To give an example, following Nordhaus let us assume

$$B(R) = \beta R^{\alpha}, \tag{8a}$$

where α is the constant elasticity of cost reduction with respect to research. Using (8a) equation (5) becomes

$$R = [\frac{\psi \alpha \beta}{\rho s}]^{\frac{1}{(1 - \alpha)}}. \tag{8b}$$

From equations (8a) and (8b), the size of the invention is:

$$B = \beta[\frac{\psi \alpha \beta}{\rho s}]^{\frac{\alpha}{(1 - \alpha)}}. \tag{8c}$$

When (8c) is substituted in (7), the optimal patent term ψ^* may be obtained from the solution of the equation:

$$\psi + \psi^{\frac{1}{(1 - \alpha)}}[\eta \beta \{\frac{(\beta \alpha)}{\rho s}\}^{\frac{\alpha}{(1 - \alpha)}}(1 + \frac{k}{2})] - \psi^{\frac{\alpha}{(1 - \alpha)}}[\eta \beta \{\frac{(\beta \alpha)}{(\rho s)}\}^{\frac{\alpha}{(1 - \alpha)}}] = 1. \tag{8d}$$

It is extremely difficult to solve for ψ from equation (8d). However, it is possible to compute values of T that would satisfy (7) for different values of B and η and determine whether the existing patent term is greater or less than the optimal patent term. The reasoning for this may be illustrated in Figure 3. In Figure 3, PP' represents the solution of the policy maker's equilibrium (7) and represents the existing life of a patent (which is 20 years in Canada and in the United States). The curves OI_1, OI_2 and OI_3 represent inventor equilibria for different industries - I_1, I_2 and I_3. At the existing patent life ψ_0 the observed size of the inventions in the three industries will be B_1, B_2 and B_3. By examining the observed equilibrium points (ψ_0,B_1), (ψ_0,B_2) and (ψ_0,B_3), we can determine whether the existing life is longer or shorter than the optimal. For I_1, I_2 and I_3, the inventor equilibria are respectively to the right of, on and to the left of PP'. Thus, for I_1, the existing life is longer than the optimal; for I_3 the existing life is shorter than the optimal; whereas for I_2, the existing life is optimal.