4 Chapter 4 – Implicit Taxes and Clienteles, Marginal Tax Rates, and Arbitrage

4.1 Tax-Favored Status and Implicit Rates: “[I]mplicit taxes arise because the prices of investments that are tax favored are bid up in the marketplace." (p. 4-3) When the cost of a tax favored asset increases, the internal rate of return of the asset declines (because the nominal before-tax return remains constant but the cost of the investment increases).

4.1.1 You should know about the following kinds of interest income: (a) interest on federal T-Bills (as well as federal bonds and notes) is subject to federal income tax but not to state income tax; (b) interest on state and local bonds is exempt from federal income but, in general, is subject to state income tax; and (c) interest on bonds issued by corporations are subject to the federal income tax and to state income tax. Note that many states exempt interest on their own state bonds as well as interest from local bonds issued by a municipality within the state (no state exempts the interest on bonds issued by other states or by municipalities located in other states, though some states do not levy an income tax at all). Note: gain arising from the sale or exchange of a state or local bond *is* subject to federal income tax, though such gain rarely arises in significant amounts.

4.1.2 The value of initial expensing. The TCJA of 2017 allows taxpayers that purchase a depreciable asset other than real estate (i.e., equipment and machinery) to immediately deduct the cost of the asset. We saw in the last chapter that if the return to the asset would be taxed in full only at disinvestment (i.e., a traditional IRA), the effect is the same as denying the initial deduction but exempting the return from taxation (i.e., a Roth IRA). This result can be generalized.

4.1.2.1 Suppose an investment B generates a return of R_1 after one year, R_2 after two years, etc. If the cost of the investment is nondeductible and the return is not taxed,

then the after-tax cost remains unchanged as do the annual returns.

4.1.2.2 If the investment is scalable, then an investment of $B/(1 – t)$ will generate a return of $R_1/(1 -t)$ in year one, $R_2/(1 – t)$, etc. If we then tax-effect both sides and assume the initial cost is deductible and the annual return is fully taxable, we get that the after-tax cost is B and the annual after-tax return is $R_1(1 – t)/(1 – t)$ in year one, etc., $R_2(1 – t)/(1 – t)$ in year 2, etc., for the same result as in the tax-free case.

4.1.3 An investment can be tax-preferred in a variety of ways including full or partial exclusion of income, allowable tax credits, or acceleration of depreciation.

4.1.3.1 Historically, investment in depreciable equipment included an investment tax credit (ITC). The effect of such a credit is to reduce the after-tax cost of the equipment by the dollar amount of the credit. *Note that the value of a tax credit is the dollar amount of the tax credit as opposed to a deduction that is worth the dollar amount of the deduction times the taxpayer's marginal tax rate.*

4.1.3.2 Depreciation is allowable for investments in assets that waste over time. The economically correct depreciation in any year is the diminution in the value of the asset. For example, if investment property is purchased for $1,000 and after one year it is worth $850, then $150 should be allowable as a depreciation deduction. As a result, if the property generated receipts of $250, the net income would be $250 - $150, or $100, for a 10% pre-tax return. If depreciation is allowable in excess of the true, economic depreciation, then the taxable return will be understated for tax purposes. In this example, if the depreciation deduction were set at

$200 (despite the economic decline being only $150), the investor would pay tax on $50 of net income even though the true return was $100. For equipment and machinery (but not for buildings), depreciation is considerably accelerated in the following three ways: (1) the total depreciation is larger than it should be because scrap value is treated as $0; (2) the statutory life over which the depreciation deductions are allowable is shorter than the economic life of the asset; and (3) the rate at which the depreciation deductions are allowed is overly skewed to the early years of the investment.

4.1.3.3 Example: Suppose a taxpayer invests $100,000 in an asset that will pay out 10% (i.e., $10,000) each year. Assume further that the asset will be sold at the end of year 3. What is the investor's after-tax rate of return assuming (a) no depreciation or tax credit is allowed; (b) the cost of the investment can be deducted immediately; or (c) the asset qualifies for a 10% tax credit and depreciation can be claimed at a rate of 50% in each of the first two years? Assume the investor has significant income each year from other sources to make all deductions fully valuable, that the tax credit reduces the dollar amount of allowable depreciation, and the taxpayer faces a tax rate of 40%.

4.1.3.3.1 The after-tax cost of the investment equals $100,000. The investment's after-tax return will be $6,000 after one year, $6,000 after two years, and $106,000 after three years. Because $\$6,000/1.06 + \$6,000/(1.06)^2 + \$106,000/(1.06)^3$ equals $5,660 + $5,340 + $89,000, or $100,000, the after-tax annual rate of return equals 6% (i.e., the before-tax rate of

return of 10% times (1 minus the annual tax rate).

4.1.3.3.2 The after-tax cost of the investment equals $100,000 – 0.40($100,000), or $60,000. The after-tax return will be $6,000 after one year, $6,000 after two years, and $66,000 after three years. Because $6,000/1.10 + $6,000/$(1.10)^2$ + $66,000/$(1.10)^3$ equals $5,455 + $4,959 + $49,587, or $60,000, the after-tax annual rate of return equals 10%. Thus, for a nondepreciable asset, allowing immediate expensing of the cost is equivalent to exemption of the return (i.e., the after-tax rate of return of 10% equals the pre-tax rate of return of 10%).

4.1.3.3.3 The before-tax cash flow is an outflow of $100,000 in year 0, a $10,000 receipt in year 1, a $10,000 receipt in year 2, and a $110,000 receipt in year 3. The after-tax cash flow is an outflow of $90,000 in year 0, an $18,000 receipt in year 0 (the value of the depreciation deduction), a $24,000 receipt in year 1 ($6,000 + $18,000), $6,000 in year 2, and $66,000 in year 3. The IIR for this investment is the value of r that makes the following true: $90,000 = $18,000 + $24,000/(1 + r) + 6,000 / $(1 + r)^2$ + $66,000/$(1 + r)^3$. According to my calculation, that implies R is about 12.8%.

4.1.3.3.4 If an investment costs $I at time zero and yields only a single payment of $A after n compounding periods, then the IRR is that value of r for which $I = $A/$(1 + r)^n$. Solving for

r yields $r = (\$A/\$I)^{1/n} - 1$, a formula we have seen before.

4.1.3.3.5 If an investment costs $I at time zero, compounds at a rate R per compounding period, and yields only a single payment after n compounding periods, the accumulation will equal $\$I(1 + R)^n$. The IRR is that value of r for which $[\$I(1 + R)^n]/(1 + r)^n = \$I$, or r = R.

4.1.4 Equilibrium Analysis: *If there were no frictions or restrictions and the laws of supply and demand had time to adjust the cost of all goods to their market-clearing price*, every *risk-adjusted, after-tax return* would be equal. So, for example, a taxable bond would pay interest at the tax-free rate, grossed-up by the tax rate, assuming no risk. Similarly, if an investment is tax-favored, then its price should be bid up until its after-tax rate of return equals the return of all other assets. That is the basis for the discussion below equation 4.2 on page 4-5, where we assume the investment is deductible when made (at a tax rate of t_0) and is fully taxable after n years at a rate of t_n, assuming the equilibrium rate of return equals r_b. Note: if the cost of a nondepreciable asset generating a fixed annual return is deductible and tax rates are constant, the *effect* of the initial deduction is to exempt the fixed annual return from taxation. That is, the I.R.R. of a deductible bond returning an after-tax rate of R(1-t) each year is the same as a nondeductible bond returning an after tax rate of R each year.

4.1.5 Computing the Implicit Tax

4.1.5.1 "The **implicit tax** on the returns to any asset is defined as the difference between the before-tax return on a fully taxable bond (our reference security) and the risk-adjusted before tax return on an alternative asset." Page 4-7. That is: $\mathbf{t_{Ia} = (R_b - R_a)/R_b}$, where a is an arbitrary asset and b is the benchmark asset.

4.1.5.2 Alternatively, the implicit tax rate on an investment ("a") is that tax rate which, if applied to a fully taxable investment ("b"), would reduce the pre-tax return to that offered by the investment (investment "a"). For example, if investment "a" yields a before-tax return of 6% and fully-taxable bonds yield a before-tax return of 10%, then the implicit tax rate equals 40% (because 10%(1 – 40%) = 6%). See equation 4.3 at page 4-7, for deriving the **implicit tax rate**. Note that an implicit tax is not paid to the taxing authority but instead is extracted by the market.

4.2 Clienteles: Because there are cross-sectional variations among taxpayers, there will be inframarginal investors. Inframarginal investors can obtain an above-market after-tax return on their investments by exploiting their special tax circumstances.

4.2.1 Evidence on the Existence of Implicit Taxes and Clienteles: The authors observe that there is some evidence (though not much) that tax-preferred assets pay reduced pre-tax returns. In the case of state and local bonds, that clearly is true. Beyond this simple case, the evidence is much more mixed. Why? Risk-premium is not measured well; frictions and restrictions can dominate other explanations; the theory of how investors behave may be inaccurate.

4.2.2 Example: High-bracket taxpayers should purchase tax-exempt securities because the implicit tax rate on tax-exempt securities is based on mid-bracket taxpayers. Consider the case of a few taxpayers in the 40% bracket, many taxpayers in the 25% bracket, taxable bonds return 10% on a pre-tax basis, and a flood of tax-exempt securities. To attract the marginal (i.e., 25%) investor, the issuers of exempt securities must offer a yield of 7.5%. But if such bonds are held by high-bracket taxpayers, they will enjoy an above-market return.

4.3 Implicit Taxes and Corporate Tax Burdens: Our authors address the debate concerning corporate exploitation of tax loopholes. Our authors clearly believe that the payment of implicit taxes should be treated on a moral level as equivalent to the payment of explicit taxes. Note, however, that the payment of implicit taxes will not cover the cost of roads or schools or national defense. When two private taxpayers together engage in a tax-favored transaction, the tax savings will be captured by the two taxpayers: some of the tax savings will be shifted from the nominal payor of taxes to the counterparty through implicit taxes, but that does not change the fact that reduced revenue is flowing to the government. (One important reason why large corporations historically paid little federal income tax is that they paid substantial foreign taxes, and in general US law permits taxpayers to avoid double taxation on foreign earnings.) In any event, if US taxpayers substitute implicit taxes for explicit taxes, the questions are (1) why has Congress permitted revenue to escape the taxing system?; and (2) Is it escaping because some activity is deliberately being encouraged or because a tax advisor has found a way to reduce taxes without engaging in activity intended by Congress to be tax favored?

4.4 Marginal Tax Rates: Marginal tax rate is the statutory rate imposed on the last dollar of taxable income. (Typo at top of page 17: 79% should be 7.9%.)

4.4.1 Additional Details on Local-Level Tax Rates and Individual-Level Marginal Rates: For corporate taxpayers, state and municipal income taxes are deductible. Accordingly, the aggregate tax burden on a corporate tax payer equals $\mathbf{(t_{fed}) + (T_{state} + t_{local})(1 - t_{fed})}$. For individual taxpayers, determining the aggregate marginal tax rate is more difficult. State and local income taxes imposed on business income are deductible but state and local income taxes imposed on wages and investment income is limited, with the limitation of $10,000 applicable to the taxpayer's sum of non-business income taxes and real estate

taxes. For many individual homeowners, non-business state and local income taxes are effectively nondeductible.

4.4.2 Average and Effective Tax Rates:

4.4.2.1 Average tax rate is defined as the ratio of total tax burden to total income. However, two questions arise: (1) should total tax burden include implicit taxes, and (2) should total income include current accessions to wealth even if not current includible in federal gross income. In general, the answers are “no” and “no” (though under GAAP the answer to the second question often is “yes.”) This divorces the definition of average tax rate from economic reality. In determining whether a particular investment should be made, it is marginal rather than average tax rate that should be considered.

4.4.2.2 Note that GAAP does not discount future tax obligations. Accordingly, *for GAAP reporting there is no advantage to deferring taxes.*

4.5 Tax Arbitrage: "Tax arbitrage" refers to investment strategies that exploit tax rules to increase after-tax return. "Organizational-form" arbitrage refers to taking offsetting positions in assets to exploit differential rates of taxation on the assets; "clientele-based" arbitrage refers to low-bracket taxpayers selling tax benefits to higher-bracket taxpayers (or to high-bracket taxpayers buying tax benefits from lower-bracket taxpayers).

4.5.1 Organizational-Form Arbitrage

4.5.1.1 Immediate Tax Rebates When Taxable Income Is Negative: Assume that tax deductions in excess if taxable income yield immediate benefits in the form of an immediate refund. (Note that for a taxpayer having significant other income, this assumption accurately describes an investment yielding current deductions in excess of current income.)

4.5.1.1.1 Suppose a taxpayer directly invest in an asset compounding with an annual pre-tax return of R, and no tax is due until the investment is terminated after two years. Assume further that this taxpayer can borrow at the same rate R, that interest is payable annually, and that interest is deductible when paid. If the taxpayer borrows to invest and then borrows again to pay the interest due at the end of year one, the taxpayer's after-tax return after the two year investment will equal $[(1 + R)^2(1 – t) + t] – [1 + R(1 – t)]^2$, or $R^2t(1 – t)$. This is a positive after-tax yield on a $0 net investment, for an infinite after-tax return.

4.5.1.1.2 What drives this transaction is taking offsetting positions in differently-tax activities: the taxpayer invests in a favorably-taxed activity (here, an investment offering deferral) and simultaneously borrows with full deductibility of the costs.

4.5.1.1.3 There are two ways to preclude this tax arbitrage: deny deferral to the investment return or postpone deductibility of the borrowing cost. However, the borrowing side of the equation is something of a red herring: if a taxpayer makes the same investment but without the borrowing, the same deferral will be obtained. All the borrowing side of the equation adds is that the investment opportunity will not be limited by the taxpayer's available cash. Note the book (at p. 4-19) shows that for a $1,000 investment (and offsetting borrowing) with R = 10% and t =

0.40, the net accumulation from the arbitrage equals $2.40. Note also that if the taxpayer invests *without* the borrowing, the accumulation will equal $1,000[(1 + 0.10)^2(1 – 0.40) + 0.40], or $1,126.00 while the same investment without deferral would yield $1000[1 + [0.10(1 – 0.40)]^2, or $1,123.60, and the difference is the same $2.40. Thus, as expected, all of the benefit from the arbitrage arises from the deferral.

4.5.1.2 Restrictions on Organizational-Form Arbitrage:

4.5.1.2.1 The Effects of Frictions on Organizational-Form Arbitrage: If frictions are present, then there will be costs incurred to obtain arbitrage gains, reducing the benefit of the arbitrage opportunity and, if the costs are sufficiently high, eliminating the benefit in full. Note that because the taxpayer can elect to disregard the arbitrage investment, a fully-informed taxpayer should never be forced to accept a return less than obtained on a fully-taxable investment.

4.5.1.2.2 Frictions might arise in either of two ways: (1) the taxpayer may incur special costs in purchasing the long side of the investment or (2) the taxpayer may incur a higher cost (that is, a higher interest rate) on the short side of the investment. In either case the effect is the same.

4.5.2 Clientele-Based Arbitrage: Because there are too few taxpayers in the highest bracket to purchase all exempt securities that states and municipalities want to sell, they must be priced for mid-bracket taxpayer. For example, to capture

taxpayers in the 25% bracket, exempt securities must pay interest at a rate of at 3.75% if fully taxable securities with the same risk offer 5.0%. But if such securities are then acquired by a 40% taxpayer, the tax-free 3.75% return exceeds the 3.0% after-tax return that she could get from the fully taxable bonds. Note that such bonds should not be purchased by taxpayers in a tax bracket below 25%.

4.5.2.1 Clientele-Based Arbitrage with Investments in Tax-Favored Assets Other than Tax-Exempt Bonds: Interest on indebtedness used by a taxpayer to acquire or hold exempt securities is disallowed by I.R.C. section 265. More generally, section 265 disallows deductions for amounts paid by a taxpayer to generate income that is exempt from taxation. Note that section 163(d) plays a similar role in the context of taxable securities that accumulate rather than pay interest or dividends.

4.6 Tax Planning for Low-Marginal-Tax-Rate Firms: Firms with low marginal tax rates (perhaps because of losses sustained in prior years that can be carried forward to the current year) often must reverse usual strategies. For example, if compensation or other deductions can be deferred, the deductions will be claimed with the firm faces a higher marginal rate. Of course, deferral of the deduction is a cost so long as the firm's current marginal tax rate is not zero, and so a firm must determine whether the cost of deferral is outweighed by benefit of a higher-valued future deduction.

4.6.1 Suppose such a firm owns and uses depreciable equipment as to which the statutory depreciation deduction exceeds economic depreciation. Such excess statutory depreciation is a valuable tax benefit with its value dependent on the owner's marginal tax rate. For a low-bracket owner, the valuable depreciation should be sold to a high-bracket taxpayer. How? By selling the depreciable property and then leasing it back. Such a sale and leaseback separates use of the depreciable equipment from ownership (and so from the depreciation).

4.6.2 Many start-up firms are low-bracket taxpayers for many years. Such firms often generate R&D credits that cannot be exploited. How can such tax credits be used? The start-up can partner with a more mature firm (generally using a partnership structure) so that the R&D credits can be assigned to the mature firm.

4.7 Adaptability of the Tax Plan: A plan is *adaptable* to the extent it can be modified at low cost as future events change. Adaptability usually comes at a cost. For example, callable bonds usually pay a higher interest rate than noncallable bonds. Similarly, investing in short-term debt instruments preserves the opportunity to reallocate capital if interest rates rise but loses the opportunity to profit from a sudden decrease in market interest rates.

4.7.1 Transaction Costs and Tax Clienteles: Repositioning capital often cannot be done without incurring significant transaction costs. If the costs are high enough, they will dominate the benefit of capital redeployment.

4.7.1.1 Example 1: Investor can purchase fully taxable bonds paying 10% annual interest or tax-exempt bonds paying 7% annual interest, with each investment having the same risk and three-year investment horizon. Investor estimates a 70% chance that tax rates will be 40% and a 30% chance that tax rates will be 0% (because a disputed loss in a prior year may carry forward). The investor's estimated tax rate equals 0.70(40%) + 0.30(0%), or 28%. At that estimated tax rate, a risk-neutral investor would purchase the taxable bonds to obtain an estimated after-tax return of 10% times (1 – 0.28), or 7.2%.

4.7.1.2 Example 2: Assuming the investor can change her investment after the first year when the uncertainty is resolved, what is the investor's optimal investment strategy if the cost of switching investments equals 100

basis points (after taxes) per year? If the investor initially purchases the taxable bonds, she will stick with that investment no matter what happens because of the cost of switching. In this case, her three-year accumulation per dollar invested will be $0.70[1.10(1 – 0.40)]^3 + 0.30(1.10^3)$, or 1.233. If she initially purchases the exempt bonds, she will switch to increase her after-tax return from 7% to 9% if the tax rate turns out to be 0%. In this case, her three-year accumulation per dollar invested will be $0.70(1.07)^3 + 0.30[1.07(1.09)^2]$, or 1.24. Thus, an initial purchase of the tax-exempt bonds is the best decision.

4.7.1.3 Example 3: Reconsider example 2 but assume that the cost of switching investments is free. In this case, an initial purchaser of taxable bonds will switch to exempt bonds if the tax rate turns out to be 40% while an initial purchaser of the exempt bonds will switch to taxable bonds if the tax rate turns out to be 0%. Accordingly, the after-tax three-year accumulation of an initial purchase of taxable bonds will be $0.70(1.06)(1.07)^2 + 0.30(1.10)^3$, or 1.249; the after-tax three-year accumulation of an initial purchase of exempt securities will be $0.70(1.07)^3 + 0.30(1.07)(1.10)^2$, or 1.246. Accordingly, taxable bonds constitute the best initial purchase.

4.7.1.4 Transaction Costs and Tax Clienteles: If there is a positive cost to exiting a tax strategy, a potential investor must worry that circumstances will occur that make the investment disadvantageous but the cost of exiting will outweigh the benefit of an exit. The potential investor should determine the expected value of the investment by identifying all possible outcomes as well as estimating the probability that each outcome will occur. For example, if there are three possible

outcomes, O_1, O_2 and O_3, and they will occur with probabilities P_1, P_2, and P_3 (where $P_1 + P_2 + P_3 = 1$), then the expected outcome of the investment is $O_1P_1 + O_2P_2 + O_3P3$. Note that if the investor has the ability to change investments during the investment period, then each possible change should be treated as a new investment strategy with its own outcome, O_i.

4.7.2 Adaptability in Investment and Financing Decisions: Note that in the face of uncertain tax rates and transaction costs to redeploy capital, it may be sensible to accept a lower initial after-tax return to preserve flexibility. Put another way, there can be a value to *liquidity*.

4.8 Reversibility of Tax Plans

4.8.1 In the face of uncertainty, contacting parties may allocate risks in their agreement. For example, an investor facing uncertain tax rates may seek a provision providing for the unwinding of a transaction if tax rates change. Note that such a provision is not fundamentally different from a provision allowing a party to avoid contractual obligations upon the occurrence of changes in weather or labor conditions. However, such clauses sometimes are used by the government as evidence that the initial contract was not what it seemed to be. For example, suppose an employment agreement between a closely-held corporation and its owner provides for a generous salary that will be reduced if challenged by the government as unreasonable. In such circumstances, the government might use the willingness of the employer-owner to relinquish nominal salary as proof that the nominal salary was excessive. In addition, some provisions of the Internal Revenue Code preclude recharacterization of a transaction. *E.g.*, section 4958(c)(1)(A) ("The term "excess benefit transaction" means any transaction in which an economic benefit is provided by an applicable tax-exempt organization directly or indirectly to or

for the use of any disqualified person if the value of the economic benefit provided exceeds the value of the consideration (including the performance of services) received for providing such benefit. *For purposes of the preceding sentence, an economic benefit shall not be treated as consideration for the performance of services unless such organization clearly indicated its intent to so treat such benefit."*) (emphasis added)

4.8.2 Congress is considering significant tax reform. How might parties contract around possible changes? For example, suppose an investment strategy makes sense only if tax rates do not decline substantially. How does a party account for the possibility that nominal rates decline but effective rates increase because, for example, additional loss limitations are added to the Internal Revenue Code? What if income tax rates decline but a national value added tax ("VAT") is enacted?

4.8.3 Issuers of tax-preferred investments often include a representation that the anticipated tax results will be available. For example, states and local governments issuing tax-exempt securities represent and warrant that they will not do anything to cause the securities to become taxable. Consider how contracting parties might contract against the following tax risks:

4.8.3.1 A partnership will be taxed as a corporation if its ownership interests become publicly traded (even if not traded on a formal exchange). How can a promoter ensure the interests will not become publicly traded?

4.8.3.2 An S corporation will lose its tax status and become a taxable C corporation if any of its shares become owned by a disqualified person including, for example, a non-US citizen. How can investors ensure no disqualified person becomes a shareholder? Can such protection be extended to bankruptcy proceedings?

4.8.3.3 Private equity firms generally pay their managers a fixed fee of about 2% of assets under management as well as an incentive bonus of about 20% of profits. Under current law, the incentive component is taxed as long-term capital gain, but Congress considered changing the taxation of such "carried interests." How might the managers and investors account for such a change?

4.8.4 Note that tax changes almost always have only prospective application in the sense that they start to apply in the next taxable year. But such "prospective" changes are retroactive *in the sense* that they affect investments already made and so may defeat the expectations of investors.

4.9 Insuring Against Adverse Changes in Tax Status

4.9.1 Advance Rulings: In many areas, taxpayers can request an advance ruling (also called a private letter ruling, or PLR) from the IRS. PLRs are not available for issues that are highly fact dependent (such as a taxpayer's motive), legal issues currently under review by the government, and some other issues. The cost of a PLR varies but generally costs approximately $100,000 (including legal fees) for a complex business transaction. If a taxpayer receives a favorable ruling, the IRS is bound to follow the ruling *as to that taxpayer* so long as the taxpayer did not materially misrepresent the underlying facts. If the taxpayer receives an unfavorable ruling, the taxpayer is required to attach the ruling to the taxpayer's return that covers the transaction (if it was executed), thereby ensuring a audit and a adverse administrative result.

4.9.2 Professional Legal Opinions: A legal opinion can provide protection from the standard negligence penalty. The opinion must have been received before the transaction was initiated and must be reasonable on its face. The IRS provides guidance (in Circular 230) governing what must be in such an onion to qualify. The lawyer or law firm providing the opinion must not

be otherwise involved in the transaction or in some other way have a conflict of interest. No opinion can relieve a taxpayer from its actual tax liability plus interest (if the tax payment is made after the due date).

4.9.3 Tax Indemnifications: One party to a transaction may agree to indemnify another party to the transaction if anticipated tax results do not occur. This shifts rather than eliminates the tax problem. Note that receipt of a tax indemnity payment should itself constitute taxable income so that the payment must be grossed-up to reflect the additional tax. For example, if a tax indemnity payment must cover $100 in taxes and the recipient is in the 21% tax bracket, then the payment should equal $126.58 (i.e., $I / (1 – t), where I = $100 and t = 0.21).

4.9.4 Question: Because Congress can change both the tax rates and the tax base (that is, what constitutes gross income and what is deductible), how should an agreement be drafted to provide for an indemnification if an investor's tax position becomes worse as the result of a change in the law?

4.10 Tax Planning When a Taxpayer's Marginal Tax Rate is Strategy Dependent: When there are multiple tax brackets, investment in a particular strategy may change the taxpayer's marginal tax bracket, and that change might make additional investment in the strategy ill-advised. Note that corporations now face a single tax rate on all taxable income so that corporate tax rates no longer are strategy dependent.

4.11 Discussion Questions (p. 4-28):

4.11.1 Question 1:

4.11.1.1 Part (a): True, because the implicit tax is defined as the tax rate that if applied to a fully taxable investment would reduce its pre-tax return to the return of the pre-tax return of the alternate investment. So, for example, if a fully taxable investment returns 10% before taxes while a partially taxable alternative

investment returns 8.5% before taxes, then the implicit tax rate on the alternate investment equals 15%.

4.11.1.2 Part (b): False: For an investment that is taxed more harshly than a fully-taxable investment, the implicit tax rate is negative, implying that the pre-tax return from such an investment is expected to return a higher premium before taxes.

4.11.1.3 Part (c): False. This statement is ambiguous: for any particular asset, the explicit tax rate can vary from zero to the statutory maximum while the implicit tax rate is potentially unbounded. To be sure, if the implicit tax rate exceeds the statutory maximum, it would be disadvantageous for *any* taxpayer to purchase the asset. But for any particular asset, the actual explicit tax may be much lower than the statutory maximum (e.g., tax-exempt bonds or SPDAs), and for such assets, the implicit tax often will exceed the explicit taxes.

4.11.1.4 Part (d): True, because implicit taxes are extracted by the market rather than by the taxing authority.

4.11.2 Question 10: Organizational-form arbitrage is the taking of a long position in an asset or a productive activity through a favorably taxed organizational form and a short position in an asset or a productive activity through an unfavorably taxed organizational form. I would call this "loophole-based" tax arbitrage, though the names do not matter. For example, if a corporation loans money to its sole owner, an individual, subsequent interest payments from the individual to the corporation should generate an interest deduction at as much as 37% and taxable interest income at 21%, for a net deduction of 16%.

4.11.3 Question 11: Clientele-based arbitrage is carried out by taking long and short positions in differentially taxed assets so that the net investment cost is zero and the after-tax return is

positive. I would call this "rate-based" arbitrage, though the names do not matter.

4.12 Exercises (p. 4-29):

4.12.1 Exercise 17: Note that we ignore any differential between the tax rate on ordinary income/deductions and capital gain/losses. In addition, we assume all deductions will yield an after-tax benefit of the dollar amount of the deduction times the tax rate.

4.12.1.1 Part (a): The taxpayer should be willing to pay the present discounted value of the after-tax income stream that the bond will generate. Each interest payment of $60.00 will yield $42.00 after taxes. The facts say the investor is willing to accept a 6% pre-tax annual return, which means the investor requires a 4.20% *after-tax* annual return (because the investor has a tax rate of 30%, and 6% times (1 – 0.30) equals 4.20%. Thus, the value of the bond is $\$42.0/1.042 + \$42.00/(1.042)^2 + \ldots + \$42.00/(1.042)^5 + \$1{,}000/(1.042)^5$, or $1,000.00.

4.12.1.2 Part (b): Now, the *after-tax* interest payment is $60.00 because the interest is tax exempt. Accordingly, the value of the bond increases to $\$60/1.042 + \$60/(1.042)^2 + \ldots + \$60/(1.042)^5 + \$1{,}000/(1.042)^5$, or $1,079.69. However, this answer is not quite right because if the taxpayer pays $1,079.69 for the bond, the taxpayer will incur a *deductible loss* of $79.69 on redemption, and that loss is worth $79.69 times 0.30 divided by $(1.042)^5$, or $19.46, further increasing the value of the bond. The true value of the bond is close to $1,105.

4.12.2 Exercise 18:

4.12.2.1 Part (a): The implicit tax rate, t_a, is given by the formula $t_a = (R_b – R_a)/R_b$. Here, $R_b = 7\%$ and $R_a = 5\%$, so t_a

= 28.57% (or two-sevenths). That is, a tax of 28.57% on an investment returning 7% yields 5%.

4.12.2.2 Part (b): The explicit tax reduces the pre-tax return of 5% down to the equilibrium after-tax return of 4% (assuming the asset is held by the marginal investor), so the explicit tax rate is (5% - 4%)/7%, or 14.28%. Thus, the marginal investor faces three equivalent choices: (a) purchase the fully taxable bond paying 7% pre-tax but subject to a an explicit tax of 42.86% for an after-tax return of 4%; (b) purchase a tax-favored bond paying 5% pre-tax, subject to an explicit tax rate of 14.28% (imposed on the pre-tax return grossed up by the implicit tax), for an after-tax return of 4%; or (c) purchase a tax-exempt bond subject to no explicit tax but subject to an implicit tax of 42.86% (on the pre-tax return grossed-up by the implicit tax).

4.12.2.3 Suppose Congress provides that bonds issued by any firm formed in China will be taxed at a rate of 60%. For such bonds to be competitive to the marginal investor, they must offer a 4% after-tax return. Accordingly, 0.04 = (1 – 0.60) times Rc, where Rc equals the pre-tax return on bonds issued by firms formed in China. Accordingly, Rc = 0.04/(0.40), or 10%. The implicit tax on such a bond equals (7% - 10%)/7%, or about *negative* 43%. That means the explicit tax rate (not the statutory tax rate!) is defined by the equation (10% - 4%)/7%, or about 86%.

4.12.3 Exercise 19: Firm 1: Expected marginal tax rate, E(mtr) = .50(40%) + .50(0%) = 20%. Firm 2: E(mtr) = .50(40%) + .50(0%) = 20%. For firm 1, while the expected taxable income is a loss of $500,00: there is a 50% chance of its mtr being 40% and a 50% chance of its mtr being 0 so the correct answer is .50(.40%) + .50(0%) = 20% rather than E(TI) = -$500,000, with

an E(mtr) = 0. If the firm were to earn another dollar of income, what effect would this have on its tax bill? This effect is the mtr. There is a 50% chance the additional dollar will be taxed at 40% and a 50% chance that the dollar will not be taxed giving, in expectation, an mtr of 20%. Similar reasoning applies to firm 2.

4.13 Tax-Planning Problems (p. 4-31):

4.13.1 Problem 24:

4.13.1.1 Part (a): The tax-exempt investment will return 5% after taxes in all events. The fully taxable investment will yield 7%(1 – t), and that will be greater than 5% only if 0.07(1 – t) > 0.05, or 1 – t > 0.05/0.07 or 1 – 0.7143 > t or 0.2857 > t. Thus, if the tax rate is less than 28.57%, prefer the fully taxable asset to the exempt asset. The partially taxable asset will yield 6%(1 – 0.5t), and that will be greater than 5% only if 0.06 > .05 + .03t, or 33.33%. Accordingly, prefer the partially-taxed asset to the exempt asset if the tax rate is below 33.33%. Finally, the fully taxable asset will be preferred to the partially taxable asset only if 0.07(1 – t) > 0.06(1 – 0.5t), or 0.25 > t. Accordingly, the fully taxable asset will be preferred to the partially taxable asset for tax rates below 25%. Combining all this, we get: if the tax rate is less than 25%, purchase the fully taxable asset; if the tax rate is between 25% and 33%, purchase the partially taxable asset; if the tax rate is above 33%, purchase the exempt asset.

4.13.1.2 Part (b): We compute the total tax burden if the $150,000 is invested in each asset. If $150,000 is invested in the fully taxable asset, the pre-tax return will equal 7% times $150,000, or $10,500. The tax burden on that amount will equal $1,000 + $1,500 + $200, or $2,700. Accordingly, the after-tax return will equal

$10,500 - $2,700, or $7,800. If the $150,000 is invested in the partially taxable asset, the pre-tax return will equal 6% times $150,000, or $9,000. Because only half of the partially taxed asset is subject to taxation, the tax burden will equal 20% of $4,500, or $900. Accordingly, the after-tax return will equal $9,000 - $900, or $8,100. Finally, if the $150,000 is invested in the tax exempt asset, the pre-tax return will equal 5% of $150,000, or $7,500, which is also the after-tax return. Thus, the partially-taxed asset should be purchased.

4.13.2 Problem 31:

4.13.2.1 Part a: Straight-line depreciation equals $166,667 per year (assuming the investment credit does NOT reduce basis). Thus, the value of the investment credit plus the value of the depreciation equals $50,000 + $166,667(0.35) + $166,667(0.35)/1.10 + $166,667(0.35)/$1.10^2$ or $50,000 + 58,333 + $53,030 + 48,209 = $209,572. If the cost of the equipment were expensed immediately, the after-tax benefit of the expensing would equal $500,000 times 0.35, or $175,000. Thus, the partial investment tax credit plus the rapid depreciation is worth an extra $34,572 in present value.

4.13.2.2 Part (b): The pre-tax internal rate of return equals ($805,255/$500,000)$^{1/5}$ – 1, or 10%. The after-tax rate of return equals [$805,255(1 – 0.35)]/($500,000 - $209,572)]$^{1/5}$ - 1, or [$523,416/290,428]$^{1/5}$ – 1, or 12.5%. Thus, this is a highly tax-favored investment because the after-tax rate of return exceeds the pre-tax rate of return times (1 – 0.35). In fact, because the after-tax rate of return exceeds the pre-tax rate of return, the investment bears a *negative* effective tax rate.

4.13.2.3 Part (c): For the corporate bonds, the annual, after-tax percentage return equals $0.12(1 – 0.35)$, or 7.8%. For the non-dividend paying equity, the total return will equal $\$5{,}000{,}000[(1 + 0.12)^5(1 – 0.35) + 0.35]$, or $7,477,610.47, so the annual, after-tax percentage return equals $(7{,}477{,}610.47 / 5{,}000{,}000)^{1/5} – 1$, or 8.38%. For the dividend-paying equity, the annual, after-tax percentage return equals $0.10 – 0.10(1 – 0.70)(0.35)$, or 8.95%. This is the greatest after-tax internal rate of return. This assumes the investments are equally risky or the specified rates of returns are already risk-adjusted.

4.13.2.4 Part (d): The firm faces a marginal tax rate of 35%. Clientele-based arbitrage could involve (1) issuing fully-taxable securities (corporate bonds) and investing in tax-favored assets (municipal bonds) **but** interest deductions are limited on corporate borrowings when the loan proceeds are invested in municipal bonds, see section 265, or (2) investing in preferred stock and buying tax-favored equipment. The firm could also undertake organizational-form based arbitrage of the type discussed in the text for individual taxpayers. See chapter 9, section 9.4, for the Black-Tepper pension arbitrage strategy.