«Notes»

Supplement to "Growth Accounting" [2000/May]: For Chapter 4

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This note supplements Chapter 4 in "Growth Accounting: a New Approach Using Recursive programming" [2000/May] and briefly presents the structure and limitations of the Cobb-Douglas production function by using the Solow model. The Solow-Kamiryo model reinforces the limitations. Also, case-studies/examples in these models are shown using recursive programming: maximum repeating time, t, is set at 1250.

Review of the Solow model and its limitations

The purpose of this supplement is to review Solow [1956, 1957] and clarify the limitations of the Solow model in terms of Propositions 3-1 and 3-2 in Chapter 3. First, let me briefly formulate the equations in the Cobb-Douglas production function, following Hicks-neutral in technology and reviewing the relationship between Harrod-neutral and Hicks-neutral. Second, let me review the Solow model, and find its limitation that cannot overcome even using an additional parameter.

1 Equations of the Cobb-Douglas production function using Hick-neutral

First, using my own way, I formulate the equations inherent in the Cobb-Douglas production function. These equations are based on Hick-neutral technology and not inconsistent with the literature: $Y = \mathrm{A}(t)\,F(K, L) = F(A(t)K, A(t)L)$.

Why did I take Hicks-neutral instead of Harrod-neutral expressed as $Y = F(K, A(t)L)$? Three reasons: (1) Hick-neutral can generalize a discrete model (such as the Kamiryo model). When the Cobb-Douglas production function follows Hicks neutral, this production function can be compared with the generalized discrete model. (2) The relationship between the level of technology and the capital-output ratio can be formulated in Hicks-neutral but not using Harrod-neutral. (3) Hicks-neutral is called total factor productivity and fits my notion that physical and human capital should cooperate with each other as a whole.

The equations inherent in the Hicks-neutral Cobb-Douglas production function are formulated as follows:

$$Y = A(t)F(K,L) = F(A(t)K, A(t)L). \quad Y(t) = (e^{\lambda t} \cdot K(t))^{\alpha} \cdot (e^{\lambda t} \cdot L(t))^{1-\alpha}.$$

Thus, $\log Y(t) = t\lambda \log e + \alpha \cdot \log K(t) + (1-\alpha) \log L(t)$.

$$\frac{dY/dt}{Y} = \lambda + \alpha \cdot \frac{dK/dt}{K} + (1-\alpha) \cdot \frac{dL/dt}{L}. \tag{1}$$

α is the share of capital/profit to output or the elasticity of output with respect to capital, where output is gross domestic product less capital-consumption[1] and indirect taxes.

Y is shown as output or factor income, where Y is the sum of profit, P, and wages or compensation of workers, W: Y=P + W. Indirect taxes are not included in Y.

λ is the rate of Hicks-neutral technological progress (the growth rate of per capita output divided by the relative share of labour).

n, s, α, and λ are given as parameters in the production function.

Basic functions of the growth rates of capital-output are shown as follows:

1) Why does the Cobb-Douglas production function use the depreciation rate, δ, as a parameter, together with n? This may be the only way to derive the growth rates. This framework, however, reduces to $\frac{s}{\Omega} + \delta = n + \frac{\lambda}{1-\alpha} + \delta$ since $\delta \equiv D_{EP}/K$. My model measures δ as a variable using the coefficient of time preference as a parameter and the growth rate of output as a variable (see Appendix 1-1).

$$g_K = \frac{s}{\Omega} \text{ since } \frac{s}{\Omega} = \frac{S}{Y}\cdot\frac{Y}{K} = \frac{S}{K} = \frac{\dot{K}}{K}, \text{ using Equation 1.} \tag{2}$$

$$g_Y = \lambda + (1-\alpha)n + \frac{\alpha \cdot s}{\Omega}, \text{ using Equation 1.}^{2)} \tag{3}$$

Consider Equations 2 and 3. If Ω is a variable, then neither g_K nor g_Y can be calculated even if the rate of technological progress, λ, is given. If the value of Ω is given, then both values, g_K and g_Y, can be measured. Before that, how is Ω given/measured? Even if the rate of technological progress, λ, is given, the value of Ω is unknown. There seems to be no solution.

However, a method for measuring g_K and g_Y can be found *in the long run* (in the balanced growth-state) as follows:

Let variables in the long run be indicated by a superscript, *, i.e., in the long run, $g_Y^* = g_K^*$ or $g_y^* = g_k^*$, and both Ω and λ are Ω^* and λ^*.

$$\text{If } g_Y^* = g_K^*, \text{ then } \Omega^* = \frac{(1-\alpha)s}{\lambda^* + (1-\alpha)n}. \tag{4}$$

This is because $\frac{s}{\Omega} = \lambda + (1-\alpha)n + \frac{\alpha \cdot s}{\Omega}$ and, accordingly,

$s = \lambda \cdot \Omega + (1-\alpha)n \cdot \Omega + \alpha \cdot s$

As a result, $g_K^* = g_Y^* = \frac{s}{\Omega^*} = \frac{s\left\{\lambda^* + (1-\alpha)n\right\}}{(1-\alpha)s} = \frac{\lambda^* + (1-\alpha)n}{1-\alpha} = \frac{\lambda^*}{1-\alpha} + n,$

$$g_Y^* = g_K^* = \frac{s}{\Omega^*} = \frac{\lambda^*}{1-\alpha} + n, \tag{5}$$

$$\text{or, } g_y^* = g_k^* = \frac{\lambda^*}{1-\alpha}. \tag{6}$$

$$\text{If } g_Y^* = g_K^*, \text{ then } g_{\Omega^*} = 0 \text{ since } g_\Omega = \frac{g_K - g_Y}{1+g_Y}.$$

Equations 5 and 6 illustrate the same results that Solow [1956, revised 1969, p. 94] derived. They can also be expressed as follows:.

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2) Where, $g_K \equiv \frac{dK/dt}{K} = \dot{K}/K$, $\dot{K} = S$, and $g_Y \equiv \frac{dY/dt}{Y} = \dot{Y}/Y$.

$$\Omega^* = \frac{s}{\frac{\lambda^*}{1-\alpha} + n}. \tag{7}$$

$$\text{or, } \lambda^* = (1-\alpha)\left\{\frac{s}{\Omega^*} - n\right\}.^{3)} \tag{8}$$

Equations 7 and 8 imply that if λ^* is given then Ω^* is measured and if Ω^* is given then λ^* is measured. The Solow model assumes that λ^* is given as a parameter.

In short, the Cobb-Douglas production function in the long run, if λ^* is given, extracts and measures the capital-output ratio, Ω^*, under $g_{\Omega^*} = 0$. The results *in the long run* are the same as Solow's. Unfortunately, both the capital-output ratio, $\Omega(t)$, and the rate of change in the capital-output ratio, $g_\Omega(t)$, still remain unexpressed and cannot be calculated in the short run (see Figures 4-1 and 4-2 [Growth Accounting, pp. 121–122] for a quick comparison).

2 Relationship between Hicks-neutral and Harrod-neutral

What is the difference in the Cobb-Douglas production function between Hick-neutral expressed as $Y=A(t)\,F(K,L)=F(A(t)\,K, A(t)L)$ and Harrod-neutral expressed as $Y=(K, A(t)\,L)$? Harrod-neutral is labour-augmenting.[4] I prefer Hicks-neutral as for the three reasons stated above. However, the relationship between both "neutrals" can be expressed by simply using equations. Therefore, the difference is only a difference of notion/thought: it is easy to change

3) When the necessary condition in the balanced growth-state, $\Omega^* = \theta \equiv S / S_p$, is introduced into the production function, then the value of Ω^* is given and, as a result, the value of λ^* becomes a variable by setting the ratio of undistributed profit to output, $s_{SP/Y}$, as a variable (see the next section).

4) Romer, D [1996, p. 7]: A and L enter multiplicatively. AL is referred to as effective labour, and technological progress that enters in this fashion is known as labour-augmenting or Harrod-neutral. If knowledge enters in the form Y=A(K, L), technological progress is Hicks-neutral.

from one to the other using equations.

Before starting, let me briefly review Solow [1956]. Solow [1956] proposes an exogenous growth model, starting with the Harrod-Domar [1947, 1948] model[5] that does not involve technology. This model uses the Cobb-Douglas production function, where per capita output, y, is a dependent variable and per capita capital, k, is an independent variable. The model sets the following ratios each as parameters: the rate of saving; s, the growth rate of population/ workers; n, the relative share of profit; α, the level of technology; A, and the rate of technological progress, λ. The capital-output ratio, Ω, is not used directly, but implicitly included since $y = k / \Omega$. For the level of technology, Solow [1956; 1969, p. 94 as a correction] expresses the growth rate of per capita output as the rate of technological progress divided by the relative share of labour: $g_y = \lambda / (1-\alpha)$. This is Hick-neutral since the growth rate of per capita output equals the rate of technological progress in Harrod-neutral. Solow [1957] explicitly uses Hicks-neutral: $Y=A(t)F(K,L)$ as shown in his Equation 1a. Solow has respected Arrow's [1962] "learning by doing" in almost all his papers, and I interpret this attitude as supporting Hicks-neutral technology.[6]

Now the relationship between Hicks- and Harrod- neutral is expressed as follows:[7]

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5) In this thesis, I call this model as the Harrod model. Partly because I cite "Fundamental Equations" in Harrod [1973, pp. 16–31] for comparison with the Solow model.

6) There are two interpretations for technological progress; one is embodied (defined as a situation that technological progress is done only by new capital and labour) and the other is disembodied (defined as a situation that technological progress is done by old and new capital and labour). My model is based on disembodied technological progress. Disembodied technology is expressed in the capital-output ratio on average. Embodied technological progress is involved in the rate of change in the capital-output ratio.

7) The relationship between Harrod-neutral and Hicks-neutral is discussed in Jones [1998, pp. 32–45]. Only for the comparison between both neutralities, do I use A_H and λ_H for Harrod-neutral. I use Hicks-neutral, A and λ, in this thesis. Jones uses "A" in Harrod-neutral and "B" in Hicks-neutral, each for the rate of technological progress.

Hicks-neutral:

$Y = AK^{\alpha}L^{1-\alpha}$ and

y=Ak$^{\alpha}$ where the level of technology, A, is Hicks-neutral and, accordingly,

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha\frac{\dot{K}}{K} + (1-\alpha)\frac{\dot{L}}{L}$$

$g_Y = \lambda + \alpha \cdot g_K + (1-\alpha)n$, where $\lambda \equiv \dot{A} / A$.

$g_y = \dfrac{\lambda}{1-\alpha}$, which corresponds with Solow [1956, 1969]. (9)

Harrod-neutral:

$Y = K^{\alpha}(A_H L)^{1-\alpha}$ and

$y = k^{\alpha} A_H^{\,1-\alpha}$ where A_H is Harrod-neutral and, accordingly,

$$\frac{\dot{y}}{y} = \alpha\frac{\dot{k}}{k} + (1-\alpha)\frac{\dot{A}_H}{A_H}$$

This equation is also shown as

$g_y = \alpha \cdot g_k + (1-\alpha)\lambda_H$, (10)

where $\lambda_H \equiv \dot{A}_H / A_H$ and $g_k = \lambda_H$ in the balanced growth-state: $g_y = g_k$.

Thus $g_y = g_k = \lambda_H$ since $g_k = \alpha \cdot g_k + (1-\alpha)\lambda_H$ and $g_k = \lambda_H$. In short, it was proved that the growth rate of per capita output equals the rate of technological progress in Harrod-neutral.

What is the relationship between the Hicks-neutral λ and the Harrod-neutral λ_H? This relationship between each rate of technological progress is simple:

$\lambda = \lambda_H^{\,1-\alpha}$ or $\lambda_H = \lambda^{\frac{1}{1-\alpha}}$ (11)

Why did Jones [1998, p.42] prefer Harrod-neutral, A_H and λ_H? Jones [ibid., p. 44] pointed out that if the growth rate of per capita output equaled the rate of technological progress, the relationship between these two ratios is shown using a 45-degree line.

I can connect Hicks-neutral (A and λ) in the Cobb-Douglas production func-

tion (as the Solow model) with the Kamiryo model. However, I must indicate that the growth rates of output and per capita output measured using Hicks-neutral are higher than those measured using Harrod-neutral. This is because Hicks-neutral λ is higher than Harrod-neutral λ_H. Hicks-neutral technology is called total factor productivity growth (or multifactor productivity growth as indicated by Jones [1998]) and shows the difference (Solow's residual) between the growth rate of output and the sum of the growth rates of capital and labour. Solow sets total factor productivity as a parameter or residual, but I measure it endogenously. I show both cases in my model using recursive-programming in Tables 4-1-1 to 4-1-3.

In Tables 4-1-1 to 4-1-3, the following results are of interesting:

1. Use of $g_Y(t)$ and $g_K(t)$ in the Hicks-neutral technology (see Table 4-1-1): Set $a=\alpha \cdot g_K(t)$, $b=(1-\alpha)n$, and the rate of technology, λ, as a parameter. The difference between $g_Y(t)$ and the sum of a, b, and λ is not zero in the case of the Solow model and the Solow-Kamiryo model because of the limitations of the Cobb-Douglas production function. This difference is larger when $\lambda=0.05$ as an optional/random parameter as in the Solow model than that measured when $\lambda=0.032185$ as a variable derived from my proposition in the Solow-Kamiryo model.
2. Use of $g_y(t)$ and $g_k(t)$ in the both Harrod-neutral and Hicks-neutral technology (see Table 4-1-2): The value of the effective capital-labour ratio, k_e is defined as K/AL. For the Harrod-neutral technology, set $a_e=\alpha \cdot g_{ke}(t)$, $b=(1-\alpha)n$, and the rate of technology, $\lambda=0.038532$, which is connected with $\lambda=0.05$ as the above parameter in the Hicks-neutral technology.[8] For the Hicks-neutral technology, set $a=\alpha \cdot g_K(t)$ and $\lambda=0.05$. The difference for the Harrod-neutral is that calculated between $g_y(t)$ and the sum of a_e+b and the difference for the Hicks-neutral is that calculated between $g_y(t)$ and the sum of $a+\lambda$.

3. When the rate of technological progress is derived from my propositions, the results using the Solow model equals the results using the Solow-Kamiryo model (see Table 4-1-3).

In short, when the Cobb-Douglas production function introduces my propositions, the results become more appropriate, but still have its inherent limitations.

Finally, let me show the above tables and also Appendix A4, whose contents are the following:

For Chapter 4 (for the method that measures the elasticity, see 41(1))

A4-1 Case study of the Solow model with lambda given and the structure of elasticity of substitution: IRC, CRC, and DRC:

A4-1-1 $\lambda = 0.05$ with Figure A4-1-1: **IRC** (increasing returns to capital)

A4-1-2 $\lambda = 0.041025$ with Figure A4-1-2: **CRC** (constant returns to capital)

A4-1-3 $\lambda = -0.01$ with Figure A4-1-3: **DRC** (diminishing returns to capital)

A4-2 Case study of the Solow model and the Solow-Kamiryo model with $\lambda = 0$ (including the case of $s_{SP/Y}=n$) and the structure of elasticity of substitution: only under DRC

A4-2-1 $\lambda = 0.0$ with Figure A4-2-1: **DRC**

A4-2-2 $\lambda = 0.0$ ($s_{SP/Y} = 0.044984$) with Figure A4-2-2 in the Solow-Kamiryo model: **DRC**

A4-2-3 $s_{SP/Y} = n = 0.01$ (resulting in $\lambda = 0.0$) with Figure A4-2-3 in the Solow-Kamiryo model: **DRC**

A4-3 Case study of the Solow-Kamiryo model with $\Psi > 1$, $\Psi = 1$, and $\Psi < 1$ and the structure of elasticity of substitution: IRC, CRC, and DRC

A4-3-1 A(0) and λ ($= 0.032185$), where $s_{SP/Y} = 0.044984$, are variables under

8) Set $1/(1-\alpha) = 1/(1-0.08) = 1.08695$. The relationship between the Hicks-neutral and Harrod-neutral is $\lambda_{Harrod} = \lambda_{Hicks}^{\wedge} (1/(1-\alpha))$ (see, Jones [1998, p. 42], where $\lambda_{Hicks} = \lambda_{Harroc}^{\wedge} (1-\alpha)$). Thus, $\lambda_{Harrod} = 0.05^{\wedge}1.08695$.

$S=\Omega \cdot S_P$ with Figure A4-3-1 in the Solow-Kamiryo model: **IRC**

A4-3-2 A(0) and λ (=0.021458), where $s_{SP/Y}=0.033324$, are variables under $S=\Omega \cdot S_P$ with Figure A4-3-2 in the Solow-Kamiryo model: **CRC**

A4-3-3 A(0) and λ (=0.0138), where $s_{SP/Y}=0.025$, are variables under $S=\Omega \cdot S_P$ with Figure A4-3-3 in the Solow-Kamiryo model: **DRC**

A4-4 Case study of the Solow model and the Solow-Kamiryo model: with $\alpha=0$ & $\alpha=1$ and the structure of elasticity of substitution

A4-4-1 A(0) and λ (=0.007993), where $s_{SP/Y}=0.017993$, are variables under $S=\Omega \cdot S_P$ in the Solow-Kamiryo model: **DRC**

A4-4-2 A(0) and λ (=0.0), where $s_{SP/Y}=0.033324$, are variables and $\alpha=1$ under $S=\Omega \cdot S_P$ in the Solow-Kamiryo model: **CRC**

Table 4-1-1 The Solow model vs. the Solow-Kamiryo model using Hicks-neutral (IRC)

Solow model	n	α	1−α	λ		
Hicks-neutra	0.010000	0.080000	0.920000	**0.05**		
$g_Y(t)$	$g_K(t)$	$a=\alpha*g_K(t)$	$b=(1-\alpha)n$	If $g_Y(t)=a+b+\lambda$	Difference	
(1)	---	---	---	(2)	(1)-(2)	
0.065535	0.056045	0.004484	0.009200	0.063684	0.001851	
0.065577	0.056552	0.004524	0.009200	0.063724	0.001853	
0.065618	0.057038	0.004563	0.009200	0.063763	0.001855	
0.065657	0.057504	0.004600	0.009200	0.063800	0.001857	
0.065695	0.057950	0.004636	0.009200	0.063836	0.001859	
0.065731	0.058377	0.004670	0.009200	0.063870	0.001861	
0.065765	0.058785	0.004703	0.009200	0.063903	0.001863	
0.065798	0.059175	0.004734	0.009200	0.063934	0.001864	
0.065830	0.059548	0.004764	0.009200	0.063964	0.001866	
0.065860	0.059903	0.004792	0.009200	0.063992	0.001867	
0.065888	0.060242	0.004819	0.009200	0.064019	0.001869	
0.065916	0.060565	0.004845	0.009200	0.064045	0.001870	
0.065941	0.060872	0.004870	0.009200	0.064070	0.001872	
0.065966	0.061165	0.004893	0.009200	0.064093	0.001873	
0.065990	0.061444	0.004915	0.009200	0.064115	0.001874	
0.066012	0.061709	0.004937	0.009200	0.064137	0.001875	
0.066033	0.061960	0.004957	0.009200	0.064157	0.001877	
0.066054	0.062200	0.004976	0.009200	0.064176	0.001878	
0.066073	0.062427	0.004994	0.009200	0.064194	0.001879	
0.066091	0.062642	0.005011	0.009200	0.064211	0.001880	
0.066108	0.062847	0.005028	0.009200	0.064228	0.001881	
0.066125	0.063041	0.005043	0.009200	0.064243	0.001882	
0.066140	0.063225	0.005058	0.009200	0.064258	0.001882	
0.066155	0.063400	0.005072	0.009200	0.064272	0.001883	
0.066169	0.063565	0.005085	0.009200	0.064285	0.001884	
0.066182	0.063722	0.005098	0.009200	0.064298	0.001885	
0.066195	0.063870	0.005110	0.009200	0.064310	0.001885	
0.066207	0.064011	0.005121	0.009200	0.064321	0.001886	
0.066218	0.064144	0.005131	0.009200	0.064331	0.001887	
0.066229	0.064270	0.005142	0.009200	0.064342	0.001887	
0.066239	0.064389	0.005151	0.009200	0.064351	0.001888	
0.066248	0.064501	0.005160	0.009200	0.064360	0.001888	
0.066257	0.064608	0.005169	0.009200	0.064369	0.001889	

(Data from AA 4-1)

s=0.05 $s_{SP/Y}$=0.0643< θ=S/S_P=0.777027 Ψ=Ω(0)/θ=1.168544

S-K model	n	α	1−α	λ	(4)
Hicks-neutra	0.010000	0.080000	0.920000	**0.032185**	
$g_Y(t)$	$g_K(t)$	$a=\alpha*g_K(t)$	$b=(1-\alpha)n$	Difference	
(1)	---	(2)	(3)	(1)-(2)-(3)-(4)	
0.044962	0.033938	0.002715	0.009200	0.000862	
0.044992	0.034302	0.002744	0.009200	0.000863	
0.045022	0.034658	0.002773	0.009200	0.000864	
0.045050	0.035007	0.002801	0.009200	0.000865	
0.045079	0.035349	0.002828	0.009200	0.000866	
0.045106	0.035683	0.002855	0.009200	0.000866	
0.045133	0.036010	0.002881	0.009200	0.000867	
0.045160	0.036329	0.002906	0.009200	0.000868	
0.045185	0.036640	0.002931	0.009200	0.000869	
0.045210	0.036944	0.002955	0.009200	0.000870	
0.045235	0.037240	0.002979	0.009200	0.000871	
0.045259	0.037529	0.003002	0.009200	0.000871	
0.045282	0.037810	0.003025	0.009200	0.000872	
0.045305	0.038083	0.003047	0.009200	0.000873	
0.045327	0.038350	0.003068	0.009200	0.000874	
0.045348	0.038609	0.003089	0.009200	0.000874	
0.045369	0.038861	0.003109	0.009200	0.000875	
0.045389	0.039106	0.003128	0.009200	0.000876	
0.045409	0.039344	0.003147	0.009200	0.000876	
0.045428	0.039575	0.003166	0.009200	0.000877	
0.045447	0.039799	0.003184	0.009200	0.000878	
0.045465	0.040016	0.003201	0.009200	0.000878	
0.045482	0.040227	0.003218	0.009200	0.000879	
0.045499	0.040431	0.003235	0.009200	0.000880	
0.045516	0.040629	0.003250	0.009200	0.000880	
0.045532	0.040821	0.003266	0.009200	0.000881	
0.045547	0.041007	0.003281	0.009200	0.000881	
0.045562	0.041187	0.003295	0.009200	0.000882	
0.045576	0.041361	0.003309	0.009200	0.000882	
0.045590	0.041529	0.003322	0.009200	0.000883	
0.045604	0.041692	0.003335	0.009200	0.000883	
0.045617	0.041850	0.003348	0.009200	0.000884	
0.045630	0.042002	0.003360	0.009200	0.000884	

(Data from AA 4-3)

s=0.05 $s_{SP/Y}$=0.0449(θ=S/S_P=1.111509 Ψ=Ω(0)/θ=1.349516

Solow M :Hicks-neutral

$g^*_y=\lambda/(1-\alpha)$	$g^*_Y=g^*_y+n$	λ as given
0.0543478	0.0643478	0.05

$k^*(t)$, where $\chi=1/(1-\alpha)$ $=A(t)^{\chi}(\Omega^*)^{\chi}$ — infinite

In terms of Hicks- and Harrod-, **Vital relationship**

$\Omega^*=s/(n+g^*_y)$

0.777027		$\chi=1/(1-\alpha)$
	$k(0)=$	$A(0)^{\chi}(\Omega^*)^{\chi}$
		1.086957
		11
		Ω(0)
		0.907990

Note: $\Omega(0)=K(0)/Y(0)=k(0)/(A(0)k(0)^{\alpha})$

$A^*=k^*/(\Omega^*k^{*\alpha})$ — infinite

=0.05^1.086 **0.038533** where,1/(1-α)= 1.08695

$y^*=A^*k^{*\alpha}$ — infinite

$g^*_Y=s/\Omega^*$

A(0)	
	10
	as given
	y(0)
	12.11467

Note: $y(0)=A(0)k(0)^{\alpha}$

0.064348

By goal seek $\lambda=\lambda_H^{1-\alpha}$

Note: θ=S/S_P is not directly calculated

S-K M :Hicks-neutral

$g^*_y=\lambda/(1-\alpha)$	$g^*_Y=g^*_y+n$	λ as given
0.038532	0.044984	0.032185

$\lambda_{Harrod}=\lambda_H=$ 0.034984 $\lambda_{Hicks}=\lambda=$ λ_H^0.92= 0.049998 where,1-α= 1-0.08=0.92

Note: $\lambda=(1-\alpha)(sSP/Y-n)$

$k^*(t)$, where $\chi=1/(1-\alpha)$ $=A(t)^{\chi}(\Omega^*)^{\chi}$ — infinite

$\Omega^*=s/(n+g^*_y)$ — 1.111509

$A^*=k^*/(\Omega^*k^{*\alpha})$ — infinite

$y^*=A^*k^{*\alpha}$ — infinite

$g^*_Y=s/\Omega^*$ — 0.044984

$s_{SP/Y}$	
	0.044984
	as given*
	Ω(0)
	1.5
	as given
	A(0)
	6.053270

Note: $A(0)=k(0)^{1-\alpha}/\Omega(0)$

y(0)	
	7.333333

Note: $y(0)=A(0)k(0)^{\alpha}$

λ: Hicks' λ_H: Harrod's

See, Jones [1998, P. 42]

Note: θ=S/S_P is calculated using this $s_{SP/Y}$.

Table 4-1-2 Harrod-neutral vs. Hicks-neutral using k_e vs. k in Solow model (IRC)

Solow model n		α	1−α	λ		
Harrod-neut	0.010000	0.080000	0.920000	**0.038532**		
$g_y(t)$	$g_{ke}(t)$	$a=\alpha*g_{ke}(t)$	$b=\lambda(1-\alpha)$	a+b	$g_y(t)$-a-b	
---	---	---	---	---	---	Difference
0.039005	0.03594	0.002876	0.035449	0.038325	0.000680	
0.039016	0.03608	0.002886	0.035449	0.038336	0.000681	
0.039027	0.03621	0.002897	0.035449	0.038346	0.000681	
0.039038	0.03634	0.002907	0.035449	0.038356	0.000682	
0.039048	0.03646	0.002917	0.035449	0.038366	0.000682	
0.039058	0.03658	0.002926	0.035449	0.038375	0.000682	
0.039067	0.03669	0.002935	0.035449	0.038384	0.000683	
0.039076	0.03679	0.002944	0.035449	0.038393	0.000683	
0.039085	0.03690	0.002952	0.035449	0.038401	0.000684	
0.039093	0.03700	0.002960	0.035449	0.038409	0.000684	
0.039101	0.03709	0.002967	0.035449	0.038417	0.000684	
0.039109	0.03718	0.002975	0.035449	0.038424	0.000685	
0.039116	0.03727	0.002982	0.035449	0.038431	0.000685	
0.039123	0.03736	0.002989	0.035449	0.038438	0.000685	
0.039130	0.03744	0.002995	0.035449	0.038444	0.000685	
0.039136	0.03752	0.003001	0.035449	0.038450	0.000686	
0.039142	0.03759	0.003007	0.035449	0.038456	0.000686	
0.039148	0.03766	0.003013	0.035449	0.038462	0.000686	
0.039154	0.03773	0.003018	0.035449	0.038468	0.000686	
0.039160	0.03780	0.003024	0.035449	0.038473	0.000687	
0.039165	0.03786	0.003029	0.035449	0.038478	0.000687	
0.039170	0.03792	0.003034	0.035449	0.038483	0.000687	
0.039175	0.03798	0.003038	0.035449	0.038487	0.000687	
0.039179	0.03803	0.003043	0.035449	0.038492	0.000688	
0.039184	0.03809	0.003047	0.035449	0.038496	0.000688	
0.039188	0.03814	0.003051	0.035449	0.038500	0.000688	
0.039192	0.03819	0.003055	0.035449	0.038504	0.000688	
0.039196	0.03823	0.003059	0.035449	0.038508	0.000688	
0.039200	0.03828	0.003062	0.035449	0.038511	0.000688	
0.039203	0.03832	0.003066	0.035449	0.038515	0.000689	
0.039207	0.03836	0.003069	0.035449	0.038518	0.000689	
0.039210	0.03840	0.003072	0.035449	0.038521	0.000689	
0.039213	0.03844	0.003075	0.035449	0.038524	0.000689	

(Data from AA 4-1 k_e)

s=0.05 $s_{SP/Y}$=0.0643< θ=S/S_P=0.777027 Ψ=Ω(0)/θ=1.168544

Harrod-neutral λ=0.038532 corresponds with Hicks-neutral λ=0.05 since 0.038532^0.92=0.05.

Solow model n		α	1−α	λ		
Hicks-neutra	0.010000	0.080000	0.920000	**0.050000**		
$g_y(t)$	$g_k(t)$	$a=\alpha*g_k(t)$	λ	a+λ	$g_y(t)$-a-b	
---	---	---	---	---	---	Difference
0.054985	0.045589	0.003647	0.050000	0.053647	0.001338	
0.055027	0.046091	0.003687	0.050000	0.053687	0.001340	
0.055068	0.046572	0.003726	0.050000	0.053726	0.001342	
0.055106	0.047034	0.003763	0.050000	0.053763	0.001344	
0.055144	0.047475	0.003798	0.050000	0.053798	0.001346	
0.055179	0.047898	0.003832	0.050000	0.053832	0.001347	
0.055213	0.048302	0.003864	0.050000	0.053864	0.001349	
0.055246	0.048688	0.003895	0.050000	0.053895	0.001351	
0.055277	0.049057	0.003925	0.050000	0.053925	0.001352	
0.055307	0.049409	0.003953	0.050000	0.053953	0.001354	
0.055335	0.049744	0.003980	0.050000	0.053980	0.001355	
0.055362	0.050064	0.004005	0.050000	0.054005	0.001357	
0.055388	0.050369	0.004029	0.050000	0.054029	0.001358	
0.055412	0.050659	0.004053	0.050000	0.054053	0.001359	
0.055435	0.050934	0.004075	0.050000	0.054075	0.001361	
0.055458	0.051197	0.004096	0.050000	0.054096	0.001362	
0.055479	0.051446	0.004116	0.050000	0.054116	0.001363	
0.055499	0.051683	0.004135	0.050000	0.054135	0.001364	
0.055518	0.051908	0.004153	0.050000	0.054153	0.001365	
0.055536	0.052121	0.004170	0.050000	0.054170	0.001366	
0.055553	0.052324	0.004186	0.050000	0.054186	0.001367	
0.055569	0.052516	0.004201	0.050000	0.054201	0.001368	
0.055585	0.052698	0.004216	0.050000	0.054216	0.001369	
0.055599	0.052871	0.004230	0.050000	0.054230	0.001369	
0.055613	0.053035	0.004243	0.050000	0.054243	0.001370	
0.055626	0.053190	0.004255	0.050000	0.054255	0.001371	
0.055639	0.053337	0.004267	0.050000	0.054267	0.001372	
0.055650	0.053476	0.004278	0.050000	0.054278	0.001372	
0.055662	0.053608	0.004289	0.050000	0.054289	0.001373	
0.055672	0.053732	0.004299	0.050000	0.054299	0.001374	
0.055682	0.053850	0.004308	0.050000	0.054308	0.001374	
0.055692	0.053962	0.004317	0.050000	0.054317	0.001375	
0.055700	0.054067	0.004325	0.050000	0.054325	0.001375	

(Data from AA 4-1)

Solow M :Harrod-neutral

$g^*_Y=\lambda$	$g^*_Y=g^*_y+n$	λ as given
0.038532	0.048532	0.0385318

$k^*(t)$, where $\chi=1/(1-\alpha)$ $\chi=1/(1-\alpha)$

$=A(t)^\chi(\Omega^*)^\chi$ 1.086957

infinite k(0)= $A(0)^\chi(\Omega^*)^\chi$

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$\Omega^*=s/(n+g^*_y)$ Ω(0)

1.030253 0.907990

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

$A^*=k^*/(\Omega^*k^{*\alpha})$ A(0)

infinite 10

as given

$y^*=A^*k^{*\alpha}$ y(0)

infinite 12.11467

Note: $y(0)=A(0)k(0)^\alpha$

$g^*_Y=s/\Omega^*$

0.048532

Note: θ=S/S_P is not directly calculated

Solow M :Hicks-neutral

$g^*_y=\lambda/(1-\alpha)$	$g^*_Y=g^*_y+n$	λ as given
0.054348	0.064348	0.05

$k^*(t)$, where $\chi=1/(1-\alpha)$

$=A(t)^\chi(\Omega^*)^\chi$

infinite

$\Omega^*=s/(n+g^*_y)$ Ω(0)

0.777027 0.907990

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

$A^*=k^*/(\Omega^*k^{*\alpha})$ A(0)

infinite 10

as given

$y^*=A^*k^{*\alpha}$ y(0)

infinite 12.11467

Note: $y(0)=A(0)k(0)^\alpha$

$g^*_Y=s/\Omega^*$

0.064348

Note: θ=S/S_P is not directly calculated

s=0.05 $s_{SP/Y}$=0.0643< θ=S/S_P=0.777027 Ψ=Ω(0)/θ=1.168544

Table 4-1-3 Solow model vs. Solow-Kamiryo model using k and Hicks-neutral (IRC)

There is no difference of results between Solow M and Solow-Kamiryo M.

Solow model n		α	1−α	λ			S-K model n		α	1−α	λ		
Hicks-neutra	0.010000	0.080000	0.920000	**0.032185**			**Hicks-neutra**	0.010000	0.080000	0.920000	**0.032185**		
$g_y(t)$	$g_k(t)$	$a=\alpha*g_k(t)$	λ	a+λ	$g_y(t)$-a-b		$g_y(t)$	$g_k(t)$	$a=\alpha*g_k(t)$	λ	a+λ	$g_y(t)$-a-b	
---	---	---	---	---	Difference		---	---	---	---	---	Difference	
0.034616	0.023701	0.001896	0.032185	0.034081	0.000535		0.034616	0.023701	0.001896	0.032185	0.034081	0.000535	
0.034646	0.024061	0.001925	0.032185	0.034110	0.000536		0.034646	0.024061	0.001925	0.032185	0.034110	0.000536	
0.034675	0.024414	0.001953	0.032185	0.034138	0.000537		0.034675	0.024414	0.001953	0.032185	0.034138	0.000537	
0.034703	0.024760	0.001981	0.032185	0.034166	0.000537		0.034703	0.024760	0.001981	0.032185	0.034166	0.000537	
0.034731	0.025098	0.002008	0.032185	0.034193	0.000538		0.034731	0.025098	0.002008	0.032185	0.034193	0.000538	
0.034759	0.025429	0.002034	0.032185	0.034219	0.000539		0.034759	0.025429	0.002034	0.032185	0.034219	0.000539	
0.034785	0.025752	0.002060	0.032185	0.034245	0.000540		0.034785	0.025752	0.002060	0.032185	0.034245	0.000540	
0.034811	0.026068	0.002085	0.032185	0.034271	0.000541		0.034811	0.026068	0.002085	0.032185	0.034271	0.000541	
0.034837	0.026376	0.002110	0.032185	0.034295	0.000542		0.034837	0.026376	0.002110	0.032185	0.034295	0.000542	
0.034862	0.026677	0.002134	0.032185	0.034319	0.000543		0.034862	0.026677	0.002134	0.032185	0.034319	0.000543	
0.034886	0.026970	0.002158	0.032185	0.034343	0.000543		0.034886	0.026970	0.002158	0.032185	0.034343	0.000543	
0.034910	0.027256	0.002180	0.032185	0.034366	0.000544		0.034910	0.027256	0.002180	0.032185	0.034366	0.000544	
0.034933	0.027534	0.002203	0.032185	0.034388	0.000545		0.034933	0.027534	0.002203	0.032185	0.034388	0.000545	
0.034955	0.027805	0.002224	0.032185	0.034410	0.000546		0.034955	0.027805	0.002224	0.032185	0.034410	0.000546	
0.034977	0.028069	0.002246	0.032185	0.034431	0.000546		0.034977	0.028069	0.002246	0.032185	0.034431	0.000546	
0.034998	0.028326	0.002266	0.032185	0.034451	0.000547		0.034998	0.028326	0.002266	0.032185	0.034451	0.000547	
0.035019	0.028575	0.002286	0.032185	0.034471	0.000548		0.035019	0.028575	0.002286	0.032185	0.034471	0.000548	
0.035039	0.028818	0.002305	0.032185	0.034491	0.000548		0.035039	0.028818	0.002305	0.032185	0.034491	0.000548	
0.035059	0.029053	0.002324	0.032185	0.034509	0.000549		0.035059	0.029053	0.002324	0.032185	0.034509	0.000549	
0.035077	0.029282	0.002343	0.032185	0.034528	0.000550		0.035077	0.029282	0.002343	0.032185	0.034528	0.000550	
0.035096	0.029504	0.002360	0.032185	0.034545	0.000550		0.035096	0.029504	0.002360	0.032185	0.034545	0.000550	
0.035114	0.029719	0.002378	0.032185	0.034563	0.000551		0.035114	0.029719	0.002378	0.032185	0.034563	0.000551	
0.035131	0.029928	0.002394	0.032185	0.034579	0.000552		0.035131	0.029928	0.002394	0.032185	0.034579	0.000552	
0.035148	0.030130	0.002410	0.032185	0.034596	0.000552		0.035148	0.030130	0.002410	0.032185	0.034596	0.000552	
0.035164	0.030326	0.002426	0.032185	0.034611	0.000553		0.035164	0.030326	0.002426	0.032185	0.034611	0.000553	
0.035180	0.030516	0.002441	0.032185	0.034626	0.000553		0.035180	0.030516	0.002441	0.032185	0.034626	0.000553	
0.035195	0.030700	0.002456	0.032185	0.034641	0.000554		0.035195	0.030700	0.002456	0.032185	0.034641	0.000554	
0.035210	0.030878	0.002470	0.032185	0.034655	0.000555		0.035210	0.030878	0.002470	0.032185	0.034655	0.000555	
0.035224	0.031051	0.002484	0.032185	0.034669	0.000555		0.035224	0.031051	0.002484	0.032185	0.034669	0.000555	
0.035238	0.031217	0.002497	0.032185	0.034683	0.000556		0.035238	0.031217	0.002497	0.032185	0.034683	0.000556	
0.035251	0.031378	0.002510	0.032185	0.034695	0.000556		0.035251	0.031378	0.002510	0.032185	0.034695	0.000556	
0.035264	0.031534	0.002523	0.032185	0.034708	0.000556		0.035264	0.031534	0.002523	0.032185	0.034708	0.000556	
0.035277	0.031685	0.002535	0.032185	0.034720	0.000557		0.035277	0.031685	0.002535	0.032185	0.034720	0.000557	

(Data from AA 4-1) Using the initial Ω(0), k(0), and y(0) of S-K Mo (Data from AA 4-3) A(t) and λ are variables.

Using λ=0.032185 calculated by S-K M.

s=0.05 $s_{SP/Y}$=0.0449(θ=S/S_P=1.111506 Ψ=Ω(0)/θ=1.349520 s=0.05 $s_{SP/Y}$=0.0449(θ=S/S_P=1.111506 Ψ=Ω(0)/θ=1.349520

Solow M **:Hicks-neutral**

$g^*_y=\lambda/(1-\alpha)$ $g^*_Y=g^*_y+n$ λ given

0.034984 0.044984 0.032185

$k^*(t)$, where $\chi=1/(1-\alpha)$ $\chi=1/(1-\alpha)$

$=A(t)^\chi(\Omega^*)^\chi$ 1.086957

infinite k(0) given

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$\Omega^*=s/(n+g^*_y)$ Ω(0) given

1.111509 1.5

Note: $\Omega(0)=K(0)/Y(0)=k(0)/(A(0)k(0)^\alpha)$

$A^*=k^*/(\Omega^*k^{*\alpha})$ A(0) as a variable

infinite 6.053270

Note: $A(0)=k(0)^{1-\alpha}/\Omega(0)$

$y^*=A^*k^{*\alpha}$ y(0) given

infinite 7.333333

$g^*_Y=s/\Omega^*$

0.044984

Note: θ=S/S_P is not directly calculated.

S−K M **:Hicks-neutral**

$g^*_y=\lambda/(1-\alpha)$ $g^*_Y=g^*_y+n$ λ as a variable

0.034984 0.044984 0.032185

Note: $\lambda=(1-\alpha)(s_{SP/Y}-n)$

$k^*(t)$, where $\chi=1/(1-\alpha)$ $s_{SP/Y}$

$=A(t)^\chi(\Omega^*)^\chi$ 0.044984

infinite as given*

$\Omega^*=s/(n+g^*_y)$ Ω(0) given

1.111509 1.5

$A^*=k^*/(\Omega^*k^{*\alpha})$ A(0)

infinite as a variable

Note: $A(0)=k(0)^{1-\alpha}/\Omega(0)$

$y^*=A^*k^{*\alpha}$ $y(0)=A(0)k(0)^\alpha$

infinite 7.333333

$g^*_Y=s/\Omega^*$

0.044984

Note: θ=S/S_P is calculated using this $s_{SP/Y}$.

Appendix 4-1-1Case study of the **Solow** Model: λ=0.05 as a parameter

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

n	s	α	Ω(0)see Note	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^	A(0) as given	λ as given	IRC under a given λ	Ψ*=Ω(0)/Ω*	**Balanced growth-state** $g^*_y=\lambda/(1-\alpha)$	$g^*_Y=g^*_y+n$
0.01	0.05	0.08	**1.50000**	**11**	0.92	1.211467	**7.333333**	6.053269	**0.032185**	given by from S-K M	1.349516	0.034984	0.044984
time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change :	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_\Omega(t)$	$k^*(t)$, where $\chi=1/(1-\alpha)$
0	11	6.053269	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.500000	---	0.053333	---	$=A(t)^\chi(\Omega^*)^\chi$
1	11.256667	6.251264	7.58718	0.379359	0.112567	0.266793	11.523459	0.023701	1.483642	0.034616	0.053921	-0.010905	infinite
2	11.523459	6.455735	7.85005	0.392502	0.115235	0.277268	11.800727	0.024061	1.467948	0.034646	0.054498	-0.010578	
3	11.800727	6.666893	8.12225	0.406112	0.118007	0.288105	12.088832	0.024414	1.452889	0.034675	0.055063	-0.010258	$\Omega^*=s/(n+g^*_y)$
4	12.088832	6.884959	8.40412	0.420206	0.120888	0.299318	12.388150	0.024760	1.438442	0.034703	0.055616	-0.009944	1.111509
5	12.388150	7.110157	8.69600	0.434800	0.123881	0.310919	12.699068	0.025098	1.424580	0.034731	0.056157	-0.009637	
6	12.699068	7.342721	8.99826	0.449913	0.126991	0.322923	13.021991	0.025429	1.411280	0.034759	0.056686	-0.009336	$A^*=k^*/(\Omega^*k^{*\alpha})$
7	13.021991	7.582892	9.31127	0.465564	0.130220	0.335344	13.357335	0.025752	1.398519	0.034785	0.057203	-0.009042	infinite
8	13.357335	7.830919	9.63541	0.481771	0.133573	0.348197	13.705532	0.026068	1.386275	0.034811	0.057709	-0.008755	
9	13.705532	8.087058	9.97108	0.498554	0.137055	0.361499	14.067031	0.026376	1.374528	0.034837	0.058202	-0.008474	$y^*=A^*k^{*\alpha}$
10	14.067031	8.351575	10.31869	0.515935	0.140670	0.375264	14.442295	0.026677	1.363257	0.034862	0.058683	-0.008200	infinite
11	14.442295	8.624744	10.67867	0.533933	0.144423	0.389510	14.831805	0.026970	1.352443	0.034886	0.059152	-0.007932	
12	14.831805	8.906849	11.05146	0.552573	0.148318	0.404255	15.236060	0.027256	1.342068	0.034910	0.059610	-0.007672	$g^*_Y=s/\Omega^*$
13	15.236060	9.198180	11.43752	0.571876	0.152361	0.419515	15.655575	0.027534	1.332113	0.034933	0.060055	-0.007418	0.044984
14	15.655575	9.499041	11.83732	0.591866	0.156556	0.435310	16.090885	0.027805	1.322561	0.034955	0.060489	-0.007170	
15	16.090885	9.809742	12.25135	0.612568	0.160909	0.451659	16.542544	0.028069	1.313397	0.034977	0.060911	-0.006929	$r^*=\alpha/\Omega^*$
16	16.542544	10.130606	12.68013	0.634006	0.165425	0.468581	17.011125	0.028326	1.304604	0.034998	0.061321	-0.006695	0.071974
17	17.011125	10.461965	13.12417	0.656209	0.170111	0.486097	17.497222	0.028575	1.296168	0.035019	0.061720	-0.006467	
18	17.497222	10.804162	13.58403	0.679202	0.174972	0.504229	18.001452	0.028818	1.288073	0.035039	0.062108	-0.006245	**Note:**
19	18.001452	11.157553	14.06027	0.703013	0.180015	0.522999	18.524450	0.029053	1.280307	0.035059	0.062485	-0.006029	K(t)/Y(t)
20	18.524450	11.522502	14.55347	0.727673	0.185245	0.542429	19.066879	0.029282	1.272855	0.035077	0.062851	-0.005820	$=\Omega(t)$
21	19.066879	11.899388	15.06423	0.753212	0.190669	0.562543	19.629422	0.029504	1.265705	0.035096	0.063206	-0.005617	$=k(t)^{(1-\alpha)} / A(t)$
22	19.629422	12.288602	15.59319	0.779660	0.196294	0.583365	20.212787	0.029719	1.258846	0.035114	0.063550	-0.005420	
23	20.212787	12.690546	16.14100	0.807050	0.202128	0.604922	20.817709	0.029928	1.252264	0.035131	0.063884	-0.005228	A(t)
24	20.817709	13.105637	16.70832	0.835416	0.208177	0.627239	21.444948	0.030130	1.245949	0.035148	0.064208	-0.005043	=$J$3*EXP($K$3*A5)
25	21.444948	13.534306	17.29585	0.864793	0.214449	0.650343	22.095292	0.030326	1.239890	0.035164	0.064522	-0.004863	$=A(0)*EXP(\lambda*t)$
26	22.095292	13.976995	17.90432	0.895216	0.220953	0.674263	22.769555	0.030516	1.234076	0.035180	0.064826	-0.004689	
27	22.769555	14.434165	18.53446	0.926723	0.227696	0.699028	23.468582	0.030700	1.228498	0.035195	0.065120	-0.004520	**$k^*(t)$, where $\chi=1/(1-\alpha)$**
28	23.468582	14.906288	19.18706	0.959353	0.234686	0.724667	24.193249	0.030878	1.223146	0.035210	0.065405	-0.004356	**$=A(t)^\chi(\Omega^*)^\chi$**
29	24.193249	15.393853	19.86291	0.993145	0.241932	0.751213	24.944462	0.031051	1.218011	0.035224	0.065681	-0.004198	**infinite**
30	24.944462	15.897366	20.56284	1.028142	0.249445	0.778697	25.723160	0.031217	1.213084	0.035238	0.065948	-0.004045	**Thus, k^*, y^*, and A^***
31	25.723160	16.417349	21.28771	1.064386	0.257232	0.807154	26.530314	0.031378	1.208357	0.035251	0.066206	-0.003897	**infinite**
32	26.530314	16.954339	22.03841	1.101920	0.265303	0.836617	27.366931	0.031534	1.203822	0.035264	0.066455	-0.003754	
33	27.366931	17.508893	22.81586	1.140793	0.273669	0.867124	28.234055	0.031685	1.199470	0.035277	0.066696	-0.003615	
34	28.234055	18.081587	23.62101	1.181050	0.282341	0.898710	29.132764	0.031831	1.195294	0.035289	0.066929	-0.003481	
35	29.132764	18.673012	24.45484	1.222742	0.291328	0.931415	30.064179	0.031971	1.191288	0.035301	0.067154	-0.003352	

Structure of the elasiticity of substitution, σ (1) For Appendix 4-1-1 Case study of the **Solow** Model: λ=0.05 as a parameter

IRC		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		183.3333		46383		7.33333	**25**	0.01	168.667	6.74667	14.66667	0.05333	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.33333	25.000000	---	168.667	6.74667	14.66667	0.05333	0.00791	---
0.044962	0.033938	191.576	8.243	50114	0.0804	7.58718	25.250000	0.250000	176.250	6.98021	15.32611	0.05390	0.00772	0.00545
0.044992	0.034302	200.196	8.619	54165	0.0808	7.85005	25.502500	0.252500	184.180	7.22204	16.01567	0.05446	0.00754	0.00530
0.045022	0.034658	209.209	9.013	58565	0.0812	8.12225	25.757525	0.255025	192.472	7.47247	16.73672	0.05500	0.00736	0.00515
0.045050	0.035007	218.634	9.425	63346	0.0816	8.40412	26.015100	0.257575	201.143	7.73179	17.49072	0.05554	0.00718	0.00500
0.045079	0.035349	228.490	9.856	68542	0.0820	8.69600	26.275251	0.260151	210.211	8.00032	18.27917	0.05606	0.00701	0.00486
0.045106	0.035683	238.796	10.306	74190	0.0824	8.99826	26.538004	0.262753	219.692	8.27840	19.10368	0.05657	0.00683	0.00472
0.045133	0.036010	249.574	10.778	80330	0.0828	9.31127	26.803384	0.265380	229.608	8.56637	19.96589	0.05707	0.00666	0.00459
0.045160	0.036329	260.844	11.271	87008	0.0831	9.63541	27.071418	0.268034	239.977	8.86458	20.86754	0.05755	0.00649	0.00446
0.045185	0.036640	272.631	11.786	94271	0.0835	9.97108	27.342132	0.270714	250.820	9.17339	21.81045	0.05803	0.00633	0.00433
0.045210	0.036944	284.956	12.326	102174	0.0838	10.31869	27.615553	0.273421	262.160	9.49320	22.79651	0.05849	0.00616	0.00420
0.045235	0.037240	297.846	12.890	110773	0.0842	10.67867	27.891709	0.276156	274.019	9.82438	23.82771	0.05894	0.00600	0.00408
0.045259	0.037529	311.326	13.480	120131	0.0845	11.05146	28.170626	0.278917	286.420	10.16734	24.90612	0.05938	0.00584	0.00396
0.045282	0.037810	325.424	14.098	130319	0.0848	11.43752	28.452332	0.281706	299.390	10.52251	26.03392	0.05981	0.00568	0.00384
0.045305	0.038083	340.167	14.743	141411	0.0851	11.83732	28.736855	0.284523	312.954	10.89033	27.21338	0.06023	0.00553	0.00372
0.045327	0.038350	355.586	15.419	153489	0.0854	12.25135	29.024224	0.287369	327.139	11.27124	28.44688	0.06063	0.00538	0.00361
0.045348	0.038609	371.711	16.125	166645	0.0857	12.68013	29.314466	0.290242	341.974	11.66572	29.73689	0.06102	0.00523	0.00350
0.045369	0.038861	388.575	16.864	180975	0.0860	13.12417	29.607611	0.293145	357.489	12.07424	31.08603	0.06141	0.00509	0.00340
0.045389	0.039106	406.213	17.637	196588	0.0863	13.58403	29.903687	0.296076	373.716	12.49731	32.49701	0.06178	0.00494	0.00329
0.045409	0.039344	424.658	18.446	213600	0.0865	14.06027	30.202724	0.299037	390.686	12.93544	33.97267	0.06214	0.00480	0.00319
0.045428	0.039575	443.950	19.291	232141	0.0868	14.55347	30.504751	0.302027	408.434	13.38919	35.51599	0.06249	0.00467	0.00309
0.045447	0.039799	464.126	20.176	252350	0.0871	15.06423	30.809799	0.305048	426.996	13.85909	37.13008	0.06283	0.00453	0.00300
0.045465	0.040016	485.227	21.101	274380	0.0873	15.59319	31.117896	0.308098	446.409	14.34574	38.81819	0.06316	0.00440	0.00290
0.045482	0.040227	507.297	22.069	298399	0.0875	16.14100	31.429075	0.311179	466.713	14.84972	40.58373	0.06348	0.00427	0.00281
0.045499	0.040431	530.378	23.082	324589	0.0878	16.70832	31.743366	0.314291	487.948	15.37165	42.43026	0.06378	0.00415	0.00273
0.045516	0.040629	554.519	24.141	353152	0.0880	17.29585	32.060800	0.317434	510.157	15.91218	44.36151	0.06408	0.00403	0.00264
0.045532	0.040821	579.767	25.248	384304	0.0882	17.90432	32.381408	0.320608	533.386	16.47197	46.38136	0.06437	0.00391	0.00256
0.045547	0.041007	606.174	26.407	418284	0.0884	18.53446	32.705222	0.323814	557.680	17.05171	48.49390	0.06465	0.00379	0.00248
0.045562	0.041187	633.792	27.618	455355	0.0886	19.18706	33.032274	0.327052	583.089	17.65210	50.70338	0.06493	0.00368	0.00240
0.045576	0.041361	662.678	28.886	495801	0.0888	19.86291	33.362597	0.330323	609.664	18.27388	53.01426	0.06519	0.00357	0.00232
0.045590	0.041529	692.890	30.212	539934	0.0890	20.56284	33.696223	0.333626	637.459	18.91781	55.43120	0.06544	0.00346	0.00225
0.045604	0.041692	724.489	31.599	588095	0.0892	21.28771	34.033185	0.336962	666.530	19.58469	57.95909	0.06569	0.00335	0.00217
0.045617	0.041850	757.538	33.049	640656	0.0894	22.03841	34.373517	0.340332	696.935	20.27534	60.60301	0.06593	0.00325	0.00210
0.045630	0.042002	792.104	34.566	698026	0.0895	22.81586	34.717252	0.343735	728.736	20.99059	63.36831	0.06616	0.00315	0.00204
0.045642	0.042149	828.257	36.153	760649	0.0897	23.62101	35.064425	0.347173	761.996	21.73133	66.26056	0.06638	0.00305	0.00197
0.045654	0.042291	866.070	37.813	829013	0.0899	24.45484	35.415069	0.350644	796.784	22.49846	69.28560	0.06659	0.00296	0.00191

SM given lambda with sig (A4-1)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-1-1 Case study of the **Solow** Model: λ=0.05 as a parameter

IRC K^{U} k^{U} Δk(t)=(kt(1+n)−k(t−1))/n

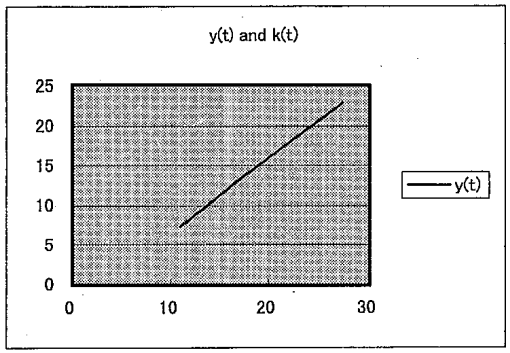
(2) 275.0000 11.00000 using **n** (1) (1)/(2) **MPL** **MPK** Y=wL+rK is confirmed. **APL** **APK**

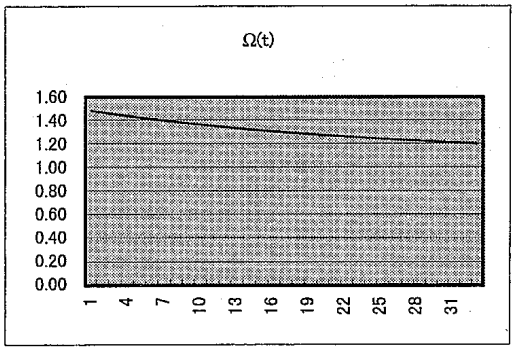
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
---	275.0000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---
0.70531	284.3329	9.3329	11.2607	37.3316	3.31521	4.70037	32.9723	0.8832	191.576	0.22241	0.75481	7.5872	0.6738	0.00000
0.70235	294.0860	9.7531	11.5317	38.6262	3.34958	4.76910	34.1364	0.8838	200.196	0.22226	0.76239	7.8500	0.6807	0.00000
0.69948	304.2785	10.1925	11.8132	39.9668	3.38323	4.83677	35.3422	0.8843	209.209	0.22212	0.76981	8.1222	0.6876	0.00000
0.69670	314.9306	10.6520	12.1057	41.3550	3.41616	4.90334	36.5911	0.8848	218.634	0.22197	0.77707	8.4041	0.6942	0.00000
0.69401	326.0631	11.1325	12.4095	42.7924	3.44836	4.96878	37.8846	0.8853	228.490	0.22183	0.78416	8.6960	0.7008	0.00000
0.69139	337.6980	11.6349	12.7251	44.2810	3.47982	5.03306	39.2244	0.8858	238.796	0.22170	0.79109	8.9983	0.7071	0.00000
0.68886	349.8584	12.1604	13.0528	45.8225	3.51056	5.09615	40.6121	0.8863	249.574	0.22157	0.79785	9.3113	0.7134	0.00000
0.68642	362.5682	12.7098	13.3930	47.4188	3.54056	5.15804	42.0493	0.8868	260.844	0.22144	0.80445	9.6354	0.7194	0.00000
0.68405	375.8527	13.2845	13.7463	49.0719	3.56983	5.21870	43.5379	0.8872	272.631	0.22131	0.81088	9.9711	0.7254	0.00000
0.68175	389.7381	13.8854	14.1130	50.7838	3.59837	5.27812	45.0797	0.8877	284.956	0.22119	0.81715	10.3187	0.7311	0.00000
0.67953	404.2518	14.5138	14.4936	52.5565	3.62618	5.33627	46.6765	0.8881	297.846	0.22107	0.82325	10.6787	0.7368	0.00000
0.67739	419.4228	15.1710	14.8887	54.3924	3.65328	5.39316	48.3304	0.8886	311.326	0.22095	0.82920	11.0515	0.7423	0.00000
0.67532	435.2810	15.8583	15.2986	56.2936	3.67965	5.44878	50.0433	0.8890	325.424	0.22084	0.83498	11.4375	0.7476	0.00000
0.67331	451.8581	16.5770	15.7240	58.2624	3.70532	5.50311	51.8174	0.8894	340.167	0.22073	0.84061	11.8373	0.7528	0.00000
0.67138	469.1868	17.3287	16.1654	60.3014	3.73029	5.55616	53.6548	0.8898	355.586	0.22062	0.84608	12.2514	0.7579	0.00000
0.66951	487.3017	18.1149	16.6232	62.4129	3.75456	5.60793	55.5577	0.8902	371.711	0.22052	0.85139	12.6801	0.7628	0.00000
0.66770	506.2387	18.9370	17.0983	64.5996	3.77814	5.65841	57.5286	0.8905	388.575	0.22041	0.85655	13.1242	0.7676	0.00000
0.66596	526.0356	19.7969	17.5910	66.8642	3.80105	5.70762	59.5699	0.8909	406.213	0.22032	0.86156	13.5840	0.7722	0.00000
0.66428	546.7318	20.6962	18.1021	69.2094	3.82329	5.75555	61.6839	0.8913	424.658	0.22022	0.86643	14.0603	0.7767	0.00000
0.66265	568.3684	21.6367	18.6321	71.6382	3.84487	5.80223	63.8733	0.8916	443.950	0.22013	0.87114	14.5535	0.7811	0.00000
0.66109	590.9888	22.6203	19.1818	74.1535	3.86581	5.84765	66.1409	0.8919	464.126	0.22004	0.87572	15.0642	0.7853	0.00000
0.65958	614.6378	23.6491	19.7519	76.7583	3.88612	5.89183	68.4893	0.8923	485.227	0.21995	0.88015	15.5932	0.7895	0.00000
0.65812	639.3629	24.7250	20.3430	79.4559	3.90581	5.93478	70.9215	0.8926	507.297	0.21987	0.88445	16.1410	0.7934	0.00000
0.65672	665.2132	25.8503	20.9560	82.2497	3.92488	5.97652	73.4404	0.8929	530.378	0.21978	0.88861	16.7083	0.7973	0.00000
0.65536	692.2404	27.0272	21.5915	85.1429	3.94336	6.01706	76.0492	0.8932	554.519	0.21970	0.89265	17.2959	0.8010	0.00000
0.65406	720.4986	28.2582	22.2504	88.1393	3.96125	6.05642	78.7509	0.8935	579.767	0.21963	0.89655	17.9043	0.8047	0.00000
0.65280	750.0441	29.5456	22.9335	91.2424	3.97857	6.09462	81.5490	0.8938	606.174	0.21955	0.90032	18.5345	0.8082	0.00000
0.65159	780.9362	30.8920	23.6416	94.4560	3.99533	6.13168	84.4468	0.8940	633.792	0.21948	0.90398	19.1871	0.8116	0.00000
0.65042	813.2365	32.3003	24.3757	97.7841	4.01154	6.16761	87.4478	0.8943	662.678	0.21941	0.90751	19.8629	0.8149	0.00000
0.64930	847.0097	33.7732	25.1366	101.2308	4.02722	6.20244	90.5559	0.8945	692.890	0.21934	0.91092	20.5628	0.8180	0.00000
0.64821	882.3235	35.3138	25.9254	104.8004	4.04238	6.23619	93.7747	0.8948	724.489	0.21928	0.91422	21.2877	0.8211	0.00000
0.64717	919.2485	36.9250	26.7429	108.4971	4.05704	6.26888	97.1083	0.8950	757.538	0.21922	0.91741	22.0384	0.8241	0.00000
0.64617	957.8587	38.6102	27.5903	112.3255	4.07120	6.30053	100.5606	0.8953	792.104	0.21916	0.92050	22.8159	0.8270	0.00000
0.64520	998.2315	40.3728	28.4685	116.2903	4.08488	6.33117	104.1359	0.8955	828.257	0.21910	0.92347	23.6210	0.8297	0.00000
0.64427	1040.4478	42.2163	29.3787	120.3964	4.09809	6.36082	107.8387	0.8957	866.070	0.21904	0.92634	24.4548	0.8324	0.00000

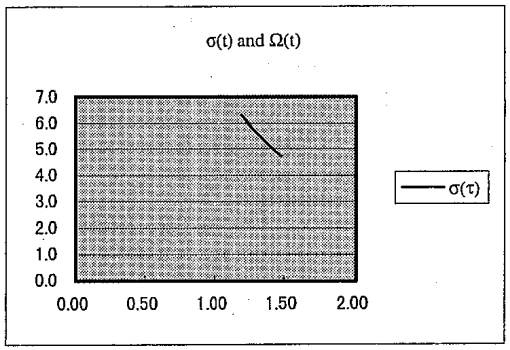
Figure A4-1-1 Solow M with given lambda For Appendix 4-1-1 Case study of the **Solow** Model: λ=0.05 as a parameter

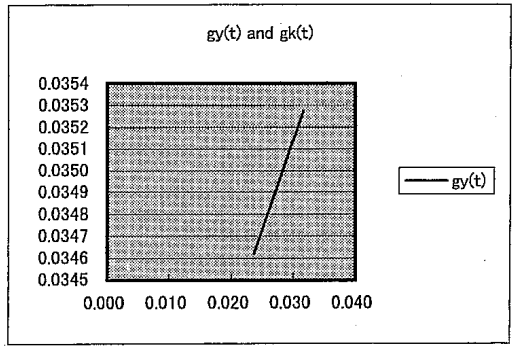
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	1.5	11	0	0		1.349516

k(t)	y(t)	Ω(t)	σ(t)	gk(t)	gy(t)
11.000000	7.333333	1.483642	4.700371	0.023701	0.034616
11.256667	7.587184	1.467948	4.769102	0.024061	0.034646
11.523459	7.850048	1.452889	4.836770	0.024414	0.034675
12.088832	8.404117	1.438442	4.903340	0.024760	0.034703
12.388150	8.696003	1.424580	4.968780	0.025098	0.034731
12.699068	8.998265	1.411280	5.033060	0.025429	0.034759
13.021991	9.311273	1.398519	5.096155	0.025752	0.034785
13.357335	9.635412	1.386275	5.158041	0.026068	0.034811
13.705532	9.971080	1.374528	5.218701	0.026376	0.034837
14.067031	10.318690	1.363257	5.278116	0.026677	0.034862
14.442295	10.678669	1.352443	5.336274	0.026970	0.034886
14.831805	11.051458	1.342068	5.393164	0.027256	0.034910
15.236060	11.437516	1.332113	5.448778	0.027534	0.034933
15.655575	11.837317	1.322561	5.503111	0.027805	0.034955
16.090885	12.251351	1.313397	5.556161	0.028069	0.034977
16.542544	12.680127	1.304604	5.607927	0.028326	0.034998
17.011125	13.124172	1.296168	5.658411	0.028575	0.035019
17.497222	13.584030	1.288073	5.707618	0.028818	0.035039
18.001452	14.060266	1.280307	5.755554	0.029053	0.035059
18.524450	14.553465	1.272855	5.802227	0.029282	0.035077
19.066879	15.064232	1.265705	5.847647	0.029504	0.035096
19.629422	15.593193	1.258846	5.891827	0.029719	0.035114
20.212787	16.140999	1.252264	5.934779	0.029928	0.035131
20.817709	16.708320	1.245949	5.976518	0.030130	0.035148
21.444948	17.295853	1.239890	6.017059	0.030326	0.035164
22.095292	17.904319	1.234076	6.056421	0.030516	0.035180
22.769555	18.534464	1.228498	6.094620	0.030700	0.035195
23.468582	19.187061	1.223146	6.131676	0.030878	0.035210
24.193249	19.862910	1.218011	6.167610	0.031051	0.035224
24.944462	20.562841	1.213084	6.202441	0.031217	0.035238
25.723160	21.287711	1.208357	6.236190	0.031378	0.035251
26.530314	22.038409	1.203822	6.268880	0.031534	0.035264
27.366931	22.815857	1.199470	6.300533	0.031685	0.035277









IRC

SM given lambda with sig (A4-1)

Appendix 4-1-2 Case study of the **Solow** Model: λ=0.041025 as a parameter

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

n	s	α	Ω(0)see Note	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^ A(0) as given	λ as given	CRC under a given λ	Ψ*=Ω(0)/Ω*	**Balanced growth-state** $g^*_y=\lambda/(1-\alpha)$	$g^*_Y=g^*_y+n$
0.01	0.05	0.08	0.90799	11	0.92	1.211467	12.114665	**10**	**0.041025**		0.991387	0.044592	0.054592
time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_\Omega(t)$	$k^*(t)$, where $\chi=1/(1-\alpha)$
0	11	10	12.11467	0.605733	0.11	0.495733	11.495733	0.045067	0.907990	---	0.088107	---	$=A(t)^\chi(\Omega^*)^\chi$
1	11.495733	10.418782	12.66659	0.633330	0.114957	0.518372	12.014106	0.045093	0.907563	0.045559	0.088148	-0.000471	infinite
2	12.014106	10.855101	13.24370	0.662185	0.120141	0.542044	12.556149	0.045117	0.907157	0.045561	0.088188	-0.000448	
3	12.556149	11.309692	13.84712	0.692356	0.125561	0.566794	13.122944	0.045141	0.906770	0.045563	0.088225	-0.000426	**$\Omega^*=s/(n+g^*_y)$**
4	13.122944	11.783321	14.47806	0.723903	0.131229	0.592673	13.715617	0.045163	0.906402	0.045565	0.088261	-0.000405	0.915879
5	13.715617	12.276785	15.13777	0.756888	0.137156	0.619732	14.335349	0.045184	0.906053	0.045566	0.088295	-0.000386	
6	14.335349	12.790914	15.82757	0.791379	0.143353	0.648025	14.983374	0.045205	0.905720	0.045568	0.088328	-0.000367	$A^*=k^*/(\Omega^*k^{*\wedge}\alpha)$
7	14.983374	13.326574	16.54883	0.827441	0.149834	0.677608	15.660982	0.045224	0.905404	0.045570	0.088358	-0.000349	infinite
8	15.660982	13.884666	17.30298	0.865149	0.156610	0.708539	16.369521	0.045242	0.905103	0.045571	0.088388	-0.000332	
9	16.369521	14.466131	18.09153	0.904576	0.163695	0.740881	17.110403	0.045260	0.904817	0.045573	0.088416	-0.000316	$y^*=A^*k^{*\wedge}\alpha$
10	17.110403	15.071945	18.91604	0.945802	0.171104	0.774698	17.885100	0.045276	0.904545	0.045574	0.088442	-0.000301	infinite
11	17.885100	15.703131	19.77814	0.988907	0.178851	0.810056	18.695157	0.045292	0.904286	0.045576	0.088468	-0.000286	
12	18.695157	16.360749	20.67957	1.033978	0.186952	0.847027	19.542183	0.045307	0.904040	0.045577	0.088492	-0.000272	**$g^*_Y=s/\Omega^*$**
13	19.542183	17.045907	21.62210	1.081105	0.195422	0.885683	20.427867	0.045322	0.903806	0.045578	0.088515	-0.000259	0.054592
14	20.427867	17.759758	22.60762	1.130381	0.204279	0.926102	21.353969	0.045335	0.903583	0.045579	0.088536	-0.000246	
15	21.353969	18.503504	23.63808	1.181904	0.213540	0.968364	22.322334	0.045348	0.903371	0.045580	0.088557	-0.000234	$r^*=\alpha/\Omega^*$
16	22.322334	19.278396	24.71554	1.235777	0.223223	1.012554	23.334887	0.045361	0.903170	0.045581	0.088577	-0.000223	0.087348
17	23.334887	20.085740	25.84213	1.292106	0.233349	1.058758	24.393645	0.045372	0.902979	0.045582	0.088596	-0.000212	
18	24.393645	20.926893	27.02010	1.351005	0.243936	1.107068	25.500713	0.045383	0.902796	0.045583	0.088614	-0.000202	**Note:**
19	25.500713	21.803273	28.25178	1.412589	0.255007	1.157582	26.658295	0.045394	0.902623	0.045584	0.088631	-0.000192	K(t)/Y(t)
20	26.658295	22.716354	29.53964	1.476982	0.266583	1.210399	27.868694	0.045404	0.902458	0.045585	0.088647	-0.000183	=Ω(t)
21	27.868694	23.667673	30.88623	1.544311	0.278687	1.265624	29.134319	0.045414	0.902302	0.045586	0.088662	-0.000174	=k(t) ^ (1-α) / A(t)
22	29.134319	24.658831	32.29423	1.614711	0.291343	1.323368	30.457687	0.045423	0.902153	0.045587	0.088677	-0.000165	
23	30.457687	25.691497	33.76643	1.688322	0.304577	1.383745	31.841432	0.045432	0.902011	0.045587	0.088691	-0.000157	A(t)
24	31.841432	26.767410	35.30578	1.765289	0.318414	1.446874	33.288306	0.045440	0.901876	0.045588	0.088704	-0.000149	=$J$3*EXP($K$3*A5)
25	33.288306	27.888379	36.91532	1.845766	0.332883	1.512883	34.801189	0.045448	0.901748	0.045589	0.088717	-0.000142	=A(0)*EXP(λ*t)
26	34.801189	29.056293	38.59826	1.929913	0.348012	1.581901	36.383090	0.045455	0.901626	0.045589	0.088729	-0.000135	
27	36.383090	30.273117	40.35795	2.017898	0.363831	1.654067	38.037157	0.045463	0.901510	0.045590	0.088740	-0.000129	**$k^*(t)$, where $\chi=1/(1-\alpha)$**
28	38.037157	31.540899	42.19789	2.109894	0.380372	1.729523	39.766680	0.045469	0.901400	0.045590	0.088751	-0.000122	$=A(t)^\chi(\Omega^*)^\chi$
29	39.766680	32.861774	44.12173	2.206087	0.397667	1.808420	41.575099	0.045476	0.901295	0.045591	0.088761	-0.000116	**infinite**
30	41.575099	34.237964	46.13331	2.306665	0.415751	1.890914	43.466014	0.045482	0.901195	0.045592	0.088771	-0.000111	**Thus, k^*, y^*, and A^***
31	43.466014	35.671787	48.23662	2.411831	0.434660	1.977171	45.443185	0.045488	0.901100	0.045592	0.088780	-0.000105	**infinite**
32	45.443185	37.165655	50.43584	2.521792	0.454432	2.067360	47.510545	0.045493	0.901010	0.045592	0.088789	-0.000100	
33	47.510545	38.722084	52.73536	2.636768	0.475105	2.161663	49.672208	0.045499	0.900924	0.045593	0.088798	-0.000095	
34	49.672208	40.343694	55.13974	2.756987	0.496722	2.260265	51.932473	0.045504	0.900842	0.045593	0.088806	-0.000091	
35	51.932473	42.033213	57.65377	2.882688	0.519325	2.363364	54.295836	0.045508	0.900765	0.045594	0.088813	-0.000086	

Structure of the elasiticity of substitution, σ (2) For Appendix 4-1-2 Case study of the **Solow** Model: λ=0.041025 as a parameter

CRC		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		302.8666		76625		12.11467	**25**	0.01	278.637	11.14549	24.22933	0.08811	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	302.867	---	76625	---	12.11467	25.000000	---	278.637	11.14549	24.22933	0.08811	0.00791	---
0.056014	0.055544	319.832	16.965	85412	0.1147	12.66659	25.250000	0.250000	294.245	11.65327	25.58652	0.08815	0.00756	0.00459
0.056016	0.055568	337.747	17.916	95208	0.1147	13.24370	25.502500	0.252500	310.728	12.18420	27.01979	0.08818	0.00724	0.00439
0.056018	0.055592	356.667	18.920	106131	0.1147	13.84712	25.757525	0.255025	328.134	12.73935	28.53339	0.08822	0.00692	0.00420
0.056020	0.055615	376.648	19.981	118310	0.1148	14.47806	26.015100	0.257575	346.516	13.31981	30.13184	0.08825	0.00663	0.00402
0.056022	0.055636	397.749	21.101	131889	0.1148	15.13777	26.275251	0.260151	365.929	13.92675	31.81990	0.08829	0.00634	0.00384
0.056024	0.055657	420.032	22.283	147029	0.1148	15.82757	26.538004	0.262753	386.430	14.56136	33.60257	0.08832	0.00607	0.00368
0.056026	0.055676	443.565	23.533	163911	0.1148	16.54883	26.803384	0.265380	408.079	15.22492	35.48517	0.08835	0.00580	0.00352
0.056027	0.055695	468.416	24.852	182735	0.1148	17.30298	27.071418	0.268034	430.943	15.91874	37.47330	0.08837	0.00555	0.00336
0.056029	0.055712	494.661	26.245	203725	0.1149	18.09153	27.342132	0.270714	455.088	16.64421	39.57288	0.08840	0.00531	0.00322
0.056030	0.055729	522.377	27.716	227129	0.1149	18.91604	27.615553	0.273421	480.587	17.40275	41.79014	0.08842	0.00508	0.00308
0.056031	0.055745	551.646	29.269	253226	0.1149	19.77814	27.891709	0.276156	507.515	18.19589	44.13170	0.08845	0.00486	0.00294
0.056033	0.055760	582.556	30.910	282326	0.1149	20.67957	28.170626	0.278917	535.952	19.02520	46.60451	0.08847	0.00465	0.00282
0.056034	0.055775	615.199	32.643	314775	0.1149	21.62210	28.452332	0.281706	565.983	19.89234	49.21594	0.08849	0.00445	0.00269
0.056035	0.055789	649.672	34.473	350959	0.1149	22.60762	28.736855	0.284523	597.698	20.79901	51.97376	0.08851	0.00426	0.00258
0.056036	0.055802	686.077	36.405	391306	0.1150	23.63808	29.024224	0.287369	631.191	21.74704	54.88616	0.08853	0.00407	0.00247
0.056037	0.055814	724.523	38.446	436298	0.1150	24.71554	29.314466	0.290242	666.561	22.73829	57.96182	0.08855	0.00389	0.00236
0.056038	0.055826	765.124	40.601	486469	0.1150	25.84213	29.607611	0.293145	703.914	23.77476	61.20990	0.08857	0.00373	0.00226
0.056039	0.055837	808.001	42.877	542416	0.1150	27.02010	29.903687	0.296076	743.360	24.85849	64.64004	0.08859	0.00356	0.00216
0.056040	0.055848	853.281	45.280	604804	0.1150	28.25178	30.202724	0.299037	785.018	25.99164	68.26247	0.08860	0.00341	0.00206
0.056041	0.055858	901.099	47.819	674374	0.1150	29.53964	30.504751	0.302027	829.011	27.17647	72.08795	0.08862	0.00326	0.00197
0.056042	0.055868	951.598	50.499	751954	0.1150	30.88623	30.809799	0.305048	875.471	28.41533	76.12788	0.08863	0.00312	0.00189
0.056042	0.055877	1004.928	53.330	838467	0.1151	32.29423	31.117896	0.308098	924.534	29.71069	80.39427	0.08865	0.00298	0.00181
0.056043	0.055886	1061.248	56.319	934942	0.1151	33.76643	31.429075	0.311179	976.348	31.06512	84.89982	0.08866	0.00285	0.00173
0.056044	0.055894	1120.724	59.476	1042527	0.1151	35.30578	31.743366	0.314291	1031.066	32.48131	89.65793	0.08867	0.00273	0.00165
0.056045	0.055902	1183.535	62.810	1162501	0.1151	36.91532	32.060800	0.317434	1088.852	33.96209	94.68277	0.08868	0.00261	0.00158
0.056045	0.055910	1249.866	66.331	1296291	0.1151	38.59826	32.381408	0.320608	1149.877	35.51040	99.98928	0.08870	0.00250	0.00151
0.056046	0.055917	1319.916	70.050	1445490	0.1151	40.35795	32.705222	0.323814	1214.322	37.12931	105.59326	0.08871	0.00239	0.00145
0.056046	0.055924	1393.892	73.976	1611873	0.1151	42.19789	33.032274	0.327052	1282.381	38.82206	111.51138	0.08872	0.00229	0.00138
0.056047	0.055931	1472.016	78.123	1797419	0.1151	44.12173	33.362597	0.330323	1354.254	40.59199	117.76124	0.08873	0.00219	0.00132
0.056047	0.055937	1554.518	82.503	2004337	0.1151	46.13331	33.696223	0.333626	1430.157	42.44264	124.36146	0.08874	0.00209	0.00126
0.056048	0.055943	1641.646	87.128	2235088	0.1151	48.23662	34.033185	0.336962	1510.314	44.37769	131.33166	0.08874	0.00200	0.00121
0.056048	0.055948	1733.657	92.012	2492419	0.1151	50.43584	34.373517	0.340332	1594.965	46.40098	138.69259	0.08875	0.00191	0.00116
0.056049	0.055954	1830.827	97.169	2779393	0.1151	52.73536	34.717252	0.343735	1684.361	48.51653	146.46615	0.08876	0.00183	0.00111
0.056049	0.055959	1933.443	102.617	3099424	0.1151	55.13974	35.064425	0.347173	1778.768	50.72856	154.67547	0.08877	0.00175	0.00106
0.056050	0.055963	2041.812	108.369	3456322	0.1151	57.65377	35.415069	0.350644	1878.467	53.04147	163.34498	0.08878	0.00167	0.00101

SM given lambda with sig (A4-1)

Structure of the elasiticity of substitution, σ (2) For Appendix 4-1-2 Case study of the **Solow** Model: λ=0.041025 as a parameter

CRC K^{υ} k^{υ} Δk(t)=(kt(1+n)−k(t−1))/n

(2)	275.0000		11.00000	using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
---	275.0000	---	11.0000	---	---	---	---	---	302.867	---	---	---	---	---
0.60676	290.2745	15.2745	11.4960	61.0979	5.31470	8.75916	67.8595	1.1107	319.832	0.17853	0.99159	12.6666	1.1018	0.04103
0.60664	306.4046	16.1301	12.0147	63.8816	5.31696	8.76458	70.9538	1.1107	337.747	0.17852	0.99200	13.2437	1.1023	0.04103
0.60653	323.4383	17.0337	12.5570	66.7923	5.31911	8.76974	74.1891	1.1107	356.667	0.17851	0.99239	13.8471	1.1027	0.04103
0.60642	341.4262	17.9879	13.1242	69.8357	5.32116	8.77465	77.5720	1.1108	376.648	0.17851	0.99276	14.4781	1.1032	0.04103
0.60632	360.4219	18.9957	13.7172	73.0179	5.32311	8.77933	81.1092	1.1108	397.749	0.17850	0.99311	15.1378	1.1036	0.04103
0.60623	380.4818	20.0599	14.3372	76.3453	5.32496	8.78378	84.8077	1.1108	420.032	0.17850	0.99345	15.8276	1.1039	0.04103
0.60614	401.6656	21.1838	14.9856	79.8243	5.32673	8.78802	88.6748	1.1109	443.565	0.17849	0.99377	16.5488	1.1043	0.04103
0.60605	424.0363	22.3707	15.6636	83.4621	5.32841	8.79205	92.7183	1.1109	468.416	0.17849	0.99407	17.3030	1.1047	0.04103
0.60597	447.6603	23.6241	16.3725	87.2657	5.33000	8.79589	96.9461	1.1109	494.661	0.17848	0.99436	18.0915	1.1050	0.04103
0.60589	472.6081	24.9477	17.1138	91.2429	5.33153	8.79955	101.3668	1.1110	522.377	0.17848	0.99463	18.9160	1.1053	0.04103
0.60581	498.9537	26.3456	17.8890	95.4014	5.33297	8.80302	105.9890	1.1110	551.646	0.17847	0.99489	19.7781	1.1056	0.04103
0.60574	526.7755	27.8218	18.6995	99.7495	5.33435	8.80634	110.8221	1.1110	582.556	0.17847	0.99514	20.6796	1.1059	0.04103
0.60567	556.1563	29.3808	19.5470	104.2959	5.33566	8.80949	115.8755	1.1110	615.199	0.17846	0.99538	21.6221	1.1062	0.04103
0.60561	587.1835	31.0272	20.4331	109.0497	5.33691	8.81248	121.1594	1.1110	649.672	0.17846	0.99560	22.6076	1.1064	0.04103
0.60555	619.9494	32.7658	21.3597	114.0203	5.33810	8.81534	126.6842	1.1111	686.077	0.17846	0.99582	23.6381	1.1067	0.04103
0.60549	654.5513	34.6020	22.3286	119.2175	5.33923	8.81805	132.4610	1.1111	724.523	0.17845	0.99602	24.7155	1.1069	0.04103
0.60543	691.0923	36.5410	23.3417	124.6518	5.34030	8.82064	138.5012	1.1111	765.124	0.17845	0.99622	25.8421	1.1071	0.04103
0.60538	729.6811	38.5887	24.4010	130.3338	5.34132	8.82309	144.8169	1.1111	808.001	0.17845	0.99640	27.0201	1.1073	0.04103
0.60533	770.4323	40.7513	25.5087	136.2750	5.34230	8.82543	151.4205	1.1111	853.281	0.17844	0.99658	28.2518	1.1075	0.04103
0.60528	813.4673	43.0350	26.6669	142.4872	5.34322	8.82766	158.3253	1.1112	901.099	0.17844	0.99674	29.5396	1.1077	0.04103
0.60524	858.9141	45.4468	27.8780	148.9826	5.34410	8.82978	165.5450	1.1112	951.598	0.17844	0.99690	30.8862	1.1079	0.04103
0.60519	906.9078	47.9937	29.1443	155.7743	5.34494	8.83179	173.0939	1.1112	1004.928	0.17844	0.99705	32.2942	1.1081	0.04103
0.60515	957.5913	50.6835	30.4683	162.8756	5.34574	8.83371	180.9871	1.1112	1061.248	0.17843	0.99720	33.7664	1.1082	0.04103
0.60511	1011.1153	53.5240	31.8528	170.3009	5.34649	8.83554	189.2401	1.1112	1120.724	0.17843	0.99733	35.3058	1.1084	0.04103
0.60508	1067.6390	56.5237	33.3004	178.0647	5.34722	8.83727	197.8696	1.1112	1183.535	0.17843	0.99746	36.9153	1.1086	0.04103
0.60504	1127.3307	59.6916	34.8141	186.1826	5.34790	8.83892	206.8925	1.1112	1249.866	0.17843	0.99759	38.5983	1.1087	0.04103
0.60501	1190.3678	63.0371	36.3969	194.6707	5.34855	8.84049	216.3270	1.1112	1319.916	0.17843	0.99770	40.3580	1.1088	0.04103
0.60497	1256.9379	66.5701	38.0518	203.5458	5.34918	8.84199	226.1916	1.1113	1393.892	0.17842	0.99782	42.1979	1.1090	0.04103
0.60494	1327.2391	70.3012	39.7822	212.8257	5.34977	8.84341	236.5061	1.1113	1472.016	0.17842	0.99792	44.1217	1.1091	0.04103
0.60491	1401.4804	74.2414	41.5916	222.5288	5.35033	8.84476	247.2909	1.1113	1554.518	0.17842	0.99802	46.1333	1.1092	0.04103
0.60489	1479.8829	78.4025	43.4835	232.6744	5.35086	8.84605	258.5676	1.1113	1641.646	0.17842	0.99812	48.2366	1.1093	0.04103
0.60486	1562.6798	82.7968	45.4617	243.2826	5.35137	8.84727	270.3585	1.1113	1733.657	0.17842	0.99821	50.4358	1.1094	0.04103
0.60484	1650.1173	87.4375	47.5302	254.3747	5.35186	8.84844	282.6871	1.1113	1830.827	0.17842	0.99830	52.7354	1.1095	0.04103
0.60481	1742.4556	92.3383	49.6930	265.9725	5.35232	8.84955	295.5779	1.1113	1933.443	0.17841	0.99838	55.1397	1.1096	0.04103
0.60479	1839.9695	97.5139	51.9544	278.0992	5.35275	8.85060	309.0565	1.1113	2041.812	0.17841	0.99846	57.6538	1.1097	0.04103

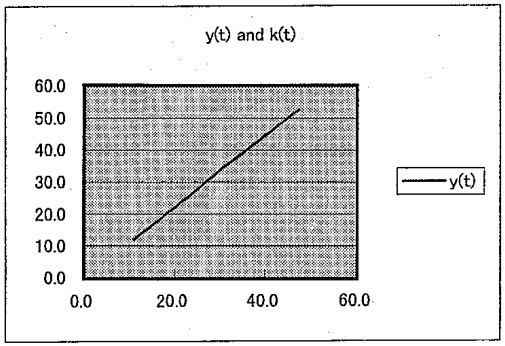
Figure A4-1-2 Solow M with given lambda

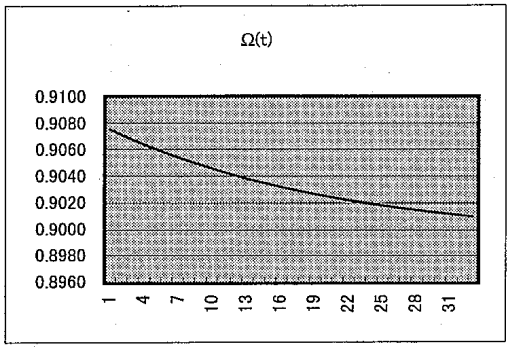
For Appendix 4-1-2 Case study of the **Solow** Model: λ=0.041025 as a parameter

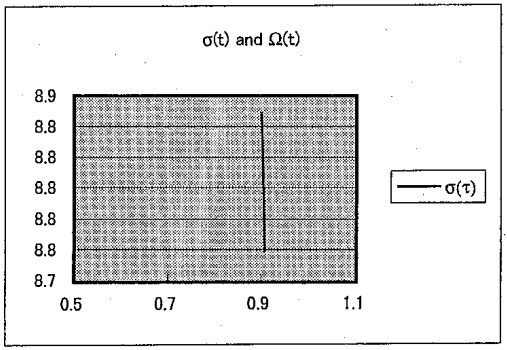
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	0.9079904	11	**10**	**0.041025**			0.991387

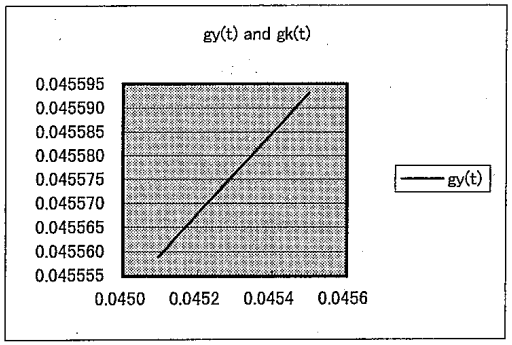
k(t)	y(t)	Ω(t)	σ(t)	gk(t)	gy(t)
11.000000	12.114665				
11.495733	12.666594	0.907563	8.759158	0.045093	0.045559
12.014106	13.243695	0.907157	8.764577	0.045117	0.045561
12.556149	13.847115	0.906770	8.769738	0.045141	0.045563
13.122944	14.478055	0.906402	8.774651	0.045163	0.045565
13.715617	15.137769	0.906053	8.779328	0.045184	0.045566
14.335349	15.827570	0.905720	8.783780	0.045205	0.045568
14.983374	16.548830	0.905404	8.788018	0.045224	0.045570
15.660982	17.302982	0.905103	8.792052	0.045242	0.045571
16.369521	18.091528	0.904817	8.795892	0.045260	0.045573
17.110403	18.916036	0.904545	8.799547	0.045276	0.045574
17.885100	19.778145	0.904286	8.803025	0.045292	0.045576
18.695157	20.679570	0.904040	8.806335	0.045307	0.045577
19.542183	21.622104	0.903806	8.809486	0.045322	0.045578
20.427867	22.607622	0.903583	8.812484	0.045335	0.045579
21.353969	23.638083	0.903371	8.815337	0.045348	0.045580
22.322334	24.715538	0.903170	8.818053	0.045361	0.045581
23.334887	25.842129	0.902979	8.820636	0.045372	0.045582
24.393645	27.020097	0.902796	8.823095	0.045383	0.045583
25.500713	28.251784	0.902623	8.825434	0.045394	0.045584
26.658295	29.539641	0.902458	8.827660	0.045404	0.045585
27.868694	30.886229	0.902302	8.829778	0.045414	0.045586
29.134319	32.294226	0.902153	8.831793	0.045423	0.045587
30.457687	33.766432	0.902011	8.833711	0.045432	0.045587
31.841432	35.305775	0.901876	8.835535	0.045440	0.045588
33.288306	36.915318	0.901748	8.837271	0.045448	0.045589
34.801189	38.598261	0.901626	8.838922	0.045455	0.045589
36.383090	40.357951	0.901510	8.840493	0.045463	0.045590
38.037157	42.197888	0.901400	8.841987	0.045469	0.045590
39.766680	44.121732	0.901295	8.843409	0.045476	0.045591
41.575099	46.133308	0.901195	8.844762	0.045482	0.045592
43.466014	48.236618	0.901100	8.846049	0.045488	0.045592
45.443185	50.435844	0.901010	8.847273	0.045493	0.045592
47.510545	52.735362	0.900924	8.848438	0.045499	0.045593
49.672208	55.139743	0.900842	8.849545	0.045504	0.045593
51.932473	57.653770	0.900765	8.850599	0.045508	0.045594

CRC









Appendix 4-1-3 Case study of the **Solow** Model: λ= - 0.01 as a parameter

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

Balanced growth-state

n	s	α	Ω(0)see Note	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^ A(0) as given	λ as given	DRC under a given λ	Ψ*=Ω(0)/Ω*	g^*_y=λ/(1-α)	g^*_Y=g^*_y+n
0.01	0.05	0.08	0.90799	11	0.92	1.211467	12.114665	**10**	**-0.01**		-0.015791	-0.010870 -0.000870

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change :	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	gΩ(t)	k*(t), where χ=1/(1-α)
													=A(t)^χ(Ω*)^χ
0	11	10	12.11467	0.6057333	0.11	0.495733	11.495733	0.045067	0.907990	---	0.088107	---	
1	11.495733	9.900498	12.03649	0.601825	0.114957	0.486867	11.982601	0.042352	0.955073	-0.006453	0.083763	0.051854	infinite
2	11.982601	9.801987	11.95634	0.597817	0.119826	0.477991	12.460592	0.039890	1.002197	-0.006659	0.079825	0.049340	
3	12.460592	9.704455	11.87447	0.593724	0.124606	0.469118	12.929709	0.037648	1.049360	-0.006847	0.076237	0.047060	**Ω*=s/(n+g^*_y)**
4	12.929709	9.607894	11.79113	0.589556	0.129297	0.460259	13.389968	0.035597	1.096563	-0.007019	0.072955	0.044983	-57.5
5	13.389968	9.512294	11.70652	0.585326	0.133900	0.451426	13.841394	0.033714	1.143805	-0.007176	0.069942	0.043082	
6	13.841394	9.417645	11.62082	0.581041	0.138414	0.442627	14.284021	0.031978	1.191086	-0.007320	0.067166	0.041337	A*=k*/(Ω*k*^α)
7	14.284021	9.323938	11.53420	0.576710	0.142840	0.433870	14.717891	0.030374	1.238406	-0.007454	0.064599	0.039728	infinite
8	14.717891	9.231163	11.44680	0.572340	0.147179	0.425161	15.143052	0.028887	1.285765	-0.007577	0.062220	0.038242	
9	15.143052	9.139312	11.35875	0.567938	0.151431	0.416507	15.559559	0.027505	1.333162	-0.007692	0.060008	0.036863	y*=A*k*^α
10	15.559559	9.048374	11.27017	0.563508	0.155596	0.407913	15.967472	0.026216	1.380597	-0.007799	0.057946	0.035581	infinite
11	15.967472	8.958341	11.18115	0.559058	0.159675	0.399383	16.366855	0.025012	1.428071	-0.007898	0.056020	0.034386	
12	16.366855	8.869204	11.09180	0.554590	0.163669	0.390921	16.757776	0.023885	1.475582	-0.007992	0.054216	0.033270	**g^*_Y=s/Ω***
13	16.757776	8.780954	11.00219	0.550109	0.167578	0.382532	17.140308	0.022827	1.523131	-0.008079	0.052523	0.032224	(0.000870)
14	17.140308	8.693582	10.91240	0.545620	0.171403	0.374217	17.514525	0.021833	1.570718	-0.008161	0.050932	0.031243	
15	17.514525	8.607080	10.82250	0.541125	0.175145	0.365980	17.880504	0.020896	1.618343	-0.008238	0.049433	0.030320	r*=α/Ω*
16	17.880504	8.521438	10.73256	0.536628	0.178805	0.357823	18.238327	0.020012	1.666006	-0.008311	0.048019	0.029451	(0.001391)
17	18.238327	8.436648	10.64262	0.532131	0.182383	0.349748	18.588075	0.019177	1.713706	-0.008380	0.046682	0.028631	
18	18.588075	8.352702	10.55275	0.527638	0.185881	0.341757	18.929832	0.018386	1.761443	-0.008445	0.045417	0.027856	**Note:**
19	18.929832	8.269591	10.46299	0.523149	0.189298	0.333851	19.263683	0.017636	1.809218	-0.008506	0.044218	0.027123	K(t)/Y(t)
20	19.263683	8.187308	10.37338	0.518669	0.192637	0.326032	19.589715	0.016925	1.857031	-0.008565	0.043080	0.026427	=Ω(t)
21	19.589715	8.105842	10.28396	0.514198	0.195897	0.318301	19.908016	0.016248	1.904880	-0.008620	0.041997	0.025767	=k(t) ^ (1-α) / A(t)
22	19.908016	8.025188	10.19477	0.509739	0.199080	0.310658	20.218675	0.015605	1.952767	-0.008673	0.040967	0.025139	
23	20.218675	7.945336	10.10584	0.505292	0.202187	0.303105	20.521780	0.014991	2.000692	-0.008723	0.039986	0.024542	A(t)
24	20.521780	7.866279	10.01720	0.500860	0.205218	0.295642	20.817422	0.014406	2.048653	-0.008771	0.039050	0.023973	=$J$3*EXP($K$3*A5)
25	20.817422	7.788008	9.92889	0.496444	0.208174	0.288270	21.105693	0.013848	2.096652	-0.008817	0.038156	0.023429	=A(0)*EXP(λ*t)
26	21.105693	7.710516	9.84091	0.492046	0.211057	0.280989	21.386681	0.013313	2.144688	-0.008860	0.037301	0.022911	
27	21.386681	7.633795	9.75331	0.487665	0.213867	0.273799	21.660480	0.012802	2.192762	-0.008902	0.036484	0.022415	**k*(t), where χ=1/(1-α)**
28	21.660480	7.557837	9.66609	0.483305	0.216605	0.266700	21.927180	0.012313	2.240872	-0.008942	0.035700	0.021941	**=A(t)^χ(Ω*)^χ**
29	21.927180	7.482636	9.57929	0.478964	0.219272	0.259693	22.186872	0.011843	2.289020	-0.008980	0.034949	0.021486	**infinite**
30	22.186872	7.408182	9.49291	0.474645	0.221869	0.252777	22.439649	0.011393	2.337205	-0.009017	0.034229	0.021050	**Thus, k*, y*, and A***
31	22.439649	7.334470	9.40698	0.470349	0.224396	0.245952	22.685601	0.010961	2.385427	-0.009052	0.033537	0.020632	**infinite**
32	22.685601	7.261490	9.32150	0.466075	0.226856	0.239219	22.924820	0.010545	2.433686	-0.009086	0.032872	0.020231	
33	22.924820	7.189237	9.23650	0.461825	0.229248	0.232577	23.157397	0.010145	2.481982	-0.009119	0.032232	0.019845	
34	23.157397	7.117703	9.15198	0.457599	0.231574	0.226025	23.383422	0.009760	2.530316	-0.009150	0.031617	0.019474	
35	23.383422	7.046881	9.06796	0.453398	0.233834	0.219564	23.602986	0.009390	2.578686	-0.009181	0.031024	0.019116	

SM given lambda with sig (A4-1)

Structure of the elasiticity of substitution, σ (3) For Appendix 4-1-3 Case study of the **Solow** Model: λ= - 0.01 as a parameter

DRC

		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		302.8666		76625		12.11467	**25**	0.01	278.637	11.14549	24.22933	0.08811	0.00791	using g_{WK}(t)
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	g_{WK}(t)	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	302.867	---	76625	---	12.11467	25.000000	---	278.637	11.14549	24.22933	0.08811	0.00791	---
0.003483	0.052776	303.921	1.055	80950	0.0564	12.03649	25.250000	0.250000	279.608	11.07357	24.31372	0.08398	0.00758	0.00189
0.003274	0.050289	304.917	0.995	85299	0.0537	11.95634	25.502500	0.252500	280.523	10.99983	24.39332	0.08022	0.00729	0.00188
0.003084	0.048025	305.857	0.940	89672	0.0513	11.87447	25.757525	0.255025	281.388	10.92451	24.46856	0.07678	0.00703	0.00187
0.002911	0.045953	306.747	0.890	94065	0.0490	11.79113	26.015100	0.257575	282.208	10.84784	24.53979	0.07362	0.00679	0.00186
0.002752	0.044051	307.592	0.844	98479	0.0469	11.70652	26.275251	0.260151	282.984	10.76999	24.60733	0.07071	0.00657	0.00185
0.002606	0.042298	308.393	0.802	102912	0.0450	11.62082	26.538004	0.262753	283.722	10.69115	24.67147	0.06802	0.00636	0.00184
0.002472	0.040678	309.156	0.762	107363	0.0433	11.53420	26.803384	0.265380	284.423	10.61146	24.73244	0.06552	0.00617	0.00184
0.002347	0.039176	309.881	0.726	111831	0.0416	11.44680	27.071418	0.268034	285.091	10.53106	24.79049	0.06320	0.00600	0.00184
0.002231	0.037780	310.572	0.691	116315	0.0401	11.35875	27.342132	0.270714	285.727	10.45005	24.84580	0.06103	0.00584	0.00183
0.002123	0.036478	311.232	0.659	120814	0.0387	11.27017	27.615553	0.273421	286.333	10.36855	24.89855	0.05901	0.00569	0.00183
0.002023	0.035262	311.861	0.630	125327	0.0374	11.18115	27.891709	0.276156	286.912	10.28666	24.94891	0.05712	0.00555	0.00183
0.001929	0.034124	312.463	0.601	129854	0.0361	11.09180	28.170626	0.278917	287.466	10.20445	24.99703	0.05534	0.00542	0.00184
0.001840	0.033055	313.038	0.575	134393	0.0350	11.00219	28.452332	0.281706	287.995	10.12201	25.04303	0.05367	0.00530	0.00184
0.001758	0.032051	313.588	0.550	138944	0.0339	10.91240	28.736855	0.284523	288.501	10.03941	25.08704	0.05209	0.00519	0.00184
0.001680	0.031105	314.115	0.527	143507	0.0328	10.82250	29.024224	0.287369	288.986	9.95670	25.12918	0.05060	0.00508	0.00185
0.001606	0.030212	314.619	0.504	148080	0.0319	10.73256	29.314466	0.290242	289.450	9.87395	25.16954	0.04920	0.00498	0.00185
0.001537	0.029368	315.103	0.483	152663	0.0310	10.64262	29.607611	0.293145	289.894	9.79121	25.20821	0.04787	0.00489	0.00186
0.001471	0.028570	315.566	0.464	157255	0.0301	10.55275	29.903687	0.296076	290.321	9.70853	25.24530	0.04661	0.00480	0.00187
0.001409	0.027813	316.011	0.445	161857	0.0293	10.46299	30.202724	0.299037	290.730	9.62595	25.28086	0.04541	0.00472	0.00187
0.001350	0.027094	316.437	0.427	166467	0.0285	10.37338	30.504751	0.302027	291.122	9.54351	25.31499	0.04427	0.00464	0.00188
0.001294	0.026411	316.847	0.409	171084	0.0277	10.28396	30.809799	0.305048	291.499	9.46124	25.34774	0.04319	0.00456	0.00189
0.001241	0.025761	317.240	0.393	175709	0.0270	10.19477	31.117896	0.308098	291.861	9.37919	25.37919	0.04216	0.00449	0.00190
0.001190	0.025141	317.617	0.377	180341	0.0264	10.10584	31.429075	0.311179	292.208	9.29737	25.40938	0.04117	0.00443	0.00191
0.001141	0.024550	317.980	0.363	184979	0.0257	10.01720	31.743366	0.314291	292.541	9.21583	25.43838	0.04023	0.00437	0.00192
0.001095	0.023986	318.328	0.348	189624	0.0251	9.92889	32.060800	0.317434	292.862	9.13458	25.46624	0.03933	0.00431	0.00193
0.001051	0.023447	318.663	0.335	194274	0.0245	9.84091	32.381408	0.320608	293.170	9.05364	25.49301	0.03847	0.00425	0.00194
0.001009	0.022930	318.984	0.321	198929	0.0240	9.75331	32.705222	0.323814	293.465	8.97304	25.51873	0.03765	0.00420	0.00195
0.000968	0.022436	319.293	0.309	203589	0.0234	9.66609	33.032274	0.327052	293.750	8.89281	25.54344	0.03686	0.00414	0.00197
0.000930	0.021962	319.590	0.297	208254	0.0229	9.57929	33.362597	0.330323	294.023	8.81294	25.56719	0.03610	0.00410	0.00198
0.000893	0.021507	319.875	0.285	212923	0.0224	9.49291	33.696223	0.333626	294.285	8.73348	25.59002	0.03537	0.00405	0.00199
0.000857	0.021070	320.149	0.274	217595	0.0219	9.40698	34.033185	0.336962	294.537	8.65442	25.61195	0.03467	0.00401	0.00201
0.000823	0.020650	320.413	0.263	222271	0.0215	9.32150	34.373517	0.340332	294.780	8.57578	25.63302	0.03399	0.00396	0.00202
0.000790	0.020247	320.666	0.253	226951	0.0211	9.23650	34.717252	0.343735	295.013	8.49758	25.65326	0.03335	0.00392	0.00203
0.000758	0.019858	320.909	0.243	231633	0.0206	9.15198	35.064425	0.347173	295.236	8.41982	25.67271	0.03272	0.00389	0.00205
0.000728	0.019484	321.142	0.234	236318	0.0202	9.06796	35.415069	0.350644	295.451	8.34252	25.69139	0.03212	0.00385	0.00206

SM given lambda with sig (A4-1)

Structure of the elasiticity of substitution, σ (3) For Appendix 4-1-3 Case study of the **Solow** Model: λ= - 0.01 as a parameter

Δk(t)=(kt(1+n)−k(t−1))/n

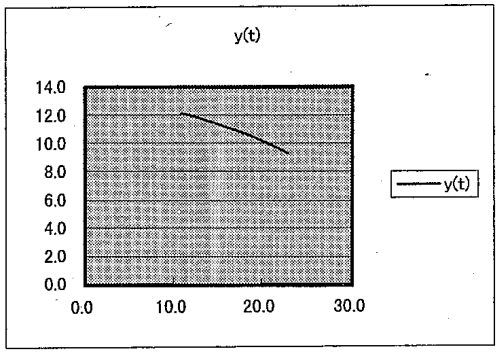
DRC	K^{υ}		k^{υ}	using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
(2)	275.0000		11.00000											
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
---	275.0000	---	11.0000	---	---	---	---	---	302.867	---	---	---	---	---
0.24964	289.5133	14.5133	11.4659	58.0531	5.06312	20.28177	4.2193	0.0727	303.921	2.87122	15.15303	12.0365	1.0498	-0.01000
0.25755	304.0727	14.5594	11.9233	57.6611	4.83602	18.77708	3.9408	0.0683	304.917	3.05432	15.35995	11.9563	1.0028	-0.01000
0.26550	318.6757	14.6030	12.3721	57.2609	4.62821	17.43185	3.6877	0.0644	305.857	3.24222	15.57064	11.8745	0.9598	-0.01000
0.27350	333.3198	14.6441	12.8125	56.8537	4.43734	16.22439	3.4568	0.0608	306.747	3.43513	15.78546	11.7911	0.9203	-0.01000
0.28153	348.0028	14.6830	13.2445	56.4404	4.26142	15.13655	3.2453	0.0575	307.592	3.63325	16.00477	11.7065	0.8839	-0.01000
0.28960	362.7227	14.7199	13.6680	56.0220	4.09876	14.15308	3.0511	0.0545	308.393	3.83678	16.22891	11.6208	0.8502	-0.01000
0.29771	377.4776	14.7549	14.0832	55.5992	3.94791	13.26110	2.8722	0.0517	309.156	4.04595	16.45821	11.5342	0.8190	-0.01000
0.30584	392.2658	14.7882	14.4900	55.1727	3.80763	12.44962	2.7069	0.0491	309.881	4.26100	16.69301	11.4468	0.7900	-0.01000
0.31401	407.0855	14.8198	14.8886	54.7432	3.67686	11.70927	2.5538	0.0467	310.572	4.48218	16.93364	11.3588	0.7629	-0.01000
0.32221	421.9354	14.8498	15.2789	54.3111	3.55465	11.03201	2.4117	0.0444	311.232	4.70976	17.18044	11.2702	0.7376	-0.01000
0.33044	436.8138	14.8785	15.6611	53.8771	3.44019	10.41090	2.2796	0.0423	311.861	4.94401	17.43376	11.1812	0.7139	-0.01000
0.33870	451.7195	14.9057	16.0351	53.4415	3.33278	9.83991	2.1563	0.0403	312.463	5.18523	17.69396	11.0918	0.6917	-0.01000
0.34699	466.6513	14.9318	16.4012	53.0047	3.23177	9.31381	2.0413	0.0385	313.038	5.43374	17.96142	11.0022	0.6708	-0.01000
0.35530	481.6079	14.9566	16.7592	52.5672	3.13661	8.82804	1.9336	0.0368	313.588	5.68986	18.23652	10.9124	0.6511	-0.01000
0.36364	496.5882	14.9803	17.1094	52.1292	3.04681	8.37859	1.8328	0.0352	314.115	5.95397	18.51968	10.8225	0.6325	-0.01000
0.37201	511.5911	15.0029	17.4518	51.6911	2.96193	7.96196	1.7382	0.0336	314.619	6.22643	18.81130	10.7326	0.6150	-0.01000
0.38040	526.6157	15.0246	17.7865	51.2531	2.88157	7.57502	1.6492	0.0322	315.103	6.50765	19.11185	10.6426	0.5984	-0.01000
0.38882	541.6609	15.0452	18.1135	50.8154	2.80539	7.21505	1.5655	0.0308	315.566	6.79805	19.42180	10.5528	0.5826	-0.01000
0.39727	556.7259	15.0650	18.4330	50.3784	2.73306	6.87960	1.4867	0.0295	316.011	7.09809	19.74164	10.4630	0.5676	-0.01000
0.40574	571.8098	15.0839	18.7449	49.9422	2.66430	6.56650	1.4123	0.0283	316.437	7.40827	20.07192	10.3734	0.5534	-0.01000
0.41424	586.9118	15.1020	19.0495	49.5070	2.59886	6.27383	1.3421	0.0271	316.847	7.72909	20.41319	10.2840	0.5399	-0.01000
0.42276	602.0311	15.1193	19.3468	49.0730	2.53649	5.99986	1.2757	0.0260	317.240	8.06112	20.76605	10.1948	0.5269	-0.01000
0.43130	617.1669	15.1358	19.6368	48.6403	2.47699	5.74303	1.2129	0.0249	317.617	8.40497	21.13115	10.1058	0.5146	-0.01000
0.43987	632.3186	15.1517	19.9197	48.2090	2.42017	5.50195	1.1535	0.0239	317.980	8.76125	21.50917	10.0172	0.5029	-0.01000
0.44847	647.4854	15.1668	20.1955	47.7794	2.36584	5.27536	1.0971	0.0230	318.328	9.13067	21.90085	9.9289	0.4916	-0.01000
0.45709	662.6667	15.1813	20.4644	47.3516	2.31385	5.06214	1.0436	0.0220	318.663	9.51397	22.30697	9.8409	0.4809	-0.01000
0.46573	677.8618	15.1952	20.7264	46.9256	2.26405	4.86126	0.9928	0.0212	318.984	9.91194	22.72838	9.7533	0.4706	-0.01000
0.47440	693.0703	15.2084	20.9816	46.5015	2.21630	4.67179	0.9446	0.0203	319.293	10.32543	23.16600	9.6661	0.4607	-0.01000
0.48309	708.2914	15.2211	21.2301	46.0795	2.17048	4.49289	0.8987	0.0195	319.590	10.75538	23.62080	9.5793	0.4512	-0.01000
0.49181	723.5246	15.2332	21.4720	45.6596	2.12647	4.32379	0.8551	0.0187	319.875	11.20279	24.09384	9.4929	0.4421	-0.01000
0.50055	738.7694	15.2448	21.7073	45.2419	2.08418	4.16379	0.8135	0.0180	320.149	11.66873	24.58627	9.4070	0.4334	-0.01000
0.50931	754.0253	15.2559	21.9362	44.8265	2.04349	4.01227	0.7740	0.0173	320.413	12.15440	25.09934	9.3215	0.4249	-0.01000
0.51810	769.2918	15.2665	22.1588	44.4135	2.00433	3.86862	0.7362	0.0166	320.666	12.66106	25.63439	9.2365	0.4168	-0.01000
0.52691	784.5684	15.2766	22.3751	44.0029	1.96660	3.73232	0.7003	0.0159	320.909	13.19011	26.19290	9.1520	0.4090	-0.01000
0.53575	799.8546	15.2862	22.5851	43.5947	1.93024	3.60289	0.6659	0.0153	321.142	13.74306	26.77645	9.0680	0.4015	-0.01000

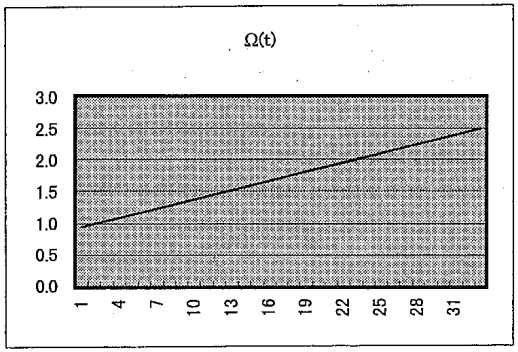
Figure A4-1-3 Solow M with given lambda For Appendix 4-1-3 Case study of the **Solow** Model: λ= - 0.01 as a parameter

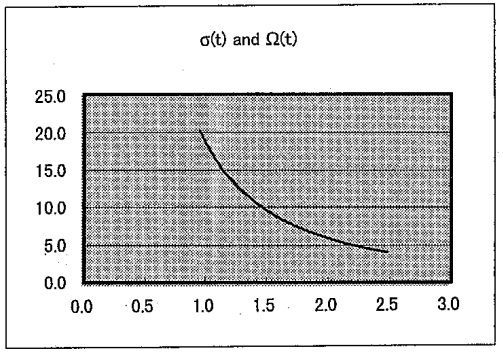
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	0.9079904	11	**10**	**-0.01**			-0.015791

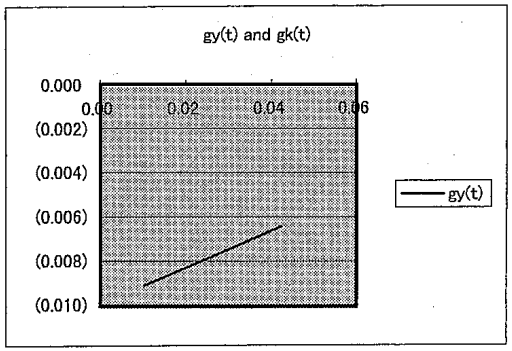
k(t)	y(t)	Ω(t)	σ(t)	gk(t)	gy(t)
11.000000	12.114665				
11.495733	12.036494	0.955073	20.281767	0.042352	(0.006453)
11.982601	11.956338	1.002197	18.777077	0.039890	(0.006659)
12.460592	11.874471	1.049360	17.431850	0.037648	(0.006847)
12.929709	11.791127	1.096563	16.224386	0.035597	(0.007019)
13.389968	11.706515	1.143805	15.136547	0.033714	(0.007176)
13.841394	11.620819	1.191086	14.153083	0.031978	(0.007320)
14.284021	11.534199	1.238406	13.261096	0.030374	(0.007454)
14.717891	11.446800	1.285765	12.449617	0.028887	(0.007577)
15.143052	11.358751	1.333162	11.709274	0.027505	(0.007692)
15.559559	11.270167	1.380597	11.032015	0.026216	(0.007799)
15.967472	11.181151	1.428071	10.410897	0.025012	(0.007898)
16.366855	11.091796	1.475582	9.839906	0.023885	(0.007992)
16.757776	11.002187	1.523131	9.313808	0.022827	(0.008079)
17.140308	10.912400	1.570718	8.828038	0.021833	(0.008161)
17.514525	10.822503	1.618343	8.378593	0.020896	(0.008238)
17.880504	10.732558	1.666006	7.961955	0.020012	(0.008311)
18.238327	10.642624	1.713706	7.575022	0.019177	(0.008380)
18.588075	10.552752	1.761443	7.215048	0.018386	(0.008445)
18.929832	10.462990	1.809218	6.879598	0.017636	(0.008506)
19.263683	10.373379	1.857031	6.566504	0.016925	(0.008565)
19.589715	10.283961	1.904880	6.273834	0.016248	(0.008620)
19.908016	10.194770	1.952767	5.999858	0.015605	(0.008673)
20.218675	10.105842	2.000692	5.743027	0.014991	(0.008723)
20.521780	10.017204	2.048653	5.501946	0.014406	(0.008771)
20.817422	9.928886	2.096652	5.275361	0.013848	(0.008817)
21.105693	9.840913	2.144688	5.062140	0.013313	(0.008860)
21.386681	9.753309	2.192762	4.861259	0.012802	(0.008902)
21.660480	9.666093	2.240872	4.671789	0.012313	(0.008942)
21.927180	9.579288	2.289020	4.492888	0.011843	(0.008980)
22.186872	9.492910	2.337205	4.323789	0.011393	(0.009017)
22.439649	9.406975	2.385427	4.163794	0.010961	(0.009052)
22.685601	9.321500	2.433686	4.012265	0.010545	(0.009086)
22.924820	9.236497	2.481982	3.868620	0.010145	(0.009119)
23.157397	9.151980	2.530316	3.732324	0.009760	(0.009150)
23.383422	9.067960	2.578686	3.602890	0.009390	(0.009181)

DRC









Appendix 4-2-1Case study of the **Solow** Model: λ=0.0 as a parameter

Note: Ω(0)=K(0)/Y(0)= k(0)/(A(0)k(0)^α)

n	s	α	Ω(0)see Note	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^	**A(0) as given**	**λ as given**	**DRC under a given λ**		Ψ*=Ω(0)/Ω*	**Balanced growth-state**
0.01	0.05	0.08	0.9079904	11	0.92	1.2114665	12.114665	**10**	**0**			0.181598	$g^*_y=\lambda/(1-\alpha)$ 0	$g^*_Y=g^*_y+n$ 0.01
time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_\Omega(t)$	$k^*(t)$, where $\chi=1/(1-\alpha)$	
0	11	10	12.114665	0.6057333	0.11	0.4957333	11.495733	0.0450667	0.9079904	---	0.0881067	---	$=A(t)^\chi(\Omega^*)^\chi$	
1	11.495733	10.000000	12.157462	0.607873	0.114957	0.492916	11.988649	0.042878	0.945570	0.003533	0.084605	0.041388	infinite	
2	11.988649	10.000000	12.198365	0.609918	0.119886	0.490032	12.478681	0.040875	0.982808	0.003364	0.081399	0.039381		
3	12.478681	10.000000	12.237522	0.611876	0.124787	0.487089	12.965770	0.039034	1.019706	0.003210	0.078454	0.037544	$\Omega^*=s/(n+g^*_y)$	
4	12.965770	10.000000	12.275067	0.613753	0.129658	0.484096	13.449866	0.037336	1.056269	0.003068	0.075738	0.035856	5	
5	13.449866	10.000000	12.311116	0.615556	0.134499	0.481057	13.930923	0.035767	1.092498	0.002937	0.073227	0.034299		
6	13.930923	10.000000	12.345776	0.617289	0.139309	0.477980	14.408902	0.034311	1.128396	0.002815	0.070897	0.032859	$A^*=k^*/(\Omega^*k^{*\wedge}\alpha)$	
7	14.408902	10.000000	12.379140	0.618957	0.144089	0.474868	14.883770	0.032957	1.163966	0.002702	0.068731	0.031523	infinite	
8	14.883770	10.000000	12.411293	0.620565	0.148838	0.471727	15.355497	0.031694	1.199212	0.002597	0.066710	0.030281		
9	15.355497	10.000000	12.442313	0.622116	0.153555	0.468561	15.824058	0.030514	1.234135	0.002499	0.064823	0.029122	$y^*=A^*k^{*\wedge}\alpha$	
10	15.824058	10.000000	12.472268	0.623613	0.158241	0.465373	16.289431	0.029409	1.268739	0.002408	0.063055	0.028039	infinite	
11	16.289431	10.000000	12.501222	0.625061	0.162894	0.462167	16.751598	0.028372	1.303027	0.002321	0.061396	0.027025		
12	16.751598	10.000000	12.529233	0.626462	0.167516	0.458946	17.210543	0.027397	1.337001	0.002241	0.059835	0.026073	$g^*_Y=s/\Omega^*$	
13	17.210543	10.000000	12.556354	0.627818	0.172105	0.455712	17.666256	0.026479	1.370664	0.002165	0.058366	0.025178	0.01	
14	17.666256	10.000000	12.582634	0.629132	0.176663	0.452469	18.118725	0.025612	1.404019	0.002093	0.056979	0.024335		
15	18.118725	10.000000	12.608116	0.630406	0.181187	0.449219	18.567943	0.024793	1.437068	0.002025	0.055669	0.023539	$r^*=\alpha/\Omega^*$	
16	18.567943	10.000000	12.632843	0.631642	0.185679	0.445963	19.013906	0.024018	1.469815	0.001961	0.054429	0.022787	0.016	
17	19.013906	10.000000	12.656852	0.632843	0.190139	0.442704	19.456610	0.023283	1.502262	0.001901	0.053253	0.022075		
18	19.456610	10.000000	12.680179	0.634009	0.194566	0.439443	19.896052	0.022586	1.534411	0.001843	0.052137	0.021401	**Note:**	
19	19.896052	10.000000	12.702855	0.635143	0.198961	0.436182	20.332235	0.021923	1.566266	0.001788	0.051077	0.020760	K(t)/Y(t)	
20	20.332235	10.000000	12.724913	0.636246	0.203322	0.432923	20.765158	0.021292	1.597829	0.001736	0.050068	0.020152	$=\Omega(t)$	
21	20.765158	10.000000	12.746379	0.637319	0.207652	0.429667	21.194825	0.020692	1.629103	0.001687	0.049107	0.019573	$=k(t)^{(1-\alpha)} / A(t)$	
22	21.194825	10.000000	12.767280	0.638364	0.211948	0.426416	21.621241	0.020119	1.660089	0.001640	0.048190	0.019021		
23	21.621241	10.000000	12.787641	0.639382	0.216212	0.423170	22.044411	0.019572	1.690792	0.001595	0.047315	0.018495	A(t)	
24	22.044411	10.000000	12.807486	0.640374	0.220444	0.419930	22.464341	0.019049	1.721213	0.001552	0.046479	0.017992	=$J$3*EXP($K$3*A5)	
25	22.464341	10.000000	12.826835	0.641342	0.224643	0.416698	22.881039	0.018549	1.751355	0.001511	0.045679	0.017512	$=A(0)*EXP(\lambda*t)$	
26	22.881039	10.000000	12.845708	0.642285	0.228810	0.413475	23.294514	0.018071	1.781221	0.001471	0.044913	0.017053		
27	23.294514	10.000000	12.864126	0.643206	0.232945	0.410261	23.704775	0.017612	1.810812	0.001434	0.044179	0.016613	**$k^*(t)$, where $\chi=1/(1-\alpha)$**	
28	23.704775	10.000000	12.882106	0.644105	0.237048	0.407058	24.111833	0.017172	1.840132	0.001398	0.043475	0.016192	$=A(t)^\chi(\Omega^*)^\chi$	
29	24.111833	10.000000	12.899665	0.644983	0.241118	0.403865	24.515698	0.016750	1.869183	0.001363	0.042799	0.015787	**infinite**	
30	24.515698	10.000000	12.916818	0.645841	0.245157	0.400684	24.916382	0.016344	1.897967	0.001330	0.042150	0.015399	**Thus, k^*, y^*, and A^***	
31	24.916382	10.000000	12.933581	0.646679	0.249164	0.397515	25.313897	0.015954	1.926487	0.001298	0.041526	0.015027	**infinite**	
32	25.313897	10.000000	12.949969	0.647498	0.253139	0.394359	25.708257	0.015579	1.954746	0.001267	0.040926	0.014668		
33	25.708257	10.000000	12.965994	0.648300	0.257083	0.391217	26.099474	0.015218	1.982745	0.001237	0.040348	0.014324		
34	26.099474	10.000000	12.981669	0.649083	0.260995	0.388089	26.487562	0.014870	2.010487	0.001209	0.039791	0.013992		
35	26.487562	10.000000	12.997007	0.649850	0.264876	0.384975	26.872537	0.014534	2.037974	0.001182	0.039255	0.013672		

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-1Case study of the **Solow** Model: λ=0.0 as a parameter

DRC		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		302.8666		76625		12.114665	**25**	0.01	278.637	11.14549	24.22933	0.08811	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	302.867	---	76625	---	12.114665	25.000000	---	278.637	11.14549	24.22933	0.08811	0.00791	---
0.013568	0.053307	306.976	4.109	81805	0.0676	12.157462	25.250000	0.250000	282.418	11.18487	24.55807	0.08478	0.00758	0.00277
0.013398	0.051283	311.089	4.113	87152	0.0654	12.198365	25.502500	0.252500	286.202	11.22250	24.88710	0.08173	0.00728	0.00273
0.013242	0.049424	315.208	4.119	92671	0.0633	12.237522	25.757525	0.255025	289.992	11.25852	25.21666	0.07891	0.00701	0.00269
0.013099	0.047710	319.337	4.129	98364	0.0614	12.275067	26.015100	0.257575	293.790	11.29306	25.54697	0.07630	0.00676	0.00265
0.012966	0.046124	323.478	4.141	104235	0.0597	12.311116	26.275251	0.260151	297.599	11.32623	25.87821	0.07388	0.00652	0.00261
0.012843	0.044654	327.632	4.155	110288	0.0581	12.345776	26.538004	0.262753	301.422	11.35811	26.21058	0.07163	0.00631	0.00258
0.012729	0.043286	331.803	4.171	116527	0.0566	12.379140	26.803384	0.265380	305.259	11.38881	26.54423	0.06954	0.00611	0.00255
0.012623	0.042011	335.991	4.188	122955	0.0552	12.411293	27.071418	0.268034	309.112	11.41839	26.87930	0.06758	0.00592	0.00252
0.012524	0.040819	340.199	4.208	129577	0.0539	12.442313	27.342132	0.270714	312.983	11.44693	27.21595	0.06574	0.00574	0.00249
0.012432	0.039703	344.429	4.229	136396	0.0526	12.472268	27.615553	0.273421	316.874	11.47449	27.55429	0.06401	0.00558	0.00246
0.012345	0.038656	348.680	4.252	143418	0.0515	12.501222	27.891709	0.276156	320.786	11.50112	27.89444	0.06239	0.00542	0.00243
0.012263	0.037671	352.956	4.276	150645	0.0504	12.529233	28.170626	0.278917	324.720	11.52689	28.23651	0.06086	0.00528	0.00241
0.012186	0.036743	357.258	4.301	158084	0.0494	12.556354	28.452332	0.281706	328.677	11.55185	28.58061	0.05942	0.00514	0.00239
0.012114	0.035868	361.585	4.328	165738	0.0484	12.582634	28.736855	0.284523	332.659	11.57602	28.92683	0.05806	0.00502	0.00236
0.012045	0.035041	365.941	4.355	173612	0.0475	12.608116	29.024224	0.287369	336.666	11.59947	29.27526	0.05677	0.00489	0.00234
0.011981	0.034258	370.325	4.384	181711	0.0466	12.632843	29.314466	0.290242	340.699	11.62222	29.62600	0.05555	0.00478	0.00232
0.011920	0.033516	374.739	4.414	190039	0.0458	12.656852	29.607611	0.293145	344.760	11.64430	29.97913	0.05439	0.00467	0.00230
0.011861	0.032812	379.184	4.445	198603	0.0451	12.680179	29.903687	0.296076	348.849	11.66576	30.33473	0.05328	0.00457	0.00228
0.011806	0.032142	383.661	4.477	207407	0.0443	12.702855	30.202724	0.299037	352.968	11.68663	30.69287	0.05223	0.00447	0.00226
0.011754	0.031505	388.170	4.509	216456	0.0436	12.724913	30.504751	0.302027	357.117	11.70692	31.05362	0.05123	0.00438	0.00224
0.011704	0.030899	392.713	4.543	225755	0.0430	12.746379	30.809799	0.305048	361.296	11.72667	31.41707	0.05028	0.00429	0.00222
0.011656	0.030320	397.291	4.578	235312	0.0423	12.767280	31.117896	0.308098	365.508	11.74590	31.78327	0.04937	0.00420	0.00221
0.011611	0.029768	401.904	4.613	245130	0.0417	12.787641	31.429075	0.311179	369.751	11.76463	32.15230	0.04850	0.00412	0.00219
0.011567	0.029240	406.553	4.649	255216	0.0411	12.807486	31.743366	0.314291	374.028	11.78289	32.52422	0.04767	0.00405	0.00217
0.011526	0.028735	411.239	4.686	265575	0.0406	12.826835	32.060800	0.317434	378.339	11.80069	32.89909	0.04687	0.00397	0.00216
0.011486	0.028251	415.962	4.724	276215	0.0401	12.845708	32.381408	0.320608	382.685	11.81805	33.27697	0.04610	0.00390	0.00214
0.011448	0.027788	420.724	4.762	287140	0.0396	12.864126	32.705222	0.323814	387.066	11.83500	33.65793	0.04537	0.00383	0.00213
0.011412	0.027344	425.525	4.801	298358	0.0391	12.882106	33.032274	0.327052	391.483	11.85154	34.04202	0.04467	0.00377	0.00211
0.011377	0.026917	430.366	4.841	309875	0.0386	12.899665	33.362597	0.330323	395.937	11.86769	34.42930	0.04399	0.00371	0.00210
0.011343	0.026507	435.248	4.882	321697	0.0382	12.916818	33.696223	0.333626	400.428	11.88347	34.81984	0.04334	0.00365	0.00208
0.011311	0.026114	440.171	4.923	333831	0.0377	12.933581	34.033185	0.336962	404.957	11.89889	35.21368	0.04272	0.00359	0.00207
0.011280	0.025735	445.136	4.965	346285	0.0373	12.949969	34.373517	0.340332	409.525	11.91397	35.61088	0.04211	0.00353	0.00206
0.011250	0.025370	450.144	5.008	359064	0.0369	12.965994	34.717252	0.343735	414.132	11.92871	36.01149	0.04153	0.00348	0.00205
0.011221	0.025018	455.195	5.051	372177	0.0365	12.981669	35.064425	0.347173	418.779	11.94314	36.41558	0.04098	0.00343	0.00203
0.011193	0.024680	460.290	5.095	385631	0.0361	12.997007	35.415069	0.350644	423.467	11.95725	36.82319	0.04044	0.00338	0.00202

SM & S-KM lambda=0 & sig (A4-2)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-1Case study of the **Solow** Model: λ=0.0 as a parameter

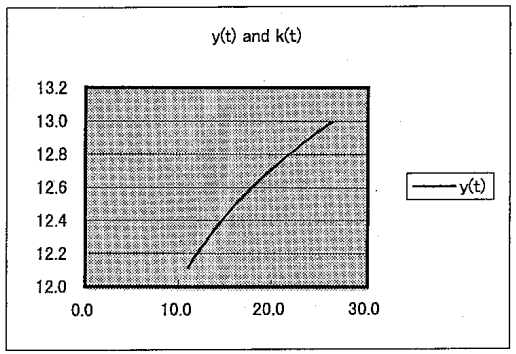
DRC	K^{υ}		k^{υ}	Δk(t)=(kt(1+n)−k(t−1))/n										
(2)	275.0000		11.00000	using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
---	275.0000	---	11.0000	---	---	---	---	---	302.867	---	---	---	---	---
0.36569	289.6594	14.6594	11.4717	58.6376	5.11152	13.97770	16.4372	0.2803	306.976	0.73703	3.92887	12.1575	1.0598	0.00000
0.37470	304.5141	14.8547	11.9406	58.8306	4.92695	13.14890	16.2886	0.2769	311.089	0.74638	3.82768	12.1984	1.0216	0.00000
0.38356	319.5644	15.0503	12.4066	59.0151	4.75673	12.40169	16.1533	0.2737	315.208	0.75516	3.73233	12.2375	0.9864	0.00000
0.39225	334.8108	15.2464	12.8699	59.1919	4.59926	11.72547	16.0295	0.2708	319.337	0.76344	3.64234	12.2751	0.9538	0.00000
0.40078	350.2537	15.4429	13.3302	59.3614	4.45316	11.11128	15.9161	0.2681	323.478	0.77124	3.55728	12.3111	0.9236	0.00000
0.40916	365.8939	15.6402	13.7875	59.5243	4.31725	10.55157	15.8117	0.2656	327.632	0.77861	3.47677	12.3458	0.8954	0.00000
0.41738	381.7320	15.8381	14.2419	59.6809	4.19051	10.03991	15.7155	0.2633	331.803	0.78558	3.40046	12.3791	0.8692	0.00000
0.42546	397.7690	16.0369	14.6933	59.8318	4.07204	9.57081	15.6266	0.2612	335.991	0.79218	3.32804	12.4113	0.8447	0.00000
0.43340	414.0056	16.2367	15.1417	59.9772	3.96107	9.13953	15.5443	0.2592	340.199	0.79845	3.25922	12.4423	0.8217	0.00000
0.44119	430.4430	16.4374	15.5870	60.1174	3.85690	8.74200	15.4678	0.2573	344.429	0.80440	3.19374	12.4723	0.8002	0.00000
0.44885	447.0822	16.6392	16.0292	60.2529	3.75894	8.37467	15.3967	0.2555	348.680	0.81006	3.13137	12.5012	0.7799	0.00000
0.45636	463.9243	16.8421	16.4684	60.3838	3.66665	8.03448	15.3304	0.2539	352.956	0.81546	3.07191	12.5292	0.7608	0.00000
0.46375	480.9704	17.0462	16.9044	60.5105	3.57956	7.71873	15.2685	0.2523	357.258	0.82060	3.01515	12.5564	0.7428	0.00000
0.47101	498.2220	17.2515	17.3374	60.6331	3.49725	7.42506	15.2106	0.2509	361.585	0.82550	2.96092	12.5826	0.7258	0.00000
0.47813	515.6802	17.4582	17.7672	60.7519	3.41932	7.15138	15.1564	0.2495	365.941	0.83019	2.90906	12.6081	0.7096	0.00000
0.48514	533.3464	17.6662	18.1940	60.8671	3.34546	6.89587	15.1055	0.2482	370.325	0.83467	2.85942	12.6328	0.6943	0.00000
0.49202	551.2220	17.8756	18.6176	60.9789	3.27534	6.65688	15.0578	0.2469	374.739	0.83896	2.81185	12.6569	0.6798	0.00000
0.49879	569.3085	18.0865	19.0381	61.0873	3.20869	6.43299	15.0128	0.2458	379.184	0.84307	2.76625	12.6802	0.6660	0.00000
0.50544	587.6074	18.2989	19.4554	61.1927	3.14527	6.22290	14.9705	0.2446	383.661	0.84701	2.72248	12.7029	0.6529	0.00000
0.51197	606.1202	18.5128	19.8697	61.2951	3.08485	6.02545	14.9306	0.2436	388.170	0.85079	2.68045	12.7249	0.6404	0.00000
0.51839	624.8485	18.7283	20.2808	61.3947	3.02723	5.83962	14.8930	0.2426	392.713	0.85442	2.64005	12.7464	0.6285	0.00000
0.52471	643.7939	18.9454	20.6889	61.4916	2.97221	5.66448	14.8574	0.2416	397.291	0.85791	2.60120	12.7673	0.6171	0.00000
0.53092	662.9581	19.1642	21.0938	61.5859	2.91962	5.49919	14.8238	0.2407	401.904	0.86127	2.56380	12.7876	0.6062	0.00000
0.53702	682.3429	19.3847	21.4956	61.6777	2.86932	5.34299	14.7919	0.2398	406.553	0.86450	2.52778	12.8075	0.5958	0.00000
0.54303	701.9499	19.6070	21.8943	61.7672	2.82115	5.19522	14.7617	0.2390	411.239	0.86761	2.49307	12.8268	0.5859	0.00000
0.54893	721.7809	19.8310	22.2900	61.8544	2.77499	5.05524	14.7331	0.2382	415.962	0.87061	2.45960	12.8457	0.5763	0.00000
0.55474	741.8378	20.0569	22.6825	61.9395	2.73071	4.92250	14.7059	0.2374	420.724	0.87351	2.42730	12.8641	0.5671	0.00000
0.56045	762.1224	20.2846	23.0721	62.0224	2.68821	4.79649	14.6801	0.2367	425.525	0.87630	2.39612	12.8821	0.5583	0.00000
0.56607	782.6365	20.5142	23.4585	62.1034	2.64737	4.67675	14.6555	0.2360	430.366	0.87899	2.36600	12.8997	0.5499	0.00000
0.57160	803.3822	20.7457	23.8419	62.1824	2.60811	4.56284	14.6322	0.2353	435.248	0.88160	2.33688	12.9168	0.5418	0.00000
0.57704	824.3613	20.9791	24.2223	62.2596	2.57034	4.45437	14.6099	0.2347	440.171	0.88411	2.30873	12.9336	0.5340	0.00000
0.58239	845.5759	21.2146	24.5996	62.3350	2.53398	4.35101	14.5887	0.2340	445.136	0.88655	2.28149	12.9500	0.5264	0.00000
0.58766	867.0280	21.4520	24.9740	62.4086	2.49895	4.25240	14.5685	0.2334	450.144	0.88890	2.25512	12.9660	0.5192	0.00000
0.59284	888.7195	21.6916	25.3453	62.4806	2.46517	4.15826	14.5492	0.2329	455.195	0.89118	2.22958	12.9817	0.5122	0.00000
0.59794	910.6527	21.9332	25.7137	62.5510	2.43260	4.06831	14.5308	0.2323	460.290	0.89339	2.20484	12.9970	0.5055	0.00000

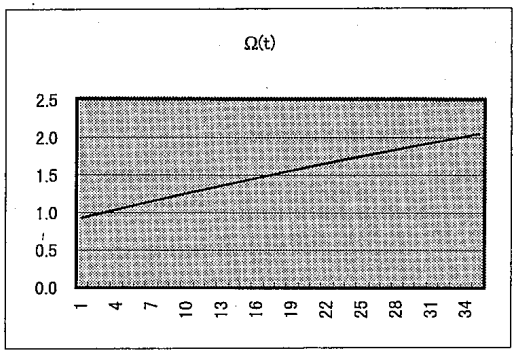
Figure A4-2-1 Solow Model when λ is zero For Appendix 4-2-1Case study of the **Solow** Model: λ=0.0 as a parameter

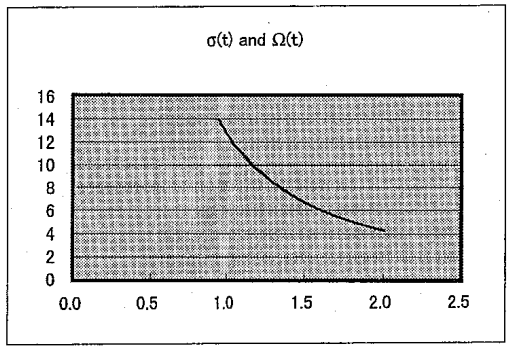
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	0.9079904	11	**10**	**0**			0.181598

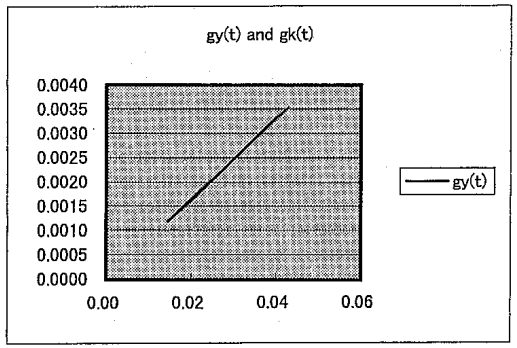
k(t)	y(t)	Ω(t)	σ(t)	gk(t)	gy(t)
11.00000	12.11467				
11.49573	12.15746	0.94557	13.97770	0.04288	0.00353
11.98865	12.19836	0.98281	13.14890	0.04087	0.00336
12.47868	12.23752	1.01971	12.40169	0.03903	0.00321
12.96577	12.27507	1.05627	11.72547	0.03734	0.00307
13.44987	12.31112	1.09250	11.11128	0.03577	0.00294
13.93092	12.34578	1.12840	10.55157	0.03431	0.00282
14.40890	12.37914	1.16397	10.03991	0.03296	0.00270
14.88377	12.41129	1.19921	9.57081	0.03169	0.00260
15.35550	12.44231	1.23414	9.13953	0.03051	0.00250
15.82406	12.47227	1.26874	8.74200	0.02941	0.00241
16.28943	12.50122	1.30303	8.37467	0.02837	0.00232
16.75160	12.52923	1.33700	8.03448	0.02740	0.00224
17.21054	12.55635	1.37066	7.71873	0.02648	0.00216
17.66626	12.58263	1.40402	7.42506	0.02561	0.00209
18.11872	12.60812	1.43707	7.15138	0.02479	0.00203
18.56794	12.63284	1.46982	6.89587	0.02402	0.00196
19.01391	12.65685	1.50226	6.65688	0.02328	0.00190
19.45661	12.68018	1.53441	6.43299	0.02259	0.00184
19.89605	12.70286	1.56627	6.22290	0.02192	0.00179
20.33223	12.72491	1.59783	6.02545	0.02129	0.00174
20.76516	12.74638	1.62910	5.83962	0.02069	0.00169
21.19483	12.76728	1.66009	5.66448	0.02012	0.00164
21.62124	12.78764	1.69079	5.49919	0.01957	0.00159
22.04441	12.80749	1.72121	5.34299	0.01905	0.00155
22.46434	12.82683	1.75136	5.19522	0.01855	0.00151
22.88104	12.84571	1.78122	5.05524	0.01807	0.00147
23.29451	12.86413	1.81081	4.92250	0.01761	0.00143
23.70478	12.88211	1.84013	4.79649	0.01717	0.00140
24.11183	12.89966	1.86918	4.67675	0.01675	0.00136
24.51570	12.91682	1.89797	4.56284	0.01634	0.00133
24.91638	12.93358	1.92649	4.45437	0.01595	0.00130
25.31390	12.94997	1.95475	4.35101	0.01558	0.00127
25.70826	12.96599	1.98274	4.25240	0.01522	0.00124
26.09947	12.98167	2.01049	4.15826	0.01487	0.00121
26.48756	12.99701	2.03797	4.06831	0.01453	0.00118

DRC









Appendix 4-2-2 Case study of the **Solow-Kamiryo** Model: λ is given as zero

If Ω*=θ, then λ is a variable **DRC** **Balanced growth-state**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^α	A(0) as a variable	λ as zero	$s_{SP/Y}$ using θ	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ	g^*_y=λ/(1-α)	g^*_Y=g^*_y+n
0.01	0.05	0.08	1.5	11	0.92	1.211467	7.333333	6.053270	**0**	**0.0449839**	1.1115094	1.3495162	0	0.01

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change in k	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_Ω$(t)	k˜(t), where χ=1/(1-α)
0	11	6.053270	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.5	---	0.053333	---	=A(t)^χ(Ω*)^χ
1	11.256667	6.053270	7.346877	0.367344	0.112567	0.254777	11.511444	0.022633	1.532170	0.001847	0.052214	0.021447	infinite
2	11.511444	6.053270	7.360044	0.368002	0.115114	0.252888	11.764332	0.021968	1.564046	0.001792	0.051149	0.020804	
3	11.764332	6.053270	7.372850	0.368642	0.117643	0.250999	12.015331	0.021336	1.595629	0.001740	0.050137	0.020193	**Ω*=s/(n+g^*_y)**
4	12.015331	6.053270	7.385312	0.369266	0.120153	0.249112	12.264443	0.020733	1.626922	0.001690	0.049173	0.019612	1.111509
5	12.264443	6.053270	7.397447	0.369872	0.122644	0.247228	12.511671	0.020158	1.657929	0.001643	0.048253	0.019059	
6	12.511671	6.053270	7.409267	0.370463	0.125117	0.245347	12.757018	0.019609	1.688652	0.001598	0.047375	0.018531	A˜=k˜/(Ω˜k˜^α)
7	12.757018	6.053270	7.420787	0.371039	0.127570	0.243469	13.000487	0.019085	1.719092	0.001555	0.046536	0.018027	infinite
8	13.000487	6.053270	7.432018	0.371601	0.130005	0.241596	13.242083	0.018584	1.749254	0.001514	0.045734	0.017545	
9	13.242083	6.053270	7.442974	0.372149	0.132421	0.239728	13.481811	0.018103	1.779139	0.001474	0.044966	0.017084	y˜=A˜k˜^α
10	13.481811	6.053270	7.453665	0.372683	0.134818	0.237865	13.719676	0.017643	1.808749	0.001436	0.044229	0.016643	infinite
11	13.719676	6.053270	7.464101	0.373205	0.137197	0.236008	13.955684	0.017202	1.838088	0.001400	0.043523	0.016221	
12	13.955684	6.053270	7.474293	0.373715	0.139557	0.234158	14.189842	0.016779	1.867158	0.001365	0.042846	0.015815	g^*_Y=s/Ω*
13	14.189842	6.053270	7.484249	0.374212	0.141898	0.232314	14.422156	0.016372	1.895961	0.001332	0.042195	0.015426	0.044984
14	14.422156	6.053270	7.493978	0.374699	0.144222	0.230477	14.652633	0.015981	1.924499	0.001300	0.041569	0.015052	
15	14.652633	6.053270	7.503489	0.375174	0.146526	0.228648	14.881281	0.015605	1.952776	0.001269	0.040967	0.014693	r˜=α/Ω˜
16	14.881281	6.053270	7.512790	0.375639	0.148813	0.226827	15.108108	0.015242	1.980793	0.001239	0.040388	0.014347	0.071974
17	15.108108	6.053270	7.521887	0.376094	0.151081	0.225013	15.333121	0.014894	2.008553	0.001211	0.039830	0.014015	
18	15.333121	6.053270	7.530789	0.376539	0.153331	0.223208	15.556330	0.014557	2.036058	0.001183	0.039292	0.013694	**Note:**
19	15.556330	6.053270	7.539501	0.376975	0.155563	0.221412	15.777741	0.014233	2.063310	0.001157	0.038773	0.013385	K(t)/Y(t)
20	15.777741	6.053270	7.548030	0.377401	0.157777	0.219624	15.997365	0.013920	2.090313	0.001131	0.038272	0.013087	=Ω(t)
21	15.997365	6.053270	7.556382	0.377819	0.159974	0.217845	16.215211	0.013618	2.117067	0.001107	0.037788	0.012799	=k(t) ^ (1-α) / A(t)
22	16.215211	6.053270	7.564563	0.378228	0.162152	0.216076	16.431287	0.013326	2.143575	0.001083	0.037321	0.012521	
23	16.431287	6.053270	7.572578	0.378629	0.164313	0.214316	16.645603	0.013043	2.169841	0.001060	0.036869	0.012253	A(t)
24	16.645603	6.053270	7.580432	0.379022	0.166456	0.212566	16.858169	0.012770	2.195865	0.001037	0.036432	0.011993	=$J$3*EXP($K$3*A5)
25	16.858169	6.053270	7.588131	0.379407	0.168582	0.210825	17.068993	0.012506	2.221650	0.001016	0.036009	0.011742	=A(0)*EXP(λ*t)
26	17.068993	6.053270	7.595680	0.379784	0.170690	0.209094	17.278087	0.012250	2.247198	0.000995	0.035600	0.011500	
27	17.278087	6.053270	7.603082	0.380154	0.172781	0.207373	17.485461	0.012002	2.272511	0.000975	0.035203	0.011264	**k˜(t), where χ=1/(1-α)**
28	17.485461	6.053270	7.610342	0.380517	0.174855	0.205662	17.691123	0.011762	2.297592	0.000955	0.034819	0.011037	=A(t)^χ(Ω*)^χ
29	17.691123	6.053270	7.617465	0.380873	0.176911	0.203962	17.895085	0.011529	2.322442	0.000936	0.034446	0.010816	**infinite**
30	17.895085	6.053270	7.624453	0.381223	0.178951	0.202272	18.097357	0.011303	2.347065	0.000917	0.034085	0.010602	**Thus, k*, y*, and A˜**
31	18.097357	6.053270	7.631312	0.381566	0.180974	0.200592	18.297949	0.011084	2.371461	0.000900	0.033734	0.010394	**infinite**
32	18.297949	6.053270	7.638045	0.381902	0.182979	0.198923	18.496872	0.010871	2.395633	0.000882	0.033394	0.010193	
33	18.496872	6.053270	7.644655	0.382233	0.184969	0.197264	18.694136	0.010665	2.419582	0.000865	0.033064	0.009997	

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-2 Case study of the **Solow-Kamiryo** Model: λ is given as zero

DRC

		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		183.3333		46383		7.333333	**25**	0.01	168.667	6.74667	14.66667	0.05333	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.333333	25.000000	---	168.667	6.74667	14.66667	0.05333	0.00791	---
0.011865	0.032860	185.509	2.175	48476	0.0451	7.346877	25.250000	0.250000	170.668	6.75913	14.84069	0.05225	0.00773	0.00385
0.011810	0.032188	187.700	2.191	50627	0.0444	7.360044	25.502500	0.252500	172.684	6.77124	15.01596	0.05122	0.00756	0.00382
0.011757	0.031549	189.906	2.207	52838	0.0437	7.372850	25.757525	0.255025	174.714	6.78302	15.19251	0.05024	0.00741	0.00379
0.011707	0.030940	192.130	2.223	55111	0.0430	7.385312	26.015100	0.257575	176.759	6.79449	15.37037	0.04930	0.00726	0.00376
0.011659	0.030360	194.370	2.240	57446	0.0424	7.397447	26.275251	0.260151	178.820	6.80565	15.54958	0.04840	0.00711	0.00373
0.011614	0.029806	196.627	2.257	59846	0.0418	7.409267	26.538004	0.262753	180.897	6.81653	15.73017	0.04755	0.00698	0.00370
0.011570	0.029276	198.902	2.275	62310	0.0412	7.420787	26.803384	0.265380	182.990	6.82712	15.91218	0.04673	0.00684	0.00367
0.011529	0.028769	201.195	2.293	64842	0.0406	7.432018	27.071418	0.268034	185.100	6.83746	16.09562	0.04595	0.00672	0.00365
0.011489	0.028285	203.507	2.312	67442	0.0401	7.442974	27.342132	0.270714	187.226	6.84754	16.28054	0.04520	0.00660	0.00362
0.011451	0.027820	205.837	2.330	70112	0.0396	7.453665	27.615553	0.273421	189.370	6.85737	16.46697	0.04448	0.00649	0.00360
0.011414	0.027374	208.187	2.349	72853	0.0391	7.464101	27.891709	0.276156	191.532	6.86697	16.65492	0.04379	0.00638	0.00357
0.011379	0.026946	210.556	2.369	75668	0.0386	7.474293	28.170626	0.278917	193.711	6.87635	16.84444	0.04312	0.00627	0.00355
0.011345	0.026536	212.944	2.389	78557	0.0382	7.484249	28.452332	0.281706	195.909	6.88551	17.03555	0.04248	0.00617	0.00352
0.011313	0.026141	215.353	2.409	81522	0.0377	7.493978	28.736855	0.284523	198.125	6.89446	17.22827	0.04187	0.00607	0.00350
0.011282	0.025761	217.783	2.430	84566	0.0373	7.503489	29.024224	0.287369	200.360	6.90321	17.42264	0.04128	0.00598	0.00348
0.011252	0.025395	220.233	2.450	87689	0.0369	7.512790	29.314466	0.290242	202.615	6.91177	17.61867	0.04071	0.00589	0.00346
0.011223	0.025042	222.705	2.472	90894	0.0365	7.521887	29.607611	0.293145	204.889	6.92014	17.81641	0.04016	0.00580	0.00344
0.011195	0.024703	225.198	2.493	94182	0.0362	7.530789	29.903687	0.296076	207.182	6.92833	18.01587	0.03963	0.00572	0.00342
0.011168	0.024375	227.713	2.515	97555	0.0358	7.539501	30.202724	0.299037	209.496	6.93634	18.21708	0.03912	0.00564	0.00340
0.011143	0.024059	230.251	2.537	101015	0.0355	7.548030	30.504751	0.302027	211.831	6.94419	18.42006	0.03863	0.00556	0.00338
0.011118	0.023754	232.811	2.560	104565	0.0351	7.556382	30.809799	0.305048	214.186	6.95187	18.62485	0.03815	0.00549	0.00336
0.011093	0.023459	235.393	2.583	108205	0.0348	7.564563	31.117896	0.308098	216.562	6.95940	18.83146	0.03769	0.00542	0.00334
0.011070	0.023174	237.999	2.606	111938	0.0345	7.572578	31.429075	0.311179	218.959	6.96677	19.03993	0.03724	0.00535	0.00332
0.011048	0.022898	240.628	2.629	115766	0.0342	7.580432	31.743366	0.314291	221.378	6.97400	19.25028	0.03681	0.00528	0.00331
0.011026	0.022631	243.282	2.653	119691	0.0339	7.588131	32.060800	0.317434	223.819	6.98108	19.46252	0.03639	0.00521	0.00329
0.011005	0.022372	245.959	2.677	123716	0.0336	7.595680	32.381408	0.320608	226.282	6.98803	19.67670	0.03599	0.00515	0.00327
0.010984	0.022122	248.660	2.702	127841	0.0333	7.603082	32.705222	0.323814	228.768	6.99484	19.89284	0.03560	0.00509	0.00326
0.010964	0.021880	251.387	2.726	132071	0.0331	7.610342	33.032274	0.327052	231.276	7.00151	20.11095	0.03522	0.00503	0.00324
0.010945	0.021644	254.138	2.751	136406	0.0328	7.617465	33.362597	0.330323	233.807	7.00807	20.33107	0.03485	0.00497	0.00323
0.010927	0.021416	256.915	2.777	140850	0.0326	7.624453	33.696223	0.333626	236.362	7.01450	20.55322	0.03449	0.00492	0.00321
0.010909	0.021195	259.718	2.803	145404	0.0323	7.631312	34.033185	0.336962	238.940	7.02081	20.77743	0.03414	0.00486	0.00320
0.010891	0.020980	262.546	2.829	150072	0.0321	7.638045	34.373517	0.340332	241.543	7.02700	21.00372	0.03381	0.00481	0.00318
0.010874	0.020771	265.401	2.855	154855	0.0319	7.644655	34.717252	0.343735	244.169	7.03308	21.23211	0.03348	0.00476	0.00317

SM & S-KM lambda=0 & sig (A4–2)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-2 Case study of the **Solow-Kamiryo** Model: λ is given as zero

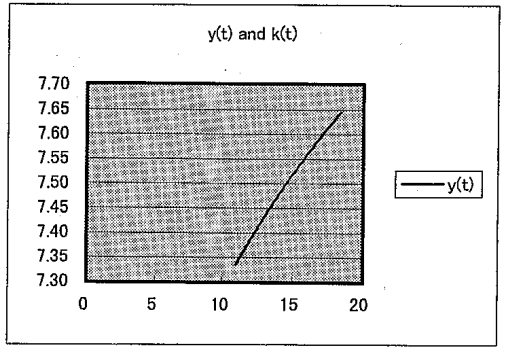
$\Delta k(t)=(kt(1+n)-k(t-1))/n$

DRC	K^{υ}		k^{υ}	using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
(2)	275.0000		11.00000											
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
---	275.0000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---
0.49832	284.0364	9.0364	11.2490	36.1458	3.21325	6.44820	8.7013	0.2407	185.509	0.84279	2.76938	7.3469	0.6531	0.00000
0.50497	293.1790	9.1426	11.4961	36.2082	3.14961	6.23718	8.6767	0.2396	187.700	0.84674	2.72549	7.3600	0.6402	0.00000
0.51152	302.4285	9.2495	11.7414	36.2690	3.08899	6.03889	8.6535	0.2386	189.906	0.85053	2.68334	7.3728	0.6279	0.00000
0.51795	311.7857	9.3572	11.9848	36.3280	3.03118	5.85227	8.6316	0.2376	192.130	0.85417	2.64283	7.3853	0.6162	0.00000
0.52427	321.2514	9.4657	12.2264	36.3855	2.97598	5.67641	8.6109	0.2367	194.370	0.85767	2.60387	7.3974	0.6050	0.00000
0.53049	330.8265	9.5751	12.4661	36.4414	2.92323	5.51045	8.5913	0.2358	196.627	0.86104	2.56637	7.4093	0.5944	0.00000
0.53660	340.5118	9.6853	12.7041	36.4958	2.87277	5.35365	8.5728	0.2349	198.902	0.86428	2.53026	7.4208	0.5841	0.00000
0.54261	350.3081	9.7963	12.9401	36.5489	2.82446	5.20530	8.5552	0.2341	201.195	0.86740	2.49546	7.4320	0.5743	0.00000
0.54852	360.2164	9.9083	13.1744	36.6006	2.77816	5.06480	8.5386	0.2333	203.507	0.87041	2.46191	7.4430	0.5650	0.00000
0.55434	370.2376	10.0212	13.4068	36.6510	2.73375	4.93157	8.5227	0.2325	205.837	0.87331	2.42953	7.4537	0.5560	0.00000
0.56006	380.3725	10.1350	13.6375	36.7002	2.69113	4.80511	8.5077	0.2318	208.187	0.87611	2.39827	7.4641	0.5473	0.00000
0.56568	390.6222	10.2497	13.8663	36.7482	2.65018	4.68493	8.4934	0.2311	210.556	0.87881	2.36807	7.4743	0.5390	0.00000
0.57122	400.9876	10.3654	14.0933	36.7950	2.61081	4.57063	8.4799	0.2305	212.944	0.88142	2.33889	7.4842	0.5310	0.00000
0.57666	411.4696	10.4821	14.3185	36.8408	2.57294	4.46180	8.4669	0.2298	215.353	0.88394	2.31067	7.4940	0.5234	0.00000
0.58202	422.0694	10.5997	14.5420	36.8854	2.53648	4.35808	8.4546	0.2292	217.783	0.88638	2.28337	7.5035	0.5160	0.00000
0.58729	432.7877	10.7184	14.7636	36.9291	2.50136	4.25916	8.4428	0.2286	220.233	0.88874	2.25694	7.5128	0.5089	0.00000
0.59248	443.6258	10.8381	14.9835	36.9718	2.46750	4.16471	8.4316	0.2281	222.705	0.89102	2.23135	7.5219	0.5020	0.00000
0.59758	454.5846	10.9588	15.2016	37.0135	2.43484	4.07447	8.4209	0.2275	225.198	0.89324	2.20655	7.5308	0.4954	0.00000
0.60261	465.6652	11.0806	15.4180	37.0543	2.40332	3.98818	8.4107	0.2270	227.713	0.89538	2.18251	7.5395	0.4890	0.00000
0.60756	476.8687	11.2035	15.6326	37.0942	2.37288	3.90561	8.4009	0.2265	230.251	0.89746	2.15921	7.5480	0.4828	0.00000
0.61243	488.1961	11.3274	15.8455	37.1333	2.34346	3.82653	8.3916	0.2260	232.811	0.89948	2.13659	7.5564	0.4769	0.00000
0.61722	499.6486	11.4525	16.0566	37.1716	2.31503	3.75073	8.3826	0.2255	235.393	0.90143	2.11465	7.5646	0.4711	0.00000
0.62194	511.2273	11.5787	16.2661	37.2090	2.28752	3.67804	8.3741	0.2251	237.999	0.90333	2.09334	7.5726	0.4655	0.00000
0.62659	522.9332	11.7060	16.4738	37.2457	2.26091	3.60828	8.3659	0.2246	240.628	0.90517	2.07264	7.5804	0.4602	0.00000
0.63116	534.7677	11.8344	16.6798	37.2816	2.23513	3.54128	8.3580	0.2242	243.282	0.90696	2.05253	7.5881	0.4549	0.00000
0.63567	546.7317	11.9641	16.8841	37.3168	2.21017	3.47690	8.3505	0.2238	245.959	0.90870	2.03299	7.5957	0.4499	0.00000
0.64011	558.8266	12.0949	17.0868	37.3513	2.18598	3.41500	8.3433	0.2234	248.660	0.91039	2.01398	7.6031	0.4450	0.00000
0.64448	571.0534	12.2269	17.2877	37.3851	2.16252	3.35544	8.3364	0.2230	251.387	0.91204	1.99550	7.6103	0.4402	0.00000
0.64879	583.4135	12.3601	17.4871	37.4182	2.13977	3.29810	8.3297	0.2226	254.138	0.91364	1.97751	7.6175	0.4356	0.00000
0.65303	595.9081	12.4945	17.6847	37.4507	2.11769	3.24286	8.3233	0.2222	256.915	0.91519	1.96000	7.6245	0.4311	0.00000
0.65721	608.5383	12.6302	17.8807	37.4826	2.09625	3.18963	8.3172	0.2219	259.718	0.91671	1.94296	7.6313	0.4268	0.00000
0.66133	621.3054	12.7671	18.0751	37.5138	2.07544	3.13830	8.3113	0.2216	262.546	0.91818	1.92635	7.6380	0.4226	0.00000
0.66538	634.2108	12.9054	18.2679	37.5445	2.05522	3.08878	8.3056	0.2212	265.401	0.91962	1.91018	7.6447	0.4185	0.00000

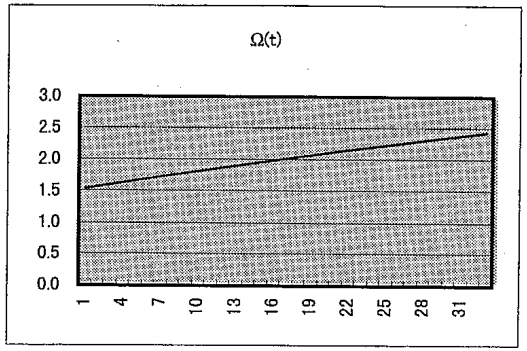
Figure A4-2-2 S-K Model when λ is zero For Appendix 4-2-2 Case study of the **Solow-Kamiryo** Model: λ is given as zero

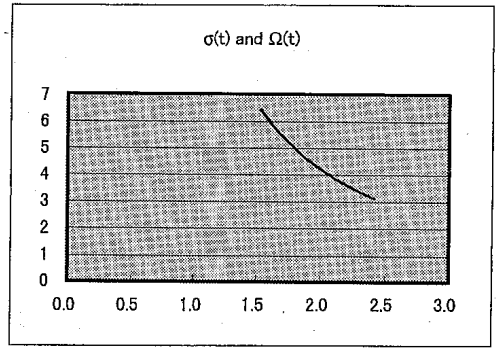
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	1.5	11	6.053270	**0.000000**	**0.044984**	1.111509	1.349516

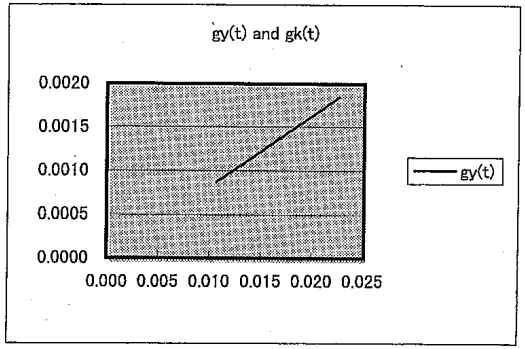
k(t)	y(t)	Ω(t)	**σ(t)**	gk(t)	gy(t)
11.00000	7.33333	1.53217	6.44820	0.02263	0.00185
11.25667	7.34688	1.56405	6.23718	0.02197	0.00179
11.51144	7.36004	1.59563	6.03889	0.02134	0.00174
11.76433	7.37285	1.62692	5.85227	0.02073	0.00169
12.01533	7.38531	1.65793	5.67641	0.02016	0.00164
12.26444	7.39745	1.68865	5.51045	0.01961	0.00160
12.51167	7.40927	1.71909	5.35365	0.01909	0.00155
12.75702	7.42079	1.74925	5.20530	0.01858	0.00151
13.00049	7.43202	1.77914	5.06480	0.01810	0.00147
13.24208	7.44297	1.80875	4.93157	0.01764	0.00144
13.48181	7.45366	1.83809	4.80511	0.01720	0.00140
13.71968	7.46410	1.86716	4.68493	0.01678	0.00137
13.95568	7.47429	1.89596	4.57063	0.01637	0.00133
14.18984	7.48425	1.92450	4.46180	0.01598	0.00130
14.42216	7.49398	1.95278	4.35808	0.01560	0.00127
14.65263	7.50349	1.98079	4.25916	0.01524	0.00124
14.88128	7.51279	2.00855	4.16471	0.01489	0.00121
15.10811	7.52189	2.03606	4.07447	0.01456	0.00118
15.33312	7.53079	2.06331	3.98818	0.01423	0.00116
15.55633	7.53950	2.09031	3.90561	0.01392	0.00113
15.77774	7.54803	2.11707	3.82653	0.01362	0.00111
15.99737	7.55638	2.14358	3.75073	0.01333	0.00108
16.21521	7.56456	2.16984	3.67804	0.01304	0.00106
16.43129	7.57258	2.19586	3.60828	0.01277	0.00104
16.64560	7.58043	2.22165	3.54128	0.01251	0.00102
16.85817	7.58813	2.24720	3.47690	0.01225	0.00099
17.06899	7.59568	2.27251	3.41500	0.01200	0.00097
17.27809	7.60308	2.29759	3.35544	0.01176	0.00095
17.48546	7.61034	2.32244	3.29810	0.01153	0.00094
17.69112	7.61746	2.34706	3.24286	0.01130	0.00092
17.89509	7.62445	2.37146	3.18963	0.01108	0.00090
18.09736	7.63131	2.39563	3.13830	0.01087	0.00088
18.29795	7.63804	2.41958	3.08878	0.01066	0.00087
18.49687	7.64465				



DRC







Appendix 4-2-3 Case study of the **Solow-Kamiryo** Model: when $s_{SP/Y}$=**n** resulting in λ=zero

If Ω*=θ, then λ is a variable **DRC** **Balanced growth-state**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^α	A(0) as a variable	λ as a variable	$s_{SP/Y}$ equal to n	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ	g^*_y=λ/(1-α)	g^*_Y=g^*_y+n
0.01	0.05	0.08	1.5	11	0.92	1.211467	7.333333	6.053270	0	0.01	5	0.3	0	0.01

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change in k	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_Ω$(t)	k^*(t), where χ=1/(1-α)
0	11	6.053270	7.333333	0.366667	0.110000	0.256667	11.256667	0.023333	1.5	---	0.053333	---	=A(t)^χ($Ω^*$)^χ
1	11.256667	6.053270	7.346877	0.367344	0.112567	0.254777	11.511444	0.022633	1.532170	0.001847	0.052214	0.021447	infinite
2	11.511444	6.053270	7.360044	0.368002	0.115114	0.252888	11.764332	0.021968	1.564046	0.001792	0.051149	0.020804	
3	11.764332	6.053270	7.372850	0.368642	0.117643	0.250999	12.015331	0.021336	1.595629	0.001740	0.050137	0.020193	**$Ω^*$=s/(n+g^*_y)**
4	12.015331	6.053270	7.385312	0.369266	0.120153	0.249112	12.264443	0.020733	1.626922	0.001690	0.049173	0.019612	5.000000
5	12.264443	6.053270	7.397447	0.369872	0.122644	0.247228	12.511671	0.020158	1.657929	0.001643	0.048253	0.019059	
6	12.511671	6.053270	7.409267	0.370463	0.125117	0.245347	12.757018	0.019609	1.688652	0.001598	0.047375	0.018531	A^*=k^*/($Ω^*$$k^*$^α)
7	12.757018	6.053270	7.420787	0.371039	0.127570	0.243469	13.000487	0.019085	1.719092	0.001555	0.046536	0.018027	infinite
8	13.000487	6.053270	7.432018	0.371601	0.130005	0.241596	13.242083	0.018584	1.749254	0.001514	0.045734	0.017545	
9	13.242083	6.053270	7.442974	0.372149	0.132421	0.239728	13.481811	0.018103	1.779139	0.001474	0.044966	0.017084	y^*=$A^*$$k^*$^α
10	13.481811	6.053270	7.453665	0.372683	0.134818	0.237865	13.719676	0.017643	1.808749	0.001436	0.044229	0.016643	infinite
11	13.719676	6.053270	7.464101	0.373205	0.137197	0.236008	13.955684	0.017202	1.838088	0.001400	0.043523	0.016221	
12	13.955684	6.053270	7.474293	0.373715	0.139557	0.234158	14.189842	0.016779	1.867158	0.001365	0.042846	0.015815	**g^*_Y=s/$Ω^*$**
13	14.189842	6.053270	7.484249	0.374212	0.141898	0.232314	14.422156	0.016372	1.895961	0.001332	0.042195	0.015426	0.010000
14	14.422156	6.053270	7.493978	0.374699	0.144222	0.230477	14.652633	0.015981	1.924499	0.001300	0.041569	0.015052	
15	14.652633	6.053270	7.503489	0.375174	0.146526	0.228648	14.881281	0.015605	1.952776	0.001269	0.040967	0.014693	**r^*=α/$Ω^*$**
16	14.881281	6.053270	7.512790	0.375639	0.148813	0.226827	15.108108	0.015242	1.980793	0.001239	0.040388	0.014347	0.016000
17	15.108108	6.053270	7.521887	0.376094	0.151081	0.225013	15.333121	0.014894	2.008553	0.001211	0.039830	0.014015	
18	15.333121	6.053270	7.530789	0.376539	0.153331	0.223208	15.556330	0.014557	2.036058	0.001183	0.039292	0.013694	**Note:**
19	15.556330	6.053270	7.539501	0.376975	0.155563	0.221412	15.777741	0.014233	2.063310	0.001157	0.038773	0.013385	K(t)/Y(t)
20	15.777741	6.053270	7.548030	0.377401	0.157777	0.219624	15.997365	0.013920	2.090313	0.001131	0.038272	0.013087	=Ω(t)
21	15.997365	6.053270	7.556382	0.377819	0.159974	0.217845	16.215211	0.013618	2.117067	0.001107	0.037788	0.012799	=k(t) ^ (1-α) / A(t)
22	16.215211	6.053270	7.564563	0.378228	0.162152	0.216076	16.431287	0.013326	2.143575	0.001083	0.037321	0.012521	
23	16.431287	6.053270	7.572578	0.378629	0.164313	0.214316	16.645603	0.013043	2.169841	0.001060	0.036869	0.012253	A(t)
24	16.645603	6.053270	7.580432	0.379022	0.166456	0.212566	16.858169	0.012770	2.195865	0.001037	0.036432	0.011993	=$J$3*EXP($K$3*A5)
25	16.858169	6.053270	7.588131	0.379407	0.168582	0.210825	17.068993	0.012506	2.221650	0.001016	0.036009	0.011742	=A(0)*EXP(λ*t)
26	17.068993	6.053270	7.595680	0.379784	0.170690	0.209094	17.278087	0.012250	2.247198	0.000995	0.035600	0.011500	
27	17.278087	6.053270	7.603082	0.380154	0.172781	0.207373	17.485461	0.012002	2.272511	0.000975	0.035203	0.011264	**k^*(t), where χ=1/(1-α)**
28	17.485461	6.053270	7.610342	0.380517	0.174855	0.205662	17.691123	0.011762	2.297592	0.000955	0.034819	0.011037	=A(t)^χ($Ω^*$)^χ
29	17.691123	6.053270	7.617465	0.380873	0.176911	0.203962	17.895085	0.011529	2.322442	0.000936	0.034446	0.010816	**infinite**
30	17.895085	6.053270	7.624453	0.381223	0.178951	0.202272	18.097357	0.011303	2.347065	0.000917	0.034085	0.010602	**Thus, k^*, y^*, and A^***
31	18.097357	6.053270	7.631312	0.381566	0.180974	0.200592	18.297949	0.011084	2.371461	0.000900	0.033734	0.010394	**infinite**
32	18.297949	6.053270	7.638045	0.381902	0.182979	0.198923	18.496872	0.010871	2.395633	0.000882	0.033394	0.010193	
33	18.496872	6.053270	7.644655	0.382233	0.184969	0.197264	18.694136	0.010665	2.419582	0.000865	0.033064	0.009997	

SM & S-KM lambda=0 & sig (A4-2)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-3 Case study of the **Solow-Kamiryo** Model: $s_{SP/Y}$=n resulting in λ=zero

DRC		Y^{υ}		$(W*K)^{\upsilon}$		y^{υ}	L^{υ}	gL(t)=0.01=**n**	W^{υ}	w^{υ}	P^{υ}		$(r/w)^{\upsilon}$	
		183.3333		46383		7.333333	**25**	0.01	168.667	6.74667	14.66667	0.05333	0.00791	using g_{WK}(t)
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	g_{WK}(t)	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.333333	25.000000	---	168.667	6.74667	14.66667	0.05333	0.00791	---
0.011865	0.032860	185.509	2.175	48476	0.0451	7.346877	25.250000	0.250000	170.668	6.75913	14.84069	0.05225	0.00773	0.00385
0.011810	0.032188	187.700	2.191	50627	0.0444	7.360044	25.502500	0.252500	172.684	6.77124	15.01596	0.05122	0.00756	0.00382
0.011757	0.031549	189.906	2.207	52838	0.0437	7.372850	25.757525	0.255025	174.714	6.78302	15.19251	0.05024	0.00741	0.00379
0.011707	0.030940	192.130	2.223	55111	0.0430	7.385312	26.015100	0.257575	176.759	6.79449	15.37037	0.04930	0.00726	0.00376
0.011659	0.030360	194.370	2.240	57446	0.0424	7.397447	26.275251	0.260151	178.820	6.80565	15.54958	0.04840	0.00711	0.00373
0.011614	0.029806	196.627	2.257	59846	0.0418	7.409267	26.538004	0.262753	180.897	6.81653	15.73017	0.04755	0.00698	0.00370
0.011570	0.029276	198.902	2.275	62310	0.0412	7.420787	26.803384	0.265380	182.990	6.82712	15.91218	0.04673	0.00684	0.00367
0.011529	0.028769	201.195	2.293	64842	0.0406	7.432018	27.071418	0.268034	185.100	6.83746	16.09562	0.04595	0.00672	0.00365
0.011489	0.028285	203.507	2.312	67442	0.0401	7.442974	27.342132	0.270714	187.226	6.84754	16.28054	0.04520	0.00660	0.00362
0.011451	0.027820	205.837	2.330	70112	0.0396	7.453665	27.615553	0.273421	189.370	6.85737	16.46697	0.04448	0.00649	0.00360
0.011414	0.027374	208.187	2.349	72853	0.0391	7.464101	27.891709	0.276156	191.532	6.86697	16.65492	0.04379	0.00638	0.00357
0.011379	0.026946	210.556	2.369	75668	0.0386	7.474293	28.170626	0.278917	193.711	6.87635	16.84444	0.04312	0.00627	0.00355
0.011345	0.026536	212.944	2.389	78557	0.0382	7.484249	28.452332	0.281706	195.909	6.88551	17.03555	0.04248	0.00617	0.00352
0.011313	0.026141	215.353	2.409	81522	0.0377	7.493978	28.736855	0.284523	198.125	6.89446	17.22827	0.04187	0.00607	0.00350
0.011282	0.025761	217.783	2.430	84566	0.0373	7.503489	29.024224	0.287369	200.360	6.90321	17.42264	0.04128	0.00598	0.00348
0.011252	0.025395	220.233	2.450	87689	0.0369	7.512790	29.314466	0.290242	202.615	6.91177	17.61867	0.04071	0.00589	0.00346
0.011223	0.025042	222.705	2.472	90894	0.0365	7.521887	29.607611	0.293145	204.889	6.92014	17.81641	0.04016	0.00580	0.00344
0.011195	0.024703	225.198	2.493	94182	0.0362	7.530789	29.903687	0.296076	207.182	6.92833	18.01587	0.03963	0.00572	0.00342
0.011168	0.024375	227.713	2.515	97555	0.0358	7.539501	30.202724	0.299037	209.496	6.93634	18.21708	0.03912	0.00564	0.00340
0.011143	0.024059	230.251	2.537	101015	0.0355	7.548030	30.504751	0.302027	211.831	6.94419	18.42006	0.03863	0.00556	0.00338
0.011118	0.023754	232.811	2.560	104565	0.0351	7.556382	30.809799	0.305048	214.186	6.95187	18.62485	0.03815	0.00549	0.00336
0.011093	0.023459	235.393	2.583	108205	0.0348	7.564563	31.117896	0.308098	216.562	6.95940	18.83146	0.03769	0.00542	0.00334
0.011070	0.023174	237.999	2.606	111938	0.0345	7.572578	31.429075	0.311179	218.959	6.96677	19.03993	0.03724	0.00535	0.00332
0.011048	0.022898	240.628	2.629	115766	0.0342	7.580432	31.743366	0.314291	221.378	6.97400	19.25028	0.03681	0.00528	0.00331
0.011026	0.022631	243.282	2.653	119691	0.0339	7.588131	32.060800	0.317434	223.819	6.98108	19.46252	0.03639	0.00521	0.00329
0.011005	0.022372	245.959	2.677	123716	0.0336	7.595680	32.381408	0.320608	226.282	6.98803	19.67670	0.03599	0.00515	0.00327
0.010984	0.022122	248.660	2.702	127841	0.0333	7.603082	32.705222	0.323814	228.768	6.99484	19.89284	0.03560	0.00509	0.00326
0.010964	0.021880	251.387	2.726	132071	0.0331	7.610342	33.032274	0.327052	231.276	7.00151	20.11095	0.03522	0.00503	0.00324
0.010945	0.021644	254.138	2.751	136406	0.0328	7.617465	33.362597	0.330323	233.807	7.00807	20.33107	0.03485	0.00497	0.00323
0.010927	0.021416	256.915	2.777	140850	0.0326	7.624453	33.696223	0.333626	236.362	7.01450	20.55322	0.03449	0.00492	0.00321
0.010909	0.021195	259.718	2.803	145404	0.0323	7.631312	34.033185	0.336962	238.940	7.02081	20.77743	0.03414	0.00486	0.00320
0.010891	0.020980	262.546	2.829	150072	0.0321	7.638045	34.373517	0.340332	241.543	7.02700	21.00372	0.03381	0.00481	0.00318
0.010874	0.020771	265.401	2.855	154855	0.0319	7.644655	34.717252	0.343735	244.169	7.03308	21.23211	0.03348	0.00476	0.00317

SM & S-KM lambda=0 & sig (A4-2)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-2-3 Case study of the **Solow-Kamiryo** Model: $s_{SP/Y}$=n resulting in λ=zero

$\Delta k(t)=(kt(1+n)-k(t-1))/n$

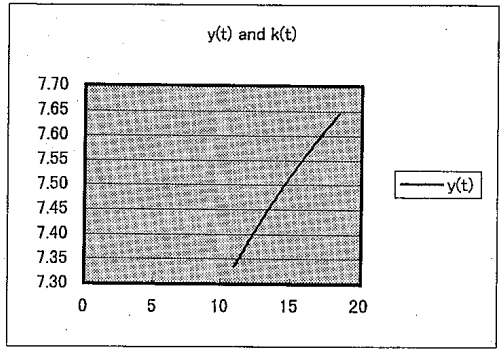
DRC	K^{v}		k^{v}	using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	λ
(2)	275.0000		11.00000											
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	
---	275.0000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---
0.49832	284.0364	9.0364	11.2490	36.1458	3.21325	6.44820	8.7013	0.2407	185.509	0.84279	2.76938	7.3469	0.6531	0.00000
0.50497	293.1790	9.1426	11.4961	36.2082	3.14961	6.23718	8.6767	0.2396	187.700	0.84674	2.72549	7.3600	0.6402	0.00000
0.51152	302.4285	9.2495	11.7414	36.2690	3.08899	6.03889	8.6535	0.2386	189.906	0.85053	2.68334	7.3728	0.6279	0.00000
0.51795	311.7857	9.3572	11.9848	36.3280	3.03118	5.85227	8.6316	0.2376	192.130	0.85417	2.64283	7.3853	0.6162	0.00000
0.52427	321.2514	9.4657	12.2264	36.3855	2.97598	5.67641	8.6109	0.2367	194.370	0.85767	2.60387	7.3974	0.6050	0.00000
0.53049	330.8265	9.5751	12.4661	36.4414	2.92323	5.51045	8.5913	0.2358	196.627	0.86104	2.56637	7.4093	0.5944	0.00000
0.53660	340.5118	9.6853	12.7041	36.4958	2.87277	5.35365	8.5728	0.2349	198.902	0.86428	2.53026	7.4208	0.5841	0.00000
0.54261	350.3081	9.7963	12.9401	36.5489	2.82446	5.20530	8.5552	0.2341	201.195	0.86740	2.49546	7.4320	0.5743	0.00000
0.54852	360.2164	9.9083	13.1744	36.6006	2.77816	5.06480	8.5386	0.2333	203.507	0.87041	2.46191	7.4430	0.5650	0.00000
0.55434	370.2376	10.0212	13.4068	36.6510	2.73375	4.93157	8.5227	0.2325	205.837	0.87331	2.42953	7.4537	0.5560	0.00000
0.56006	380.3725	10.1350	13.6375	36.7002	2.69113	4.80511	8.5077	0.2318	208.187	0.87611	2.39827	7.4641	0.5473	0.00000
0.56568	390.6222	10.2497	13.8663	36.7482	2.65018	4.68493	8.4934	0.2311	210.556	0.87881	2.36807	7.4743	0.5390	0.00000
0.57122	400.9876	10.3654	14.0933	36.7950	2.61081	4.57063	8.4799	0.2305	212.944	0.88142	2.33889	7.4842	0.5310	0.00000
0.57666	411.4696	10.4821	14.3185	36.8408	2.57294	4.46180	8.4669	0.2298	215.353	0.88394	2.31067	7.4940	0.5234	0.00000
0.58202	422.0694	10.5997	14.5420	36.8854	2.53648	4.35808	8.4546	0.2292	217.783	0.88638	2.28337	7.5035	0.5160	0.00000
0.58729	432.7877	10.7184	14.7636	36.9291	2.50136	4.25916	8.4428	0.2286	220.233	0.88874	2.25694	7.5128	0.5089	0.00000
0.59248	443.6258	10.8381	14.9835	36.9718	2.46750	4.16471	8.4316	0.2281	222.705	0.89102	2.23135	7.5219	0.5020	0.00000
0.59758	454.5846	10.9588	15.2016	37.0135	2.43484	4.07447	8.4209	0.2275	225.198	0.89324	2.20655	7.5308	0.4954	0.00000
0.60261	465.6652	11.0806	15.4180	37.0543	2.40332	3.98818	8.4107	0.2270	227.713	0.89538	2.18251	7.5395	0.4890	0.00000
0.60756	476.8687	11.2035	15.6326	37.0942	2.37288	3.90561	8.4009	0.2265	230.251	0.89746	2.15921	7.5480	0.4828	0.00000
0.61243	488.1961	11.3274	15.8455	37.1333	2.34346	3.82653	8.3916	0.2260	232.811	0.89948	2.13659	7.5564	0.4769	0.00000
0.61722	499.6486	11.4525	16.0566	37.1716	2.31503	3.75073	8.3826	0.2255	235.393	0.90143	2.11465	7.5646	0.4711	0.00000
0.62194	511.2273	11.5787	16.2661	37.2090	2.28752	3.67804	8.3741	0.2251	237.999	0.90333	2.09334	7.5726	0.4655	0.00000
0.62659	522.9332	11.7060	16.4738	37.2457	2.26091	3.60828	8.3659	0.2246	240.628	0.90517	2.07264	7.5804	0.4602	0.00000
0.63116	534.7677	11.8344	16.6798	37.2816	2.23513	3.54128	8.3580	0.2242	243.282	0.90696	2.05253	7.5881	0.4549	0.00000
0.63567	546.7317	11.9641	16.8841	37.3168	2.21017	3.47690	8.3505	0.2238	245.959	0.90870	2.03299	7.5957	0.4499	0.00000
0.64011	558.8266	12.0949	17.0868	37.3513	2.18598	3.41500	8.3433	0.2234	248.660	0.91039	2.01398	7.6031	0.4450	0.00000
0.64448	571.0534	12.2269	17.2877	37.3851	2.16252	3.35544	8.3364	0.2230	251.387	0.91204	1.99550	7.6103	0.4402	0.00000
0.64879	583.4135	12.3601	17.4871	37.4182	2.13977	3.29810	8.3297	0.2226	254.138	0.91364	1.97751	7.6175	0.4356	0.00000
0.65303	595.9081	12.4945	17.6847	37.4507	2.11769	3.24286	8.3233	0.2222	256.915	0.91519	1.96000	7.6245	0.4311	0.00000
0.65721	608.5383	12.6302	17.8807	37.4826	2.09625	3.18963	8.3172	0.2219	259.718	0.91671	1.94296	7.6313	0.4268	0.00000
0.66133	621.3054	12.7671	18.0751	37.5138	2.07544	3.13830	8.3113	0.2216	262.546	0.91818	1.92635	7.6380	0.4226	0.00000
0.66538	634.2108	12.9054	18.2679	37.5445	2.05522	3.08878	8.3056	0.2212	265.401	0.91962	1.91018	7.6447	0.4185	0.00000

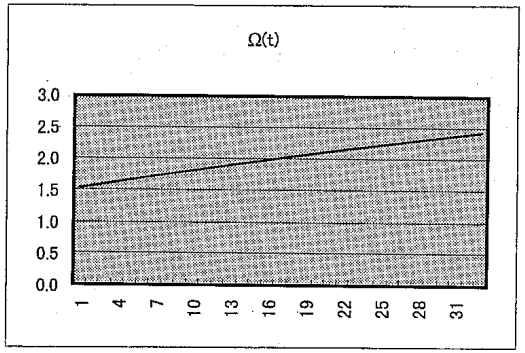
Figure A4-2-3 S-K Model when $s_{SP/Y}$=n For Appendix 4-2-3 Case study of the **Solow-Kamiryo** Model: $s_{SP/Y}$=n resulting in λ=zero

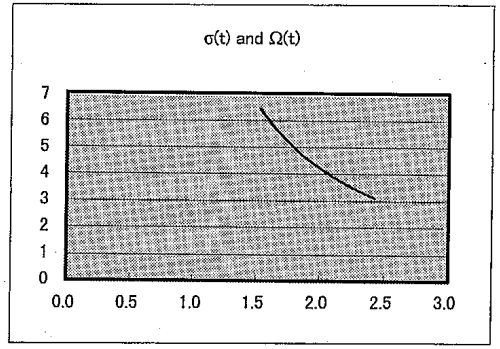
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	1.5	11	6.053270	**0.000000**	**0.010000**	5.000000	0.300000

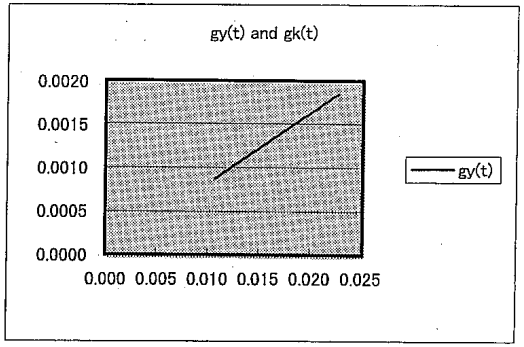
k(t)	y(t)	Ω(t)	σ(t)	gk(t)	gy(t)
11.00000	7.33333				
11.25667	7.34688	1.53217	6.44820	0.02263	0.00185
11.51144	7.36004	1.56405	6.23718	0.02197	0.00179
11.76433	7.37285	1.59563	6.03889	0.02134	0.00174
12.01533	7.38531	1.62692	5.85227	0.02073	0.00169
12.26444	7.39745	1.65793	5.67641	0.02016	0.00164
12.51167	7.40927	1.68865	5.51045	0.01961	0.00160
12.75702	7.42079	1.71909	5.35365	0.01909	0.00155
13.00049	7.43202	1.74925	5.20530	0.01858	0.00151
13.24208	7.44297	1.77914	5.06480	0.01810	0.00147
13.48181	7.45366	1.80875	4.93157	0.01764	0.00144
13.71968	7.46410	1.83809	4.80511	0.01720	0.00140
13.95568	7.47429	1.86716	4.68493	0.01678	0.00137
14.18984	7.48425	1.89596	4.57063	0.01637	0.00133
14.42216	7.49398	1.92450	4.46180	0.01598	0.00130
14.65263	7.50349	1.95278	4.35808	0.01560	0.00127
14.88128	7.51279	1.98079	4.25916	0.01524	0.00124
15.10811	7.52189	2.00855	4.16471	0.01489	0.00121
15.33312	7.53079	2.03606	4.07447	0.01456	0.00118
15.55633	7.53950	2.06331	3.98818	0.01423	0.00116
15.77774	7.54803	2.09031	3.90561	0.01392	0.00113
15.99737	7.55638	2.11707	3.82653	0.01362	0.00111
16.21521	7.56456	2.14358	3.75073	0.01333	0.00108
16.43129	7.57258	2.16984	3.67804	0.01304	0.00106
16.64560	7.58043	2.19586	3.60828	0.01277	0.00104
16.85817	7.58813	2.22165	3.54128	0.01251	0.00102
17.06899	7.59568	2.24720	3.47690	0.01225	0.00099
17.27809	7.60308	2.27251	3.41500	0.01200	0.00097
17.48546	7.61034	2.29759	3.35544	0.01176	0.00095
17.69112	7.61746	2.32244	3.29810	0.01153	0.00094
17.89509	7.62445	2.34706	3.24286	0.01130	0.00092
18.09736	7.63131	2.37146	3.18963	0.01108	0.00090
18.29795	7.63804	2.39563	3.13830	0.01087	0.00088
18.49687	7.64465	2.41958	3.08878	0.01066	0.00087

DRC





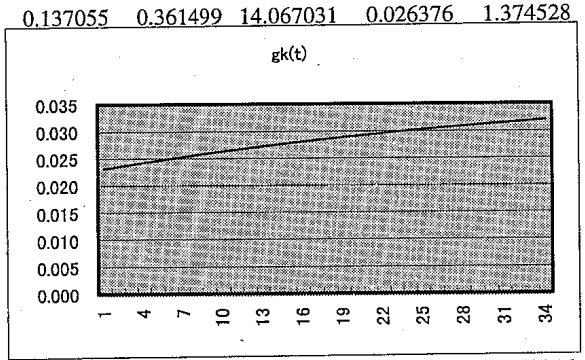




Appendix 4-3-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long **If $\Omega^{*}=\theta$, then λ is a variable**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^α	A(0) as a variable	**λ as a variable**	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	**IRC** Ψ=Ω(0)/θ	**Balanced growth-state** $g^{*}_{y}=\lambda/(1-\alpha)$	$g^{*}_{Y}=g^{*}_{y}+n$
0.01	0.05	0.08	1.5	11	0.92	1.211467	7.333333	6.053270	**0.032185**	**0.044984**	1.111509	**1.349516**	0.034984	0.044984

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change in k	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_{\Omega}(t)$	$k^{*}(t)$, where $\chi=1/(1-\alpha)$
0	11	6.053270	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.5	---	0.053333	---	$=A(t)^{\chi}(\Omega^{*})^{\chi}$
1	11.256667	6.2512642	7.587184	0.379359	0.112567	0.266793	11.523459	0.023701	1.483642	0.034616	0.053921	-0.010905	infinite
2	11.523459	6.4557349	7.850048	0.392502	0.115235	0.277268	11.800727	0.024061	1.467948	0.034646	0.054498	-0.010578	
3	11.800727	6.6668937	8.122248	0.406112	0.118007	0.288105	12.088832	0.024414	1.452889	0.034675	0.055063	-0.010258	**$\Omega^{*}=\theta=s/(n+g^{*}_{y})$**
4	12.088832	6.8849592	8.404118	0.420206	0.120888	0.299318	12.388150	0.024760	1.438442	0.034703	0.055616	-0.009944	1.111509
5	12.388150	7.1101573	8.696004	0.434800	0.123881	0.310919	12.699068	0.025098	1.424580	0.034731	0.056157	-0.009637	
6	12.699068	7.3427214	8.998265	0.449913	0.126991	0.322923	13.021991	0.025429	1.411280	0.034759	0.056686	-0.009336	$A^{*}=k^{*}/(\Omega^{*}k^{*\alpha})$
7	13.021991	7.5828923	9.311273	0.465564	0.130220	0.335344	13.357335	0.025752	1.398519	0.034785	0.057203	-0.009042	infinite
8	13.357335	7.8309189	9.635413	0.481771	0.133573	0.348197	13.705532	0.026068	1.386275	0.034811	0.057709	-0.008755	
9	13.705532	8.0870582	9.971081	0.498554	0.137055	0.361499	14.067031	0.026376	1.374528	0.034837	0.058202	-0.008474	$y^{*}=A^{*}k^{*\alpha}$
10	14.067031	8.3515754	10.318691	0.515935						0.034862	0.058683	-0.008200	infinite
11	14.442295	8.6247447	10.678669	0.533933						0.034886	0.059152	-0.007932	
12	14.831806	8.9068489	11.051459	0.552573						0.034910	0.059610	-0.007672	**$g^{*}_{Y}=s/\Omega^{*}$**
13	15.236060	9.1981805	11.437517	0.571876						0.034933	0.060055	-0.007418	0.0449839
14	15.655576	9.4990411	11.837317	0.591866						0.034955	0.060489	-0.007170	
15	16.090886	9.8097424	12.251352	0.612568						0.034977	0.060911	-0.006929	$r^{*}=\alpha/\Omega^{*}$
16	16.542544	10.130606	12.680128	0.634006						0.034998	0.061321	-0.006695	0.0719742
17	17.011125	10.461966	13.124172	0.656209						0.035019	0.061720	-0.006467	
18	17.497223	10.804163	13.584031	0.679202						0.035039	0.062108	-0.006245	**Note:**
19	18.001452	11.157553	14.060267	0.703013						0.035059	0.062485	-0.006029	K(t)/Y(t)
20	18.524451	11.522502	14.553466	0.727673						0.035077	0.062851	-0.005820	$=\Omega(t)$
21	19.066880	11.899388	15.064233	0.753212						0.035096	0.063206	-0.005617	$=k(t)^{(1-\alpha)} / A(t)$
22	19.629422	12.288602	15.593194	0.779660	0.196294	0.583365	20.212788	0.029719	1.258846	0.035114	0.063550	-0.005420	
23	20.212788	12.690546	16.140999	0.807050	0.202128	0.604922	20.817710	0.029928	1.252264	0.035131	0.063884	-0.005228	A(t)
24	20.817710	13.105638	16.708320	0.835416	0.208177	0.627239	21.444949	0.030130	1.245949	0.035148	0.064208	-0.005043	=$J$3*EXP($K$3*A5)
25	21.444949	13.534306	17.295854	0.864793	0.214449	0.650343	22.095292	0.030326	1.239890	0.035164	0.064522	-0.004863	$=A(0)*EXP(\lambda*t)$
26	22.095292	13.976996	17.904320	0.895216	0.220953	0.674263	22.769555	0.030516	1.234076	0.035180	0.064826	-0.004689	$k^{*}(t)$, where $\chi=1/(1-\alpha)$
27	22.769555	14.434165	18.534465	0.926723	0.227696	0.699028	23.468583	0.030700	1.228498	0.035195	0.065120	-0.004520	$=A(t)^{\chi}(\Omega^{*})^{\chi}$
28	23.468583	14.906288	19.187062	0.959353	0.234686	0.724667	24.193250	0.030878	1.223146	0.035210	0.065405	-0.004356	infinite
29	24.193250	15.393854	19.862911	0.993146	0.241933	0.751213	24.944463	0.031051	1.218011	0.035224	0.065681	-0.004198	Thus, k^{*}, y^{*}, and A^{*}
30	24.944463	15.897367	20.562842	1.028142	0.249445	0.778697	25.723161	0.031217	1.213084	0.035238	0.065948	-0.004045	infinite
31	25.723161	16.417349	21.287712	1.064386	0.257232	0.807154	26.530315	0.031378	1.208357	0.035251	0.066206	-0.003897	
32	26.530315	16.95434	22.038411	1.101921	0.265303	0.836617	27.366932	0.031534	1.203822	0.035264	0.066455	-0.003754	
33	27.366932	17.508894	22.815858	1.140793	0.273669	0.867124	28.234056	0.031685	1.199470	0.035277	0.066696	-0.003615	



Structure of the elasiticity of substitution, σ (1) For Appendix 4-3-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

IRC

		Y^0		$(W*K)^0$		y^0	L^0	gL(t)=0.01=**n**	W^0	w^0	P^0		$(r/w)^0$	
		183.3333		46383		7.333333	25	0.01	168.667	6.74667	14.6667	0.05333	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.333333	25.000000	---	168.667	6.74667	14.6667	0.05333	0.00791	---
0.044962	0.033938	191.576	8.243	50114	0.0804	7.587184	25.250000	0.250000	176.250	6.98021	15.3261	0.05390	0.00772	0.00545
0.044992	0.034302	200.196	8.619	54165	0.0808	7.850048	25.502500	0.252500	184.180	7.22204	16.0157	0.05446	0.00754	0.00530
0.045022	0.034658	209.209	9.013	58565	0.0812	8.122248	25.757525	0.255025	192.472	7.47247	16.7367	0.05500	0.00736	0.00515
0.045050	0.035007	218.634	9.425	63346	0.0816	8.404118	26.015100	0.257575	201.143	7.73179	17.4907	0.05554	0.00718	0.00500
0.045079	0.035349	228.490	9.856	68542	0.0820	8.696004	26.275251	0.260151	210.211	8.00032	18.2792	0.05606	0.00701	0.00486
0.045106	0.035683	238.796	10.306	74190	0.0824	8.998265	26.538004	0.262753	219.692	8.27840	19.1037	0.05657	0.00683	0.00472
0.045133	0.036010	249.574	10.778	80330	0.0828	9.311273	26.803384	0.265380	229.608	8.56637	19.9659	0.05707	0.00666	0.00459
0.045160	0.036329	260.844	11.271	87008	0.0831	9.635413	27.071418	0.268034	239.977	8.86458	20.8675	0.05755	0.00649	0.00446
0.045185	0.036640	272.631	11.786	94271	0.0835	9.971081	27.342132	0.270714	250.820	9.17339	21.8104	0.05803	0.00633	0.00433
0.045210	0.036944	284.956	12.326	102174	0.0838	10.318691	27.615553	0.273421	262.160	9.49320	22.7965	0.05849	0.00616	0.00420
0.045235	0.037240	297.846	12.890	110773	0.0842	10.678669	27.891709	0.276156	274.019	9.82438	23.8277	0.05894	0.00600	0.00408
0.045259	0.037529	311.327	13.480	120131	0.0845	11.051459	28.170626	0.278917	286.420	10.16734	24.9061	0.05938	0.00584	0.00396
0.045282	0.037810	325.424	14.098	130319	0.0848	11.437517	28.452332	0.281706	299.390	10.52252	26.0339	0.05981	0.00568	0.00384
0.045305	0.038083	340.167	14.743	141411	0.0851	11.837317	28.736855	0.284523	312.954	10.89033	27.2134	0.06023	0.00553	0.00372
0.045327	0.038350	355.586	15.419	153489	0.0854	12.251352	29.024224	0.287369	327.139	11.27124	28.4469	0.06063	0.00538	0.00361
0.045348	0.038609	371.711	16.125	166645	0.0857	12.680128	29.314466	0.290242	341.974	11.66572	29.7369	0.06102	0.00523	0.00350
0.045369	0.038861	388.575	16.864	180975	0.0860	13.124172	29.607611	0.293145	357.489	12.07424	31.0860	0.06141	0.00509	0.00340
0.045389	0.039106	406.213	17.637	196588	0.0863	13.584031	29.903687	0.296076	373.716	12.49731	32.4970	0.06178	0.00494	0.00329
0.045409	0.039344	424.658	18.446	213600	0.0865	14.060267	30.202724	0.299037	390.686	12.93545	33.9727	0.06214	0.00480	0.00319
0.045428	0.039575	443.950	19.291	232141	0.0868	14.553466	30.504751	0.302027	408.434	13.38919	35.5160	0.06249	0.00467	0.00309
0.045447	0.039799	464.126	20.176	252350	0.0871	15.064233	30.809799	0.305048	426.996	13.85909	37.1301	0.06283	0.00453	0.00300
0.045465	0.040016	485.227	21.101	274380	0.0873	15.593194	31.117896	0.308098	446.409	14.34574	38.8182	0.06316	0.00440	0.00290
0.045482	0.040227	507.297	22.069	298399	0.0875	16.140999	31.429075	0.311179	466.713	14.84972	40.5837	0.06348	0.00427	0.00281
0.045499	0.040431	530.378	23.082	324590	0.0878	16.708320	31.743366	0.314291	487.948	15.37165	42.4303	0.06378	0.00415	0.00273
0.045516	0.040629	554.519	24.141	353152	0.0880	17.295854	32.060800	0.317434	510.157	15.91219	44.3615	0.06408	0.00403	0.00264
0.045532	0.040821	579.767	25.248	384304	0.0882	17.904320	32.381408	0.320608	533.386	16.47197	46.3814	0.06437	0.00391	0.00256
0.045547	0.041007	606.174	26.407	418285	0.0884	18.534465	32.705222	0.323814	557.680	17.05171	48.4939	0.06465	0.00379	0.00248
0.045562	0.041187	633.792	27.619	455355	0.0886	19.187062	33.032274	0.327052	583.089	17.65210	50.7034	0.06493	0.00368	0.00240
0.045576	0.041361	662.678	28.886	495801	0.0888	19.862911	33.362597	0.330323	609.664	18.27388	53.0143	0.06519	0.00357	0.00232
0.045590	0.041529	692.890	30.212	539934	0.0890	20.562842	33.696223	0.333626	637.459	18.91781	55.4312	0.06544	0.00346	0.00225
0.045604	0.041692	724.489	31.599	588095	0.0892	21.287712	34.033185	0.336962	666.530	19.58469	57.9591	0.06569	0.00335	0.00217
0.045617	0.041850	757.538	33.049	640656	0.0894	22.038411	34.373517	0.340332	696.935	20.27534	60.6030	0.06593	0.00325	0.00210
0.045630	0.042002	792.104	34.566	698026	0.0895	22.815858	34.717252	0.343735	728.736	20.99059	63.3683	0.06616	0.00315	0.00204

S-KM IRC CRC DRC with sig(A4-3)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-3-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

IRC	K^0		k^0	Δk(t)=(kt(1+n)−k(t−1))/n			**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
(2)	275.000		11.00000	using **n**	(1)	(1)/(2)	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	---	---	183.333	---	---	---	---	---
---	275.000	---	11.0000	---	---	---	---	0.8832	191.576	0.22241	0.75481	7.5872	0.6738	0.03219
0.70531	284.333	9.3329	11.2607	37.3316	3.31521	4.70037	32.9723	0.8838	200.196	0.22226	0.76239	7.8500	0.6807	0.03219
0.70235	294.086	9.7531	11.5317	38.6262	3.34958	4.76910	34.1364	0.8843	209.209	0.22212	0.76981	8.1222	0.6876	0.03219
0.69948	304.279	10.1925	11.8132	39.9668	3.38323	4.83677	35.3422	0.8848	218.634	0.22197	0.77707	8.4041	0.6942	0.03219
0.69670	314.931	10.6520	12.1057	41.3550	3.41616	4.90334	36.5911	0.8853	228.490	0.22183	0.78416	8.6960	0.7008	0.03219
0.69401	326.063	11.1325	12.4095	42.7924	3.44836	4.96878	37.8846	0.8858	238.796	0.22170	0.79109	8.9983	0.7071	0.03219
0.69139	337.698	11.6350	12.7251	44.2810	3.47982	5.03306	39.2244	0.8863	249.574	0.22157	0.79785	9.3113	0.7134	0.03219
0.68886	349.858	12.1604	13.0528	45.8225	3.51056	5.09615	40.6121	0.8868	260.844	0.22144	0.80445	9.6354	0.7194	0.03219
0.68642	362.568	12.7098	13.3930	47.4188	3.54056	5.15804	42.0493	0.8872	272.631	0.22131	0.81088	9.9711	0.7254	0.03219
0.68405	375.853	13.2845	13.7463	49.0719	3.56983	5.21870	43.5379	0.8877	284.956	0.22119	0.81715	10.3187	0.7311	0.03219
0.68175	389.738	13.8854	14.1130	50.7838	3.59837	5.27812	45.0797	0.8881	297.846	0.22107	0.82325	10.6787	0.7368	0.03219
0.67953	404.252	14.5138	14.4936	52.5565	3.62618	5.33627	46.6765	0.8886	311.327	0.22095	0.82920	11.0515	0.7423	0.03219
0.67739	419.423	15.1710	14.8887	54.3924	3.65328	5.39316	48.3304	0.8890	325.424	0.22084	0.83498	11.4375	0.7476	0.03219
0.67532	435.281	15.8583	15.2986	56.2936	3.67965	5.44878	50.0433	0.8894	340.167	0.22073	0.84061	11.8373	0.7528	0.03219
0.67331	451.858	16.5770	15.7240	58.2624	3.70532	5.50311	51.8174	0.8898	355.586	0.22062	0.84608	12.2514	0.7579	0.03219
0.67138	469.187	17.3287	16.1654	60.3014	3.73029	5.55616	53.6548	0.8902	371.711	0.22052	0.85139	12.6801	0.7628	0.03219
0.66951	487.302	18.1149	16.6232	62.4129	3.75456	5.60793	55.5578	0.8905	388.575	0.22041	0.85655	13.1242	0.7676	0.03219
0.66770	506.239	18.9370	17.0983	64.5996	3.77814	5.65841	57.5286	0.8909	406.213	0.22032	0.86156	13.5840	0.7722	0.03219
0.66596	526.036	19.7969	17.5910	66.8642	3.80105	5.70762	59.5699	0.8913	424.658	0.22022	0.86643	14.0603	0.7767	0.03219
0.66428	546.732	20.6962	18.1021	69.2094	3.82329	5.75555	61.6839	0.8916	443.950	0.22013	0.87114	14.5535	0.7811	0.03219
0.66265	568.368	21.6367	18.6321	71.6382	3.84487	5.80223	63.8734	0.8919	464.126	0.22004	0.87572	15.0642	0.7853	0.03219
0.66109	590.989	22.6203	19.1818	74.1535	3.86581	5.84765	66.1409	0.8923	485.227	0.21995	0.88015	15.5932	0.7895	0.03219
0.65958	614.638	23.6491	19.7519	76.7583	3.88612	5.89183	68.4893	0.8926	507.297	0.21987	0.88445	16.1410	0.7934	0.03219
0.65812	639.363	24.7250	20.3430	79.4559	3.90581	5.93478	70.9215	0.8929	530.378	0.21978	0.88861	16.7083	0.7973	0.03219
0.65672	665.213	25.8503	20.9560	82.2497	3.92488	5.97652	73.4404	0.8932	554.519	0.21970	0.89265	17.2959	0.8010	0.03219
0.65536	692.240	27.0272	21.5915	85.1429	3.94336	6.01706	76.0492	0.8935	579.767	0.21963	0.89655	17.9043	0.8047	0.03219
0.65406	720.499	28.2582	22.2504	88.1393	3.96125	6.05642	78.7509	0.8938	606.174	0.21955	0.90032	18.5345	0.8082	0.03219
0.65280	750.044	29.5456	22.9335	91.2424	3.97857	6.09462	81.5490	0.8940	633.792	0.21948	0.90398	19.1871	0.8116	0.03219
0.65159	780.936	30.8920	23.6416	94.4560	3.99533	6.13168	84.4468	0.8943	662.678	0.21941	0.90751	19.8629	0.8149	0.03219
0.65042	813.237	32.3003	24.3757	97.7841	4.01154	6.16761	87.4479	0.8945	692.890	0.21934	0.91092	20.5628	0.8180	0.03219
0.64930	847.010	33.7732	25.1366	101.2309	4.02722	6.20244	90.5559	0.8948	724.489	0.21928	0.91422	21.2877	0.8211	0.03219
0.64821	882.324	35.3138	25.9254	104.8004	4.04238	6.23619	93.7747	0.8950	757.538	0.21922	0.91741	22.0384	0.8241	0.03219
0.64717	919.249	36.9250	26.7429	108.4971	4.05704	6.26888	97.1083	0.8953	792.104	0.21916	0.92050	22.8159	0.8270	0.03219
0.64617	957.859	38.6102	27.5903	112.3255	4.07120	6.30053	100.5606							

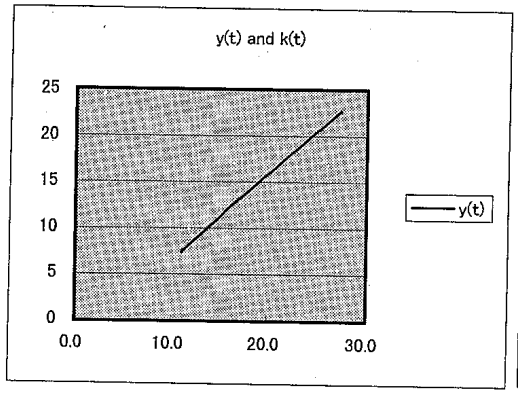
Figure 4-3-1 S-K by DRC CRC IRC

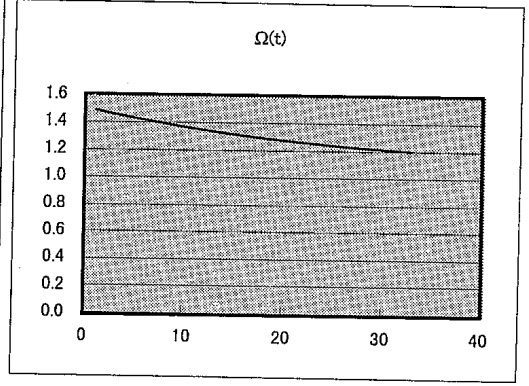
For Appendix 4-3-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

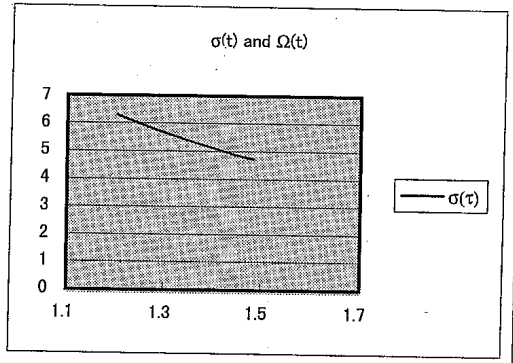
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	$\theta=s/s_{SP/Y}$	$\Psi=\Omega(0)/\theta$
0.01	0.05	0.08	1.5	11	6.053270	**0.032185**	**0.044984**	1.111509	1.349516

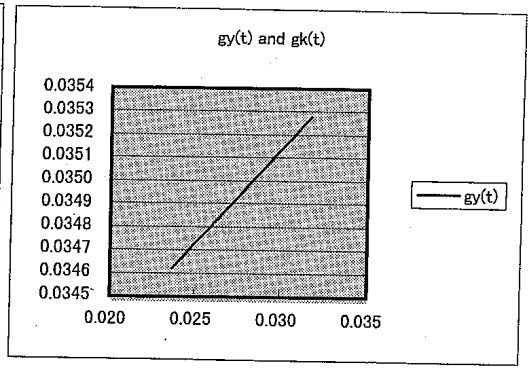
k(t)	y(t)	Ω(t)	**σ(t)**	gk(t)	gy(t)
11.00000	7.33333	1.48364	4.70037	0.02370	0.03462
11.25667	7.58718	1.46795	4.76910	0.02406	0.03465
11.52346	7.85005	1.45289	4.83677	0.02441	0.03467
11.80073	8.12225	1.43844	4.90334	0.02476	0.03470
12.08883	8.40412	1.42458	4.96878	0.02510	0.03473
12.38815	8.69600	1.41128	5.03306	0.02543	0.03476
12.69907	8.99827	1.39852	5.09615	0.02575	0.03479
13.02199	9.31127	1.38628	5.15804	0.02607	0.03481
13.35733	9.63541	1.37453	5.21870	0.02638	0.03484
13.70553	9.97108	1.36326	5.27812	0.02668	0.03486
14.06703	10.31869	1.35244	5.33627	0.02697	0.03489
14.44229	10.67867	1.34207	5.39316	0.02726	0.03491
14.83181	11.05146	1.33211	5.44878	0.02753	0.03493
15.23606	11.43752	1.32256	5.50311	0.02781	0.03496
15.65558	11.83732	1.31340	5.55616	0.02807	0.03498
16.09089	12.25135	1.30460	5.60793	0.02833	0.03500
16.54254	12.68013	1.29617	5.65841	0.02858	0.03502
17.01113	13.12417	1.28807	5.70762	0.02882	0.03504
17.49722	13.58403	1.28031	5.75555	0.02905	0.03506
18.00145	14.06027	1.27285	5.80223	0.02928	0.03508
18.52445	14.55347	1.26571	5.84765	0.02950	0.03510
19.06688	15.06423	1.25885	5.89183	0.02972	0.03511
19.62942	15.59319	1.25226	5.93478	0.02993	0.03513
20.21279	16.14100	1.24595	5.97652	0.03013	0.03515
20.81771	16.70832	1.23989	6.01706	0.03033	0.03516
21.44495	17.29585	1.23408	6.05642	0.03052	0.03518
22.09529	17.90432	1.22850	6.09462	0.03070	0.03520
22.76956	18.53446	1.22315	6.13168	0.03088	0.03521
23.46858	19.18706	1.21801	6.16761	0.03105	0.03522
24.19325	19.86291	1.21308	6.20244	0.03122	0.03524
24.94446	20.56284	1.20836	6.23619	0.03138	0.03525
25.72316	21.28771	1.20382	6.26888	0.03153	0.03526
26.53031	22.03841	1.19947	6.30053	0.03169	0.03528
27.36693	22.81586				

IRC





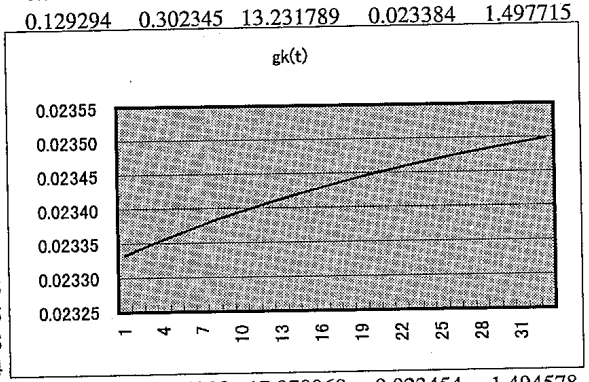




Appendix 4-3-2 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long **If Ω*=θ, then λ is a variable**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	CRC Ψ=Ω(0)/θ	Balanced growth-state $g^{*}_{y}=\lambda/(1-\alpha)$	$g^{*}_{Y}=g^{*}_{y}+n$
0.01	0.05	0.08	1.5	11	0.92	1.211467	7.333333	6.053270	**0.021458**	**0.033324**	1.500415	**0.999724**	0.023324	0.033324

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change in k	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_{\Omega}(t)$	$k^{*}(t)$, where $\chi=1/(1-\alpha)$
													$=A(t)^{\chi}(\Omega^{*})^{\chi}$
0	11	6.053270	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.5	---	0.053333	---	
1	11.256667	6.184565	7.506232	0.375312	0.112567	0.262745	11.519412	0.023341	1.499643	0.023577	0.053346	-0.000238	infinite
2	11.519412	6.318709	7.683211	0.384161	0.115194	0.268966	11.788378	0.023349	1.499296	0.023578	0.053358	-0.000231	
3	11.788378	6.455762	7.864369	0.393218	0.117884	0.275335	12.063713	0.023356	1.498961	0.023578	0.053370	-0.000224	**$\Omega^{*}=\theta=s/(n+g^{*}_{y})$**
4	12.063713	6.595788	8.049802	0.402490	0.120637	0.281853	12.345566	0.023364	1.498635	0.023579	0.053382	-0.000217	1.500415
5	12.345566	6.738851	8.239612	0.411981	0.123456	0.288525	12.634091	0.023371	1.498319	0.023579	0.053393	-0.000211	
6	12.634091	6.885018	8.433902	0.421695	0.126341	0.295354	12.929445	0.023378	1.498012	0.023580	0.053404	-0.000204	$A^{*}=k^{*}/(\Omega^{*}k^{*\wedge}\alpha)$
7	12.929445	7.034354	8.632779	0.431639	0.129294	0.302345	13.231789	0.023384	1.497715	0.023581	0.053415	-0.000198	infinite
8	13.231789	7.186930	8.836350	0.441817						0.023581	0.053425	-0.000192	
9	13.541289	7.342815	9.044725	0.452236						0.023582	0.053435	-0.000187	$y^{*}=A^{*}k^{*\wedge}\alpha$
10	13.858112	7.502081	9.258019	0.462901						0.023582	0.053445	-0.000181	infinite
11	14.182432	7.664802	9.476348	0.473817						0.023583	0.053454	-0.000176	
12	14.514425	7.831052	9.699829	0.484991						0.023583	0.053463	-0.000170	**$g^{*}_{Y}=s/\Omega^{*}$**
13	14.854272	8.000908	9.928586	0.496429						0.023584	0.053472	-0.000165	0.0333241
14	15.202159	8.174448	10.162741	0.508137						0.023584	0.053481	-0.000160	
15	15.558274	8.351753	10.402424	0.520121						0.023584	0.053489	-0.000155	$r^{*}=\alpha/\Omega^{*}$
16	15.922813	8.532903	10.647763	0.532388						0.023585	0.053497	-0.000151	0.0533186
17	16.295973	8.717982	10.898893	0.544945						0.023585	0.053505	-0.000146	
18	16.677958	8.907076	11.155950	0.557798						0.023586	0.053512	-0.000142	**Note:**
19	17.068976	9.100271	11.419075	0.570954						0.023586	0.053520	-0.000138	K(t)/Y(t)
20	17.469240	9.297656	11.688409	0.584420	0.174692	0.409728	17.878968	0.023454	1.494578	0.023586	0.053527	-0.000133	=Ω(t)
21	17.878968	9.499323	11.964101	0.598205	0.178790	0.419415	18.298383	0.023459	1.494385	0.023587	0.053534	-0.000129	$=k(t)^{(1-\alpha)}/A(t)$
22	18.298383	9.705364	12.246299	0.612315	0.182984	0.429331	18.727714	0.023463	1.494197	0.023587	0.053540	-0.000126	
23	18.727714	9.915874	12.535158	0.626758	0.187277	0.439481	19.167195	0.023467	1.494015	0.023587	0.053547	-0.000122	A(t)
24	19.167195	10.130951	12.830834	0.641542	0.191672	0.449870	19.617065	0.023471	1.493839	0.023588	0.053553	-0.000118	=$J$3*EXP($K$3*A5)
25	19.617065	10.350692	13.133488	0.656674	0.196171	0.460504	20.077569	0.023475	1.493668	0.023588	0.053559	-0.000115	=A(0)*EXP(λ*t)
26	20.077569	10.575199	13.443286	0.672164	0.200776	0.471389	20.548957	0.023478	1.493502	0.023588	0.053565	-0.000111	$k^{*}(t)$, where $\chi=1/(1-\alpha)$
27	20.548957	10.804576	13.760395	0.688020	0.205490	0.482530	21.031487	0.023482	1.493341	0.023589	0.053571	-0.000108	$=A(t)^{\chi}(\Omega^{*})^{\chi}$
28	21.031487	11.038928	14.084988	0.704249	0.210315	0.493935	21.525422	0.023485	1.493185	0.023589	0.053577	-0.000105	infinite
29	21.525422	11.278363	14.417242	0.720862	0.215254	0.505608	22.031030	0.023489	1.493033	0.023589	0.053582	-0.000101	Thus, k^{*}, y^{*}, and A^{*}
30	22.031030	11.522991	14.757338	0.737867	0.220310	0.517557	22.548586	0.023492	1.492886	0.023590	0.053587	-0.000098	infinite
31	22.548586	11.772926	15.105460	0.755273	0.225486	0.529787	23.078374	0.023495	1.492744	0.023590	0.053593	-0.000095	
32	23.078374	12.028282	15.461798	0.773090	0.230784	0.542306	23.620680	0.023498	1.492606	0.023590	0.053598	-0.000092	



Structure of the elasiticity of substitution, σ (2) For Appendix 4-3-2 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

CRC		Y^0		$(W*K)^0$		y^0	L^0	gL(t)=0.01=**n**	W^0	w^0	P^0		$(r/w)^0$	
		183.3333		46383		7.333333	**25**	0.01	168.667	6.74667	14.6667	0.05333	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.333333	25.000000	---	168.667	6.74667	14.6667	0.05333	0.00791	---
0.0338128	0.033575	189.532	6.199	49562	0.0685	7.506232	25.250000	0.250000	174.370	6.90573	15.1626	0.05335	0.00772	0.00509
0.0338135	0.033582	195.941	6.409	52958	0.0685	7.683211	25.502500	0.252500	180.266	7.06855	15.6753	0.05336	0.00755	0.00498
0.0338141	0.033590	202.567	6.626	56588	0.0685	7.864369	25.757525	0.255025	186.361	7.23522	16.2053	0.05337	0.00738	0.00486
0.0338147	0.033597	209.416	6.850	60467	0.0685	8.049802	26.015100	0.257575	192.663	7.40582	16.7533	0.05338	0.00721	0.00475
0.0338153	0.033604	216.498	7.081	64612	0.0686	8.239612	26.275251	0.260151	199.178	7.58044	17.3198	0.05339	0.00704	0.00464
0.0338159	0.033611	223.819	7.321	69042	0.0686	8.433902	26.538004	0.262753	205.913	7.75919	17.9055	0.05340	0.00688	0.00454
0.0338164	0.033618	231.388	7.569	73777	0.0686	8.632779	26.803384	0.265380	212.877	7.94216	18.5110	0.05341	0.00673	0.00443
0.0338169	0.033625	239.213	7.825	78836	0.0686	8.836350	27.071418	0.268034	220.076	8.12944	19.1370	0.05342	0.00657	0.00433
0.0338175	0.033631	247.302	8.090	84243	0.0686	9.044725	27.342132	0.270714	227.518	8.32115	19.7842	0.05343	0.00642	0.00423
0.0338180	0.033637	255.665	8.363	90022	0.0686	9.258019	27.615553	0.273421	235.212	8.51738	20.4532	0.05344	0.00627	0.00413
0.0338185	0.033643	264.312	8.646	96197	0.0686	9.476348	27.891709	0.276156	243.167	8.71824	21.1449	0.05345	0.00613	0.00404
0.0338189	0.033649	273.250	8.939	102797	0.0686	9.699829	28.170626	0.278917	251.390	8.92384	21.8600	0.05346	0.00599	0.00395
0.0338194	0.033654	282.491	9.241	109850	0.0686	9.928586	28.452332	0.281706	259.892	9.13430	22.5993	0.05347	0.00585	0.00386
0.0338198	0.033660	292.045	9.554	117387	0.0686	10.162741	28.736855	0.284523	268.682	9.34972	23.3636	0.05348	0.00572	0.00377
0.0338203	0.033665	301.922	9.877	125443	0.0686	10.402424	29.024224	0.287369	277.768	9.57023	24.1538	0.05348	0.00559	0.00368
0.0338207	0.033670	312.133	10.211	134052	0.0686	10.647763	29.314466	0.290242	287.163	9.79594	24.9707	0.05349	0.00546	0.00360
0.0338211	0.033675	322.690	10.557	143253	0.0686	10.898893	29.607611	0.293145	296.875	10.02698	25.8152	0.05350	0.00534	0.00351
0.0338215	0.033680	333.604	10.914	153086	0.0686	11.155950	29.903687	0.296076	306.916	10.26347	26.6883	0.05351	0.00521	0.00343
0.0338219	0.033684	344.887	11.283	163594	0.0686	11.419075	30.202724	0.299037	317.296	10.50555	27.5910	0.05351	0.00509	0.00335
0.0338222	0.033689	356.552	11.665	174825	0.0687	11.688409	30.504751	0.302027	328.028	10.75334	28.5242	0.05352	0.00498	0.00328
0.0338226	0.033693	368.612	12.060	186828	0.0687	11.964101	30.809799	0.305048	339.123	11.00697	29.4889	0.05353	0.00486	0.00320
0.0338230	0.033697	381.079	12.468	199655	0.0687	12.246299	31.117896	0.308098	350.593	11.26660	30.4863	0.05353	0.00475	0.00313
0.0338233	0.033702	393.968	12.889	213365	0.0687	12.535158	31.429075	0.311179	362.451	11.53235	31.5175	0.05354	0.00464	0.00306
0.0338236	0.033706	407.294	13.325	228016	0.0687	12.830834	31.743366	0.314291	374.710	11.80437	32.5835	0.05355	0.00454	0.00299
0.0338239	0.033709	421.070	13.776	243675	0.0687	13.133488	32.060800	0.317434	387.385	12.08281	33.6856	0.05355	0.00443	0.00292
0.0338243	0.033713	435.313	14.242	260410	0.0687	13.443286	32.381408	0.320608	400.488	12.36782	34.8250	0.05356	0.00433	0.00285
0.0338246	0.033717	450.037	14.724	278295	0.0687	13.760395	32.705222	0.323814	414.034	12.65956	36.0029	0.05356	0.00423	0.00278
0.0338248	0.033720	465.259	15.222	297410	0.0687	14.084988	33.032274	0.327052	428.038	12.95819	37.2207	0.05357	0.00413	0.00272
0.0338251	0.033724	480.997	15.737	317839	0.0687	14.417242	33.362597	0.330323	442.517	13.26386	38.4797	0.05357	0.00404	0.00266
0.0338254	0.033727	497.267	16.270	339673	0.0687	14.757338	33.696223	0.333626	457.485	13.57675	39.7813	0.05358	0.00395	0.00260
0.0338257	0.033730	514.087	16.820	363007	0.0687	15.105460	34.033185	0.336962	472.960	13.89702	41.1270	0.05358	0.00386	0.00254
0.0338259	0.033733	531.476	17.389	387946	0.0687	15.461798	34.373517	0.340332	488.958	14.22485	42.5181	0.05359	0.00377	0.00248

S-KM IRC CRC DRC with sig(A4-3)

Structure of the elasiticity of substitution, σ (2) For Appendix 4-3-2 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

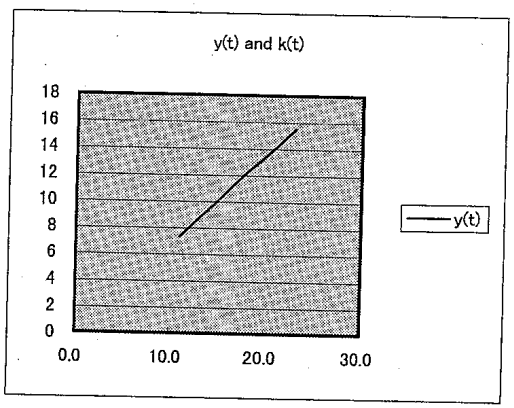
CRC (2)	K^0 275.000		k^0 11.00000	Δk(t)=(kt(1+n)-k(t-1))/n using **n**	(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	λ
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	
---	275.000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---
0.65936	284.233	9.2330	11.2568	36.9322	3.28089	4.97583	24.7961	0.6714	189.532	0.29575	0.99296	7.5062	0.6668	0.02146
0.65930	293.778	9.5452	11.5196	37.8030	3.28162	4.97747	25.3812	0.6714	195.941	0.29574	0.99317	7.6832	0.6670	0.02146
0.65923	303.646	9.8680	11.7886	38.6943	3.28234	4.97906	25.9801	0.6714	202.567	0.29573	0.99337	7.8644	0.6671	0.02146
0.65916	313.848	10.2017	12.0641	39.6067	3.28303	4.98060	26.5931	0.6714	209.416	0.29573	0.99357	8.0498	0.6673	0.02146
0.65910	324.395	10.5467	12.3460	40.5406	3.28370	4.98210	27.2206	0.6714	216.498	0.29572	0.99376	8.2396	0.6674	0.02146
0.65904	335.298	10.9033	12.6346	41.4966	3.28435	4.98355	27.8630	0.6715	223.819	0.29572	0.99395	8.4339	0.6675	0.02146
0.65898	346.570	11.2721	12.9301	42.4752	3.28499	4.98496	28.5204	0.6715	231.388	0.29571	0.99413	8.6328	0.6677	0.02146
0.65892	358.223	11.6533	13.2325	43.4768	3.28560	4.98632	29.1934	0.6715	239.213	0.29571	0.99431	8.8363	0.6678	0.02146
0.65887	370.271	12.0473	13.5421	44.5021	3.28619	4.98765	29.8823	0.6715	247.302	0.29571	0.99448	9.0447	0.6679	0.02146
0.65881	382.725	12.4548	13.8591	45.5515	3.28677	4.98893	30.5874	0.6715	255.665	0.29570	0.99465	9.2580	0.6680	0.02146
0.65876	395.601	12.8760	14.1835	46.6258	3.28733	4.99018	31.3092	0.6715	264.312	0.29570	0.99481	9.4763	0.6681	0.02146
0.65871	408.913	13.3114	14.5156	47.7254	3.28788	4.99139	32.0480	0.6715	273.250	0.29569	0.99496	9.6998	0.6682	0.02146
0.65866	422.674	13.7616	14.8555	48.8510	3.28840	4.99257	32.8042	0.6715	282.491	0.29569	0.99511	9.9286	0.6683	0.02146
0.65861	436.902	14.2270	15.2035	50.0031	3.28891	4.99371	33.5783	0.6715	292.045	0.29568	0.99526	10.1627	0.6684	0.02146
0.65856	451.610	14.7082	15.5598	51.1824	3.28941	4.99481	34.3707	0.6715	301.922	0.29568	0.99540	10.4024	0.6685	0.02146
0.65852	466.815	15.2057	15.9244	52.3896	3.28989	4.99589	35.1817	0.6715	312.133	0.29568	0.99554	10.6478	0.6686	0.02146
0.65848	482.535	15.7199	16.2977	53.6252	3.29036	4.99693	36.0119	0.6715	322.690	0.29567	0.99568	10.8989	0.6687	0.02146
0.65843	498.787	16.2516	16.6798	54.8900	3.29081	4.99794	36.8617	0.6716	333.604	0.29567	0.99581	11.1560	0.6688	0.02146
0.65839	515.588	16.8013	17.0709	56.1847	3.29125	4.99892	37.7315	0.6716	344.887	0.29567	0.99593	11.4191	0.6689	0.02146
0.65835	532.958	17.3695	17.4713	57.5099	3.29168	4.99987	38.6219	0.6716	356.552	0.29566	0.99605	11.6884	0.6690	0.02146
0.65831	550.915	17.9570	17.8812	58.8664	3.29209	5.00079	39.5332	0.6716	368.612	0.29566	0.99617	11.9641	0.6691	0.02146
0.65828	569.479	18.5644	18.3007	60.2549	3.29249	5.00169	40.4661	0.6716	381.079	0.29566	0.99629	12.2463	0.6692	0.02146
0.65824	588.672	19.1923	18.7302	61.6762	3.29288	5.00255	41.4210	0.6716	393.968	0.29565	0.99640	12.5352	0.6692	0.02146
0.65820	608.513	19.8415	19.1698	63.1310	3.29326	5.00339	42.3984	0.6716	407.294	0.29565	0.99651	12.8308	0.6693	0.02146
0.65817	629.026	20.5126	19.6198	64.6201	3.29362	5.00421	43.3989	0.6716	421.070	0.29565	0.99661	13.1335	0.6694	0.02146
0.65814	650.232	21.2064	20.0804	66.1444	3.29398	5.00500	44.4230	0.6716	435.313	0.29565	0.99672	13.4433	0.6695	0.02146
0.65810	672.156	21.9237	20.5519	67.7047	3.29432	5.00577	45.4713	0.6716	450.037	0.29564	0.99681	13.7604	0.6695	0.02146
0.65807	694.821	22.6653	21.0346	69.3018	3.29466	5.00652	46.5443	0.6716	465.259	0.29564	0.99691	14.0850	0.6696	0.02146
0.65804	718.253	23.4320	21.5287	70.9366	3.29498	5.00724	47.6426	0.6716	480.997	0.29564	0.99700	14.4172	0.6697	0.02146
0.65801	742.478	24.2246	22.0344	72.6100	3.29530	5.00794	48.7669	0.6716	497.267	0.29564	0.99709	14.7573	0.6697	0.02146
0.65799	767.522	25.0440	22.5522	74.3229	3.29560	5.00862	49.9177	0.6716	514.087	0.29563	0.99718	15.1055	0.6698	0.02146
0.65796	793.413	25.8911	23.0821	76.0762	3.29590	5.00928	51.0956	0.6716	531.476	0.29563	0.99727	15.4618	0.6699	0.02146

Figure A4-3-2 S-K by DRC CRC IRC

For Appendix 4-3-2 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ
0.01	0.05	0.08	1.5	11	6.053270	**0.021458**	**0.033324**	1.500415	0.999724

k(t)	y(t)	Ω(t)	**σ(t)**	gk(t)	gy(t)
11.00000	7.33333	1.49964	4.97583	0.02334	0.02358
11.25667	7.50623	1.49930	4.97747	0.02335	0.02358
11.51941	7.68321	1.49896	4.97906	0.02336	0.02358
11.78838	7.86437	1.49863	4.98060	0.02336	0.02358
12.06371	8.04980	1.49832	4.98210	0.02337	0.02358
12.34557	8.23961	1.49801	4.98355	0.02338	0.02358
12.63409	8.43390	1.49772	4.98496	0.02338	0.02358
12.92944	8.63278	1.49743	4.98632	0.02339	0.02358
13.23179	8.83635	1.49715	4.98765	0.02340	0.02358
13.54129	9.04473	1.49688	4.98893	0.02340	0.02358
13.85811	9.25802	1.49661	4.99018	0.02341	0.02358
14.18243	9.47635	1.49636	4.99139	0.02341	0.02358
14.51443	9.69983	1.49611	4.99257	0.02342	0.02358
14.85427	9.92859	1.49587	4.99371	0.02343	0.02358
15.20216	10.16274	1.49564	4.99481	0.02343	0.02358
15.55827	10.40242	1.49541	4.99589	0.02344	0.02358
15.92281	10.64776	1.49520	4.99693	0.02344	0.02359
16.29597	10.89889	1.49498	4.99794	0.02345	0.02359
16.67796	11.15595	1.49478	4.99892	0.02345	0.02359
17.06898	11.41907	1.49458	4.99987	0.02345	0.02359
17.46924	11.68841	1.49438	5.00079	0.02346	0.02359
17.87897	11.96410	1.49420	5.00169	0.02346	0.02359
18.29838	12.24630	1.49402	5.00255	0.02347	0.02359
18.72771	12.53516	1.49384	5.00339	0.02347	0.02359
19.16720	12.83083	1.49367	5.00421	0.02347	0.02359
19.61706	13.13349	1.49350	5.00500	0.02348	0.02359
20.07757	13.44329	1.49334	5.00577	0.02348	0.02359
20.54896	13.76039	1.49318	5.00652	0.02349	0.02359
21.03149	14.08499	1.49303	5.00724	0.02349	0.02359
21.52542	14.41724	1.49289	5.00794	0.02349	0.02359
22.03103	14.75734	1.49274	5.00862	0.02350	0.02359
22.54859	15.10546	1.49261	5.00928	0.02350	0.02359
23.07837	15.46180				



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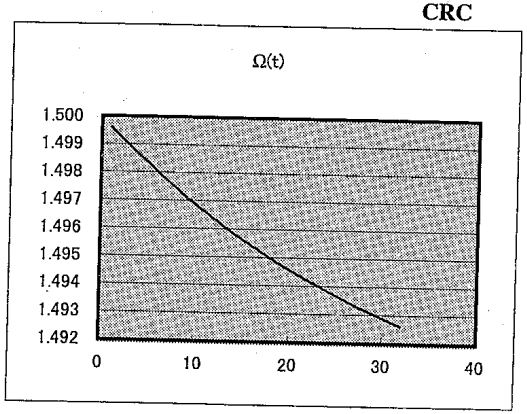
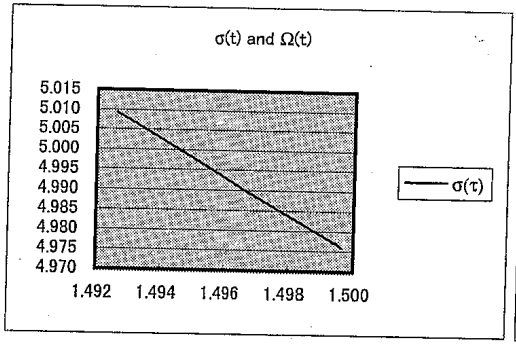
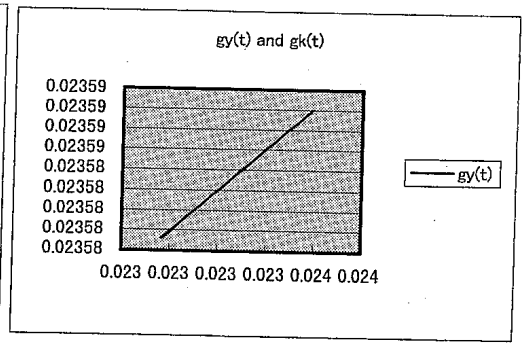


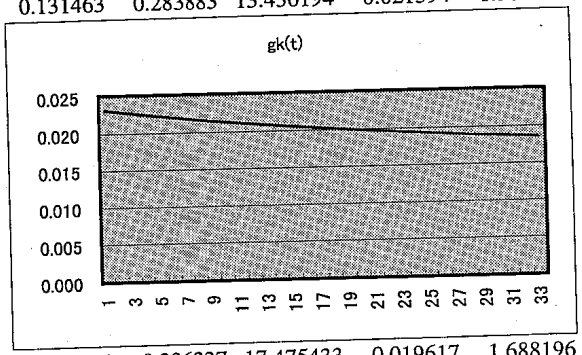




Appendix 4-3-3 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long **If $\Omega^{*}=\theta$, then λ is a variable**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	DRC Ψ=Ω(0)/θ	Balanced growth-state $g^{*}_{y}=\lambda/(1-\alpha)$	$g^{*}_{Y}=g^{*}_{y}+n$
0.01	0.05	0.08	1.5	11	0.92	1.211467	7.333333	6.053270	**0.0138**	**0.025**	2	**0.75**	0.015	0.025

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_{\Omega}(t)$	$k^{*}(t)$, where $\chi=1/(1-\alpha)$
										1.5	---	0.053333	---	$=A(t)^{\chi}(\Omega^{*})^{\chi}$
0	11	6.053270	7.333333	0.366667	0.11	0.256667	11.256667	0.023333						infinite
1	11.256667	6.137384	7.448967	0.372448	0.112567	0.259882	11.516548	0.023087	1.511171	0.015768	0.052939	0.007448		
2	11.516548	6.222667	7.566279	0.378314	0.115165	0.263148	11.779697	0.022850	1.522089	0.015749	0.052559	0.007224		
3	11.779697	6.309135	7.685295	0.384265	0.117797	0.266468	12.046165	0.022621	1.532758	0.015730	0.052193	0.007010	$\Omega^{*}=\theta=s/(n+g^{*}_{y})$	
4	12.046165	6.396804	7.806044	0.390302	0.120462	0.269841	12.316005	0.022401	1.543184	0.015712	0.051841	0.006802	2.000000	
5	12.316005	6.485692	7.928553	0.396428	0.123160	0.273268	12.589273	0.022188	1.553374	0.015694	0.051501	0.006603		
6	12.589273	6.575815	8.052851	0.402643	0.125893	0.276750	12.866022	0.021983	1.563331	0.015677	0.051173	0.006410	$A^{*}=k^{*}/(\Omega^{*}k^{*\wedge}\alpha)$	
7	12.866022	6.667190	8.178966	0.408948	0.128660	0.280288	13.146311	0.021785	1.573062	0.015661	0.050856	0.006225	infinite	
8	13.146311	6.759835	8.306928	0.415346	0.131463	0.283883	13.430194	0.021594	1.582572	0.015645	0.050551	0.006045		
9	13.430194	6.853768	8.436765	0.421838						0.015630	0.050256	0.005872	$y^{*}=A^{*}k^{*\wedge}\alpha$	
10	13.717730	6.949005	8.568508	0.428425						0.015615	0.049970	0.005705	infinite	
11	14.008978	7.045566	8.702187	0.435109						0.015601	0.049695	0.005544		
12	14.303998	7.143469	8.837833	0.441892						0.015587	0.049429	0.005388	$g^{*}_{Y}=s/\Omega^{*}$	
13	14.602850	7.242732	8.975475	0.448774						0.015574	0.049171	0.005237	0.025	
14	14.905595	7.343375	9.115146	0.455757						0.015561	0.048922	0.005091		
15	15.212296	7.445416	9.256878	0.462844						0.015549	0.048681	0.004950	$r^{*}=\alpha/\Omega^{*}$	
16	15.523017	7.548875	9.400703	0.470035						0.015537	0.048448	0.004814	0.04	
17	15.837822	7.653772	9.546653	0.477333						0.015525	0.048222	0.004682		
18	16.156777	7.760126	9.694762	0.484738						0.015514	0.048003	0.004554	**Note:**	
19	16.479947	7.867958	9.845063	0.492253						0.015503	0.047792	0.004430	K(t)/Y(t)	
20	16.807401	7.977288	9.997590	0.499880						0.015493	0.047587	0.004310	$=\Omega(t)$	
21	17.139206	8.088138	10.152379	0.507619	0.171392	0.336227	17.475433	0.019617	1.688196	0.015483	0.047388	0.004194	$=k(t)^{(1-\alpha)} / A(t)$	
22	17.475433	8.200528	10.309463	0.515473	0.174754	0.340719	17.816152	0.019497	1.695087	0.015473	0.047195	0.004082		
23	17.816152	8.314480	10.468879	0.523444	0.178162	0.345282	18.161434	0.019380	1.701820	0.015463	0.047008	0.003973	A(t)	
24	18.161434	8.430015	10.630663	0.531533	0.181614	0.349919	18.511353	0.019267	1.708401	0.015454	0.046827	0.003867	=$J$3*EXP($K$3*A5)	
25	18.511353	8.547156	10.794851	0.539743	0.185114	0.354629	18.865982	0.019157	1.714832	0.015445	0.046652	0.003764	$=A(0)*EXP(\lambda*t)$	
26	18.865982	8.665924	10.961481	0.548074	0.188660	0.359414	19.225396	0.019051	1.721116	0.015436	0.046481	0.003665	$k^{*}(t)$, where $\chi=1/(1-\alpha)$	
27	19.225396	8.786343	11.130589	0.556529	0.192254	0.364276	19.589672	0.018948	1.727258	0.015428	0.046316	0.003568	$=A(t)^{\chi}(\Omega^{*})^{\chi}$	
28	19.589672	8.908435	11.302215	0.565111	0.195897	0.369214	19.958886	0.018847	1.733259	0.015419	0.046156	0.003475	infinite	
29	19.958886	9.032223	11.476397	0.573820	0.199589	0.374231	20.333117	0.018750	1.739125	0.015411	0.046000	0.003384	Thus, k^{*}, y^{*}, and A^{*}	
30	20.333117	9.157732	11.653174	0.582659	0.203331	0.379328	20.712444	0.018656	1.744856	0.015404	0.045849	0.003296	infinite	
31	20.712444	9.284985	11.832587	0.591629	0.207124	0.384505	21.096949	0.018564	1.750458	0.015396	0.045702	0.003210		
32	21.096949	9.414006	12.014675	0.600734	0.210969	0.389764	21.486713	0.018475	1.755932	0.015389	0.045560	0.003127		



Structure of the elasiticity of substitution, σ (3) For Appendix 4-3-3 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

DRC		Y^0		$(W*K)^0$		y^0	L^0	gL(t)=0.01=**n**	W^0	w^0	P^0		$(r/w)^0$	
		183.3333		46383		7.333333	**25**	0.01	168.667	6.74667	14.6667	0.05333	0.00791	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	$g_{WK}(t)$	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	46383	---	7.333333	25.000000	---	168.667	6.74667	14.6667	0.05333	0.00791	---
0.025926	0.033318	188.086	4.753	49171	0.0601	7.448967	25.250000	0.250000	173.040	6.85305	15.0469	0.05295	0.00773	0.00476
0.025906	0.033078	192.959	4.873	52114	0.0598	7.566279	25.502500	0.252500	177.522	6.96098	15.4367	0.05258	0.00755	0.00467
0.025887	0.032847	197.954	4.995	55219	0.0596	7.685295	25.757525	0.255025	182.118	7.07047	15.8363	0.05223	0.00739	0.00458
0.025869	0.032625	203.075	5.121	58496	0.0593	7.806044	26.015100	0.257575	186.829	7.18156	16.2460	0.05189	0.00723	0.00450
0.025851	0.032410	208.325	5.250	61953	0.0591	7.928553	26.275251	0.260151	191.659	7.29427	16.6660	0.05156	0.00707	0.00441
0.025834	0.032203	213.707	5.382	65600	0.0589	8.052851	26.538004	0.262753	196.610	7.40862	17.0965	0.05124	0.00692	0.00433
0.025818	0.032003	219.224	5.517	69447	0.0586	8.178966	26.803384	0.265380	201.686	7.52465	17.5379	0.05093	0.00677	0.00425
0.025802	0.031810	224.880	5.656	73505	0.0584	8.306928	27.071418	0.268034	206.890	7.64237	17.9904	0.05064	0.00663	0.00418
0.025786	0.031624	230.679	5.799	77785	0.0582	8.436765	27.342132	0.270714	212.225	7.76182	18.4543	0.05035	0.00649	0.00410
0.025772	0.031444	236.624	5.945	82298	0.0580	8.568508	27.615553	0.273421	217.694	7.88303	18.9299	0.05007	0.00635	0.00403
0.025757	0.031270	242.719	6.095	87058	0.0578	8.702187	27.891709	0.276156	223.301	8.00601	19.4175	0.04981	0.00622	0.00396
0.025743	0.031102	248.967	6.248	92076	0.0576	8.837833	28.170626	0.278917	229.050	8.13081	19.9174	0.04955	0.00609	0.00389
0.025730	0.030939	255.373	6.406	97367	0.0575	8.975475	28.452332	0.281706	234.943	8.25744	20.4299	0.04930	0.00597	0.00382
0.025717	0.030782	261.941	6.567	102946	0.0573	9.115146	28.736855	0.284523	240.985	8.38593	20.9553	0.04905	0.00585	0.00375
0.025705	0.030630	268.674	6.733	108826	0.0571	9.256878	29.024224	0.287369	247.180	8.51633	21.4939	0.04882	0.00573	0.00368
0.025692	0.030483	275.577	6.903	115025	0.0570	9.400703	29.314466	0.290242	253.530	8.64865	22.0461	0.04859	0.00562	0.00362
0.025681	0.030340	282.654	7.077	121558	0.0568	9.546653	29.607611	0.293145	260.041	8.78292	22.6123	0.04837	0.00551	0.00355
0.025669	0.030202	289.909	7.256	128444	0.0566	9.694762	29.903687	0.296076	266.716	8.91918	23.1927	0.04816	0.00540	0.00349
0.025658	0.030069	297.348	7.439	135701	0.0565	9.845063	30.202724	0.299037	273.560	9.05746	23.7878	0.04795	0.00529	0.00343
0.025648	0.029939	304.974	7.626	143348	0.0564	9.997590	30.504751	0.302027	280.576	9.19778	24.3979	0.04775	0.00519	0.00337
0.025637	0.029814	312.793	7.819	151406	0.0562	10.152379	30.809799	0.305048	287.769	9.34019	25.0234	0.04756	0.00509	0.00332
0.025627	0.029692	320.809	8.016	159897	0.0561	10.309463	31.117896	0.308098	295.144	9.48471	25.6647	0.04737	0.00499	0.00326
0.025618	0.029574	329.027	8.218	168843	0.0559	10.468879	31.429075	0.311179	302.705	9.63137	26.3222	0.04719	0.00490	0.00320
0.025608	0.029460	337.453	8.426	178269	0.0558	10.630663	31.743366	0.314291	310.457	9.78021	26.9962	0.04701	0.00481	0.00315
0.025599	0.029349	346.092	8.639	188198	0.0557	10.794851	32.060800	0.317434	318.404	9.93126	27.6873	0.04684	0.00472	0.00309
0.025590	0.029241	354.948	8.857	198658	0.0556	10.961481	32.381408	0.320608	326.552	10.08456	28.3959	0.04668	0.00463	0.00304
0.025582	0.029137	364.028	9.080	209677	0.0555	11.130589	32.705222	0.323814	334.906	10.24014	29.1223	0.04652	0.00454	0.00299
0.025573	0.029036	373.338	9.309	221283	0.0554	11.302215	33.032274	0.327052	343.471	10.39804	29.8670	0.04636	0.00446	0.00294
0.025565	0.028938	382.882	9.545	233507	0.0552	11.476397	33.362597	0.330323	352.252	10.55829	30.6306	0.04621	0.00438	0.00289
0.025558	0.028842	392.668	9.786	246382	0.0551	11.653174	33.696223	0.333626	361.255	10.72092	31.4134	0.04606	0.00430	0.00284
0.025550	0.028750	402.701	10.033	259941	0.0550	11.832587	34.033185	0.336962	370.485	10.88598	32.2160	0.04592	0.00422	0.00280
0.025543	0.028660	412.987	10.286	274221	0.0549	12.014675	34.373517	0.340332	379.948	11.05350	33.0389	0.04578	0.00414	0.00275

Structure of the elasiticity of substitution, σ (3). For Appendix 4-3-3 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

DRC	K^0		k^0	Δk(t)=(kt(1+n)−k(t−1))/n			**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**	
(2)	275.000		11.00000	using **n**	(1)	(1)/(2)	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**			183.333					
---	275.000	---	11.0000	---	---	---	---	---	188.086	0.38571	1.28511	7.4490	0.6619	0.01380
0.61591	284.162	9.1624	11.2540	36.6496	3.25659	5.28748	19.0123	0.5188	192.959	0.38601	1.27684	7.5663	0.6573	0.01380
0.61816	293.562	9.3995	11.5111	37.2259	3.23392	5.23150	19.2974	0.5184	197.954	0.38629	1.26886	7.6853	0.6529	0.01380
0.62036	303.205	9.6427	11.7715	37.8107	3.21205	5.17776	19.5869	0.5180	203.075	0.38657	1.26116	7.8060	0.6486	0.01380
0.62249	313.097	9.8919	12.0352	38.4040	3.19097	5.12616	19.8809	0.5177	208.325	0.38683	1.25371	7.9286	0.6445	0.01380
0.62456	323.244	10.1474	12.3022	39.0059	3.17064	5.07659	20.1795	0.5173	213.707	0.38709	1.24653	8.0529	0.6405	0.01380
0.62658	333.653	10.4094	12.5727	39.6166	3.15101	5.02894	20.4826	0.5170	219.224	0.38733	1.23958	8.1790	0.6367	0.01380
0.62854	344.331	10.6779	12.8466	40.2363	3.13207	4.98311	20.7905	0.5167	224.880	0.38757	1.23287	8.3069	0.6330	0.01380
0.63044	355.284	10.9532	13.1240	40.8650	3.11377	4.93902	21.1031	0.5164	230.679	0.38780	1.22638	8.4368	0.6294	0.01380
0.63230	366.520	11.2354	13.4049	41.5030	3.09609	4.89658	21.4205	0.5161	236.624	0.38803	1.22010	8.5685	0.6259	0.01380
0.63410	378.045	11.5248	13.6896	42.1503	3.07901	4.85571	21.7428	0.5158	242.719	0.38824	1.21403	8.7022	0.6226	0.01380
0.63586	389.866	11.8214	13.9778	42.8071	3.06250	4.81633	22.0701	0.5156	248.967	0.38845	1.20815	8.8378	0.6193	0.01380
0.63756	401.992	12.1255	14.2699	43.4736	3.04653	4.77838	22.4024	0.5153	255.373	0.38865	1.20246	8.9755	0.6162	0.01380
0.63923	414.429	12.4373	14.5657	44.1500	3.03108	4.74180	22.7397	0.5151	261.941	0.38885	1.19695	9.1151	0.6132	0.01380
0.64084	427.186	12.7570	14.8654	44.8363	3.01614	4.70651	23.0823	0.5148	268.674	0.38904	1.19161	9.2569	0.6102	0.01380
0.64242	440.271	13.0847	15.1691	45.5327	3.00168	4.67246	23.4301	0.5146	275.577	0.38922	1.18645	9.4007	0.6074	0.01380
0.64395	453.691	13.4206	15.4767	46.2394	2.98768	4.63960	23.7832	0.5143	282.654	0.38940	1.18144	9.5467	0.6047	0.01380
0.64544	467.456	13.7651	15.7884	46.9566	2.97412	4.60787	24.1417	0.5141	289.909	0.38957	1.17659	9.6948	0.6020	0.01380
0.64690	481.574	14.1182	16.1042	47.6843	2.96099	4.57722	24.5056	0.5139	297.348	0.38974	1.17188	9.8451	0.5994	0.01380
0.64831	496.055	14.4802	16.4242	48.4229	2.94827	4.54761	24.8752	0.5137	304.974	0.38990	1.16732	9.9976	0.5969	0.01380
0.64969	510.906	14.8514	16.7484	49.1724	2.93594	4.51900	25.2503	0.5135	312.793	0.39006	1.16289	10.1524	0.5945	0.01380
0.65103	526.138	15.2319	17.0770	49.9330	2.92400	4.49133	25.6312	0.5133	320.809	0.39021	1.15860	10.3095	0.5922	0.01380
0.65234	541.760	15.6221	17.4099	50.7049	2.91242	4.46458	26.0179	0.5131	329.027	0.39035	1.15444	10.4689	0.5899	0.01380
0.65361	557.782	16.0221	17.7473	51.4883	2.90118	4.43871	26.4105	0.5129	337.453	0.39050	1.15040	10.6307	0.5877	0.01380
0.65485	574.214	16.4322	18.0893	52.2833	2.89029	4.41367	26.8090	0.5128	346.092	0.39064	1.14648	10.7949	0.5855	0.01380
0.65606	591.067	16.8526	18.4358	53.0901	2.87973	4.38944	27.2137	0.5126	354.948	0.39077	1.14267	10.9615	0.5835	0.01380
0.65723	608.351	17.2836	18.7870	53.9089	2.86948	4.36598	27.6244	0.5124	364.028	0.39090	1.13898	11.1306	0.5814	0.01380
0.65838	626.076	17.7256	19.1430	54.7400	2.85953	4.34327	28.0414	0.5123	373.338	0.39103	1.13539	11.3022	0.5795	0.01380
0.65950	644.255	18.1787	19.5038	55.5833	2.84987	4.32127	28.4648	0.5121	382.882	0.39115	1.13190	11.4764	0.5776	0.01380
0.66059	662.898	18.6432	19.8695	56.4393	2.84050	4.29996	28.8946	0.5120	392.668	0.39127	1.12852	11.6532	0.5757	0.01380
0.66165	682.017	19.1194	20.2402	57.3080	2.83140	4.27931	29.3309	0.5118	402.701	0.39139	1.12523	11.8326	0.5740	0.01380
0.66268	701.625	19.6077	20.6159	58.1897	2.82256	4.25929	29.7738	0.5117	412.987	0.39150	1.12203	12.0147	0.5722	0.01380
0.66369	721.733	20.1083	20.9968	59.0845	2.81398	4.23989	30.2235	0.5115						

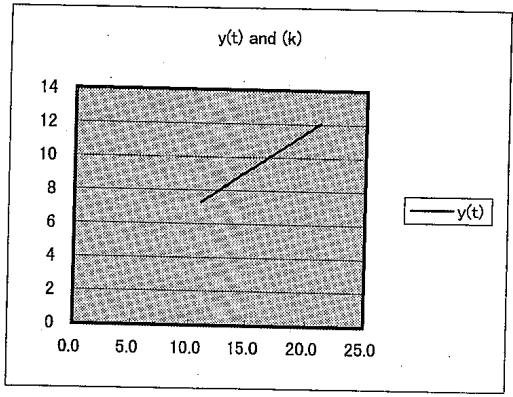
Figure A4-3-3 S-K by DRC CRC IRC

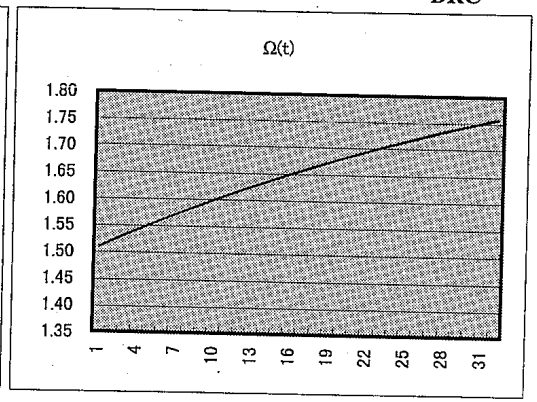
For Appendix 4-3-3 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under $S=\Omega^{*}*S_P$ in the long run

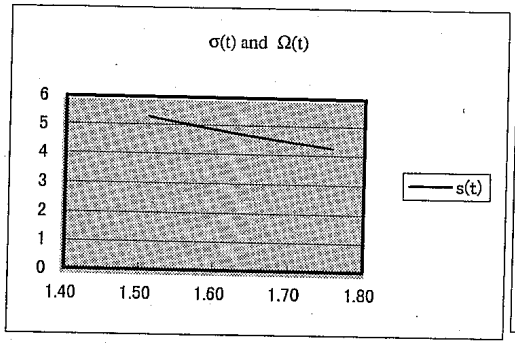
n	s	α	Ω(0) as given	k(0)	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	$\theta=s/s_{SP/Y}$	$\Psi=\Omega(0)/\theta$
0.01	0.05	0.08	1.5	11	6.053270	**0.0138**	**0.025**	2	0.75

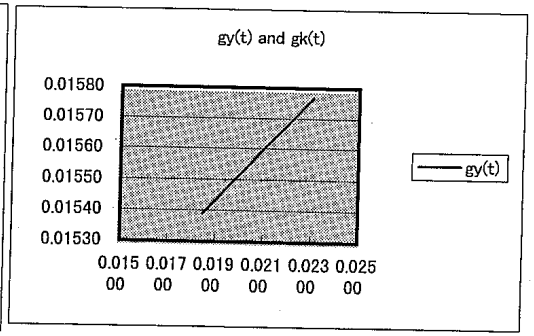
k(t)	y(t)	Ω(t)	**σ(t)**	gk(t)	gy(t)
11.00000	7.33333				
11.25667	7.44897	1.51117	5.28748	0.02309	0.01577
11.51655	7.56628	1.52209	5.23150	0.02285	0.01575
11.77970	7.68529	1.53276	5.17776	0.02262	0.01573
12.04616	7.80604	1.54318	5.12616	0.02240	0.01571
12.31601	7.92855	1.55337	5.07659	0.02219	0.01569
12.58927	8.05285	1.56333	5.02894	0.02198	0.01568
12.86602	8.17897	1.57306	4.98311	0.02179	0.01566
13.14631	8.30693	1.58257	4.93902	0.02159	0.01565
13.43019	8.43677	1.59187	4.89658	0.02141	0.01563
13.71773	8.56851	1.60095	4.85571	0.02123	0.01562
14.00898	8.70219	1.60982	4.81633	0.02106	0.01560
14.30400	8.83783	1.61850	4.77838	0.02089	0.01559
14.60285	8.97548	1.62697	4.74180	0.02073	0.01557
14.90559	9.11515	1.63526	4.70651	0.02058	0.01556
15.21230	9.25688	1.64335	4.67246	0.02043	0.01555
15.52302	9.40070	1.65126	4.63960	0.02028	0.01554
15.83782	9.54665	1.65899	4.60787	0.02014	0.01553
16.15678	9.69476	1.66655	4.57722	0.02000	0.01551
16.47995	9.84506	1.67393	4.54761	0.01987	0.01550
16.80740	9.99759	1.68115	4.51900	0.01974	0.01549
17.13921	10.15238	1.68820	4.49133	0.01962	0.01548
17.47543	10.30946	1.69509	4.46458	0.01950	0.01547
17.81615	10.46888	1.70182	4.43871	0.01938	0.01546
18.16143	10.63066	1.70840	4.41367	0.01927	0.01545
18.51135	10.79485	1.71483	4.38944	0.01916	0.01544
18.86598	10.96148	1.72112	4.36598	0.01905	0.01544
19.22540	11.13059	1.72726	4.34327	0.01895	0.01543
19.58967	11.30222	1.73326	4.32127	0.01885	0.01542
19.95889	11.47640	1.73912	4.29996	0.01875	0.01541
20.33312	11.65317	1.74486	4.27931	0.01866	0.01540
20.71244	11.83259	1.75046	4.25929	0.01856	0.01540
21.09695	12.01467	1.75593	4.23989	0.01847	0.01539

DRC









Appendix 4-4-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under S=Ω *S_P in the long r **If Ω*=θ, then λ is a variable**

n	s	α	Ω(0) as given	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^	A(0) as a variable	λ as a variable	$s_{SP/Y}$ as given	θ=s/$s_{SP/Y}$	Ψ=Ω(0)/θ	**Balanced growth-state** g^*_y=λ/(1-α)	g^*_Y=g^*_y+n
0.01	0.05	**0**	1.5	11	1	1	7.333333	7.333333	**0.007993**	**0.017993**	2.778846	0.539793	0.007993	0.017993

time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	$g_Ω$(t)	k*(t), where χ=1/(1-α)
0	11	7.333333	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.5	---	0	---	=A(t)^χ(Ω*)^χ
1	11.256667	7.392184	7.392184	0.369609	0.112567	0.257043	11.513709	0.022835	1.522780	0.008025	0.000000	0.015186	infinite
2	11.513709	7.451507	7.451507	0.372575	0.115137	0.257438	11.771147	0.022359	1.545152	0.008025	0.000000	0.014692	
3	11.771147	7.511306	7.511306	0.375565	0.117711	0.257854	12.029001	0.021906	1.567124	0.008025	0.000000	0.014220	**Ω*=θ=s/(n+g*y)**
4	12.029001	7.571586	7.571586	0.378579	0.120290	0.258289	12.287291	0.021472	1.588703	0.008025	0.000000	0.013770	2.778846
5	12.287291	7.632348	7.632348	0.381617	0.122873	0.258745	12.546035	0.021058	1.609896	0.008025	0.000000	0.013340	
6	12.546035	7.693599	7.693599	0.384680	0.125460	0.259220	12.805255	0.020661	1.630711	0.008025	0.000000	0.012929	A*=k*/(Ω*k*^α)
7	12.805255	7.755341	7.755341	0.387767	0.128053	0.259714	13.064969	0.020282	1.651153	0.008025	0.000000	0.012536	infinite
8	13.064969	7.817578	7.817578	0.390879	0.130650	0.260229	13.325198	0.019918	1.671230	0.008025	0.000000	0.012159	
9	13.325198	7.880315	7.880315	0.394016	0.133252	0.260764	13.585962	0.019569	1.690947	0.008025	0.000000	0.011798	y*=A*k*^α
10	13.585962	7.943556	7.943556	0.397178	0.135860	0.261318	13.847280	0.019234	1.710312	0.008025	0.000000	0.011452	infinite
11	13.847280	8.007304	8.007304	0.400365	0.138473	0.261892	14.109173	0.018913	1.729331	0.008025	0.000000	0.011120	
12	14.109173	8.071563	8.071563	0.403578	0.141092	0.262486	14.371659	0.018604	1.748010	0.008025	0.000000	0.010801	**g^*_Y=s/Ω***
13	14.371659	8.136338	8.136338	0.406817	0.143717	0.263100	14.634760	0.018307	1.766355	0.008025	0.000000	0.010495	0.0179931
14	14.634760	8.201633	8.201633	0.410082	0.146348	0.263734	14.898494	0.018021	1.784371	0.008025	0.000000	0.010200	
15	14.898494	8.267452	8.267452	0.413373	0.148985	0.264388	15.162881	0.017746	1.802066	0.008025	0.000000	0.009916	r*=α/Ω*
16	15.162881	8.333800	8.333800	0.416690	0.151629	0.265061	15.427942	0.017481	1.819444	0.008025	0.000000	0.009643	0
17	15.427942	8.400679	8.400679	0.420034	0.154279	0.265755	15.693697	0.017226	1.836511	0.008025	0.000000	0.009381	
18	15.693697	8.468096	8.468096	0.423405	0.156937	0.266468	15.960165	0.016979	1.853273	0.008025	0.000000	0.009127	**Note:**
19	15.960165	8.536053	8.536053	0.426803	0.159602	0.267201	16.227366	0.016742	1.869736	0.008025	0.000000	0.008883	K(t)/Y(t)
20	16.227366	8.604556	8.604556	0.430228	0.162274	0.267954	16.495320	0.016512	1.885904	0.008025	0.000000	0.008647	=Ω(t)
21	16.495320	8.673609	8.673609	0.433680	0.164953	0.268727	16.764047	0.016291	1.901783	0.008025	0.000000	0.008420	=k(t) ^ (1-α) / A(t)
22	16.764047	8.743215	8.743215	0.437161	0.167640	0.269520	17.033567	0.016077	1.917378	0.008025	0.000000	0.008200	
23	17.033567	8.813381	8.813381	0.440669	0.170336	0.270333	17.303901	0.015871	1.932694	0.008025	0.000000	0.007988	A(t)
24	17.303901	8.884109	8.884109	0.444205	0.173039	0.271166	17.575067	0.015671	1.947736	0.008025	0.000000	0.007783	=$J$3*EXP($K$3*A5)
25	17.575067	8.955405	8.955405	0.447770	0.175751	0.272020	17.847087	0.015478	1.962510	0.008025	0.000000	0.007585	=A(0)*EXP(λ*t)
26	17.847087	9.027273	9.027273	0.451364	0.178471	0.272893	18.119980	0.015291	1.977019	0.008025	0.000000	0.007393	k*(t), where χ=1/(1-α)
27	18.119980	9.099718	9.099718	0.454986	0.181200	0.273786	18.393766	0.015110	1.991268	0.008025	0.000000	0.007208	=A(t)^χ(Ω*)^χ
28	18.393766	9.172744	9.172744	0.458637	0.183938	0.274700	18.668465	0.014934	2.005263	0.008025	0.000000	0.007028	infinite
29	18.668465	9.246357	9.246357	0.462318	0.186685	0.275633	18.944098	0.014765	2.019008	0.008025	0.000000	0.006854	Thus, k*, y*, and A*
30	18.944098	9.320560	9.320560	0.466028	0.189441	0.276587	19.220685	0.014600	2.032507	0.008025	0.000000	0.006686	infinite
31	19.220685	9.395358	9.395358	0.469768	0.192207	0.277561	19.498247	0.014441	2.045764	0.008025	0.000000	0.006523	
32	19.498247	9.470757	9.470757	0.473538	0.194982	0.278555	19.776802	0.014286	2.058784	0.008025	0.000000	0.006365	
33	19.776802	9.546761	9.546761	0.477338	0.197768	0.279570	20.056372	0.014136	2.071572	0.008025	0.000000	0.006211	
34	20.056372	9.623375	9.623375	0.481169	0.200564	0.280605	20.336977	0.013991	2.084131	0.008025	0.000000	0.006062	
35	20.336977	9.700603	9.700603	0.485030	0.203370	0.281660	20.618637	0.013850	2.096465	0.008025	0.000000	0.005918	

Structure of the elasiticity of substitution, σ (1)
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For Appendix 4-4-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under S=Ω *S_P in the long run

gY(t)	gK(t)	Y^{υ} Y(t)	ΔY(t)	$(W*K)^{\upsilon}$ W*K	$g_{WK}(t)$	y^{υ} y(t)	L^{υ} L(t)	gL(t)=0.01=**n** ΔL(t)	W^{υ} W(t)	w^{υ} w(t)	P^{υ} P(t)	r(t)	$(r/w)^{\upsilon}$ (r/w)(t)	using $g_{WK}(t)$ Δ(r/w)(t)
---	---	183.3333	---	50417	---	7.333333	25.0000	---	183.333	7.33333	0.00000	0.00000	0.00000	---
0.018105	0.033063	186.653	3.319	53027	0.0518	7.392184	25.2500	0.250000	186.653	7.39218	0.00000	0.00000	0.00000	0.00000
0.018105	0.032583	190.032	3.379	55746	0.0513	7.451507	25.5025	0.252500	190.032	7.45151	0.00000	0.00000	0.00000	0.00000
0.018105	0.032125	193.473	3.441	58578	0.0508	7.511306	25.7575	0.255025	193.473	7.51131	0.00000	0.00000	0.00000	0.00000
0.018105	0.031687	196.976	3.503	61529	0.0504	7.571586	26.0151	0.257575	196.976	7.57159	0.00000	0.00000	0.00000	0.00000
0.018105	0.031268	200.542	3.566	64601	0.0499	7.632348	26.2753	0.260151	200.542	7.63235	0.00000	0.00000	0.00000	0.00000
0.018105	0.030868	204.173	3.631	67801	0.0495	7.693599	26.5380	0.262753	204.173	7.69360	0.00000	0.00000	0.00000	0.00000
0.018105	0.030485	207.869	3.697	71133	0.0491	7.755341	26.8034	0.265380	207.869	7.75534	0.00000	0.00000	0.00000	0.00000
0.018105	0.030117	211.633	3.764	74602	0.0488	7.817578	27.0714	0.268034	211.633	7.81758	0.00000	0.00000	0.00000	0.00000
0.018105	0.029765	215.465	3.832	78213	0.0484	7.880315	27.3421	0.270714	215.465	7.88032	0.00000	0.00000	0.00000	0.00000
0.018105	0.029427	219.366	3.901	81973	0.0481	7.943556	27.6156	0.273421	219.366	7.94356	0.00000	0.00000	0.00000	0.00000
0.018105	0.029102	223.337	3.972	85886	0.0477	8.007304	27.8917	0.276156	223.337	8.00730	0.00000	0.00000	0.00000	0.00000
0.018105	0.028790	227.381	4.044	89958	0.0474	8.071563	28.1706	0.278917	227.381	8.07156	0.00000	0.00000	0.00000	0.00000
0.018105	0.028490	231.498	4.117	94196	0.0471	8.136338	28.4523	0.281706	231.498	8.13634	0.00000	0.00000	0.00000	0.00000
0.018105	0.028201	235.689	4.191	98606	0.0468	8.201633	28.7369	0.284523	235.689	8.20163	0.00000	0.00000	0.00000	0.00000
0.018105	0.027923	239.956	4.267	103195	0.0465	8.267452	29.0242	0.287369	239.956	8.26745	0.00000	0.00000	0.00000	0.00000
0.018105	0.027656	244.301	4.344	107969	0.0463	8.333800	29.3145	0.290242	244.301	8.33380	0.00000	0.00000	0.00000	0.00000
0.018105	0.027398	248.724	4.423	112935	0.0460	8.400679	29.6076	0.293145	248.724	8.40068	0.00000	0.00000	0.00000	0.00000
0.018105	0.027149	253.227	4.503	118102	0.0457	8.468096	29.9037	0.296076	253.227	8.46810	0.00000	0.00000	0.00000	0.00000
0.018105	0.026909	257.812	4.585	123475	0.0455	8.536053	30.2027	0.299037	257.812	8.53605	0.00000	0.00000	0.00000	0.00000
0.018105	0.026678	262.480	4.668	129065	0.0453	8.604556	30.5048	0.302027	262.480	8.60456	0.00000	0.00000	0.00000	0.00000
0.018105	0.026454	267.232	4.752	134877	0.0450	8.673609	30.8098	0.305048	267.232	8.67361	0.00000	0.00000	0.00000	0.00000
0.018105	0.026238	272.070	4.838	140922	0.0448	8.743215	31.1179	0.308098	272.070	8.74322	0.00000	0.00000	0.00000	0.00000
0.018105	0.026029	276.996	4.926	147208	0.0446	8.813381	31.4291	0.311179	276.996	8.81338	0.00000	0.00000	0.00000	0.00000
0.018105	0.025828	282.012	5.015	153745	0.0444	8.884109	31.7434	0.314291	282.012	8.88411	0.00000	0.00000	0.00000	0.00000
0.018105	0.025632	287.117	5.106	160540	0.0442	8.955405	32.0608	0.317434	287.117	8.95540	0.00000	0.00000	0.00000	0.00000
0.018105	0.025444	292.316	5.198	167606	0.0440	9.027273	32.3814	0.320608	292.316	9.02727	0.00000	0.00000	0.00000	0.00000
0.018105	0.025261	297.608	5.292	174951	0.0438	9.099718	32.7052	0.323814	297.608	9.09972	0.00000	0.00000	0.00000	0.00000
0.018105	0.025084	302.997	5.388	182586	0.0436	9.172744	33.0323	0.327052	302.997	9.17274	0.00000	0.00000	0.00000	0.00000
0.018105	0.024912	308.482	5.486	190523	0.0435	9.246357	33.3626	0.330323	308.482	9.24636	0.00000	0.00000	0.00000	0.00000
0.018105	0.024746	314.068	5.585	198772	0.0433	9.320560	33.6962	0.333626	314.068	9.32056	0.00000	0.00000	0.00000	0.00000
0.018105	0.024585	319.754	5.686	207347	0.0431	9.395358	34.0332	0.336962	319.754	9.39536	0.00000	0.00000	0.00000	0.00000
0.018105	0.024429	325.543	5.789	216258	0.0430	9.470757	34.3735	0.340332	325.543	9.47076	0.00000	0.00000	0.00000	0.00000
0.018105	0.024278	331.437	5.894	225518	0.0428	9.546761	34.7173	0.343735	331.437	9.54676	0.00000	0.00000	0.00000	0.00000
0.018105	0.024131	337.438	6.001	235142	0.0427	9.623375	35.0644	0.347173	337.438	9.62337	0.00000	0.00000	0.00000	0.00000
0.018105	0.023988	343.548	6.109	245142	0.0425	9.700603	35.4151	0.350644	343.548	9.70060	0.00000	0.00000	0.00000	0.00000

S-KM alfa=0 & alfa=1 (A4-4)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-4-1 Case study of the **Solow-Kamiryo** Model: A(0) and λ are variables under S=Ω *S_P in the long run **α=0**

(2) Δ(r/w)/(r/w)(t)	K^{υ} K(t)	ΔK(t)	k^{υ} k(t)	Δk(t)=(kt(1+n)−k(t−1))/n using **n** Δk(t)	(1) Δk(t)/k(t)	(1)/(2) σ(t)	MPL =ΔY/ΔL	MPK =ΔY/ΔK	Y=wL+rK is confirmed. Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	APL =Y/L	APK =Y/K	λ
---	275.000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---
#DIV/0!	284.092	9.0923	11.2512	36.3693	3.23249	#DIV/0!	13.2773	0.3651	186.653	0.55232	#DIV/0!	7.3922	0.6570	0.00799
#DIV/0!	293.349	9.2565	11.5027	36.6596	3.18703	#DIV/0!	13.3838	0.3651	190.032	0.55232	#DIV/0!	7.4515	0.6478	0.00799
#DIV/0!	302.773	9.4237	11.7547	36.9522	3.14360	#DIV/0!	13.4912	0.3651	193.473	0.55232	#DIV/0!	7.5113	0.6390	0.00799
#DIV/0!	312.367	9.5939	12.0071	37.2471	3.10208	#DIV/0!	13.5995	0.3651	196.976	0.55232	#DIV/0!	7.5716	0.6306	0.00799
#DIV/0!	322.134	9.7672	12.2600	37.5444	3.06236	#DIV/0!	13.7086	0.3651	200.542	0.55232	#DIV/0!	7.6323	0.6225	0.00799
#DIV/0!	332.077	9.9437	12.5133	37.8442	3.02432	#DIV/0!	13.8186	0.3651	204.173	0.55232	#DIV/0!	7.6936	0.6148	0.00799
#DIV/0!	342.201	10.1233	12.7671	38.1463	2.98787	#DIV/0!	13.9295	0.3652	207.869	0.55232	#DIV/0!	7.7553	0.6074	0.00799
#DIV/0!	352.507	10.3062	13.0214	38.4509	2.95291	#DIV/0!	14.0413	0.3652	211.633	0.55232	#DIV/0!	7.8176	0.6004	0.00799
#DIV/0!	362.999	10.4923	13.2762	38.7580	2.91936	#DIV/0!	14.1540	0.3652	215.465	0.55232	#DIV/0!	7.8803	0.5936	0.00799
#DIV/0!	373.681	10.6819	13.5315	39.0675	2.88714	#DIV/0!	14.2676	0.3652	219.366	0.55232	#DIV/0!	7.9436	0.5870	0.00799
#DIV/0!	384.556	10.8749	13.7875	39.3796	2.85619	#DIV/0!	14.3821	0.3652	223.337	0.55232	#DIV/0!	8.0073	0.5808	0.00799
#DIV/0!	395.627	11.0714	14.0440	39.6941	2.82642	#DIV/0!	14.4975	0.3652	227.381	0.55232	#DIV/0!	8.0716	0.5747	0.00799
#DIV/0!	406.899	11.2714	14.3011	40.0112	2.79778	#DIV/0!	14.6139	0.3652	231.498	0.55232	#DIV/0!	8.1363	0.5689	0.00799
#DIV/0!	418.374	11.4751	14.5588	40.3308	2.77021	#DIV/0!	14.7311	0.3653	235.689	0.55232	#DIV/0!	8.2016	0.5633	0.00799
#DIV/0!	430.056	11.6824	14.8171	40.6531	2.74365	#DIV/0!	14.8494	0.3653	239.956	0.55232	#DIV/0!	8.2675	0.5580	0.00799
#DIV/0!	441.950	11.8935	15.0762	40.9779	2.71806	#DIV/0!	14.9685	0.3653	244.301	0.55232	#DIV/0!	8.3338	0.5528	0.00799
#DIV/0!	454.058	12.1084	15.3359	41.3054	2.69338	#DIV/0!	15.0886	0.3653	248.724	0.55232	#DIV/0!	8.4007	0.5478	0.00799
#DIV/0!	466.385	12.3273	15.5963	41.6355	2.66958	#DIV/0!	15.2097	0.3653	253.227	0.55232	#DIV/0!	8.4681	0.5430	0.00799
#DIV/0!	478.935	12.5500	15.8574	41.9682	2.64661	#DIV/0!	15.3318	0.3653	257.812	0.55232	#DIV/0!	8.5361	0.5383	0.00799
#DIV/0!	491.712	12.7769	16.1192	42.3036	2.62443	#DIV/0!	15.4548	0.3653	262.480	0.55232	#DIV/0!	8.6046	0.5338	0.00799
#DIV/0!	504.720	13.0078	16.3818	42.6418	2.60300	#DIV/0!	15.5789	0.3653	267.232	0.55232	#DIV/0!	8.6736	0.5295	0.00799
#DIV/0!	517.963	13.2429	16.6452	42.9827	2.58229	#DIV/0!	15.7039	0.3654	272.070	0.55232	#DIV/0!	8.7432	0.5253	0.00799
#DIV/0!	531.445	13.4822	16.9093	43.3263	2.56227	#DIV/0!	15.8299	0.3654	276.996	0.55232	#DIV/0!	8.8134	0.5212	0.00799
#DIV/0!	545.171	13.7259	17.1743	43.6727	2.54290	#DIV/0!	15.9569	0.3654	282.012	0.55232	#DIV/0!	8.8841	0.5173	0.00799
#DIV/0!	559.145	13.9740	17.4402	44.0219	2.52417	#DIV/0!	16.0850	0.3654	287.117	0.55232	#DIV/0!	8.9554	0.5135	0.00799
#DIV/0!	573.372	14.2266	17.7068	44.3739	2.50603	#DIV/0!	16.2141	0.3654	292.316	0.55232	#DIV/0!	9.0273	0.5098	0.00799
#DIV/0!	587.856	14.4838	17.9744	44.7287	2.48847	#DIV/0!	16.3442	0.3654	297.608	0.55232	#DIV/0!	9.0997	0.5063	0.00799
#DIV/0!	602.601	14.7456	18.2428	45.0864	2.47146	#DIV/0!	16.4754	0.3654	302.997	0.55232	#DIV/0!	9.1727	0.5028	0.00799
#DIV/0!	617.613	15.0122	18.5121	45.4470	2.45498	#DIV/0!	16.6076	0.3654	308.482	0.55232	#DIV/0!	9.2464	0.4995	0.00799
#DIV/0!	632.897	15.2836	18.7824	45.8105	2.43901	#DIV/0!	16.7409	0.3654	314.068	0.55232	#DIV/0!	9.3206	0.4962	0.00799
#DIV/0!	648.457	15.5599	19.0537	46.1769	2.42352	#DIV/0!	16.8752	0.3654	319.754	0.55232	#DIV/0!	9.3954	0.4931	0.00799
#DIV/0!	664.298	15.8412	19.3259	46.5463	2.40850	#DIV/0!	17.0106	0.3655	325.543	0.55232	#DIV/0!	9.4708	0.4901	0.00799
#DIV/0!	680.426	16.1276	19.5991	46.9186	2.39392	#DIV/0!	17.1472	0.3655	331.437	0.55232	#DIV/0!	9.5468	0.4871	0.00799
#DIV/0!	696.845	16.4192	19.8733	47.2940	2.37978	#DIV/0!	17.2848	0.3655	337.438	0.55232	#DIV/0!	9.6234	0.4842	0.00799
#DIV/0!	713.561	16.7160	20.1485	47.6723	2.36605	#DIV/0!	17.4235	0.3655	343.548	0.55232	#DIV/0!	9.7006	0.4815	0.00799

Appendix 4-4-2 Case study of the **Solow-Kamiryo** Model :**α=1**

n	s	α	Ω(0)=Ω*	k(0)	β=1-α	k(0)^α	y(0)=A(0)k(0)^A(0) as a variable		If **α=1**, gk(t)=gy(t) and **λ=0** and g_Ω=0 **(CRS)**				**Balanced growth-state**	
0.01	0.05	**1**	1.5	11	0	11	7.333333	0.666667	**λ as a variable $s_{SP/Y}$ as given**		**0**	**0.033324**	1.500415	0.999724	#DIV/0!	0.01
time	k(t)	A(t)	y(t)	s(t)	n*k(t)	Net change	k(t+1)	gk(t)	Ω(t)=K(t)/Y(t)	gy(t)	r(t)	g_Ω(t)	k*(t), where χ=1/(1-α)	
0	11	0.666667	7.333333	0.366667	0.11	0.256667	11.256667	0.023333	1.5	-----	0.666667	---	=A(t)^χ(Ω*)^χ	
1	11.256667	0.666667	7.504444	0.375222	0.112567	0.262656	11.519322	0.023333	1.500000	0.023333	0.666667	0	infinite	
2	11.519322	0.666667	7.679548	0.383977	0.115193	0.268784	11.788106	0.023333	1.500000	0.023333	0.666667	1.48E-16		
3	11.788106	0.666667	7.858738	0.392937	0.117881	0.275056	12.063162	0.023333	1.500000	0.023333	0.666667	-1.48E-16	**Ω*=θ=s/(n+g*$_y$)**	
4	12.063162	0.666667	8.042108	0.402105	0.120632	0.281474	12.344636	0.023333	1.500000	0.023333	0.666667	0	1.500415	
5	12.344636	0.666667	8.229757	0.411488	0.123446	0.288042	12.632678	0.023333	1.500000	0.023333	0.666667	0		
6	12.632678	0.666667	8.421785	0.421089	0.126327	0.294762	12.927440	0.023333	1.500000	0.023333	0.666667	0	A*=k*/(Ω*k*^α)	
7	12.927440	0.666667	8.618293	0.430915	0.129274	0.301640	13.229080	0.023333	1.500000	0.023333	0.666667	0	infinite	
8	13.229080	0.666667	8.819387	0.440969	0.132291	0.308679	13.537759	0.023333	1.500000	0.023333	0.666667	0		
9	13.537759	0.666667	9.025173	0.451259	0.135378	0.315881	13.853640	0.023333	1.500000	0.023333	0.666667	1.48E-16	y*=A*k*^α	
10	13.853640	0.666667	9.235760	0.461788	0.138536	0.323252	14.176891	0.023333	1.500000	0.023333	0.666667	0	infinite	
11	14.176891	0.666667	9.451261	0.472563	0.141769	0.330794	14.507686	0.023333	1.500000	0.023333	0.666667	-1.48E-16		
12	14.507686	0.666667	9.671790	0.483590	0.145077	0.338513	14.846198	0.023333	1.500000	0.023333	0.666667	1.48E-16	**g*$_Y$=s/Ω***	
13	14.846198	0.666667	9.897465	0.494873	0.148462	0.346411	15.192610	0.023333	1.500000	0.023333	0.666667	0	0.0333241	
14	15.192610	0.666667	10.128406	0.506420	0.151926	0.354494	15.547104	0.023333	1.500000	0.023333	0.666667	-1.48E-16		
15	15.547104	0.666667	10.364736	0.518237	0.155471	0.362766	15.909869	0.023333	1.500000	0.023333	0.666667	0	r*=α/Ω*	
16	15.909869	0.666667	10.606580	0.530329	0.159099	0.371230	16.281100	0.023333	1.500000	0.023333	0.666667	0	0.6664824	
17	16.281100	0.666667	10.854067	0.542703	0.162811	0.379892	16.660992	0.023333	1.500000	0.023333	0.666667	0		
18	16.660992	0.666667	11.107328	0.555366	0.166610	0.388756	17.049749	0.023333	1.500000	0.023333	0.666667	1.48E-16	**Note:**	
19	17.049749	0.666667	11.366499	0.568325	0.170497	0.397827	17.447576	0.023333	1.500000	0.023333	0.666667	-1.48E-16	K(t)/Y(t)	
20	17.447576	0.666667	11.631717	0.581586	0.174476	0.407110	17.854686	0.023333	1.500000	0.023333	0.666667	0	=Ω(t)	
21	17.854686	0.666667	11.903124	0.595156	0.178547	0.416609	18.271296	0.023333	1.500000	0.023333	0.666667	1.48E-16	=k(t) ^ (1-α) / A(t)	
22	18.271296	0.666667	12.180864	0.609043	0.182713	0.426330	18.697626	0.023333	1.500000	0.023333	0.666667	-1.48E-16		
23	18.697626	0.666667	12.465084	0.623254	0.186976	0.436278	19.133904	0.023333	1.500000	0.023333	0.666667	0	A(t)	
24	19.133904	0.666667	12.755936	0.637797	0.191339	0.446458	19.580361	0.023333	1.500000	0.023333	0.666667	1.48E-16	=$J$3*EXP($K$3*A5)	
25	19.580361	0.666667	13.053574	0.652679	0.195804	0.456875	20.037237	0.023333	1.500000	0.023333	0.666667	-1.48E-16	=A(0)*EXP(λ*t)	
26	20.037237	0.666667	13.358158	0.667908	0.200372	0.467536	20.504772	0.023333	1.500000	0.023333	0.666667	1.48E-16	k*(t), where χ=1/(1-α)	
27	20.504772	0.666667	13.669848	0.683492	0.205048	0.478445	20.983217	0.023333	1.500000	0.023333	0.666667	0	=A(t)^χ(Ω*)^χ	
28	20.983217	0.666667	13.988811	0.699441	0.209832	0.489608	21.472825	0.023333	1.500000	0.023333	0.666667	-1.48E-16	infinite	
29	21.472825	0.666667	14.315217	0.715761	0.214728	0.501033	21.973858	0.023333	1.500000	0.023333	0.666667	1.48E-16	Thus, k*, y*, and A*	
30	21.973858	0.666667	14.649238	0.732462	0.219739	0.512723	22.486581	0.023333	1.500000	0.023333	0.666667	-1.48E-16	infinite	
31	22.486581	0.666667	14.991054	0.749553	0.224866	0.524687	23.011268	0.023333	1.500000	0.023333	0.666667	0		
32	23.011268	0.666667	15.340845	0.767042	0.230113	0.536930	23.548198	0.023333	1.500000	0.023333	0.666667	0		
33	23.548198	0.666667	15.698798	0.784940	0.235482	0.549458	24.097655	0.023333	1.500000	0.023333	0.666667	0		
34	24.097655	0.666667	16.065104	0.803255	0.240977	0.562279	24.659934	0.023333	1.500000	0.023333	0.666667	0		
35	24.659934	0.666667	16.439956	0.821998	0.246599	0.575398	25.235333	0.023333	1.500000	0.023333	0.666667	1.48E-16		

S–KM alfa=0 & alfa=1 (A4–4)

Structure of the elasiticity of substitution, σ (1) For Appendix 4-4-2 Case study of the **Solow-Kamiryo** Model: :**α=1**

CRC

α=1

		Y^υ		$(W*K)^\upsilon$		y^υ	L^υ	$g_L(t)=0.01=$**n**	W^υ	w^υ	P^υ		$(r/w)^\upsilon$	
		183.3333		0		7.333333	**25**	0.01	0.000	0.00000	183.33333	0.66667	#DIV/0!	using $g_{WK}(t)$
gY(t)	gK(t)	Y(t)	ΔY(t)	W*K	g_{WK}(t)	y(t)	L(t)	ΔL(t)	W(t)	w(t)	P(t)	r(t)	(r/w)(t)	Δ(r/w)(t)
---	---	183.333	---	0	---	7.333333	25.0000	---	0.000	0.00000	183.33333	0.66667	#DIV/0!	---
0.033567	0.033567	189.487	6.154	0	#DIV/0!	7.504444	25.2500	0.250000	0.000	0.00000	189.48722	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	195.848	6.360	0	#DIV/0!	7.679548	25.5025	0.252500	0.000	0.00000	195.84768	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	202.422	6.574	0	#DIV/0!	7.858738	25.7575	0.255025	0.000	0.00000	202.42163	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	209.216	6.795	0	#DIV/0!	8.042108	26.0151	0.257575	0.000	0.00000	209.21625	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	216.239	7.023	0	#DIV/0!	8.229757	26.2753	0.260151	0.000	0.00000	216.23894	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	223.497	7.258	0	#DIV/0!	8.421785	26.5380	0.262753	0.000	0.00000	223.49736	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	230.999	7.502	0	#DIV/0!	8.618293	26.8034	0.265380	0.000	0.00000	230.99942	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	238.753	7.754	0	#DIV/0!	8.819387	27.0714	0.268034	0.000	0.00000	238.75330	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	246.767	8.014	0	#DIV/0!	9.025173	27.3421	0.270714	0.000	0.00000	246.76746	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	255.051	8.283	0	#DIV/0!	9.235760	27.6156	0.273421	0.000	0.00000	255.05062	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	263.612	8.561	0	#DIV/0!	9.451261	27.8917	0.276156	0.000	0.00000	263.61182	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	272.460	8.849	0	#DIV/0!	9.671790	28.1706	0.278917	0.000	0.00000	272.46039	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	281.606	9.146	0	#DIV/0!	9.897465	28.4523	0.281706	0.000	0.00000	281.60597	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	291.059	9.453	0	#DIV/0!	10.128406	28.7369	0.284523	0.000	0.00000	291.05855	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	300.828	9.770	0	#DIV/0!	10.364736	29.0242	0.287369	0.000	0.00000	300.82841	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	310.926	10.098	0	#DIV/0!	10.606580	29.3145	0.290242	0.000	0.00000	310.92622	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	321.363	10.437	0	#DIV/0!	10.854067	29.6076	0.293145	0.000	0.00000	321.36298	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	332.150	10.787	0	#DIV/0!	11.107328	29.9037	0.296076	0.000	0.00000	332.15006	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	343.299	11.149	0	#DIV/0!	11.366499	30.2027	0.299037	0.000	0.00000	343.29923	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	354.823	11.523	0	#DIV/0!	11.631717	30.5048	0.302027	0.000	0.00000	354.82264	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	366.733	11.910	0	#DIV/0!	11.903124	30.8098	0.305048	0.000	0.00000	366.73286	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	379.043	12.310	0	#DIV/0!	12.180864	31.1179	0.308098	0.000	0.00000	379.04286	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	391.766	12.723	0	#DIV/0!	12.465084	31.4291	0.311179	0.000	0.00000	391.76606	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	404.916	13.150	0	#DIV/0!	12.755936	31.7434	0.314291	0.000	0.00000	404.91634	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	418.508	13.592	0	#DIV/0!	13.053574	32.0608	0.317434	0.000	0.00000	418.50803	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	432.556	14.048	0	#DIV/0!	13.358158	32.3814	0.320608	0.000	0.00000	432.55595	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	447.075	14.519	0	#DIV/0!	13.669848	32.7052	0.323814	0.000	0.00000	447.07541	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	462.082	15.007	0	#DIV/0!	13.988811	33.0323	0.327052	0.000	0.00000	462.08225	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	477.593	15.511	0	#DIV/0!	14.315217	33.3626	0.330323	0.000	0.00000	477.59281	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	493.624	16.031	0	#DIV/0!	14.649238	33.6962	0.333626	0.000	0.00000	493.62400	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	510.193	16.569	0	#DIV/0!	14.991054	34.0332	0.336962	0.000	0.00000	510.19332	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	527.319	17.125	0	#DIV/0!	15.340845	34.3735	0.340332	0.000	0.00000	527.31881	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	545.019	17.700	0	#DIV/0!	15.698798	34.7173	0.343735	0.000	0.00000	545.01914	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	563.314	18.294	0	#DIV/0!	16.065104	35.0644	0.347173	0.000	0.00000	563.31362	0.66667	#DIV/0!	#DIV/0!
0.033567	0.033567	582.222	18.909	0	#DIV/0!	16.439956	35.4151	0.350644	0.000	0.00000	582.22218	0.66667	#DIV/0!	#DIV/0!

Structure of the elasiticity of substitution, σ (2) For Appendix 4-4-2 Case study of the **Solow-Kamiryo** Model: :**α=1** **α=1**

Δk(t)=(kt(1+n)-k(t-1))/n

CRC	K^{υ}		k^{υ}	using **n**											
(2)	275.000		11.00000		(1)	(1)/(2)	**MPL**	**MPK**	Y=wL+rK is confirmed.			**APL**	**APK**		
Δ(r/w)/(r/w)(t)	K(t)	ΔK(t)	k(t)	**Δk(t)**	**Δk(t)/k(t)**	**σ(t)**	=ΔY/ΔL	=ΔY/ΔK	Y=wL+rK	p=(w/MPL)/(1-α)	p=(r/MPK)/α	=Y/L	=Y/K	λ	
---	275.000	---	11.0000	---	---	---	---	---	183.333	---	---	---	---	---	
#DIV/0!	284.231	9.2308	11.2567	36.9233	3.28013	#DIV/0!	24.6156	0.6667	189.487	#DIV/0!	1.00000	7.5044	0.6667	0.00000	
#DIV/0!	293.772	9.5407	11.5193	37.7849	3.28013	#DIV/0!	25.1899	0.6667	195.848	#DIV/0!	1.00000	7.6795	0.6667	0.00000	
#DIV/0!	303.632	9.8609	11.7881	38.6665	3.28013	#DIV/0!	25.7777	0.6667	202.422	#DIV/0!	1.00000	7.8587	0.6667	0.00000	
#DIV/0!	313.824	10.1919	12.0632	39.5687	3.28013	#DIV/0!	26.3792	0.6667	209.216	#DIV/0!	1.00000	8.0421	0.6667	0.00000	
#DIV/0!	324.358	10.5340	12.3446	40.4920	3.28013	#DIV/0!	26.9947	0.6667	216.239	#DIV/0!	1.00000	8.2298	0.6667	0.00000	
#DIV/0!	335.246	10.8876	12.6327	41.4368	3.28013	#DIV/0!	27.6246	0.6667	223.497	#DIV/0!	1.00000	8.4218	0.6667	0.00000	
#DIV/0!	346.499	11.2531	12.9274	42.4037	3.28013	#DIV/0!	28.2691	0.6667	230.999	#DIV/0!	1.00000	8.6183	0.6667	0.00000	
#DIV/0!	358.130	11.6308	13.2291	43.3931	3.28013	#DIV/0!	28.9287	0.6667	238.753	#DIV/0!	1.00000	8.8194	0.6667	0.00000	
#DIV/0!	370.151	12.0212	13.5378	44.4056	3.28013	#DIV/0!	29.6037	0.6667	246.767	#DIV/0!	1.00000	9.0252	0.6667	0.00000	
#DIV/0!	382.576	12.4247	13.8536	45.4417	3.28013	#DIV/0!	30.2945	0.6667	255.051	#DIV/0!	1.00000	9.2358	0.6667	0.00000	
#DIV/0!	395.418	12.8418	14.1769	46.5021	3.28013	#DIV/0!	31.0014	0.6667	263.612	#DIV/0!	1.00000	9.4513	0.6667	0.00000	
#DIV/0!	408.691	13.2729	14.5077	47.5871	3.28013	#DIV/0!	31.7247	0.6667	272.460	#DIV/0!	1.00000	9.6718	0.6667	0.00000	
#DIV/0!	422.409	13.7184	14.8462	48.6975	3.28013	#DIV/0!	32.4650	0.6667	281.606	#DIV/0!	1.00000	9.8975	0.6667	0.00000	
#DIV/0!	436.588	14.1789	15.1926	49.8337	3.28013	#DIV/0!	33.2225	0.6667	291.059	#DIV/0!	1.00000	10.1284	0.6667	0.00000	
#DIV/0!	451.243	14.6548	15.5471	50.9965	3.28013	#DIV/0!	33.9977	0.6667	300.828	#DIV/0!	1.00000	10.3647	0.6667	0.00000	
#DIV/0!	466.389	15.1467	15.9099	52.1864	3.28013	#DIV/0!	34.7910	0.6667	310.926	#DIV/0!	1.00000	10.6066	0.6667	0.00000	
#DIV/0!	482.044	15.6551	16.2811	53.4041	3.28013	#DIV/0!	35.6028	0.6667	321.363	#DIV/0!	1.00000	10.8541	0.6667	0.00000	
#DIV/0!	498.225	16.1806	16.6610	54.6502	3.28013	#DIV/0!	36.4335	0.6667	332.150	#DIV/0!	1.00000	11.1073	0.6667	0.00000	
#DIV/0!	514.949	16.7238	17.0497	55.9254	3.28013	#DIV/0!	37.2836	0.6667	343.299	#DIV/0!	1.00000	11.3665	0.6667	0.00000	
#DIV/0!	532.234	17.2851	17.4476	57.2303	3.28013	#DIV/0!	38.1535	0.6667	354.823	#DIV/0!	1.00000	11.6317	0.6667	0.00000	
#DIV/0!	550.099	17.8653	17.8547	58.5657	3.28013	#DIV/0!	39.0438	0.6667	366.733	#DIV/0!	1.00000	11.9031	0.6667	0.00000	
#DIV/0!	568.564	18.4650	18.2713	59.9322	3.28013	#DIV/0!	39.9548	0.6667	379.043	#DIV/0!	1.00000	12.1809	0.6667	0.00000	
#DIV/0!	587.649	19.0848	18.6976	61.3306	3.28013	#DIV/0!	40.8871	0.6667	391.766	#DIV/0!	1.00000	12.4651	0.6667	0.00000	
#DIV/0!	607.375	19.7254	19.1339	62.7617	3.28013	#DIV/0!	41.8411	0.6667	404.916	#DIV/0!	1.00000	12.7559	0.6667	0.00000	
#DIV/0!	627.762	20.3875	19.5804	64.2261	3.28013	#DIV/0!	42.8174	0.6667	418.508	#DIV/0!	1.00000	13.0536	0.6667	0.00000	
#DIV/0!	648.834	21.0719	20.0372	65.7247	3.28013	#DIV/0!	43.8165	0.6667	432.556	#DIV/0!	1.00000	13.3582	0.6667	0.00000	
#DIV/0!	670.613	21.7792	20.5048	67.2583	3.28013	#DIV/0!	44.8389	0.6667	447.075	#DIV/0!	1.00000	13.6698	0.6667	0.00000	
#DIV/0!	693.123	22.5102	20.9832	68.8277	3.28013	#DIV/0!	45.8851	0.6667	462.082	#DIV/0!	1.00000	13.9888	0.6667	0.00000	
#DIV/0!	716.389	23.2658	21.4728	70.4337	3.28013	#DIV/0!	46.9558	0.6667	477.593	#DIV/0!	1.00000	14.3152	0.6667	0.00000	
#DIV/0!	740.436	24.0468	21.9739	72.0771	3.28013	#DIV/0!	48.0514	0.6667	493.624	#DIV/0!	1.00000	14.6492	0.6667	0.00000	
#DIV/0!	765.290	24.8540	22.4866	73.7589	3.28013	#DIV/0!	49.1726	0.6667	510.193	#DIV/0!	1.00000	14.9911	0.6667	0.00000	
#DIV/0!	790.978	25.6882	23.0113	75.4800	3.28013	#DIV/0!	50.3200	0.6667	527.319	#DIV/0!	1.00000	15.3408	0.6667	0.00000	
#DIV/0!	817.529	26.5505	23.5482	77.2412	3.28013	#DIV/0!	51.4941	0.6667	545.019	#DIV/0!	1.00000	15.6988	0.6667	0.00000	
#DIV/0!	844.970	27.4417	24.0977	79.0434	3.28013	#DIV/0!	52.6956	0.6667	563.314	#DIV/0!	1.00000	16.0651	0.6667	0.00000	
#DIV/0!	873.333	28.3628	24.6599	80.8878	3.28013	#DIV/0!	53.9252	0.6667	582.222	#DIV/0!	1.00000	16.4400	0.6667	0.00000	