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Knowledge / LLCR

The Loan Life Cover Ratio (LLCR) with the Debt Service Cover Ratio (DSCR) form the two ratios that a project finance financial model will need to produce to assist in structuring and monitoring a project finance transaction. this post covers what it means, how to calculate it, how to test it and forms an essential grounding for more advanced analysis and industry specific variations involving the LLCR. Think of this as LLCR 101.

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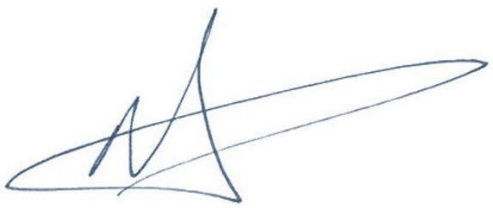

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Introduction

In this article, we introduce the Loan Life Cover Ratio (LLCR) calculation; in particular it's application in a project finance financial model. We intend you to read this with the accompanying Excel workbook so you can review the layout of the calculations and the actual formula - rather than just read about it. If you find this useful and you want to understand more about the intention, interpretation and market nuances of the LLCR and how it is used in debt-sizing ask us about our two day, 100% hands-on, case study based, Project Finance Analysis course, delivered in person by Nick Crawley.

The DSCR Cover Ratio, essentially, measures the performance of cash to debt service in a period – but this is only one part of the debt sizing equation which has at least two components. The second component is how the cash available over the life of the loan compares to the total outstanding debt, considering the time value of money and how all of this moves with time. This is the Loan Life Cover Ratio, the LLCR.

The LLCR formula

Simplistically the formula is:

$$LLCR = \frac{Present\ value\ of\ CFADS}{Debt\ balance}$$

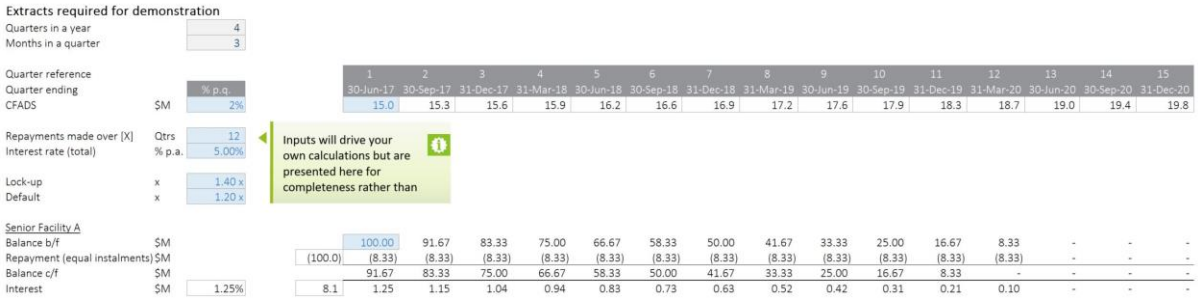
and mathematically it is

$$LLCR_{t_i} = \left[\sum_{t=t_i}^{t=L-i} CFADS_t \,.\, DF_{t_i} \Big/ OB_{t_i} \right]$$

Where:
t is the time dimension incorporating all time periods
i is the period being measured
DF = Discount factor for each period i – usually being the total Cost of Debt
L = length of assessment. Such that L-'i is the remaining qualifying cashflows
OB = Opening balance of the debt

How to calculate the LLCR

As with all critical output in a project finance financial model the first step is to localise all required components of the calculation. For the purpose of demonstration, we have created a simplified debt repayment facility and a CFADS line with a growth factor.



Extracts required for demonstration																		
Quarters in a year		4																
Months in a quarter		3																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Quarter reference				30-Jun-17	30-Sep-17	31-Dec-17	31-Mar-18	30-Jun-18	30-Sep-18	31-Dec-18	31-Mar-19	30-Jun-19	30-Sep-19	31-Dec-19	31-Mar-20	30-Jun-20	30-Sep-20	31-Dec-20
Quarter ending		% p.q.																
CFADS	$M	2%		15.0	15.3	15.6	15.9	16.2	16.6	16.9	17.2	17.6	17.9	18.3	18.7	19.0	19.4	19.8
Repayments made over [X]	Qtrs	12																
Interest rate (total)	% p.a.	5.00%																
Lock-up	x	1.40 x																
Default	x	1.20 x																
Senior Facility A																		
Balance b/f	$M			100.00	91.67	83.33	75.00	66.67	58.33	50.00	41.67	33.33	25.00	16.67	8.33	-	-	-
Repayment (equal instalments)	$M		(100.0)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	(8.33)	-	-	-
Balance c/f	$M			91.67	83.33	75.00	66.67	58.33	50.00	41.67	33.33	25.00	16.67	8.33	-	-	-	-
Interest	$M	1.25%	8.1	1.25	1.15	1.04	0.94	0.83	0.73	0.63	0.52	0.42	0.31	0.21	0.10	-	-	-

Inputs will drive your own calculations but are presented here for completeness rather than

The next step is to integrate the mathematics above taking care to clearly layout the numerator and denominator of the LLCR, before taking the minimum and identifying the date of the minimum and the LLCR @ COD where COD stands for Commercial Operations Date. LLCR @ COD is an important concept because it represents the LLCR at the start of the repayment facility lifetime and in theory the highest CFADS and Debt Opening Balance.

The LLCR calculation																		
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Quarter reference				30-Jun-17	30-Sep-17	31-Dec-17	31-Mar-18	30-Jun-18	30-Sep-18	31-Dec-18	31-Mar-19	30-Jun-19	30-Sep-19	31-Dec-19	31-Mar-20	30-Jun-20	30-Sep-20	31-Dec-20
Quarter ending																		
Calculate ?	[1,0]																	
Cost of debt	% p.q.			1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	1.25%	0.00%	0.00%	0.00%
Cost of debt	1+r			1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	-	-	-
CFADS	$M			15.00	15.30	15.61	15.92	16.24	16.56	16.89	17.23	17.57	17.93	18.28	18.65	-	-	-
CFADS (NPV)	$M			185.20	172.52	159.37	145.76	131.66	117.07	101.98	86.36	70.21	53.51	36.25	18.42	-	-	-
Balance b/f	$M			100.00	91.67	83.33	75.00	66.67	58.33	50.00	41.67	33.33	25.00	16.67	8.33	-	-	-
LLCR				30-Jun-17	30-Sep-17	31-Dec-17	31-Mar-18	30-Jun-18	30-Sep-18	31-Dec-18	31-Mar-19	30-Jun-19	30-Sep-19	31-Dec-19	31-Mar-20	30-Jun-20	30-Sep-20	31-Dec-20
CFADS (NPV)	$M	These are the key pick-ups		185.2	172.5	159.4	145.8	131.7	117.1	102.0	86.4	70.2	53.5	36.3	18.4	-	-	-
Debt balance b/f	$M	LLCR@COD / Min / Min date		100.0	91.7	83.3	75.0	66.7	58.3	50.0	41.7	33.3	25.0	16.7	8.3	-	-	-
LLCR	x	1.85 x / 1.85 x / 30-Jun-17		1.85 x	1.88 x	1.91 x	1.94 x	1.97 x	2.01 x	2.04 x	2.07 x	2.11 x	2.14 x	2.18 x	2.21 x	0.00 x	0.00 x	0.00 x

Break down the discounting of CFADS. Transparancy means less errors and more chance of finding them.

Variations in the LLCR formula

Occasionally, depending on the situation, aggressiveness of the advisors and commercial situation it a borrower is able to take into account the value of reserve accounts such as a Debt Service Reserve Account (DSRA) and very occasionally the value of free cash at bank. These are heavily dependent on the commercial structure, setting of covenants and control over cash. These variations occur when squeezing out the last drop of value, usually in highly competitive situations. The inevitable discussion then follows "is this value, added to the numerator as extra cash value or subtracted from the denominator as netting off debt". Try it with some simple figures but you will see that the more conservative result comes from adding this extra value to the numerator. Either approach always comes with increased control over the project and cash balances by lenders, which is not always in the best interest of the smooth running of the project.

Nick's cheat sheet

Here are some of my go-to checks.

- With a gradually growing and stable CFADS line the LLCR trends up without major kinks.
- With a steadily growing and stable CFADS and annuity repayment facility the LLCR @ COD is usually within 5bps of the average DSCR.
- The minimum LLCR is often the first one – if not I hunt down why it isn't.
- The average LLCR, mathematically doesn't mean anything useful and is not referred to in project documentation.
- If the LLCR spikes in the last repayment period the principal repayment in the last period is significantly less than CFADS - expect the DSCR to also spike.

Success factors

- Lay out each element in a separate line – do perform the calculation in one row - don't be tricked by the simplicity of a ratio.
- Gather all feeder lines into a local area rather than reference lines multiple screens up / down.
- When gathering feeder lines avoid daisy-chaining and instead reference the source, or a direct summary.
- Keep all signs the same way – it's your choice which way but we make everything positive.
- For annuity / credit foncier / mortgage style repayment profiles the Average DSCR is usually very close, within 5 basis points, of the LLCR.
- Identify what the date of a minimum is so you can explain why it occurs.
- Identify the movement from the base case LLCR of every scenario and be able to explain it.
- Sense check the magnitude and profile of the LLCR – does it make sense?

Common material errors

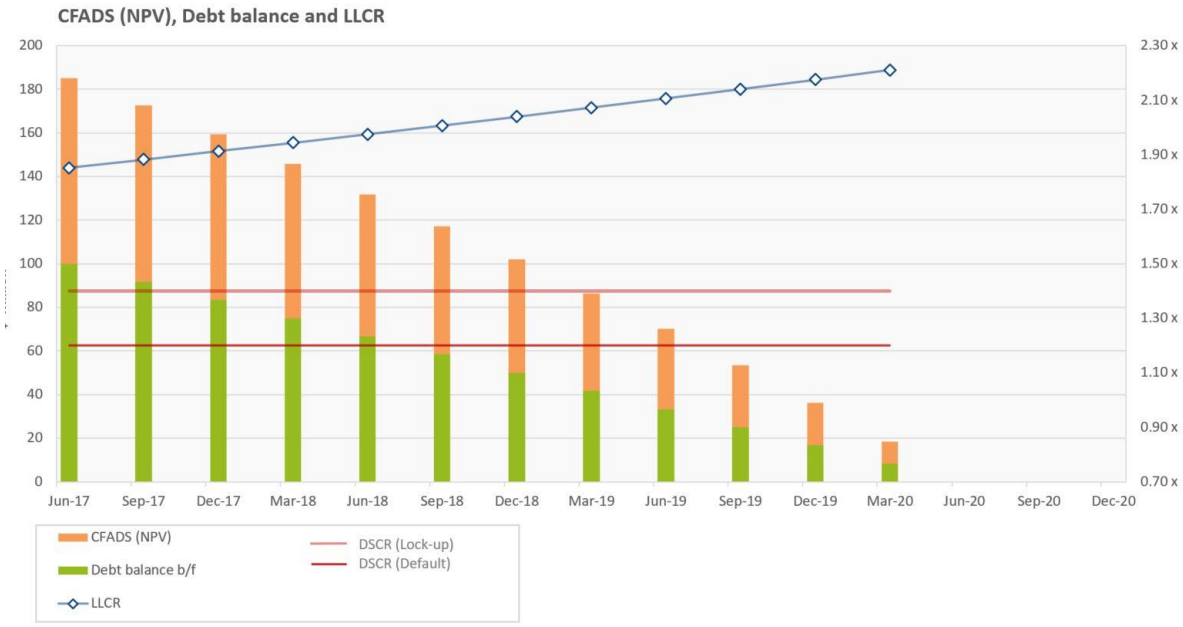
Our own checklist for testing the LLCR calculation in a Project Finance Financial Model is based on the main errors we have seen over the years. Follow the tips below to increase the confidence in your analysis.

- By far the most common error is the numerator including cashflows beyond the life of loan.
- The next most common error in calculating the LLCR is the numerator being the closing balance rather than the opening.
- Does the LLCR discount factor incorporate the changing cost of debt over the life of the loan – the impact of hedging, refinancing fees, changing margins and Political Risk Insurance (PRI).
- Does the LLCR discount factor include financing fees other than interest, for a revolving facility this would include a commitment fee or a line fee. For a vanilla project finance construction facility being refinanced by an operational repayment facility these fees are often non-existent and agency fees are in comparison immaterial. Stop and think, is it just the interest or are other fees involved. Generally for a corporate facility there is a commitment fee during repayment but this normally only during construction / development for a project financing.

- Occasionally the evaluation period of the numerator is longer than the tenor of the facility, this is called a synthetic tenor. In these situations, like for the Project Life Cover Ratio (PLCR) I always look for the discount rate to be at least the cost of debt of the last period of the tenor and one might argue a little higher to reflect higher risk. To think more about this read our post on the PLCR.

Plotting the LLCR

Communicating the profile of the LLCR over the life of the loan, like the DSCR is an important requirement of any project finance financial model. The plot below shows the way we prefer to show it, not only the ratio but also the components of the LLCR, being CFADS and Debt Balance.



Summary

To wrap up, this is an introductory article on the LLCR, it is the source of many errors and confusion. If you found this helpful and would like to learn about other aspects of Project Finance Modelling or Advanced Financial Modelling then you would love our training courses! Check them out here or just give us a call.

I hope that was useful – smooth and happy modelling!