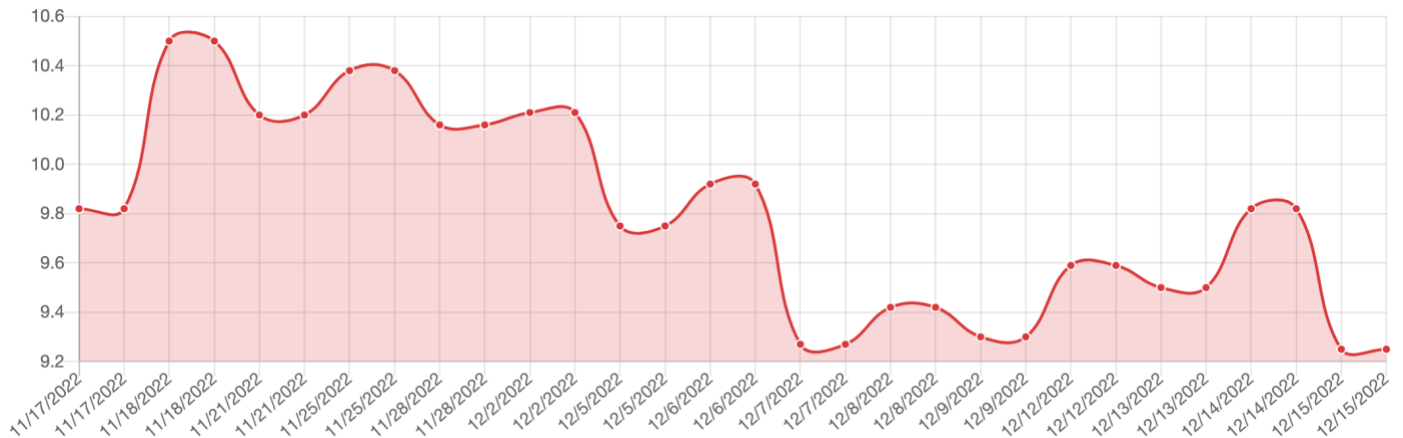


## Valuation Analysis

This report covers three Valuation Methodologies: Market Value (Stock Value), Average EBIT Industry Trading Multiples Valuation Method, and Discount Cash Flow Valuation Method. Because AAM did not declare or pay any dividends in these years, the author excludes the Intrinsic Value Method and Dividend Discount Model Method.



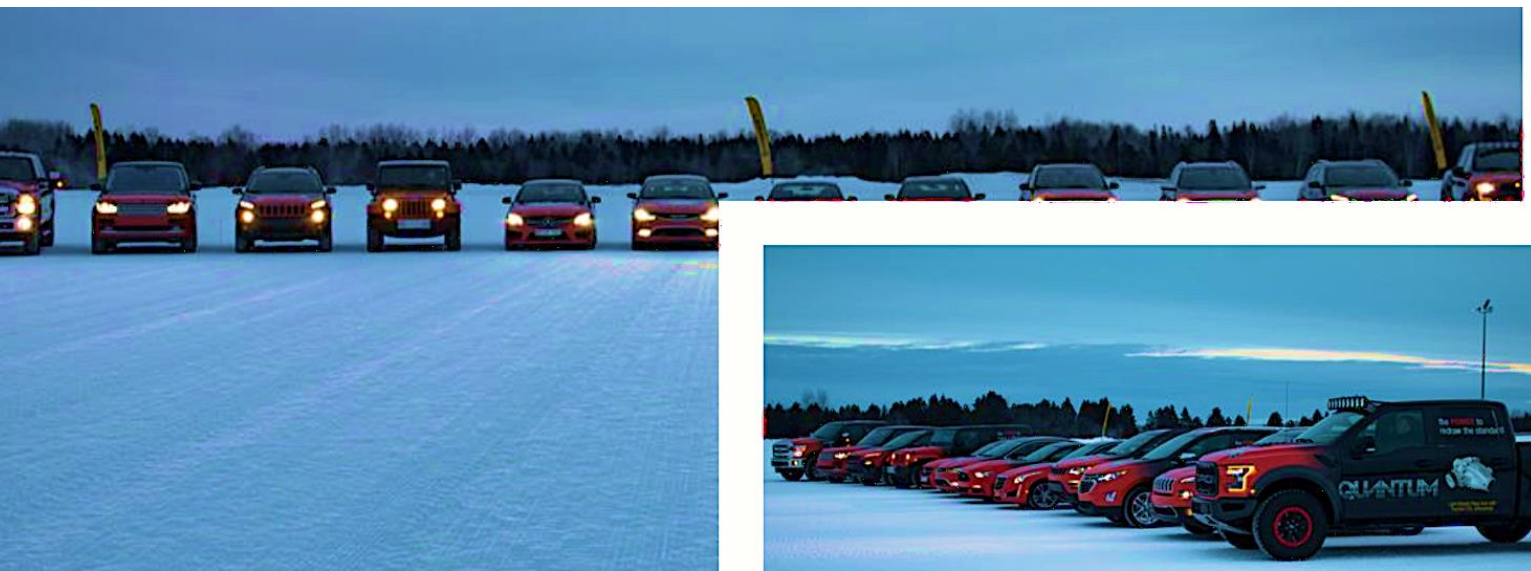
### Method#1. Market Value



#### METHOD #1 - Market Value / Using the Stock Price

Company	Symbol	Beta	Stock Price 12/12/2022	Shares Outstanding (000)	Equity Value (\$000)	Total Debt (\$000) 9/30/2022	Cash (\$000) 9/30/2022	Enterprise Value (\$000)
Americal Axle & Manufacturing	AXL	2.04x	\$ 9.60	114,550	1,099,680	2,813,300	472,300	3,440,680

Americal Axle & Manufacturing (AXL) is trading at \$9.60, with a last 30-day range of \$9.22 to \$10.48. Currently, AAM's equity value is \$1.1B. Similar to other companies in the auto parts industry, AAM owns lots of debt with much cash. Based on this methodology, the company's enterprise value is \$3.4B now.





## Method#2. Average EBIT Industry Trading Multiples

To value AAM with this methodology, a peer group should be formed first. We chose 18 companies in the peer group of AAM and made peer company profiles (seen in the below form). All these companies are in the Consumer Cyclical sector and the Auto Parts industry. They all design, manufacture, and market similar products as AAM. Some of these companies engage in the fast-growing Electric Vehicle market.

After comparison and selection, 12 companies (✓) are recognized as comparable to AAM; 1 company (?) may be comparable to AAM; 5 companies (x) are excluded. The selection process is based on the Locations, Products, and Services. The selected companies are highly consistent with AAM in these aspects.

Company Profiles (Consumer Cyclical Sector & Auto Parts Industry)						
Company	Symbol	Locations/ Countries	Products	Mainly Serve	Location of Customers	COMP
Adient plc	ADNT	200/31	Seating systems and components	Automotive OEM	Americas, Europe, Middle East, and Africa; and Asia Pacific.	✓
Autoliv Inc.	ALV	62/ 28	Safety systems, modules and components	Car manufacturers	Europe, the Americas, China, Japan, and rest of Asia	✓
BorgWarner Inc.	BWA	93/23	Air Management, E-Propulsion & Drivetrain, Fuel Injection. (EVv)	Automotive OEM	Americas, Europe, China, and Globally	✓
Commercial Vehicle Group, Inc.	CVGI	31/ 4 Continents	Vehicle Solutions, Warehouse Automation, Electrical Systems, and Aftermarket Accessories.	Vehicle markets	North America, Europe, and the Asia-Pacific regions	✓
Dana Incorporated	DAN	139/32	Light Vehicle Drive Systems, Commercial Vehicle Drive and Motion Systems, Off-Highway Drive and Motion Systems, and Power Technologies (EVv)	Automotive OEM, Vehicle manufacturers	North America, Europe, South America, and the Asia Pacific	✓
Dorman Products, Inc.	DORM	6/U.S. & Asia(CN)	Replacement parts and fasteners, original equipment dealer...	Vehicle markets	United States, Canada&Mexico, Europe, Middle East, Australia.	?
Douglas Dynamics, Inc.	PLOW	15/ U.S.&CN	Work Truck Attachments and Solutions	Snowplowers	United States	x
Gentex Corporation	GNTX	14/8	Digital vision, connected car, dimmable glass, and fire protection products	Automotive and aerospace	Americas, Europe, and Asia	✓
Holley Inc.	HLLY	42/4	Automotive aftermarket products for car and truck enthusiasts (EVv)	Automotive	United States, Canada, Europe, and China	x
Lear Corporation	LEA	253/38	Automotive seating, and electrical distribution systems and related components (EVv)	Automotive OEM	North America, Europe, Africa, Asia, and South America.	✓
LKQ Corporation	LKQ	1600/25	Replacement parts, components, and systems	Vehicle markets	North America, Europe and Taiwan.	✓
Miller Industries, Inc.	MLR	19/ 3	Towing and recovery equipment, car carriers	Vehicle markets & Leasing companies	Americas, Europe, the Pacific Rim, the Middle East, and Africa	x
Modine Manufacturing Company	MOD	36/14	Heat transfer systems and heat transfer components (EVv)	OEM vehicular applications	America, EMEA, Asia	✓
Monro, Inc.	MNRO	32 States in U.S.	Automotive undercar repair, and tire sales and services	Vehicle markets	United States	x
Motorcar Parts of America, Inc.	MPAA	30/6	Heavy-duty truck, industrial, marine, and agricultural application replacement parts (EVv)	Automotive & Professional Repair	United States, Canada and Mexico, Malaysia, China and India	✓
Standard Motor Products, Inc.	SMP	25/8	Replacement parts for the engine management and temperature control systems of motor vehicles	Automotive, OEM	Americas, Europe, Asia, Mexico	✓
Superior Industries International, Inc.	SUP	9/2	Aluminum wheels	OEM	North America and Europe.	x
Visteon Corporation	VC	21/14	Automotive electronics and connected car solutions (EVv)	Vehicle manufacturers	Americas, Europe, Africa; and Asia Pacific. (Globally)	✓
Americal Axle & Manufacturing	AXL	85/18	Driveline and Metal Forming technologies	OEM and Vehicle market	United States, Mexico, South America, China, other Asian countries, and Europe	

Legend: ✓ = Comparable to AAM(AXL); x = Not Comparable to AAM(AXL); ? = Maybe Comparable to AAM(AXL).

The five companies are excluded mainly for the following reasons. First, Douglas Dynamics, Inc. (PLOW) is excluded because its portfolio of products and services is separated only into Work Truck Attachments and Work Truck Solutions and primarily serves snowplows, sand, and salt spreaders. Its business, compared to other peers' business, is further outside AAM's business range. Therefore, PLOW is eliminated from the valuation method. Second, Holley Inc.(HLLY) operates in the performance automotive aftermarket parts industry, which is far beyond AAM's market. Third, Miller Industries, Inc.(MLR), Monro, Inc. (MNRO), and Superior Industries International (SUP) cover only a few locations with highly concentrated products, which are different from AAM's.





BRINGING THE FUTURE  
FASTER

Accordingly, the Trading Comparable Methodology is based on 13 companies, 12 of which are comparable to AAM, and 1 of which may be comparable to AAM.

**METHOD #2 -Average EBITDA Industry Trading Multiples**

Company	Symbol	Beta	Stock Price 12/12/2022	Shares Outstanding (000)	Equity Value (\$000)	Total Debt (\$000) 9/30/2022	Cash (\$000) 9/30/2022	Enterprise Value (\$000)	EBITDA (\$000) LTM 6/30/2022	EBITDA Multiple	COMP
Adient plc	ADNT	2.65x	\$ 36.75	94,860	3,486,105	2,578,000	947,000	5,117,105	603,000	8.49x	✓
Autoliv Inc.	ALV	1.66x	\$ 81.23	86,840	7,054,013	2,102,000	969,000	8,187,013	972,000	8.42x	✓
BorgWarner Inc.	BWA	1.44x	\$ 41.11	234,150	9,625,907	4,288,000	1,240,000	12,673,907	1,963,000	6.46x	✓
Commercial Vehicle Group, Inc.	CVGI	3.13x	\$ 7.13	33,370	237,928	191,506	38,713	390,721	44,880	8.71x	✓
Dana Incorporated	DAN	2.36x	\$ 16.71	143,350	2,395,379	2,780,000	384,000	4,791,379	494,000	9.70x	✓
Dorman Products, Inc.	DORM	0.57x	\$ 83.55	31,429	2,625,893	313,343	35,435	2,903,801	224,943	12.91x	?
Douglas Dynamics, Inc.	PLOW	0.99x	\$ 36.42	22,890	833,654	312,163	2,843	1,142,974	75,994	15.04x	x
Gentex Corporation	GNTX	0.92x	\$ 27.61	234,580	6,476,754	-	239,056	6,237,698	461,142	13.53x	✓
Holley Inc.	HLLY	0.45x	\$ 2.46	118,240	290,870	641,627	16,606	915,891	148,366	6.17x	x
Lear Corporation	LEA	1.49x	\$ 130.87	59,110	7,735,726	2,605,600	842,200	9,499,126	1,073,500	8.85x	✓
LKQ Corporation	LKQ	1.38x	\$ 53.80	267,180	14,374,284	3,687,000	269,000	17,792,284	1,847,860	9.63x	✓
Miller Industries, Inc.	MLR	1.00x	\$ 27.53	11,420	314,393	45,944	33,208	327,129	32,086	10.20x	x
Modine Manufacturing Company	MOD	2.30x	\$ 20.59	52,100	1,072,739	370,600	70,100	1,373,239	212,600	6.46x	✓
Monro, Inc.	MNRO	1.03x	\$ 45.90	31,460	1,444,014	719,752	9,794	2,153,972	168,902	12.75x	x
Motorcar Parts of America, Inc.	MPAA	1.44x	\$ 11.64	19,420	226,049	262,952	9,600	479,401	35,324	13.57x	✓
Standard Motor Products, Inc.	SMP	0.51x	\$ 36.16	21,570	779,971	308,154	17,525	1,070,600	146,749	7.30x	✓
Superior Industries International, Inc.	SUP	3.93x	\$ 4.53	27,020	122,401	571,751	121,841	572,311	165,900	3.45x	x
Visteon Corporation	VC	1.79x	\$ 141.06	28,140	3,969,428	498,000	452,000	4,015,428	282,000	14.24x	✓
<b>American Axle &amp; Manufacturing</b>	<b>AXL</b>	<b>2.04x</b>	<b>\$ 9.60</b>	<b>114,550</b>	<b>1,099,680</b>	<b>2,813,300</b>	<b>472,300</b>	<b>3,440,680</b>	<b>624,800</b>	<b>5.51x</b>	

Legend: ✓ = Comparable to AAM(AXL); x = Not Comparable to AAM(AXL); ? = Maybe Comparable to AAM(AXL).

AAM (AXL) EBITDA Multiple Valuation	EBITDA Multiple	Enterprise Value (\$000)	Stock Price Value
Average EBITDA Multiple (✓)	9.61x	\$ 6,005,353.57	\$ 31.99
Average EBITDA Multiple (✓+?)	9.87x	\$ 6,163,832.21	\$ 33.37
Average EBITDA Multiple (✓)*	9.19x	\$ 5,742,513.48	\$ 29.69
Average EBITDA Multiple (✓+?)*	9.50x	\$ 5,936,102.01	\$ 31.38

\* Remove Outliers(VC)



The EBITDA Multiple in this whole industry is low now, largely due to the impact of GCP and the passive expectation. Currently, AXL's EBITDA Multiple is 5.51x, which is far below the industry average. Visteon Corporation (VC) is recognized as an outlier because its EBITDA Multiple is 14.24x, which is the largest.

The average EBITDA Multiple for all the comparable companies is 9.61x. With this multiple, AAM's Enterprise Value is \$6.6B, and its Stock Price Value is \$31.99. This stock value is much larger than its current stock price. When the outlier (VC) is removed, the average EBITDA Multiple(✓)\* is 9.19x and the new Stock Price Value is \$29.69, which is about 200% of its current stock price. Considering DORM, which may be comparable to AAM, the average EBITDA Multiple(✓+?) and the Stock Price Value are \$9.87x and \$33.37 separately, and \$9.50 and \$31.38 without the outlier (VC). The Average EBITDA Multiple (✓)\* is highlighted in the form above, which is recognized as the most accurate valuation result in this report. Later in the third Method (DCF), this multiple would be used. According to this Average EBITDA Industry Trading Multiples Method, AXL is undervalued now.





### Method#3. Discount Cash Flow Valuation

The third valuation methodology is the DCF model which provides an enterprise value based on the net present value of future cash flows. Based on what we have done in the **Projection Analysis Section**, we calculate AAM's future cash flows. The assumed EBITDA Multiple is 9.19x, which is the average EBITDA multiple of AAM's comparables excluding the outlier. The WACC is calculated as 7.75% and we expect the growth could be 3%.

METHOD #3 - Discount Cash Flow Valuation Analysis										
	year =									
	HISTORICAL			PROJECTED				EXIT YEAR		
	12/31/2020	12/31/2021	9/30/2022	12/31/2023	12/30/2024	12/30/2025	12/31/2026	12/31/2027	12/30/2028	
Revenues (\$000)	4,710,800	5,156,600	5,644,800	5,511,116	6,062,228	6,547,206	7,070,983	7,636,661	8,247,594	
Revenue Growth	-29.7%	9.5%		-5.0%	10.0%	8.0%	8.0%	8.0%	8.0%	
Cost of Revenues (COGS)	(4,128,100)	(4,433,900)	(4,967,100)	(4,629,639)	(5,092,603)	(5,500,011)	(5,940,012)	(6,415,213)	(6,928,430)	
Operating Expenses (Excl. Non-rec.)	(400,500)	(430,000)	(420,000)	(413,334)	(439,512)	(458,304)	(494,969)	(534,566)	(577,332)	
EBIT	182,200	292,700	257,700	468,143	530,113	588,890	636,002	686,882	741,832	
Less Taxes (Tax rate x EBIT)	22.00%			(57,958)	(72,361)	(86,774)	(99,278)	(112,503)	(126,523)	
Plus Depreciation				329,589	362,548	391,552	422,876	456,707	493,243	
Less Working Capital				(110,222)	(121,245)	(130,944)	(141,420)	(152,733)	(164,952)	
Debt Service (Forecasted)				(254,699)	(251,199)	(336,927)	(320,080)	(304,076)	(288,873)	
Less Capex				(350,831)	(385,914)	(416,787)	(450,130)	(486,140)	(525,031)	
Cash Flow				24,023	61,943	9,011	47,971	88,135	129,696	
EBITDA		624,800		797,733	892,662	980,443	1,058,878	1,143,588	1,235,075	
Debt		2,813,300		2,949,275	2,899,275	2,849,275	2,706,811	2,571,471	2,320,752	
<b>Terminal Value</b>										
Assumptions										
EBITDA Multiple Method	9.19x								Exit year's EBITDA x Trading Multiple	10,510,677
Perpetuity Method	7.75%	WACC		Growth	3.00%				Next Year's CF / (WACC - Growth)	2,732,116
Average										6,621,396
Less Debt Outstanding (at Exit)										(2,571,471)
Equity Value at Terminal										4,049,926
Equity Cash Flows	14.20%			24,023	61,943	9,011	47,971	4,138,061		
AAM's Equity Cash Flows			\$ 2,232,846.16	21,035	47,493	6,050	28,200	2,130,068		
$PV = \text{SUM} ( FV1 / (1+CAPM)^1 + FV2 / (1+CAPM)^2 + \dots )$										
<b>Stock Price Value \$ 19.49</b>										
<b>Cost of Equity Calculation</b>										
Risk Free Rate (5 year)	3.00%			WACC Calc:		Amount	% Cap	RoR	AT RoR	WACC
Premium based on MC =	5.50%			Total Debt	3,104,500	73.843%	7.000%	5.460%	4.032%	
AAM Beta from yahoo =	2.04x			MV Equity	1,099,680	26.157%	14.204%	14.204%	3.715%	
Expected Equity Return =	14.204%			Total Cap	4,204,180	100.0%			7.747%	
<b>Cost of Debt Calculation</b>										
Avg Debt	3,026,888			WACC (Firm Valuation Discount Rate)		7.747%				
Interest	211,882			CAPM (Equity Valuation Discount Rate)		14.204%				
Rate	7.00%									

According to this methodology, AAM has an equity value of \$ 2.2B; thus, its stock price value is \$19.49, which is almost twice as much as its current stock price. This Method also shows that AXL is greatly undervalued now.





## Discussion & Results

ENTERPRISE VALUATION ANALYSIS							
	Enterprise Value (\$000)	Total Debt (\$000)	Cash (\$000)	Equity Value (\$000)	Shares Outstanding (000)	Stock Price	Recom.
METHOD #1 - Market Value / Using the Stock Price	3,440,680	2,813,300	472,300	1,099,680	114,550	\$ 9.60	
METHOD #2 - Average EBITDA Industry Trading Multiples	5,742,513	2,813,300	472,300	3,401,513	114,550	\$ 29.69	BUY
METHOD #3 - Discount Cash Flow Valuation Analysis	4,573,846	2,813,300	472,300	2,232,846	114,550	\$ 19.49	BUY
Average of METHOD #2 & METHOD#3	5,158,180	2,813,300	472,300	2,817,180	114,550	\$ 24.59	BUY

According to the valuation results in the above form, we highly recommend **BUY** AXL. The three valuation methodologies indicate that the stock price of AAM is now significantly underestimated.

The current stock price of AAM (AXL) is \$9.60 with an enterprise value of \$3.4B and an Equity value of \$1.1B. Based on the average EBITDA Multiple of industry peers, Method#2 results in the highest enterprise value of \$5.7B for AAM. Therefore, this Trading Comparables methodology provides the highest stock value of \$29.69, about three times its current stock price. Method#3 provides an enterprise value of \$4.6B based on the net present value of future cash flows. This DCF methodology results in a \$19.49 stock value. These two methods yield an average stock price of \$24.59, which is 150% of the current stock price of \$9.6. Obviously, it's undervalued now.

Besides the impacts of acquisitions, restructuring, and GCP, we also have to consider that AAM is in the cyclical automotive industry, which is dependent on general economic conditions and other factors, such as credit availability, interest rates, fuel prices, consumer preference, and confidence. Currently, the industry is quickly pivoting from internal combustion engines to electric propulsion. The trend towards advanced electronic integration and electrification has increased the level of new market entrants, including technology companies; thus the competition is substantial. However, through the advancement of its electric drive technology and leveraging its engineering leadership in conventional drivelines, AAM is able to support multiple vehicle segments globally, including small vehicles in Asia, high-performance luxury vehicles in Europe, and CUVs and large trucks in North America. In recent years, with a deep connection with global automotive market segments, AAM is also committed to electrification as the electric vehicle prospects grow.

**Therefore, we recommend investors buy AXL.** Although this company has been hard hit by the Global Covid Pandemic and the lowered market expectations, we believe that this company is resiling, recovering, and resurging with huge potential to grow further.



## Technical Analysis

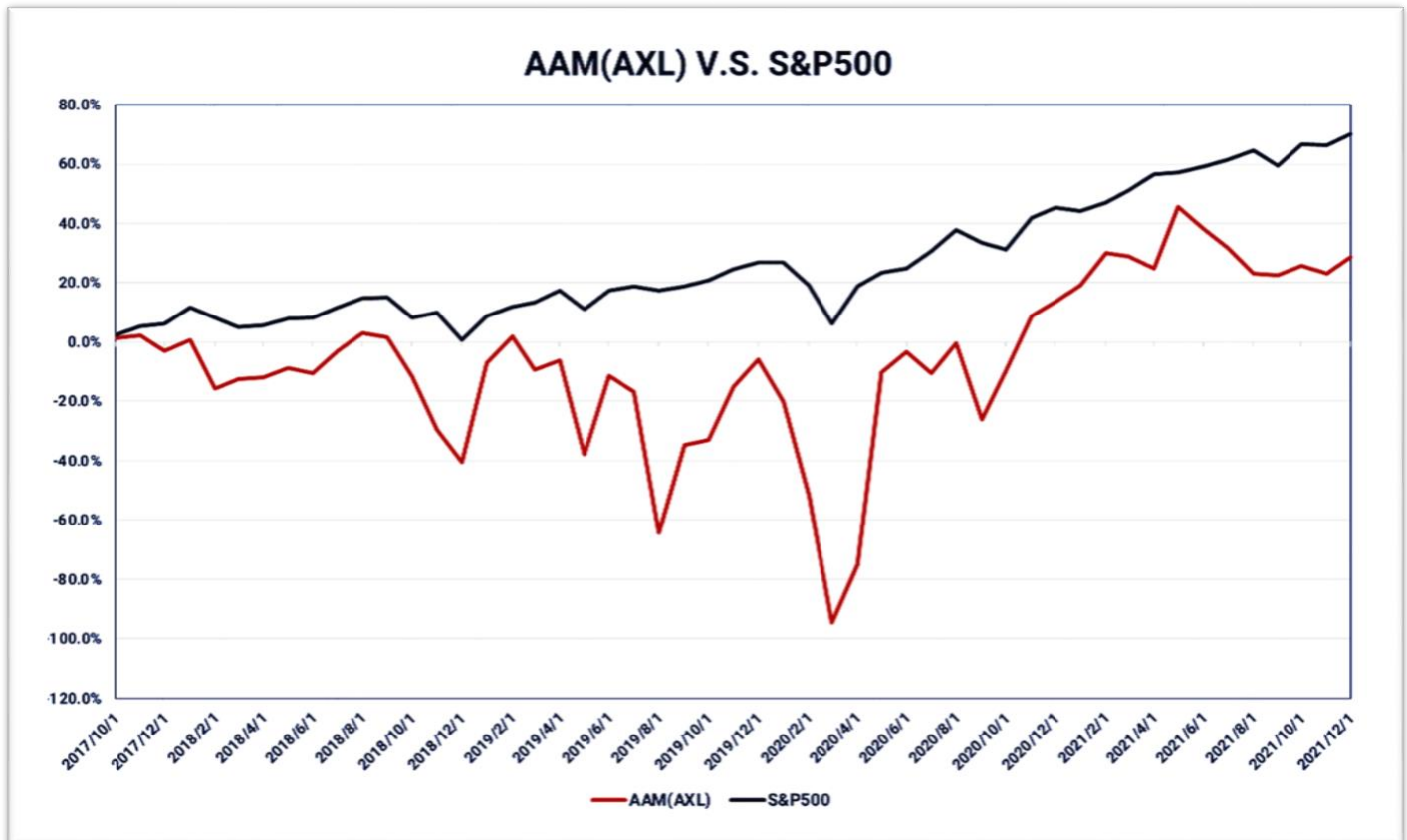
In this part, AAM's (AXL) 5-year performance is compared with S&P500 5-year performance to calculate Beta. With the 5-year average percentage change of AXL and S&P500, the Beta of AXL is calculated as 2.04x, shown in the right form.



	y		x
	AAM(AXL)		S&P500
1-Year MAX	\$	13.06	\$ 479.98
1-Year MIN	\$	5.66	\$ 457.77
5-Year Average % Change		0.92%	0.86%
5-Year Standard Deviation		19.30%	5.02%
<b>Beta Calculation</b>			
Total [y-Avg(y)][x-Avg(x)]			30.8497%
Total x <sup>2</sup>			15.1442%
Beta			2.0371

Over the past five years, the volatility of AXL is stronger than S&P500. During the last five years, AXL has been beaten up by the company's exogenous and fundamental risks. In early 2020, AXL further suffered from the combined impact of GCP and its restructuring program. Since then, AXL followed the recovery in U.S. vehicle production and has grown fast. However, the current valuation of AXL is very low.

According to what has been discussed in the whole report, AAM(AXL) is undervalued now. In recent quarters, the company handily beat earnings estimates in a row. Therefore, with the expectations for modest earnings gains going forward and an extremely low valuation, we highly recommend investors BUY AXL.





## Appendix

American Axle & Manufacturing Holdings. (AXL)							S&P 500 ETF (SPY)					
Date	Open	High	Low	Close	% Change	Cum Change%	Open	High	Low	Close	% Change	Cum Change %
2017/9/1	14.63	18.34	14.25	17.58			247.92	251.32	244.95	251.23		
2017/10/1	17.54	18.87	17.16	17.79	1.2%	1.2%	251.49	257.89	251.29	257.15	2.4%	2.4%
2017/11/1	18.12	20.27	16.96	17.95	0.9%	2.1%	258.04	266.05	255.63	265.01	3.1%	5.4%
2017/12/1	17.97	18.22	16.27	17.03	-5.1%	-3.0%	264.76	268.60	260.76	266.86	0.7%	6.1%
2018/1/1	17.15	19.63	17.09	17.65	3.6%	0.6%	267.84	286.63	267.40	281.90	5.6%	11.7%
2018/2/1	17.55	17.73	14.75	14.76	-16.4%	-15.8%	281.07	283.06	252.92	271.65	-3.6%	8.1%
2018/3/1	14.83	15.92	13.96	15.22	3.1%	-12.6%	271.41	280.41	257.83	263.15	-3.1%	5.0%
2018/4/1	15.07	16.43	14.58	15.34	0.8%	-11.9%	262.55	271.30	254.67	264.51	0.5%	5.5%
2018/5/1	15.32	16.55	13.99	15.82	3.1%	-8.7%	263.87	274.25	259.05	270.94	2.4%	7.9%
2018/6/1	15.93	18.55	15.41	15.56	-1.6%	-10.4%	272.41	279.48	268.49	271.28	0.1%	8.1%
2018/7/1	15.33	17.10	14.68	16.72	7.5%	-2.9%	269.51	284.37	269.24	281.33	3.7%	11.8%
2018/8/1	16.63	18.83	15.91	17.71	5.9%	3.0%	281.56	291.74	279.16	290.31	3.2%	15.0%
2018/9/1	17.71	19.34	17.03	17.44	-1.5%	1.5%	289.84	293.94	286.71	290.72	0.1%	15.1%
2018/10/1	17.83	18.50	14.31	15.17	-13.0%	-11.5%	292.11	293.21	259.85	270.63	-6.9%	8.2%
2018/11/1	15.37	15.95	11.26	12.45	-17.9%	-29.5%	271.60	281.22	263.07	275.65	1.9%	10.0%
2018/12/1	12.77	12.96	10.13	11.10	-10.8%	-40.3%	280.28	280.40	233.76	249.92	-9.3%	0.7%
2019/1/1	10.85	14.87	10.81	14.78	33.2%	-7.2%	245.98	270.47	243.67	269.93	8.0%	8.7%
2019/2/1	14.70	17.20	13.44	16.10	8.9%	1.8%	270.15	281.31	267.83	278.68	3.2%	12.0%
2019/3/1	16.20	16.49	13.34	14.31	-11.1%	-9.3%	280.44	285.18	272.42	282.48	1.4%	13.3%
2019/4/1	14.51	16.43	14.42	14.75	3.1%	-6.3%	284.70	294.45	284.40	294.02	4.1%	17.4%
2019/5/1	14.86	14.96	10.05	10.11	-31.5%	-37.7%	294.72	294.95	275.24	275.27	-6.4%	11.0%
2019/6/1	10.06	13.19	9.96	12.76	26.2%	-11.5%	275.31	296.31	273.09	293.00	6.4%	17.5%
2019/7/1	13.05	13.23	10.77	12.07	-5.4%	-16.9%	296.68	302.23	294.33	297.43	1.5%	19.0%
2019/8/1	12.08	12.15	6.03	6.34	-47.5%	-64.4%	297.60	300.87	281.72	292.45	-1.7%	17.3%
2019/9/1	6.26	9.23	5.87	8.22	29.7%	-34.7%	290.57	302.63	289.27	296.77	1.5%	18.8%
2019/10/1	8.30	9.32	6.75	8.36	1.7%	-33.0%	297.74	304.55	284.82	303.33	2.2%	21.0%
2019/11/1	8.89	11.21	8.75	9.86	17.9%	-15.1%	304.92	315.48	304.74	314.31	3.6%	24.6%
2019/12/1	10.00	11.26	9.23	10.76	9.1%	-6.0%	314.59	323.80	307.13	321.86	2.4%	27.0%
2020/1/1	10.95	10.99	8.80	9.24	-14.1%	-20.1%	323.54	332.95	320.36	321.73	0.0%	27.0%
2020/2/1	9.29	10.62	5.77	6.33	-31.5%	-51.6%	323.35	339.08	285.54	296.26	-7.9%	19.1%
2020/3/1	6.36	6.64	2.50	3.61	-43.0%	-94.6%	298.21	313.84	218.26	257.75	-13.0%	6.1%
2020/4/1	3.40	4.67	2.72	4.32	19.7%	-74.9%	247.98	294.88	243.90	290.48	12.7%	18.8%
2020/5/1	4.10	8.03	3.87	7.11	64.6%	-10.3%	285.31	306.84	272.99	304.32	4.8%	23.5%
2020/6/1	7.21	9.62	6.81	7.60	6.9%	-3.4%	303.62	323.41	296.74	308.36	1.3%	24.8%
2020/7/1	7.58	8.15	6.39	7.06	-7.1%	-10.5%	309.57	327.23	309.07	326.52	5.9%	30.7%
2020/8/1	7.14	8.24	6.54	7.78	10.2%	-0.3%	328.32	351.30	327.73	349.31	7.0%	37.7%
2020/9/1	7.68	8.53	4.82	5.77	-25.8%	-26.2%	350.21	358.75	319.80	334.89	-4.1%	33.6%
2020/10/1	5.85	7.74	5.66	6.72	16.5%	-9.7%	337.69	354.02	322.60	326.54	-2.5%	31.1%
2020/11/1	6.84	8.86	6.75	7.96	18.5%	8.8%	330.20	364.38	327.24	362.06	10.9%	42.0%
2020/12/1	8.10	8.68	7.28	8.34	4.8%	13.5%	365.57	378.46	362.03	373.88	3.3%	45.2%



BRINGING THE FUTURE  
FASTER

American Axle & Manufacturing Holdings. (AXL)							S&P 500 ETF (SPY)					
Date	Open	High	Low	Close	% Change	Cum Change%	Open	High	Low	Close	% Change	Cum Change %
2020/12/1	8.10	8.68	7.28	8.34	4.8%	13.5%	365.57	378.46	362.03	373.88	3.3%	45.2%
2021/1/1	8.43	9.90	7.86	8.81	5.6%	19.2%	375.31	385.85	364.82	370.07	-1.0%	44.2%
2021/2/1	8.95	11.06	8.34	9.77	10.9%	30.1%	373.72	394.17	370.38	380.36	2.8%	47.0%
2021/3/1	9.96	12.92	8.75	9.66	-1.1%	28.9%	385.59	398.12	371.88	396.33	4.2%	51.2%
2021/4/1	9.84	10.39	8.65	9.28	-3.9%	25.0%	398.40	420.72	398.18	417.30	5.3%	56.5%
2021/5/1	9.36	11.53	9.19	11.20	20.7%	45.7%	419.43	422.82	404.00	420.04	0.7%	57.1%
2021/6/1	11.39	13.06	10.13	10.35	-7.6%	38.1%	422.57	428.78	414.70	428.06	1.9%	59.1%
2021/7/1	10.76	11.50	8.80	9.69	-6.4%	31.7%	428.87	441.80	421.97	438.51	2.4%	61.5%
2021/8/1	9.89	10.25	8.28	8.87	-8.5%	23.3%	440.34	453.07	436.10	451.56	3.0%	64.5%
2021/9/1	8.81	9.32	7.90	8.81	-0.7%	22.6%	452.56	454.05	428.78	429.14	-5.0%	59.5%
2021/10/1	8.90	10.91	8.69	9.08	3.1%	25.7%	430.98	459.56	426.36	459.25	7.0%	66.5%
2021/11/1	9.23	10.12	8.64	8.86	-2.4%	23.2%	460.30	473.54	457.77	458.97	-0.1%	66.5%
2021/12/1	9.19	10.01	8.18	9.33	5.3%	28.5%	461.64	479.00	448.92	474.96	3.5%	69.9%
2022/1/1	9.49	10.54	7.50	8.14	-12.8%	15.8%	476.30	479.98	420.76	449.91	-5.3%	64.7%
2022/2/1	8.19	9.37	7.41	9.26	13.8%	29.5%	450.68	458.12	410.64	436.63	-3.0%	61.7%
2022/3/1	9.15	9.29	7.02	7.76	-16.2%	13.3%	435.04	462.07	415.12	451.64	3.4%	65.2%
2022/4/1	7.86	7.92	6.41	6.62	-14.7%	-1.4%	453.31	457.83	411.21	412.00	-8.8%	56.4%
2022/5/1	6.61	8.21	6.36	8.11	22.5%	21.2%	412.07	429.66	380.54	412.93	0.2%	56.6%
2022/6/1	8.24	9.41	7.28	7.53	-7.2%	14.0%	415.17	417.44	362.17	377.25	-8.6%	48.0%
2022/7/1	7.45	9.00	6.80	8.91	18.3%	32.3%	376.56	413.03	371.04	411.99	9.2%	57.2%
2022/8/1	8.89	11.96	8.44	10.35	16.2%	48.5%	409.15	431.73	395.04	395.18	-4.1%	53.1%
2022/9/1	10.19	10.44	6.72	6.83	-34.0%	14.5%	392.89	401.56	390.04	392.24	-0.7%	52.3%
2022/10/1	7.02	9.78	6.80	9.69	41.9%	56.4%	400.28	401.55	390.33	392.24	0.0%	52.3%

# American Axle & Manufacturing

**Dec 2022 Analysis**

**Yingying Cai**  
**Professor Chris C. Droussiotis**  
**Professor Stuart D. Shelly**

**Evaluation Result**  
**\$ 24.59**  
**Recom. BUY**

