

JANUARY 29, 2018

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CONFUSION COMPOUNDS CONFUSION

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Legal documents generally are meant to be precise, clarifying obscurities that potentially may lead to multiple interpretations; however, many legal agreements have been drafted, signed and put into use based on misunderstandings of some financial concepts. If we believe there is an imperfection when in fact there is none, subsequent effort to fix the imperfection may result in unnecessary additional clauses that compound the obscurity and confusion. Frequently unclear (and at times, wrong) language is added, which may result in self-contradiction. This article introduces two frequently observed examples of confusion in the world of real estate joint venture operating agreements.

CONFUSION #1 – “XIRR USES DAILY COMPOUNDING?”

A widespread confusion shared by many legal, and occasionally, financial professionals is the belief that the XIRR formula in Microsoft Excel follows daily compounding, which is not true. The fact that XIRR can generate daily results does not mean it compounds daily; in fact, XIRR compounds annually, but it simply has the ability to provide results based on inputs from any given day.

The underlying formula that XIRR utilizes is as follows:

$$(1+R)^{(\#days/365)}-1$$

While XIRR follows an annual compounding convention, the compounding duration is captured within the exponent (i.e. “#days/365”) as any fraction of a year, enabling the compounding calculation at any given day.

For comparison purposes, a daily compounding formula looks as follows:

$$(1+R/365)^{(\#days)}-1$$

Daily compounding results in a higher effective rate compared to an annual compounding¹.

An example of an erroneous clause may prescribe the use of XIRR and at the same time, requires daily compounding. As the two requirements contradict each other, one needs to decide which clause takes prevalence, justifies the calculation and defends against potential objections from the other partners, their legal counsel, as well as auditors.

CONFUSION #2 – “COMPOUNDING CAN BE CALCULATED ONLY ON THE LAST DAY? (E.G. ON DECEMBER 31 FOR ANNUAL COMPOUNDING?)”

Many believe that a compounding action can happen only on the last day of the compounding period. For example, if an annual compounding is used, December 31 is the only day in the year when the accrued interest can be attached to the principal. Such a belief forces a side calculation where a partial-year accrual is calculated separately and is incorporated at calendar yearend. However, if we use the fractional year in the exponent to capture the compounding duration, annual compounding can be computed on any given day as opposed to only once in a year (i.e. on December 31).

Many joint venture operating agreements address how to account for the residual portion of the compounding that occurred between the actual transaction date and the last day of the compounding period. The following is an example of such a clause used for the calculation of an annual compounding:

“All Contributions will be considered to have been made at the end of the Calendar Year in which they were actually made; and each Contribution will be increased by an amount equal to the interest accruing on such Contribution at the applicable IRR Rate, for the period commencing on the date such Contribution is actually made through the last day of the Calendar Year in which the same is made.”

Let’s assume an example where a contribution of \$10,000,000 is made on June 30, 2017, and we would like to calculate an accrued return of 10% on December 31, 2018. The above clause separates the period to the following two sub-periods:

- “Period 1” - June 30, 2017 through December 31, 2017
- “Period 2” - January 1, 2018 through December 31, 2018
- For Period 1, the accrued return is $10,000,000 * ((1+10\%)^{0.5}-1) = 488,088$.
- For Period 2, the accrued return is $(10,000,000+488,088) * ((1+10\%)^1-1) = 1,048,809$.
- For Period 1 & 2, total accrued return is $488,088+1,048,809 = 1,536,897$.

However, the separation of periods is unnecessary since annual compounding can be calculated to the exact date by using a fractional year in the exponent, as follows:

For Period 1 & 2, the accrued return is $10,000,000 * ((1+10\%)^{1.5}-1) = 1,536,897$.

As such, the previous clause may be dramatically simplified by saying “all Contributions will be considered to have been made on the date such Contribution is actually made.” Or perhaps, the clause can be omitted entirely as it does not contain any new information.

The above example demonstrates the case of a partial year accrual in an annual compounding, but a compounding of any frequency can be calculated to the exact date using the following formulas:

Annual Compounding: $(1+R)^{(\#days/365)}-1$

Quarterly Compounding: $(1+R/4)^{(\#days/91)}-1$

Monthly Compounding: $(1+R/12)^{(\#days/30)}-1$

Daily Compounding: $(1+R/365)^{(\#days)}-1$

Joint venture operating agreements usually are drafted at the time of transaction. Once the deal closes, asset management and finance teams are left to deal with any imperfections, such as self-contradicting compounding clauses. Sometimes the resulting economic impact is too small to catch anyone’s attention; however, occasionally the stake in dispute becomes large enough and “lawsuit-worthy.” Once the documents are signed and put to use, it becomes difficult, expensive and cumbersome to make amendments as it then requires all parties to agree on the original intent. As such, the attorneys drafting the documents should use only the necessary language in the joint venture operating agreements from the outset. Knowing the correct way to draft the financial concepts is the least expensive solution to prevent potential complications down the road.

¹ Given the same nominal rate, different compounding frequencies result in different mathematical outputs. For example, a 10% return compounded annually will result in a smaller effective rate compared to a 10% return compounded monthly.

Annual Compounding @ 10% for 1 year: $(1+10\%)^1-1 = 10.0000\%$

Quarterly Compounding @ 10% for 1 year: $(1+10\%/4)^4-1 = 10.3813\%$

Monthly Compounding @ 10% for 1 year: $(1+10\%/12)^{12}-1 = 10.4713\%$

Daily Compounding @ 10% for 1 year: $(1+10\%/365)^{365}-1 = 10.5156\%$



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