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APPENDIX

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NUMERICAL ILLUSTRATION OF RENTAL COST CALCULATIONS.



This Appendix is intended to provide examples of the calculation of the rental cost of capital index made for each country in Chapter IV, as well as to present the derivation of some of the tax rate and tax incentive parameters used in the calculations. For each individual country, only examples of the calculations for two forms of incentives, namely universal incentives and pioneer (or promoted) enterprise incentives, will be given. Calculations for other incentive packages can be made along the same lines as the two packages.

Malaysia

A. Universal Incentives

$u = 0.45$; The domestic price of imported capital goods is raised to $(1 + \text{tariff rate})(1 + \text{sales tax rate})$, which equals $(1 + 0.05)(1 + 0.10)$ or 1.155, so that $\tau_E = 0.155$ or 15.5%.

$$\tau_S = 0 \text{ (by assumption)}$$

$$k_E = k_S = 0$$

$$z_E = 1 \text{ (first-year write-off for plant expenditure)}$$

Buildings are depreciated strictly on a straight-line basis with an initial allowance of 10 per cent and an annual allowance of 2 per cent over 45 years. Therefore, z_S can be calculated as

$$\begin{aligned} z_S &= 0.10 + 0.02 \int_0^{45} e^{-(0.15)s} ds \\ &= 0.10 + \frac{0.02}{0.15} (1 - e^{-6.75}) \\ &= 0.10 + 0.133 = 0.233 \end{aligned}$$

The rental cost of capital index for equipment is

$$I_E = (1 + 0.155)[1 - 0 - (0.45)(1)] / (1 - 0.45) = 1.155$$

And the rental cost of capital index for buildings is

$$I_S = (1 + 0)[1 - 0 - (0.45)(0.233)] / (1 - 0.45) = 1.628$$

The weighted rental cost index is therefore calculated as

$$I = 0.6(1.155) + 0.4(1.628)$$

= 1.344, where 0.6 and 0.4 is respectively the share of equipment and buildings in the hypothetical investment project.

With the adjustment for the benchmark tax rate, the index I_B is $1.344 / (1 + 0.25)$, which equals 1.075.

B. Special Incentive Program - Pioneer Status Incentives

The pioneer firm is assumed to enjoy the maximum income tax holiday of 8 years, so that $N_0 = 8$.

$$u = 0.45 ; u_H = u - (u - u')(1 - e^{-(r + \delta)N_0})$$

$$u_H = (0.45) - (0.45 - 0)(1 - e^{-(0.10 + 0.0879)(8)})$$

= 0.10, which is the effective tax rate under the tax

holiday.

$\tau_E = 0.0775$ since the one-half import tariff relief is assumed.

$$\tau_S = 0 \text{ (by assumption)}$$

$$k_E = k_S = 0$$

The pioneer firm can claim the normal capital allowances which, for equipment expenditure, consist of 20 per cent in initial allowance

and an annual allowance of 10 per cent, and for building expenditure, 10 per cent in initial allowance and 2 per cent in annual allowance. Depreciation for equipment is generally calculated on a straight-line basis but accelerated depreciation (which is distinct from first-year write-off) may also be used. Building expenditure is depreciated strictly on a straight-line basis. The calculation of the present value of depreciation allowances on equipment expenditure is made assuming that the firm chooses the sum-of-the-years'-digits method, while the straight-line depreciation is used to calculate z_S . That is,

$$\begin{aligned} z_E &= 0.20 + 0.8 \int_0^8 e^{-0.15s} \frac{2(8-s)}{8^2} ds \\ &= 0.20 + 0.8 \left[\frac{2}{(0.15)(8)} \left(1 - \frac{1}{(0.15)(8)} (1 - e^{-0.15(8)}) \right) \right] \\ &= 0.20 + 0.557 = 0.757 \\ z_S &= 0.10 + 0.20 \int_0^{45} e^{-(0.15)s} ds \\ &= 0.10 + 0.133 = 0.233, \end{aligned}$$

Since the pioneer firm is allowed to carry forward unused depreciation allowances accumulated during the holiday period so that they can be fully deducted from post-holiday taxable income, the relevant allowances in the tax holiday case must be discounted by e^{-rN_0} to take account of delayed absorption. The discounted values of the allowances are given by

$$\begin{aligned} z_E^* &= z_E e^{-rN_0} = 0.757 e^{-0.10(8)} \\ &= 0.340, \text{ and} \\ z_S^* &= 0.233 e^{-0.10(8)} \\ &= 0.105 \end{aligned}$$

where * is used to represent the case of delayed absorption of unused depreciation allowances, and it is assumed that the pioneer firm in

question deducts unused depreciation allowances from the profits earned during the first period after the termination of the holiday period.

For equipment and buildings, the rental cost of capital indexes are calculated, respectively, as

$$I_E = (1 + 0.0775)[1 - 0 - 0.45(0.340)] / (1 - 0.10) = 1.014$$

$$I_S = (1 + 0)[1 - 0 - 0.45(0.105)] / (1 - 1.10) = 1.059$$

And the weighted value of the index and the index with benchmark are respectively

$$I = 0.608 + 0.424 = 1.032$$

$$I_B = 1.032 / 1.25 = 0.826.$$

Singapore

A. Universal Incentives

$$u = 0.40$$

$$\tau_E = 0 \text{ since capital goods can be imported free of duty.}$$

$$\tau_S = 0 \text{ (by assumption)}$$

$$k_E = k_S = 0$$

Depreciation allowances on machinery and plant expenditures may be claimed in three annual allowances of $33\frac{1}{3}$ per cent, thus resulting in the present value of depreciation allowances based on the sum-of-the-years'-digits method of 0.865 ; that is,

$$\begin{aligned} z_E &= \frac{2}{0.45} \left[1 - \frac{1}{0.45} (1 - e^{-0.45}) \right] \\ &= 0.865 \end{aligned}$$

The value of z_S is calculated on a straight-line basis as

$$\begin{aligned} z_S &= 0.25 + 0.03 \int_0^{25} e^{-0.15s} ds \\ &= 0.25 + 0.195 \\ &= 0.445 \end{aligned}$$

The respective rental cost of capital index for equipment and buildings is

$$I_E = 1.09 \text{ and } I_S = 1.37$$

The weighted rental cost of capital index I is calculated at 1.202, and the index relative to the benchmark case, I_B , is 1.036.

B. Special Incentive Program - Pioneer Industries Incentives

The pioneer firm is assumed to be granted the maximum tax-exempt period of 10 years.

$$\begin{aligned} u &= 0.40 ; u_H = 0.40 - (0.40 - 0)(1 - e^{-(0.10 + 0.0879)10}) \\ u_H &= 0.06 \\ \tau_E &= 0 ; \tau_S = 0 \text{ (by assumption)} \\ k_E &= k_S = 0 \\ z_E &= 0.865 ; z_E^* = 0.318 \\ z_S &= 0.445 ; z_S^* = 0.164 \end{aligned}$$

The values of I_E , I_S , I and I_B are calculated, respectively, at 0.929, 0.994, 0.96 and 0.828.

ThailandA. Universal Incentives

$u = 0.40$; The domestic price of imported capital goods is raised to $(1+0.15)(1+0.055)$, which equals 1.213, so that $\tau_E = 0.213$ or 21.3%.

$$\tau_S = 0 \text{ (by assumption)}$$

$$k_E = k_S = 0$$

Depreciation allowances on capital expenditures on machinery and plant may be claimed with an annual allowance of 20 per cent for 5 years, while capital expenditure on buildings is depreciated over 20 years at 5 per cent per annum. Based on the sum-of-the-years'-digits method, the present value of depreciation allowances for equipment and plant is calculated as

$$\begin{aligned} z_E &= \frac{2}{0.75} \left[1 - \frac{1}{0.75} (1 - e^{-0.75}) \right] \\ &= 0.791 \end{aligned}$$

And for buildings it is calculated as

$$\begin{aligned} z_S &= \frac{2}{3} \left[1 - \frac{1}{3} (1 - e^{-3}) \right] \\ &= 0.456. \end{aligned}$$

The rental cost of capital indexes are calculated at 1,382 for equipment, 1,363 for buildings, and the weighted index I and the index with benchmark I_B are calculated at 1,374 and 1,205, respectively.

B. Special Incentive Program - Promoted Enterprise Incentives

The promoted firm is assumed to be granted the income tax relief for a maximum period of 8 years.

$$u = 0.40$$

The effective tax rate under the tax holiday u_H is calculated at 0.09.

$$\tau_E = 0 ; \tau_S = 0 \text{ (by assumption)}$$

$$k_E = k_S = 0$$

$$z_E = 0.791 ; z_E^* = 0.355$$

$$z_S = 0.456 ; z_S^* = 0.205$$

The indexes I_E , I_S , I and I_B are calculated at 0.943, 1.009, 0.969 and 0.85, respectively.

VITAE

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