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Pitfalls in Conventional Earnings-Based DSCR Measures—and a Recommended Alternative

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FOR LENDERS, a significant error in calculating the debt service coverage ratio (DSCR) could prompt the approval of a toxic loan or the decline of a profitable loan. So what potential for material misstatement exists among conventional earnings-based DSCR measures?

This article will consider four conventional measures.[1] Sometimes their results will accurately indicate a borrower's earnings-based coverage capacity. Each measure has an inherent potential, however, to significantly overstate or understate the borrower's earnings-based debt coverage in certain circumstances. The pitfalls in each are summarized in Table 1.

On the following pages, test cases will demonstrate how each measure systematically understates or overstates the interest tax shield benefit, or overstates or understates the cost of taxes prior to post-tax outlays. (Post-tax outlays include current portion of long-term debt (CPTLD), unfinanced capital expenditures (CAPEX), and dividends.) As will be shown, the resulting DSCR misstatements are dramatic enough to make a costly credit decision likely. The consistent accuracy of the recommended alternative will be provided with each case.

Measure 1
EBIDA / (Interest + CPLTD)

Measure 1's failing is in treating income taxes as a fixed amount, rather than as a figure that scales down as tax-deductible expenses (like interest) increase. Suppose we are evaluating the company spread in Table 2.

Let's consider a refinancing of Blue Chip's bank debt, which includes a $25MM interest-only revolving line of credit and a $5MM term loan amortizing over 25 years. Both are priced at 6.50%. We want to compare the borrower's 2012 earnings statement against the proposed debt service, assuming a fully drawn line of credit. As shown, under the fully drawn scenario, total proposed debt service would be $2,033M, of which 90% would be interest.

Let's try DSCR Measure 1.

Measure 1 DSCR	
Measure 1 DSCR	**= EBIDA / (Interest + CPLTD)**
	= 2,001 / 2,033
	= 0.97×

Measure 1 says the borrower doesn't cover debt service from earnings. But go back to the income statement. If interest expense were to have been increased to the fully drawn level, then, all else equal,[2] income taxes would have decreased proportionately. See the adjustments in Table 3.

Table 1

Conventional Earnings-Based Debt Service Coverage Ratio Measures

	1	2	3	4	Recommended Alternative
Treatment of:	EBIDA / Interest + CPLTD	EBITDA / Interest + CPLTD	EBIDA / Interest x (1-TaxRate) + CPLTD	EBITDA / Interest + CPLTD/ (1-TaxRate)	EBITDA / Interest + Pretax Provision for Post-Tax Outlays*
Interest Tax Shield Benefit	Understated	Accurate	Overstated	Accurate	Accurate
Tax Cost Before Principal Amortization	Accurate	Understated	Accurate	Overstated	Accurate

* Pretax provision for post-tax outlays is simply the amount of pretax cash that must be set aside to meet required post-tax outlays, where post-tax outlays = CPLTD + unfinanced CAPEX + dividends. The provision can be calculated as follows:

If noncash expenses (depreciation + depletion + amortization) > post-tax outlays, then

Pretax provision for post-tax outlays = Post-tax outlays

For example, if a company's post-tax outlays consist of CPLTD of $90M and $10M in unfinanced CAPEX, and its noncash expenses are $100M, then the company can apply $100M of cash inflow from operations to post-tax outlays without paying taxes on that $100M cash inflow. In this case, the pretax cash that the borrower must set aside for post-tax outlays would simply be $100M.

If post-tax outlays > noncash expenses, then

Pretax provision for post-tax outlays =
Noncash expenses + (post-tax outlays - noncash expenses) / (1- income tax rate)

For example, if post-tax outlays consist of CPLTD of $100M and noncash expenses are $50M, then the borrower can apply $50M of cash inflow from operations directly against $50M of post-tax outlays without paying taxes on that $50M inflow, but the company must set aside $77M (assuming a 35% income tax rate) to meet the remaining $50M of post-tax outlays. This company's pretax provision for post-tax outlays = $50M + $77M = $127M.

Note: Measures 1 to 4 may account for unfinanced CAPEX and dividends either by deducting these items from the numerator or adding them to the denominator. Numerator versus denominator treatment is irrelevant to our analysis of the pitfalls inherent in each measure.

Table 2

Blue Chip Enterprises (C corporation) Accrual Basis in $000s Income Statement (FY 2012)/DSCR Summary

Revenue	33,333	
Expenses (other than those itemized below)	30,753	
Interest	614	
Depreciation	312	
Amortization	-	
Earnings Before Taxes	1,654	
Income Taxes	579	*35%*
Earnings After Taxes	1,075	
Unfinanced CAPEX	-	
Dividends	-	
EBIDA	2,001	
EBITDA	2,580	
Proposed Debt Service		
Interest Portion (assuming LOCs fully drawn)	1,830	*90%*
CPLTD Portion	203	*10%*
Total Proposed Debt Service	2,033	*100%*

Table 3

Blue Chip Enterprises (C corporation) Accrual Basis in $000s Income Statement (FY 2012)/DSCR Summary

	Actual			Adjusted to Assume Fully Drawn LOC	
Revenue	33,333				
Expenses (other than those itemized below)	30,753				
Interest	~~614~~		→	**1,830**	
Depreciation	312				
Amortization	-				
Earnings Before Taxes	~~1,654~~		→	**438**	
Income Taxes	~~579~~	*35%*	→	**153**	*35%*
Earnings After Taxes	~~1,075~~			**284**	
Unfinanced CAPEX	-				
Dividends	-				
EBIDA	~~2,001~~		→	**2,427**	
EBITDA	2,580				
Proposed Debt Service					
Interest Portion (assuming LOCs fully drawn)	1,830	*90%*			
CPLTD Portion	203	*10%*			
Total Proposed Debt Service	2,033	*100%*			

Clearly, $284M of adjusted after-tax earnings + $312M in depreciation add-back will cover $203M in CPLTD—with $378M in earnings before depreciation and amortization (EBDA) to spare. Blue Chip covers debt service from earnings. But lenders relying on Measure 1 for DSCR will fail to recognize Blue Chip's coverage capacity and may pass on a profitable loan. The error occurs because Measure 1 treats income taxes as fixed.

The recommended alternative avoids the risk of misrepresenting changes in income taxes by defining its DSCR numerator as pretax (EBITDA). (The recommended alternative then makes adjustments in the denominator for the cost of taxes.) The recommended alternative would represent Blue Chip's earnings-based coverage capacity as follows:

Recommended alternative

DSCR = EBITDA / (Interest + pretax provision for post-tax outlays).

In the case of Blue Chip Enterprises:

Post-tax outlays
(CPLTD + unfinanced CAPEX + dividends)
= $203M

Noncash expenses
(depreciation + depletion + amortization)
= $312M

Pretax provision for post-tax outlays
= $203M

Pretax provision calculation:
Noncash expenses > post-tax outlays,
so pretax provision for post-tax outlays
= post-tax outlays
= $203M

Recommended alternative DSCR
= $2,580M / ($1,830M + $203M)
= $2,580M/$2,065M
= 1.27×

Whereas Measure 1 understates Blue Chip's coverage capacity, the recommended alternative accurately represents it. Lenders using the recommended alternative will see profit opportunities that other lenders miss.

Measure 1 understates DSCR most when income taxes paid are significant and interest is a major component of debt service.

Measure 2

EBITDA / (Interest + CPLTD)

Measure 2's failing is in treating principal as though it can be paid from pretax earnings. Consider the company spread in Table 4.

Table 4

Subprime R Us (C corporation) Accrual Basis in $000s
Income Statement (FY 2012)/DSCR Summary

Revenue	33,333	
Expenses (other than those itemized below)	27,753	
Interest	1,223	
Depreciation	500	
Amortization	-	
Earnings Before Taxes	3,857	
Income Taxes	1,350	*35%*
Earnings After Taxes	2,527	
Unfinanced CAPEX	-	
Dividends	-	
EBIDA	4,230	
EBITDA	5,580	
Proposed Debt Service		
Interest Portion (assuming LOCs fully drawn)	1,223	*28%*
CPLTD Portion	3,200	*72%*
Total Proposed Debt Service	4,423	*100%*

Suppose we are considering a refinancing of Subprime R Us's bank debt, which includes a $16MM five-year fully amortizing term loan and a $16MM interest-only construction line of credit that was fully drawn during 2012. Both facilities are priced at 5%. We want to compare the borrower's 2012 earnings against its proposed debt service. As shown, total proposed debt service is $4,423M, of which 28% is interest and 72% principal. Consider what happens if we use DSCR Measure 2 here.

Measure 2 DSCR

Measure 2 DSCR = EBITDA / (Interest + CPLTD)
= $5,580M / $4,423M
= 1.26×

Per Measure 2, Subprime's capacity appears okay. But look at the earnings after tax and add to it noncash expenses to calculate EBDA: $2,507M + $500M = $3,007M. So $3,007M is what is available to service Subprime's post-tax outlays of $3,200M. Subprime will post a $193M shortfall, even while a lender relying on Measure 2 believes there is sufficient coverage. The error occurs because Measure 2 fails to apply tax cost prior to principal amortization.

Even though the recommended alternative uses pretax cash inflow from earnings as its numerator, it avoids understating tax cost by determining the level of pretax cash that must be set aside (the pretax provision) to meet post-tax cash outlays and includes that provision in its denominator.

Suppose we had evaluated Subprime's coverage capacity using the recommended alternative. Per the recommended alternative, DSCR = EBITDA / (interest + pretax provision for post-tax outlays), where

In the case of Subprime R Us:

Post-tax outlays
(CPLTD + unfinanced CAPEX + dividends)
= $3,200M

Noncash expenses
(depreciation + depletion + amortization)
= $500M

Pretax provision for post-tax outlays
= $4,654M

Pretax provision calculation:
Post-tax outlays > noncash expenses, so pretax provision for post-tax outlays = noncash expenses + (post-tax outlays - noncash expenses) / (1 - income tax rate)
= $500M + ($3,200M - $500M) / (1-35%)
= $4,654M

Recommended alternative DSCR
= $5,580 / ($1,223M + $4,654M)
= 0.95×

As shown, the recommended alternative correctly foresees the shortfall. A lender using the recommended alternative ratio will see coverage deficiencies that other lenders miss and may avoid predictable loan loss.

Measure 2 overstates DSCR most when CPLTD is a major component of debt service, and noncash expenses are low in comparison to CPLTD.

Measure 3

EBIDA / (Interest × (1 – Income Tax Rate) + CPTLD)

Like Measure 1, Measure 3 uses an after-tax numerator, but accounts for the potential tax shield benefit of interest expense by reducing interest expense per the borrower's income tax rate in the denominator. The potential error here is in assuming that the borrower's actual income tax level was high enough to absorb the full benefit of the potential tax shield. For instance, a borrower with earnings of $0 would have paid no income tax, so it doesn't make sense to assume that increased interest expense could have reduced that borrower's tax payments. Consider the company spread in Table 5.

Table 5

Underwater Associates (C corporation) Accrual Basis in $000s Income Statement (FY 2012)/DSCR Summary

Revenue	33,333	
Expenses (other than those itemized below)	31,753	
Interest	1,377	
Depreciation	250	
Amortization	-	
Earnings Before Taxes	(47)	
Income Taxes	-	*35%*
Earnings After Taxes	(47)	
Unfinanced CAPEX	-	
Dividends	-	
EBIDA	1,580	
EBITDA	1,580	
Proposed Debt Service		
Interest Portion (assuming LOCs fully drawn)	1,377	*81%*
CPLTD Portion	320	*19%*
Total Proposed Debt Service	1,697	*100%*
Potential Debt Tax Shield (Interest Expense × Tax Rate)	482	

Suppose we are considering a refinancing of the borrower's bank debt, which includes an $8 million term loan amortizing over 25 years and a $23 million interest-only revolving line of credit. (To avoid the need to make income-statement adjustments to support the fully drawn LOC assumption, this income statement is prepared as

though the LOC were fully drawn during 2012.) The interest rate on both facilities is 4.95%. What decision might we make if we use DSCR Measure 3?

Measure 3 DSCR

Measure 3 DSCR = EBIDA / (Interest × (1 – Tax rate) + CPTLD)
= $1,580M / $1,377M × (1 – 35%) + $320M
= $1,580M / $898M + $312M
= $1,580M / $1,215M
=1.30×

As in the Measure 2 example, this satisfactory DSCR is a mirage and believing it could lead to a loan loss. Look back at Underwater Associates' negative earnings after taxes of $ (47M) and add back noncash expenses of $250M to get EBDA of $203M. Underwater's EBDA falls $117M short of the $320M needed to cover CPLTD. Measure 3 overstates DSCR here because it assumes that $1 in interest expense will only cost the company 65 cents in terms of after-tax earnings on the theory that interest expense reduces taxes. But Underwater paid $0 in income taxes in 2012; its income taxes can't get lower. So for Underwater Associates, $1 before taxes costs $1 after taxes.

The recommended alternative avoids the need to calculate income tax changes (and the risk of calculating them wrong) by defining its numerator as EBITDA. (The recommended alternative then adjusts for tax costs prior to post-tax outlays in its denominator.) Per the recommended alternative, DSCR = EBITDA / (interest + pretax provision for post-tax outlays). For Underwater Associates:

In the case of Underwater Associates:

Post-tax outlays
(CPLTD + unfinanced CAPEX + dividends)
= $320M

Noncash expenses
(depreciation + depletion + amortization)
= $250M

Pretax provision for post-tax outlays
= $357M

Pretax provision calculation:
Post-tax outlays > noncash expenses, so pretax provision for post-tax outlays = noncash expenses + (post-tax outlays - noncash expenses) / (1 - income tax rate)
$250M + ($320M - $250M) / (1-35%) = $357M

Recommended alternative DSCR
= $1,580 / ($1,377M + $357M)
= $1,580 / $1,734M
= 0.91×

The recommended alternative correctly foresees Underwater's shortfall. As observed in the Measure 2 discussion, a lender using the recommended alternative ratio will see coverage deficiencies that other lenders miss and may avoid predictable loan loss.

Measure 3 overstates DSCR most when the potential debt tax shield is significantly greater than actual income taxes paid.

Measure 4

EBITDA / (Interest + CPTLD / (1 – Income Tax Rate))

Like Measure 2, Measure 4 uses a pretax numerator, but accounts for the tax cost prior to principal by applying in the denominator a pretax cash set-aside for principal equal to CPLTD / (1 – tax rate). Measure 4's error is in the assumption that all cash set aside for principal amortization will first be taxed. In actuality, an amount of cash inflow from earnings equal to the sum of noncash expenses will not be taxed.

Suppose we are evaluating the company spread in Table 6.

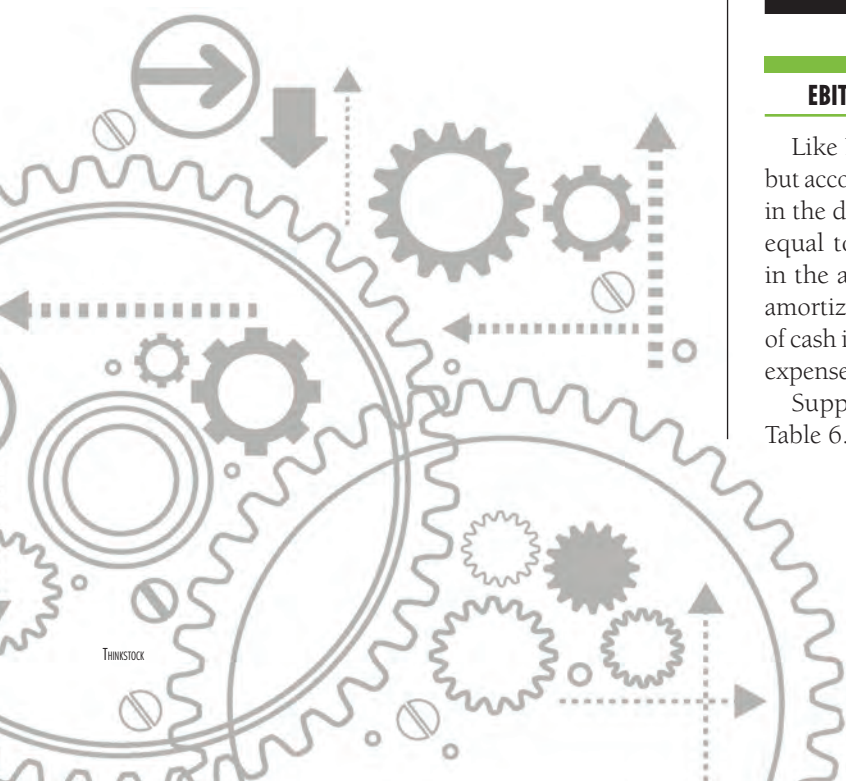

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Table 6

Solid Gold, Inc. (C corporation) Accrual Basis in $000s
Income Statement (FY 2012)/DSCR Summary

Revenue	33,333	
Expenses (other than those itemized below)	29,253	
Interest	835	
Depreciation	2,925	
Amortization	-	
Earnings Before Taxes	320	
Income Taxes	112	*35%*
Earnings After Taxes	208	
Unfinanced CAPEX	-	
Dividends	-	
EBIDA	3,968	
EBITDA	4,080	
Proposed Debt Service		
Interest Portion (assuming LOCs fully drawn)	835	*26%*
CPLTD Portion	2,399	*74%*
Total Proposed Debt Service	3,234	*100%*

We are considering a refinancing of Solid Gold's bank debt, which includes a term loan of $24 million amortizing over 10 years and an $8 million interest-only revolving line of credit. (To simplify adjustments, this income statement is prepared as though the LOC were fully drawn during 2012.) Both facilities are priced at 4.00%. How would Measure 4 state Solid Gold's earnings-based coverage capacity?

Measure 4 DSCR

Measure 4 DSCR = EBITDA / (Interest + CPTLD / (1 – Income tax rate))
= $4,080M / ($835M + $2,399M / (1 - 35%))
= $4,080M / $835M + $3690M
= $4,080M / $4,525M
=0.90×

Measure 4 says Solid Gold doesn't cover. But as shown above, Solid Gold's EBDA = $208M + $2,925M = $3,133M, well in excess of its CPLTD requirement of $2,399M. Solid Gold's earnings cover its debts with money to spare, but a lender relying on Measure 4 won't see this strength and may miss out on a profitable loan. The error occurs because Measure 4 increases CPLTD in its denominator from $2,399M to $3,690M, assuming that if the borrower's tax rate is 35% then it must set aside $3,690M pretax to meet $2,399M in CPLTD post-tax. But $2,925M in depreciation expense allows $2,925M of newly generated cash inflow to go untaxed, which means the borrower will not have to pay taxes on the cash it sets aside for CPLTD.

The recommended alternative avoids overstating the tax cost on cash set aside for post-tax outlays by making a tax adjustment only on that portion of cash that will actually be taxed—that is, the amount by which the post-tax outlays exceed the value of noncash expenses. Per the recommended alternative, DSCR = EBITDA / (interest + pretax provision for post-tax outlays), where

In the case of Solid Gold, Inc.:

Post-tax outlays
(CPLTD + unfinanced CAPEX + dividends)
= $2,399M

Noncash expenses
(depreciation + depletion + amortization)
= $2,925M

Pretax provision for post-tax outlays
= $2,399M

Pretax provision calculation: Noncash expenses > post-tax outlays, so pretax provision for post-tax outlays = post-tax outlays
= $2,399M

Recommended alternative DSCR
= $4,080 / ($835M + $2,399M)
= $4,080 / $3,234M
= 1.26×

The recommended alternative correctly shows sufficient coverage. As previously stated, lenders using the recommended alternative will recognize profit opportunities that other lenders miss.

Measure 4 most understates DSCR when CPLTD is high as a percentage of total debt service and the value of noncash add-backs is significant.

Related Considerations

The foregoing analysis considered, lenders are in a better position to identify good and bad loans by employing the recommended alternative DSCR.

Here are some related considerations:

- Desirable ratios. Because the recommended alternative accounts for unfinanced CAPEX and dividends by adding them to the denominator, the DSCRs it produces will be depressed compared to measures that subtract

these items from the numerator. If you are transitioning to the recommended alternative as your DSCR measure and have previously subtracted unfinanced CAPEX and dividends from your numerator, it may be necessary to modulate the risk level you associate with various DSCRs.

- **Stress resistance/DSCR elasticity.** Your DSCR formula forms the basis for the stress testing of coverage capacity. Perhaps even more important than a company's DSCR is the amount of variance it can withstand before its DSCR falls below a minimum acceptable level. For instance, we could have one borrower with a 1.50× DSCR who, because of mostly fixed expenses, can withstand just a 1% sales decline before its DSCR falls below 1.25×. We could have another borrower with a 1.35× DSCR but who, because of mostly variable expenses, can withstand an 8% sales decline before its DSCR falls below 1.25×. The second borrower's DSCR is more stress resistant/less elastic and might be the better credit risk.
- **Other tax shields.** Loss carry-forwards are another item (in addition to depreciation, depletion, and amortization) that could allow a borrower to avoid taxation on newly generated cash inflow. It might be appropriate to add loss carry-forwards to your pretax provision for the post-tax outlays calculation if you are very confident that the loss carry-forwards will outlast your loan term.
- **DSCRs over the life of a term loan.** As a loan amortizes and the interest portion of debt service decreases and the principal portion increases, then, all else equal, income taxes will increase and DSCR will decrease. Several other factors tend to mitigate the credit impact of this effect, however: The loan-to-value ratio tends to improve over time with market appreciation and principal amortization, and inflation reduces the real cost of a fixed payment over a long term. ❖

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Notes

1. This article analyzes earnings-based coverage capacity only. A comprehensive repayment capacity analysis will include a cash flow coverage ratio as well, which takes into account balance-sheet swing factors.
2. "All else equal" may be an unwarranted assumption. The economic impact of market interest rate changes (and tax rate changes) may be passed on to your borrower's customers to degrees that vary based on industry characteristics. Consider your borrower's circumstances.