A quick intro to the notion of

Deferred Tax

(in the context of asset depreciation and capital allowances)

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1 Overview

Simply put, a *deferred* tax is one that is paid at a later stage from when it is accrued. It commonly arises when assets are purchased. For accounting purposes, they incur a cost through depreciation (often linearly and over several years) that is deducted from earnings. But depreciation is merely for accounting purposes: when computing actual tax, depreciation is ignored. The cost of the asset is instead deducted using capital allowances. Commonly, one can deduct the entire asset price from earnings in the year of purchase. In that case, the tax savings are realised all at once at the beginning, rather than over the asset's lifetime.

What are the implications of deferred tax for the income statement and the balance sheet? The income statement merely states things as if earnings were reduced only by depreciation, for as long as the asset depreciates. If the capital allowance is higher than the depreciation, the computed tax would thus be an overestimate of the actual tax paid (the deferred tax is therefore said to be *charged* to the P/L account).

To bring stated profit from the P/L in line with actual profit, the balance sheet records the difference as a tax liability that cancels out the savings in tax, such that the net assets (assets - liabilities) equal the total equity (which includes the net profit from the P/L).

Concretely, let A be the original asset price, r the tax rate, and T the lifetime of the asset (e.g. it has fully depreciated in T years). Assume that the entire asset price can be deducted from earnings in year one, so that the asset reduces tax by rA in year one and has no effect thereafter. Meanwhile, if only the yearly depreciation were tax-deductible, then the asset would reduce tax by rA/T over T

years. The total tax is the same, it is merely distributed differently. The P/L's profit only reflects a tax saving of rA/T when the one actually realised is rA. The difference $rA - rA/T = rA\left(\frac{T-1}{T}\right)$ is effectively the charge. In the following $T-1$ years, the P/L continues to reflect a saving of rA/T but the actual one is 0, therefore rA/T of the initial liability is effectively paid off or released, until, after T years, it's back to zero.

2   An example

Let's take a quick look at what exactly the effect is on the income statement and balance sheet. Assume we start of with no reserves, have earnings of c_0, a depreciation of $D = A/T$ of an asset purchased (out of the c_0) at the beginning of the year, then the net income I_0 as per the income statement is

$$I_0 = (1-r)(c_0 - D).$$

The actual tax payable, however, is not $r(c_0 - D)$ but $r(c_0 - A)$, assuming we use the full capital allowance in year one. On the balance sheet the net assets are computed using the actual tax paid and a deferred tax liability over the tax to be paid in future years, which is the difference between the above amounts:

$$DT_0 = r(c_0 - D) - r(c_0 - A) = r(A - D).$$

Our assets are the depreciated asset $A - D$, and the cash that's left in the bank after purchasing A out of c_0, that is $b_0 = c_0 - A$ (assume we start with zero cash in the bank). Add in the above deferred tax liability and we get

$$
\begin{aligned}
A_0 &= (A - D) + (c_0 - A) - r(c_0 - A) - DT_0 \\
&= c_0 - D - r(c_0 - A) - r(A - D) \\
&= (1 - r)(c_0 - D)
\end{aligned}
$$

The shareholders funds E_0 are exactly our taxed income (as we start from zero), I_0, which lo and behold, is the same as our net assets:

$$E_0 = I_0 = (1-r)(c_0 - D).$$

Let's work through another year to illustrate how the deferred tax liability now starts being released. Beginning again with the income statement, we note that

the net income after tax, given a cashflow in that year of c_1, is simply

$$I_1 = (1-r)(c_1 - D),$$

with an implied tax of $r(c_1 - D)$. Again, this is not what is actually being paid. It is now an overestimate for we have already used up our capital allowances in full in the previous year and now need to pay tax on all earnings, that is rc_1. The difference between the two, rD, is what we can reduce the deferred tax liability by. The net assets at year end are our doubly depreciated asset $A - 2D$, our cash $b_1 = b_0 - r(c_0 - A) + c_1$ (which is previous year's minus actual tax paid plus this year's pre-tax income), reduced by our actual tax rc_1, and our adjusted deferred tax liability $r(A - D) - rD = r(A - 2D)$

$$
\begin{aligned}
A_1 &= A - 2D + b_1 - rc_1 - r(A - 2D) \\
&= A - 2D + b_0 - r(c_0 - A) + c_1 - rc_1 - r(A - 2D) \\
&= A - 2D + (c_0 - A) - r(c_0 - A) + c_1 - rc_1 - r(A - 2D) \\
&= (1-r)(c_0 + c_1 - 2D)
\end{aligned}
$$

This should match our shareholders funds, given by last year's value plus the taxed income as per income statement:

$$
\begin{aligned}
E_1 &= E_0 + I_1 \\
&= (1-r)(c_0 - D) + (1-r)(c_1 - D) \\
&= (1-r)(c_0 + c_1 - 2D)
\end{aligned}
$$

We note that the deferred tax doesn't show up in the aggregate figures that we are interested in: net assets and equity (or shareholders' funds). It is as if we were paying tax each year on earnings less depreciation when really the tax savings were all had in the year of purchase, and none thereafter. After T years, will have fully depreciated, contributing in the process total tax savings of rA:

$$E_{T-1} = (1-r)\left(\sum_{i=0}^{T-1} c_i\right) - A + rA.$$

We have glossed over a few details (such as what to do when tax rates change in the course of depreciation) and terminology (such as temporary differences and their timing reversal) but any accountant can easily fill in those details. For many situations, neither the details nor the accountants are strictly necessary.