Inheritance Tax and Valuation

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It has long been known in the literature how to include income taxes in the valuation of companies. These taxes can be neutral and therefore do not influence the company value, provided certain conditions are met; essentially, a firm's cash flows have to be taxed the same way as those of a financial investment, which requires the use of economic depreciation. In this paper, we clarify how to value a company when its owner becomes liable for inheritance tax. Here, too, this type of tax is irrelevant when all assets are equally taxed. However, if some assets, e.g. business assets, are treated preferentially, which is the case in most European jurisdictions, the company value rises. We show that a considerable increase can be observed within realistic parameters for European countries.

1. Introduction

The ultimate goal of any business valuation is to determine the price that a seller has to ask in return for the surrendering of his shares in order to attain the same consumption level as he would if he retained those shares. This is referred to as the marginal price. For some time it has been known that income taxes can have a large influence on these marginal prices. Therefore, more than a decade ago the association of CPAs in Germany decided to recommend including income tax in all business valuations. [1] Since then, both the theoretical and the practical debate have gained in intensity.

Price determination from a financial theory perspective means that companies with identical cash flows also have identical prices. If the two prices were different, there would be an arbitrage opportunity, which would violate one of the few undisputed paradigms of financial theory. Therefore, market participants are unable to increase their wealth by simply rearranging their portfolios. Because taxation affects cash flows, it is clear that taxes have to be included in all calculations of market values.

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1. See G. Siepe, *Die Berücksichtigung von Ertragsteuern bei der Unternehmensbewertung*, 50 Die Wirtschaftsprüfung (1997), 1-10 and 37-44; G. Siepe, *Kapitalisierungszinssatz und Unternehmensbewertung*, 51 Die Wirtschaftsprüfung (1998), 325-338; Institut der Wirtschaftsprüfer in Deutschland, *Handbuch für Rechnungslegung, Prüfung und Beratung*, 12th edn. (Düsseldorf: IDW-Verlag, 2002), section A, Rn. 104 f.; W. Ballwieser, L. Kruschwitz & A. Löffler, *Einkommensteuer und Unternehmensbewertung: Probleme mit der Steuerreform 2008*, 60 Die Wirtschaftsprüfung (2007), 765-769.

Regarding the impact of income tax on a company's value, a few years ago a controversy broke out in the literature. [2] The Anglo-Saxon literature has largely ignored income tax – for example, there is no reference in the very prestigious monograph Koller et al. (2005) [3] on how to deal with income tax. Inheritance tax plays an important role in many jurisdictions, [4] which also exerts influence on the market price of a company. To our knowledge, the question of how inheritance tax would be taken into account in a company valuation has not yet been discussed in the literature. This is the goal of our paper.

In section 2. we briefly present some national inheritance tax regimes before presenting our methodology. The main results are described in section 3. The paper concludes with a summary.

2. National Inheritance Tax Codes

The impact of taxes on company value results from an unequal taxation of the business to be valued and of an alternative investment in the capital market. If financial assets and real investments are equally taxed, it is well known that the tax cannot influence the marginal price of the real investment. [5] The situation is similar – as we will show – with inheritance tax. Here, too, the company's value is affected by a different treatment of assets. The reason for this could be a different valuation of assets, a different tax rate, or the explicit exemption of certain assets. In the following we use selected examples to show that the explicit exemption of companies from inheritance tax is in fact standard in international law. As we will not take into account any personal allowances or progressive tax rates in the remainder of the paper, there is no need to distinguish between an estate tax, which is assessed on the assets of the deceased, and an inheritance tax, which taxes the legacies received by the beneficiaries. We refer to both forms as "inheritance tax".

2.1. Germany

German inheritance tax law [6] requires the disputed assets to be valued at their fair market value. Determining the market or nominal value of financial assets is usually not a problem. However, for business assets (incl. shares in EU/EEA-based corporations, if the deceased directly held more than 25% of the nominal capital of that company), valuation rules and specifically, the rules governing exemption and relief are extremely complex.

The law distinguishes between two types of relief. In the case of the so-called regular "relief" only 15% of the value is subject to inheritance tax. There is also the possibility of a full tax exemption. However, these reliefs are subject to certain conditions, most of which will not be discussed here and which are stricter in the case of full exemption. [7] There is one necessary condition which has to be mentioned in the context of this paper. The transferee is not allowed to sell the business for a period of five years in the case of regular relief and for a period of seven years in the case of full exemption ("holding period").

The tax rates depend on the relation between bequeather and beneficiary and can reach up to 50%.

2.2. United Kingdom

Under British inheritance tax law assets are generally valued at market value. The British regime also incorporates the idea of a relief of business assets. [8] As in Germany, financial assets are not exempt from inheritance tax.

Business relief on transfers of certain types of businesses and of business assets can be claimed if they qualify as relevant business property and the transferor has owned them for a minimum period of two years. [9] The relief rate is 100% for a business or shares in an unlisted company and 50% for a majority holding of shares in a listed company (more than 50% of voting rights). The tax rate can reach up to 40%.

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2. *See*, for example, M. Ollmann & F. Richter, Kapitalmarktorientierte Unternehmensbewertung und Einkommensteuer: eine deutsche Perspektive im Kontext internationaler Praxis, in: H.-J. Kleineidam ed., *Unternehmenspolitik und Internationale Besteuerung: Festschrift für Lutz Fischer* (Berlin: Erich Schmidt, 1999), 159-178; J. Laitenberger, *Die Berücksichtigung von Kursgewinnen bei der Unternehmensbewertung*, 2 FinanzBetrieb (2000), pp. 546-550; A. Löffler, *Besteuerung von Kursgewinnen und Dividenden in der Unternehmensbewertung*, 3 FinanzBetrieb (2001), 593-594; J. Wilhelm, *Bemerkungen über Kapitalkosten vor und nach Steuern – Anmerkungen zu dem gleichnamigen Beitrag von Kruschwitz und Löffler*, 75 Zeitschrift für Betriebswirtschaft (2005), 1005-1012; L. Kruschwitz & A. Löffler, *Kapitalkosten, Wertprozesse und Steuern*, 75 Zeitschrift für Betriebswirtschaft (2005), 1013-1019; M.S. Rapp & B. Schwetzler, *Equilibrium security prices with capital income taxes and an exogenous interest rate*, 64 Public Finance Analysis (Finanzarchiv), 3 (2008), 334-351 to name a few.
3. *See* T. Koller, M. Goedhart & D. Wessels, *Valuation: Measuring and Managing the Value of Companies*, 4th edn. (Hoboken, NJ: John Wiley & Sons, 2005).
4. In most countries taxes are levied both on inheritances and on (major) gifts.
5. *See* S.-E. Johansson, *Income taxes and investment decisions*, 71 Swedish Journal of Economics 2 (1969), 104-110; P.A. Samuelson, *Tax deductibility of economic depreciation to insure invariant valuations*, 72 Journal of Political Economy (1964), 604-606.
6. For an overview, *see* J. Lüdicke & A. Fürwentsches, *Das neue Erbschaftsteuerrecht*, 62 Der Betrieb (2009), 12-18; K. Henselmann, C. Schrenker & S. Schneider, *Unternehmensbewertung für erbschaft- und schenkungssteuerliche Zwecke – Anwendungen verschiedener Bewertungsmethoden im Vergleich*, 1 CFbiz, 397-404 or D. Langenmayr, *Quantitative Steuerbelastungsanalyse der Übertragung von Unternehmensvermögen nach der Erbschaftsteuerreform*, 47 Deutsches Steuerrecht, 1387-1394.
7. For details, *see* G. Scholten & L. Korezkij, *Begünstigungen für Betriebsvermögen nach der Erbschaftsteuerreform – Lohnsummenprüfung*, 47 Deutsches Steuerrecht (2009), 253-256.
8. For an overview, *see* A. Richter, *Die Unternehmensnachfolge im britischen Erbschaftsteuerrecht*, 17 Internationales Steuerrecht (2008), pp. 59-62.
9. However, if, in the case of a gift, the transferor dies within seven years, the property is taxed.

2.3. France

Under French inheritance tax law, too, assets are valued at market value. [10] Financial assets are not exempt from tax. The French law also recognizes a substantial tax exemption for business assets. For shares in a qualifying business, the value is reduced by 75% in calculating the tax due. One necessary condition is that the assets must be held for more than six years. The tax rate in France can reach up to 60%.

3. Model

3.1. Market valuation and inheritance tax

Below we attempt to present the impact of inheritance tax on a company's value in a formal model. For this purpose there should be a present (t = 0) and infinite future points in time (t = 1, … , T, … , ∞). The present and future are certain. For simplicity, we disregard any additional tax burden or assume that these taxes are neutral in terms of financing decisions.

An investor can trade at any time and either invest in the riskless capital market (financial investment) or in a company (real investment). In the following, we assume that the nominal riskless interest rate is rf and remains constant over time.

The investor can buy or sell the company at any time. Shares are traded at market value (also referred to as fair price or company value), which we denote by V_t (t = 1, 2, …). The current market value of the company is denoted by V_0. The company provides at time t the certain cash flows of CF_t.

The usual valuation equation (disregarding inheritance tax) reads:

(1) $(1+r_f)V_t^{vorher} = CF_{t+1} + V_{t+1}$

Now we introduce an inheritance tax into our model, so we want to describe the properties of this tax. We assume the following:

Taxpayer The investor is liable for tax.

Tax Object Both the company and a capital market investment are tax objects.

Tax Liability In case of a financial asset, the tax base consists of interest and the invested amount; in the case of a real investment, the cash flow and a proportionate amount b ∈ [0,1] of the enterprise value ("tax relief") are taxed. The tax base is taxed proportionally. The tax rate is independent of the tax base and is .

Time Next, we assume that in years T_1, T_2, … there are investors that are liable for taxation.

The assumption of one or more certain dates on which a legacy is payable limits our model. It would be realistic to suggest that the timing of the tax burden is uncertain. We assume fixed points in time for an inheritance but will abandon this restriction later on.

We need to stress that in our model, it is not only the time at which an inheritance of the real investment becomes effective that is important. Rather, it suffices for another investor (who at that moment does not yet own the real investment) to be present who will, at any of the mentioned points in time T_1, T_2, … be subject to inheritance tax. Assuming this investor acts rationally, he will liquidate his financial assets and – in order to avoid tax – invest in the enterprise. [11]

Consider the equation (1) at a point in time when no inheritance tax is due. It converts to:

(2) $V_t(1+r_f) = V_{t+1} + CF_{t+1}$

To interpret this equation, we focus on an investor who at time t may have financial resources amounting to Vt. The investor can invest in a given period in two ways.

On the one hand, he can invest in the company at t, realize the cash flow one period later and sell the company at a price of Vt+1. On the other, he can invest in the capital market. Under the terms of an arbitrage-free market, both systems lead to identical results, reflected by the equation (2) from the perspective of time t + 1. While the outcome of the capital market system is shown on the left side of the equation, the payment surplus and the proceeds on the sale are shown on the right.

10. For details cf. article 787 B Code Général des Impôts, CGI.
11. We point out that our model, where property is transferred through inheritance, is quite simple. To understand this, assume that an inheritance will take place at time T_1. To determine its market value, we derive a relationship between the corporate values in T_1 -1 and T_1 by assuming that the company is acquired in T_1 - 1 and sold in T_1. In this situation, the price is paid by the deceased, but the heir inherits and realizes the value and the cash flow. A testator who follows the rules of the homo economicus and only maximizes his own utility, has no interest in leaving an estate that does not increase its own utility. Apparently, then, there is a logical contradiction. But were we to accept this argument, then any determination of a company's value even without inheritance tax but with a perpetual lifespan would be contradictory, since no investor lives forever. Therefore, our model disregards this problem. In the economic literature so-called overlapping generations are used to circumvent that problem. In these models, the utility function of the deceased incorporates the consumption of his heirs.

After these preliminary considerations we now investigate how the equations change if investors are liable for inheritance tax and the markets are arbitrage-free. We concentrate on the first point in time when an investor has to pay inheritance tax. This leads to:

$$(1-\tau)(1+\gamma_f)V_{T_1-1} = CF_{T_1} + V_{T_1} - \tau(CF_{T_1} + bV_{T_1})$$

or:

$$(1+\gamma_f)V_{T_1-1} = CF_{T_1} + \frac{1-b\tau}{1-\tau}V_{T_1} \qquad (3)$$

Equation (3) demonstrates in what direction the company's value will move. If there is no exemption (b = 1) the company value remains unchanged. If, however, the inheritance tax regime treats business assets preferentially, the picture changes dramatically. Since the real investment is taxed less, any rational investor will value the company higher because of the tax relief. Equation (3) applies at all subsequent points in time at which an investor is liable for inheritance tax, and it is the starting point of our further considerations.

3.2. Valuation equation

From (3) it immediately follows:

$$V_t = \frac{CF_1}{1+\gamma_f} + \cdots + \frac{CF_{T_1}}{(1+\gamma_f)^{T_1}} + \frac{1-b\tau}{1-\tau}\left(\frac{CF_{T_1+1}}{(1+\gamma_f)^{T_1+1}} + \cdots + \frac{CF_{2T_1}}{(1+\gamma_f)^{2T_1}} + \frac{1-b\tau}{1-\tau}\left(\frac{CF_{2T_1+1}}{(1+\gamma_f)^{2T_1+1}} + \cdots + \frac{CF_{3T_1}}{(1+\gamma_f)^{3T_1}} + \frac{1-b\tau}{1-\tau}(\cdots)\right)\right) \qquad (4)$$

Equation (4) shows how the value of a company can be determined when inheritance tax plays a role. If capital market and real investments are taxed identically, there will be no difference in value. However, when companies are given a tax advantage, there is a deviation to the value without tax.

In order to better understand this discrepancy, we modify the valuation equation (4). Usually, companies are valued by discounting cash flows CF_t with the product of all riskless rates that have accrued until that time $(1+r_f)^t$. If an inheritance tax is due, any subsequent cash flow has to be multiplied by the expression $\frac{1-b\tau}{1-\tau}$.

We now determine the value of a company using a modified equation where inheritance tax is not shown by a factor before the summand, but instead shown in the riskless rate. This requires us to adjust the riskless rate r_f for every point in time T when an inheritance can occur.

For these purposes, we assume that at time T an investor will be subject to inheritance tax. How should the riskless interest rate be modified so that after using rfm instead of rf in equation (2), the resulting value corresponds to (4)? The solution is simple, given that:

$$\frac{1-b\tau}{1-\tau}\cdot\frac{1}{(1+\gamma_f)^T} = \frac{1}{(1+\gamma_f^m)^T} \;\Rightarrow\; r_f^m = (1+\gamma_f)\sqrt[T]{\frac{1-b\tau}{1-\tau}} - 1 \qquad (5)$$

has to apply. If the riskless interest rate rf for any point in time T when an inheritance can occur were to be replaced by a modified riskless rate rfm according to equation (5), the valuation formula that explicitly ignores the inheritance tax liability will produce an identical company value.

To understand the effect of equation (5), we have presented the functional dependence of the modified riskless rate r_f^m on the actual riskless rate r_f in Figure 1. It is evident that the modifications have, at times, a considerable impact.

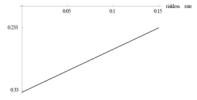
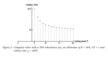


Figure 1: Modified riskless rate with a 50% inheritance tax and an allowance of b = 50%.

This effect is even stronger if we assume that all costs of capital and all expected cash flows are constant over time and that a transfer is due every T years, i.e. $T_1 = T$, $T_2 = 2T$, …. Equation (4) then simplifies to:

$$V_t = \frac{CF}{\gamma_f}\cdot\frac{(1+\gamma_f)^T - 1}{(1+\gamma_f)^T - \frac{1-b\tau}{1-\tau}}$$

The effect of different "holding periods" T on the value of the company is shown in Figure 2. Again, inheritance tax has an enormous impact on the value of the company.



3.3. Valuation equation under uncertainty concerning T_1

In the last chapter we assumed that there is a certain point in time T_1 at which the inheritance tax is due. In reality, of course, the remaining lifespan of the testator is uncertain. Even if a transfer of ownership of the business to the next generation is planned at a fixed point in time, it is still possible it will be transferred earlier if the testator dies. The next chapter deals with this uncertainty. In contrast to equation (3) we concentrate on only one transfer. As in the section above, cash flows CF remain constant.

In the following we assume that a testator aged a dies at time $T \leq T_{max}$ with probability p_{a+T} at the age of (a+T) years. [12] Tmax denotes the point in time at which – if the transferor survives until then – the ownership of the company is transferred as a gift to the next generation as planned. So the transfer time $(\bar{T})$ (T has a particular density function with:

$$f(T,a) = \begin{cases} p_{a+T} & T = 1 \\ p_{a+T} \cdot \left(\prod_{t=a+1}^{a+T-1}(1-p_t)\right) & 1 < T < T_{max} \\ \prod_{t=a+1}^{a+T-1}(1-p_t) & T = T_{max} \\ 0 & \text{Otherwise} \end{cases} \quad (6)$$

Of course, $\sum_{T=1}^{T_{max}} f(T,a) = 1$ holds.

First we need to determine the value of the firm in the presence of an inheritance tax depending on the point of time of the transfer:

$$(7) \quad V_t(T) = \sum_{\tau=1}^{T} \frac{CF}{(1+r_f)^\tau} + \frac{1-b\cdot s}{1-s} \sum_{\tau=T+1}^{\infty} \frac{CF}{(1+r_f)^\tau} = \frac{CF}{r_f}\left(1 + \frac{(1-b)s}{(1-s)(1+r_f)^T}\right)$$

Using the density function (6) we are able to determine the expected value of the enterprise depending on *a*:

$$(8) \quad E[V_t] = \sum_{T=1}^{T_{max}} f(T,a) \cdot V_t(T)$$

Consider an investor who plans to transfer his firm to the next generation in 25 years time. If there is no uncertainty regarding the point in time of the transfer, the firm value is given by 10.46 using formula (7). If this point in time is uncertain, the picture changes. The value will now also depend on the age of the investor because the probabilities which are used to determine the expected present value change as *a* rises: the older the transferor, the less likely he will live until the planned transfer time. The firm value can now be calculated using formula (8) and is (as a function of his age) shown in Figure 3.

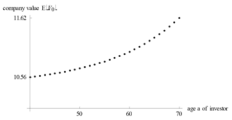


Figure 3: Expected business value depending on the age of the transferor with τ = 50%, b = 50%, r_f = 10% and CF = 1. The investor will transfer his company if he dies or, if he survives, in 25 years.

4. An Example

To illustrate our valuation formulas we wish to give an example; for reasons of simplicity we suppose that there is only one transfer in the future and therefore formula (7) can be applied. In order to illustrate our valuation formulas we calculate the future value at the transfer point of the two alternatives “selling the firm in t=0” and “holding the firm”. The example shows that if the firm is sold at a price according to formula (7), the (after-tax) future value at the transfer point is the same in both cases. To calculate the future values we assume that the interest payments and the cash flows of the firm are not consumed but reinvested. The latter are not reinvested at firm level but held as a cash deposit.

A firm has constant cash flows in the amount of CF = 100 per year. Using a discount factor of r_f = 10% the firm value in the absence of inheritance taxes accounts for $V_0 = \frac{100}{0.1} = 1000$.

Let us assume that five periods from now an inheritance tax is due either on the transferred business assets or on the received money if the firm had been sold five years ago. Business assets are privileged and a) are taxed according to the French regulation at only 25% of their value or b) according to the British regulation are fully tax exempt. In order to isolate the effect of the preferential treatment of business assets we assume in both cases a tax rate of $\tau = 40\%$ = 40%.

Using formula (7) the seller should demand at least 1310 (case a) or 1414 (case b). The lower the reduced tax rate for business assets, the higher the firm value. In the following we show that if these prices are paid, the seller is indifferent between selling or holding the firm.

If the seller holds the firm until *t* = 5, its future value is:

1000 # 1.15 = 1610

According to our model the cash flows are not reinvested and therefore only the value of the firm at t=5 (V5=1000) is taxed at the reduced tax rate for business assets while the cash deposit is subject to the regular tax rate. Therefore the after-tax value accounts for:

1610 - 0.4 # (610 + 0.25 # 1000) = 1266

12. In the following, we use mortality probabilities that are based on the mortality tables (male) for 2008, *see Statistisches Bundesamt*, *Bevölkerung und Erwerbstätigkeit, Sterbetafel Deutschland* (2011). It would have been possible to use a geometric distribution as an approximation of the mortality and survival probabilities; but in order to obtain more realistic results we have decided to apply real mortality probabilities.

However, if the investor decides to sell his company at the price of 1310, his future value in t=5 is:

1310 # 1.15 = 2110

which is taxed at the regular rates and thus leads to an after-tax value of:

2110 # (1 - 0.4) = 1266

It can be seen, that – if the company is sold at the price according to formula (7) – the after-tax values are the same. If business assets are completely tax exempt, e.g. in the United Kingdom, the selling price accounts for 1414, which leads to an after-tax value of:

1610 - 0.4 # (610 + 0 # 1000) = 1366

if the company is held and:

(1414 # 1.15) # (1 - 0.4) =1366

if it is sold.

The price the seller has to demand decreases as the holding period rises. Again in the case of France, if the transfer is due in t=10, the selling price should not be less than 1193, which leads to an after-tax value if the company is held of:

2594 - 0.4 # (1594 + 0.25 # 1000) = 1856.4

and if the company is sold of:

1193 # 1.110 # (1 - 0.4) = 1856.6

This leads us to the situation in which the age of the seller plays an important role. Even if the planned transfer period is the same for an old and a young seller – say, ten years – the old seller is more likely to die by the time this point is reached.

Unlike in formula (8), where we use probabilities taken from mortality tables, we assume in this very simplified example, that the young seller dies at a probability of 10% in t = 5 and the older seller at a probability of 30%.

Calculating the expected values of the selling price we obtain for the young seller (again assuming the French regulation):

0.1 # V (5) + 0.9 # V (10) = 0.1 #1310 + 0.9 # 1193 = 1205

and for the seller:

0.3 # V + 0.7 #V (10) = 0.3 # 1310 + 0.7 # 1193 = 1228

Even in this very simplified example an old seller has to demand a higher price for the firm, although the planned transfer period (ten years) is the same in both cases. In addition, an older investor is assumed to have a shorter (planned) transfer period. This of course increases the price considerably. In this case not only the likelihood of death changes, but also the length of the transfer period. In the example above, if the older seller had a transfer period of only five years, his selling price would be 1310.

5. Summary

For years CPAs have agreed that income tax has to be taken into consideration when valuating a company. In this study, we have investigated how valuation equations have to be adjusted when investors are liable for inheritance tax.

If business assets have an advantage over capital market investments as far as inheritance tax is concerned, this will increase the company's value. It is clear, by reference to an example based on simple figures, that a considerable increase can be observed within realistic parameters for European countries.