Chapters 1 and 2: The Really Big Picture

Governments are third parties to most economic transactions

They bring their own general set of rules—and everyone has to go along with them

Governments impose taxes, nominally, for the benefit of society

Governments can use tax money to buy public goods that are not provided in sufficient quantities by market forces

e.g.,

Social safety net
Education
Police and Fire protection
Defense
Public Parks

Governments can use tax policy to promote socially beneficial investments

Subsidized housing
Empowerment Zones with targeted jobs tax credits
Research and Development Tax credit

<u>What does Tax Planning involve?</u>

1. Converting one type of income into another

    e.g., ordinary income into capital gains

    Traditionally, capital gains tax rates have been below tax rates on ordinary income. Capital gains (and losses) are equal to the change in value of an asset over time (i.e., the increase in value of a security). Examples of ordinary income include wages and bonuses to employees and income from normal operations of a corporation.

    > Consider this: An entrepreneur and a venture capitalist are going to form a corporation to develop a new product. The entrepreneur is going to contribute his ideas and the venture capitalist is going to contribute his money. In return for these inputs, both are going to receive stock. The value per share of stock (and by extension, the value of the ideas being contributed by the entrepreneur) can be inferred from the amount of cash invested by the VC for the number of shares he's receiving for cash relative to the number of shares the entrepreneur is receiving for his ideas.

    > Is the value of the shares received by the entrepreneur ordinary income (like wages) or is it capital gains income? Is it taxable currently or is it taxable in the future when the entrepreneur sells the stock? Does the treatment of income for the entrepreneur affect the tax treatment for the VC?

    > If it's taxable immediately as ordinary income what bad things might happen?

Note: you don't always want to structure events to achieve a low tax outcome. For example, you may be able to structure an economic event to minimize taxes but if the "overhead" involved in doing so exceeds the tax savings you've just reduced overall wealth. For tax planning to be efficient, you've got to consider all costs, not just tax costs.

2. Shifting income from one pocket to another

> e.g., from a high tax pocket to a low tax pocket

> Obviously, it is better to arrange affairs such that income, if it has to be recognized, is recognized in the low tax pocket. This incentive has been the source of many significant disputes in the international trade arena. Specifically, firms try to source income in low tax jurisdictions and source expenses and losses in high tax jurisdictions.

> Note: shifting income from one taxpayer to another is an example of the importance of considering all taxpayers that are party to a particular transaction. It is especially important to consider all parties in, for example, compensation planning, estate planning, and corporate mergers and acquisitions.

3. Shifting income from one time period to another

> e.g., from the present to the future

> Absent a change in tax rates, this is a straightforward time value of money thing. All else equal, it's better to pay taxes later than sooner. This incentive led many old-line firms with rising inventory input prices to select LIFO inventory valuation method, despite the fact that this election oftentimes reduces reported earnings.

> Problem: A company values its inventory using LIFO and reports a LIFO inventory reserve of $50,000,000. This firm faces a marginal tax rate of 35% and has an after-tax cost of capital of 15%. What's a ballpark estimate of the annual savings from using LIFO for this firm?

Basic Tax Planning

Proposition: The tax an investor does or does not have to pay on an investment will affect the investor's required pre-tax rate of return.

Consider the following:

Municipal securities   non-taxable at federal level

Corporate debt   fully taxable at federal level

Problem: Assume that you (acting and being taxed as an individual) can choose between a municipal security that pays 5% per annum and a corporate bond of equal risk and duration. Your personal tax rate is .396 (This is the top tax rate on individuals in 2000).

1. At what rate of interest would you be indifferent between holding the municipal security and the corporate bond? (When you're looking at two alternative tax treatments and two parties it is often helpful to identify one party's indifference point and then see under which of the alternatives the other party is better off—we'll do this a lot. The extent to which the other party is better off is a measure of the potential gains on the table and what's available to negotiate over.)
2. What is the tax payment on the corporate bond? Who pays it? Who gets it?
3. What is the corporation's after-tax cost of borrowing (assume the corporation pays taxes at a 35% rate)?
4. What is the tax payment on the municipal security? Who pays this tax? Who gets it?
5. What is the municipality's after-tax cost of borrowing?

Proposition: The tax on returns to capital providers can affect how a firm finances its activities (i.e., the right hand side of its balance sheet).

Consider the following:

Preferred Stock dividend	70% of dividend non-taxable to corporation that owns less than 20% of the company. Dividend payments not tax deductible.
Corporate Bond interest payment	Fully taxable at federal level. Interest payments tax deductible.

Problem: Assume that a corporation must raise $1,000,000 to fund investment opportunities. The current shareholders are not interested in diluting their ownership interest and thus are considering only two forms of financing: debt and preferred stock. Assume the debt and preferred stock will have the same risk profile and duration. Pre-tax interest rates on comparably risky corporate debt are 10%. Assume that the marginal investor is a corporation with a marginal tax rate of 35%.

1. At what dividend rate on the preferred stock is the corporate investor indifferent to holding the debt or preferred stock?
2. What marginal tax rate would make a corporation prefer financing using preferred stock versus debt?
3. Why might a firm issue both debt and preferred stock?

<u>Broad Restrictions on Taxpayer Behavior</u>

Constructive Receipt Doctrine:

> In a nutshell, the constructive receipt doctrine says that a taxpayer cannot turn his back on income earned. For example, a cash basis taxpayer can not choose to not pick up a paycheck at the end of the year and cash it at the end of the year.

Business-Purpose Doctrine and Substance-over-Form Doctrines:

> At heart, these doctrines allow the IRS to look past the legal structure of a transaction to its economic heart and address the question—"Is it a real deal or just a sham transaction designed to accomplish a tax outcome?"
>
> The business purpose and substance over form doctrines are codified in the following (partial) U.S. tax code sections:

> > Section 482: In any case of two or more organizations, trades, or businesses (whether or not incorporated, whether or not organized in the United States, and whether or not affiliated) owned or controlled directly or indirectly by the same interests, <u>the Secretary may distribute, apportion, or allocate gross income, deductions, credits, or allowances between or among such organizations, trades, or businesses, if he determines that <i>such distribution, apportionment, or allocation is necessary in order to prevent evasion of taxes or clearly to reflect the income of any of such organizations, trades, or businesses</i>.</u>

> > Section 446(b)   If no method of accounting has been regularly used by the taxpayer, or if the method used does not clearly reflect income, <u>the computation of taxable income shall be made under such method as, in the opinion of the Secretary, does clearly reflect income</u>

> > Section 269 …any corporation acquires, or acquired on or after October 8, 1940, directly or indirectly, property of another corporation, not controlled, directly or indirectly, immediately before such acquisition, by such acquiring corporation or its stockholders, the basis of which property, in the hands of the acquiring corporation, is determined by reference to the basis in the hands of the transferor corporation, and <u>the principal purpose for which such acquisition was made is evasion or avoidance of Federal income tax by securing the benefit of a deduction, credit, or other allowance which such person or corporation would not otherwise enjoy, then the Secretary may disallow such deduction, credit, or other allowance.</u>

Related-Party versus Arm's length contracts:

The IRS is far more likely to get interested in scrutinizing related-party transactions than arm's length contracts.

Consider this: Say you've got two brothers operating two businesses. One brother supplies the other with inventory that is sold in the second brother's business. Across the street you've got the same two types of businesses with the same relationship, but no brothers involved. In each of the two cases, the supplier businesses have higher tax rates than the acquiring businesses.

1. What are the brothers more likely to do than the unrelated parties in structuring transactions? Who loses? Who wins? How much is won?

Assignment-of-Income Doctrine:

The goal here is to get income into the hands of a low-tax taxpayer versus a high tax taxpayer. The IRS frowns on you transferring income-generating assets to your children. (Basically, children under 14 have to pay tax on income in excess of $1,400 at the rate that applies to their parents—the so-called "kiddie-tax")

Chapter 3:   Alternative Savings Vehicles

Overview: The purpose behind reviewing the effect of alternative taxation of income (ordinary vs. capital vs. exempt, annual vs. deferred, deductible investments versus non-deductible investments) is to highlight the importance of income characterization, the power of compounding pre-tax versus after-tax returns and to introduce the basic algebra for the course.

Note: Don't get too worked up by the algebra—you don't have to memorize anything: focus on understanding the imbedded intuition. Also, all the math fits nicely into a cheap calculator that can do present values and has a memory function.

As an aside:

Individual Rates

Top ordinary rates	=	39.6%
(Bush proposal 33%--we'll see)		
Top short-term capital gains rates	=	39.6%
Top long-term capital gains rates	=	20.0%

Corporate Rates

Top ordinary rates	=	35.0%
Top short-term capital gains rates	=	35.0%
Top long-term capital gains rates	=	35.0%

Savings Vehicles	Taxation	Examples

SV1 Ordinary Income / Annual Taxation

* Wages
* Bonus
* Interest income
* Dividend income

Return to SV1   = $I $[1 + R(1-t)]^n$

where $I   =   initial investment
         R   =   pretax return
         t   =   tax rate on ordinary income
         n   =   compounding periods

Problem: An individual invests $1,000 in a partnership. All partnership income is taxable to partners annually (partnerships are referred to as pass-through or conduit entities because of this feature). Assume the partnership generates a pretax return of 10% for 10 years. Also assume that the individual faces a 39.6% tax rate. All of the returns to the partnership are reinvested. What will the partnership stake be worth in 10 years? What is the annualized rate of return? Use a calculator.

SV2 Ordinary Income / Deferred Taxation

* Single Premium Deferred annuity
* Non-deductible IRAs
* Return of interest on life insurance proceeds
* returns from foreign subsidiaries

Return to SV2 $=$ $\$I (1 + R)^n (1-t) + \$It$

where $\$I$ $=$ initial investment
R $=$ pretax return
t $=$ tax rate on ordinary income
n $=$ compounding periods

Problem: An individual invests $1,000 in a non-deductible IRA. All returns are exempt from taxation until withdrawn. The IRA invests in fully taxable corporate bonds that yield 10% for 10 years. Assume that the individual withdraws all of the IRA's assets at the end of 10 years and, at that point, pays tax on the returns at a 39.6% tax rate. How much would the individual have at that point? What is the annualized rate of return?

SV1 vs. SV2 So long as tax rates do not go up, SV2 will always dominate SV1. Also, dominance is growing in the pretax rate of return, R, since the relative value of SV2 over SV1 is a function of compounding the pretax return on investment (sometimes referred to as the "inside return") vs. the after-tax return on investment.

SV3 Capital Gains / Annual Taxation see mark to market rules on non-hedging futures transactions (section 1256)

Return to SV3 $=$ $\$I [1 + R(1-t_{cg})]^n$ (Same as SV1 except tax rate)

where $\$I$ $=$ initial investment

R   =   pretax return
t_{cg} =   tax rate on capital gains
n   =   compounding periods

SV3 vs. SV1   So long as capital gains rates are lower than ordinary rates, SV3 will always dominate SV1.

SV3 vs. SV2   Which is better depends on the value of the deferral of ordinary taxation in SV2 (which depends, in part, on the rate of return) versus the value of lower capital gains treatment in SV3.

SV4   Capital Gains   /   Deferred Taxation * Non-dividend paying
                                                    stock (pick a hi-tech)

Return to SV4   = $I (1 + R)^n (1-t_{cg}) + $It_{cg} (Same as SV2
                                                    except tax rate)

where $I   =   initial investment
          R   =   pretax return
          t_{cg} =   tax rate on capital gains
          n   =   compounding periods

SV4 vs. SV2   The returns on SV4 are the same as SV2 if the capital gains rates are the same as ordinary income rates (88-91).

SV4 vs. SV3   SV4 always dominates SV3 unless the capital gains rate equals 0% or there's only one compounding period.

SV5   Exempt   /   Never taxable   * life insurance proceeds
                                                * some municipal
                                                  securities
                                                * Roth IRAs

Return to SV5   = $I [1 + R]^n   (Same as SV1-SV4 when
                                                tax equals zero)

where $I   =   initial investment
           R   =   pretax return
           n   =   compounding periods

SV6* Ordinary   /   Deferred Taxation * company sponsored
                                                   pension plans
                                            * Deductible IRAs

* Contribution deductible

Return to SV6   = $[\$I / (1 - t_o)]$ $[1 + R]^n$ $(1 - t_f)$

where $I   =   initial investment
           R   =   pretax return
           t_o =   tax rate on ordinary income of contributor
           t_f =   tax rate on ordinary income of the recipient when funds withdrawn. Note: income related to funds withdrawn from a retirement plan does not retain its character—it's all ordinary income
           n   =   compounding periods

      Note 1:   if the (1-t)s cancel out in the return to SV6 you're left With $I [1 + R]^n$, the same as the return to SV5.

      Note 2:   the equivalence of SV5 and SV6 breaks down if the tax rate in effect at the time the contribution is made, $t_{o, (now)}$, differs from the tax rate pensioners' pay, $t_{f, (future)}$, when they receive pension payouts. If $t_o > t_f$ then pension returns will be greater than returns to tax exempt savings. (The intuition here is that the higher the current tax rate, the higher the government contribution, in the form of a tax deduction, to the pension plan—if tax rates were 100% contributing to a pension plan would be the same as paying your taxes, i.e., pension contributions would generate tax credits.)

It's important to note that investors will compete for the favorable tax treatment accorded in SV2-6. This competition will drive down the pretax rates of return to these different vehicles, potentially leaving the after-tax returns available across the different vehicles identical (e.g., returns to municipal securities vs. returns to fully taxable bonds vs. returns to non-dividend paying stock vs. returns to foreign subsidiaries). In fact, if returns are not equal across alternative vehicles arbitrage opportunities may exist

Problem: Say you have $100,000 of taxable income all of which is subject to a tax rate of 40%. You can borrow money at a pretax rate of 10% and deduct interest expense from taxable income. You can purchase tax exempt municipal securities that yield 7%. How much money do you want to borrow? What will you do with the money you borrow? How much better off will you be?

Chapter 4:   Optimal Organizational Form

Alternative Organizational Forms:

Pass-Through Entities: The income of these organizations is not taxed at the entity level. Rather, it is passed through to the "owners" and they pay tax.

Sole Proprietorships
Partnerships
S-corporations
Limited Liability Corporations (LLCs)
Limited Liability Partnerships (LLPs)

Non-tax considerations:
1. ownership may not be readily marketable
2. case law not really well developed in some instances (e.g., LLCs)
3. somebody has to be personally liability

C Corporations   Pay entity level tax.

Shareholders pay second tax on dividends. Shareholders also pay a tax on any appreciation in value (capital gains). Taxation at the entity level and then again at the shareholder level is referred to as double taxation

Non-tax considerations:
1. ownership readily marketable
2. well established case law
3. corporate liability shield

Comparing returns to pass-though entities to those of non-pass-through entities

Partner return equals: $\$I [1+R (1-t_p)]^n$ [1]

where $\$I$ $=$ initial investment
          R $=$ pretax return
          t_p $=$ partner's tax rate
          n $=$ compounding periods

(This is just like SV1)

Corporate return *assuming
no dividends* equals $\$I [1+R (1-t_c)]^n$

Less the tax on shareholders t_{cg} $*$ $\$I [1+R (1-t_c)]^n$ $+$ $t_{cg} \$I$

which simplifies to: $\$I [1+R (1-t_c)]^n (1-t_{cg}) + \$It_{cg}$ [2]

where $\$I$ $=$ initial investment
          R $=$ pretax return
          t_c $=$ corporation's tax rate
          t_{cg} $=$ shareholder's capital gains tax rate
          n $=$ compounding periods

(This is just like SV2)

When should you invest in a partnership?

$\$I [1+R (1-t_p)]^n$ $>$ $\$I [1+R (1-t_c)]^n (1-t_{cg}) + \$It_{cg}$ [3]

When should you invest in a corporation?

$\$I [1+R (1-t_p)]^n$ $<$ $\$I [1+R (1-t_c)]^n (1-t_{cg}) + \$It_{cg}$ [4]

In a nutshell, optimal organizational form (from a tax standpoint) depends on the personal tax rate, t_p, the corporate tax rate, t_c, the capital gains tax rate, t_{cg}, the rate of return earned on investments, R, and the number of compounding periods, n.

Consider the following:

1. If the personal tax rate equals the corporate rate and there is no capital gains tax returns to partnerships and corporations will be equal. (Consider the special case where no income taxes are paid)

2. If the personal tax rate equals the corporate rate and there is a positive capital gains tax, returns to partnerships will always exceed those to corporations. Some non-tax benefits associated with corporations must exist for corporations to be preferred to partnerships.

3. If the personal tax rate is greater than corporate rate and there is no capital gains tax, returns to corporations will always exceed those to partnerships.

   If the personal tax rate (currently the top personal rate is 39.6%) is greater than corporate rate (currently the top corporate rate is 35.0%) and there is a positive capital gains tax (currently the tax rate on long-term capital gains is 20% (18% if held more than 5 years)) neither organizational form clearly dominates the other. However, the longer you hold the investment in the corporate form and the greater the "inside return", the greater the value of the "corporate tax shield."

   Problem: Assmue you can invest $1 today and earn a pretax return of 20% on the initial investment and the reinvestment of returns. Tax rates are as noted above. If the investment horizon is 5 years is it preferable to operate within a partnership structure or a corporate structure? What if the investment horizon is 30 years?

At what after-tax corporate rate of return, $R(1-t_c)$ or r^*_c would an investor be indifferent to investing in the corporate or partnership form? (i.e., what r^*_c is going to compensate you for having to pay capital gains taxes?)

$$\$I\,[1+R\,(1-t_p)]^n \quad = \quad \$I\,[1+R\,(1-t_c)]^n\,(1-t_{cg}) + \$It_{cg}$$

$$\$I\,(1+r_p)^n \quad = \quad \$I\,(1+r^*_c)^n\,(1-t_{cg}) + \$It_{cg}$$

$$r^*_c \quad = \quad \{[(1+r_p)^n - t_{cg}]/(1-t_{cg})\}^{1/n} - 1$$

Implications:

1. The higher the capital gains tax rate, t_{cg}, the higher r^*_c will have to be to offset it.
2. The higher the after-tax return partnerships, r_p, the higher r^*_c will be (seems obvious).

<u>What is the implied annual shareholder level tax rate, t_s, that equates r^*_c with r_p?</u>

Recall: $\qquad\qquad\qquad\qquad\qquad\qquad R_p\,(1\text{-}t_p) \qquad = \qquad r_p$

We want to identify t_s such that $\qquad r^*_c\,(1\text{-}t_s) \qquad = \qquad r_p$

Rearranging $\qquad\qquad\qquad\qquad\qquad\qquad t_s \qquad\qquad = \qquad 1 - (r_p / r^*_c)$

The implied annual shareholder level tax rate, t_s is the annual rate of tax that could be paid on gains that is equivalent to paying the capital gains tax when the security is sold.

<u>What premium return has to be generated by the corporate form to justify it over the partnership form?</u>

Recall $\qquad R^*_c\,(1\text{-}t_c)\,(1\text{-}t_s) \qquad\qquad = \qquad r_p$

and $\qquad\qquad r_p \qquad\qquad\qquad\qquad = \qquad R_p\,(1\text{-}t_p)$

so $\qquad\qquad R^*_c\,(1\text{-}t_c)\,(1\text{-}t_s) \qquad\qquad = \qquad R_p\,(1\text{-}t_p)$

Rearranging

$$\frac{R^*_c}{R_p} \qquad = \qquad \frac{(1\text{-}t_p)}{(1\text{-}t_c)\,(1\text{-}t_s)}$$

Problem: If the personal tax rate is 39.6% and the corporate rate is 35%, and the effective annualized shareholder tax rate is 10% by how much do pretax returns on corporate projects have to exceed those to partnerships? What happens if the personal tax rate drops to 33% and the effective annualized shareholder tax rate drops to 8%? What might be the consequences from such a change on the choice of organizational form?

<u>More on Partnerships versus C corporations:</u>

It may be preferable to organize start-ups as pass-through entities so that early losses can be used to offset otherwise taxable income. These pass-throughs can then be converted to C corporations to take advantage of the corporate tax shield, as well as other corporate form advantages.

<u>What happens to shareholder's after-tax return if the corporation pays dividends?</u>

Of course, it depends on shareholder's tax rates and reinvestment opportunities.

From a tax standpoint, dividends are tax disadvantaged in that they're typically taxed at ordinary rates which are higher than capital gains tax rates (for individuals).

Note: dividend policy is far less relevant in a tax sense to tax exempt investors such as pension funds. This suggests that pension funds may form a natural clientele for dividend paying stocks (as well as other investments that generate tax disadvantaged returns, such as corporate bonds).

Chapter 5:   Implicit Taxes

An implicit tax is the reduction in an asset's pretax return relative to a benchmark asset's return (e.g., fully taxable corporate bonds). Think of implicit taxes as the reduction in pretax returns an investor is willing to accept to gain the preferential tax treatment that attends the investment.

Taxpayers with relatively low tax rates (e.g., people with low levels of income, firms with net operating loss carryovers, pension funds) form natural clienteles for assets with high explicit taxes, a.k.a., tax-disfavored assets. Alternatively, taxpayers with relatively high tax rates (e.g., highly compensated Sloan School graduates, corporations that pay tax at the top corporate rate) form natural clienteles for assets with high implicit tax rates, a.k.a., tax-favored assets.

The following assets can be thought of as tax-favored or tax-disfavored:

Tax-favored

* Municipal bonds
* Depreciable assets
* Research and development costs
* Advertising costs
* Investments in human capital
* Investments that allow deferral of
  tax on increases in value
  (non-dividend paying stock)

Tax-disfavored

* Junk Bonds
* Short-lived Goodwill
* Special tax assessments (windfall
  profits for natural resource firms)
* Dividend paying stock

How to calculate after-tax returns based on based on after tax investment

After tax returns   /   After tax investment

Where

After tax returns equal:

Pretax returns less taxes paid on pretax returns

e.g., $\$1(1+R)^n (1-t_{pn})$

where $1   =   one dollar of investment
             R   =   pretax rate of return
             t_{pn} =   tax rate on returns at time n
             n   =   compounding periods

and After tax investment equal:

Pretax investment less present value of deductions

i.e., $\$1 (1-t_{po})$

$1   =   one dollar of investment
t_{po} =   tax rate at time o that determines the present value
                    of the investment write-off (e.g., immediate
                    deduction for R&D activities, advertising, the
                    present value of depreciation deductions, etc.)

Thus an investor's after tax rate of return based on after tax investment
equals:
        $\$1(1+R)^n (1-t_{pn})$ / $\$1 (1-t_{po})$

The higher the present value of deductions, the lower the required pretax rate
of return. Stated another way, assets that give rise to accelerated deductions
require lower risk-adjusted pretax rates of return than they would absent the
tax benefits.

We can calculate the annualized rate of return is equal to

$$\{\$1(1+R)^n (1-t_{pn}) \ / \quad \$1 (1-t_{po}) \}^{1/n} \quad - \quad 1$$

Note: if the investor's future tax rate, t_{pn}, is equal to his current tax rate t_{po} then we're left with $\$1(1+R)^n$, i.e., the investment is, effectively tax exempt. As such, it should be priced to generate a pretax return equal to that of a municipal bond…which is the same as saying that it should be priced to generate an after-tax return equal to that of a fully taxable corporate bond $(1+r_b)^n$.

Problem: The Economic Recovery Tax Act of 1981 introduced the accelerated cost recovery system (ACRS) which accelerated depreciation deductions on productive assets (e.g., buildings, machinery and equipment). What was the likely effect of this change in tax policy on required rates of return on affected assets? On the supply of affected assets?

Problem: An individual can invest $1,000 in an asset. The investment is immediately deductible for tax purposes. The investment gives rise to an annual pretax rate of return of 10% for 10 years. The return is taxable at the end of 10 years. In case 1, the investor's tax rate in the year of investment is 40% and is expected to be 40% in ten years. In case 2, the investor's tax rate in the year of investment is 40% and is expected to be 30% in ten years.

1. What is the average annual rate of return on the investment in cases 1 and 2?
2. What factors will affect the price of a depreciable asset if future tax rates are expected to increase? decrease?

Recognizing that:

The after tax return on our asset of interest = After tax return on fully taxable corporate bond

$$\{\$1(1+R)^n (1-t_{pn}) \ / \ \$1 (1-t_{po}) \}^{1/n} \ - \ 1 \ = \ (1+r_b)$$

You can solve for R as follows:

$$R \ = \ \{[(1+r_b)^n (1-t_{po})] / (1-t_{pn})\}^{1/n} \ - \ 1$$

What this tells you is that, as investor tax rates decline, investors are willing to accept a lower pretax rate of return on investments…makes sense since what they want is a targeted after-tax rate of return and if you reduce the rate to which returns are subject, you need less of a pretax return to generate the same after tax return.

Problem: An individual can invest $1,000 in an asset that has a 10-year life and generates a return that is taxable at the conclusion of those 10 years. The investment is immediately deductible for tax purposes. The return is taxable at the end of 10 years. The investor's tax rate in the year of investment is 40% and is expected to be 30% in ten years. The pre-tax rate of return that can be earned on fully taxable bonds of equal risk is 10%. What pretax rate of return on the investment will make the investor indifferent between investing in the $1,000 asset or a $1,000 fully taxable bond?

Total taxes include both taxes explicitly paid to taxing authorities and implicit taxes paid via the reduction in pretax returns.

The implicit tax rate can be calculated as follows:

$$R_b (1- t_{ia}) = R_a$$

Rearranging $\quad t_{ia} \quad = \quad (R_b - R_a) / R_b$

Where:

R_b = risk adjusted pretax return on the benchmark asset
t_{ia} = implicit tax rate
R_a = risk adjusted pre-explicit tax return on an alternative investment

The explicit tax rate can be calculated as follows:

$$(R_a - r^*) / R_b$$

Where:

r^* = after-tax rate risk adjusted return on the benchmark asset

Problem: Assume the risk-adjusted rate of return on a fully taxable bond is 10% and the risk-adjusted rate of return on depreciable equipment is 9% and the risk adjusted rate of return on a tax exempt bond is 7%.

1. What is the explicit tax rate on the returns to the fully taxable bond? The implicit tax rate?
2. What is the explicit tax rate on the returns to the depreciable asset? The implicit tax rate?
3. What is the explicit tax rate on the returns to the tax-exempt bond? The implicit tax rate?

Adjusting for risk embedded in required rates of return

What you want to do is compare after-tax returns on investment alternatives after you have adjusted for risk. Also, you want to identify the extent to which an asset is bears implicit vs. explicit tax (remember that the highly taxed form a clientele for investments that reduce explicit taxes (i.e., tax-favored assets and vice versa).

You can get information on expected pretax returns that reflect the relative riskiness of investments.

and

You can attempt to adjust expected pretax returns for the imbedded pretax risk premium (e.g., by using the CAPM)

Relevant notation

R^{ob} = required pretax return, including risk premium, benchmark
R^{oa} = required pretax return, including risk premium, alternative
R^{rpb} = required pretax risk premium, benchmark
R^{rpa} = required pretax risk premium, alternaive
R^{rab} = required pretax return excluding risk premium (R^{ob} - R^{rpb}), BM
R^{raa} = required pretax return excluding risk premium (R^{oa} - R^{rpa}), ALT
$r*$ = risk adjusted after tax rate of return on a risky asset (in equilibrium this is equal to r*, the after-tax rate risk adjusted return on the benchmark asset). Also, note that $r* = R^{raa}(1\text{-}gt)$ where g is equal to the portion of the return that is taxable. Note $R^{raa} = r* / (1\text{-}gt)$. Also, g is always equal to 1 for fully taxable benchmark assets and zero for tax-exempt assets.

	Not adjusting for risk	Adjusting for risk
Implicit tax:	$(R^{ob} - R^{oa}) / R^{ob}$	$(R^{rab} - R^{raa}) / R^{rab}$
Explicit Tax:	$(R^{oa} - r*) / R^{ob}$	$(R^{raa} - r*) / R^{rab}$

Problem: Calculate the implicit and explicit tax rates for the following three assets using the required pretax returns including and excluding risk premiums.

Asset 1: fully taxable, pretax rate of return 15%, risk premium 3%
Asset 2: partially taxable, pretax rate of return 20%, risk premium 9%
Asset 2: tax exempt, pretax rate of return 10%, risk premium 0%

Do the results suggest differences regarding the relative tax-favored / tax-disfavored status of the partially taxable asset that would affect its attractiveness to a taxpayer facing a relatively low tax rate? A relatively high tax rate?

Chapter 7: Marginal Tax Rates

For our purposes, we're going to define marginal tax rates as the present value of the tax due on the next dollar of income earned.

If you're unmarried and not the head of a household the 2000 tax rate schedule looks like this:

For unmarried individuals other than heads of households and surviving spouses, the tax is 15 percent of the taxable income between $0 and $26,250; $3,937.50 plus 28 percent of the taxable income over $26,250 but not over $63,550; $14,381.50 plus 31 percent of the taxable income over $63,550 but not over $132,600; $35,787 plus 36 percent of the taxable income over $132,600 but not over $288,350; or $91,857 plus 39.6 percent of the taxable income over $288,350.

1. What's the marginal tax rate of an individual with taxable income of $39,000? What is the effective tax rate of the same individual (i.e., total tax payable/taxable income)?
2. What's the marginal tax rate of an individual with taxable income of $139,000? What is the effective tax rate of the same individual?

If you're a corporation the 2000 tax rate schedule looks like this:

11(b) AMOUNT OF TAX.--
11(b)(1) IN GENERAL.--The amount of the tax imposed by subsection (a) shall be the sum of--
11(b)(1)(A) 15 percent of so much of the taxable income as does not exceed $50,000,
11(b)(1)(B) 25 percent of so much of the taxable income as exceeds $50,000 but does not exceed $75,000,
11(b)(1)(C) 34 percent of so much of the taxable income as exceeds $75,000 but does not exceed $10,000,000, and
11(b)(1)(D) 35 percent of so much of the taxable income as exceeds $10,000,000.
In the case of a corporation which has taxable income in excess of $100,000 for any taxable year, the amount of tax determined under the preceding sentence for such taxable year shall be increased by the lesser of (i) 5 percent of such excess, or (ii) $11,750. In the case of a corporation which has taxable income in excess of $15,000,000, the amount of the tax determined under the foregoing provisions of this paragraph shall be increased by an additional amount equal to the lesser of (i) 3 percent of such excess, or (ii) $100,000.

1. What's the marginal tax rate of a corporation with taxable income of $100,000,000? What is the effective tax rate of the same corporation?

What about State and Local taxes?

Problem: Say the federal tax rate is 35%, the state tax rate is 5%
and the local tax rate is 3%. Recognizing that state and
local taxes are deductible for federal purposes, what is
the firm's marginal tax rate?

What is taxable income for a given period of time?

It's not simply current period taxable revenues less current period tax-
deductible expense (though it might be). A relatively important feature of
the tax system is that losses generated in one year can be carried back to
offset taxable income in the two preceding years (and, in so doing, generate
refunds of previously paid taxes) or forward to offset taxable income in the
subsequent 20 years. Note: carryback and carryforwards are not mutually
exclusive.

Problem: Grace has a consulting business. In 2002 she generates
taxable revenues of $500,000 and incurs tax-deductible
expenses of $800,000. In 2000 she had taxable income
of $35,000. In 2001 she had taxable income of $140,000.
She anticipates generating income of $500,000 in 2003.
Assume Grace's after tax cost of capital is 10% and that
she paid and expects to pay taxes as an unmarried
individual based on the tax rate table on the preceding
page. What is the present value of the after-tax benefit
from the net operating losses incurred in 2002 assuming:
1) Grace carries back losses to generate a refund of taxes
paid in 2000 and 2001 and carries forward the remaining
losses to offset projected income in 2003; and 2) Grace
does not carry back losses to generate a refund of taxes
paid in 2000 and 2001, but rather carries forward the
entire 2002 loss to offset projected income in 2003

The availability of net operating losses affects that calculation of marginal tax rate.

If a company can offset taxable income using NOLs in a given year, it effectively defers payment of tax until the future.

Until when in the future?

    It depends on how long it's going to be able to defer payment.

How long will it be able to defer payment?

    For as long as it has NOLs available to offset taxable income.

The critical issue in calculating marginal tax rates in the presence of NOLs is identifying expected future taxable income and when that expected future taxable income will exhaust available NOLs.

Problem:	Assume a company has $100,000,000 in NOLs, and expects to generate $25,000,000 per year in taxable income (without regard to the NOL). The firm faces a marginal statutory tax rate on every dollar of income of 35%. The firm's after-tax cost of capital is 10%. What is the firm's marginal tax rate?

Problem:	What kinds of investments and financing are you going to prefer if you're a corporation with a low tax rate?
	What happens if your tax rate changes?

A few other things:

1.   Don't confuse marginal tax rates with effective tax rates. Effective tax rates are typically defined as the sum of taxes paid or payable divided by pretax income. The effective tax rate doesn't tell you what the marginal tax rate is on the next dollar of income.

2.   It's not only NOLs that might reduce a firms marginal tax rate.

    a. Obviously, level of income will do so, since tax rates are progressive.
    b. The presence of tax credit carryforwards, most especially alternative minimum tax credit carryforwards, reduce marginal tax rates

3.   To give you a quick sense of the relative importance of taking NOLs into account in the calculation of marginal tax rates, somewhere between 25% and 40% of public corporations at any point in time have net operating losses—and these aren't just the obvious losers. Included among the firms with NOLs are companies like Cisco—where the NOL is a product of generous stock option compensation—we'll discuss this in connection with the compensation.