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# Studies in Applied Finance

# INVESTMENT THESIS FOR AMG ADVANCED METALLURGICAL GROUP (EURONEXT: AMG)

**Philip Prokos** 

Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise



#### Investment Thesis for AMG Advanced Metallurgical Group (EuroNext: AMG)

#### By Philip Prokos

**Disclaimer**: These research reports are primarily student reports for academic purposes and are not specific recommendations to buy or sell a stock. Potential investors should consult a qualified investment advisor before making any investment. This study was completed in May 2016.

#### About the Series

The Studies in Applied Finance series is under the general direction of Professor Steve H. Hanke, Co-Director of the Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise (<u>hanke@jhu.edu</u>) and Dr. Hesam Motlagh (<u>hnekoor1@jhu.edu</u>), a Fellow at the Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise. This working paper is one in a series on applied financial economics, which focuses on company valuations. The authors are mainly students at the Johns Hopkins University in Baltimore who have conducted their work at the Institute as undergraduate researchers.

#### About the Author

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#### <u>Summary</u>

This investment thesis is an analysis of Advanced Metallurgical Group, a global critical materials company. Our analysis examines the economic trends and factors that affect AMG, and how they adjust to these changes. This analysis is then combined with the Hanke-Guttridge Discounted Cash Flow (HG-DCF) model in order to calculate the estimated share price. A Monte Carlo simulation is presented to show a distribution of possible free cash flows. In addition to this, we also analyze the proxy statements, and management compensation of AMG to verify that management is aligned with the shareholders. This investment thesis will provide the necessary financial information, along with background information to make an investment decision.

#### **Acknowledgements**

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Keywords: AMG, Advanced Metallurgical Group, Free Cash Flow, Discounted Cash Flow, Depreciation, financial modeling, Investment Thesis

JEL codes: C63, G11

#### Investment Thesis for Advanced Metallurgical Group (EuroNext: AMG) by Philip Prokos



Rating: Buy – Average Free Cash Flow per Share: \$14.37

Date	5/09/2016
Current Price	9.74 Euros
Shares Outstanding	28.252M
Market Cap	260.7M
Dividend Yield	1.19%
Beta	N/A
52-Week range	6.08-9.68
P/E (ttm)	25.61
P/E (2016)	17.21*
P/E (2017)	10.19*
P/E (2018)	8.75*
EPS (ttm)	0.41
EPS (F)	0.40

\*Based on consensus estimates as of the time of this writing (Source: Bloomberg Terminal)

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#### **Executive Summary:**

Advanced Metallurgical Group (EuroNext: AMG) is a global critical materials company. They produce highly engineered specialty metals and mineral products and provide related vacuum furnace systems and services. Using the Hanke-Guttridge Discounted Cash Flow Model (HG-DCF) we have determined that the estimated free cash flow per share to be approximately \$14.37, which is a 29.34% gain over the current stock price of \$11.11 (9.74 euros). This is a 27% gain over the 52 week high of 9.93 euros (\$11.32). This estimate is based on a conservative revenue loss of initially 7.75%, progressing to a no-growth company by 2022, the Capital Expenditure rising from 0.8% to the depreciation and amortization by 2023, and no change in working capital by 2018. This conservative estimate is based on the fact that metal prices may increase moderately, but without assuming a massive price rebound. Also, taking into consideration AMG's management compensation plan that is well aligned with the shareholders, **we rate AMG as a buy**.

## **Catalysts and Risks**:

- Metal Price Volatility Risk Risk arises from price changes between purchase, process, and sale of the metals. The price declines in 2015 were led by Ferrovanadium, Molybdenum and Nickel which fell 53%, 43% and 42% respectively (Figure 1).<sup>1</sup>
- Mining Risk Risks that are inherent to the mining industry including safety, regulatory, geopolitical, environmental, operational and economic. Operational mining risks are related to extracting the material and range from weather conditions to the performance of key machinery.
- Supply Risk The Critical Materials segment relies on the supply of metals and metalcontaining raw materials. There is a limited amount of suppliers of these critical materials.
- Currency Risk AMG's global presence allows foreign exchange risk to arise. Besides its functional currency (the U.S. dollar), AMG's primary areas of exposure are the euro, Brazilian real, and British pound.
- Increased competition in the space from other mining companies.

<sup>&</sup>lt;sup>1</sup> See the supplementary material for a full overview of metals.



Figure 1 – Price declines of metals in 2015 versus 2014. Source: AMG 2015 Annual Report.

## **AMG Company Overview:**

AMG is split into 2 different sectors: critical metals and engineering. AMG Critical Metals is a world leading producer in specialty metals, alloys, and high performance materials, including aluminum master alloys and powders, titanium alloys and coatings, chromium metal, ferrovanadium, antimony, tantalum, niobium, silicon metal and natural graphite. On the other hand, AMG Engineering designs, engineers, and produces advanced vacuum furnace systems and operates vacuum heat treatment facilities primarily for the transportation and energy (including solar and nuclear) industries. These furnace systems include vacuum remelting, solar silicon melting and crystallization, vacuum induction melting, vacuum heat treatment and high pressure gas quenching, turbine blade coating, and sintering.

AMG was incorporated in November 2006 in the Netherlands, and is organized into two divisions: AMG Critical Materials and AMG Engineering. AMG Critical Materials originated from Graphit Kropfmul in 1870 in order to mine graphite in Germany. They then acquired RW Silicium in Germany. AMG then acquired 60% of this combined company in 2008 and finished the full takeover in 2012. Additionally, in the late 1970s, Metallurgy expanded to Brazil by acquiring Companhia Industrial Fluminense. The AMG Engineering side began with its predecessor ALD Vacuum Technologies GmBH in Germany in the mid-1800s.

## **Historical Performance:**

AMG' stock price took a hit in 2011, going from nearly 17 euros to under 6 euros in 2012 (when the full austerity measures were put into place). This decrease was a result of falling metal prices from 2011 to present as shown below in Figure 2.



Figure 2 – Global price of aluminum versus time for the past 5 years. Source: International Monetary Fund.

Starting in 2011, AMG began austerity measures in an effort to reduce long term debt and increase free cash flows (Figure 3). This was done because executives estimated that the predicted Chinese growth rates were overstated, and that the commodities market would take a negative hit over the next couple of years. The reduction of net debt is shown in the figure below, along with the resulting free cash flows. The austerity measures were a success- the free cash flows hit new highs and the stock price outperformed other key indices.



Figure 3 – Shown is AMG's net debt (A), free cash flow (B), and Share price versus key indices (C) over the last few years. Source: AMG 2015 Annual Report Page 6-7

Taking a look at the long-term asset turns and useful life<sup>2</sup>, we can see that the efficiency of AMG fell dramatically after 2009, and continued to fall as a result of economic headwinds, including slower emerging market growth and collapsing metal prices. Both of these have begun an upward trend, back to a higher level of efficiency.



Figure 4 –Shown is AMG's historical (left) and forecasted (right) operational efficiency as measured by long-term asset turns (LAT) and useful life (UL). Source: AMG 2015 Annual Report.

# **AMG Business Segments:**

AMG is divided into 4 distinct end-markets: Transportation, Specialty Metals & Chemicals, Energy, and Infrastructure (Figure 5). Transportation is based on the demand of critical materials in the transportation industry. Highly engineered metallurgical solutions increase operating efficiency, lower aircraft weight and improve economics. AMG's gamma titanium aluminide is most useful as it is a light-weight aerospace alloy which gives aircrafts capabilities to operate at higher temperatures with less carbon emissions and reduced fuel consumption. Specialty metals and chemicals create products which improve living standards. These metallurgical solutions include tantalum, which is used as capacitors in electronics, and vanadium-based chemicals which improve the insulation and infrared absorbent properties of glass and chemical compounds. Energy is based on the increasing use of energy and improvements in efficiency. Metals such as silicon are used in the production of polysilicon by the solar energy industry. Infrastructure is related to global GDP growth and reducing carbon

<sup>&</sup>lt;sup>2</sup> Long-term asset turns is equal to net revenue divided long-term assets. Useful life is the long-term assets divided by the depreciation and amortization (D&A).

emissions. Critical materials such as ferrovanadium are used for high-strength steels, and graphite is used in the insulation of homes and buildings.



Figure 5 – Revenue by end-market for AMG. Source: AMG 2015 Annual Report.

The transportation market accounted for a large portion of AMG's net revenue, followed by specialty metals, infrastructure, and then energy.

Additionally, each AMG facility is also broken up into site names in order to evaluate individual performance:

Site Name'	Location	Country	Division
AMG Headquarters	Amsterdam	Netherlands	AMG Corporate
AMS USA Headquarters	Pennsylvania	USA	AMB Corporate
ALD USA*	Connecticut	USA	AMO Engineering
ALD France	Grenoble	France	AMG Engineering
ALD Vacuum Technologies	Hanau	Germany	AMG Engineering
ALD Vacuheat <sup>2</sup>	Limbach	Germany	AM0 Engineering
ALD TT USA"	Michigan	USA	AMO Engineering
ALD Dynatech <sup>a</sup>	Mumbai	India	AMG Engineering
ALD TT Mexico?	Ramos Arizpe	Mexico	AMG Engineering
ALD Japan <sup>2</sup>	Shinjuku-ku	Japan	AMG Engineering
ALD C&K*	Suzho	China	AMO Engineering
AM9 Inteläifast	Speyer	Germany	AM0 Engineering
AMG Antimony	Chauny	France	AMG Critical Materials
Bogala Graphite Lanka	Colombo	Sri Lanka	AMG Critical Materials
AMG Mining/	Kroptmuhl	Germany	AMG Critical Materials
AMG Antimony	Lucette	France	AMG Critical Materials
AMO Mineração <sup>1</sup>	Nazareno	Brazil	AMG Critical Materials
AMB Silicon?	Pocking	Germany	AMG Critical Materials
AMG Graphite	Qingdae	China	AMG Critical Materials
AMB Graphite Tym	Tyn	Czech Republic	AM9 Critical Materials
AMG Alpoco	Anglesey	UK	AMG Critical Materials
AMG Titanium Allays and Coatings <sup>1</sup>	Brand Erbisdorf	Germany	AMC Critical Materials
AMG Aluminum <sup>a</sup>	Jiaxing	China	AMG Critical Materials
AM9 Aluminum	Kentucky	USA	AMB Critical Materials
AMG Alpece	Minworth	UK	AMG Critical Materials
AM9 Titanium Alleys and Coatings <sup>®</sup>	Numberg	Dermany	AM9 Critical Materials
AMG Vanadium	Ohio	USA	AMG Critical Materials
AMG Superalloys and AMG Aluminum <sup>1</sup>	Rotherham	UK	AMG Critical Materials
AMG Superalloys <sup>4</sup>	Sao Joao del Rei	Brazil	AMG Critical Materials
AMS Aluminum	Washington	USA	AMB Critical Materials

Figure 6 – AMG facilities that are used to measure performance. Source: AMG 2015 Annual Report Page 41

## Acquisitions and Disposals:

AMG sold its interest in AMG Graphit Kropfmuhl GmBH during the year ended December 31, 2015. The agreement was equal to 40% equity interest by way of a capital increase in combination with a 10.33% equity interest in Bogala Graphtie Lanka for a combined cash award of ~\$38 million. Also in 2015, AMG disposed of Suda Maden (its mining assets in Turkey) for a loss of \$2.60 million and sold its 100% ownership in MG Trade Services in New Delhi with a loss of \$1.03 million. During 2014, AMG sold its 25% ownership in Bostlan S.A. for \$740,000. AMG also sold its 51% equity interest in Benda-lutz-Alpoco for \$580,000. Also in 2014, they sold its 45% ownership in Nanjing Yunhai KB Alloys for \$650,000. As for acquisitions, the company acquired 1.007 million additional shares of Thermique Industrue Vide in 2013, increasing their ownership from 56.8% to 100%. They also received an additional 30% ownership in Dynatech in 2010.

## AMG Model:

The Hanke-Guttridge Discounted Cash Flow (HGDCF) for AMG is based on primary data from SEC filings. Using this financial data, we determine 5-year averages for AMG's business performances and make assumptions based on this. Performance metrics include revenue growth, cost structures (including cost of goods sold, selling general and administrative [SG&A], restructuring expense, environmental expense, and other income), operating margins, finance costs, tax provisions, change in working capital, capital expenditure and depreciation & amortization (D&A).

## **Income Statement and Balance Sheet:**

Looking over the balance sheet, it is clear that AMG has decreased their books for the last 5 years. Their total assets have fallen from \$901 million to \$736 million, their non-current assets have decreased from \$405 million in 2012 to \$315 million in 2015, and their non-current liabilities have decreased from \$482 million in 2012 to \$320 million in 2015. Looking deeper into their balance sheet, AMG has dramatically reduced their debt levels and obligations to creditors. This debt reduction initiative began in 2011, when they concluded that there were warning signs in the global economy. The net debt at the time was close to \$220 million<sup>3</sup> when they decided to begin putting austerity measures in place. This debt reduced to \$112 million in 2015.

During the austerity period, capital expenditures reduced (along with working capital and debt) to generate free cash flow to pay off debt. Also, in the income statement, it is clear that revenue has consistently decreased from \$1.35 billion in 2011 to \$977 million in 2015. This revenue decrease is off-set by significantly decreasing SG&A levels from \$171 million to \$122

<sup>&</sup>lt;sup>3</sup> AMG 2015 Annual report page 6

million in the same period. The operating expenses have also reduced dramatic fashion from their 2013 values (from 204 million to 124 million). This reduction was followed with fairly constant operating margins, which demonstrates company stability and management quality during a difficult transition period.

#### Value Driver Assumptions:

The most noticeable line items are the revenue growth, negative change in working capital, and the extremely low capital expenditures (CAPEX) compared to D&A. Revenue growth has been negative for the last four years, averaging a 7.75% decrease a year. Capital expenditure has decreased significantly since 2012 (from 5.85% to 0.66%), averaging 1.62% in the last 4 years, while D&A has averaged around 2.73% the last 5 years (which justifies the revenue decrease). Change in working capital has also been exceptionally negative peaking at -44.89% in 2014 and averaging -31.33% over the last 4 years. We believe this reflects the austerity measures put into place and it should come as no surprise that these values decreased.

With these values in hand, we forecast that CAPEX will slowly increase to the average D&A of 2.73% (in order to sustain the company's revenue and assets), and change in working capital will equilibrate or flatten out after a couple years (as shown in the DCF tab of the accompanying spreadsheet). As metal prices start to rise, and as the CAPEX is increased, AMG will be able to sustain a stable 0% revenue growth. It should be noted that this is a very harsh scenario, assuming very little rebound in metal prices.

To consider how the company would have performed without austerity, we performed a parallel analysis where we assumed a net finance cost of 1.86% of revenue (as this was the average of 2011 and 2012 before the austerity to reflect increased debt load). I also assumed working capital to be zero, and assumed CAPEX to be 5.85% of revenue (which is the capital expenditures value in 2012 before the reduction). This analysis will allow us to ascertain how the company may have performed without the presence of the austerity measures.

#### **Monte Carlo Scenarios:**

In doing the Monte Carlo simulations, we chose different scenarios in order to evaluate the estimated share price. These different scenarios were an attempt to show how the company is valued, as well as how it would be valued without the austerity measures put in place in 2013 (originally beginning in 2011 with debt reduction). The estimated mean value of AMG (with the austerity measures taken into account) is \$14.33, which is a 33.6% gain over the current share price (as of April 19<sup>th</sup>; Figure 7 below). We would like reiterate that these simulation results are reflecting a scenario where metal prices are depressed and AMG's top-line is completely flat. Even with these harsh assumptions, AMG has demonstrated a resilient free cash flow level that is most likely the result of the austerity measures.



Figure 7 – Results of the Monte Carlo simulation on AMG. In the left half is the binned probability distribution (pink values are below the current price, and blue are above). In the right half are the descriptive statistics of the simulation including the percentiles on the bottom.

To directly compare results, we repeated the analysis without austerity measures which led to an estimated mean share price is \$-0.98 (109.13% loss over the share price). This analysis suggests that without the austerity measures, and changes that were put into place, the company's free cash flows would have been unsustainable.



**Figure 8** – Results of the Monte Carlo simulation on AMG without Austerity measures. The figure key and description is identical to figure 7.

## **Competition:**

It is worth noting that AMG has competition from any other mining or chemicals companies (specifically in the Materials sector, chemicals industry, and specialty chemicals sub-industry). Examples of these include Dow Chemicals, DuPont, Covestro AG (coatings, adhesives, polyurethanes as thermal insulation), Koninklijke DSM (engineering plastics and coatings) and Nitto Denko Corp (tapes, vynels, insulation, other chemicals/materials). These are worth mentioning because they may increase competitive pressures and thus pricing power and this will decrease margins in the future.

## **Management Compensation:**

Management is paid in 3 main categories: base salary, annual bonus, and option compensation. The base salary of the management board members were determined by the Supervisory Board. This number has a large range for different members, for example Amy Ard earns \$500,000 base, Eric Jackson earns \$611,000 base, and Dr. Heinz Schimmelbusch earns 1.028 million base a year.

The short term incentive plan provides the annual bonus for board members. The annual cash bonus depends on 3 factors: Return on Capital Employed (ROCE), Operating Cash Flow and Individual performance. These are proportioned at 40%, 40% and 20% respectively. The target short term incentive and actual payout (based as a % of base salary) differed with different members. Dr. Heinz Schimmelbusch was payed 110%, Eric Jackson was paid 84%, and Amy Ard earned 77% of her base salary. The company's ROCE was below the annual target, while the operating cash flow was significantly above the target set. ROCE is the company's earnings before interest and taxes (EBIT) divided by capital employed. Capital employed is fixed assets plus working capital required. We believe these financial metrics help incentivize management to be shareholder friendly.

The peer group used for benchmarking is shown below in Figure 9:

- 1. Allegheny Technologies Incorporated
- 2. Ametek, Inc.
- 3. Castle (A.M.) & Co.
- 4. Bodycote plc
- 5. Cabot Corporation
- 6. Carpenter Technology Corporation
- 7. First Solar, Inc.
- 8. Ferroglobe plc (formerly Globe Specialty Metals Inc.)
- 9. Commercial Metals Company
- 10. HudBay Minerals Inc.
- 11. KEMET Corporation
- 12. Lundin Mining Corporation
- 13. Materion Corporation
- 14. Morgan Advanced Materials plc [formerly Morgan Crucible Company plc]
- 15. OM Group, Inc."
- 16. Outotec Oyj
- 17. Pfeiffer Vacuum Technology AG
- 18. Precision Castparts Corp.
- 19. PVA TePla AG
- 20. RTI International Metals, Inc.

Figure 9 – Peer groups used for benchmarking for AMG. Source: AMG Annual Report 2015 Page 35

The long term incentives were given to Management Board members as the AMG Option Plan (which was introduced in 2007). The option table in Figure 10 summarizes these values.

AMG OPTION PLAN		N	ION-VESTED	VESTED OPTIONS UNDER THE PLAN				
FOR THE YEAR ENDED DECEMBER 31, 2015	YEAR	DATE OF GRANT	NUMBER OF OPTIONS	PRESENT VALUE AT DATE OFGRANT (€)	VESTING	EXERCISE PRICE [6]	NUMBER OF OPTIONS	MARKET VALUE AT 12/31/2015 (€)
Dr. Heinz Schimmelbusch	2007	07-07-11	-	2,700,000	25% each yr over 4 years	24.00	225,000	-
	2008	08-11-12	-	846,665	25% each yr over 4 years	12.70	133,333	-
	2009	09-05-13	-	661,852	100% vested on 1/1/10	8.00	165,463	168,772
	2009	09-11-10	-	500,000	50% vested after 3 years, 50% vested after 4 years	9.84	101,626	-
	2010	10-05-12	-	249,999	50% vested after 3 years, 50% vested after 4 years	7.99	62,578	64,455
	2011	11-05-11	-	500,000	50% vested after 3 years, 50% vested after 4 years	15.08	66,313	-
	2012	12-05-15	77,676	500,233	50% vested after 3 years, 50% vested after 4 years	6.44	77,676	200,404
	2013	13-05-03	79,400	270,000	50% vested after 3 years, 50% vested after 4 years	6.80		n/a
	2014	14-05-08	78,865	340,000	50% vested after 3 years, 50% vested after 4 years	7.82	-	n/a
	2015	15-05-07	76,341	340,000	50% vested after 3 years, 50% vested after 4 years	8.08	-	n/a
EricJackson	2007	07-07-11	-	1,200,000	25% each yr over 4 years	24.00	100,000	-
	2008	08-11-12	-	254,000	25% each yr over 4 years	12.70	40,000	-
	2009	09-05-13	-	383,116	100% vested on 1/1/10	8.00	95,779	97,695
	2009	09-11-10	-	150,001	50% vested after 3 years, 50% vested after 4 years	9.84	30,488	-
	2010	10-05-12	-	74,998	50% vested after 3 years, 50% vested after 4 years	7.99	18,773	19,336
	2011	11-05-11	-	150,001	50% vested after 3 years, 50% vested after 4 years	15.08	19,894	-
	2012	12-05-15	23,303	150,071	50% vested after 3 years, 50% vested after 4 years	6.44	23,303	60,122
	2013	13-05-03	26,467	90,000	50% vested after 3 years, 50% vested after 4 years	6.80	-	n/a
	2014	14-05-08	23,196	100,000	50% vested after 3 years, 50% vested after 4 years	7.82	-	n/a
	2015	15-05-07	22,453	100,000	50% vested after 3 years, 50% vested after 4 years	8.08	-	n/a

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Note: Given that Amy Ard provided her intent to resign prior to December 31, 2015 and all options granted to her between 2013 and 2015 are unvested and therefore forfeited, option information is no longer meaningful.

Figure 10 – Table detailing AMG's option plan for specific executives. Source: AMG Annual Report 2015 Page 36

The Board Members were also awarded Performance Share Units (PSUs). The present value of the PSUs is calculated as 100% of the fair market value at the grant date. They have a 3-year vesting period, are subject to a minimum average ROCE over the performance period (as chosen by the supervisory board), and are subject to the relative Shareholder Return (TSR)

compared to the Bloomberg World Metal Fabricate/ Hardware Index. In 2014 (2011's PSU payouts), the PSUs were not paid out because the relative TSR did not meet requirements so the multiplier was 0. The current PSUs issued in 2015 were as follows: Dr. Heinz Schimmelbusch received E1,360, Eric Jackson received E400, and Amy Ard received E360.

(in thousands)					RETIREMENT	OTHER	VALUE OF VESTED OPTIONS
FOR THE YEAR ENDED DECEMBER 31, 2015	BASE SALARY	ANNUAL BONUS	OPTION COMPENSATION	PERFORMANCE SHARE UNITS	BENEFITS & PENSIONS	REMUNER- ATION	"IN THE MONEY" AT DEC. 31, 2015
Heinz Schimmelbusch	1,028	1,121	426	2,502	267	101	473
Eric Jackson	611	511	130	769	338	59	193
Amy Ard	500	387	(80)	142	[330]	15	_

The summary of all compensation is shown in the table below.

#### Source: AMG Annual Report 2015 Page 34

The renumeration of the supervisory board in 2014 is shown below. The members of the Supervisory Board receive remuneration in the form of cash and shares.

FOR THE YEAR ENDED DECEMBER 31, 2015	ROLE	CASH REMUNERATION	SHARE REMUNERATION	# OF SHARES GRANTED
Norbert Quinkert	Chairman & Selection and Appointment Committee Chair	\$103	\$57	6,561
Jack Messman	Vice Chairman & Remuneration Committee Chair	\$90	\$44	5,136
Guy de Selliers	Member & Risk Management Committee Chair	\$80	\$39	4,494
Martin Hoyos	Member & Audit Committee Chair	\$80	\$39	4,494
Steve Hanke	Member & Member Risk Management Committee	\$60	\$43	4,994
Herb Depp	Member & Member Remuneration Committee	\$60	\$43	4,994
Donatella Ceccarelli	Member & Member Selection & Appointment Committee	\$60	\$43	4,994
Robert Meuter (from May 7, 2015)	Member & Member Audit Committee	\$39	\$28	3,230
Petteri Soininen* (from May 7, 2015)	Member & Member Remuneration Committee	-	-	-
Pedro Pablo Kuczynski [through May 7 , 2015]	Chairman & Member Selection & Appointment Committee	\$33	\$23	2,716
Ute Wolf [through May 7, 2015]	Member & Member Audit Committee	\$21	\$15	1,764

\* Messr. Soininen waived all remuneration given his non-independent director status

Source: AMG Annual Report 2015 Page 31

## **Multiples:**

It behooves us to consider what the current multiple of AMG is when proposing an investment thesis. The reason for this exercise is that most other equity analysts incorporate some form of this analysis. The trailing 12-month price to earnings (P/E) ratio is 25.61 and the forward 12 month P/E ratio is 17.21. The earnings per share (EPS) is \$0.41 therefore the estimated share price based on the P/E \*EPS method is \$10.50 comporting with our suggestion that AMG is undervalued on a fundamental and relative basis.

# **Insider Trading:**

The percentage of shares held has steadily increased by insiders, thus mitigating concerns that management is selling off shares. We actually view this increased ownership as a positive sign for potential investors suggesting that management believes in the company they work for.



Figure 11 – Insider trading activity for AMG. Source: Bloomberg Terminal (function <GPTR>)

## **Conclusion:**

Using the HGDCF, and a Monte-Carlo simulation, I have concluded that the current stock price of AMG is undervalued based on the estimated free cash flows. This is based on a very conservative no-growth stable company, where the capex is equal to the D&A. Not only does the estimated share price project an increase in stock price, but management compensation is also well-aligned with the shareholders, and metal prices are expected to increase in the future. According to the Monte-Carlo analysis, I estimate the share price to be \$14.37. With commodity prices being at a trough, and AMG creating free cash flows through these tough times, I believe now is a great time to buy AMG.

# **Supplements:**

## **Metal Supplement:**

<u>Ferro-vanadium</u>: This metal is an alloy that is created by combining vanadium and iron. Ferro-Vanadium is used as a universal hardener, anti-corrosive and a strengthener for high-strength and low-alloy steel.

<u>Molybdenum</u>: This metal is mostly obtained from molybenite, wulfenite, and powerllite, which are often mined in conjunction with tin and tungsten. Because of molybdenum's high melting point, it is often used to make electrodes of electrically heated glass furnaces. It is also commonly used in making missiles and aircrafts, along with a use in the nuclear power industry.

<u>Antimony</u>: The main use of antimony is as a hardener for batteries, along with some application for solders and as a flame-retardant. Antimony is often alloyed with lead to increase the durability, and is finding new uses in semiconductor devices.

<u>Niobium</u>: This metal is used mainly as an alloying agent, but also has application in the superconductivity field. When niobium and titanium are mixed into an alloy, superconductive wire is created.

<u>Tantalum</u>: This metal is used to make a lot of components for chemical plants, nuclear plants, airplanes and missiles. Tantalum is a strong metal, and is often alloyed with steel to increase its steel and melting temperature.

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**Supplementary Figure 1** – Share performance history over the past year. Source: Bloomberg Terminal (function <GP>)



**Supplementary Figure 2** – AMG's stock performance versus the AEX index over the past year. Source: Bloomberg Terminal

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AMG NA	€ <b>↓ 9.2</b> 2	26	+.032	<b>۲ سرمیم</b> ۱۹۹۵ م	~~~	A9.197	/9.2	226 A	2	201	x 211	15				
At 1	1:3/ 0 0	1 30	,/34 0	9.25A	Η9.	25 A	L 9.	151 A	val	. 2	83,0	179			1.00	
AMG NA Equ	nty	95) P	Actions	96) AL	ert						Analy	∕st I	Recon	nmen	datio	ns
AMG Advanced	Metallurgical Gro	oup NV											As	of 0	4/12/1	16 🗄
Consensus Rat	ing	4.50	6	5M 11		2Y 5	Υ	Max								<b>.</b>
Buys	75.0%	3	100 - 12	N Tgt Px 10.75											4	-11.0
Holds	25.0%	1	80 - 10	kiy							11					-10.0
Sells	0.0%	0	60 - 85	ell										$ \rightarrow $	$\sim$	<b>-9.00</b>
			40-				<b>-</b> 7		$\sim$	$\sim$			~``	$\sim \sim$		8.00
12M Tgt Px	4/4	10.75	20-	$\sim\sim$	$\sim$		$\gamma$				V.	7				7.00
Last Price		9.23	0-			$\sim \sim$	$\sim$				$\sim$	′				- 6.00
Pricing Current	cy	EUR	De la compañía de la comp	ion Spread (Tot	- Pv) 152						0		~		_	- 0.00
Return Potenti	31	16.5%	2.00			$\sim$	$\sim$	_		~~	/	$\sim$	$\sim$	-	$\sim$	
LIM Return		3.8%	0.00 - Apr	Jun Jul	Aug Sep (	ct Nov Dec J	lan Feb I	Mar Apr N	lay Jun	Jul	ug Sep	Oct N	ov Dec J	an Feb	Mari	
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Showing 5 of 3	sources		0 m mly cont		Decer	mondatia			Fat Dy	-	Dista	+ 1		DADE	Daal	
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**Supplementary Figure 3** – Analyst recommendations for AMG. Source: Bloomberg Terminal (function <ANR>)



#### The figures below show where each type of metal or alloy is produced.

Source: AMG 2015 Annual Report