

A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance from the
NOVA – School of Business and Economics.

FAST AND FUEL-EFFICIENT PRODUCTION AHEAD
AIRBUS

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Abstract

Airbus is one of the top multinational companies in the Aerospace and Defence sector. The firm manufactures aircrafts, helicopters and defence and space related products. The investment recommendation derived from the performed research for Airbus SE is buy, as result of the 2020 target price of 156.64€ per share. This in line with an estimated cash dividend of €1.40 and an implicit return on investment of 19.97%. The company is looking forward to producing faster and build fuel-efficient aircrafts. Airbus' backlog is high when compared to its competitor Boeing. Airbus reported 7,471 jets while Boeing backlog was 5,675 jets.

Keywords

Airbus, Valuation, Fuel-Efficiency, Aircrafts, Aerospace, Defence

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AIRBUS SE

AEROSPACE & DEFENCE

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COMPANY REPORT

3 JANUARY 2019

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Fast and Fuel-Efficient Production Ahead

Leading the longest flight in history

- The investment recommendation derived from the performed research for Airbus SE is **BUY**, as result of the 2020 target price of **156.54€ per share**. This in line with an estimated cash dividend of €1.40 and an implicit return on investment of 19.97%.
- Airbus is one of the top multinational companies in the Aerospace and Defence sector. The firm manufactures aircrafts, helicopters and defence and space related products. The company sells mostly to America, Asia and Europe.
- Air traffic doubles every 15 years, and emerging countries are now increasing their demand for commercial aircrafts.
- Airbus jets are going to be the leaders in doing the longest flight ever done for the "Project Sunrise". The company is also looking forward to producing faster and build fuel-efficient aircrafts.
- The company's risks are related to its correlation with the economy health, political issues (Brexit) and war (defence sector).
- Airbus' backlog is high when compared to its competitor Boeing. Airbus reported 7,471 jets while Boeing backlog was 5,675
- In an extremely competitive sector, Airbus' revenues, for all segments are forecasted to grow at a 10 years CAGR of 1.27%.
- With 52 weeks to date characterized by big falls (last quarter 2018) and incredible recoveries (first quarter 2019) in global equities, Airbus' stock was able to rapidly offset the Q4 2018 shortfall having a 23.9% annualized volatility in its share price.

Recommendation: BUY

Price Target FY20: 156.54 €

Price (as of 4-Jan-20) 130.48 €

Reuters: AIR:PA, Bloomberg: AIR-FN

52-week range (€) 83.10-136.40

Market Cap (€m) 65,130

Outstanding Shares (m) 775.731

Other (...)

Source: Bloomberg



Source: Yahoo Finance

(Values in € millions)	2018	2019	2020
Revenues	63,707	65,244	66,140
EBITDA	7,053	6,942	6,750
Net Profit	3,335	3,371	3,245

Source: The authors, Company Report

THIS REPORT WAS PREPARED EXCLUSIVELY FOR ACADEMIC PURPOSES BY ANA MADEIRA AND JOÃO AVEIRO, MASTER IN FINANCE STUDENTS OF THE NOVA SCHOOL OF BUSINESS AND ECONOMICS. THE REPORT WAS SUPERVISED BY A NOVA SBE FACULTY MEMBER, ACTING IN A MERE ACADEMIC CAPACITY, WHO REVIEWED THE VALUATION METHODOLOGY AND THE FINANCIAL MODEL. (PLEASE REFER TO THE DISCLOSURES AND DISCLAIMERS AT END OF THE DOCUMENT)

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Executive summary

AIRBUS

Airbus is a worldwide company that manufactures products for the aerospace, defence, military and space sectors. The company was founded by F. Kracht, R. Béteille, F.J. Strauss, and H. Ziegler. With its current CEO being G. Faury.

Airbus owns the world's largest passenger aircraft and it has delivered more than 12,000 aircrafts. The company is listed in CAC40, MDAX 50, EURO STOXX 50, MSCI World, FTSE All-World, MSCI A&D indices.

The Aerospace and Defence sector is the one that mostly reflects changes in the economy. The correlation coefficient is 0.9948 between the amount of air passengers and GDP. Consequently, if GDP increases, then revenues in the sector are going to evolve positively. This is at the same time a **risk** that Airbus faces. When the economy enters a recession, Airbus revenues will decrease. Now the sector is being influenced by the increased investments in defence of several countries, for example in the U.S. Besides, it is also reflecting the evolution of emerging countries. Due to the increased GDP per capita and the wider distributions of wealth within these countries, a large middle class is arising in emerging countries. Therefore, large parts of the population in emerging countries will finally be wealthy enough to be able to use air transportation.

Airbus has been one of the vocal about the risks of Brexit. The firm employs 14,000 people in the U.K. and has its wing production based there. It would be highly risky to change the production of one of the most complex components of an aircraft to another country. This is one example of the risks the company has to be aware of due to its correlation with the economy and the world.

For 2020, Airbus aims to invest more in R&D since the company is competing for "project Sunrise" and it is trying to manufacture the most fuel-efficient aircraft. As faster and more fuel-efficient jets reduce costs and pollution for airlines, it is expected that demand for these new aircrafts is going to increase.

Using a DCF valuation it is possible to understand that Airbus' share price is **undervalued**. According to our valuation, the market is not properly valuing the future sale of **fast and fuel-efficient jets**, which allow **longer flights** as well as the continuous growth of air passengers in **emerging countries**.

Company overview

Company description



Exhibit 1: Airbus Segments
Source: Company Report

Airbus is a global company that operates in the Aerospace and Defence sector. It is registered in The Netherlands, however, its main manufacturing site is located in Toulouse, France. The company manufactures aircrafts, helicopters, defence and space products. Airbus SE is owned by a European Aerospace company called EADS, it is being managed by the CEO Guillaume Faury and is the owner of the world's largest passenger plane, the A380. Its shares are listed on the Paris, the Frankfurt and the Spanish Stock Exchange.

Airbus is considered a **large** firm. It employs around 136,343 people (which are all divided between their six geographic segments - Europe, North-America, Latin-America, Oceania, Africa & Middle East, and Asia), its annual revenue has been on average €62,895. When compared to Boeing, Airbus has reported lower revenues and net earnings between 2014 and 2018.

Airbus can be considered a **healthy** company. When looking to the company's financial statements, we can understand that between 2014 to 2018, non-current assets (€56,564 for 2018) are larger than non-current liabilities (44,693 for 2018). Although, current liabilities (€60,354 for 2018) are larger than current assets (€58,300 for 2018), the difference is not significant. Airbus registered a profit for all the periods between 2014-2018, with 2018 being its most profitable year with a Net Operating Income of €3,011.¹

When looking to Airbus' ratios, it is important to stress that the company has a **capital structure** on average of 15,75. Airbus finances itself with more debt than equity, what allows the firm to save up on taxes. It could be the case that the company has a high probability of not meeting its debt obligations, although, due to its healthy financial history that might not be the case. Boeing's capital structure is on average 116,30, meaning that Boeing finances itself with a higher percentage of debt than Airbus. Airbus' **shareholder equity ratio** is 7% meaning that the company depends a lot on debt. Boeing's shareholder equity ratio is on average 2.4%, meaning that Airbus has more assets financed with equity than Boeing. Airbus' **retained earnings** decreased from December 2018 (€ 5,923 million) to June 2019 (€ 3,377 million), meaning that there is less money available for Airbus to expand its activities.²

¹Airbus financial statements

²Bloomberg

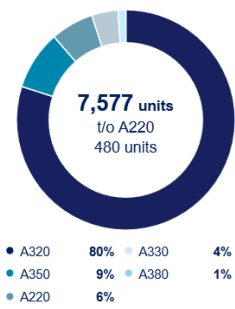


Exhibit 2: Airbus Sales of Commercial Aircrafts
Source: Company Report

Airbus operates in three main segments: **commercial aircraft, helicopters and defence & space**. Airbus is a leader in the aerospace sector, it is the 2nd largest space company and is part of the top 10 defence companies.

In the **Commercial Aircraft segment** Airbus manufactures aircrafts ranging between 100 to 600 seats. Their portfolio contains passenger aircrafts, corporate jets, freighter aircrafts and previous-generation aircraft. Airbus best seller is the A320 family aircraft that has reached 15,193 deliveries. The company achieved a new commercial aircraft delivery record in 2018 by delivering 800 commercial aircraft (A220, A320 family, A330, A350, A380) to 93 customers. Airbus orders per year have been decreasing since 2017 (1207). The company registered 831 net orders in 2018 and 542 orders until October 2019. Since 2012, Airbus has been having more orders per year when compared to Boeing (Defence & Security Monitor).³

	A300/A310	A220/A320	A330/A340/A350	A380	Total
Total orders	816	15320	3041	290	19467
Total deliveries	816	9117	2162	239	12334
Aircraft in fleet	308	8691	1995	237	11231

Exhibit 3: Airbus Sales of Commercial Aircrafts
Source: Company Report



Exhibit 4: Helicopter Segment Division
Source: Company Report

Regarding the **Helicopter segment**, Airbus aims to deliver the most efficient helicopters to its customers. The company portfolio consists of civil, military, pre-owned and ACH helicopters. Airbus helicopters are used in more than 150 countries all over the world and are in service by more than 160 armed forces worldwide. After the delivery of one of their helicopters occurs, Airbus ensures that the customer receives the necessary post-sale support and service.⁴



Exhibit 5: Defence and Space segment division
Source: Company Report

Airbus is Europe's best performer in the **defence segment** and is between the top 10 defence companies worldwide. Regarding defence, the company portfolio contains the A400M MRTT, Eurofighter and C295. The company believes that in the future we will benefit from the value of space. Airbus supplies electronic systems, telecommunications platforms, scientific satellites and many other technologies. Airbus Defence and Space has over 30 years of experience with in-orbit operations, its first Earth observation satellite was launched in 1986.⁵

One of the company's dependent variables is **oil price**. Oil prices effect the demand for aircraft mainly because, higher oil prices are passed on to customers by airlines. Therefore, higher oil prices often mean higher prices



Exhibit 6: Crude oil price evolution (dollars per barrel)
Source: U.S. Energy Information Administration

for customers. These higher prices reduce the demand for air traffic and consequently the airlines will have a lower need for aircraft. However, it is not always as simple as this since higher oil prices could potentially mean increased demand for some fuel-efficient models such as Airbus' A320neo. In order to deal with the differences in oil prices and consequently changes in demand for aircrafts, the company has a backlog of orders that supports production plans. That backlog is managed proactively to identify and respond to potential risks. The short-term order book allows Airbus to reallocate aircrafts between customers. Besides, the firm is conscious about production and maintains overbooking in order to hedge against unpredictable events, while meeting its delivery obligations.

Regarding taxes, as Airbus is a multinational enterprise that operates in different jurisdictions meaning that the firm is subject to different tax laws, therefore, Airbus is taxed in a compliant manner everywhere it creates value. Airbus is registered in The Netherlands, consequently the company also pays taxes there. Thus, the income taxes reflected in the income statement reflect the rules defined by the tax authorities in The Netherlands. In general, companies in The Netherlands are subject to 25% corporate tax on its global profits. In 2004, France, Germany, U.K. and Spain signed a quadrilateral advance pricing agreement (APA) covering the commercial aircraft activity in order to avoid double taxation.⁶

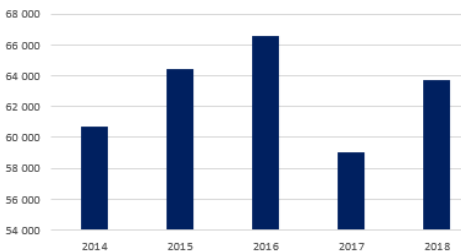


Exhibit 7: Airbus Revenues Evolution in € millions
Source: Company Report

For the future, Airbus aims to innovate in order to contribute to the world's progress. The company has devoted itself to the "Flightpath 2050", which is a plan to reduce noise, CO₂ and NO_x emissions from companies in the A&D sector. Aligned with this, the firm was the first aerospace company becoming ISO 14001 certified, which demonstrates that the organization fulfils the requirements for having put in place an effective environmental management system.



Exhibit 8: Airbus' revenues by geographical region
Source: Company Report

Regarding the historic **evolution of revenues** from 2014 to 2018, the company have been increasing its revenues. Although, there was decrease in revenues in 2017 due to an increase in production costs, less orders and weaker prices in Q1 of 2017. From 2017 to 2018, Airbus increased its revenues with more than 4 million euros. Another highlight is that during 2014 to 2018 revenues are mostly due to the sale of aircrafts, followed by the sale of helicopters and then military and defence. The company have been increasing the sale of commercial aircraft during the years, while sales in the other two segments have been decreasing.⁷

⁶ Airbus Website
⁷ Airbus financial statements

In 2018, when looking at the revenues generated per geographical area, Asia Pacific region and Europe are the 2 main contributors to revenues. Together they make up almost 60% of revenues. From 2014 to 2018, Asia has been increasing its revenues while Europe and Latin America have been decreasing its weight. Another country that has also been increasing its revenues along with Asia is the United States.

Shareholder structure

Airbus had 778,096,721 shares issued at 30 September 2019. The current shareholder structure of Airbus consists of mostly free float (public investors). Besides, it is also owned by governments, namely the GZBV (German state), SOGEPA (French state), SEPI (Spanish state).⁸



Exhibit 9: Airbus' shareholders
Source: Company Report

Airbus is traded on the Paris, Frankfurt and Spanish stock exchange what might be one of the reasons for the French, German and Spanish governments to still own a fairly large part of the company. Another reason could be the fact that before Airbus became known as Airbus it was known as EADS which was a merger of the following 3 companies Aerospatiale Marta, Daimler Chrysler Aerospace AG (DASA) and Construcciones Aeronauticas SA (CASA). And when EADS became Airbus Group its shares were swapped on a one-to-one basis, with the issue of additional shares. The owners of these previously mentioned companies remained as some of the bigger owners of this newly created company. Aerospatiale Marta was owned by the French government meaning that they immediately acquired a stake in Airbus when it was created. The Spanish government started investing in CASA from 1943 onwards and acquired a large stake in the company before it merged. Even though DASA was not owned by the German government they were the only aircraft manufacturer in Germany and, therefore, the German government was interested in its success even after the merger and acquired shares in order to influence the newly created merger.

Management Team

Airbus' governance disclosure score was **65.50** in 2017.⁹ Governance Disclosure Score is part of Bloomberg's ESG disclosure scores. The other parts are environmental and social. These disclosure scores do not measure ESG performance but rather measure transparency. As companies disclose more information this score will go up. Disclosure scores allow investors to judge how **transparent** a company is about its risks and opportunities. In 2014 the highest score given on a scale of 100

⁸ Airbus Website
⁹ Bloomberg

was 89 and the lowest was 1 indicating that Airbus is transparent having a score of 65.50.

The company board structure is formed by 12 people of which 25% are women. Airbus' board independence is high. There are 11 non-executive directors on board and 11 independent directors.¹⁰ There is no CEO Duality and at least one independent chair person. The board average age in 2018 was 59 years old. In 2018, Airbus hired the German Dominik Asam as CFO. This new hire rebalanced the national balance at the company. Both the French and German government are big shareholders of Airbus and this is reflected in the chief executives that the company contracts, there tends to be a balance between French and German people for these positions.¹¹

Dividend Policy

Airbus dividend policy is important for valuation purposes since theory suggest that investors value current dividends more than uncertain cash flows in the future and Airbus dividend policy has been demonstrating a devotion to shareholders' returns. The company follows a target **payout ratio of 30%-40%**¹², what is considered a low payout ratio when compared to its peers Boeing and Lockheed Martin that have a payout ratio of 43% and 41%, respectively. Now (02/01/2020), the company has a **dividend yield of 1.27%**, which is considered a low yield when compared to its biggest competitor Boeing that has a dividend yield of 2.41%. The peer companies considered in this report have a dividend yield on average of 2.15%. Despite of this, Airbus' dividends are considered stable and have been growing for 8 years. It's a good sign that Airbus has growing earnings per share (of around 16% over the last five years) and steady dividends.

Gross Dividend in €

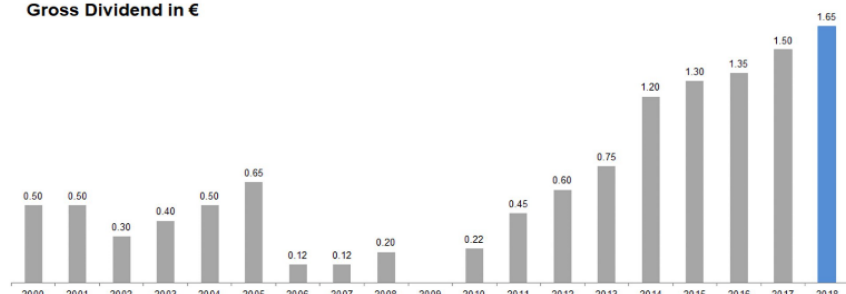


Exhibit 10:
Airbus gross dividend evolution
Source:
Company Report

Share Performance

Airbus is listed in CAC40, MDAX 50, EURO STOXX 50, MSCI World, FTSE All-World, MSCI A&D indices. In the beginning of 2014 Airbus share price was 55.28€ and now in the end of December 2019 it is being traded at

¹⁰ Bloomberg

¹¹ F. Cocco & S. Pfeifer. (2018, November, 21) Financial Times: Airbus reshuffles leadership in generational shift

¹² Airbus website



Exhibit 11: Airbus Stock Evolution
Source: Yahoo Finance

130.48€. This means that there was such a huge increase in the company share price and that the company value in the market is higher. This increase is also correlated to the expansion of the economy as we can see from the increase in the indices in which Airbus is being traded.

Between 2013 and the beginning of 2015, Airbus outperformed the market, although after that the company underperformed the market when compared to the MSCI.

When compared to its peers, Airbus outperformed its biggest competitor Boeing until 2017. After that, Boeing outperformed Airbus, although this situation is very close to be reverted. Thales has been outperforming Airbus and Boeing until the end of 2017. We can see that the companies of the Aerospace and Defence sector have ups and downs at the same time. For example, in the end of 2019, all companies saw a decrease in their share price due to slow down of the economy.

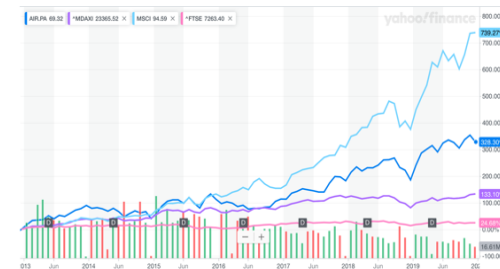


Exhibit 12: Airbus stock price VS. Market
Source: Yahoo Finance

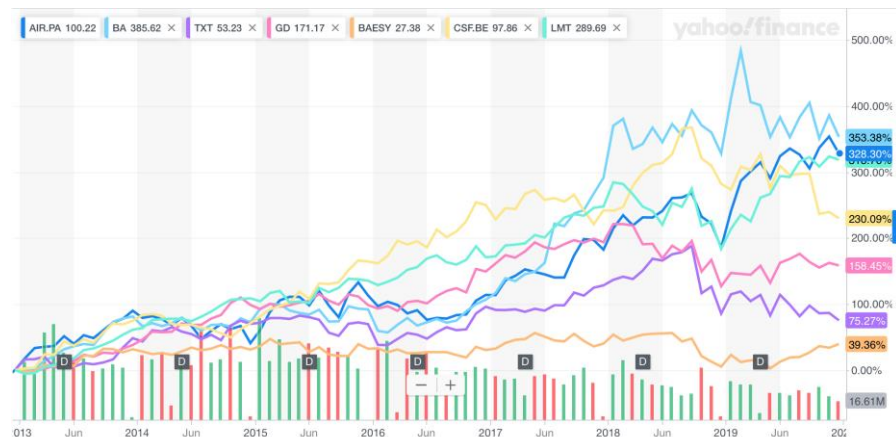


Exhibit 13: Airbus and its competitors stock performance
Source: Yahoo Finance

The Sector

According to the AeroDynamic Advisory and Teal Group Corp. the aerospace industry is worth an estimated **US\$ 838 billion** in 2017 (with the U.S. and France making up 57% of the global aerospace industry total), this means that the industry is considered as being one of the most powerful and biggest in the world.¹³ The aerospace sector is divided between aeronautics and space. Besides, it includes five different markets: commercial airliners, general aviation, missiles, space and military aircrafts. It's estimated that this sector employs around 500,000 people in technical jobs and around 700,000 people in related businesses.

It is estimated that there are on average around 102,465 flights per day. Despite this, it is expected that this number will continually increase due to the rise of the global population in urban areas, an increasing middle class

Ranking	Country	Industry Size (\$B)
1	United States	\$408.4
2	France	\$69.0
3	China	\$61.2
4	United Kingdom	\$48.8
5	Germany	\$46.2
6	Russia	\$27.1
7	Canada	\$24.0
8	Japan	\$21.0
9	Spain	\$14.4
10	India	\$11.0

Exhibit 14: 2017 Global Aerospace Industry – Top 10 Countries
Source: AeroDynamic Advisory and Teal Group

¹³ Bloomberg

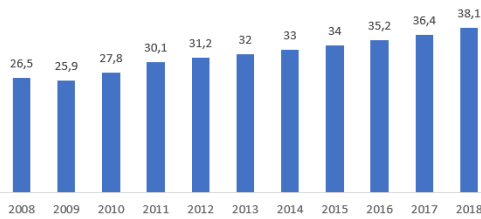


Exhibit 15: Number of flights by the global airline industry in millions
Source: Statista

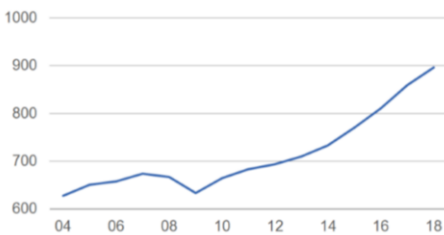


Exhibit 16: Global CO₂ emissions of the airline industry, million tonnes
Source: IATA

in emerging countries, as well as the increase in net routes added each year since 2000. During 2018 the sector remained stable since both the global military expenditure and the demand for passenger air travel continued to increase. In 2019, commercial aerospace went through a short descent with estimated lower aircraft deliveries than in 2018 since production rates decreased for some aircraft models. In 2020-2021 deliveries are expected to return to the right path.¹⁴

The amount of **emissions** that aircraft's produce is considered to be one of the industry's biggest concerns. According to the European Commission, a person flying from New York to London produces the same amount of emissions as an individual heating its house throughout an entire year.¹⁵ Due to the fact that the number of flights per year is expected to keep growing, the level of emissions is expected to be 70% higher than in 2015 by 2020. Besides, another concern of the sector is to produce **fuel-efficient aircrafts** due to the rise in oil prices. In 2020, leaders in the A&D leaders established three main goals: achieve 1.5% fuel efficiency improvements, stabilise CO₂ emissions and reduce to 50% emissions by 2050¹⁶.

Cyber security is another concern in this sector. Until now, there is no known accident driven by a cyber-attack and this is due to regulation. After the first hijacking of a commercial aircraft, security has been of top priority for the regulators. Another preoccupation is related to the fact that A&D is one of the biggest exporting industries in the U.S. it generated a net trade surplus of US\$86 billion in 2017. However, the increasing transatlantic and transpacific trade tensions might have a significant impact on this sector due to import tariffs on aluminium and steel, both important materials for the production process of most products. A potential result from this are higher manufacturing costs and lower profitability and a potential solution for A&D companies is to move their manufacturing locations to avoid tariffs.

A couple of large companies and several partnerships dominate the Aerospace. The U.S. is the country where six of the eleven largest aerospace companies are based. The U.S. is followed by France, China, United Kingdom and Germany. The ten biggest companies in this industry are: Boeing, Airbus, Lockheed Martin, United Technologies, GE aviation, Northrop Grumman, Raytheon, Safran, BAE Systems, Rolls-Royce Holdings and Leonardo.

¹⁴ Deloitte. (2019). *2020 global aerospace and defense industry outlook*

¹⁵ European Commission. (n.d.). Reducing emissions from aviation

¹⁶ Air Transport Action Group. (2018). *Powering global economic growth, employment, trade links, tourism and support for sustainable development through air transport*

Research and development is a key activity for manufacturing business due to the need of constant innovation in technology. Although, the Aerospace and Defence industry does not spend a lot on R&D when compared to other industries such as industrials, software & internet and auto

Mergers and Acquisitions (M&A) are also an important part in the Aerospace and Defence sector. Many companies try to go beyond their market, try to expand their product portfolio and create new opportunities through M&A and partnerships. For example, recently the merger of two big communications and electronics contractors happened, and this was one of the biggest mergers in the defence sector. In addition, prime contractors usually acquire small companies in order to have access to new technologies and markets such as Asia and the Middle East. In 2018, M&A activity registered the third highest value deal by reaching \$57.8 billion in 2018. One of the impacts of M&As, due to investment in emerging technologies, for the sector is the increasing competition from adjacent industries, for example software. Due to recent mergers and acquisitions the sector is already very consolidated, this is supported by the fact that only the 10 biggest companies within this industry generate 86% of its revenues. Therefore, very big mergers are very unlikely to happen in the future, however, joint ventures and acquisitions of small companies are still likely to happen as this is the easiest way for companies within the sector to expand their product portfolio in 2016 almost half of all mergers and acquisitions within the aerospace and defence industry were driven by product expansions.¹⁷

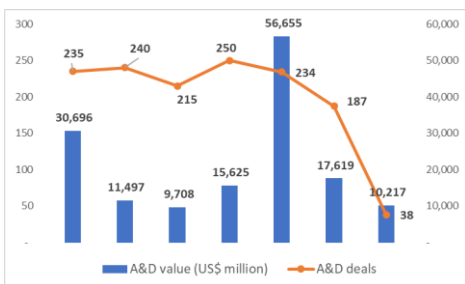


Exhibit 17: A&D deals VS. M&A deals
Source: EY

1	Raytheon	86.8	22.1x
2	Inmarsat	5.5	7.6x
3	WestJet	4.9	12.1x
4	LORD Corporation	3.7	16.5x
5	Hispasat	1.5	8.3x
6	Forgital	1.1	10.2x
7	KeyW	0.9	24.4x
8	LGS Innovations	0.8	10.0x
9	Bombardier (CRJ Program)	0.8	
10	Hong Kong Express Airways	0.6	
Total (implied TEV - \$ billion)		106.6	
Total (TEV/EBITDA - weighted average^a)		18.5x	

■ Enterprise value (TEV)
◆ TEV/EBITDA multiple

Exhibit 18: Top A&D deals in first half of 2019
Source: AlixPartners

During 2018 there was a peak in **backlog**, although, it is expected that production rates will increase, with around 38,000 aircrafts expected to be manufactured during upcoming 20 years. In 2018, Boeing has seven years of backlog while Airbus has nine years of production.¹⁸

While the demand for wide-body aircrafts is decreasing, the demand for commercial aircrafts is rising. As a consequence, various new manufacturing programs, mainly Chinese and Russian programs, are arising from outside the U.S. and the EU. These new entrants may face difficulties in competing against the current duopoly in the long term. The challenges when entering in the A&D sector are related to the procurement of orders from global airlines, managing costs and schedule overruns and acquiring certification from regulators and having a reliable track record.

¹⁷ Deloitte. (2017). *Merger and acquisition trends in aerospace and defense. A closer look at value creation*

¹⁸ PWC. (2019). *Aerospace and defense: 2018 year in review and 2019 forecast* (Report No. 576178-2019).

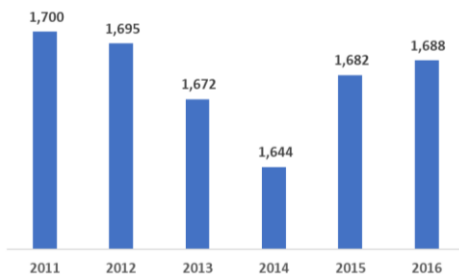


Exhibit 19: Global defence expenditure in US\$ billion
 Source: EY, Stockholm International Peace Research Institute (SIPRI)

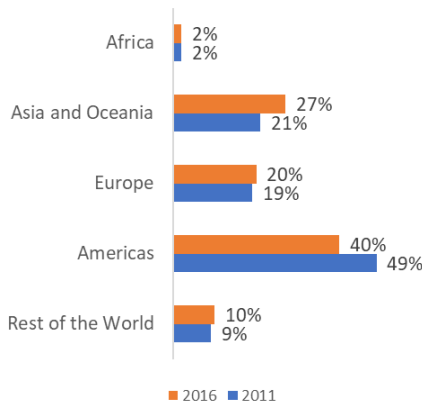


Exhibit 20: Global defence spending comparison between 2011 and 2016
 Source: EY, SIPRI

Since Trump was elected, the **defence budget** increased in the United States and also in NATO countries to counter potential threats from Russia and the Middle East. US FY20 defence budget requests around \$750 billion.¹⁹ Besides, there has been growth in defence spending from India, China, and Japan, because of enduring security threats. Geopolitical uncertainties is the factor that during the last two years resulted in an increase of 20% in defence spending.

The future of the sector might be related with new capabilities such as smart flight planning, hybrid and electric aircraft concepts. Moreover, it is expected that India and China will keep trying to grow in the commercial aerospace and defence sector while Japan is expected to grow in the defence sector. France is also expected to increase its budget for military spending to 2 percent of GDP. The Middle east spending budget on defence is expected to recover after the stabilization of oil prices. There is uncertainty regarding the United Kingdom due to the impact of Brexit on the Aerospace and Defence sector.

These expectations about the future depend on demand, the economy, on political stability and on technological innovations. Hence, It is important to keep in mind the **risks** associated with the sector - volatility and economic environment, managing the supply chain, competition in international and domestic markets, ability to perform on key contracts, compliance to regulations, innovation capacity, failure to realize the benefits of M&As and partnerships, exposure to cybersecurity attacks, foreign currency because the operation in a number of countries carries exposure to foreign currencies exchange rates.²⁰

Comparables

The Aerospace and Defence sector are dominated by Airbus and Boeing. This duopoly owns 99% of the total large plane orders which consists of 90% of the total plane market. Therefore, it is complicated to encounter peers that could potentially be compared to Airbus. Although, there are other companies that still can be considered.

Peer companies were defined based on specific characteristics in order to determine which firms could serve as good comparisons. Firstly, the companies operate in the same industry. This means that the companies have to be present in the **aerospace, helicopters and defence and space sectors**. Furthermore, companies should be similar in terms of performances and finally companies should have similar prospects for all

Company	Net Income	Revenues	Enterprise Value
AIRBUS SE	3 576	63 707	51 129
BOEING	7 960	85 702	164 529
TEXTRON	716	11 839	11 233
LOCKHEED MARTIN	4 411	45 562	75 938
BAE SYSTEMS	1 504	19 011	17 502
GENERAL DYNAMICS	2 985	31 610	49 642
THALES	1 033	15 855	18 798

Exhibit 21: Airbus' Comparables (in € millions, 2018)
 Source: Bloomberg

¹⁹ PWC. (2019). *Aerospace and defense: 2018 year in review and 2019 forecast* (Report No. 576178-2019).

²⁰ EY. (2017). *Top ten risks in aerospace and defense (A&D)*.

ROIC and growth. In accordance to the McKinney valuation book²¹, we can assume that similar assets should sell for similar prices if these conditions apply. The companies that satisfy these conditions and were considered as suitable for comparison were Boeing, Textron, Lockheed Martin, BAE Systems, General Dynamics and Thales. These companies have on average (between 2014 and 2018) a **market capitalization** of more than 10 billion and **revenues** of more than 15 billion. Besides, all of them operate in the same segment as Airbus.



Boeing is the biggest Airbus competitor. Boeing is the America's largest exporter by dollar value and has around 150,000 employees around the world. The company is much older and more established when compared to Airbus. The company share is being currently traded at around \$371.68. In 2018, Boeing reported revenues of €85,702 and its market capitalization was valued at €159,854. The company has outperformed Airbus in most areas. Boeing's revenue, pre-tax profits and earning per share are growing more than Airbus's numbers. Besides, the company is also more generous to its shareholders. In 2017 the dividends per share for Airbus were €1.65 while the share price was €96.93, Boeings dividends per share was higher being €1.71, however, its share price was also more than double the value of that of Airbus with a share price of €276.87. In total Boeing paid out €2.97 billion in dividends where Airbus paid out only €1.2 billion in dividends. Boeing has doubled its pay-out during the last years.



Lockheed Martin is also an American company in the Aerospace and Defence sector. The company is strong in the defence sector, it was the world largest company in the sector in 2014 based on revenue. Its share is being traded at \$393.55. The company declared revenues of €45,562 and Its market capitalization was valued at €64,248. This company is currently taking advantage of the increase in the budget for the defence in U.S. Which allowed them to increase dividends per share from €1.75, to €1.92 in the last quarter of 2018. The increased defense budget allowed them to increase the total amount of dividends paid in 2018 by 8.51% compared to 2017. In 2018 the total amount of dividends paid was €2.04 billion. Besides, this company also operates in the hypersonic technology sector and it's still a sector where the company can grow.



Textron is an American company found in 1923 and employs more than 37,000 people around the world. Its share is currently being traded at \$47.96, however when compared to other companies, Textron is trades at an expensive valuation and reported disappoint earnings for Q3 2019 (with a decrease in its cash flows). The company known for making the Bell

aircraft, in 2018 reported €11,839 and its market capitalization was valued at €9,401. In 2018 it only paid out €0.02 dividends per share with a share price of €40.40.

BAE SYSTEMS

BAE Systems is a British company listed in the LSE and FTSE indexes. The company is the largest defence contractor in Europe, although it also operates in the aerospace and security segments. Its share is being traded at £570.20 and its value has been increasing since the beginning of 2019. It had a fairly high dividend per share of €14.68 in 2018. The company employs around 83,200 people over the world. The company market capitalization for 2018 was valued at €16,331 and reported revenues of €19,011.

GENERAL DYNAMICS

General Dynamics is an American Aerospace and Defence company. The company was formed in 1952 and has been evolved through different mergers and acquisitions. The company is currently being traded at \$186.52 and employs 92,000 people around the world. In 2018, General Dynamics reported €31,610 as revenues and its market capitalization was valued at €39,639. In 2018, the company acquired CSRA, a company focused in cybersecurity and data analytics. It reported dividends per share of €0.81 in 2018.

THALES

Thales is a multinational company from France that was created in 2000. Its stock is traded on the Euronext Paris and is currently being traded for €90. Thales reported revenues of €15,855 in 2015 and its market capitalization is valued at €21,737. Its dividends per share in 2018 were €2.08.

When comparing Airbus to its peers it is possible to understand that Boeing is the closest to Airbus since it has the most similar revenues, ratios, share price and products.

Key Drivers

- Economic Drivers

As in any industry sector, aerospace and defence industries have some key drivers which are highly correlated with the company success or failure. In terms of forecasting those key drivers are essential. As stated on the Global Market Forecast 2019-2038 ("GMF") (a paper that Airbus produces annually), **economy** is playing a major role on the aerospace and defence industry, with economy growth projected to gradually slow down from 2.8% to 2.7% in 2020, as a result of slowing trades and

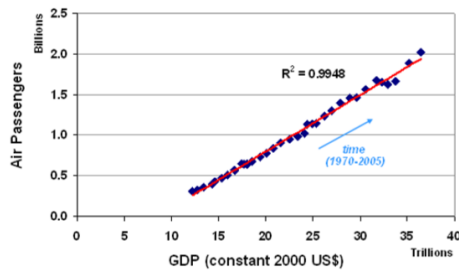


Exhibit 22: Correlation between Air Passengers and GDP

Source: Analysis Of The Interaction Between Air Transportation And Economic Activity: A Worldwide Perspective – Mariya Hansman

industrial sectors growth. Other major key drivers, that are highly correlated with the economy health are the **passenger traffic**. From graph 22, it is possible to understand the correlation between the air passenger and GDP. The correlation coefficient was calculated using time-series world aggregate data during the 1970–2005 time period.²² Besides, revenues passenger kilometres (“RPKs”) are showing a year-over-year growth of +4.6%. The first half of 2019 was weak in opposition to a strong first half of 2018 with freight tonne kilometres (“FTKs”) decreasing 3.3% since last year. However, world international trade is expected to double in the next twenty years which gives hope for a stable positive growth. RPKs and FTKs are the most used measures for air traffic performance and growth. International airlines and cargo transporters, being Airbus mains customers, use these metrics to predict their needs and consequently they impact Airbus performance. For RPKs, the ratio is calculated by multiplying the revenue from each passenger and the kilometres flown while for FTKs, the ratio is calculated by multiplying the tonnes transported by the kilometres flown. While the ratios are predicted to have a stable growth, those should not directly interfere with any revenue forecast, since it should be considered as a condition for an aircraft manufacturer normal operation (i.e. considered its influence only if the RPKs or/and FTKs are predicted to be volatile over the foreseeable future). However, any significant change to these metrics during a short period, may reflect a shift towards different market conditions.

■ Aviation Mega-Cities

Another key driver for aerospace growth is Aviation Mega-Cities (“AMCs”) which are cities with the most aviation connectivity/international passengers. About a quarter of the world’s urban population live in AMCs. Currently there are 66 cities classified as AMC and 60% of the world’s traffic is considered to be flown either from or to one of these cities. The number of airlines serving these cities have been increasing year after year in the past years, totalizing 516 at the moment. This number means that 90% of airlines are serving these cities. Low-cost carriers have been playing an important role in this growth because they nowadays account for 25% of total air traffic in AMCs. In addition to the later, long-haul travel are these cities focus, however short-haul travel is gradually conquering these airports.

AMCs are supposed to drive the industry future – a trend that can already be observed by high-class airlines being settled and big airports such as Dubai Airport working both as a primary and secondary destination.

²² Ishutkina, M.A. (2009). *Analysis of the interaction between air transportation and economic activity: A worldwide perspective* (Doctoral dissertation).

According to the GMF, Africa is a region worth to keep an eye on. Although it still has only 2 AMCs, Addis Ababa and Johannesburg, it is expected to have 8 in the foreseeable future. During 2018, 4 of the 10 fastest growing countries in the world were African, showing a clear tendency of increasing air traffic in Africa.

It is expected that by 2038 it will be added to the current AMCs' list cities for example Lagos, Muscat, Rio de Janeiro and Philadelphia and 91 other cities around the world.

Other key drivers such as geopolitics, urban population growth and financial variables should be considered as correlated and important drivers for the aerospace industry.

- Helicopters & Defence

Fully linked with GDP growth and government spending, Airbus has been able to increase its market share worldwide in the helicopters manufacturing' industry by providing best-in-class solution and securing major governmental and armed forces contracts. As stated previously, we are currently facing times of unequal defence spending, which directly affects the armed helicopters that Airbus is currently producing. In terms of deliveries, Airbus has set record high values with 356 deliveries in 2018 plus 413 orders.

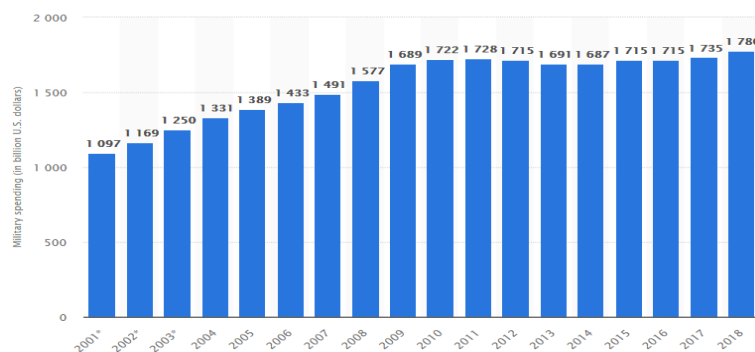


Exhibit 23: Global military spending per year
Source: Statista

Global military spending has increased since the beginning of the century and it is expected to keep growing. In order to not influence the forecast with the correlation between GDP and military spending, a more specific assessment was made on each region spending on military spending and accounted for an individual allowance and assessment.

Forecasting Assumptions

Revenues

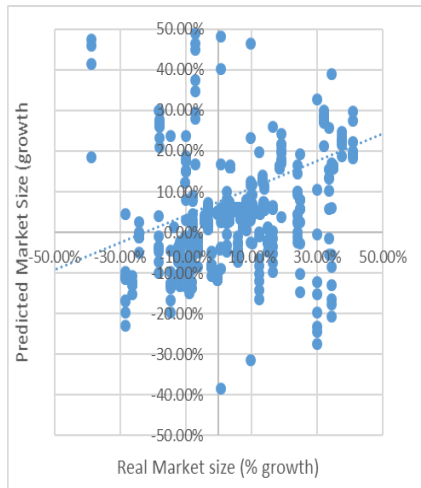


Exhibit 24: Predicted Market Size VS Real Market Size

Source: The Authors

Airbus total revenues are divided into 3 segments: Aircrafts, Helicopters and Defence, as reported by the company. Within each segment, the division is between regions of the globe for completeness of the revenues. The reported regions are Asia-Pacific, Europe, North America, Middle East and Latin America. The remaining regions of the globe are considered as 'Others'. All segments were analysed on a region' precision level. Furthermore, forecasts are driven by three main variables: market share, market size and gross domestic product growth (both market share and market size were calculated for each region).

GDP growth was used as a driver to estimate each countries' wealth and thus each region market size can be extrapolated using GDP growth. As per market size it is considered the total aircraft manufacturers' revenues (in euros). The relationship between market size growth and GDP growth was inferred and it was possible to prove that it is statistically significant at a 10% significance level for the analysed regions. Given the inference, data for the GDP from International Monetary Fund was used. IMF already predicts GDP per country until 2024. From 2024 until 2029, GDP was forecasted. For each region market size, the nine most relevant countries were used (accounting for countries that are considered to be the main drivers of each region' economy and the main contributors for Airbus' revenues), and for the majority of the regions it was proven to be statistically significant at a 10% significance level in each Airbus' segment. Therefore, GDP growth is a good proxy and may be used to predict the market behaviour for the foreseeable future.

Airbus' market share for each region was calculated differently across the segments. For the aircraft and defence segments, the revenues from peers were analysed in order to calculate Airbus market share, with an allowance for new entrees and smaller companies that do not appear as relevant companies. For the helicopters segment, the values for the market share were possible to source from Airbus website, as Airbus appears as one of the biggest players in the world, with an average market share for the past five years rounding 50%. Hereupon, the market share for the future was predicted using historical performance: an average of the market share growth within each segment and region during the previous four years, given a certain year on 3 years forward basis, as the market is considered to be broadly stable over the years. After this period, Airbus is considered to be a market proxy, with its advantage to be a pioneer in terms of technology and with stable

market share, as a result of the reactions from its competitors (and mainly its archival, Boeing).

All the three segments' revenues were computed through the previously stated assumptions and drivers.

▪ Asia-Pacific

New manufacturing hubs for example Indonesia and Vietnam are emerging and have the potential to be a stimulus for traffic growth. Despite a break in the region's economic growth, with India outpacing China, Asia-Pacific will continue to lead the world's economic growth, led by domestic and regional sources of growth, with a forecasted average real GDP growth between a range of 6.0% and 7.0% for the next 10 years. The compounded annual growth rate ("CAGR") **between 2019 and 2029 is 6.59%** versus the 4.1% predicted by the market for the next 20 years. On the assumptions used, the expected middle-class growth was the main reason for the difference – in 2008 there 32% (or 1.2 billion people) of the population was considered as middle-class and in 2018 this number has become a solid 50% - where 75% of the population is assumed to be middle-class in 2038 (in opposition to the 72% predicted by the market).

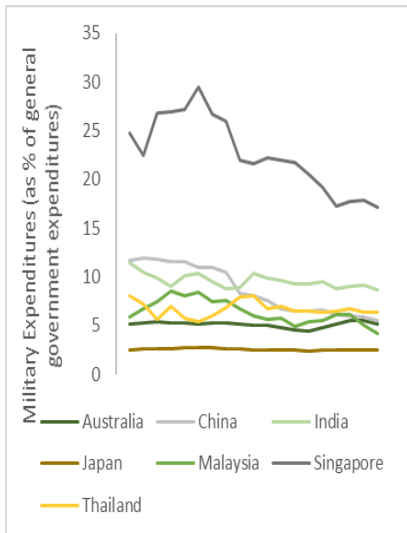


Exhibit 25: Asia-Pacific Military Expenses
Source: WorldData

Regarding Average Market Share between 2019 and 2029 ("AMS"), **Airbus is settled 60.1%**, reaching 61.1% in the last forecasted year – a growth of 4.4% when compared to the value observed in 2018.

Opposed to other regions, Airbus shows itself as the market leader in this region and it is not expected to be outpaced by its peers for the foreseeable future. Airbus has shown positive performance and is expected to strengthen its market position in this region. Airbus market size is forecasted to increase at a **10-year CAGR of 0.88%** and its **revenues at a 10-year CAGR of 1.62%**. Countries which have been heavily investing in defence since 2000 - such as Singapore that has an average of 22.6% of military spending in terms of general government expenditure - are in a downwards trend during the period. However, these countries spending on defence came to a stagnated value by the end of the observed period. It is expected that the market conditions will slowly come to a balanced equilibrium of military spending with growth decreasing year-after-year. A sample of relevant countries on the region was used as a proxy for forecasting (Exhibit 25). Therefore, it was forecasted a **10-year CAGR of 1.56%** for the combined Helicopters and Defence segments in Asia-Pacific. As for the individual characteristics of Airbus and the Helicopters Market, Airbus prospects are to gain most of the market share in this field while losing a big share on the defence industry, primarily due to new regional

Asia-Pacific	
10-year CAGR	
Revenues	1.60%
- Aircrafts	1.62%
- Helicopters	-1.40%
- Defence	2.75%
GDP growth	6.59%
AMS	
- Aircrafts	60.10%
- Helicopters	68.75%
- Defence	16.45%

Exhibit 26: Asia-Pacific CAGR and AMS
Source: The Authors

entrants and current regional players that are favourites to win bigger contracts with the government.

▪ Europe

The European market has been in continuous growth for the past 20 years, with the number of routes increasing from 1,600 in 1998 to 5,500 in 2018. European economy is currently sustained by the Central Bank stimulus and Brexit uncertainty may have a notorious impact on Airbus revenues in Europe. With United Kingdom serving the world population with its huge connectivity and low-cost carrier hubs, it is expected that the harder the measures coming from the deal, the bigger will be the impact on Airbus revenues. Hence, to derive the European predicted market size, the **10 years CAGR for the real GDP growth is set at 3.53%**, considering an allowance for the current political and economic uncertainty. Countries in the North of Europe are setting the world competitive prices for low-cost carriers on the long-haul travel are expected to offset a good proportion of the negative nature of this instability.

Concerning the market share, Airbus is slowly decreasing its market strength having 34.4% of total European revenues over aircrafts sales in 2018 and 31.9% forecasted for 2029 – the **AMS for Airbus is 32.3%**. Boeing is the market leader in Europe, and it is predicted that its dominance will get stronger over a 10 years' period. Market size is then extrapolated and results in a **0.88% 10-year CAGR**.

Due to all the political instability, trade tensions and the developing nature of most European countries, aircraft's revenues are forecasted to be **nearly stagnated with a 10-year CAGR of -0.12%**.

Apart from Russia, European countries show a stable government spending when it comes to military spending. Unsurprisingly, Russia has placed itself as the largest military equipment's customer. Military spending has been considered to be stable at a 4% level of the total government expenditures. A set of European countries, such as Germany, France, Russia, and others, were used to reach the stability conclusion. Being the conditions settled, and for research purposes, the prospects for military spending in Europe is predicted to decrease to levels of 2% to 3% of total government expenditures, what leads to a fall on the revenues over the forecasted period. Hence, a **10-year CAGR of -2.69%** for the combined Helicopters and Defence segments was estimated. In terms of the helicopters industry, Airbus is predicted to keep being the market leader and the pioneer in terms of innovation. Considering Defence industry, Airbus prospects are to lose a small proportion of market

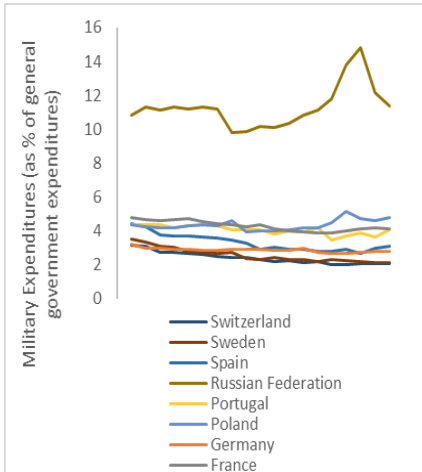


Exhibit 27: European Military Expenditures
Source: WorldData

Europe	
10-year CAGR	
Revenues	-0.72%
- Aircrafts	-0.12%
- Helicopters	-8.73%
- Defence	-0.74%
GDP growth	3.53%
AMS	
- Aircrafts	32.28%
- Helicopters	47.10%
- Defence	8.93%

Exhibit 28: Europe CAGR and AMS
Source: The Authors

share (moving from the 9.7% to 8.8% in 2029) due to the poor market conditions and needs within European countries.

North America

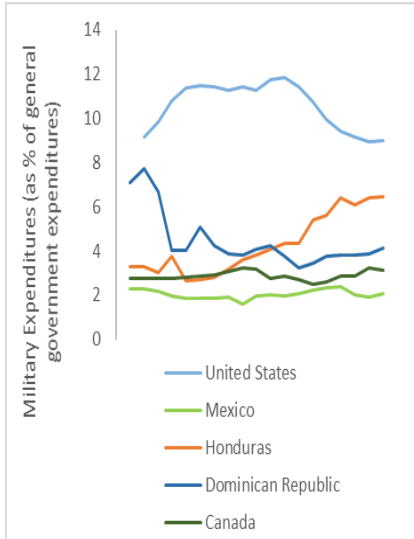


Exhibit 29: American Military Expenditure
Source: WorldData

This year might be a turning point to the trading history of U.S. with trade tensions between the later and China. This is affecting all world with tariffs being imposed on a monthly basis. Any possible development and deal will certainly be roll forwarded to 2020. A prudent approach when forecasting the **GDP growth** was used, with allowances for the fact that the current president is under impeachment proceedings and all the political instability that this one is bringing to the region, resulting in a **10-year CAGR of 3.5%**, given the fact that U.S. expansion is being driven by stimulus in employment and supported by business investment and government spending.

Despite Boeing headquarters are in North America and the company owns the majority of the market share in the region, the firm is currently facing issues with its Boeing 737 MAX, and Airbus ought to gain a small proportion of market share on the forecasted future. The current market share on aerospace sector is 15.6% (versus 36.5% for Boeing) and it is predicted to grow at a 10-year CAGR of 1.65%, reaching 18.9% on the last forecasted year (reflecting a total increase of 3.3% over the period).

U.S. expansion defined by a more competitive tax environment supporting the business fixed investment, **Airbus' revenues in the region were forecasted at a 10-year CAGR of 5.1%**, showing the clear opportunity that Airbus has on the next 10 years to offset Boeing' supremacy over the region.

North American military spending has shown high values over the 21st century. Countries such as the United States have settled its average of military spending on 10.6% over the period and this is expected to remain stable. Smaller countries are showing high averages and an upwards trend over the period. Airbus prospects on Defence are quite good while for helicopters it is predicted to slow down. Therefore, revenues were forecasted at a **10-year CAGR of -3.26% for the Helicopters segment and 4.54% for the Defence segment.**

North America	
10-year CAGR	
Revenues	4.51%
- Aircrafts	5.10%
- Helicopters	-3.26%
- Defence	4.54%
GDP growth	3.51%
AMS	
- Aircrafts	18.24%
- Helicopters	40.10%
- Defence	2.93%

Exhibit 30: North America CAGR and AMS
Source: The Authors

Middle East

Even though, there are differences between the countries that were analysed to create a proxy for the Middle East GDP growth, it was possible to generate strong pillars that are in accordance with the region potential. Middle East is an economy **driven by its substantial fuel resources**, however it is also an economy affected by volatile oil revenues, fiscal tightening and general political instability. Middle East is playing an important role in the global

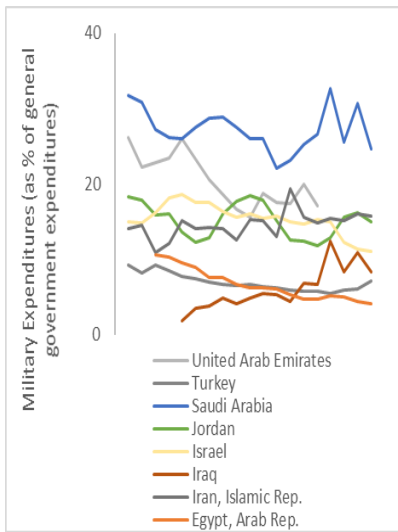


Exhibit 31: Middle East Military Expenditures
Source: WorldData

Middle East	
10-year CAGR	
Revenues	-0.10%
- Aircrafts	-0.73%
- Helicopters	0.05%
- Defence	2.13%
GDP growth	3.96%
AMS	
- Aircrafts	44.11%
- Helicopters	23.83%
- Defence	8.46%

Exhibit 32: Middle East CAGR and AMS
Source: The Authors

economy benefiting from its geographical location. There are currently 5 AMCs in this region and the number is supposed to increase at least to 11 in the next 20 years. This region has been driving Airbus' order book in the past few years, with Middle Eastern airlines being the most relevant customers for high quality and technologically advanced aircrafts. The Middle Eastern population is able to reach (as well as be reached by) any airport in the world within 8,400 nautical miles (16,000km), letting this region the only capable of such performance. Given the aforementioned, the Middle East GDP growth is expected to slowdown from its huge values in the recent past and stabilize in the future, as well as the other analysed regions. GDP growth was forecasted at a **10-year CAGR of 3.96%**. Airbus positioning in this region is strong with its market share rounding 44.7% in the long term. The market size was forecasted at a 10-year CAGR of -1.29% and the revenues at a **10-year CAGR of -1.29%**. This is primarily due to the asymmetries that this region is showing.

Despite being a region with historical high levels, it does not appear to be a relevant region in historical performance for Airbus. In the Middle East, the level of revenues for 2018 are 0.9% of total revenues for the Helicopters segment and 1.7% for the Defence segment. It is prudent to predict a ratio within this range as there are major peers playing heavily in this region. Therefore, it was forecasted a 10 years CAGR of 2.21% for the Helicopters segment and 2.13% for the Defence segment. Moreover, Defence market size prospects within the region are forecasted to increase by 64.6% in 2029 and Airbus should be able to take 28.7% of the market's increase.

Latin America

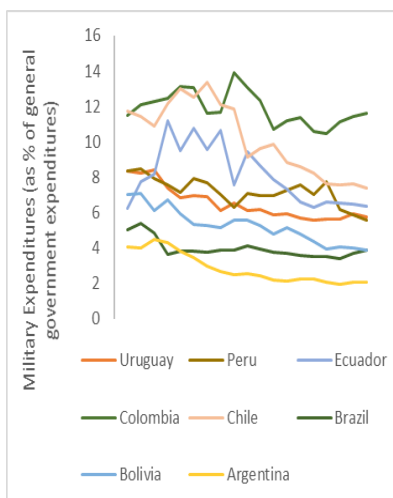


Exhibit 33: Latin American Military Expenses
Source: WorldData

Economic performance is varying a lot in Latin America, with Brazil recovering at a huge rate, with some countries such as Venezuela going through recession and other countries, such as Chile and Peru, with positive prospects of growth. Due to asymmetries in countries belonging to Latin America, and lack of information in this region from most of the peers' companies, Airbus is expected to lose some of its revenues in the long term. GDP growth is forecasted at a **10-year CAGR of 4.21%**, however market size is forecasted at a **-7.2% 10-year CAGR**. With most of the airports showing fees for the inbound flights, the air traffic in this region is mainly supported by its tourism nature. Boeing is the market leader and is forecasted to reinforce its strength in the region over the next 10 years. Using the mentioned as an allowance for the negative prospects over the period for Airbus, revenues on Airbus' aerospace segment were forecasted at a 10 years CAGR -7.3%, showing it's

Latin America	
10-year CAGR	
Revenues	-2.85%
- Aircrafts	-7.33%
- Helicopters	3.77%
- Defence	3.95%
GDP growth	4.21%
AMS	
- Aircrafts	30.50%
- Helicopters	68.75%
- Defence	25.11%

Exhibit 34: Latin America CAGR and AMS
Source: The Authors

propensity to lose market share and being outpaced for new regional entrants while following the market size trend.

Military spending in Latin America is highly volatile between countries, however, most of them are posting high historical numbers. For forecasting purposes, military spending as a percentage of total government expenditures is considered to be stable across all countries, and thus it is expected that normal market behaviour will happen in a balanced and stable environment. Therefore, it is forecasted a **10-year CAGR of 3.77% for the Helicopters segment** revenues and **3.95% for the Defence segment** in accordance with the predicted GDP growth for the region.

Other Countries

Airbus reports its revenues by considering a minority of other countries that somehow, together, have a relevant impact in the company’s revenues. However, those are not concentrated enough in a specific region to be considered. Countries included in the report as ‘Other Countries’ are not available and thus no true inference may be made. For the forecasting process it was taken a prudent approach that considers the revenues in those countries to be nearly stagnated or in a downwards trend over the three segments. Inference was made about the GDP growth by considering IMF’s ‘other advanced economies’. A bigger allowance for new entrants was used across all segments. The final value for the revenues for all segments were forecasted with an average **10-year CAGR of -2.85%**.



Exhibit 35: Airbus’ Operating Costs
Source: The Authors

Operating Costs

Airbus segregates its operating costs within three major captions: cost of sales (“COGS”), administrative expenses and research and development expenses (“R&D”).

Cost of sales are expected to increase as a **percentage of revenues** in the long term as a result of the industry’s fast changes. Airbus is operating under full capacity and new labour force will be needed. Moreover, new and more **light expensive material for the production of aircrafts is being acquired** and implemented in new airplanes. Third party manufacturers are also included in this caption. In a capital-intensive industry like Aerospace and Defence, cost of sales is settled at near 85% of revenues, primarily due to the cost of manufacturing, materials and maintenance, and followed by the time to deliver products impact. Despite this, Airbus is expected to slowly benefit from the economies of scale meaning a stable gross margin of 13.8% from 2029 going forwards. Airbus’ average costs of sales over the past 5 years are 4.9% above the industry average and 2.1% above the industry median.

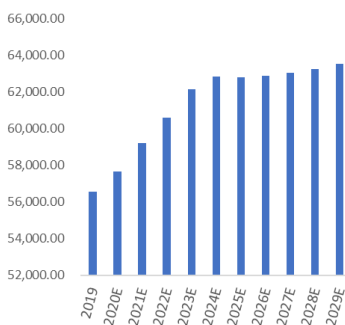


Exhibit 36: Estimated Cost of Sales in € millions
Source: The Authors

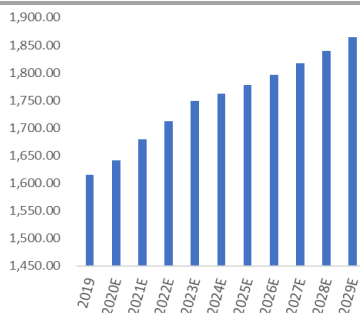


Exhibit 37: Estimated Administrative Expenses in € millions
Source: The Authors

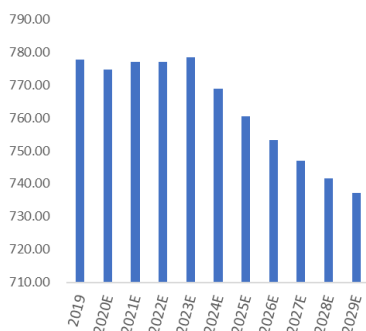


Exhibit 38: Estimated R&D in € millions
Source: The Authors

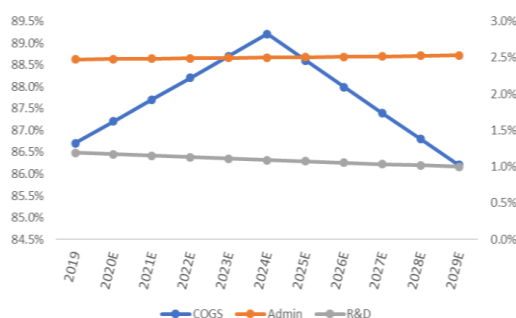


Exhibit 39: Estimated Operating Costs as Percentage of Revenues (Left Axis: COGS; Right Axis: Administrative and R&D Expenses)
Source: The Authors

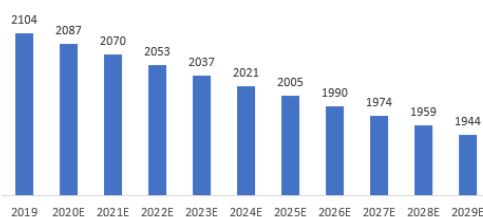


Exhibit 40: Estimated Capital Expenditures in € millions
Source: The Authors

Administrative expenses are mostly related to management and operation activity. This caption is forecasted to increase with revenues and demonstrates an increase from €1.5 billion in 2018 to the forecasted €1.8 billion in 2029. In terms of administrative expenses, Airbus spends 2,5% of its revenues on administrative expenses compared to the industry average of 4.3%. This difference seems to indicate that Airbus is better able to reduce its administrative expenses than its competitors.

Since 2015, Airbus has spent over four billion euros in **R&D**. As a percentage of revenues, Airbus is being outpaced by all its peers, being the company that spends less in research and development in terms of revenues. The industry average is 2.1% above of Airbus spending, however mainly due to the natural marginal trade-off that no technological advance will be achieved per euro spend in excess – Airbus, alongside with Boeing, is still the company that most spends on R&D. Airbus programs are capital consuming in order to develop competitive and innovative products. This spending has been notable and has bringing Airbus the opportunity to be the first market-mover, being in advantage in relation to its peers for the past 10 years. The spending in R&D is in line with the fuel efficiency strategy and the commitment to creating fuel-efficient aircraft by airbus, furthermore this is in accordance with current- and more likely to be in accordance with future regulations regarding CO₂ emissions. These regulations are already affecting Aerospace and Defence manufacturers limiting the materials that can be used during the production process while simultaneously increasing the requirements of the environmental performance of these products. Over ten years these costs are expected to start being offset and a slight decrease (nearly stagnation) is being projected.

Capital Expenditures

Concerning Capital Expenditures (“CAPEX”), Airbus has been slowly decreasing capital expenditure, benefiting from the economies of scale. In 2018 Airbus reported capital expenditures of €2.6 billion. The reduction is expected to be equal to **€1.9 billion by 2029, reflecting Airbus increased efficiency, as well as lower spending on manufacturing equipment.**

From 2015 to 2018, Airbus decreased its capital expenditures by 20.3% and this value is estimated to decrease by 25.5% by 2029. In opposition to asset-light businesses that face higher margins and demonstrate higher flexibility in their business ‘*modus operandi*’, heavy-asset businesses, such as Airbus’ Aerospace and Defence industries, CAPEX is set at high values primarily due to the huge needs for infrastructures and machinery, result of the

technological development and equipment getting rapidly out of date. Although decreasing, the allocation to CAPEX is expected to remain with high values (€1.9 billion in 2029) due to its nature of being an asset-heavy industry.

Net Working Capital

In the long-term, Airbus is expected expand while developing its business model. In a highly cyclical industry that is mainly characterized by the technological innovation, Airbus is expected to decrease its short-term capital needs, followed by a long-term increase. In the Net Working Capital, all the current assets and liabilities that arise from operational activities were included. The NWC was then compared against the average of Airbus' peers, which is considered to be a good proxy.

Airbus is considered to be **behind the industry average** in all the analysed metrics, with exception of the collection period. As a consequence of **Airbus' disruptive production** during the past few years, the company inventories are currently 46% of total revenues and are expected to slightly increase on the short-term and decrease on the long-term. Inventories are forecasted to **decrease by 4.6% from 2019 to 2029**. The average collection period is **expected to increase and reach the industry average** on the long-term while the **payable period is expected to decrease** and tend to the long-term' industry average.

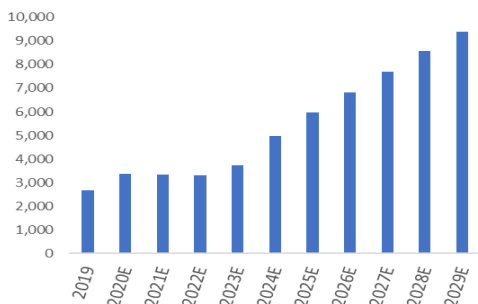


Exhibit 41: NWC in € millions
Source: The Authors

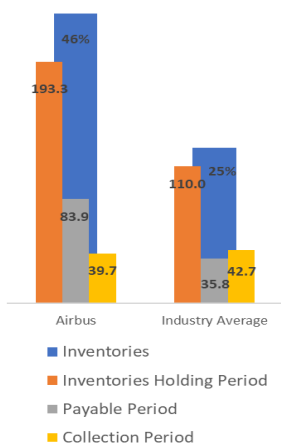


Exhibit 42: NWC metrics in 2019 – Airbus VS. Peers
Source: The Authors

Dividends

Placed as a key priority for investors, dividends play a crucial role in forecasting any company performance within any industry. Airbus has been paying dividends in a volatile manner with an increase of 61% from 2014 to 2015. The dividends are expected to grow, year-after-year, on a slow upwards trend from 7.0% to 7.6% in 2029 (versus the 11% growth from 2017 to 2018). Dividends are expected to increase in line with the perpetual growth rate that converges to 7.64%.

Valuation

Relative Valuation

Valuation models not based on forecasted cash flow do not take into account the generation of cash cashflows. Besides, the peer companies considered might also influence the valuation. The target share price is determined through a multiple valuation and considering three different multiples: EV/Revenues, EV/EBITDA and P/E ratio.

Airbus has median **EV/Revenues** of 0.80 which is low compared to its peers that have an average of 1.12. A low EV/Revenues is a sign that the company is **undervalued**.

The **EV/EBITDA** multiple of comparable companies have an average of 10 while Airbus has 7.14. An enterprise multiple below 10 is considered as **healthy**.

For the **P/E ratio**, comparable companies have a median of 19.3 price-to-earnings ratio while Airbus has 21.04. Airbus has a high P/E ratio, meaning that investors expect higher earnings and growth rates in the future.²³

Discounted Cash Flows Method

Airbus was also valued using the Discounted Cash Flow Method (DCF). DCF only relies on cash flows, rather than accounting related metrics such as profit, this is a benefit over the comparables method since it can easily be influenced by the accounting methods used within the firm. Due to the fact that Airbus capital structure varies a lot every year, the resulting WACC also changes. The result of Airbus share price using a DCF valuation was **€156.54**.

WACC Assumptions

In order to compute the company's **WACC** it was necessary to make assumptions on the company's **cost of equity**, **cost of debt**, **marginal tax rate** and the **debt to equity ratio**. All of these inputs were estimated and are further explained.

The company's **cost of equity** was computed for each year under the well-known **Capital Asset Pricing Model** ("CAPM"). For each forecasted year three inputs were used: **risk-free rate**, **beta of equity** and **market risk-premium**.

The **risk-free rate** was obtained from the **10-year Dutch Government Bond**. The rationale behind the bond choice is that there is a low probability for the Dutch Government to default with a credit rating AAA and it is considered to have a stable outlook by Standard & Poor's and Moody's. Currently the 'Dutch risk-free rate', as a proxy for risk-free debt, is settled at -0.246% showing how risk-averse investors are at this moment since they are even willing to pay, instead of receiving, money for investing in a risk-free investment.

The **levered beta of equity** for each year was computed using the **unlevered beta of equity** and adjusted for capital structure's changes.

Airbus' cost of debt was computed with the following inputs: yield of a 4-year bond issued by the company itself, the respective **probability of default** and

Non-Core Fair Value ₂₀₂₀	5 142
Enterprise Value ₂₀₂₀	123 226
Net Debt ₂₀₁₉ (incl. Minority Interests)	-6 935
Equity ₂₀₁₉	121 433
Number of Shares Outstanding	775,7
Evaluated Share Price	156,54

Exhibit 43: Estimated Share Price
Source: The Authors

Company	Beta Levered	Beta Unlevered
Airbus	0,13	0,98
Boeing	0,29	1,12
Textron	0,32	1,08
Lockheed Martin	0,28	0,78
BAE Systems	0,23	0,82
General Dynamics	0,27	1,01
Thales	0,05	0,81

Exhibit 44: Levered and Unlevered Betas
Source: The Authors

Debt/EV	20%
Re	11.5%
Rd	1.08%
Marginal Tax Rate	25%

Exhibit 45: Inputs used to compute the WACC
Source: The Authors

²³ Bloomberg

loss given default for the respective type of security. Then, the cost of debt was computed using the 10-years Unsecured Bond issued by Airbus in 2014 with a **yield to maturity of 1.33%**, and thus with an **allowance** for the product of the annualized probability of default and the loss given default ratio (both the probability and the ratio were based on a Moody’s credit default study that is able to attribute an expected probability of default given a company’s credit rating – in this case, Airbus’ bond is rated A2 and has an annualized probability of default of 50 basis points). Taking the above into account the WACC was computed using a **cost of debt of 1.08%**.

- Growth in Perpetuity

To use the Discounted Cash Flow Model, a perpetual growth rate is required to estimate the present value of the cash flows during the years that are not being thoroughly forecasted (from 2030 going forwards). Followed by a strong growth during the early stage of the forecasting process, the NOPLAT and the Unlevered Operational Free Cash Flow have reached a stable 7.69% growth rate by the end of the 10 years’ period that is being forecasted, which is above the estimated long-term inflation rate of 3.4%, indicating a **positive real long-term growth**. The growth in perpetuity derives most of the estimated target share price and thus disturbances to this value will be created in the “Sensitivity Analysis” section.

Constant growth rate from 2029	7,69%
Airbus Present Value until 2028	1 416 683
Airbus Preperuity Value	239 502
Total NPV	1 656 186

Exhibit 46: Valuation summary
Source: The Authors

Sensitivity Analysis

Given the fact that the terminal growth value, derived from the perpetuity growth rate, is accounting for the majority of the company’ enterprise value through the Discounted Cash Flows valuation model, a sensitivity analysis was run in order to understand the impact on the estimated target share price of small disturbances on the **perpetual growth rate** and the **unlevered beta**. In order to assess the true company value on the risk that it is facing, small disturbances to the unlevered beta were used in order to remove any beneficial or detrimental effect gained by adding debt to Airbus’ capital structure. Variations of 0.01 were made to the unlevered beta due to the high sensitivity of the target share price to the former. The interval tested was between 0.948 and 1.008 with the forecasted unlevered beta being 0.978, which is equal to the industry median (and slightly above to the industry average). Since the Airbus’ credit rating is not expected to undergo any change, the cost of debt was not analysed.

An assessment to the perpetual growth was made as the terminal value is weighting 86% of enterprise value. With a forecasted perpetual growth of

7.69%, disturbances of 1 basis point were made. The final interval tested was between 7.66% and 7.72%.

		Perpetuity Growth						
		7.66%	7.67%	7.68%	7.69%	7.70%	7.71%	7.72%
β_U	0.948	187.48	188.74	190.01	191.30	192.61	193.94	195.29
	0.958	174.84	175.92	177.02	178.13	179.26	180.41	181.57
	0.968	163.78	164.72	165.68	166.65	167.63	168.63	169.63
	0.978	154.02	154.85	155.69	156.54	157.40	158.28	159.16
	0.988	145.35	146.08	146.83	147.58	148.34	149.11	149.89
	0.998	137.59	138.25	138.91	139.58	140.26	140.94	141.63
	1.008	130.61	131.20	131.79	132.39	133.00	133.61	134.23

Exhibit 47: Sensitivity Analysis
Source: The Authors

The target share price is expected to be in line with the investment recommendation (**BUY**) in the majority of the cases, however, for lower growth rates and higher unlevered betas it is possible that the recommendation does not hold (red cells of the table, on the down and left corner), and one might have to challenge the market conditions and assumptions to assess if it does still hold.

In another sensitivity analysis, share price sensitivity to a different debt structure was tested, allowing for changes on the **debt to equity ratio (D/E)** given small disturbances on the **terminal growth**.

In order to assess how debt and equity holders might benefit from having more or less debt, for each terminal growth a set of scenarios were created for the **debt to equity ratio, with the former differing by 1.0% between each other** (Exhibit 48).

It is possible to conclude that Airbus' share price is slightly more sensitive to changes in the unlevered beta than to the overall debt structure.

By slightly reducing the amount of debt (minimizing the debt to equity ratio), Airbus' share price will be higher for all the levels of terminal growth that were considered. Hence, investors will be better off with a lower level of debt. For higher levels of debt, Airbus' investors will end up on a worst scenario, with the company' share price **losing its value consecutively**. This test also permits us to conclude that no "Moral-Hazard" event may occur, as it is not possible to equity holders to benefit at the debt holders' expense.

		Perpetuity Growth						
		7.66%	7.67%	7.68%	7.69%	7.70%	7.71%	7.72%
D/E	19.0%	173.24	174.32	175.41	176.52	177.65	178.79	179.94
	20.0%	166.26	167.25	168.25	169.26	170.28	171.32	172.37
	21.0%	159.88	160.78	161.70	162.62	163.56	164.51	165.47
	22.0%	154.02	154.85	155.69	156.54	157.40	158.27	159.16
	23.0%	148.61	149.38	150.16	150.94	151.74	152.54	153.35
	24.0%	143.62	144.33	145.05	145.77	146.51	147.25	148.00
	25.0%	138.99	139.65	140.31	140.98	141.67	142.35	143.05

Exhibit 48: Sensitivity Analysis
Source: The Authors

Appendix

Financial Statements

1. Income Statement

In f million	At December, 31 2014	At December, 31 2015	At December, 31 2016	At December, 31 2017	At December, 31 2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Core Business																
Revenues																
<i>Sale of commercial aircraft</i>	41 531	45 090	48 591	42 667	47 199	48 750	49 736	50 995	52 196	53 529	53 834	54 183	54 576	55 012	55 490	56 010
Asia/Pacific	13 256	13 121	15 520	15 412	17 260	17 616	18 307	18 631	19 227	19 755	19 945	20 137	20 330	20 525	20 722	20 920
Europe	13 855	14 034	15 601	11 398	13 733	13 280	13 212	13 053	12 941	12 791	12 813	12 839	12 869	12 903	12 941	12 983
North America	6 657	7 148	6 519	7 833	8 256	8 814	9 380	10 452	11 161	12 039	12 485	12 948	13 430	13 931	14 452	14 993
Middle East	4 460	6 025	6 177	5 213	4 726	4 872	4 851	4 862	4 849	4 835	4 741	4 651	4 565	4 483	4 404	4 328
Latin America	2 530	2 866	3 594	646	1 065	1 042	938	827	785	712	652	598	549	504	464	427
Other Countries	574	1 896	1 181	2 185	2 719	3 126	3 048	3 171	3 233	3 397	3 198	3 010	2 833	2 666	2 508	2 359
<i>Sale of Helicopters</i>	5 996	6 153	6 204	5 859	5 523	5 532	5 437	5 395	5 317	5 260	4 994	4 750	4 525	4 318	4 126	3 949
Asia/Pacific	1 914	1 791	1 862	2 116	2 020	2 021	2 061	2 107	2 153	2 182	2 103	2 018	1 936	1 857	1 780	1 706
Europe	2 000	1 915	1 992	1 565	1 541	1 463	1 353	1 279	1 192	1 112	978	860	756	685	596	515
North America	961	975	832	1 076	966	968	917	866	836	806	778	751	724	698	673	649
Middle East	644	822	789	716	553	580	595	588	580	581	576	572	567	563	560	556
Latin America	380	391	459	89	125	142	151	161	172	183	184	186	188	190	192	194
Other Countries	97	259	151	297	318	358	361	373	384	386	374	363	353	344	336	328
<i>Military and Defence</i>	12 728	12 917	11 736	10 496	10 985	10 961	10 967	11 127	11 196	11 264	11 595	11 958	12 356	12 787	13 252	13 753
Asia/Pacific	4 063	3 759	3 748	3 791	4 017	4 015	4 037	4 151	4 168	4 206	4 406	4 616	4 836	5 066	5 307	5 560
Europe	4 246	4 020	3 768	2 804	3 066	2 940	2 886	2 819	2 844	2 792	2 794	2 796	2 799	2 801	2 803	2 805
North America	2 040	2 048	1 574	1 927	1 922	1 934	1 976	2 130	2 153	2 216	2 365	2 523	2 692	2 873	3 067	3 274
Middle East	1 367	1 726	1 492	1 282	1 100	1 119	1 104	1 105	1 096	1 090	1 138	1 189	1 242	1 297	1 355	1 416
Latin America	806	821	868	159	248	248	254	256	272	278	295	313	331	351	372	395
Other Countries	408	543	285	533	633	706	651	667	664	681	596	522	456	399	348	304
Others	256	290	50	0	0	0	0	0	0	0	0	0	0	0	0	0
Revenues by Geographical Area	60 713	64 450	66 581	59 022	63 707	65 244	66 140	67 517	68 709	70 054	70 423	70 891	71 456	72 116	72 869	73 713
Cost of Sales	-51 776	-55 599	-61 317	-52 149	-54 920	-56 571	-57 679	-59 217	-60 606	-62 143	-62 822	-62 809	-62 878	-63 026	-63 249	-63 546
Gross Profit	8 937	8 851	5 264	6 873	8 787	8 673	8 830	8 300	8 103	7 911	7 601	8 082	8 578	9 090	9 619	10 167
Selling Expenses	-1 063	-1 065	-997	-872	-861	-858	-846	-841	-832	-826	-808	-791	-776	-762	-749	-737
Administrative expenses	-1 538	-1 586	-1 726	-1 567	-1 574	-1 615	-1 641	-1 679	-1 712	-1 750	-1 763	-1 778	-1 796	-1 817	-1 840	-1 865
Research and development expenses	-1 241	-894	-676	-509	-773	-778	-775	-777	-777	-778	-769	-761	-753	-747	-742	-737
Other expenses	-179	-222	-254	-336	-182	-169	-156	-145	-134	-124	-113	-104	-95	-87	-80	-74
Total operating expenses	-4 021	-3 867	-3 653	-3 284	-3 390	-3 421	-3 418	-3 441	-3 456	-3 478	-3 453	-3 434	-3 420	-3 413	-3 410	-3 413
Other Income	330	474	2 689	981	1 656	1 690	1 707	1 736	1 761	1 789	1 792	1 798	1 806	1 816	1 828	1 843
EBITDA	5 246	5 458	4 300	4 570	7 053	6 942	6 750	6 595	6 408	6 222	5 940	6 446	6 964	7 493	8 037	8 597
Depreciation and Amortization	-2 150	-2 456	-2 294	-2 298	-2 444	-2 448	-2 424	-2 400	-2 377	-2 354	-2 332	-2 309	-2 288	-2 266	-2 245	-2 224
EBIT	3 096	2 992	2 006	2 272	4 609	4 494	4 326	4 194	4 031	3 868	3 608	4 137	4 676	5 227	5 792	6 373
Taxes	755	547	359	1 493	1 274	1 124	1 082	1 049	1 008	967	902	1 034	1 169	1 307	1 448	1 593
NOPLAT	2 341	2 445	1 648	779	3 335	3 371	3 245	3 146	3 023	2 901	2 706	3 103	3 507	3 920	4 344	4 780
Non Core Business																
Share of profit from investments accounted for under the equity method	840	1 016	231	311	330	337	340	346	351	357	358	359	361	363	366	369
Other income from investments	55	54	21	82	109	113	116	121	124	129	131	134	137	140	144	147
Result Before Tax and OCI	895	1 070	252	393	439	450	457	467	476	486	489	493	498	503	509	516
Non core taxes	-224	-268	-63	-98	-110	-113	-114	-117	-119	-121	-122	-123	-124	-126	-127	-129
Other comprehensive income	351	1 460	-1 428	-2 733	166	0	0	0	0	0	0	0	0	0	0	0
Non Core Result	1 022	2 263	-1 239	-2 438	495	338	343	350	357	364	367	370	373	377	382	387
Financial																
Interest income	142	183	247	189	208	213	216	220	224	229	230	231	233	235	238	241
Interest expense	-462	-551	-522	-517	-440	-451	-457	-466	-475	-484	-486	-490	-494	-498	-503	-509
Other financial result	-458	-319	-632	1 489	-531	-544	-551	-563	-573	-584	-587	-591	-596	-601	-607	-614
Result Before Tax and OCI	-778	-687	-867	1 161	-763	-781	-792	-809	-823	-839	-843	-849	-856	-864	-873	-883
Tax Shield	116	138	131	129	110	113	114	117	119	121	122	122	123	125	126	127
Other Comprehensive Income	-6 146	-4 109	-4 744	10 506	-3 180	0	0	0	0	0	0	0	0	0	0	0
Financial Result	-6 809	-4 658	-1 311	11 796	-3 833	-669	-678	-692	-704	-718	-722	-727	-732	-739	-747	-756
Total Comprehensive Income	-3 445	49	-902	10 137	-3	3039	2909	2804	2676	2547	2351	2746	3148	3559	3979	4411

2. Balance Sheet

In € million	At December, 31 2014	At December, 31 2015	At December, 31 2016	At December, 31 2017	At December, 31 2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Core Business																
Operating cash	1214,26	1289	1331,62	1180,44	1274,14	1 305	1 323	1 350	1 374	1 401	1 408	1 418	1 429	1 442	1 457	1 474
Property, plant and equipment	16 321	17 127	16 913	16 610	16 773	16 429	16 091	15 761	15 437	15 120	14 810	14 506	14 208	13 916	13 631	13 351
Trade receivables	6 798	7 877	8 101	5 487	6 078	6 361	6 590	6 874	7 149	7 449	7 652	7 872	8 108	8 362	8 635	8 926
Inventories	25 355	29 051	29 688	29 737	31 891	31 755	31 619	31 485	31 350	31 217	31 083	30 951	30 819	30 687	30 556	30 426
Intangible assets	12 758	12 555	12 068	11 629	16 725	16 256	16 479	16 822	17 119	17 454	17 546	17 563	17 804	17 998	18 155	18 366
Current and non current other assets	4 211	4 985	4 934	3 912	5 134	5 826	5 706	5 763	5 695	5 879	6 023	6 028	6 045	6 088	6 112	6 255
Current and non current contract assets	0	0	0	497	854	881	895	914	932	952	958	966	975	985	997	1 010
Deferred tax assets	5 717	6 759	7 557	4 562	4 835	6 077	6 161	6 289	6 400	6 525	6 560	6 603	6 656	6 717	6 787	6 866
Current tax assets	605	860	1 110	914	1 451	1 021	1 035	1 057	1 075	1 096	1 102	1 109	1 118	1 128	1 140	1 153
Total Operating Assets	72 979	80 503	81 703	74 528	85 016	85 910	85 989	86 316	86 532	87 092	87 142	87 115	87 161	87 295	87 531	87 827
Trade liabilities	10 183	10 864	12 532	13 406	16 237	15 396	14 450	13 656	12 866	12 144	11 301	10 401	9 585	8 844	8 170	7 556
Current and non current provisions	16 112	15 080	16 969	16 051	18 888	17 094	17 325	18 132	18 915	19 448	19 271	19 325	19 438	19 520	19 550	19 604
Current tax liabilities	738	908	1 126	1 481	732	1 026	1 046	1 074	1 099	1 127	1 139	1 139	1 140	1 143	1 147	1 152
Deferred tax liabilities	1 130	1 200	1 292	1 002	1 318	1 218	1 242	1 275	1 305	1 338	1 353	1 353	1 354	1 357	1 362	1 369
Current and non current deferred income	1 356	1 312	1 205	548	666	26 586	26 673	26 946	27 138	27 381	27 238	26 796	26 397	26 036	25 711	25 418
Current other liabilities	25 222	27 037	27 535	3 909	5 288	6 275	6 284	6 336	6 368	6 413	6 368	6 331	6 303	6 283	6 271	6 266
Current contract liabilities	0	0	0	25 943	26 229	3 677	3 749	3 849	3 939	4 039	4 083	4 083	4 087	4 097	4 111	4 131
Total Operating Liabilities	54 741	56 401	60 659	62 340	69 258	71 273	70 769	71 269	71 630	71 890	70 753	69 427	68 304	67 281	66 332	65 496
Invested Capital Core Business	18 238	24 102	21 044	12 188	15 658	14 638	15 220	15 046	14 902	15 203	16 389	17 688	18 857	20 015	21 199	22 331
Non Core Business																
Non current investments and financial assets	5 227	3 884	5 268	5 824	5 507	5 036	5 380	5 701	5 837	5 769	5 742	5 842	5 904	5 932	5 955	6 015
Current portion of other long-term financial assets	187	178	522	529	489	373	423	493	493	479	470	487	498	498	499	505
Current and non current other financial assets	1 750	2 498	2 233	4 959	2 919	2 804	2 977	3 076	2 726	2 943	3 014	3 055	3 119	3 174	3 236	3 253
Current and non current securities	9 172	11 639	11 448	12 571	12 794	11 140	11 825	12 216	10 830	11 689	11 971	12 136	12 388	12 607	12 854	12 921
Assets and disposal group of assets classified as held for sale	750	1 779	1 148	202	334	283	287	293	298	304	305	307	310	312	316	319
Total Non Core Assets	17 066	19 978	20 619	24 085	22 043	19 636	20 892	21 779	20 184	21 183	21 502	21 827	22 219	22 524	22 860	23 014
Financial																
Excess of Cash and Cash Equivalents	6 057	5 301	8 811	10 836	8 139	0	0	0	0	0	0	0	0	0	0	0
Total Financial Assets	6 057	5 301	8 811	10 836	8 139	0	0	0	0	0	0	0	0	0	0	0
Long-term financing liabilities	6 278	6 325	9 791	9 894	7 463	2 355	2 105	2 041	1 832	1 408	1 381	1 542	1 584	1 471	1 222	912
Non current other liabilities	12 849	14 993	16 279	298	460	112	114	101	95	72	71	79	81	76	63	47
Short-term financing liabilities	1 073	2 790	1 687	2 212	1 463	899	915	939	959	982	992	990	990	991	994	997
Non-current contract liabilities	0	0	0	16 013	15 832	4 673	4 273	3 997	3 643	2 827	2 759	3 074	3 152	2 934	2 441	1 818
Non controlling interests	18	7	-5	2	-5	3	3	3	3	3	3	3	3	3	3	3
Total Financial Liabilities	20 218	24 125	26 752	27 509	25 213	7 727	6 935	6 547	5 941	4 621	4 505	5 022	5 148	4 792	3 987	2 971
Net Financial Assets	-14 161	-18 824	-17 941	-16 673	-17 074	-7 727	-6 935	-6 547	-5 941	-4 621	-4 505	-5 022	-5 148	-4 792	-3 987	-2 971
Total Shareholder's Equity	7 061	5 966	3 657	10 740	9 724	11 679	13 426	14 984	16 320	17 427	18 227	19 303	20 652	22 273	24 165	26 330
Δ Equity in Cash (Net Transaction with Shareholders in cash)	-	1 144	1 407	3 054	1 013	1 084	1 162	1 247	1 339	1 440	1 551	1 671	1 799	1 937	2 087	2 247
Payout Ratio		2334,7%	-156,0%	30,1%	-33766,7%	35,7%	39,9%	44,5%	50,0%	56,5%	66,0%	60,8%	57,2%	54,4%	52,4%	50,9%
Core Invested Capital																
Property, plant and equipment	16 321	17 127	16 913	16 610	16 773	16 429	16 091	15 761	15 437	15 120	14 810	14 506	14 208	13 916	13 631	13 351
NWC	10 545	16 350	13 428	9 875	9 374	2 659	3 369	3 340	3 313	3 726	4 962	5 956	6 823	7 678	8 559	9 382
Other Operating Assets	19 080	20 174	20 735	17 105	23 012	23 354	23 675	24 167	24 594	25 075	25 208	25 375	25 578	26 014	26 083	26 385
Other Operating Liabilities	-27 708	-29 549	-30 032	-31 402	-33 501	-27 804	-27 915	-28 222	-28 443	-28 719	-28 591	-28 149	-27 751	-27 394	-27 073	-26 787
Total Core Invested Capital	18 238	24 102	21 044	12 188	15 658	14 638	15 220	15 046	14 902	15 203	16 389	17 688	18 857	20 015	21 199	22 331

3. Cash Flow Maps and DCF

In € million	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Core Business															
EBIT	2 992	2 006	2 272	4 609	4 494	4 326	4 194	4 031	3 868	3 609	4 137	4 676	5 227	5 792	6 373
Taxes	547	359	1 493	1 274	1 124	1 082	1 049	1 008	967	902	1 034	1 169	1 307	1 448	1 593
NOPLAT	2 445	1 648	779	3 335	3 371	3 245	3 146	3 023	2 901	2 706	3 103	3 507	3 920	4 344	4 780
Depreciations and Amortizations	2 466	2 294	2 298	2 444	2 448	2 424	2 400	2 377	2 354	2 332	2 309	2 288	2 266	2 245	2 224
Operational CF	4 911	3 942	3 077	5 779	5 818	5 668	5 546	5 400	5 255	5 038	5 412	5 795	6 187	6 589	7 004
Net CAPEX	-3 272	-2 080	-1 995	-2 607	-2 104	-2 087	-2 070	-2 053	-2 037	-2 021	-2 005	-1 990	-1 974	-1 959	-1 944
CF from Δ NWC	-5 805	2 922	3 552	501	6 715	-710	29	27	-413	-1 236	-994	-867	-855	-880	-824
CF from Δ Other Operating Assets	-1 094	-561	3 630	-5 907	-342	-321	-493	-427	-481	-132	-168	-202	-236	-269	-302
CF from Δ Other Operating Liabilities	1 841	483	1 370	2 099	-5 697	111	307	221	276	-128	-441	-398	-358	-321	-286
Investment Cash Flow	-8 330	764	6 557	-5 914	-1 427	-3 006	-2 227	-2 232	-2 655	-3 518	-3 608	-3 457	-3 424	-3 430	-3 356
Unlevered Operational FCF	-3 419	4 706	9 634	-135	4 391	2 662	3 319	3 168	2 600	1 520	1 804	2 337	2 763	3 160	3 648
Non-Core Business															
Operational Cash Flow	2 263	-1 239	-2 438	495	338	343	350	357	364	367	370	373	377	382	387
Invest															

In (million)	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
NOPLAT					5 818	5 668	5 546	5 400	5 255	5 038	5 412	5 735	6 187	6 569	7 004
Investment Cash Flow					-1 427	-3 006	-2 227	-2 232	-2 655	-3 318	-3 808	-3 457	-3 424	-3 430	-3 356
Invested Capital				14 638	16 065	19 071	21 298	23 530	26 185	29 703	33 311	36 768	40 192	43 622	46 378
Unlevered Operational CF					4 391	2 662	3 319	3 168	2 600	1 520	1 604	2 337	2 763	3 160	3 648
ROIC					39,75%	35,28%	28,08%	25,36%	22,33%	19,24%	18,22%	17,40%	16,83%	16,39%	16,06%
FR					24,53%	53,03%	40,15%	41,34%	50,82%	69,82%	66,87%	59,68%	55,34%	52,05%	47,32%
RONIC					9,75%	10,5%	11,68%	10,48%	11,28%	13,43%	12,15%	10,38%	9,31%	8,53%	7,63%
B ₀					1,19	1,19	1,18	1,18	1,18	1,18	1,17	1,17	1,17	1,17	1,16
Re					11,5%	11,4%	11,4%	11,4%	11,4%	11,3%	11,3%	11,3%	11,3%	11,2%	11,2%
Debt/Equity	31,3%	15,5%	32,8%	25,0%	25,0%	24,7%	24,4%	24,1%	23,8%	23,6%	23,3%	23,0%	22,7%	22,5%	22,0%
Debt/EV	23,8%	53,6%	24,7%	20,0%	20,0%	19,8%	19,6%	19,4%	19,2%	19,1%	18,9%	18,7%	18,5%	18,3%	18,0%
WACC					9,33%	9,33%	9,33%	9,33%	9,33%	9,33%	9,33%	9,33%	9,33%	9,33%	9,33%
EV					123 227,64	131 404,83	140 496,88	151 005,78	163 575,69	177 035,56	191 218,83	206 301,23	222 395,33	239 505,43	

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
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Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance
from the NOVA – School of Business and Economics.

IMPACT OF GDP GROWTH ON AIRBUS' ORDERS

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A Project carried out on the Master in Finance Program, under the supervision of:
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January 3rd, 2020

Abstract

This study aims to understand the impact of GDP growth on Airbus' Orders of commercial aircrafts. Literature says that each percentage point increase in real GDP translates into a 2p.p. increase in growth of passenger air travel. For the 20 countries with the highest amount of orders, a regression between GDP growth and the amount of orders between 2006 and 2018 was computed. For most countries GDP growth did not significantly affect the amount of orders. Besides, a regression between the World GDP growth and Airbus' Orders was computed. This regression showed a small but positive relationship between World GDP and Airbus' orders.

Keywords

GDP Growth, Airbus, Air Traffic, Passengers Carried

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1- Introduction

The purpose of this research is to understand the impact of GDP growth on Airbus' Orders. Airbus is a leading manufacturer of aircrafts and there is an Airbus aircraft landing every 1.5 seconds around the world. The sector represents \$2.7 trillion in global GDP (IATA, 2019)¹ and the company is present in the aerospace, military, defense and space segments. The company valuation is mostly affected by the sale of aircrafts driven by the demand of aircrafts from airlines, governments or private buyers.

The demand for aircrafts from airlines depends on: the growth of global air traffic, growth or renovation of the fleet. Some factors that are related to the growth of air traffic are: wealth, income, ticket prices, inflation, exchange rate and urbanization.²

The demand of aircrafts from airlines is correlated with the economy health. GDP growth measures how fast the economy is growing, and this indicator can explain variations in aircrafts' orders.

Airbus' orders vary a lot every year and even though the economy's health is one reason for this, other reasons are the growth and expansion of the fleet that are subjected to airport capacity or the replacement of old aircrafts from airlines.

This study will focus on previous literature about the impact of GDP growth on the demand of aircrafts from airlines. To understand this, the impact of GDP growth on the amount of orders (for the countries with the biggest percentage amount of orders) with Airbus during the period from 2006 until 2018 will be studied. It is expected that if GDP growth is positive, then the demand for aircrafts will increase.

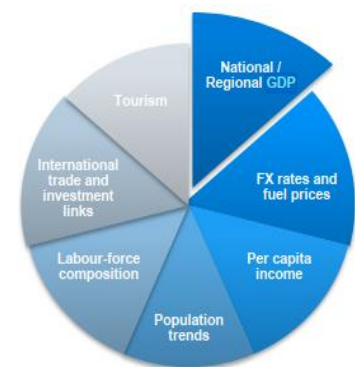


Exhibit I: Economic activities that affect air travel
Source: European Commission (2017)

2- Literature Review

Scientific literature finds consensus on the fact that aviation traffic is statistically correlated to economic growth.³ GDP growth measures the increase in the economy production when compared to

¹ IATA. (2019). *Annual review 2019*.

² European Commission. (2017). *Annual analysis related to the EU air transport market 2016*.

³ BCG. (2006). *Understanding the demand for air travel: how to compete more effectively*.

the last quarter. Every year, firms such as IATA, Boeing and Airbus forecast air traffic assuming a linear correlation between GDP growth and traffic growth.⁴ This correlation means that there is a strong dependence of traffic growth on economic growth or that what affects economic growth also affects traffic growth. For example, if oil prices increase, it will affect demand for plane tickets, but it will also affect different levels of the economy.

The Aerospace and Defense sector is more sensitive to macroeconomic changes. One can see from Exhibit II that when the economy slows down, this industry follows and when the economy recovers, the sector also heavily benefits from that.

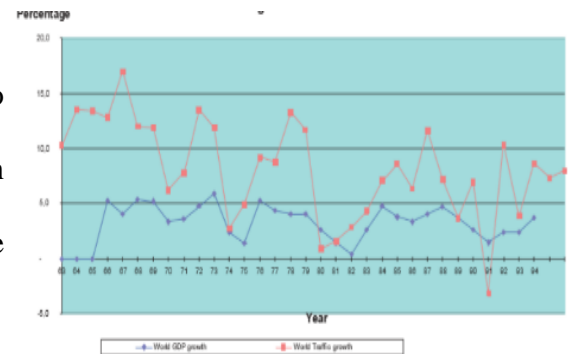


Exhibit II: World GDP growth and Traffic Growth
Source: ICAO, IMF

According to KPMG (2016), GDP growth is the most important indicator for the aerospace industry since on average, each percentage point increase in real GDP roughly translates into a 2p.p. increase in growth of passenger air travel. Consequently, growth in air travel drives new commercial aircraft orders which, in turn, drives growth across the sector.⁵

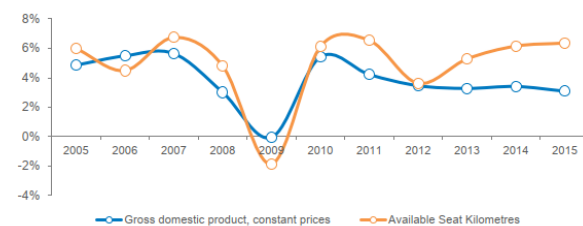


Exhibit III: Relationship of Real GDP and Air Travel
Source: European Commission 2017

Beyond the increasing GDP, companies buy aircraft to replace old planes. It is expected that during the next 20 years, 40% of all new aircrafts will be for replacements. According to Travel Pulse (2015), an aircraft operates on average 11 years and they become more expensive to operate as they age.⁶ Another factor that increases air traffic is lower oil prices because fuel saving revert in lower fares and individuals can spend more in leisure such as traveling. Besides, despite the desire of airlines in expanding and growing their fleet, one major problem is airports capacity. According to The International Transport Forum, over 80% of the commercial air traffic is based on the top 100 airports worldwide.⁷

⁴ Lenoir, N. (1998, July). *Cycles in the air transportation industry*. WCTR 1998, 8th World

⁵ KPMG. (2016). *Growth and uncertainty: Highs and lows in the aerospace and defense Sectors*.

⁶ Travelpulse, How old is too old for a commercial airplane? (2015).

⁷ International Transport Forum. (2017). *Analysis of two airport cases of restricted capacity in different countries*.

3- Data Used

The data used to understand the impact of GDP growth on Airbus' orders was: the total net orders of commercial aircrafts from Airbus per year from 2006 to 2018⁸ and the GDP growth of all countries.⁹

For each country, the percentage of orders relative to the total amount of Airbus' orders has been estimated. In order to do this the amount of orders from undisclosed people/companies (633 orders) and the amount of orders from governments, executive and private jets (224 orders) were excluded from the total amount of orders in Airbus (until September 2019). Consequently, the total amount of orders considered were 18,610 orders.

For the purpose of this research, the 20 countries that ordered the highest percentages of planes are analyzed, jointly representing 80% of the total orders. The 20 countries with the biggest amount orders in Airbus are: United States (21%), China (10%), Ireland (6%), India (4%), United Kingdom (4%), Malaysia (4%), Germany (4%), Singapore (3%), Japan (3%), Hong Kong (2%), Georgia (2%), United Arab Emirates (2%), Turkey (2%), Hungary (2%), Spain (2%), Colombia (2%), Indonesia (2%), Australia (2%), Chile (2%), Mexico (2%). To calculate the orders for each year from each country, these proportions were assumed to be constant every year. This assumption is not consistent with the hypothesis being studied. Although, there is not information on the amount of orders per year and country. For each year from 2006 to 2018, it was considered that the orders for each country was the percentage of orders for that country times the amount of orders during that year. From this, it was possible to do a regression to understand what the impact of GDP growth on the orders of that country was during 2006 to 2018. In addition to this, a regression was computed between the World GDP and Airbus total orders between 2006 and 2018.

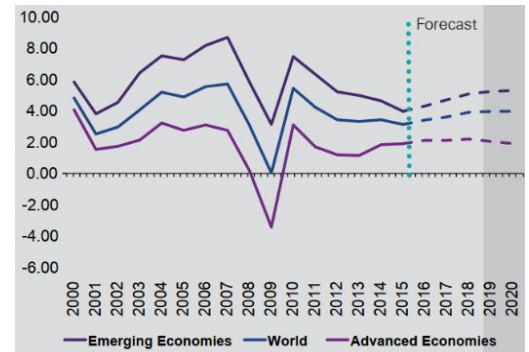


Exhibit IV: Global GDP (Annual % change)
Source: KPMG

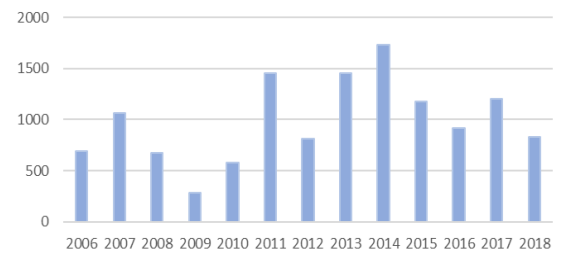


Exhibit V: Airbus' net orders per year
Source: The Author

⁸ Airbus, Orders and Deliveries. (2019).

⁹ The world bank, GDP growth. (2019).

4- Data Analysis

The regression analysis provides at least some evidence that GDP growth might positively influence Airbus' orders. Most coefficients are positive which is consistent with the hypothesized relationship. For most countries GDP growth insignificantly predicts Airbus' orders for that country. Only 3 out of the 20 countries analyzed are **significant** at a 5% level, namely Hungary, Turkey and the UK. For these countries GDP growth seems to be positively related to the amount of orders.

Country	Coefficient	Standard error	T-statistic	P-value
US	27,612	15,314	1,803	0,099
China	-4,828	4,596	-1,050	0,316
Ireland	1,271	0,856	1,484	0,166
India	-0,981	3,573	-0,275	0,789
UK	5,875	2,040	2,880	0,015
Malaysia	3,361	2,043	1,645	0,128
Germany	2,593	1,739	1,491	0,164
Singapore	-0,153	1,059	-0,144	0,888
Japan	1,553	1,361	1,141	0,278
Hong Kong	0,787	1,061	0,742	0,474
Georgia	0,630	0,659	0,956	0,360
United Arab Emir	1,114	0,639	1,744	0,109
Turkey	1,260	0,493	2,556	0,027
Hungary	1,520	0,639	2,377	0,037
Spain	0,475	0,831	0,572	0,579
Colombia	1,219	1,009	1,209	0,252
Indonesia	-0,090	3,500	-0,026	0,980
Australia	-0,274	3,182	-0,086	0,933
Chile	0,277	0,871	0,318	0,756
Mexico	0,903	0,722	1,252	0,237

Exhibit VI: Summary of Statistics
Source: The Author

Airbus biggest consumer, the U.S. ($p = 0.10$) also shows a **marginally significant** (10% level) but positive relationship between GDP growth and the amount of orders. Interestingly the coefficient for the U.S. is rather large (27.61) compared to the other countries. One should also note that the R^2 for these countries are also relatively high. Furthermore, there are a number of countries that are **almost significant** at the 10% level. United Arab Emirates ($p = 0.11$), Germany ($p = 0.16$), Malaysia ($p = 0.13$) and Ireland ($p = 0.17$) are all near the 0.1 threshold. Again, all these countries have positive coefficients in line with theory. For all other countries GDP growth does not seem to explain any variance in the amount of orders.

The regression between the World GDP and amount of orders per year showed that World GDP is **marginally significantly** related to Airbus' orders. The coefficient shows a small but positive relationship between World GDP and Airbus' orders. Furthermore, it is possible to understand the World GDP growth **explains 28%** of the variance in Airbus' orders.

	Coefficients	Standard Error	t Stat	P-value
Intercept	-580,35157	753,3414969	-0,77037	0,457307
X Variable	0,02224202	0,010567534	2,10475	0,059112

Regression Statistics	
Multiple R	0,535819
R Square	0,287102
Adjusted R Square	0,222293
Standard Error	359,3384
Observations	13

Exhibit VII: Regression output between World GDP and Total Orders between 2006 and 2018
Source: The Author

5- Discussion

5.1- Conclusions

Despite similar changes in World GDP growth and Passengers Carried Growth, this study shows that GDP growth influences but it's not the only factor impacting Airbus' Orders. It is possible to conclude that for some of the countries, GDP growth totally explains the variation on Airbus' Orders for that country.

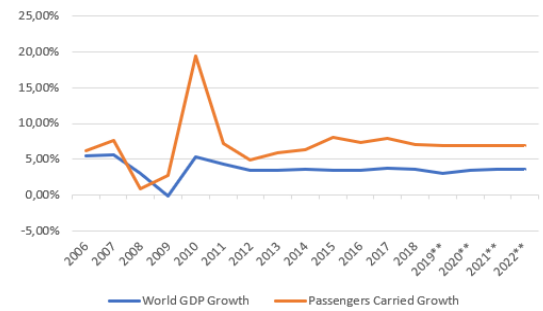


Exhibit VIII: Percentage Growth of World GDP and Passengers Carried
Source: The Author

GDP growth is **significant or almost significant** for the United States, Ireland, United Kingdom, Malaysia, Germany, United Arab Emirates, Turkey and Hungary. Although, for most of the countries, as GDP growth was the only independent variable considered to justify variations in Airbus' orders, it didn't justify the orders for that countries. This was the case for, China, India, Singapore, Japan, Hong Kong, Georgia, Spain, Colombia, Indonesia, Australia, Chile and Mexico.

There are many reasons that justify that **GDP growth is not sufficient** to justify variations on orders in these countries. For example, some companies are in these countries for tax redemption purposes, airlines do not only transport people from the country where the company is based, or because human resources are cheaper in these locations, but they possibly don't operate in the country. Besides, other reasons can be related to the fact that airlines also buy aircrafts not only due to more demand but also to replace old aircrafts, and even if people are traveling more and there is need of more aircrafts in a country, airport capacity constraints is a limitation for airlines.

5.2 – Research Limitations and Future Research

Perhaps there are some confounding variables clouding the relationship between GDP growth and the amount of orders that are not identified in this paper. It could also be the case that the estimated orders do not correspond with the actual orders. The assumption of equal proportions of orders per country does not hold, but there is not information on that. Thus, having access to the actual orders would provide more accurate results. For the future, it would be interesting to study what is the impact of GDP growth on Airbus' real orders and the impact of airports capacity constraints on the demand of aircrafts.