If the project is undertaken in partnership form, partners pay tax at their marginal personal tax rates, t_p, each year, as income is earned. Let's assume the partner obtains the QBI deduction in this example and apply the rate t_{qbi}. We assume distributions at rate $t_{qbi}R$ are made each period from the partnership to enable partners to pay their personal tax. A partner's after-tax accumulation for an initial $\$I$ investment is[13]

$$\$I[1 + R(1 - t_{qbi})]^n \tag{5.1}$$

Assume, for example, that $R = 10\%$, $n = 5$ years, and $t_{qbi} = 29.6\%$. A partner's after-tax accumulation for a $1 investment is

$$\$1[1 + .10(1 - .296)]^5 = \$1.41.$$

This provides an annual after-tax rate of return of 7%, or $1.41^{1/5} - 1$ or, more simply, $.10(1 - .296)$.

Now consider if the project is undertaken in corporate form. We assume initially the corporation pays no interim dividends. In this case, shareholders pay tax at their capital gains rate, t_{cg}, when the firm liquidates or when shareholders sell their shares. The corporation must pay taxes each year at rate t_c on the before-tax return, R. Combining the annual corporate-level tax and the end-of-investment shareholder-level tax, the after-tax accumulation to the owners in a corporation for an initial $\$I$ investment is

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

where the first term is the proceeds from the liquidation (or sale of shares) and the second term is the shareholder tax due on the liquidation.[14] This equation can be rearranged to

$$\$I[1 + R(1 - t_c)]^n (1 - t_{cg}) + t_{cg}\$I \tag{5.2}$$

More specifically, the accumulation in Equation 5.2 is exactly the same as that on a single-premium deferred annuity (i.e., savings vehicle II) for n periods in which the account grows at rate $R(1 - t_c)$ each period and all earnings are taxed at time n at rate t_{cg}.

Assuming that $t_c = 21\%$ and the shareholder faces a capital gains rate of 20%, the 5-year after-tax accumulation in corporate form for an initial $1 investment is

$$\$1[1 + .10(1 - .21)]^5 (1 - .20) + .20\$1 = \$1.37$$

This provides an annualized after-tax rate of return of 6.5%, or $1.37^{1/5} - 1$, which is 0.5 percentage points less than the partnership.

Ignoring nontax considerations, a taxpayer will prefer to invest in a partnership or proprietorship rather than a corporation whenever the accumulation in Equation 5.1 exceeds that of Equation 5.2, or

$$\underbrace{\$I[1 + R(1 - t_p)]^n}_{\text{Partnerships (P)}} > \underbrace{\$I[1 + R(1 - t_c)]^n (1 - t_{cg}) + t_{cg}\$I}_{\text{Corporations (C)}} \tag{5.3}$$

For what values of t_c, t_p (or t_{qbi}, whichever is applicable), and t_{cg} in Equation 5.3 will investors prefer the partnership form to the corporate form? Before considering the question at this level of generality, let us consider the case of $n = 1$. When $n = 1$, Equation 5.3 simplifies to

$$(1 - t_p) > (1 - t_c)(1 - t_{cg}) \tag{5.4}$$

For example, for a 1-period investment, if $t_p = 40\%$, $t_c = 30\%$, and $t_{cg} = 10\%$, the corporate form is preferred to the partnership form because

$$(1 - .40) = .60 < (1 - .30)(1 - .10) = .63$$

[13] Note that this assumes there is no capital gain or loss on the liquidation of the partnership interest. At time n, partners receive a liquidating distribution of all after-tax partnership income generated over n periods plus their initial dollar invested.

[14] Note that in both the corporate and partnership forms in our examples, we assume that any incremental valuation gain beyond that already included as the entity's taxable earnings (R) is the same across both organizational forms and taxed the same, at capital gain rates. Thus, because this incremental valuation is the same across both types, we can ignore it for our comparative purposes.

compensation payment of only 91 cents in 5 years for each dollar of current salary deferred. However, if the employer's tax rate increases from a current rate of 21% to 46%, the employer can afford a deferred payment equal to $1.96 for each dollar of current salary postponed for 5 years.

Now that the employer is indifferent between a salary and a deferred compensation contract, let us turn to the employee. What contract does the employee prefer? The employee must compare salary today versus a deferred compensation payment n periods from today. That is,

$$\text{Salary} = \$100(1 - t_{po})(1 + r_{pn})^n$$
$$\text{Deferred compensation} = D_n(1 - t_{pn})$$

where r_p is the after-tax rate of return the employee could earn on his or her personal investments. Substituting for D_n from Equation 8.1:

$$= \$100(1 + r_{cn})^n \frac{(1 - t_{co})}{(1 - t_{cn})}(1 - t_{pn})$$

The employee will prefer whichever contract provides more after-tax dollars in n years. A little algebra shows that salary will be preferred to deferred compensation if and only if:

$$\frac{(1 - t_{po})(1 + r_{pn})^n}{(1 - t_{pn})(1 + r_{cn})^n} > \frac{(1 - t_{co})}{(1 - t_{cn})} \tag{8.2}$$

The left-hand side of the equation is the ratio of the after-tax accumulation to the employee of taking current salary to the after-tax accumulation to the employee of deferred compensation. The right-hand side is the ratio of the corporation's current and future tax rates.

In this relation, three key factors combine to determine precisely whether salary or deferred compensation is preferable:

1. The employee's tax rate today versus his or her tax rate n periods from today. If the employee's tax rate is declining, then deferred compensation tends to be preferable because the income is recognized when the employee's tax rate is low.
2. The employer's tax rate today versus its tax rate n periods from today. If the employer's tax rate is increasing, then deferred compensation tends to be preferable because the employer prefers to take the deduction when tax rates are high.
3. The after-tax rate of return on investment for the employer versus that of the employee. If the employer can earn a higher after-tax rate of return than can the employee, then deferred compensation tends to be preferable. In effect, a deferred compensation contract allows the employee to save at the employer's higher rate of return on investment.

Because deferred compensation is favored if the employee's tax rate is expected to *decrease* in the future, deferral may be especially appropriate for employees who expect to face a lower tax rate in retirement or for employees on temporary assignment in a high-tax-rate foreign country.[3] Deferred compensation arrangements may also be desirable when tax rates are expected to decrease due to statutory changes in tax rates voted by the legislature. Here, however, one must be careful not to adopt a unilateral tax-planning perspective. A decline in tax rates for the employee need not favor deferred compensation if tax rates also decline for the employer. We will take a closer look at this common phenomenon.

Because deferred compensation is favored if the employer's tax rate is expected to increase in the future, deferral may be especially appropriate when a firm in a net operating loss (NOL) carryforward position cannot effectively use current tax deductions. Deferring compensation increases current taxable income but reduces future taxable income. This smoothing of taxable income is tax-advantageous for firms experiencing NOL carryforwards.

[3] Some tax jurisdictions do not permit the deferral of taxable income through the adoption of deferred compensation arrangements. This is an example of a tax-rule restriction.

Table 8.3 summarizes the outcomes given a range of stock prices on the vesting date. The table illustrates that if the stock price is expected to increase, a Section 83(b) election is dominated by the alternative strategy of borrowing and buying additional stock. If the stock price is not expected to increase or is expected to increase by only a small amount, then doing nothing and simply selling the stock at the vesting date dominates.[9]

Table 8.3 Restricted Stock: Analysis of After-Tax Accumulations to Section 83(b) Election versus Borrowing and Purchasing Additional Stock.

	Do Nothing	Section 83(b) Election	Borrow and Buy Additional Stock	Difference Equation 8.5 – Equation 8.4
P_1	Equation 8.3	Equation 8.4	Equation 8.5	Equation 8.6
$20	$12.60	$ 8.69	$ 8.06	$(0.63)
25	15.75	12.69	12.69	—
30	18.90	16.69	17.32	0.63
35	22.05	20.69	21.95	1.26
40	25.20	24.69	26.58	1.89
45	28.35	28.69	31.21	2.52
50	31.50	32.69	35.84	3.15
55	34.65	36.69	40.47	3.78
60	37.80	40.69	45.10	4.41

Table values based on following: P_0 = $25, t_p = 37%, t_{cg} = 20%, n = 3 years, r = .10.

Employee Tax Rates Expected to Rise

Might it be optimal to make a Section 83(b) election if the employee expects to face a higher tax rate on ordinary income at the vesting date? Let t_0 (t_1) be the tax rate on ordinary income at the grant date (vesting date). We can modify Equations 8.4 and 8.5 as follows. The Section 83(b) election remains

$$P_1 - (P_1 - P_0)t_{cg} - P_0 t_0 (1 + r)^n \tag{8.7}$$

And the alternative strategy of borrowing and buying additional stock becomes

$$P_1(1 - t_1) + t_0 P_1 - t_0(P_1 - P_0)t_{cg} - P_0 t_0 (1 + r)^n \tag{8.8}$$

where the second, third, and fourth terms all use the tax rate on ordinary income at the grant date because this reflects the amount of borrowing and additional shares purchased. The election is optimal if Equation 8.7 > Equation 8.8. The last term is common to both equations and drops out. We can expand the first term in Equation 8.8 such that P_1 drops out, leaving

$$\begin{aligned} P_1 t_1 - t_0 P_1 + t_0(P_1 - P_0)t_{cg} - (P_1 - P_0)t_{cg} &> 0 \\ = P_1(t_1 - t_0) - (P_1 - P_0)t_{cg}(1 - t_0) &> 0 \\ = \frac{(t_1 - t_0)}{(1 - t_0)t_{cg}} &> \frac{(P_1 - P_0)}{P_1} \end{aligned} \tag{8.9}$$

Thus, whether the election is optimal depends on the increase in ordinary income tax rate relative to the expected increase in stock price.

[9] Specifically, if the stock price is expected to appreciate by less than $r/(1 - t_p)$, then the do-nothing strategy dominates.

For simplicity, assume the option is granted with an exercise price (denoted X) equal to the stock price at grant date (denoted P_g), thus $X = P_g$. The employee prefers the ISO when the taxes due on the ISO are less than those due on the NQO:[14]

$$\textbf{ISO taxes < NQO taxes}$$
$$(P_s - X)t_{cg} < [(P_e - X)t_p + (P_s - P_e)t_{cg}]$$

The taxes due on the ISO can be partitioned into two parts: the tax due on the gain between the grant date and exercise date, even though the tax is not paid until the stock sale date, and the tax due on the gain between the exercise date and stock sale date:

$$[(P_e - X)t_{cg*} + (P_s - P_e)t_{cg}] < [(P_e - X)t_p + (P_s - P_e)t_{cg}]$$

which simplifies to

$$\begin{aligned}(P_e - X)t_{cg*} &< (P_e - X)t_p \\ (P_e - X)(t_{cg*} - t_p) &< \mathbf{0} \\ (P_e - X)(t_p - t_{cg*}) &> \mathbf{0}\end{aligned} \qquad \textbf{(8.10)}$$

where t_{cg*} is the present value of the capital gains tax rate, also referred to as the effective capital gains tax rate, reflecting the deferral for n periods of the capital gains tax for the ISO—that is, $t_{cg*} = t_{cg}/(1 + r)^n$. Note that the deferral period is measured from the exercise date until the stock sale date. Because the employee would not exercise the option if it were not in-the-money ($P_e > X$), the ISO is preferred by the employee whenever the tax rate on ordinary income exceeds the present value of the tax rate on capital gains: $t_p > t_{cg*}$. Thus, even if ordinary income and capital gains are taxed at the same rate, the employee will prefer an ISO because the ISO defers the tax on the gain at exercise until the stock is sold.

Thus, to make the employee indifferent, the firm needs to reimburse the employee for the difference in taxes as in Equation 8.10, and because the reimbursement is taxable to the employee, the reimbursement amount is

$$\frac{(P_e - X)(t_p - t_{cg*})}{(1 - t_p)}$$

This payment is deductible to the employer.

The employer prefers the NQO when[15]

$$\boldsymbol{(P_e - X)t_c - \frac{(P_e - X)(t_p - t_{cg*})}{(1 - t_p)}(1 - t_c) > 0.} \qquad \textbf{(8.11)}$$

where $(P_e - X)t_c$ is the tax deduction to the employer of NQO treatment, the numerator in the second term is the incremental taxes to the employee of NQO treatment relative to ISO treatment which we assume the employer reimburses the employee, the $(1 - t_p)$ term grosses up the payment to the employee as the employee will pay taxes on the payment, and the $(1 - t_c)$ represents the after-tax payment to the employer as the payment is tax deductible to the employer.

This equation can be simplified as follows:

[14] We focus on taxes here as the pretax gain is the same regardless of option type.

[15] Note that the corporate tax rate here is the expected rate for the year in which the NQO is exercised.

$$\frac{(P_e - X)t_c(1-t_p) - (P_e - X)(t_p - t_{cg*})(1-t_c)}{(1-t_p)} > 0$$

$$\frac{(P_e - X)}{(1-t_p)}[t_c(1-t_p) - (t_p - t_{cg*})(1-t_c)] > 0$$

$$[t_c(1-t_p) - (t_p - t_{cg*})(1-t_c)] > 0$$

$$t_c - t_p + t_{cg*} - t_{cg*}t_c > 0$$

$$t_c\,(1 - t_{cg*}) - t_p + t_{cg*} > 0$$

$$t_c > \frac{(t_p - t_{cg*})}{(1 - t_{cg*})} \qquad (8.12)$$

Equation 8.12 shows that NQOs are preferred if the corporation's marginal tax rate exceeds the difference in the employee's tax rate on ordinary income less the effective capital gains tax rate divided by one minus the employee's effective capital gains tax rate. Alternatively stated, the ISO is preferred if the incremental taxes to the employee of the NQO exceed the value of the deduction to the employer: $t_c < (t_p - t_{cg*})/(1 - t_{cg*})$. In **Table 8.5**, we use Equation 8.12 to calculate the required corporate marginal tax rate, presented in boldface, above which NQOs will be tax preferred by both parties for various employee tax rates and holding periods.

Table 8.5 Values of Corporate Marginal Tax Rate, t_c, above Which NQOs Are Jointly Preferred by Employer and Employee (Table ignores the potential effects of the AMT on ISOs)

Time Period				Holding Period in Years after Exercise of ISO and Implied t_{cg*} for Holding Period				
				1	5	10	20	Death
	t_p		t_{cg}			t_{cg*}		
Pre-TRA 86	.50		.20	.187	.143	.102	.052	0
		t_c		**.385**	**.417**	**.443**	**.473**	**.50**
1988–1990	.28		.28	.261	.200	.142	.072	0
		t_c		**.025**	**.10**	**.161**	**.224**	**.28**
1991–1992	.31		.28	.262	.200	.142	.072	0
		t_c		**.065**	**.138**	**.195**	**.256**	**0**
1993–1997	.396		.28	.261	.200	.142	.072	0
		t_c		**.182**	**.245**	**.296**	**.349**	**.396**
1998–2002	.396		.20	.187	.143	.102	.052	0
		t_c		**.257**	**.296**	**.328**	**.363**	**.396**
2003–2012	.35		.15	.140	.107	.076	.039	0
		t_c		**.244**	**.272**	**.296**	**.324**	**.35**
2013–2017[a]	.396		.20	.187	.143	.102	.052	0
		t_c		**.257**	**.296**	**.328**	**.363**	**.396**
2018–	.37		.20	.187	.143	.102	.052	0
		t_c		**.225**	**.265**	**.299**	**.336**	**.396**

$t_{cg*} = t_{cg}/(1 + r)^n$, where n is the expected holding period in years. Employees' after-tax discount rate is assumed to be 7%. t_c is solved using Equation 8.12. NQO preferred if $t_c > (t_p - t_{cg*})/(1 - t_{cg*})$.

[a] Ignores the Medicare surtaxes of 3.8% and 0.9% from the Patient Protection and Affordable Care Act.

to the difference in tax treatment of NQOs and ISOs, which is given in Equation 8.10. A disqualifying disposition results in the employee facing an incremental tax cost because the gain on exercise $(P_e - X)$ is now taxed as ordinary income rather than at capital gains rates and the tax on the gain is no longer deferred until the stock sale date.

Whether a disqualifying disposition is tax favored can be analyzed similarly to the initial grant. Suppose we hold the employee indifferent by having the firm reimburse the option-holder for incremental tax costs. Of course the payment, denoted R for reimbursement, is taxable to the option-holder and therefore needs to be grossed up by $(1 - t_p)$. At the same time, this payment is tax deductible to the firm. Thus a disqualifying disposition is tax favored if the net tax benefits (NTBs) are positive:

$$\text{NTB} = \text{GTB} - \frac{R}{(1-t_p)}(1-t_c) > 0$$

Substituting $(P_e - X)t_c$ for GTB and R from Equation 8.10, we get[17]

$$\textbf{NTB} = (P_e - X)t_c - \frac{(P_e - X)(t_p - t_{cg^*})}{(1-t_p)}(1-t_c) > 0 \qquad \textbf{(8.13)}$$

EXAMPLE 8.6 Disqualifying Disposition of ISO

Suppose an employee holds 100 ISOs with an exercise price of \$10 and a current stock price of \$25. The employee faces a tax rate of 28% on both ordinary income and capital gains. The firm faces a tax rate of 34%. (These tax rates were in effect in the post–TRA 86 period). The employee plans to hold the options for another 5 years to maturity before exercising and has an after-tax discount rate of 10%. Should the firm and employee consider a disqualifying disposition of the ISOs?

We first need to calculate the present value of the capital gains tax rate $t_{cg^*} = t_{cg}/(1 + r)^n = .28/(1.10)^5 = .174$. If the options are disqualified, the firm stands to gain gross tax benefits (GTBs) of \$15(.34) = \$5.10 per option. The employee faces an increase in tax costs of \$15 (.28 − .174) = \$1.59 per option from Equation 8.10. If we solve holding the employee indifferent between disqualifying and not disqualifying, then the employee requires a pretax payment of \$1.59/(1 − .28) = \$2.21 per option. The after-tax cost of this payment to the firm is \$2.21(1 − .34) = \$1.46. Thus, as shown in Equation 8.13, a disqualifying disposition would save the two parties \$5.10 − \$1.46 = \$3.64 per option, or \$364 in total.

Many firms that could have saved substantial sums in taxes by paying cash to employees to disqualify ISOs in the post–TRA 86 era failed to do so. Why? One possibility is that they were simply unaware of the advantages. At least one fly in the ointment is that the firm's payment to the option holder, $R/(1 - t_p)$, is recorded as an expense in calculating the firm's accounting earnings and thus reduces reported earnings. This reduction in accounting earnings represents a nontax cost of the transaction. Matsunaga, Shevlin, and Shores (1992) predict that firms with higher leverage (debt/total assets), lower interest coverage (earnings before interest/interest), and lower dividend coverage (earnings/dividends) face higher nontax costs and are thus less likely to undertake a disqualifying disposition of ISOs. They report results consistent with these predictions.[18]

[17] Equation 8.13 can be simplified to Equation 8.12, but it is convenient to use Equation 8.13 to analyze the disqualifying disposition.

[18] An alternative to a disqualifying disposition is the conversion or swapping of NQOs for ISOs. Matsunaga et al. (1992) find little evidence that many firms converted. Similar to a disqualifying disposition, with a conversion, accounting compensation expense to the firm may arise from reimbursing the employee. Also, if NQOs are issued in exchange for ISOs when the exercise price is *below* the current market price, accounting compensation expense must be recognized for the difference. Apparently this requirement discouraged many firms from converting. The interested reader is also referred to the Microsoft Corporation annual reports for 1988–1990, in which the firm reported gross tax benefits of \$11.5, \$14, and \$20 million from disqualifying dispositions and ISO conversions for the 1988, 1989, and 1990 fiscal years. Microsoft paid 50% of its gross tax benefits to employees to induce them to undertake the disqualification and/or conversion.

continued from previous page

$$N_sP_s - X - (P_s - X)t_p + (P_s - P_e)t_{cg}(1 - N_s)$$
$$= .79(\$35) - \$10 - (\$35 - \$10).37 + (\$35 - \$15).20(1 - .79)$$
$$= \$9.24$$

As illustrated in **Table 8.6**, the tax advantage to the borrow-and-buy additional shares (or the tax disadvantage of the early exercise alternative) increases with the expected increase in stock prices.

Table 8.6 Analysis of the Early Exercise Decision: Exercise Early or Borrow and Buy Additional Stock[a]

	Early Exercise	Borrow and Buy Additional Stock	Difference
P_s	Equation 8.14	Equation 8.15	Equation 8.16
$15	$ (0.77)	$ (0.77)	$ 0.00
20	3.23	5.54	2.31
25	7.23	11.85	4.62
30	11.23	18.16	6.93
35	15.23	24.47	9.24
40	19.23	30.78	11.55
45	23.23	37.09	13.86
50	27.23	43.40	16.17
55	31.23	49.71	18.48
60	35.23	56.02	20.79

[a] Table values based on X = \$10, P_e = \$15, t_p = .37, t_{cg} = .20, n = 3 years, r = .10.

Tax Rates Are Expected to Increase Now consider the case where the employee's ordinary tax rates are expected to increase from t_{p1} in the current period to t_{p2} in the next period. Under what conditions should an NQO-holder exercise in the current period? The employee will favor exercise before the tax rate change when the after-tax gain from early exercise is greater than the after-tax gain on later exercise after the tax rate has increased. But what is the expected after-tax gain arising from later exercise? The present value of the expected pretax gain from later exercise is given simply by the current value of the option W, which we can estimate using an option valuation model such as the Black–Scholes model. The expected after-tax gain is then $W(1 - t_{p2})$. Thus early exercise is tax favored if

$$(P_e - X)(1 - t_{p1}) > W(1 - t_{p2})$$

or

$$\frac{(P_e - X)}{W} > \frac{(1 - t_{p2})}{(1 - t_{p1})} \tag{8.17}$$

The left-hand side is the ratio of the gain to date on the option, or the option's intrinsic value, to the present value of the option. The right-hand side is the ratio of tax rates. Because the value of an option always exceeds its intrinsic value, except in the instant before maturity, the left-hand side is always less than unity. The ratio approaches unity when the option is deep in-the-money—the stock price is far greater than the exercise price—or when the option has only a short time to maturity. An out-of-the-money or at-the-money option ($P \leq X$) or an option with a long maturity will have a low ratio. Let's salary. As a result, the employer is indifferent between paying \$100 of salary and making a \$100 pension contribution in the current period.

For the employee, \$100 invested in the pension fund grows in value to $\$100(1 + R_{pen})^n$ in n periods, where R_{pen} is the before-tax rate of return on assets invested in the pension account.[6] Just what this before-tax return might be depends on the assets held in the pension account. The tax-favored treatment of the returns on stock to investors, compared with the tax treatment of corporate bonds, implies that the before-tax risk-adjusted returns on shares would be well below the before-tax returns on bonds.[7]

If employees compare the after-tax accumulation in a pension with that of taking a current salary and investing the after-tax amount on their own for n periods, their after-tax accumulations would be

$$\textbf{Pension: } \$100(1 + R_{pen})^n(1 - t_{pn}) \quad \textbf{(9.1)}$$

$$\textbf{Salary: } \$100(1 - t_{po})(1 + r_{pn})^n \quad \textbf{(9.2)}$$

where r_{pn} is the annualized after-tax rate of return per year available on personal nonpension investments, t_{po} is the current marginal tax rate of the employee, and t_{pn} is the marginal tax rate on ordinary income of the employee at time n. Pensions will be preferred to salary when Equation 9.1 > Equation 9.2:

$$\$100(1 + R_{pen})^n(1 - t_{pn}) > \$100(1 - t_{po})(1 + r_{pn})^n$$

which can be rearranged to

$$\frac{(1+R_{pen})^n}{(1+r_{pn})^n} > \frac{(1-t_{po})}{(1-t_{pn})} \quad \textbf{(9.3)}$$

When personal tax rates are constant over time ($t_{po} = t_{pn}$), the right-hand side of Equation 9.3 equals 1, and pensions provide higher after-tax accumulations than salary as long as the before-tax return on pension investments exceeds the after-tax return on nonpension investments ($R_{pen} > r_{pn}$). But suppose that the employee could earn after-tax at the same rate as the pension fund could earn before tax. A possible example here is the savings component of a "cash value" (whole life or universal life) insurance policy. In this case, ignoring nontax considerations, the only motivation for a pension plan would be declining marginal tax rates for the employee. Of course, cash-value life insurance policies do bear transaction-cost-related implicit taxes, so pension investments would normally be expected to provide an investment return advantage.

An important nontax cost of pension plans for some employees is that a pension investment is illiquid. Particularly for younger employees, pension investment may entail greater postponement of consumption than they desire. And although the opportunity to borrow to finance consumption can mitigate this disadvantage, the mitigation may be very slight, if at all, when significant transaction costs are associated with borrowing and where interest expense on personal borrowing is not fully tax deductible. In such circumstances, employees may require a rate of return far greater than R_{pen} per period after tax for them to prefer pension compensation over salary.

Because pension compensation yields future taxable income to the employee, whereas salary yields current taxable income, pensions become more desirable as future tax rates decline relative to current tax rates. In this regard, the 1981 and 1986 Tax Acts in the United States, both of which

[6] R_{pen} might be different for investments in the pension fund than outside the pension fund. For example, pension funds are not permitted to invest in certain kinds of assets. Pension funds also cannot invest as general partners in partnerships without attracting corporate taxation on their share of the income. Pension funds face some corporate taxation on the income they earn as limited partners in partnerships that engage in borrowing.

[7] The tax-favored treatment on stock includes a lower tax rate on dividends relative to the tax rate on interest income and favorable capital gains treatment provided the stock is held for longer than 12 months; the tax on gains can be deferred until the stock is sold; and the capital gains taxes can be avoided altogether by holding the stock until death or by donating appreciated stock to charity.

9.3 DEFERRED COMPENSATION VERSUS PENSION

From the earlier discussion in Chapter 8, equation (8.1), we know an employer is indifferent, from a tax standpoint, between a dollar of current pension contribution or salary and

$$D_n \equiv (1+r_{cn})^n[(1-t_{co})/(1-t_{cn})]$$

dollars of deferred compensation in periods, where t_{co} and t_{cn} represent the employer's current and future tax rates and r_{cn} represents the annual after-tax rate the employer can earn on marginal investments. That is, the employer can afford to pay deferred compensation of $1, plus its after-tax earnings on the dollar in salary or pension contribution postponed for n years, adjusted for changes in its tax rate over time.

For the employee, the deferred compensation payment provides an after-tax accumulation, for each dollar of salary or pension contribution sacrificed, of

$$D_n(1-t_{pn}) = \frac{(1-t_{co})(1+r_{cn})^n}{(1-t_{cn})}(1-t_{pn}) \tag{9.4}$$

In comparison, each dollar contributed to a pension plan would yield, in n periods,

$$(1 + R_{pen})^n(1 - t_{pn}) \tag{9.5}$$

Deferred compensation is preferred to pension if Equation 9.4 > Equation 9.5:

$$\frac{(1-t_{co})(1+r_{cn})^n}{(1-t_{cn})}(1-t_{pn}) > (1+R_{pen})^n(1-t_{pn}) \qquad **$$

which can be rearranged to

$$\frac{(1-t_{co})}{(1-t_{cn})} > \frac{(1+R_{pen})^n}{(1+r_{cn})^n} \tag{9.6}$$

Note that the employee's tax rates are irrelevant to this comparison, because both compensation arrangements give rise to taxation in the future. In other words $(1 - t_{pn})$ is on both sides of the ** equation so the term cancels out.[9] If the corporate tax rate is expected to be higher in the future, that is, $t_{cn} > t_{co}$, and $R_{pen} = r_{cn}$, then deferred compensation is preferred to pension. For example, if t_{co} is 21% and t_{cn} is 35%, then (1 − .21)/(1 − .35) is 1.215, which implies that deferred compensation is preferred to pension by 21.5%. If the employer has a defined benefit pension plan in place under such circumstances, it may pay a corporation to underfund, not overfund, the pension plan.

Conversely, suppose that r_{cn} = 7.5% and R_{pen} = 10% assuming t_{co} = 21% and t_{cn} = 35%. Then, deferred compensation is preferred to pension as long as

$$1.215 > (1.10)^n/(1.075)^n$$

which will occur if $n < 10$ years.

Suppose instead of the corporate tax rate increasing from a current 21% to 35%, that the corporate tax rate is expected to fall, say from 35% to 21%. Then t_{co} = 21% and t_{cn} = 35% and (1 − .35)/(1 − .21) = .822, which implies that pension is preferred to deferred compensation by 18%. If the employer has a defined benefit pension plan in place, under such circumstances it may pay a corporation to overfund the pension plan. In fact, this is exactly what many firms did in 2017 and 2018 when the TCJA decreased corporate tax rates from 35% to 21%.[10] Gaertner, Lynch, and Vernon (2018) find

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[9] If the dates of future taxation differ, however, then employee tax rates become relevant to the comparison.

[10] Under the TCJA, firms can contribute to the pension plan in 2018 until they file their tax returns in September 2018.