



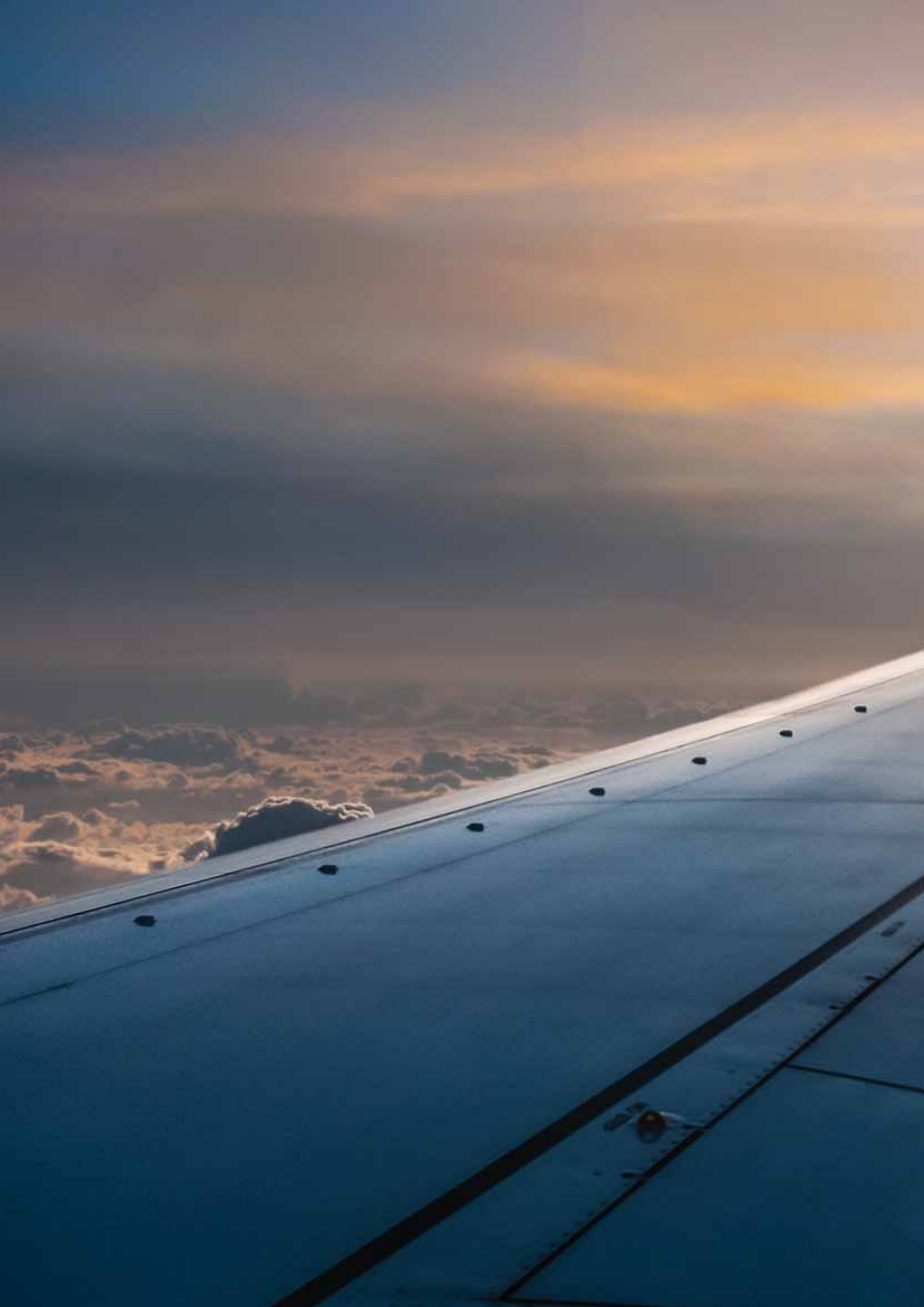
Aviation finance: an interesting prospect for long-term investors

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Executive summary

A sustained low-yield environment and demanding regulatory requirements have placed considerable pressure on insurance companies and pension schemes over the last few years. In response, investors have looked to less liquid, alternative investments that offer a higher risk-adjusted return. Increased investor appetite has led to a reduced yield on more “traditional” loans and a search for more unconventional opportunities. This paper looks at one such opportunity: aviation finance.

There is considerable demand for finance in the aviation space, and institutions such as insurance companies and pension schemes can play an important role in meeting this need. Funding is provided in various forms, from traditional shares and loans to aviation specialist products such as enhanced equipment trust certificates. The characteristics and investor rewards vary widely across different products. We

believe that some of these characteristics may appeal to institutional investors – in particular, the opportunity to access investment grade debt collateralized on a long-lasting asset. However, there are also a number of operational and analytical challenges that can either be performed in-house or outsourced to external parties. These include the need for sector-specific expertise, the complexity around asset valuations under various regulatory regimes, and also the potential requirement for system developments.

This paper begins by exploring the aviation finance landscape, including why there is a demand for finance, who has met this demand historically and what forms financing can take. The paper continues to consider the investment opportunity from the point of view of an institutional investor and asks: why would an insurer or pension scheme want to invest in aviation finance, and what are the challenges of doing so?



An overview of aviation finance

What is aviation finance?

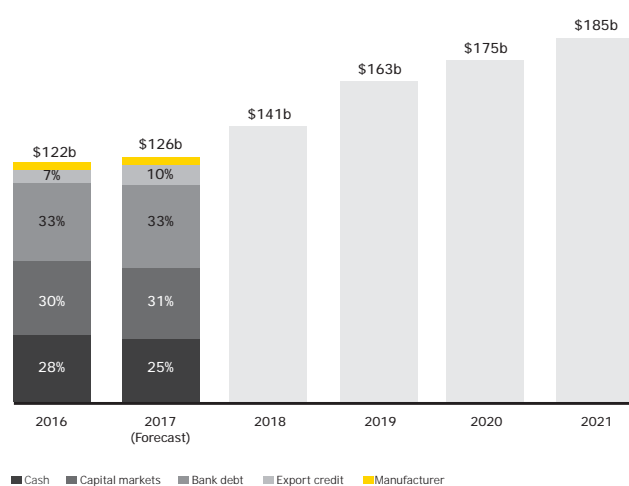
The term aviation finance refers to the provision of capital to airlines and leasing companies so that they can purchase (or refinance) commercial aircraft. Capital can be in the form of debt or equity. Given insurers' preference for fixed cash flows, this paper focuses on aviation debt.

Why is there a demand for aviation finance?

Air travel volume has more than doubled in the past 15 years in response to a growing global economy.¹ In 2016, Boeing and Airbus delivered a combined total of \$122b worth of aircraft; and as illustrated in Figure 1, this amount is expected to rise to \$185b by 2021. Airlines typically operate on low margins and, as a result, look to external sources to raise funding in order to replenish their fleet.

Leasing agents have become a core part of the aviation industry. Leasing reduces the initial capital outlay for airlines, provides access to the latest technologies and models, and allows airlines to flex the size of their fleet to mirror demand. In 2016, approximately 40% of demand for funding came from lessors.²

Figure 1: Boeing and Airbus aircraft production: a view of the financing forecast for global commercial plane deliveries



Source: Boeing Current Aircraft Finance Market Outlook 2017

Key

Cash	Funded with cash reserves or operating cash flow; not expected to be refinanced or leveraged. Includes cash equity for other financing structures.
Capital markets	Secured by structured debt transaction, such as enhanced equipment trust certificates (EETC) or unsecured debt raised by an airline, lessor or parent companies that may be used to directly or indirectly finance a delivery. May be issued in either the public or private markets.
Bank debt	Financed with aircraft-secured or unsecured commercial bank debt that may be used to directly or indirectly finance a delivery.
Export credit	Supported by a guarantee from an export credit agency, including both commercial bank loans and bond transactions funded in the capital markets. Direct export credit lending also included.
Manufacturer	Support provided by the manufacturer to aid purchase of their product.

¹As measured by revenue passenger kilometers in the report "Boeing Traffic and market outlook": www.boeing.com/commercial/market/long-term-market/traffic-and-market-outlook/.

²Boeing Current Aircraft Finance Market Outlook 2017 http://www.boeing.com/resources/boeingdotcom/company/capital/pdf/2017_BCC_market_report.pdf.

Where does aviation funding come from?

Airlines and lessors benefit from a diverse funding landscape, with capital provided by banks, through export credit agencies and capital market entities such as insurance companies, pension schemes and investment funds.

Historically, commercial banks have been one of the main sources of finance to the aviation market.³ However, the development of innovative capital market products have enticed new investors into the space over the past few years. The proposed Basel IV regulations could increase the amount of capital banks are required to hold against aviation (and other long-duration illiquid) assets and, therefore, could act to reduce banks' participation in the market (in areas where the Basel accords are ratified).⁴

Export Credit Agencies (ECAs) and, on occasion, manufacturers also provide finance. ECAs are quasi-governmental institutions that guarantee loans to purchase products manufactured domestically in a bid to increase exports. These loans became popular following the 2008 financial crisis, as they allowed access to relatively cheap finance at a time when bank lending was scarce. Since then, we understand these loans have become less popular as the prescribed terms (as set out in Aircraft Sector Understanding) have become less competitive in comparison to other sources of funding.⁵

Figure 2: breakdown of industry delivery financing since 2009, by capital provider

	2011	2012	2013	2014	2015	2016	2017F
Cash	25%	26%	25%	24%	23%	28%	25%
Capital markets	15%	18%	19%	28%	34%	30%	30%
Bank debt	27%	23%	30%	33%	30%	33%	33%
Export credit	33%	33%	26%	15%	13%	8%	10%
Manufacturer	0%	0%	0%	0%	0%	1%	2%
Total volume (US\$ billions)	\$77	\$98	\$104	\$115	\$122	\$122	\$126

Source: Boeing Current Aircraft Finance Market Outlook 2017

³ Investec report – Aviation leasing as part of a broader investment portfolio.

⁴ Basel IV is the fourth of the Basel Accords and is expected to require more stringent capital requirements and greater financial disclosure.

⁵ The OECD 2011 Aircraft Sector Understanding set unified terms, conditions and procedures of official support for large and regional aircraft exports, for its participants.



What forms can aviation finance take?

There are a range of different debt opportunities available. These can broadly be divided into four groups, depending on whether obligations are secured or unsecured and by whom you are lending to.

	Lending to an airline	Lending to a leasing company
Secured	<ul style="list-style-type: none"> ▶ EETC ▶ Secured loans ▶ ECA debt 	<ul style="list-style-type: none"> ▶ ABS ▶ Secured loans ▶ ECA debt
Unsecured	<ul style="list-style-type: none"> ▶ Unsecured bonds 	<ul style="list-style-type: none"> ▶ Unsecured bonds

Figure 3: this table explores each of these four forms of aviation finance and provides a market example in each case:

Type of debt	Description	Example ⁶
ECA debt	These are credits guaranteed by an ECA. They are set on standardized terms, with a maximum tenure of 12 years.	In April 2015, the US Export-Import Bank agreed to support financing for five Boeing 747-8s worth over \$984m for Korean Air.
Unsecured bonds	These are publicly issued bonds that are not collateralized on underlying assets. This type of finance tends to be more popular with leasing companies who prefer the flexibility in term and payment profile.	In May 2016, AerCap (an aircraft leasing company) issued \$1b of unsecured bonds, rated BBB ⁷ with a 6-year term, at a yield of 3.988%. The bond was issued at 99.813% of par with a 3.95% coupon.
Secured loans	These are private loans collateralized on underlying aircraft equipment and therefore, unlike unsecured bonds, investors have recourse to the underlying collateral in the event the issuer defaults. Lessors and airlines have differing borrowing requirements; therefore, this form of debt varies depending on the entity to which one lends.	In January 2016, Natixis arranged a \$470m recourse facility for Goshawk Aviation. The deal was secured against 22 young narrow bodies, on long-term leases.
Asset-backed security (ABS)	This is a type of structured product typically favored by airline leasing companies. In return for capital, investors are provided with notes entitling them to a stream of coupon and principal payments. Notes are typically issued in tranches, where the tranche relates to the priority of repayment. Notes are collateralized on and met by a large portfolio of aircraft and attaching rental contracts. The leasing company acts as the servicer to the portfolio, dealing with maintenance, repossession and sale of the aircraft.	In August 2016, Castlelake closed a \$916m aircraft securitization. Three tranches of notes were issued to investors rated A, BBB and BB ⁸ with coupons of 4.45%, 6.15% and 8%, respectively. The notes were securitized against a portfolio of 52 aircraft that were on loan to 20 different airlines.
Enhanced equipment trust certificate (EETC)	This is a structured debt instrument issued by a single airline. Similarly to an ABS, notes (which include coupon and principal repayments) are issued to investors in tranches. The EETC typically provides a credit enhancement to that of the underlying issuer as a result of tranching the notes, use of a liquidity facility and cross-default provisions across the underlying collateral.	In September 2016, American Airlines issued an EETC raising \$814m to finance 25 aircraft. Two tranches of notes were issued: a senior tranche rated Aa3/AA+, initial average life of 8.8 years and a 3% coupon and a junior tranche, rated A2/A+ initial average life of 8.8 years and a 3.25% coupon. ⁹

⁶ Source: Flight Global, Aircraft investor.

⁷ Rated by Standard and Poor's.

⁸ Rated by Standard and Poor's and Kroll Bond Rating Agency.

⁹ Rated by Moody's investors service and Standard & Poor's.



Aviation finance as an opportunity for institutional investors

Why invest in aviation finance?

Aviation debt provides an opportunity for insurers to access investment grade debt collateralized on long-lasting assets. Below we explore some of the key characteristics of this asset class.

Investment characteristic	Details
Stable cash-flow profile	Aviation debt cash flows are contractual and to that extent are known in advance. However, some forms of investment allow the borrower to repay early. While in many cases borrowers are required to compensate the lender if they prepay, this introduces uncertainty to the level and timing of cash flows.
Long-term cash flows	Aviation debt is available at a range of tenors. EETCs tend to offer the longest cash-flow term. In 2015 the average "A" tranche issuance had a 12-year term and 9-year weighted average life. In the past, the contractual terms available on aviation debt have largely been driven by banks. As borrowers look increasingly to the capital markets for finance, we expect to see divergence from traditional formats. In particular, we believe borrowers would be willing to issue longer-term debt, if favored by lenders.
Security	<p>In secured forms of aviation debt, cash flows are secured on physical assets. Unlike property, these assets are fungible and can be relocated with ease. This means that sale is not restricted by the geography of the purchaser, as in the case of real estate, for example. With thousands of aircraft operators globally operating on similar aircraft, which limits asset characteristics, there is an expansive secondary market for sale.</p> <p>Some aircraft – particularly the more widely used, newer-production models – could be considered to be relatively resilient to market stress. For example, following 9/11, while demand for air travel was greatly reduced, the value of these "Tier 1" aircraft typically fell by 10%-20% (compared to, for example, American Airlines and United Airlines, whose stocks fell by more than 40% during a comparable period).¹⁰</p> <p>Aircraft have finite economic lives (historically, approximately 25 years), which means that the value of the underlying collateral reduces over time. Despite this, deals are often designed such that collateral protection increases over time. This is where the debt amortizes faster than the underlying asset is expected to depreciate. However, deals that include a large payment toward the end of the loan are also common (particularly on shorter-term financings).</p> <p>Aircraft finance is also a more stable form of collateral given the limited asset idiosyncrasies (if, for example, compared to other illiquid-type assets like commercial real estate loans), where the value of most models is driven by global rather than local demand. Global recessions do happen, but they tend to be less severe than those in individual markets.</p>

¹⁰ Source: Fitch Ratings report entitled *Rating Aircraft Enhanced Equipment Trust Certificates*.

Investment characteristic	Details
Regulatory protection	<p>Aviation is a highly regulated industry. Investor capital is often protected in two ways:</p> <ul style="list-style-type: none"> ▶ Through creditor protection, e.g., international agreements such as the Cape Town Convention, which protects investors in the event of default by ensuring swift recoveries.¹¹ Following default, the Cape Town Convention permits the borrower a defined period (usually 60 days) to return the aircraft to the creditor. ▶ Through operational control and maintenance of the aircraft. The operating procedures and safety frameworks implemented by national regulators are critical, particularly to preserve collateral value. Aircraft have to be operated and maintained by authorized personnel through regulated bodies. The existence of such regulation should give comfort to investors given the limited operational and financial involvement for investors in the event they have to take possession of the aircraft.
High recoveries	<p>Generous collateral arrangements and regulatory protection has led to high historical recoveries. For example, a study by Kroll Bond Rating Agency shows that recovery rates on EETCs from 1994 to 2014 were 99.8%, 96.1% and 92.7% for A, B and C tranches, respectively. Note that EETCs typically issue notes in tranches, where the tranche relates to the priority of repayment.¹²</p>
Currency	<p>Aviation debt is predominantly US dollar denominated; however, as borrowers look to tailor debt toward new capital market investors, we expect to see an increased number of issuances in alternate currencies. For example, in 2015 Turkish Airlines issued aviation debt in Japanese yen.¹³ While this may be useful to non-US investors wishing to currency-match obligations, aircraft are typically purchased and sold in US dollars, thus creating a currency mismatch within the transaction.</p>
Diversification	<p>Aviation finance offers investors diversification to more traditional insurance asset classes, as the impact of market recessions tend not to impact the asset class in the same way as more traditional asset classes. For example, Tier 1 aircraft values typically declined 10%–20% during both the 2001–2005 and the 2008–2014 market downturns. This reflected relatively resilient demand even in a period of historically weak air travel demand and substantial airline capacity reduction.¹⁴</p>

¹¹ The Cape Town Convention on International Interests in Mobile Equipment (or Cape Town Treaty) is an international treaty designed to standardize transactions involving mobile equipment, including aircraft. It aims to protect creditors by bringing speed and certainty to the repossession process.

¹² Kroll Bond rating agency study: *EETC Historical recoveries and current outlook*.

¹³ Kroll Bond rating agency study: *EETC Historical recoveries and current outlook*.

¹⁴ Source: Fitch Ratings report entitled *Rating Aircraft Enhanced Equipment Trust Certificates*.

What are the challenges for an investor considering investing in aviation finance?

There are a number of practical and operational challenges involved when investing in aviation debt. We explore these further below.

Operational challenges

Aviation debt is a niche asset that requires extensive market knowledge to access markets and assess contractual features and collateral offerings.

Operational intensity varies depending on the form of investment held and the complexity of the transaction. For example, default management is one area where the required effort varies widely. In an ABS, it is the leasing company's responsibility to manage repossession and resale upon default of the underlying airline. In contrast, following default of an EETC or a private loan, it is the investor's responsibility to resolve the default. This could include obtaining an aircraft valuation, renegotiating the debt structure or repossessing and remarketing the aircraft. Understanding the operational efforts required and having the appropriate operational solution is key.

Valuation is critical

Institutional investors are often required to report the "fair value" of their assets under various regulatory regimes. This is a challenge for investors of private asset classes such as aviation debt, where there is no market observable price. Instead, investors are likely to need to take a mark-to-model approach. Building such capability can be challenging. This is partly due to the lack of industry transparency and available data and partly to the complexity of aviation debt instruments. The level of complexity will depend on the form of investment. For example, with a private loan one would need to assess:

- ▶ Credit quality of the issuer
- ▶ Strategic value of the aircraft to the operator
- ▶ Quality and desirability of aircraft and expected resale value (allowing for repossession and marketing costs)
- ▶ Repayment profile and how this compares to the projected depreciation of the underlying debt
- ▶ Speed of recourse to the underlying debt, on default

Structured products are comparatively more complex. For example, with an ABS, there are additional factors that would need to be considered when making a valuation assessment, including:

- ▶ Presence of structural features such as a liquidity facility
- ▶ Payment priority of the noteholder
- ▶ Credit quality of the airlines leasing the underlying pool of aircraft
- ▶ The leasing companies' ability to service the portfolio

Despite the difficulties outlined above, there are market observable prices on public debt securities (subject to the liquidity of individual issues) which provide a starting point for financial investors.

However, investors should note that there is a wide dispersion of debt pricing for what analysis would suggest are similar levels of risk.

Having the appropriate solution in place to assess and monitor the different components of value is critical to an investment in aviation debt.

Capital requirements

Both pension schemes and insurance companies are required to hold assets in order to meet future liabilities. It is therefore key to have a thorough understanding of the risks of assets held. This is particularly important to insurers who are required to hold capital against the risks within their portfolio. Insurers are encouraged to understand and model these risks as part of calculating their capital requirements. Here, we explore the likely capital requirements under the standard formula for Solvency II as a proxy for the real risks that investors may wish to consider.

Figure 4 sets out the Solvency II capital charge likely to be applied to aviation debt under the Solvency II standard formula. For capital market structures, the treatment is less clear, as both the spread risk and securitization module could be argued to apply.

Figure 4: expected Solvency II (standard formula) capital charges applied to aviation debt

Type of debt	Indicative capital charge (assuming a 10-year duration)	Comment
ECA loans	0%	When the ECA has an explicit guarantee from a highly rated government and issuance is in the ECA's own currency, these loans are likely to receive a 0% capital charge.
Private debt	11.75%-23.5%	The applicable capital charge depends on whether the collateral is deemed to meet the requirements of Article 214. ¹⁵
Unsecured bond	23.5%	Given this is unsecured debt, the full 23.5% spread risk module charge is likely to apply.
ABS/EETC	11.75%-23.5%	If the spread risk module can be applied, then as above, the charge will depend on whether collateral meets the requirements of Article 214.
	15%-100%	If the securitization module is applied, the charge applied depends on whether the structure meets the requirements of a type 1 securitization. ¹⁶ However, Recital (50) of the Capital Requirements Regulation states that <i>"An exposure that creates a direct payment obligation for a transaction or scheme used to finance or operate physical assets should not be considered an exposure to a securitization, even if the transaction or scheme has payment obligations of different seniority,"</i> which suggests that the spread risk module is most likely to be applied.

¹⁵ Article 214 allows more beneficial capital requirements if the collateral is deemed to meet a set of criteria. The requirements of Article 214 are threefold: insurers have the right to liquidate or retain the collateral in the event of default or bankruptcy; the collateral offers sufficient certainty or protection either through its inherent value and liquidity or via a third-party guarantee; and that the value of the collateral is not meaningfully tied to the credit quality of the counterparty.

¹⁶ As defined by Article 177 section 2 of the Delegated Regulation (EU) 2015/35 of 10 October 2014.

However, it is possible that an investment in aviation finance would require some (partial) internal model development, as the standard formula does not accurately capture all the idiosyncratic risks inherent within aviation. A selection of these risks is set out below.

Default risk

Risk of borrower default; for example, where default is due to a macroeconomic downturn, increased fuel prices or maintenance costs or caused by defaults on the underlying lease.

Prepayment risk

Aviation debt contracts often allow borrowers to repay early.

Residual value risk

Risk of re-lease or sale at a reduced value. The size of this risk will vary depending on its position in the product life cycle, number in service and on order, aircraft specification.

Liquidity risk

While the secondary market is deep and liquid, under times of extreme stress, such as 9/11, liquidity can be significantly reduced.

Residual value risk

Understanding residual value risk is a fundamental part in investing in aviation finance given the number of variables at play. Predicting the future value of an aircraft is core to a leasing company's success and is often driven by factors such as:

- ▶ Macroeconomic factors regarding the supply and demand for air travel
- ▶ Specifics relating to the underlying asset, such as regulatory changes (emissions, take-off weights or avionics), the life of the fleet and where the aircraft is in the model life cycle, popularity with airlines (e.g., engine choice and reliability) and a readily available secondary market (where demand factors e.g., narrow aisle vs. wide body or whether the leasing company operates in emerging markets vs. more mature markets play a role).

These factors are critical in predicting the residual value of the aircraft.

A case study for UK insurers – the matching adjustment

Capital requirements may be reduced where cash flows are deemed to meet the matching adjustment criteria. The matching adjustment allows insurers to apply a higher discount rate when calculating the company's Solvency II best estimate liabilities. This higher discount rate reduces the valuation of these liabilities, which can materially strengthen an insurer's solvency position. In order to gain approval to apply the matching adjustment, an asset must satisfy strict requirements in relation to the cash flows and the ongoing portfolio management and governance.

Aviation debt is unlikely to be eligible for matching adjustment in its unstructured form. To meet the matching adjustment requirements, insurers are likely to be required to hedge currency fluctuations so that asset cash flows are fixed to the insurer's domestic currency. This potentially may require restructure to remove any borrower optionality (e.g., prepayment options) where sufficient compensation is not provided.

Conclusion

This paper has introduced aviation debt landscape, the investor rewards and challenges. With approximately 40,000 new aircraft expected to be required over the next 20 years and additional capital for fleet refinancing, aviation finance represents a significant opportunity to lenders.¹⁷

Aviation debt could be considered an interesting prospect by insurers and pension schemes, given the opportunity to access stable cash flows that pay a premium for complexity and reduced liquidity. In addition, we understand from market participants that borrowers have indicated that they would be willing to tailor debt profiles to the needs of these investors – for example, issuing longer-term or non-US dollar denominated debt. However, aviation is and will continue to be a niche asset class. Investors will need to consider whether the opportunity justifies the cost of building or accessing the expertise and the development of operational systems.

How can EY help?

The EY Valuation and Business Modeling team has the largest integrated business, property and machinery Big Four valuation practice, with more than 10 years of aircraft appraisal and audit review experience. This includes valuation advice and support for:

- ▶ Purchase price allocation, fair value accounting (IAS 16), airline and aircraft lessee valuation audit reviews, impairment testing of Airline CGUs and International Financial Reporting Standard (IFRS) conversion
- ▶ Modeling for aircraft selection
- ▶ Financial services – valuations with portfolio acquisition and sale due diligence

In addition, EY has a wealth of experience advising insurance and pension scheme clients on the implementation of illiquid asset strategies. Particular areas we can help include:

- ▶ Financing arrangements – Providing independent advice to the lender or borrower of debt secured against aircraft assets
- ▶ Capital risk and analysis – Advising on structuring solutions and hedging strategies to maximize capital efficiencies
- ▶ Internal rating systems – Developing or validating an internal system used to assign a credit rating to aviation instruments
- ▶ Operational frameworks for onboarding assets – Guiding the development of a framework with a market-consistent valuation and capital methodology that meets the relevant asset data reporting requirements

¹⁷ Boeing: Current Market Outlook 2016-2035: http://www.boeing.com/resources/boeingdotcom/commercial/about-our-market/assets/downloads/cmo_print_2016_final.pdf.

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