

# The Importance of the LTV in Aviation Finance— How to Account for the Correct Value



**Realistic loan-to-value (LTV) calculations are a moving target that need to reflect uneven rates of aircraft depreciation over time. We urge investors to use an aircraft's constant half-life base value and to further stress these values. It is important that the amortisation of the investment is faster than the depreciating aircraft value. Investors must monitor the LTV over time and not focus solely on the initial and final LTV when entering into a transaction.**

Many assume that establishing the LTV of an aircraft transaction is a straightforward exercise: the right value simply needs to be applied to reflect the real risk exposure of a transaction. However, investors must understand the path of the LTV over time and monitor the rate of change so as to control risk exposure. While the L is easy to determine, the V is up for debate.

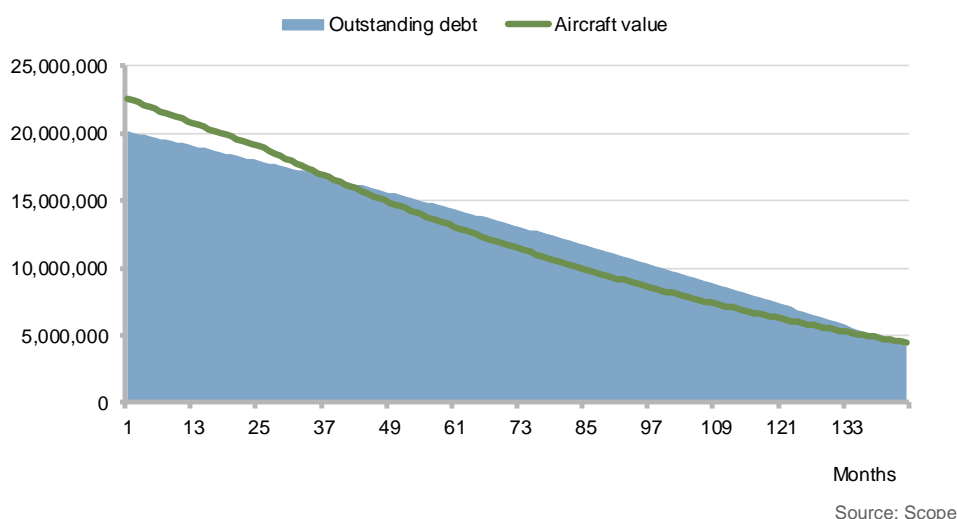
## LTVs – why they are important

The LTV indicates how much buffer the tranche in question has against an unexpected value decline. The quantification of the buffer makes it possible to calculate the severity of a default scenario. The investor will only suffer losses in the event of default if the LTV is above 100%. The importance of appropriately estimating the LTV cannot be emphasised enough. Accurate LTV is a vital factor in determining a transaction's risk, thus helping to define the appropriate compensation for the risk taken on by the investor. The LTV measures the security in a given transaction.

## LTV – a moving target

The LTV is a dynamic component that needs to be monitored over the lifetime of a transaction. The LTV needs to be estimated for each period in order to appropriately determine risk exposure as it is a constant risk component all the way to maturity. Loss given default should be estimated for each period before entering a transaction. This will highlight in which periods the transaction is under water and give the investor a clear picture of the risk taken on. The graph below illustrates why it is important to look at the LTV for each period and not just on day one. In Figure 1 the LTV is 85% on day one, but just 40 months into the transaction the LTV reaches 100%. It is therefore important to monitor the LTV to make sure the investment amortises in line with the depreciation of the aircraft. Preferably it should amortise more rapidly so as to create growing collateral support to further lower risk.

**Figure 1: Example transaction LTV**



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### Value – plenty to take from

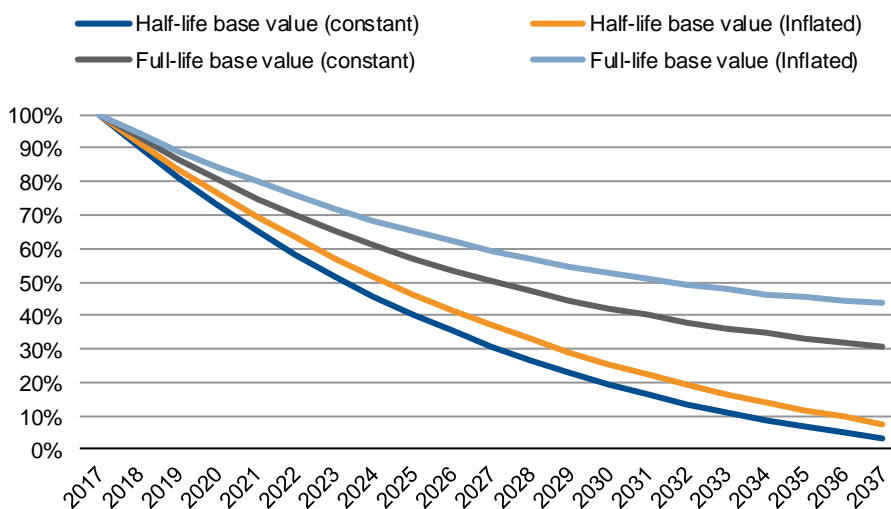
We need to use the appropriate values and depreciation assumptions when calculating the LTV to determine the risk of a given transaction. Both market value or base value can be used to calculate the LTV. Base value is the value of an aircraft traded in a balanced supply-demand market at an arm's length transaction. Market value is the value of the aircraft in the current market environment. We recommend using the base value to ensure an objective value determination. Forecasting the market environment for the full length of a transaction opens the door to bias and uncertain assumptions. The value of an aircraft depends on the aircraft's age, body, model phase and market environment. Age, body and model phase are all features that are easy to determine and can provide a good estimate of aircraft value. While the market environment can be determined for today, it is harder to forecast for the future.

Appraisers provide half-life and full-life aircraft values. Half-life means that the aircraft is between two major overhauls in its maintenance cycle. Full-life means that the aircraft is just out from a shop visit (i.e. a maintenance overhaul). In transactions where the lease contract states that the aircraft should be returned in full life, investors are often presented with an LTV calculation based on a full-life aircraft value.

Investors should consider what will happen in an event of default when determining the risk of a transaction. Investors are unlikely to receive an aircraft back in a full-life condition in a default scenario. The LTV can be distorted and lead to a false sense of security if the full-life value is used. The older an aircraft, the larger the difference between its half-life and full-life value, as demonstrated in Figure 2. A default event is more likely and the maintenance status more significant if the aircraft is older, as the probability of default increases as a function of time.

The same applies to inflated values – which investors are often presented with. We recommend using values that are not inflated in order to obtain a conservative evaluation of the contemplated transaction's risk level. Inflated values can provide a representation of real risks which is too optimistic, as demonstrated in Figure 2.

**Figure 2: Airbus A320-200 delivered in 2007**



Source: Oriel, Scope

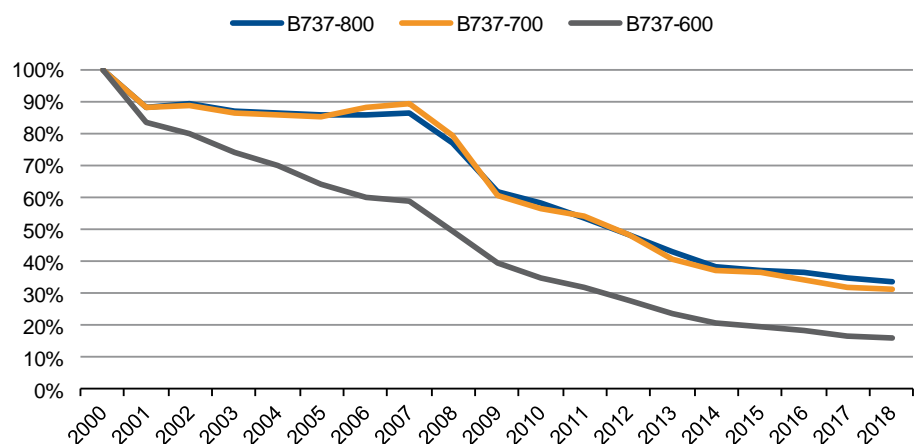
### Stressed values – controlling risk

Stressing an aircraft's base values compensates for volatility. A sufficient stress also helps simulate the effect which a market downturn will have on values. Unforeseen events (both market and aircraft related) can have a great impact on values. Many unforeseen events will fall under the stress assumptions which means that we do not need to simulate all possible scenarios when using a conservative stress. When the Boeing 787 was introduced onto the market, teething issues with the battery forced a grounding of the whole B787 fleet in 2013. Such an unforeseen issue can have a large impact on the value of the aircraft, especially if it is uncertain whether the issues can be resolved without heavy cost burdens for the operator and manufacturer. When using stressed values to calculate the LTV, it is possible to quantify the risk of aircraft values not recovering after an unforeseen issue or market downturn.

Aircraft value depreciation is also a function of the model's phase. An aircraft model being phased-out of production will see a sudden, sharp increase in value depreciation at some point. The impact may be heavier if another newer, more efficient model is scheduled to take its place. On day one of a 10-year transaction it is generally not possible to know whether or not the manufacturer plans to produce the aircraft model for the next 10 years. The introduction of a new generation model before transaction maturity can have a detrimental impact on the aircraft's value. An investor may experience a substantial loss if we see a default event at around the same time, unless this risk was accounted for when the transaction was entered into.

Figure 3 demonstrates the decline in value of three different Boeing 737 models during the 2001 and 2008 crisis. All three aircraft were delivered in 2000. Analysis has shown that newer aircraft models are more likely to recover their value after a crisis. In the 2001 crisis the value of all three models fell dramatically. The two newer -800 and -700 models recovered some of their value through low depreciation, or even appreciation, in the following years. The older -600 model did not see any value retention after the crisis had passed. A renewed fall in value was caused by the 2008 financial crisis. This crisis impacted the value of all three models at the same time and little to no value retention was seen in any model after the crisis. This demonstrates the importance of analysing how your investment will be impacted by a drop in value.

**Figure 3: Value decline in a crisis**

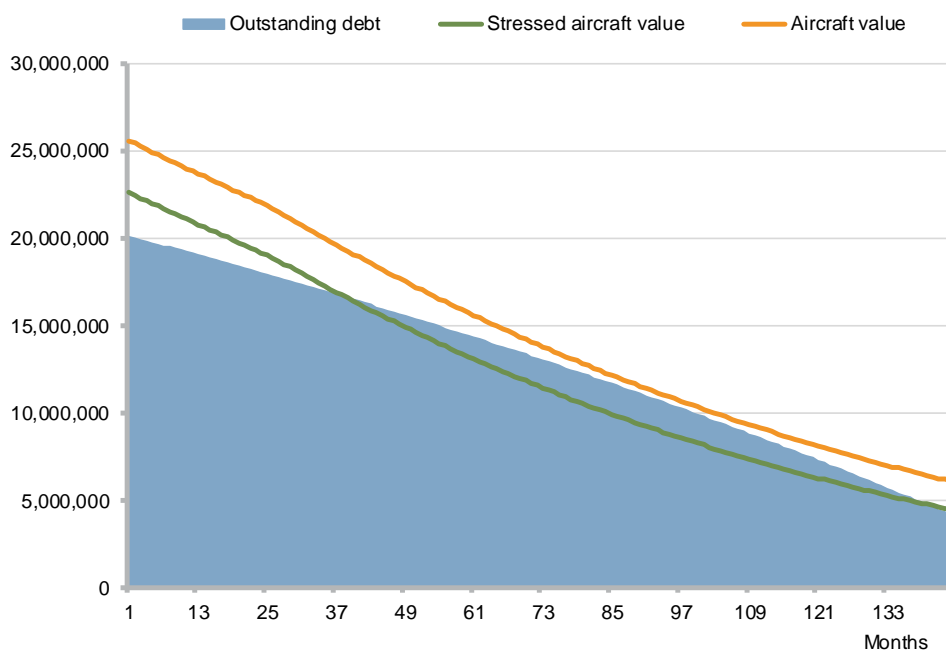


Source: AVAC, Scope

Figure 4 demonstrates the base value of an aircraft in a benign environment with the annual depreciation expected for an aircraft of its type. The LTV is expected to remain

below 100% until the legal maturity of the investment. When stressing the values, we see that a financial crisis or an unforeseen event could result in aircraft values that are below the outstanding debt. We thus allow for a calculation of the loss given default in a stressed market environment. This helps investors quantify the risk taken on in a volatile market environment.

**Figure 4: Base value vs stressed aircraft value**



Source: Scope

### Investors should calculate LTV themselves

As demonstrated above, LTVs can be based on metrics which are too optimistic. Risk might be underestimated if you use inflated market values and only consider the day-one and maturity LTV. We recommend that investors calculate the LTV themselves when contemplating an investment in aviation finance. The values used should be constant half-life base values with a stress sufficient to account for market downturns. Investors should check for periods when stressed LTVs are above 100% as defaults in these periods will drive losses.

In most transactions, stressed, constant half-life base values will produce periods of losses given an event of default. This does not mean that the investment should not be undertaken however. In order to properly understand the underlying risk of a transaction it is important to look at worse-case scenarios and unlikely events. Only in this way can investors be aware of the true potential downside of an investment if aircraft values drop due to a market downturn coupled with a simultaneous event of default.

The timing of default is another important consideration. The credit quality of the obligor drives a transaction's expected loss. A very strong airline credit profile can compensate for high loss given default upfront if the amortisation profile is aggressive. In comparison, a weaker airline credit profile calls for a more conservative LTV. If the risk is properly compensated for, it may still be a sound investment, even if the stressed LTV is above 100% for certain periods.



# The Importance of the LTV in Aviation Finance

## How to Account for the Correct Value

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