

Are you sure you consider taxes correctly?

“Taxes? My company is far away from breaking even. Taxes don’t matter to me.” This is a statement often heard from entrepreneurs. The fact that taxes might only be due in the far future – and are therefore heavily discounted – and that even then the accumulated losses can first be offset against profits lets many think that the effect of taxes is virtually negligible.

Unfortunately, this is downright wrong. If the company is to have a positive value, then the revenues must at least exceed its expenses over the whole lifetime. These exceeding revenues will ultimately make up the value. At that point all accumulated losses will be offset and the exceeding revenues will all be fully taxed. Consequently, if the company is to have a positive value, then the pre-tax value is at least reduced by the amount of the tax rate. The value reducing effect of the tax rate is actually even more severe than that, as we will see:

First the accumulated losses do not accrete over time, i.e. they can only be offset one to one against future earnings, and the time value of the investments is therefore lost. Second, the accumulated losses can only be offset if the company becomes profitable; in many cases this is not a certainty. If the company does not reach profitability the tax value of the accumulated losses – the tax assets – are lost. These two reasons imply that

the pre-tax value of a company is reduced by more than the tax rate.

Standard way to consider taxes

Usually, all valuations are performed on a risk-adjusted basis, i.e. all cash flows are multiplied with their probability. Assume a project has only a 25% chance to reach the market. Consequently, we only account for the sales revenues at 25% of their nominal values. Typically, the calculation of taxes is then made on a risk-adjusted basis as well. In table 1 the valuation of an R&D project with two two-year phases of 50% success rate each and a four-year commercialisation period is displayed. The tax rate is 20%, the discount rate is 10%. We have encountered the displayed method several times in valuation and analyst reports.

Table 1: Standard Valuation of R&D Project

Year	1	2	3	4	5	6	7	8
Phase	Pilot	Pilot	Pivotal	Pivotal	Market	Market	Market	Market
Probability	100%	100%	50%	50%	25%	25%	25%	25%
Cash Flows (CF)	-3	-3	-15	-15	20	40	50	40
rCF	-3	-3	-7.5	-7.5	5	10	12.5	10
rAcc Losses	-3	-6	-13.5	-21	-16	-6	0	0
rTaxes	0	0	0	0	0	0	-1.3	-2
Discount	100%	91%	83%	75%	68%	62%	56%	51%
rpCF	-3.0	-2.7	-6.2	-5.6	3.4	6.2	6.3	4.1
rNPV	2.5							

In the example the cash flows are adjusted to their probability (rCF: risk adjusted cash flows). Based on these the accumulated losses at year-end have been calculated. According to this calculation the company only has to pay taxes in year 7 (partially) and 8. The calculated value is USD 2.5 Mio. Without the tax considerations the value would be USD 4.3 Mio.

Closer look at the standard method

Analysing the positive scenario when the project reaches the market we notice that the company needs to spend USD 36 Mio to get there. These expenses can be carried forward but are already used up after Q1 of year 6. This is not in line with the calculation above where we only have to start pay taxes in year 7. So what is wrong?

In the standard method we have assumed that the accumulated losses are risk-adjusted (we used the risk-adjusted cash flows to compute them). But this way we account for the first phase 100% of the expenses and for the second phase just 50% of the expenses. But then we offset them against 25% of the revenues. In fact, we overstate the first phase costs by a factor 4 and the second phase costs by a factor 2 in the accumulated losses. The risk-adjusted accumulated losses of USD 21 Mio require USD 84 Mio sales to be fully offset. In reality the company spends at most USD 36 Mio. The standard method therefore overestimates the tax-reducing effect of the accumulated losses.

Correct valuation

In reality the accumulated losses are offset against the revenues as they occur, not against the risk-adjusted revenues. Table 2 displays the valuation considering taxes correctly.

Table 2: Correct Valuation of R&D Project

Year	1	2	3	4	5	6	7	8
Phase	Pilot	Pilot	Pivotal	Pivotal	Market	Market	Market	Market
Probability	100%	100%	50%	50%	25%	25%	25%	25%
Cash Flows (CF)	-3	-3	-15	-15	20	40	50	40
rCF	-3	-3	-7.5	-7.5	5	10	12.5	10
Acc Losses	-3	-6	-21	-36	-16	0	0	0
Taxes	0	0	0	0	0	-4.8	-10	-8
rTaxes	0	0	0	0	0	-1.2	-2.5	-2
Discount	100%	91%	83%	75%	68%	62%	56%	51%
rpCF	-3.0	-2.7	-6.2	-5.6	3.4	5.5	5.6	4.1
rNPV	1.1							

A valuation that correctly considers the offsetting of accumulated losses with earnings yields a value of USD 1.1 Mio. A tax rate of 20% hence reduced the value by an impressive 75%.

Table 3: Different Valuations at 20% Tax

	Value (USD Mio)	Value reduction
Pre-Tax Valuation	4.3	0%
Standard Method	2.5	41%
Correct Valuation	1.1	75%

The above displayed valuation is based on the assumption that in case of failure the tax assets are lost. This is not necessarily true. The company could be sold as a shell company including the tax assets. But usually this is linked to some requirements by tax authorities and often the tax assets cannot be realised.

Company with several projects

If the company has other projects, then the accumulated losses are calculated on a consolidated basis. If the company reaches profitability, albeit it is only because of one project, it can use the accumulated losses from all projects. The exact valuation of such multi-project companies – which is the normal case – is quite cumbersome. Assume the previous company, but with two projects of the same kind. It is possible that the

company reaches profitability with either one project or with both. If it is with one project, then it the fate of the other project still matters (i.e. whether it failed in the pilot or in the pivotal phase) because of the accumulated losses. Table 4 contains a list of the possible scenarios that have to be analysed and probability weighted.

Table 4: Scenarios for a 2-Project Company

	Project 1	Project 2
1	Market	Market
2	Market	Pivotal
3	Market	Pilot
4	Pivotal	Market
5	Pilot	Market

Obviously, it is also possible that both projects fail, but these scenarios are uninteresting from a tax perspective.

Conclusion

The example makes clear that a correct consideration of taxes is far more difficult than the relatively simple problem setting. Although the example chosen might be quite extreme in terms of value reduction, we often encounter differences between standard and correct method in the order of 20%.