A two-sector model of growth based on corporate finance (3): technological progress, labour productivity, and capital-output ratio

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1. Range of study and notations

1.1 Purpose and Methodology

This paper clarifies the relationship among labour and capital productivity, $y \equiv Y/N_E$ and $1/\Omega_P \equiv Y/K_P$, the growth rates of population/workers n, and the coefficient of technological progress and the rate of technological progress, m^* and g^*_m, where the growth rate of population/workers n is a parameter. The methodology in this paper does not depend on the Euler's theorem and accordingly on the marginal productivity theory and the Cobb-Douglas production function, but uses an approach of the relationship between savings and net investment under discrete time whose origin is traced back to Kaldor [1956], Pasinetti [1962], and anti-Pasinetti (under the dual equilibrium). An improved point lies in an introduction of the relationship between the investment-output ratio and the growth rate of labour productivity. This relationship is measured using the coefficient of technological progress m^*, where $m^{*1}=m^{*0}(1+g^*_m)$. De Long and Summers [1991, p. 454] shows the relationship between the growth rate of labour productivity and the investment-output ratio, but this research is not directly connected with any coefficient of technological progress.

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Ratios needed for this work are obtained endogenously using the initial values, Y^0, P^0, W^0, K_P^0, and N_E^0, where, Y^0 is net national income (output), P^0 is corporate profit, W^0 is household and governmental wages (labour), K_P^0 is "corporate" capital, and N_E^0 is the number of population/workers, each in the national accounts. Total capital K^0 and "household and governmental" capital K_{WG}^0 are distinguished from corporate capital K_P^0 since this K_P^0 is inevitably responsible for national production. Also, assuming that the growth rate of output equals the growth rate of corporate capital, dividend equals the sum of saving of household (and government) and undistributed profit both of which are used for corporate net investment (see review of assumptions in Appendix).

For this purpose, two formulations are used: (1) the formulation of relative share, $\pi = \Omega_P \cdot \rho$, where π(≡corporate profit/net national income) is the relative share of profit, Ω_P is capital-output ratio (the reciprocal number of capital productivity), and ρ(≡corporate profit/corporate capital) is the rate of profit, (2) the formulation of productivity, $k = \Omega_P \cdot y$, where k(≡corporate capital/labour) is the capital-labour ratio and y(≡output/labour) is labour productivity. These ratios are ex-ante and discrete and shown as real under constant π and Ω_P. The author stresses that the relationship between the above two formulations has not been clarified in the past literature.

The methodology includes (1) the financial structure of products under constant π and Ω_P, using given n as a constant, where π, Ω_P, and n are parameters,[2)] (2) $\pi(g_m^*)$ under constant Ω_P or $\Omega_P(g_m^*)$ under constant π, using g_m^* as an independent variable, and (3) $g_m^*(n)$ under constant π and Ω_P, using n as a parameter.[3)] As a result, the

2) These are predetermined variables in a broad sense. The author thinks that the diminishing returns are only prevented by decreasing the capital-output ratio using the coefficient of technological progress which takes into consideration the relationship between the investment ratio and the growth rate of labour productivity.

3) A formulation of change in price level which does not depend on the Euler's and marginal productivity theories is treated separately in a forthcoming monograph [1998].

relationship between labour and capital productivity is clarified in the synthesis of two formulations, $\pi=\Omega_P \cdot \rho$ and $k=\Omega_P \cdot y$.

As an empirical study, the initial data of six countries are chosen in the OECD National Accounts. The results of a panel data approach are compared with those in Bertora [1993], Barro [1995], and Islam [1995] to some extents. The factors which determine the growth rates of output and productivity of labour are well extracted and makes it possible to propose some new lemmas and propositions. Particularly, the relationship between the growth rate of population/workers, n, and the rate of technological progress, g^*_m, differ by stage of economic developments.

1.2 Range of study

This paper is composed of the following contents:

1. Characteristics of the financial structure of products (goods and services). This structure shows that any value or ratio is expressed in terms of "real" and that the growth rate of output equals the growth rate of corporate capital. The structure holds only under constant π and Ω_P and given n each in two periods.
2. A base for the coefficient of technological progress m^* and the introduction of the rate of technological progress g^*_m. The introduction of g^*_m is a highlight of this paper. It was found that any function which comes from saving-investment relationships does not hold without introducing factors which stimulate investment.
3. Review of representative frameworks: Hicks, Harrod, and Solow. It was shown that each model has its specified condition in terms of the neutrality of technological progress. It implies that the discrete model between two periods shows and integrates the relationships between above conditions more generally.

   The author intends to show that corporate profit and its undistributed profit used for corporate net investment exclusively determine the level of the growth rate of net national income and fundamentally influence labour and capital productivity if the growth rate of population/workers is given as a constant/parameter.

The author defines four basic values (both given initial and unknown) of national accounts as follows:

1. Net national income or output Y
2. Corporate profit P which is composed of dividend payment D_I, and undistributed profit S_P: $P = D_I + S_P$.
3. Household income W which is defined as $Y - P$ (as a residual, and including wages of public and government sectors).
4. Corporate capital stock K_P (other sectors' capital is neglected since it does not contribute to earning profit).

These values are first given at an current point of time (with superscript "0"). They are unknown at the end of one period later and must be dependent variables (with no superscript). The given initial four values constitute a base of the financial structure of products (goods and services). This financial structure of products (FSP) assumes that any saving equals corresponding net investment:

1. Corporate undistributed profit S_P equals corporate financed net investment ΔK_{SP} which comes from S_P: $S_P = \Delta K_{SP}$.
2. Savings from dividend and wages S_{DI+W} equals corporate externally raised net investment ΔK_{DI+W} ($\equiv \Delta K_{WD}$) which comes from S_{DI+W}: $S_{DI+W} = \Delta K_{WD}$.
3. As a result, net corporate capital investment $\Delta K_P \equiv \Delta K_{SP} + \Delta K_{WD}$ equals corresponding saving $S_P + S_{DI+W}$: $S_P + S_{DI+W} = \Delta K_P \equiv \Delta K_{SP} + \Delta K_{WD}$.

Another assumption is needed for saving of dividend and wages, $S_{DI+W} = \Delta K_{WD}$. The financial structure of products does not divide "dividend and wages" into two ownership, "workers' and capitalists': $S_{DI}/Y + S_W/Y = S_{DI+W}/Y$. By this treatment, dividend and wages are simply treated in terms of the propensity to save.

However, the financial structure of products needs to add the number of population/workers N_E^0 and the growth rate of population/workers n. These play an important role for labour and capital productivity. Labour productivity (productivity of labour), y, is defined as Y/N_E and capital productivity (productivity of capital), Ω_P is defined as K_P/N_E. Also, n is given as a constant or a parameter and constitutes a vital factor to the improvement of productivity, both labour and capital.

What does the financial structure of products imply? The financial structure of products clarifies fundamental relationships among Y, P, S_P, D_I, W, K_P, and N_E. The retention ratio S_P/P (or the payout ratio D_I/P) determines the growth rate of net national income g_Y together with the relative share of profit. The propensity to save S_{DI+W}/Y determines the growth rate of corporate capital together with S_P/P or S_P/Y. These are derived endogenously in the financial structure of products (see the next section). They follow the above equal-relationship between saving and investment.

Depending on the financial structure of products, where parameters (as predetermined variables) are π, Ω_P, and n, the author **first** sets the formulation of $\pi = \Omega_P \cdot \rho$, where,

1. The relative share of profit of profit $\pi \equiv P/Y$,
2. The capital-output ratio $\Omega_P \equiv K_P/Y$,
3. The rate of profit $\rho \equiv P/K_P$, $\pi = \Omega_P \cdot \rho$.

Three steps start with the financial structure of products, but before starting, "a constant" is defined as that for two periods. For example, capital stock at the end of 1990, K_P^{EOP90}, is the same as capital stock at the beginning of 1991, K_P^{BOP91}. The theoretical value of capital stock is measured at the end of 1991, K_P^{EOP91}, which equals K_P^{BOP91}. Likewise, $Y^{EOP90} = Y^{BOP91}$ and $Y^{EOP91} = Y^{BOP92}$. "a constant" Ω_P implies that $\Omega_P^{EOP90} = \Omega_P^{EOP91}$. The author uses the initial given nominal values to measure theoretical real values one year later. This does not mean "a constant" in one year, but "a constant" for two years. However, it is noted that a theoretical value measured at the end of a period is real-based and cannot directly be compared with the nominal value given at the end of the same period unless the Paasche price index is one.

Now, four steps which start with the financial structure of products are as follows:

1. Under $\Omega_P=\Omega_P^0$=a constant and $\pi=\pi^0$=a constant: This is exactly the condition of the financial structure of products and presents a base for the second and third steps.
2. Under $\Omega_P=\Omega_P^0$=a constant: π and ρ are variables.
3. Under $\pi=\pi^0$=a constant: Ω_P and ρ are variables.
4. With no constant Ω_P and π: Ω_P, π, and ρ are variables.

How can one/two of π, Ω_P, and ρ be variables? One of them must be a variable if any equation holds as a function. These four are basically parameters (or predetermined variables). At least one additional variable is required for these four and this is the rate of technological progress g^*_m, which was differently introduced into the production function by Solow [1956]. The author extracts the coefficient of technological progress m^* in the financial structure of products, if it is defined as the growth rate of labour productivity dividend by the investment-output ratio, $g_{\Delta KP/Y}\equiv\Delta K_P/Y^0$: $m^*\equiv g_{Y/NE}/\Delta K_P/Y^0=g_y/\Delta K_P/Y^0$. This equation implies that corporate net investment is expected to improve labour productivity because the growth rate of net national income depends on the growth rate of labour productivity if population/workers remain unchanged. Technological progress, first of all, is expected to improve labour productivity. The coefficient of technological progress m^* is derived endogenously in the financial structure of products. The rate of technological progress $g^*_m\equiv(m^1-m^0)/m^0$ is used as an independent variable while the growth rate of population/workers n remains as a constant/parameter since $g^*_m=\varphi(\pi, \Omega_P, n)$.

When one of the components, π, Ω_P, and ρ, is expressed as a function of g^*_m, a new m^* is determined with the change in the corresponding two of $\pi=\Omega_P\cdot\rho$. Then, the above second and third steps are released from Keynesian "equations" and replaced by functions:

2. Under $\Omega_P=\Omega_P^0$=a constant, $\pi=\pi(g^*_m)$ and $\rho=\rho(g^*_m)$

3. Under $\pi=\pi^0$=a constant, $\Omega_P=\Omega_P(g^*_m)$ and $\rho=\rho(g^*_m)$

Note that $\pi=\pi(g^*_m)$ is dual to $\rho=\rho(g^*_m)$ under constant Ω_P and $\Omega_P=\Omega_P(g^*_m)$ is dual to $\rho=\rho(g^*_m)$ under constant π. Furthermore, if m^*, g_Y, and n are given, the above fourth step is possible as follows:

4. Ω_P and π changes at the same time as $\Omega_P(\pi)$ or $\pi(\Omega_P)$.

The formulation of $\pi=\Omega_P\cdot\rho$, **second**, closely connected with another formulation of productivity. The financial structure of products is composed of two formulations: one is the formulation of $\pi=\Omega_P\cdot\rho$, and the other is the formulation of productivity, $k=\Omega_P\cdot y$, which is explained below. The synthesis of theoretical relationship between two formulations is most important and needs to be discussed since any production function is justified and generalized by this implicit (hidden) relationship. The formulation of productivity is shown as follows:

1. $\left(\frac{K_P^0}{N_E^0}\right)\equiv\left(\frac{K_P^0}{Y^0}\right)\cdot\left(\frac{Y^0}{N_E^0}\right)$ or $k^0=\Omega_P^0\cdot y^0$, where $k^0=\left(\frac{K_P^0}{N_E^0}\right)$ and $y^0=\left(\frac{Y^0}{N_E^0}\right)$
2. $\left(\frac{K_P}{N_E}\right)\equiv\left(\frac{K_P}{Y}\right)\cdot\left(\frac{Y}{N_E}\right)$ or $k=\Omega_P\cdot y$, where $k=\left(\frac{K_P}{N_E}\right)$ and $y=\left(\frac{Y}{N_E}\right)$

It is noted that the formulation of productivity is shown as the above second equation and corresponds with the formulation of $\pi=\Omega_P\cdot\rho$. Both formulations are shown not using the initial values and their ratios but using unknown values and their ratios, although the unknown values and ratios are endogenously measured once given the initial values and the growth rate of population/workers n as a constant/parameter.

In the formulation of productivity, one of three factors is set as a constant:

1. $k=k^0$=a constant
2. $\Omega_P=\Omega_P^0$=a constant
3. $y=y^0$=a constant

Then, the two residuals are composed of a parameter and a variable (as discussed in the formulation of $\pi=\Omega_P\cdot\rho$: the variable is formed as a function of g^*_m: $k=k(g^*_m)$, $\Omega_P=\Omega_P(g^*_m)$, or $y=y(g^*_m)$.

However, for the relationship between two formulations, a new concept is established: this is the increase and decrease rate of x (x is an item within the two formulations), ξ_x: $\xi_x \equiv (x-x^0)/x^0) = \Delta x/x$, where Δx is the difference between "x^0 in the financial structure of products (both under $\Omega_P=\Omega_P^0$=a constant and under $\pi=\pi^0$=a constant)" and "x at a condition that either one of Ω_P and π is a constant." This is because π changes under $\Omega_P=\Omega_P^0$=a constant and Ω_P changes under $\pi=\pi^0$=a constant. Thus, these changes are expressed as Δx. As a result, $\xi_x(g_m^*)$ is also obtained using g_m^*. It is possible to get the value of elasticity using ξ_x between two items.[4)]

The most important ratio (component) in the two formulations is labour productivity $y=Y/N_E$ and accordingly the growth rate of labour productivity $g_y=g_{Y/NE}$. This is because these ratios help maintain sustainable growth (expressed as g_Y) at a preferable balance among π, Ω_P, ρ, and k. For labour productivity, both the growth rate of labour productivity $g_y(g_m^*)=g_{Y/NE}(g_m^*)$ and the increase and decrease rate $\xi_y(g_m^*)=\xi_{Y/NE}(g_m^*)$ can be used at the same time. Furthermore, labour productivity function of g_m^*, $y(g_m^*)$, is used, but more important is the growth rate of labour productivity function of g_m^*, $g_y(g_m^*)$, since it is related to a desirable level of net investment which is directly expressed using the rate of technological progress g_m^*.

Interesting to say, "productivity," in the (Cobb-Douglas) production function, has not fully been cultivated in terms of investment which is directly connected with the rate of technological progress g_m^*. The rate of technological progress in the production function is shown as A(t) or λ, but not directly connected with net investment (see Appendixes). On the other hand, the synthesis of the two formulation helps review this connection. This synthesis shows that the capital-output ratio Ω_P

4) Even if this concept is not used,

1. The difference between π in the financial structure of products and $\pi=\pi(g_m^*)$ shows $\Delta\pi$.
2. The difference between Ω_P in the financial structure of products and $\Omega_P=\Omega_P(g_m^*)$ shows $\Delta\Omega_P$.

constitutes a common item, but only under $\xi^{e}_{\pi}\neq 0$. Furthermore, when the synthesis of $\pi=\Omega_P\cdot\rho$ and $k=\Omega_P\cdot y$ is clarified, "equations" of the financial structure of products both under $\Omega_P=\Omega_P^0$=a constant and $\pi=\pi^0$=a constant and those "functions," which are derived under $\Omega_P\neq\Omega_P^0$ or $\pi\neq\pi^0$, are broadly and consistently (more generally) reviewed in terms of productivity. How can the balance between *labour* productivity and *capital* productivity (as the reciprocal number of the capital-output ratio) be controlled? This is only under $\pi=\pi^0$=a constant which is used as the neutrality of technological progress, since $k\neq$a constant and $g_Y\neq g_{KP}$ under $\pi=\pi^0$=a constant. This is one of contributions of this paper. Hicks, Harrod, and Solow models are reviewed in a whole two-sector two-period system which uses discrete time (see **section 5**).

Conclusively speaking, the synthesis of $\pi=\Omega_P\cdot\rho$ and $k=\Omega_P\cdot y$ is classified into three types by introducing functions of the rate of technological progress, g^*_m, as follows:

Type 1. Under $\Omega_P=\Omega_P^0$=a constant $\pi=\pi(g^*_m)$ and $\rho=\rho(g^*_m)$
$k=k(g^*_m)$ and $y=y(g^*_m)$

Type 2. Under $\pi=\pi^0$=a constant $\Omega_P=\Omega_P(g^*_m)$ and $\rho=\rho(g^*_m)$
$k=k(g^*_m)$, $\Omega_P=\Omega_P(g^*_m)$, and $y=y(g^*_m)$

Either k or y in $k=\Omega_P\cdot y$ can be a constant, but, k, Ω_P, and y in $k=\Omega_P\cdot y$ can be all variables since Ω_P is already expressed as $\Omega_P(g^*_m)$ (see (3) below). This is a unique characteristic of the above synthesis. Each neutrality of technological progress expressed by Hicks [1946], Harrod [1973], or Solow [1956] cannot have this characteristic since the neutrality of technological progress is not synthesized (generalized) between them. Conditions under $\pi=\pi^0$=a constant (or $\Omega_P=\Omega_P(g^*_m)$) are stated in three ways:

(1) If k is a constant, then, $y=y(g^*_m)$: Hicks' case

(2) If y is a constant, then, $k=k(g^*_m)$: Solow's case

(3) If both k and y are not constant, then, both $y=y(g^*_m)$ and $k=k(g^*_m)$ hold. Note that Harrod' neutrality must belong to this "under $\pi=\pi^0$=a constant," but cannot hold when his equation "$G_w \equiv \Delta Y/Y = s/v$" is taken into consideration (in detail, see below).

Type 3. Consideration of n: $g^*_m=0$ and $g^*_m \neq 0$

3-1 n is replaced by g_{KP}: $g^*_m=0$. This case neglects the existence of n=a constant/parameter and the growth rate of labour productivity g_y. Thus, it follows a special case that π, Ω_P, k, and y are constants under $g^*_m=0$. This returns back to the financial structure of products.

3-2 g_{KP} is replaced by $g_Y \equiv n+g_y(1+n)$: $g^*_m \neq 0$. This case of $g_Y=g_{KP}$ may be called "the balanced growth steady-state" (hereunder, abbreviate 'steady') only under Ω_P=a constant. Then, the case belongs to Type 1 and always satisfies both the financial structure of products and the synthesis of the two formations.

Finally, it is stressed that the Cobb-Douglas (C-D) production function cannot be free from the financial structure of products and also the synthesis of $\pi=\Omega_P \cdot \rho$ and $k=\Omega_P \cdot y$ if this production function endogenously measures the rate of technological progress.

1.3 Notations for the CFGM

In this paper, a balanced growth state which uses the propensities to save as variables is only treated: the growth rate of output equals the growth rate of corporate capital ($g_Y=g_{KP}$). For this condition, the following two cases are discussed:

1. Functions under the rate of technological progress $g^*_m=0$: the capital output ratio $\Omega_P=\Omega^0_P$ and the relative share of profit $\pi=\pi^0$ are given as parameters.
2. Functions under the rate of technological progress $g^*_m \neq 0$: either π is a variable ($\Omega_P=\Omega^0_P$=a constant), or Ω_P is a variable ($\pi=\pi^0$=a constant), and functions under $g^*_m \neq 0$ and $k=k^0$=a constant, where $k \equiv y \cdot \Omega_P$.

The balanced growth state constitutes a part of the corporate financed growth model

(CFGM). An unbalanced growth state which uses the propensities to save as parameters is treated in a forthcoming book [1998]: the expected growth rate of output does not equal the expected growth rate of corporate capital ($g^e_Y \neq g^e_{KP}$).

Table 1 Notations and relationships:

Each value or ratio has superscript 0 when it shows the initial value or ratio.

Y denotes net national income

P denotes corporate profit$\equiv S_p + D_I$

S_P denotes undistributed profit (corporate saving) from profit

D_I denotes dividend from profit$\equiv S_{DI} + C_{DI}$

W denotes wages of workers$\equiv Y - P$

K_P denotes "corporate" capital stock

N_E denotes number of population/wokers

S_W denotes wages saved by wages

S_{DI} denotes dividend saved

$S_{DI+W} = \mathbf{S_{WD}}$ denotes saving in dividend and wages

C_W denotes wages consumed

C_{DI} denotes dividend consumed

C_{DI+W} denotes consumption from dividend and wages

W_{DI+W} denotes the sum of dividend and wages before distribution to consume and saving: $W + D_I = \mathbf{W_{DI+W}} = C_{DI+W} + S_{DI+W}$.

$\Delta K_P \equiv K_P - K^0_P$ denotes corporate net investment

$\Delta K_{WD} \equiv K_{WD} - K^0_{WD}$ denotes corporate net investment from saving in dividend and wages

$\Delta K_{SP} \equiv K_{SP} - K^0_{SP}$ denotes corporate financed net investment which uses corporate undistributed profit

$\pi \equiv P/Y$ denotes the relative share of profit$\equiv \Omega_P \cdot \rho$

$\Omega_P \equiv K_P/Y$ denotes the capital-output ratio ("corporate" is usually abbreviated)

$\rho \equiv P/K_P$ denotes the rate of profit

$s_{SP} \equiv S_P/P$ denotes undistributed profit divided by profit

$s_{SP/Y} \equiv S_P/Y$ denotes undistributed profit divided by net national income

$s_{(WD+SP)/Y} \equiv (S_{DI+W} + S_P)/Y$ denotes the propensity to save in dividend, wages, and profit

$s_{WD/Y} \equiv S_{DI+W}/Y$ denotes the propensity to save in dividend and wages

$s_{DI/Y} \equiv S_{DI}/Y$ denotes the dividend propensity to save

$s_{W/Y} \equiv S_W/Y$ denotes the wage propensity to save

$c_{WD/Y} \equiv C_{DI+W}/Y$ denotes the propensity to consume in dividend and wages

$c_{DI/Y} \equiv C_{DI}/Y$ denotes the dividend propensity to consume

$c_{W/Y} \equiv C_W/Y$ denotes the wage propensity to consume

$g_Y \equiv \Delta Y/Y^0$ denotes the growth rate of net national income (output)

$g_{KP} \equiv \Delta K_P/K_P^0$ denotes the growth rate of corporate capital

$g_{KSP} \equiv \Delta K_{SP}/K_P^0$ denotes the growth rate of corporate financed capital: $g_{KSP} = g_{KP}/\Omega_P$

$g_{\Delta KP/Y} \equiv \Delta K_P/Y$ denotes the investment-output ratio (or the investment ratio)

$n \equiv \Delta N_E/N_E^0$ denotes the expected growth rate of population/workers[5)]

$k \equiv K_P/N_E$ denotes the capital-labour ratio

$y \equiv Y/N_E$ denotes labour productivity

$1/\Omega_P \equiv Y/K_P$ denotes capital productivity

ξ_k denotes the increase and decrease rate of the capital-labour ratio

$\xi_{Y/KP} = \xi_{1/\Omega P}$ denotes the increase and decrease rate of capital productivity

$g_y = g_{Y/NE}$ denotes the growth rate of labour productivity

ξ_y denotes the increase and decrease rate of labour productivity

ξ_π denotes the increase and decrease rate of the relative share of profit

$\xi_{\Omega P}$ denotes the increase and decrease rate of the capital-output ratio

ξ_ρ denotes the increase and decrease rate of the rate of profit

m^* denotes the coefficient of technological progress under constant π, Ω_P, and n

$g_m^* \equiv (m^{*1} - m^{*0})/m^{*0}$ denotes the rate of technological progress

2. Characteristics of the financial structure of products

Functions in the CFGM are finally derived using the following variables, parameters and constants, and given values, and two formulations, $\pi = \Omega_P \cdot \rho$ and $k = \Omega_P \cdot y$:

Basic four variables: Y, P, K_P, and N_E $(W \equiv Y - P)$

Basic four initial given values: Y^0, P^0, K_P^0, and N_E^0 $(W^0 \equiv Y^0 - P^0)$

Parameters/variables: π, Ω_P, and n (n in the financial structure of products is a con-

5) *The balanced growth steady-state* is defined as a condition that $g_Y = g_{KP} = n$, where, "n" is the growth rate of population/workers (regardless of unemployment), but it holds only under no technological progress. For example, the "natural" growth rate G_n is determined by population increase and technological progress [Harrod, 1973, p. 28]. However, it is proved in this paper that this balanced growth steady-state destroys the financial structure of products and must be an exceptional specified case (see Section Review).

stant)

Basic variables: g^*_m and n (as $g^*_m(n)$ or $n(g_Y)$)

Variables in the two formulations: $\pi(g^*_m)$, $\Omega_P(g^*_m)$, $\rho(g^*_m)$, and $k(g^*_m)$ and $y(g^*_m)$

each under a constant Ω_P or under a constant π

Other variables: $z_1=f_1(\pi(g^*_m, \Omega_P))$ or $z_2=F_1(g^*_m)$ under a constant Ω_P

$z_1=h_1(\Omega_P(g^*_m, \pi))$ or $z_2=H_1(g^*_m)$ under a constant π

Lemma 1 If parameters, π, Ω_P, and n are given, the capital-labour ratio $k=K_P/N_E$, productivity of capital $1/\Omega_P=Y/K_P$, productivity of labour $y=Y/N_E$, and any other variables in the balanced growth state (where $g_Y=g_{KP}$) of the financial structure are shown as a function of π, Ω_P, or n using the rate of technological progress g^*_m as a basic variable.

The rate of profit ρ is a variable since π and Ω_P are parameters. This section stays in the financial structure of products under constant π, Ω_P, ρ, and n, and clarifies fundamental relationships between parameters and variables. These relationships show that variables in the balanced growth state, where the growth rate of output equals the growth rate of capital, are in "an equilibrium, under fixed price level." For this purpose, first, the relationships between the relative share of profit π and related propensities to save are shown, second, the fundamental relationships between parameters and selected variables are shown, and as a result, variables in the equilibrium are shown as a function of parameters.

2.1 Constant relative share of profit and related propensities to save as a base

Using Table 1, the relative share of profit, π or "$1-\pi$," and related propensities to save are conclusively summarized. Both (and propensities are tightly connected with each other as follows:

$$\pi\equiv P/Y \quad \pi^0\equiv P^0/Y^0 \quad s_{SP}\equiv S_P/P \quad s^0_{SP}\equiv S^0_P/P^0 \quad s_{SP}=s^0_{SP}$$

$$s_{SP/Y}\equiv S_P/Y \quad s^0_{SP/Y}\equiv S^0_P/Y^0 \quad s_{SP/Y}=s^0_{SP/Y}$$

$$s_{SP/Y}=\pi\cdot s_{SP} \quad s^0_{SP/Y}=\pi^0\cdot s^0_{SP}$$

$$s_{WD/Y} \equiv S_{WD}/Y \quad s^0_{WD/Y} \equiv S^0_P/Y^0 \quad s_{WD/Y} = s^0_{WD/Y}$$

$$s_{(WD+SP)/Y} \equiv (S_{WD} + S_P)/Y \quad s^0_{(WD+SP)/Y} \equiv (S^0_{WD} + S^0_P)/Y^0 \quad s_{(WD+SP)/Y} = s^0_{(WD+SP)/Y}$$

$$s_{DI/Y} \equiv S_{DI}/Y \quad s^0_{DI/Y} \equiv S^0_{DI}/Y^0 \quad s_{DI/Y} = s^0_{DI/Y}$$

$$s_{W/Y} \equiv S_W/Y \quad s^0_{W/Y} \equiv S^0_W/Y^0 \quad s_{W/Y} = s^0_{W/Y}$$

$$\mathbf{s_{WD/Y} = s_{DI/Y} + s_{W/Y} \quad s^0_{WD/Y} = s^0_{DI/Y} + s^0_{W/Y}}$$

$$c_{DI/Y} \equiv C_{DI}/Y \quad c^0_{DI/Y} \equiv C_{D0I}/Y^0 \quad c_{DI/Y} = c^0_{DI/Y}$$

$$c_{W/Y} \equiv C_W/Y \quad c^0_{W/Y} \equiv C^0_W/Y^0 \quad c_{W/Y} = c^0_{W/Y}$$

$$c_{(DI+W)/Y} = c_{DI/Y} + c_{W/Y} \quad c^0_{(DI+W)/Y} = c^0_{DI/Y} + c^0_{W/Y} \quad c_{(DI+W)/Y} = c^0_{(DI+W)/Y}$$

$$\mathbf{s_{DI/Y} = s_{W/Y} = s^0_{DI/Y} = s^0_{W/Y} \quad c_{DI/Y} = c_{W/Y} = c^0_{DI/Y} = c^0_{W/Y}}$$

$$1 = c_{(DI+W)/Y} + s_{(WD+SP)/Y} \quad 1 = c^0_{(DI+W)/Y} + s^0_{(WD+SP)/Y}$$

The reason why the above ratios are all shown is that the past literature [Kaldor 1978, Pasinetti 1962, 1966, and others] has not clarified a whole relationship between the relative share of profit and propensities in terms of investment. The author's model (the corporate financed growth model, CFGM) clarifies this relationship as a base using the financial structure of products. Even for an open system, this structure is applicable if 'the surplus of the nation' is given as the domestic difference between saving and investment.

2.2 Equations expressed by π and Ω_P in terms of labour and capital productivity

Using the above assumptions and equations, values and ratios needed for productivity are endogenously obtained and expressed only using π and Ω_P. It implies that equations are shown under $\pi = \pi^0$ = a constant and $\Omega_P = \Omega^0_P$ = a constant. When $\pi(g^*_m)$ under a constant Ω_P or $\Omega_P(g^*_m)$ under a constant π is introduced, these equations become composite functions, where π, Ω_P, and n are parameters while g^*_m is an independent variable: $g^*_m = \varphi(\pi, \Omega_P, n)$. This is discussed in the next section.

With necessary processes (for notations, see Table 1):

1. $s_{SP} \equiv \dfrac{S_P^0}{P^0} = \dfrac{\Delta S_P}{\Delta P} = \dfrac{S_P}{P} \qquad s_{SP} = \dfrac{1}{\Omega_P + 1}$ (1)

2. $s_{SP/Y} \equiv \dfrac{S_P^0}{Y^0} = \dfrac{\Delta S_P}{\Delta Y} = \dfrac{S_P}{Y} \qquad s_{SP/Y} = \dfrac{\pi}{\Omega_P + 1}$ (2)

3. $g_Y \equiv \dfrac{\Delta Y}{Y^0} = \dfrac{s_{SP/Y}}{1 - s_{SP/Y}} = \dfrac{\dfrac{\pi}{1+\Omega_P}}{1 - \dfrac{\pi}{1+\Omega_P}} = \dfrac{\pi}{1 + \Omega_P - \pi}$ (3)

4. $g_{KSP} \equiv \dfrac{\Delta Y}{K_{SP}^0} \qquad g_{KSP} = \dfrac{\pi}{\Omega_P(\Omega_P + 1 - \pi)}$, where $\Delta Y = \Delta K_{SP} = S_P$ (4)

5. $g_{KP} \equiv \dfrac{\Delta K_P}{K_P^0} \qquad g_{KP} = \dfrac{\pi}{\Omega_P + 1 - \pi}$ (5)

6. $\left(\dfrac{Y^0}{N_E^0}\right)(1 + g_{Y/NE}) = \dfrac{Y^0(1+g_Y)}{N_E^0(1+n)}$ (6)

$$g_Y = g_{Y/NE} + n + g_{Y/NE} \cdot n \qquad g_{Y/NE} = \frac{g_Y - n}{1+n} \quad \text{or,}$$

[6]

$$g_{Y/NE} \equiv \left(\frac{Y^0 + \Delta Y}{N_E^0 + \Delta N_E} \Big/ \frac{Y^0}{N_E^0}\right) - 1 = \left(\frac{(1+g_Y)}{(1+n)}\right) - 1 = \frac{g_Y - n}{1+n} \tag{7}$$

$$g_{Y/NE} = g_Y = \frac{\pi}{(\Omega_P + 1 - \pi)(1+n)} - \frac{n}{(1+n)} \tag{8}$$

7. $\left(\dfrac{Y^0}{K_P^0}\right)(1 + g_{Y/KP}) = \dfrac{Y^0(1+g_Y)}{K_P^0(1+g_{KP})}$

$$g_Y = g_{Y/KP} + g_{KP} + g_{Y/KP} \cdot g_{KP} \qquad g_{Y/KP} = \frac{g_Y - g_{KP}}{1 + g_{KP}} \tag{9}$$

$$g_{Y/KP} = \frac{g_Y - g_{KP}}{1 + g_{KP}} = 0 \quad \text{and} \quad g_Y = g_{KP} \text{ under } \Omega_P = \Omega_P^0 = \text{a constant}$$

$$g_{Y/KP} \equiv \left(\frac{Y^0 + \Delta Y}{K_P^0 + \Delta K_P} \Big/ \frac{Y^0}{K_P^0}\right) - 1 = \left(\frac{(1+g_Y)}{(1+g_{KP})}\right) - 1 = \frac{g_Y - g_{KP}}{1 + g_{KP}} \tag{10}$$

$g_{Y/KP} = 0$, if $g_Y = g_{KP}$

8. $g_{Y/KSP} \equiv \dfrac{g_Y - g_{KSP}}{1 + g_{KSP}}$ (11)

$$g_Y = g_{Y/KSP} + g_{KSP} + g_{Y/KSP} \cdot g_{KSP}$$

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6) When the continuous time is used, the value of "$g_{Y/NE} \cdot n$" becomes zero by differentiation. The discrete time cannot omit this value.

Also, $g_Y = g_{KSP} \cdot \Omega_P$ since the denominator of g_{KSP} is K_P^0 and the denominator of g_Y is Y^0 by definitions.

$$g_{Y/KSP} = \frac{\pi(\Omega_P - 1)}{\Omega_P(\Omega_P + 1 - \pi) + \pi} \quad \text{or,} \tag{12}$$

$$g_{Y/KSP} = \frac{g_{KSP}(\Omega_P - 1)}{1 + g_{KSP}} = \frac{g_Y(\Omega_P - 1)}{\Omega_P \cdot \dfrac{\Omega_P + g_Y}{\Omega_P}} = \frac{g_Y(\Omega_P - 1)}{\Omega_P + g_Y} = \frac{\pi(\Omega_P - 1)}{\Omega_P(1 + \Omega_P - \pi) + \pi} \tag{13}$$

9. $$g_{KP/NE} \equiv \left(\frac{K_P^0 + \Delta K_P}{N_E^0 + \Delta N_E} \Big/ \frac{K_P^0}{N_E^0}\right) - 1 = \left(\frac{(1 + g_{KP})}{(1 + n)}\right) - 1 = \left(\frac{1 + g_Y}{1 + n}\right) - 1 \tag{14}$$

$$g_{KP/NE} = g_k = \frac{\pi}{(\Omega_P + 1 - \pi)(1 + n)} - \frac{n}{(1 + n)} \tag{15}$$

The following propensities to save or consume are consistent with the above equations in the CFGM (in detail, see another paper). These also constitute composite functions.

1. $$s_{WD} \equiv \frac{S_{WD}^0}{W^0} = \frac{\Delta S_{WD}}{\Delta W} = \frac{S_{WD}}{W} \qquad s_{WD/W} = \frac{\pi(\Omega_P - 1)}{(\Omega_P + 1)(1 - \pi)}$$ where $S_{WD} = S_W + S_{DI}$ (16)

2. $$s_{WD/Y} \equiv \frac{S_{WD}^0}{Y^0} = \frac{\Delta S_{WD}}{\Delta Y} = \frac{S_{WD}}{Y} \qquad s_{WD/Y} = \frac{\pi(\Omega_P - 1)}{\Omega_P + 1} \tag{17}$$

3. $$s_{WD} \equiv \frac{S_{WD}}{W} = \frac{S_{WD}}{Y(1 - \pi)} = \frac{s_{WD/Y}}{1 - \pi} \qquad s_{WD/Y} = s_{SP/Y}(\Omega_P - 1) = \pi(1 - 2s_{SP}) \tag{18}$$

$$s_{WDY} = s_{SP/Y}(\Omega_P - 1) = \pi(1 - 2s_{SP})$$

This equation shows an important relationship between $s_{WD/Y}$ and $s_{SP/Y}$ under constant π and Ω_P. It implies that $s_{WD/Y} < s_{SP/Y}$ if $\Omega_P < 2$, $s_{WD/Y} > s_{SP/Y}$ if $\Omega_P > 2$, and **$s_{WD/Y} = s_{SP/Y}$ if $\Omega_P = 2$.**

4. $$s_{(WD+SP)/Y} \equiv \frac{S_{WD+SP}^0}{Y^0} = \frac{\Delta_{SWD+SP}}{\Delta Y} = \frac{S_{WD+SP}}{Y}$$

$$s_{(WD+SP)/Y} = s_{WD/Y} + s_{SP/Y} = \frac{\pi(\Omega_P - 1)}{1 + \Omega_P} + \frac{\pi}{1 + \Omega_P} = \frac{\pi \cdot \Omega_P}{1 + \Omega_P} \tag{19}$$

5. $S_{WD}/(D_I + W) = S_{DI}/D_I = S_W/W = s_{WD/Y} \cdot Y/(1 - s_{SP/Y})Y$

$$s_{WD/(W+DI)} \equiv s_{WDY}/(1 - s_{SP/Y}) = \frac{S_{WD}^0}{Y^0 - S_P^0} = \frac{\Delta S_{WD}}{\Delta Y - \Delta S_P} = \frac{S_{WD}}{Y - S_P}$$

$$=\frac{\pi(\Omega_P-1)}{1+\Omega_P} / \frac{1+\Omega_P-\pi}{1+\Omega_P}=\frac{\pi(\Omega_P-1)}{1+\Omega_P-\pi} \qquad (20)$$

6. $C_{DI+W}/(D_I+W)=(1-s_{WDY}-s_{SP/Y})/(1-s_{SP/Y})$

$$c_{(W+DI)/Y}=1-s_{WD/Y}-s_{SP/Y}=1-\frac{\pi\cdot\Omega_P}{1+\Omega_P}=\frac{1+\Omega_P(1-\pi)}{1+\Omega_P} \qquad (21)$$

$$c_{(DI+W)/Y}\equiv\frac{C^0_{DI+W}}{Y^0}=\frac{\Delta C_{DI+W}}{\Delta Y}=\frac{C_{DI+W}}{Y} \qquad c_{(DI+W)/Y}=\frac{\Omega_P(1-\pi)+1}{\Omega_P+1} \qquad (22)$$

3. Introduction of the rate of technological progress g^*_m

3.1 Definitions and measurement of technological progress

Before starting the rate of technological progress g^*_m, a whole version in the CFGM is illustrated in terms of productivity. This Figure 2 is a base for following sections. The value of g^*_m is a unique variable and without this the financial structure of products cannot develop into functions.

Figure 2 Illustration of "functions of g^*_m" in the CFGM

The financial structure of products:

π, Ω_P, n are parameters. $g^*_m=g^*_m(n)$, if n is a variable.

All variables are shown using π, Ω_P, and n.

Functions in terms of two formulations: $\pi=\Omega_P\cdot\rho$ and $k=\Omega_P\cdot y$

Under constant Ω_P: $\pi(g^*_m)$, $\rho(g^*_m)$, $k(g^*_m)$, $y(g^*_m)$

Under constant π: $\Omega_P(g^*_m)$, $\rho(g^*_m)$, $k(g^*_m)$, $y(g^*_m)$

Other variables use the above functions in the composite functions.

First, the coefficient of technological progress, m^*, is obtained in the financial structure of products which is under $\pi=\pi^0$=a constant and $\Omega_P=\Omega^0_P$=a constant. Second, under $\Omega_P=\Omega^0_P$=a constant, m^* changes after π changes: ($\pi\neq\pi_0$). Or, under $\pi=\pi^0$=a constant, the same m^* is replaced by a new m^* after Ω_P changes: ($\Omega_P\neq\Omega^0_P$).

m^* in the model is defined as the growth rate of labour productivity divided by the investment-output ratio $g_{\Delta KP/Y} \equiv \Delta K_P/Y^0$: $m^* \equiv g_{Y/NE}/\Delta K_P/Y^0$. The value of m^* is measured only if three parameters, π, Ω_P, and n, are given. When the values of π or Ω_P vary as the result of investment and the change in price level, a new m^* will be measured. Then, the rate of technological progress g^*_m is defined and measured as $(m^{*1}-m^{*0})/m^{*0}$ under the balanced growth state of "$g_Y=g_{KP}$." The unbalanced growth state of "$g^e_Y \neq g^e_{KP}$" is not treated in this paper.

The change in the coefficient of technological progress and the rate of technological progress are treated in this section as follows (see Figure 3 and Appendix):

1. Under both $\pi=\pi^0$=a constant and $\Omega_P=\Omega^0_P$=a constant, m^* remains unchanged and $g^*_m=0$ (already developed in the financial structure of products).
2. Under $\Omega_P=\Omega^0_P$=a constant ($\pi\neq\pi^0$), m^* changes and $g^*_m\neq 0$ (in Section 3.2)
3. Under $\pi=\pi^0$=a constant ($\Omega_P\neq\Omega^0_P$), m^* changes and $g^*_m\neq 0$ (in Section 3.3)
4. When both Ω_P and π change, m^* also changes and $g^*_m\neq 0$ (in Section 3.4)

The fundamental relationships in terms of the coefficient of technological progress, m^*, are summarized before presenting functions of the rate of technological progress, g^*_m. Both m^* and g^*_m are derived endogenously in the CFGM. The production function shows the exogenous factor A(t) as "an increasing scale factor." [Solow, 1956. P. 85]. However, the CFGM distinguishes the coefficient of technological progress with the growth rate of output although both are endogenously measured. Also, the increasing/decreasing returns are shown by using the rate of profit $\rho \equiv P/K^0_P$ since the CFGM is set under fixed price level. This rate of profit is principally a variable since the capital-output ratio Ω_P and the relative share of profit π are both initial parameters. The rate of profit ρ function of m^* or g^*_m is particularly meaningful in terms of the increasing/decreasing returns. Equations in terms of technological progress are now shown as follows (hereunder, new number is adopted for each equation since each is specified in terms of technological progress):

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1. A unique equation, $(1-A\cdot m^{*})g_{Y}=n$, where $A\equiv\dfrac{1}{\Omega_{P}(1+n)}$

   This is derived using $g_{Y}=g_{Y/NE}(1+n)+n$ and $g_{Y/NE}=g_{Y}\cdot\Omega_{P}\cdot m^{*}$

   By combining the above two, $g_{Y}=g_{Y}\cdot\Omega_{P}\cdot m^{*}+g_{Y}\cdot\Omega_{P}\cdot m^{*}\cdot n+n$

   As a result, $(1-\Omega_{P}\cdot m^{*}-\Omega_{P}\cdot m^{*}\cdot n)g_{Y}=n$

   Therefore, $(1-A\cdot m^{*})g_{Y}=n$, if $A\equiv\dfrac{1}{\Omega_{P}(1+n)}$ (m-1)

   This equation will be also used for further study on human capital.

2. The process to lead the relationship between the investment-output ratio and the growth rate of labour productivity by using m^{*}, π, Ω_{P}, and n is shown below. It is noted that the value of m^{*} reduces to Y/K_{P} if n is zero.

$$g_{KP}\cdot\Omega_{P}\cdot m^{*}=g_{Y/NE}=\frac{g_{Y}-n}{1+n}\qquad g_{Y}=\frac{\pi}{1+\Omega_{P}-\pi}$$

$$g_{Y/NE}=\frac{\pi-n(1+\Omega_{P}-\pi)}{(1+\Omega_{P}-n)(1+n)}$$

$$g_{KP}\cdot\Omega_{P}\cdot m^{*}=\frac{\pi\cdot\Omega_{P}\cdot m^{*}}{1+\Omega_{P}-\pi}$$

$$\frac{\pi\cdot\Omega_{P}\cdot m^{*}}{1+\Omega_{P}-\pi}=\frac{\pi-n(1+\Omega_{P}-\pi)}{(1+\Omega_{P}-\pi)(1+n)}$$

As a result, $\pi\cdot\Omega_{P}\cdot m^{*}=\dfrac{\pi-n(1+\Omega_{P}-\pi)}{(1+\text{n})}$

Thus, $m^{*}=\dfrac{\pi(1+n)-n(\Omega_{P}+1)}{\pi\cdot\Omega_{P}(1+n)}$ [7] (m-2)

or,

$$m^{*}=-\frac{n}{\pi(1+n)}+\frac{\pi(1+n)-n}{\Omega_{P}\cdot\pi(1+n)}\quad\text{or}\quad\Omega_{P}=\frac{\pi(1+n)-n}{\pi\cdot m^{*}(1+n)+n}\qquad\text{(m-3)}$$

The value of m^{*} is calculated only in the financial structure of products under constant π, Ω_{P}, and n. However, it is possible to obtain $g^{*}_{m}(n)$ if n is set as a

7) If n=0, then, $m^{*}=1/\Omega_{P}$. It does not reduce to non-sense, but it implies that m^{*} is more important with $n\neq0$, where human capital cooperates with fixed assets/capital stock.

variable. A new value of m^{*1} is obtained, in the same way as the case of $m^{*1}=m^{*0}$, under a new condition that π or Ω_P and n change. A path is: by the change of n, the value of m^{*0} is renewed and this is denoted as m^{*1}, where m^{*0} changes to $m^{*1}=(1+g^*_m)m^{*0}$:

$$m^*=\frac{\pi(1+n)-n(1+\Omega_P)}{\pi\cdot\Omega_P(1+n)}=\frac{\pi-n(1+\Omega_P-\pi)}{\pi\cdot\Omega_P\cdot n+\pi\cdot\Omega_P}$$ if n is a parameter or

$$m^*(n)=\frac{\pi-n(1+\Omega_P-\pi)}{\pi\cdot\Omega_P\cdot n+\pi\cdot\Omega_P} \qquad \text{(m-4)}$$

As a result, $g^*_m(n)=\left(\frac{\pi-n(1+\Omega_P-\pi)}{\pi\cdot\Omega_P\cdot n+\pi\cdot\Omega_P}-m^{*0}\right)/m^{*0}$ if n is a variable or,

$$g^*_m(n)=\frac{1}{m^{*0}}\left[\left(-\frac{n}{\pi(1+n)}+\frac{\pi(1+n)-n}{\Omega_P\cdot\pi(1+n)}\right)-m^{*0}\right] \qquad \text{(m-5)}$$

This function shows the interesting relationship between the two variables under the financial structure of products. This relationship differs by the stage of the financial structure of products, depending on the level of human capital. In the literature such as Becker [1975], Lucas [1988], and Romer [1986], human capital is differently treated. The relationship among Ω_P, π, n, and m^* and g^*_m is not introduced into each model in terms of the investment-output ratio, $g_{\Delta KP/Y}$, but both, the literature and author's model, commonly pay attention to the important function of human capital, which is just expressed by Equation m-5 in the author's model. In this sense, the results of an empirical study by country will attract readers' attention (see Appendix By country).

Finally, this g^*_m becomes an independent variable in two ways once the value of n is fixed (as a constant). This is discussed below.

1. $\pi=\pi(g^*_m)$ under a constant Ω_P: any variable$=f[\pi(g^*_m), \Omega_P]$
2. $\Omega_P=\Omega_P(g^*_m)$ under a constant π: any variable$=h[\Omega_P(g^*_m), \pi]$

3.2 Under $\Omega_P=\Omega_P^0$=a constant

Now, g_Y, $g_{Y/NE}$, and π functions of g_m^* are shown, starting with "replacing m^{*0} by $m^{*1}=m^{*0}(1+g_m^*)$." Alternatively, g_Y, $g_{Y/NE}$, and π can be shown as functions of m^*. If $g_m^*=\varphi(\pi, \Omega_P, n)$ holds, then, each of π, Ω_P, and n must be parameters, and this is consistent with all the variables which were reduced to the combination of π, Ω_P, and n. These functions are also applicable to discrete production functions which will be stated below.

Instead of $\Omega_P(g_m^*)$, $\pi(g_m^*)$ is derived in this section since $\pi\neq\pi^0$. For simplicity, some symbols are used hereunder: e.g., $A\equiv\dfrac{1}{\Omega_P(1+n)}$ (already stated above).

1. $g_Y(g_m^*)=\dfrac{n\cdot A}{-m^*+A}$ (m-6)

since $g_Y(g_m^*)=\dfrac{n\cdot A}{-g_m^*\cdot m^*+(A-m^*)}$ or $g_Y(g_m^*)=\dfrac{n\cdot A/m^*}{-g_m^*+(A-m^*)/m^*}$

This is derived by using $g_{KP}\cdot m^*=g_{Y/NE}$ and accordingly,

$$g_Y\cdot\Omega_P(1+g_m^*)m^*=\frac{g_Y-n}{1+n}\text{ as follows:}$$

$$g_m^*=\frac{g_Y-n-g_Y\cdot\Omega_P\cdot m^*(1+g_m^*)}{g_Y\cdot\Omega_P\cdot m^*(1+g_m^*)}=\frac{g_Y(1-m^*/A)-n}{g_Y\cdot m^*/A}$$

Then, $g_Y(g_m^*)=\dfrac{n\cdot A}{-m^*+A}$

2. $g_{Y/NE}(g_m^*)=\dfrac{m^*\cdot n\cdot\Omega_P\cdot A}{-m^*+A}=\dfrac{-n}{1+n}+\dfrac{A\cdot n/(1+n)}{-m^*+A}$

$$=\frac{-n}{1+n}+\frac{A\cdot n/(1+n)/m^*}{-g_m^*+(A-m^*)/m^*} \quad \text{(m-7)}$$

3. $\pi(g_m^*)=\dfrac{A\cdot n(1+\Omega_P)}{-m^*+A(1+n)}=\dfrac{A\cdot n(1+\Omega_P)/m^*}{-g_m^*+(A(1+n)-m^*)/m^*}$ (m-8)

In addition to the above three fundamental functions, the following three functions are derived using each function of g_m^*.

4. $s_{SP/Y}(g_m^*)=\dfrac{A\cdot n}{-m^*\cdot g_m^*-m^*+A(1+n)}=\dfrac{A\cdot n/m^*}{-g_m^*-1+A(1+n)/m^*}$ (m-9)

5. $$g_{\Delta KP/Y}(g^*_m)=\frac{\Omega_P\cdot n\cdot A}{-m^*\cdot g^*_m-m^*+A}=\frac{\Omega_P\cdot n\cdot A/m^*}{-g^*_m-1+A/m^*} \qquad \text{(m-10)}$$

6. $$\rho(g^*_m)=\frac{A\cdot n(1+\Omega_P)}{\Omega_P-(-m^*\cdot g^*_m-m^*+A(1+n))}=\frac{A\cdot n(1+\Omega_P)/\Omega_P\cdot m^*}{-g^*_m-1+A(1+n)/m^*} \qquad \text{(m-11)}$$

Finally, some increase and decrease rates as a function of g^*_m are conclusively shown since these are needed for discrete production functions.

$$\xi_\pi(g^*_m)=\frac{-(g^*_m\cdot B-(1-B))-g_Y\cdot C(1-B)}{(g^*_m\cdot B-(1-B))-g_Y(1-B)}$$
$$=-1+\frac{-g_Y(1+C)(1-B)/B}{g^*_m-(1+g_Y)(1-B)/B} \qquad \text{(m-12)}$$

where, $B=\Omega_P\cdot m^*(1+n)$ $\quad C=\dfrac{\Omega_P+1-\pi}{\pi}$

$$\xi_{gY}=\frac{\xi_{gY/NE}\cdot D+D+n}{g_Y}-1,\text{ where } D=g_{Y/NE}(1+n) \qquad \text{(m-13)}$$

$$\xi_{gY/NE}(g^*_m)=\frac{-g_Y(1-B)/B\cdot D}{g^*_m-(1-B)/B}-\left(1+\frac{n}{D}\right) \qquad \text{(m-14)}$$

3.3 Under $\pi=\pi^0$=a constant

Instead of $\pi(g^*_m)$, $\Omega_P(g^*_m)$ is, in the similar way as above, derived since $\Omega_P\neq\Omega^0_P$.

$$\Omega_P(m^*)=\frac{1-n/\pi(1+n)}{m^*+n/\pi(1+n)}=\frac{1-E}{m^*+E},\text{ where } E=\frac{n}{\pi(1+n)} \qquad \text{(m-15)}$$

If g^*_m is used instead of m^*,

$$\Omega_P(g^*_m)=\frac{(1-E)/m^*}{g^*_m+(E+m^*)/m^*}\text{ since } m^{*1}=m^{*0}(1+g^*_m),$$

$$\Omega_P(g^*_m)=\frac{(1-E)/m^*}{g^*_m+(E+m^*)/m^*} \qquad \text{(m-16)}$$

Just for information, $m^*(\Omega_P)$ is used to measure the value m^* when Ω_P is given as a parameter:

$$m^*(\Omega_P)=-\frac{n}{\pi(1+n)}+\frac{1-\dfrac{n}{\pi(1+n)}}{\Omega_P} \qquad \text{(m-17)}$$

$$m^*(\Omega_P)=-E+\frac{1-E}{\Omega_P} \qquad \text{(m-18)}$$

Other functions of g^*_m are obtained as follows:

1. $g_Y(g^*_m)$

Insert $\Omega_P=\dfrac{(1-E)/m^*}{g^*_m+(E+m^*)/m^*}$ into $g_Y=\dfrac{\pi}{\Omega_P+1-\pi}$,

$$g_Y(g^*_m)=\frac{\pi(g^*_m+(E+m^*)/m^*)}{(1-E)/m^*+(g^*_m+(E+m^*)/m^*)(1-\pi)}$$

$$=\frac{g^*_m+(E+m^*)/m^*}{g^*_m\left(\dfrac{1-\pi}{\pi}\right)+(E+m^*)/m^*\left(\dfrac{1-\pi}{\pi}\right)+\dfrac{(1-E)}{\pi\cdot m^*}}=\frac{(g^*_m+(E+m^*)/m^*)/\left(\dfrac{1-\pi}{\pi}\right)}{g^*_m+(E+m^*)/m^*+\dfrac{(1-E)}{(1-\pi)m^*}}$$

$$g_Y(g^*_m)=\frac{(g^*_m+F)G}{g^*_m+(F+H)}=G+\frac{-G\cdot H}{g^*_m+(F+H)} \qquad \text{(m-19)}$$

where, $F=\dfrac{E+m^*}{m^*}$, $G=\dfrac{\pi}{1-\pi}$, and $H=\dfrac{1-E}{(1-\pi)m^*}$

2. $g_{Y/NE}(g^*_m)$

Insert $g_Y(g^*_m)=\dfrac{(g^*_m+F)G}{g^*_m+(F+H)}$ into $g_{Y/NE}=\dfrac{g_Y-n}{1+n}$,

$$g_{Y/NE}(g^*_m)=\frac{\dfrac{(g^*_m+F)G}{g^*_m+(F+H)}-n}{1+n}=\frac{(g^*_m+F)G-n(g^*_m+F+H)}{(1+n)(g^*_m+F+H)}$$

$$g_{Y/NE}(g^*_m)=\frac{g^*_m(G-n)+F\cdot G-n(F+H)}{g^*_m(1+n)+(F+H)(1+n)} \quad \text{or}$$

$$g_{Y/NE}(g^*_m)=\frac{G-n}{(1+n)}+\frac{-H\cdot G}{g^*_m(1+n)+(F+H)(1+n)} \qquad \text{(m-20)}$$

3. $s_{SP/Y}(g^*_m)$

Insert $g_Y(g^*_m)=\dfrac{(g^*_m+F)G}{g^*_m+(F+H)}$ into $s_{SP/Y}=\dfrac{g_Y}{1+g_Y}$,

$$s_{SP/Y}(g^*_m)=\frac{\dfrac{(g^*_m+F)G}{g^*_m+(F+H)}}{1+\dfrac{(g^*_m+F)G}{g^*_m+(F+H)}}=\frac{(g^*_m+F)G}{g^*_m+(F+H)+(g^*_m+F)G}$$

$$s_{SP/Y}(g^*_m)=\frac{g^*_m\cdot G+F\cdot G}{g^*_m(1+G)+(F+H)+F\cdot G} \quad \text{or}$$

$$s_{SP/Y}(g_m^*)=\pi+\frac{(F\cdot G(1-\pi)-(F+H)\pi)/(1+G)}{g_m^*+\dfrac{F(1+G)+H}{1+G}} \quad \text{since } \pi=\frac{G}{1+G} \qquad \text{(m-21)}$$

4. $\rho(g_m^*)$

Insert $\Omega_P(g_m^*)=\dfrac{(1-E)/m^*}{g_m^*+(E+m^*)/m^*}$ into $\rho=\dfrac{\pi}{\Omega_P}$

$$\rho(g_m^*)=\frac{\pi}{\dfrac{(1-E)/m^*}{g_m^*+(E+m^*)/m^*}}=\pi\left(\frac{g_m^*+(E+m^*)/m^*}{(1-E)/m^*}\right)=\frac{\pi(g_m^*+F)}{(1-E)/m^*} \qquad \text{(m-22)}$$

5. $g_{\Delta KP/Y}(g_m^*)$

This is an investment function which is most typical. When Ω_P varies under a constant π, a convenient relationship that $g_Y=g_{KP}$ does not hold. Thus, $g_{\Delta KP/Y}\equiv g_{KP}\cdot\Omega_P^0$ holds, but $g_{\Delta KP/Y}=g_Y\cdot\Omega_P$ does not hold. For this solution, the value of g_{KP} must be measured independently from g_Y. How is it possible? By introducing the increase and decrease rate of the capital-output ratio, it is solved. The concept of the increase and decrease rate ξ_x was stated earlier above. When this concept is applied to Ω_P, the value of g_{KP} is measured using $\xi_{\Omega P}\equiv(\Omega_P-\Omega_P{}^0)/\Omega_P{}^0$ as follows:

First, by illustrating the basic relationship in the formulation of productivity,

$$g_{\Delta KP/Y}=\frac{\Delta K_P}{Y^0} \qquad K_P=K_P^0(1+g_{KP}) \qquad \Delta K_P=K_P^0\cdot g_{KP}$$

$$\Omega_P^0(1+\xi_{\Omega P})$$

$$Y=Y^0(1+g_Y)$$

$$K_P^0(1+g_{KP})=Y^0(1+g_Y)\cdot\Omega_P^0(1+\xi_{\Omega P})$$

($g_{\Delta KP/Y}=\Omega_P^0\cdot g_{KP}$ can be used if $g_{\Delta KP/Y}$ is given.)

As a result, $g_{KP}=g_Y+\xi_{\Omega P}(1+g_Y)$ or $g_{KP}=\xi_{\Omega P}+g_Y(1+\xi_{\Omega P})$

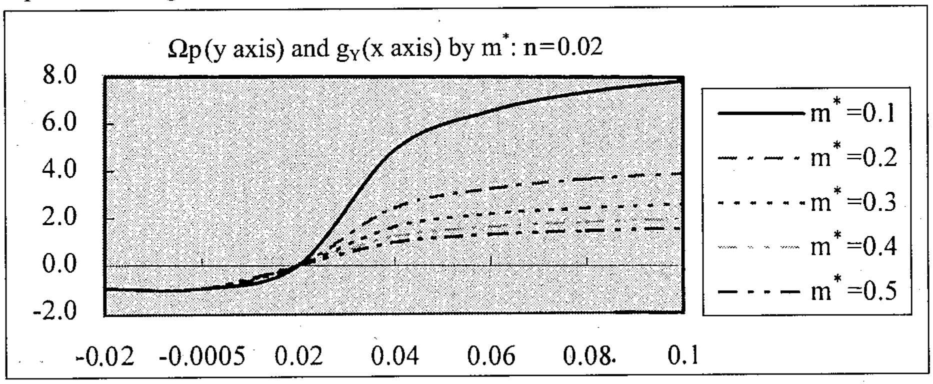
Then, if $\xi_{\Omega P}$ is measured, the value of g_{KP} is obtained endogenously.

Define $\xi_{\Omega P}\equiv(\Omega_P-\Omega_P{}^0)/\Omega_P{}^0$

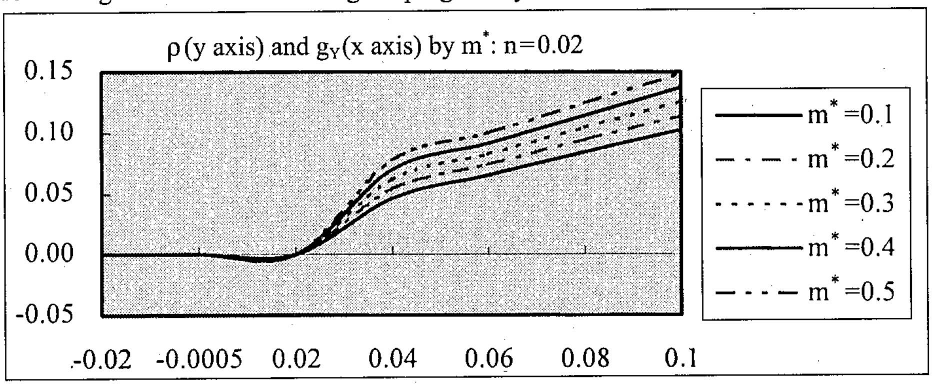
Insert $\Omega_P(g_m^*)=\dfrac{(1-E)/m^*}{g_m^*+(E+m^*)/m^*}$ into $\xi_{\Omega P}$

Figure 3 Technological progress to prevent the decreasing returns: the rate of profit shows increasing/decreasing returns (see more in Appendix B-1 and B-2)

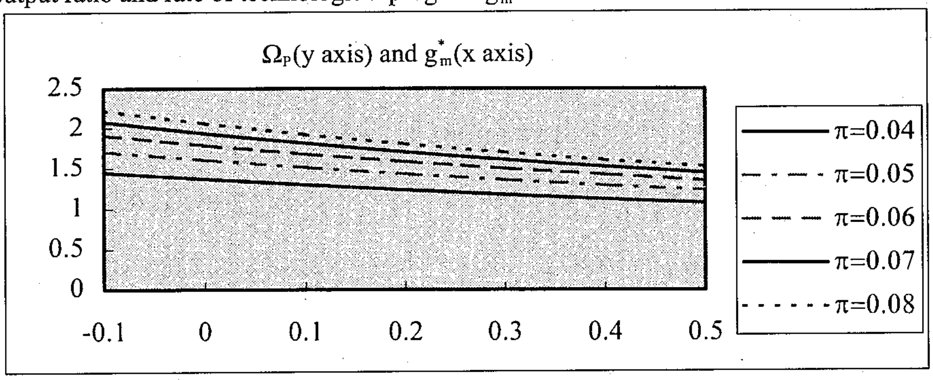
Capital-output ratio and geowth rate of output by m^*



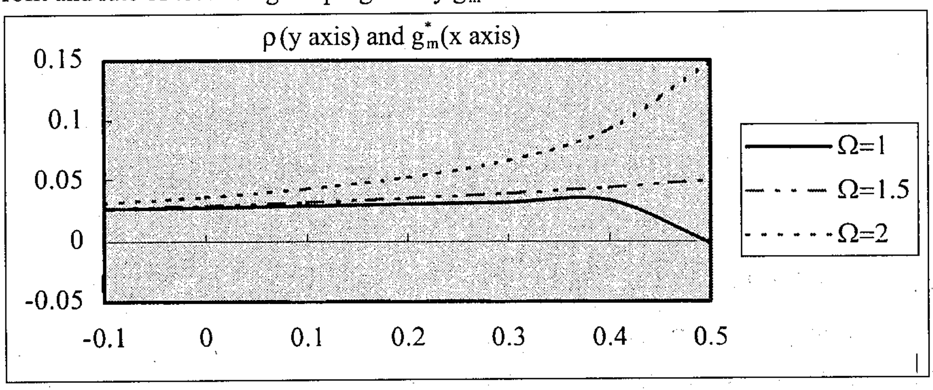
Rate of profit and growth rate of technological progress by m^*



Capital-output ratio and rate of technological progress g^*_m



Rate of profit and rate of technological progress by g^*_m



Since $g_m^*=0$ in the case of Ω_P^0

$$\xi_{\Omega P}(g_m^*)=\frac{\dfrac{(1-E)/m^*}{g_m^*+(E+m^*)/m^*}-\dfrac{(1-E)/m^*}{(E+m^*)/m^*}}{\dfrac{(1-E)/m^*}{(E+m^*)/m^*}}=\frac{F}{g_m^*+F}-1, \text{ where } F=\frac{E+m^*}{m^*} \quad \text{(m-23)}$$

Thus, $g_{KP}(g_m^*)=g_Y(g_m^*)+\xi_{\Omega P}(g_m^*)(1+g_Y(g_m^*))$ [8]

Finally, this paper does not present all the increase and decrease rates for simplicity, but the following ratios as a function of g_m^* are vital in discrete production functions:

$$g_Y=\frac{\pi}{\Omega_P+1-\pi} \text{ and } g_{KP}=g_Y+\xi_{\Omega P}(1+g_Y) \text{ or } g_{Y/NE}=\frac{g_Y-n}{1+n}$$

And thus, $\xi_k=\xi_{\Omega P}+g_{Y/NE}(1+\xi_{\Omega P})$.

The value of $\xi_k(g_m^*)$ is, thus, as follows:

$\xi_k(g_m^*)=\xi_{\Omega P}(g_m^*)+g_{Y/NE}(g_m^*)(1+\xi_{\Omega P}(g_m^*))$, where

$$\xi_{\Omega P}(g_m^*)=\frac{F}{g_m^*+F}-1 \text{ and } g_{Y/NE}(g_m^*)=\frac{G-n}{(1+n)}+\frac{-H\cdot G}{g_m^*(1+n)+(F+H)(1+n)}$$

$$\text{where, } G=\frac{\pi}{1-\pi} \quad H=\frac{1-E}{(1-\pi)m^*} \quad \text{(m-24)}$$

3.4 When both Ω_P and π simultaneously change

When the saving-side and the investment-side are integrated, both Ω_P and π become variables at the same time. This is discussed in another paper in detail.[9] Conclusively speaking,

For the saving-side:

$$\frac{I}{Y^0}=s_{SP/Y}\cdot\Omega_P(1+g_Y)=g_Y\cdot\Omega_P \quad \text{(m-25)}$$

8) If $g_m^*=0$ under a constant π, the above function does not hold and returns to $\Omega_P=\Omega_P^0=$a constant.

9) Kamiryo, H. 1998. Economic accounting: A common approach to macro and micro analyses using national and corporate accounts. Forthcoming. A monograph series: the Institute for Advanced Studies, Hiroshima Shudo University. 300pp.

$g_Y(\pi, \Omega_P)=\dfrac{\pi}{\Omega_P+1-\pi}$, where no parameter exists.

For the investment-side with the coefficient of technological progress m^*:

$$\frac{I}{Y^0}=g_Y\cdot\Omega_P=\frac{g_Y}{m^*}$$

$$g_Y(\pi, \Omega_P)=\frac{m^*\cdot\pi\cdot\Omega_P(1+n)+n\cdot M}{M}, \tag{m-26}$$

where, $M\equiv\Omega_P+1-\pi$, and n and m^* are parameters.

$$m^*(\pi, \Omega_P)=\frac{\pi-n\cdot M}{\Omega_P\cdot\pi(1+n)} \tag{m-27}$$

$$\pi(\Omega_P)=\frac{n(\Omega_P+1)}{(1+n)(1-m^*\cdot\Omega_P)} \tag{m-28}$$

$$\Omega_P(\pi)=\frac{\pi(1+n)-n}{\pi\cdot m^*(1+n)+n} \tag{m-29}$$

Using π of the saving-side which sets g_Y fixed, $\pi=\dfrac{g_Y(\Omega_P+1)}{1+g_Y}$,

$$\Omega_P(\pi)=\frac{\pi(1+g_Y)-g_Y}{g_Y} \tag{m-30}$$

$$\pi(\Omega_P)=\frac{g_Y(\Omega_P+1)}{1+g_Y} \tag{m-31}$$

There are two ways to obtain Ω_P and π: first Ω_P (as a result, π) or first π (as a result, Ω_P). Let the author show the case of first Ω_P (as a result, π).

Enter Equation 31 into Equation 29,

$$A\cdot\Omega_P^2+B\cdot\Omega_P+C=0,$$

where, $A=-m^*\cdot g_Y(1+n)$

$B=-m^*\cdot g_Y(1+g_Y)+g_Y-n$

$C=g_Y-n$

As a result, $\Omega_P=\dfrac{-B-\sqrt{B^2-4A\cdot C}}{2A}$ (m-32)

Then, π is obtained using Equation 31.

The above quadratic function enables it possible to measure both Ω_P and π simultaneously as variables.

4. Empirical results using national accounts of several countries

4.1 Outline of empirical study

This section shows some results of empirical study which uses by country the initial values of Y, P, W, K_P, and N_E. Six countries were chosen since they have each capital stock and capital consumption by sector: Japan, Sweden, UK, USA, Germany, Australia. The results are shown in "Average, Standard Deviation, Correlation, and Regression" in Appendix. The analysis follows the formulations of $\pi=\Omega_P\cdot\rho$ and $k=\Omega_P\cdot y$ with the coefficient of technological progress, m^*, where y is productivity of labour and Ω_P is the reciprocal number of productivity of capital. For international comparison of k and y, their values in a panel data approach are adjusted using exchange rate on a certain date: for example, $k^{exchrate}$=k/exchange rate and $y^{exchrate}$=y/exchange rate, each on 3 March 1997 by BNZ TT BUY.

Conclusively speaking, the convergence of the level of per capita income or product and the convergence of the standard deviation of the logarithm of per capital income [Barro, 1995, pp. 382–413] in a similar way of approach (see Figures 3 and 4 for panel analyses). In discrete time, whatever relationships between normal and real values and ratios are available. The most typical relationships are: the larger the k and the standard deviation of log y the larger y and g_y. However, these relationships are controlled by the rate of technological progress g^*_m. The value of g^*_m rather do not stimulate but check the speed of growth rates of y and g_y.

The author arranges the normal data base and the real data base (including logarithm), and then, analyzes average, standard deviation, correlation, and regression using excel. For methodology in the real data base, **First**, a variable is the rate of technological progress, g^*_m, as follows:

1. Under a constant Ω_P: $g_Y(g^*_m)$, $g_{Y/NE}(g^*_m)$ or $g_y(g^*_m)$, $\pi(g^*_m)$, $\rho(g^*_m)$

2. Under a constant π: $g_Y(g^*_m)$, $g_{Y/NE}(g^*_m)$ or $g_y(g^*_m)$, $g_{KP}(g^*_m)$, $g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$, $\Omega_P(g^*_m)$, $\rho(g^*_m)$

Appendix: "Empirical results of six countries" only show the cases of $g^*_m=0.3$ and $g^*_m=-0.3$, but observations are common to other cases. Note that functions $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ constitute a part of composite functions for many variables, which are shown only using π and Ω_P and setting n as a constant/parameter: $\varphi(\pi, \Omega_P, n)$.

$f_1(\pi(g^*_m))=F_1(g^*_m)$ under a constant Ω_P

$h_1(\Omega_P(g^*_m))=H_1(g^*_m)$ under a constant π

For example, productivity of labour $y=f_1(\Omega_P(g^*_m, \pi, n))=F_1(g^*_m)$ under given π and n, and productivity of capital $Y/K_P=f_2(\Omega_P(g^*_m, \pi, n))=F_2(g^*_m)$ under a constant π, and so on. The contents of other dependent variables which are not directly related to the above two formulations, $\pi=\Omega_P\cdot\rho$ and $k=\Omega_P\cdot y$, are reviewed in a separate paper.

Second, in the financial structure of products under constant π and Ω_P, the growth rate of population/workers, n, is possible to change from a constant to a parameter: $g^*_m(n)$. The value of $g^*_m(n)$ presents a unique perspective in terms of the relationship between technological progress and population/workers. Each country has its own characteristic in human capital and education, as discussed by Romer, P. [1986] and Lucas [1988], and this determines partly (together with corporate capital) the type of $g^*_m(n)$. Again, this function, $g^*_m(n)$, constitutes a part of a composite function. However, this "relationship between technological progress and population/workers" does not directly connected with the above two composite functions unless the value of g^*_m in $\pi(g^*_m)$ or $\Omega_P(g^*_m)$ equals the value of g^*_m in $g^*_m(n)$. This is because the base for $g^*_m(n)$ is set as a condition that the value of n is first given as a constant and accordingly the value of m^0 is first fixed.

4.2 Some results and propositions

Some characteristics are observed, as stated above, in actual values and theoretical real values (see Appendix).

For the rate of technological progress as an independent variable:

1. Under a constant Ω_P, $g_Y(g^*_m)$, $g_{Y/NE}(g^*_m)$ or $g_y(g^*_m)$, $\pi(g^*_m)$, $\rho(g^*_m)$ are rather stable compared with those $g_Y(g^*_m)$, $g_{Y/NE}(g^*_m)$ or $g_y(g^*_m)$, $g_{KP}(g^*_m)$, $g_{Y/KP}(g^*_m)= g_{1/\Omega P}(g^*_m)$, $\Omega_P(g^*_m)$, $\rho(g^*_m)$ under a constant π. It implies that the change in the relative share of profit recovers an equilibrium rather quickly. This is because the change in the capital-output directly brings about the difference between the growth rate of output and the growth rate of capital, and as a result the process to bury the difference are more complicated.
2. Technological progress under a constant Ω_P apparently brings about the improvement of labour productivity together with increasing relative share. However, this technological progress conceals a crucial inevitable side of investment which is inclined to increase the capital-output ratio. It is suggested that a base for economic policies should be, in the long run, based on decreasing Ω_P and as a result, the diminishing returns are avoided.
3. Technological progress under a constant π brings about the aggravation of the capital-output ratio or the productivity of capital. This is typical when the value of g^*_m is negative. This is because the value of g^*_m was defined as the relationship between the investment-output ratio and the growth rate of labour productivity.
4. Despite, the change in productivity of labour improves when the value of g^*_m is positive under a constant π. It implies that labour and capital productivity cannot improved separately. At the sacrifice of the aggravation of capital productivity, labour productivity improves in the short run. However, investment should be done, without aggravating the capital-output ratio, so as to improve labour productivity.

Proposition 2 If the relative share of profit is stable and if the capital-output ratio does not increase above a certain level, the growth rate of output is guaranteed supported by the improvement of labour productivity regardless of the growth rate of population/workers. It implies that technological progress controls the contents of the capital-output ratio and the growth rate of output/capital should be sustainable.

In terms of proposition 2, each country has its own stage, conditions, and state. Thus, economic policies are not the same. It seems apparently paradoxical, but population/workers can get more through a sustainable relative share of profit. Sudden decrease in the relative share of profit damage workers' life and national economy. Production is supported only by the corporate sector and the contents of corporate investment and technological progress should aim at the improvement of labour productivity in corporation with human capital. Too much production destroys environment and too much government investment destroys economic system. Also, too much welfare, particularly the raise of wage rate, is nonsense (beyond short-sighted) for population/workers themselves in real terms.

For the relationship between technological progress and population/workers:

1. $g^*_m(n)$ under constant π and Ω_P shows how this relationship be strongly related. It implies that human capital in terms of technological progress spreads into the relationship between labour and capital productivity.
2. However, from the viewpoint of full-employment, the number of population/workers must be kept at a certain level which workers can accept. The increase in population/workers seems to check technological progress to some extent, but with the growth rate of. population/workers, technological progress is stimulated if the capital-output ratio is within a certain level. It implies that human capital cooperates with corporate capital. This extent differs by the stage of economic conditions in a country.
3. A base of $g^*_m(n)$ is set at the level of $n=n^0$. It implies that the level of technological progress is set according to the current level of n. The value of g^*_m is

zero at $n=n^0$, where n^0 shows actual growth rate in the next period (one period back). The elasticity of n to g^*_m differs considerably by period and country. There exist a room for different policies by period and country.

4. The financial structure of products influences $g^*_m(n)$, but also the policies for $g^*_m(n)$ can change the financial structure of products. There is a room for reviewing the relationship between the level of technological progress and population /workers.

Proposition 3 If the pattern of $g^*_m(n)$ is reviewed in the long run, unemployment is solved to some extent. Population/workers are a given parameter, but is involved in the relationship between technological progress and population/workers and set under the controllability of the relationship between labour productivity and the capital-output.

Proposition 4 If the rate of technological progress improves itself through effective investment, the financial structure of products is strengthened. This is a positive side of investment. It implies that inflation only damages this positive side of investment and no others.

Proposition 5 If the rate of technological progress g^*_m is a criterion for the decision-making of corporate investment, the diminishing returns can be avoided since the rate of profit improves as a result.

5. Review of representative framework: Hicks, Harrod, and Solow

By synthesizing the formulation of $\pi=\Omega_P \cdot \rho$ and the formulation of productivity, the review of representative models in the past are reviewed, the author thinks, more properly than before. They start with the Cobb-Douglas (C-D) production function. The author thinks that the production function remains an expression of output, and more important is how to endogenously derive growth rates of Y and K_P. Regardless of using the production function, it is vital to review the relationship among g_Y, g_{KP}, and n in terms of productivity. Despite, the synthesis of the two formulation is expressed using the concept of the production function and also clarifies some limitations of the C-D production function. This is one of intentions of this section. First of all, it is important to confirm a condition lying between $\pi=\Omega_P \cdot \rho$ and $k \equiv K_P/N_E$, since k must change if π=a constant and if n is given.

First, the CFGM forms production functions under synthesis of the two formulation and calls them as "discrete production functions." The difference between "continuous time" and "discrete time" is not important compared with the relationship between the two formulations since discrete time can be expressed also using continuous time. Discrete production functions present three types according to the relationship between two formulations.

Given initial values are Y^0, P^0, N_E^0 and K_P^0. Variables are Y, P, N_E and K_P. n is a constant and also becomes a variable as $n(g_Y)$, and g_m^* is an independent variable. Ω_P, π, and ρ are each shown as $\Omega_P(g_m^*)$, $\pi(g_m^*)$, and $\rho(g_m^*)$. If one of three components is a constant, then, the other two are used as variables:

1. If $\Omega_P=\Omega_P^0$=a constant, π and ρ are variables: $\pi=\pi(g_m^*)$ and $\rho=\rho(g_m^*)$
2. If $\pi=\pi^0$=a constant, Ω_P and ρ are variables: $\Omega_P=\Omega_P(g_m^*)$ and $\rho=\rho(g_m^*)$

A similar treatment is applied to the formulation of $\left(\frac{K_P}{N_E}\right)=\left(\frac{K_P}{Y}\right)\cdot\left(\frac{Y}{N_E}\right)$ or $k=\Omega_P \cdot y$, but one of three must be a constant, and the other two are used as variables.

1. If $\left(\frac{K_P}{Y}\right)=\left(\frac{K_P^0}{Y^0}\right)$=a constant, $\left(\frac{K_P}{N_E}\right)$ and $\left(\frac{Y}{N_E}\right)$ are variables: $k=k(g_m^*)$ and $y=y(g_m^*)$
2. If $\left(\frac{K_P}{N_E}\right)=\left(\frac{K_P^0}{N_E^0}\right)$=a constant, Ω_P and $\left(\frac{Y}{N_E}\right)$ are variables: $\Omega_P=\Omega_P(g_m^*)$ and $y=y(g_m^*)$

As a result, the following three types are formed in terms of discrete production functions:

Type 1 Under $\Omega_P=\Omega_P^0$=a constant: $g_m^* \neq 0$

Variables: $\pi=\pi(g_m^*)$ and $\rho=\rho(g_m^*)$, $\xi_\pi=\xi_\pi(g_m^*)$ and $\xi_\rho=\xi_\rho(g_m^*)$

$k=k(g_m^*)$ and $y=y(g_m^*)$, $\xi_k=\xi_k(g_m^*)$ and $g_{Y/NE}=g_{Y/NE}(g_m^*)$

Initial values are given: π^0 and ρ^0, $k^0 \equiv \dfrac{K_P^0}{N_E^0}$ and $y^0 \equiv \dfrac{Y^0}{N_E^0}$

where, $\xi_\pi \equiv \dfrac{\pi^1 - \pi^0}{\pi^0}$, $\xi_{\Omega P} \equiv \dfrac{\Omega_P^1 - \Omega_P^0}{\Omega_P^0}$, $\xi_\rho \equiv \dfrac{\rho^1 - \rho^0}{\rho^0}$, and $\xi_k \equiv \dfrac{k^1 - k^0}{k^0}$

$g_Y = g_{KP}$

$\pi^0(1+\xi_\pi) = \Omega_P \cdot \rho^0(1+\xi_\rho)$ $\qquad \xi_\pi = \xi_\rho$ $\qquad \Omega_P = \Omega_P^0 = \text{a constant}$

$k^0 \cdot (1+\xi_k) = \Omega_P \cdot y^0 \cdot (1+g_{Y/NE})$ $\qquad \xi_k = g_{Y/NE}$ $\qquad \xi_{\Omega P} = 0$

Type 2 Under $\pi = \pi^0 = \text{a constant}$: $g_m^* \neq 0$ (under the neutrality of technological progress)

Variables: $\Omega_P = \Omega_P(g_m^*)$ and $\rho = \rho(g_m^*)$, $\xi_{\Omega P} = \xi_{\Omega P}(g_m^*)$ and $\xi_\rho = \xi_\rho(g_m^*)$

$k = k(g_m^*)$ and $y = y(g_m^*)$, $\xi_k = \xi_k(g_m^*)$ and $g_{Y/NE} = g_{Y/NE}(g_m^*)$

Initial values are given: Ω_P^0 and ρ^0, k^0 and y^0

where, $g_{Y/NE} \neq g_{Y/KP} \equiv \xi_{1/\Omega P}$ $\quad \xi_{1/\Omega P} \equiv \dfrac{\dfrac{1}{\Omega_P^1} - \dfrac{1}{\Omega_P^0}}{\dfrac{1}{\Omega_P^0}}$

$g_Y \neq g_{KP}$

$\pi \quad = \Omega_P^0(1+\xi_{\Omega P}) \cdot \rho^0(1+\xi_\rho)$ $\qquad \xi_{\Omega P} \neq \xi_\rho$ $\qquad \pi = \pi^0 = \text{a constant}$ $\quad \xi_\pi = 0$

$k^0(1+\xi_k) = \Omega_P^0(1+\xi_{\Omega P}) \cdot y^0(1+g_{Y/NE})$ $\qquad \xi_k \neq \xi_{\Omega P} \neq g_{Y/NE}$ $\qquad k \neq k^0$

Type 3 Consideration of n: $g_m^* = 0$ and $g_m^* \neq 0$

3-1 n is replaced by g_{KP}: $g_m^* = 0$

This case neglects the existence of $n = $ a constant/parameter and assumes that the growth rate of labour productivity g_y is zero. Thus, it shows a special case that π, Ω_P, k, and y are constants under $g_m^* = 0$. It cannot stay at a specified case of Type 2. As long as the growth rate of labour productivity is zero under a certain fixed level of technological progress, it returns back to the initial financial structure of products.

3-2 g_{KP} is replaced by $g_Y \equiv n + g_y(1+n)$: $g_m^* \neq 0$

This case of $g_Y=g_{KP}$ may be called "the balanced growth steady-state." Then, it belongs to Type 1 and always satisfies both the financial structure of products and the synthesis of the two formulations. However, it is not under π=a constant where the neutrality of technological progress prevails in the continuous time. $\pi(g^*_m)$ $g_Y=g_{KP}$ may brings about $g_Y \neq g_{KP}$.

In short, when the financial structure of products is broken, the coefficient of technological progress cannot be measured. $n=g_Y=g_{KP}$ may happen even under the financial structure of products, but without a function of g^*_m, since $g^*_m=0$. Any of $\pi(g^*_m)$, $\Omega_P(g^*_m)$, $\rho(g^*_m)$, $k(g^*_m)$, and $y(g^*_m)$ do not hold ($g^*_m=0$) under a constant relationship of $\pi^0=\Omega^0_P \cdot \rho^0$.

Now, the author compares the above types (frameworks) with Hick's, Harrod's, and Solow's in terms of the C-D production function under constant π. Each of them introduces the rate of technological progress into the C-D production function in terms of the neutrality of technological progress, but each base for the rate of technological progress differs even under the constant relative share of profit which comes from the definition of the neutrality. This review will clarify the characters and limitations which the C-D production function has implicitly. The review is based on (1) the synthesis of the two formulations: $\pi=\Omega_P \cdot \rho$ and $k=\Omega_P \cdot y$, and (2) a common coefficient of technological progress m^* which comes from the financial structure of products and a common rate of technological progress g^*_m under the synthesis of the two formulations.

First, the C-D production function can have both k=a constant and $k \neq$a constant.

1. Condition k=a constant: It requires the Hicks' neutrality of technological progress. This neutrality is defined as technological progress where the profit distribution to wages, P/W=a constant. If both $k=K/L$ and F_K/F_L(= rental rate r/wage rate w) are constant, then, the relative share of profit π is constant and the n^{th} homogeneity is one.

2. Condition k≠a constant: Under Harrod's and Solow's neutrality of technological progress, the relative share of profit π is constant and the n^{th} homogeneity is one.
3. If either neutrality does not hold, then, the relative share of profit π is not constant. However, the n^{th} homogeneity is not one in the continuous time. As a result, the production function is set either under the increasing returns to scale (IRS) or the decreasing returns to scale (DRS). As already discussed, this condition is inconsistent in terms of positive and negative profit.[10)]

Thus, the production function is stable under CRS (π=a constant and 1^{th} homogeneity) and this is the C-D production function.

If so, what is the difference between the C-D (continuous) production function and the discrete production function whose base is the financial structure of products? The former must obey one of the neutrality of technological progress while the latter must obey the three formations (including the formulation of change in price level which is independent of the financial structure of products). Which is more important to a national economy? The former is specified (partial) while the latter seems more general since the national economy needs, as a whole, each balance of the financial structure of products and the formulation of change in price level. This is more definitely discussed by using the elasticity of substitution σ. The value of σ is one in the case of the C-D production function since r/w is assumed to be equal to the marginal rate of substitution $MRS \equiv -dL/dK = (\partial Y)/(\partial K) / (\partial Y)/(\partial L) = \pi/k(1-\pi)$. It is suggested that the aggregate C-D production function holds only if the result under the marginal productivity involved in the aggregate C-D production function equals the result under the formulation of change in price level in the CFGM. This is because the formulation of change in price level must

10) If $\theta>1$ (IRS), $K\cdot r+L\cdot w=\theta\cdot p\cdot Y>p\cdot Y$ profit<0
If $\theta=1$ (CRS), $K\cdot r+L\cdot w=\theta\cdot p\cdot Y=p\cdot Y$ profit=0
If $\theta<1$ (DRS), $K\cdot r+L\cdot w=\theta\cdot p\cdot Y<p\cdot Y$ profit>0

independently be balanced as a part of the national economy in the same way as the financial structure of products in real terms.

In more detail, let the author compare each framework in terms of the neutrality of technological progress. This neutrality implies that the relative share of profit is constant, and as a result, must be set under the above Type 2.

First, for **Hicks** [1946], again, if both $k=K/L$ and F_K/F_L(= rental rate r/wage rate w) are constant, then, both k and π must be constant. This case corresponds with one of **Type 2** under constant π. Type 3-2 as a specified exceptional type corresponds with Hicks' framework, if he intends to includes technological progress. However, a state of $n=g_Y=g_{KP}$ implies that $\Omega_P(g^*_m)$ does not exist while a state of $n<g_Y=g_{KP}$ implies that $\Omega_P(g^*_m)$ exists: $g_Y \equiv n+g_y(1+n)$.

Next, **Harrod** [1973] proposes a growth theory using the "warranted" growth rate $G_w \equiv \Delta Y/Y=s/v$. His equation corresponds with an equation that $g_Y=s_{(SP+WD)/Y}/\Omega_P$ under any growth rate of population/workers, n. However, This corresponding equation does not hold: $g_Y \neq s_{(SP+WD)/Y}/\Omega_P$. This is because $g_Y=s_{SP/Y}/(1-s_{SP/Y})$ and $s_{(SP+WD)/Y}=s_{SP/Y}+s_{WD/Y}=s_{SP/Y}(1+\Omega_P-1)=s_{SP/Y}\cdot\Omega_P$. As a result, the above Harrod's equation is shown as g_Y equals $s_{SP/Y}\cdot\Omega_P/\Omega_P=s_{SP/Y}$: $g_Y=s_{SP/Y}$. It implies that Harrod's $G_w \equiv \Delta Y/Y=s/v$ is the same as the author's $g_Y=s_{(SP+WD)/Y}/\Omega_P$ if $\Omega_P=1$. What does $\Omega_P=1$ imply? It implies that K_P equals Y and that the growth rate of output g_Y equals the growth rate of capital g_{KP}.[11]

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11) The relationship between the natural growth rate of Harrod ([1973, p. 21], G_n=the rate of increase of the working population, n, and the rate of improvement in available technology for the production of goods and services, g_λ) and $g_Y \equiv n+g_y(1+n)$ or $g_Y=g_y+n(1+g_y)$ in the author's model is shown using the increasing factor A of the production function as follows (as kindly shown by Tokimasa, 1997/10): $G_n=\frac{\dot{A}}{A}+n$ while $g_y=\frac{\dot{A}}{A}+(1-\alpha)\frac{\dot{K}}{K}-(1-\alpha)n$ since $y=\frac{Y}{L}=AK^{1-\alpha}L^{\alpha-1}$ and $y=A\left(\frac{K}{L}\right)^{1-\alpha}$. However, the author uses m^* and g^*_m which are separated from the growth rate $g_Y=g_{KP}$ instead of A.

Also, under the n^{th} of homogeneity = 1 (CRS), Harrod's neutrality of technological progress is defined as a condition that rental rate r=a constant and K/Y=a constant. As a result, the relative share of profit, P/Y, is constant. If so, Harrod's framework (model) is misleading as follows:

1. The neutrality of technological progress implies that π is a constant and as a result, it must corresponds with Type 2.
2. Despite, his neutrality holds when rental rate r=a constant and K/Y=a constant (see above). K/Y=a constant must follow the above Type 1, where $\Omega_P=\Omega_P^0$=a constant and $\pi=\pi(g_m^*)$. Type 1 is exactly capital-saving (or labour augmenting).
3. When his growth theory ($G_w \equiv \Delta Y/Y = s/v$, see above) is taken into consideration, then, the value of v (which corresponds with Ω_P) only holds if Ω_P equals one.
4. As a result, there are two alternatives: to take his neutrality or to take his growth theory which was the first simple trial in the history of economics. It is suggested that his model is generalized by introducing the rate of technological progress $\pi=\pi(g_m^*)$ under $\Omega_P=\Omega_P^0$=a constant.

Contrary to Harrod, **Solow** [1956] proposed a model of labour-saving (or capital augmenting). Solow's neutrality of technological progress is defined as a condition that wage rate w=a constant and Y/L=y=a constant. As a result, the relative share of wages, $w \cdot L/Y$, is constant. Solow's model belongs to a case of **Type 2**, where $\pi=\pi^0$=a constant and $\Omega_P=\Omega_P(g_m^*)$. If Type 2 is set as $y=y^0$=a constant under $k=k(g_m^*)$, then, this specified case exactly corresponds with Solow's model. Type 2 can be divided into two cases: $k=k(g_m^*)$ under $y=y^0$=a constant (Solow's case) and $y=y(g_m^*)$ under $k=k^0$=a constant. However, the author places a priority on the improvement of labour productivity and moreover, the simultaneous balance among k, Ω_P, and y: $k(g_m^*)=\Omega_P(g_m^*) \cdot y(g_m^*)$ under constant π. This case which varies simultaneously holds in the "discrete" production function since $\Omega_P(g_m^*)$ is measured, but cannot be considered in the C-D production function which is tightly connected with the marginal productivity theory.[12)]

6. Conclusion

This paper introduced the coefficient of technological progress m^* and the rate of technological progress $g^*_m(\equiv(m^{*1}-m^{*0})/m^{*0})$ into the model under the balanced growth state that the growth rate of output equals the growth rate of corporate capital.

There are some definite differences between Keynesians' approach and Neo-classical approach which uses the Cobb-Douglas (C-D) production function. The author was advised to take a third path between them.[13)] The financial structure of products (FSP) is used as a base for common relationship between the above two approaches; Keynesians' equations and the C-D production function. The FSP is expressed using equations, but leads to saving/investment functions in discrete time. However, discrete saving functions cannot correspond with the C-D production function, but discrete investment functions which introduces the growth rate of population/workers corresponds with the C-D production function. For discrete investment functions;

1. Under constant π, Ω_P, and n as parameters, the coefficient of technological progress m^* is introduced and measured endogenously.
2. Under constant n as a parameter and varying π or Ω_P, or varying π and Ω_P, as variables, the rate of technological progress g^*_m is introduced and measured

12) For example, Solow [1956] states that $\Delta Y=\Delta K\cdot MPK+\Delta L\cdot MPL=\Delta K\cdot\frac{\partial Y}{\partial K}+\Delta L\cdot\frac{\partial Y}{\partial L}$: if $\Delta L=0$, then, $\Delta Y=\Delta K\cdot\frac{\partial Y}{\partial K}=(S_P+S_W)\cdot\frac{1}{\Omega}$, where $\frac{\partial Y}{\partial K}=f(\Omega)=\frac{1}{\Omega}$.

13) I had an invaluable opportunity to stay at the University of Cambridge in summer of 1996, where, Dr. G.C. Harcourt and Dr. G. Whittington admonished the author, in terms of economics and accounting, to understand that both are different in philosophy and not to be mixed up. Also, Dr. J. O'Connell advised me to take a different path by endogenously reconsidering the characters of π, Ω_P and ρ.

endogenously.

3. Both cases lead to a similar condition to the C-D production function, and derive discrete investment functions. These discrete investment functions are expressed using π, Ω_P, and n together with m^* and g^*_m (although discrete saving functions are expressed using π and Ω_P but without using n).

In terms of investment functions, the FSP is formulated into the synthesis of two formulations: $\pi = \Omega_P \cdot \rho$ and $k = \Omega_P \cdot y$, both of which are shown using $\pi(g^*_m)$ under constant Ω_P or $\Omega_P(g^*_m)$ under constant π. The relationship between these two formulations is expressed using discrete investment functions , and to some extent is compared with the C-D production function. The C-D production function is also based on the synthesis of the two formulations, but needs, as a special case, the neutrality of technological progress. In a sense, discrete investment functions is more general than the C-D production function bound by the neutrality of technological progress which assumes constant relative share of profit.[14)]

When the C-D production function introduces the saving ratio, the diminishing returns are inevitable [Solow, 1956, p. 85]. It is needed to add "an increasing factor" A(t) into the C-D production function which prevent the diminishing returns. A(t) as an exogenous variable is "one plus the growth rate" in the real terms. Discrete investment functions in this paper, however, endogenously distinguishes the growth rate of output/capital, $g_Y = g_{KP}$, with the coefficient of technological progress, m^*, and the rate of technological progress, g^*_m. A distinguished characteristic of discrete investment functions is to be able to prove an endogenous power to convert the diminishing returns to increasing returns by the introduction of g^*_m. This is shown by Figure 3 and Appendixes B-1 and B-2 which show the rate of profit ρ in the real

14) Furthermore, only if the Euler's theorem/the marginal productivity theory and the marginal utility theory match the result of "the balanced formulation of change in price 1 level," of the author's, then, the aggregate C-D production function holds regardless of the number of goods (since both are under the constant returns to scale).

terms. The value of ρ increases if the growth rate of output/capital becomes higher along with higher g_m^*. Also, the value of ρ is stable and in favour of increasing returns if the capital-output ratio lies above one and below two. When the capital-output ratio is higher than 2.5, the value of ρ becomes considerably unstable even under the same level of g_m^*. These relationships are not clarified in the C-D production function.

Observations of empirical study for six countries in 1982–1994 show some new findings, but, most of them are what already found in the panel data approach in the past. A criterion of the improvement in labour productivity is most important both for investment and economic sustainable growth, but is apt to result in larger capital-labour ratio k: the correlation between k and y is surprisingly high. The capital-output ratio determines endogenously the growth rate of output together with the relative share of profit. According to the stage of capital accumulation, different policies are endogenously suggested by country, region, and company: for example, for matured countries, to decrease capital stock by using the rate of economic depreciation (through tax system); for developing countries, to improve labour productivity allowing the capital-output ratio to be higher; and for both, to set a criteria of net investment which improves labour productivity together with the rate of technological progress. It implies human capital and knowledge productivity should be used not to increase physical capital.

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APPENDIXES

Appendix A Revise of assumptions in the model

In the last paper [1997, 38(1)], the author presented Assumptions 1 to 8. However, two of them were "sufficient conditions" themselves and were not significantly tested by the panel data analysis [1982–94] which uses actual data. As a result, the author replaces these two assumptions by the following Assumptions 7 and 8 which are significantly tested. Using Assumptions 7 and 8, sufficient conditions are derived and the growth rate of output g_Y becomes equal to the growth rate of capital g_{KP}. Assumptions 1 to 3 have been generally used in the discussions between Pasinetti and anti-Pasinetti [1962–1995]. Assumptions 7 and 8 are the author's own and leads to a new model which sets propensities to save as variables (not as parameters which the literature has taken up to date).

1. The ratio of the capital owned by capitalists to the capital owned by workers equals the ratio of the savings by capitalists to the savings by workers.
2. Dividends and wages are treated homogeneously, even if each propensity to save differs. Then, a weighted average ratio of saved dividends and wages to dividends and wages is calculated under a "two class" model; capitalists and workers coexist.
3. The author's revised assumption: Each retention ratio of capital owned by capitalists or workers is distinguished from the dividend and/or wage propensities

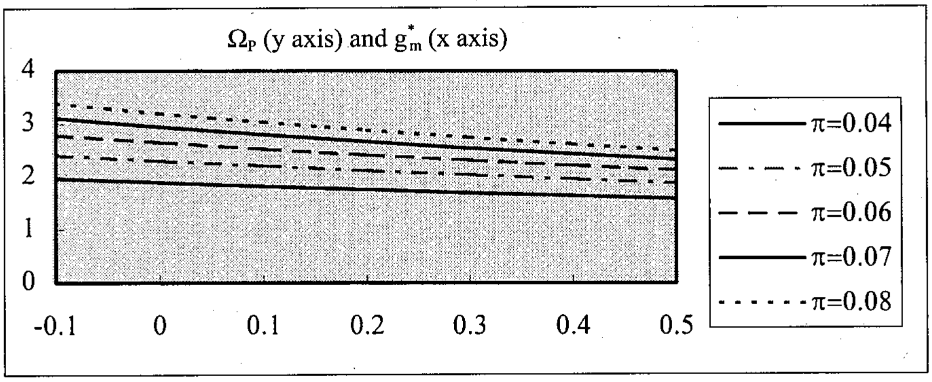
to save. This is typically expressed as a "one class model" where capital is owned only by workers.

4. Under no technical progress in the balanced growth state that the growth rate of output and the growth rate of capital are the same, propensities to save, the capital-output ratio, and the rate of profit are fixed.
5. Under technical progress in the balanced growth state that the growth rate of output and the growth rate of capital are the same, the relative share of profit still remains fixed, but the capital-output ratio and the rate of profit vary.
6. Related saving ratios remain fixed in both cases of Assumptions 4 and 5.
7. The author's added assumption: Saving is proportional to undistributed profit. It implies that the difference between the theoretical wage and dividend saving ratio and the expected wage and dividend saving ratio does not last in the real world.
8. The author's added assumption: The growth rate of capital is proportional to the ratio of dividends to capital. Since firms retain all undistributed profit, the workers need an equal right for the payment of dividends under any retention ratio. This assumption reduces to a certain proportional relationship between dividends and investment.

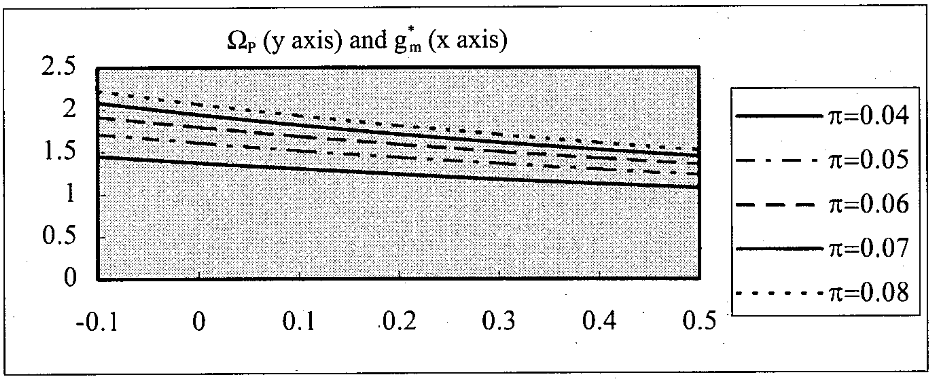
The balanced growth state, where $g_Y = g_{KP}$, holds only if $\Delta Y = S_P$, $K_{SP} = Y$, and $\Omega K_P = D_I$. These constitute the three sufficient conditions for $g_Y = g_{KP}$. The above Assumptions 4, 5, and 6 constitute the necessary condition for $g_Y = g_{KP}$.

Appendix B-1 The capital-output ratio and the rate of technological progress by the relative share of profit π

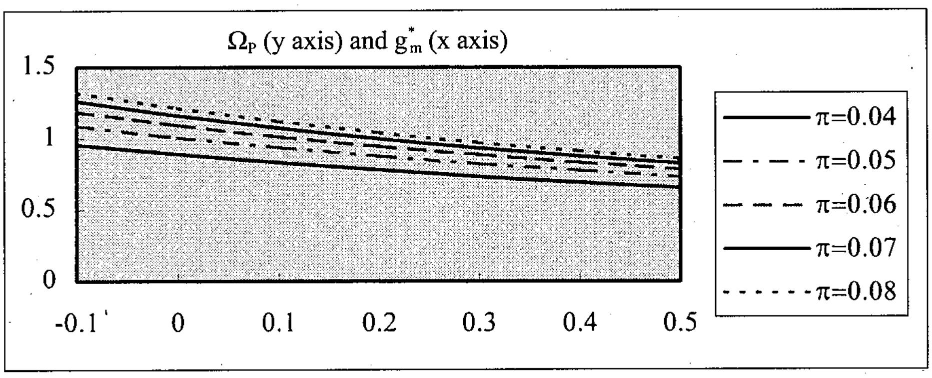
n=0.01
m=0.15



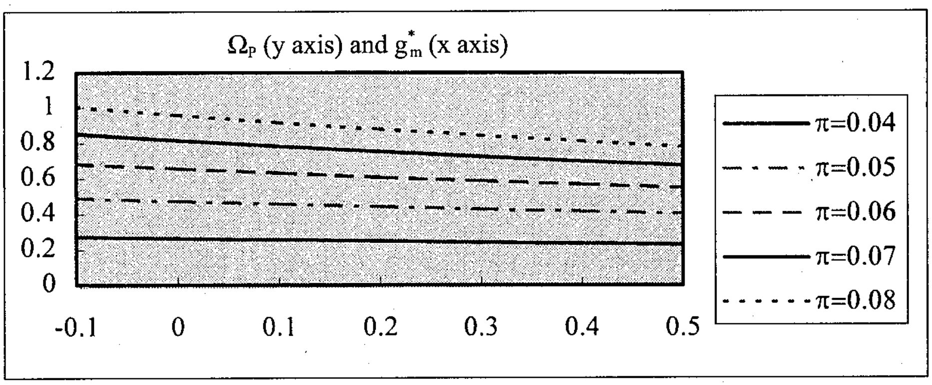
n=0.01
m=0.3



n=0.01
m=0.6

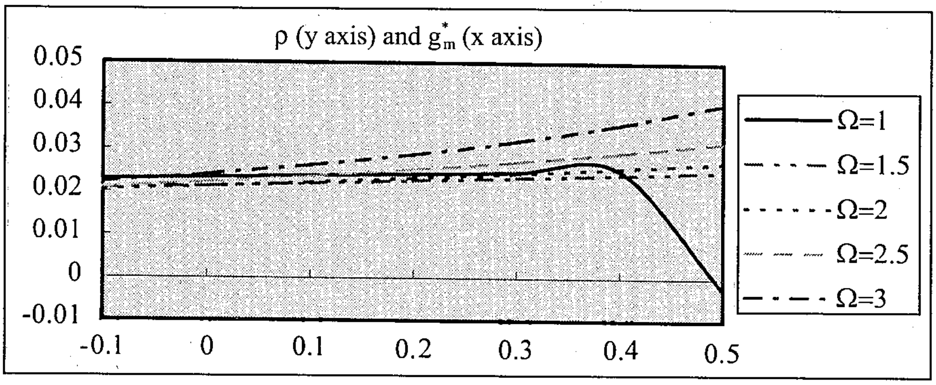


n=0.03
m=0.3

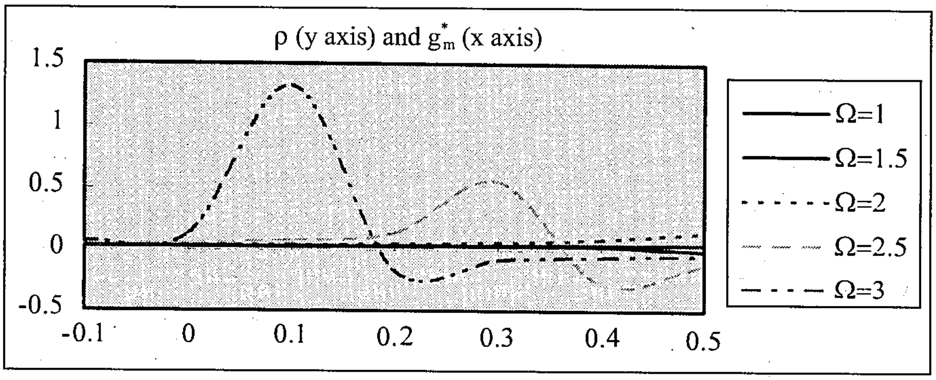


Appendix B-2 The rate of profit and the rate of technological progress by the relative share of profit π

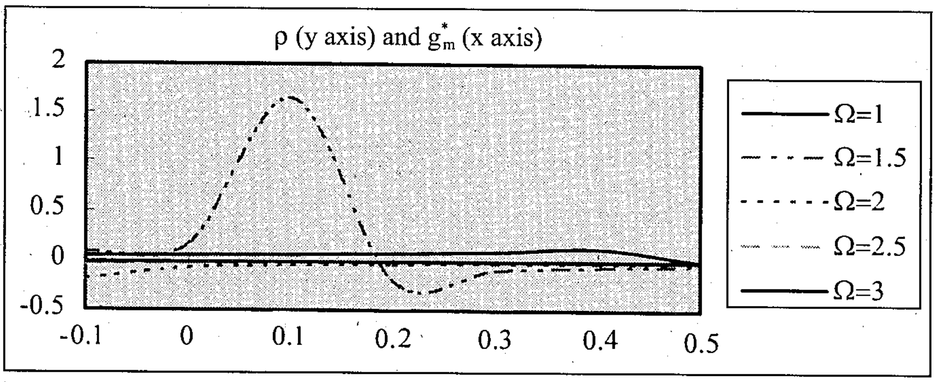
n=0.01
m=0.15



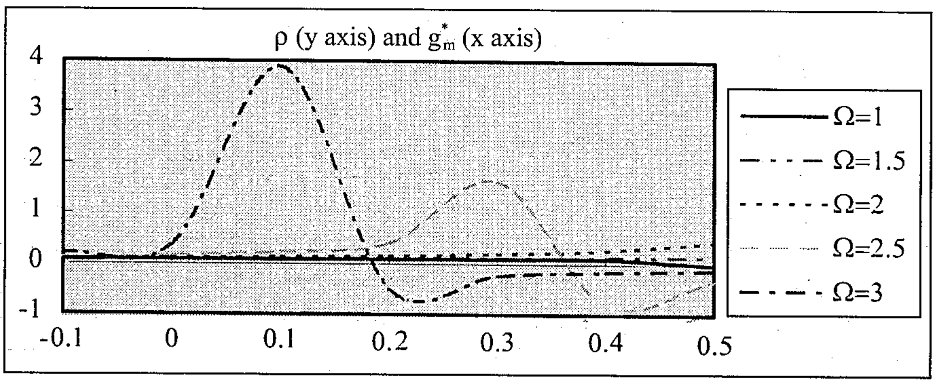
n=0.01
m=0.3



n=0.01
m=0.6



n=0.03
m=0.3



Appendix C Compare MPK and MPL of the production function with those of the discrete S-I relationship:

1. The marginal product of capital in the production function, MPK, is defined and measured as follows; MPK$=\frac{\partial Y}{\partial K}=A\alpha K^{\alpha-1}L^{1-\alpha}$ and MPL$=\frac{\partial Y}{\partial L}=AK^{\alpha}(1-\alpha)L^{-\alpha}$. If the production function is combined with profit maximization, then, the results are shown as MPK=r and MPL=w, where r is the rental price of capital measured in terms of goods, and w is goods wage rate.
2. The notion of MPK and MPL are applied to the S-I relationship if MPK is defined as ΔY/ΔK and MPL is defined as ΔY/ΔL. Sufficient conditions are $\Delta Y=S_P$, $K^0_{SP}=Y^0$ or $K^0_{WD}=K^0_P-Y^0$, and $D_I=S_P+S_{WD}$ under necessary conditions; the relative share of profit π, the capital output ratio Ω_P, and the rate of profit are fixed ρ, where $\pi=\Omega_P\cdot\rho$. Under these conditions (omit the notation "*" for the balanced growth state),

$$MPK\equiv\frac{\Delta Y}{\Delta K}=\frac{S_P}{S_P+S_{WD}}=\frac{1}{\Omega_P}\qquad MPL\equiv\frac{\Delta Y}{\Delta L}=\frac{Y^0\cdot g_Y}{N^0_E\cdot n}=\frac{\pi\cdot y^0}{(\Omega_P+1-\pi)n}$$

3. The condition that MPK equals MPL in the S-I relationship is derived using the above equations as follows:

$$\frac{1}{\Omega_P}=\frac{\pi\cdot y^0}{(\Omega_P+1-\pi)n}$$

$$\pi\cdot\Omega_P\cdot y^0=(\Omega_P+1-\pi)n\qquad \text{Thus, } n=n^*=\frac{\pi\cdot\Omega_P\cdot y^0}{(\Omega_P+1-\pi)}.$$

This condition corresponds with the balanced growth steady-state or the golden age, where

$g^*_Y=g^*_{KP}=n^*$ and $n=n^*$.

4. If MPK in the production function equals MPK in the S-I relationship, then, what happens?

MPK in the production function; **MPK=r**

MPK in the S-I relationship; $MPK_{S-I}=1/\Omega_P$

Thus, r must be equal to $1/\Omega_P$ or $1=r\cdot\Omega_P$. For example, if r is 0.2, then, Ω_P is 5 and if r is 0.1, then, Ω_P is 10. These levels of Ω_P are considerably high in the real world.

Furthermore, if $\alpha=\frac{rK}{Y}$ in the production function assuming profit maximization, then, the relative share of profit in the S-I relationship is shown as, $\pi=\frac{rK}{Y}=\frac{1}{\Omega_P}\cdot\Omega_P=1$.

5. If MPL in the production function equals MPL in the S-I relationship, then, what happens?

MPL in the production function; **MPL=w** and $(1-\alpha)=\frac{wL}{Y}$, where $\mathbf{w=(1-\alpha)y}$.

MPL in the S-I relationship; $MPL_{S\text{-}I}=(1-\pi)y$, where $y=y^0(1=g_y)$ and g_y is determined using the growth rate of population/workers.

Thus, "w" must be equal to $(1-\pi)y$. For example, if w is 0.2, which is equal to r, then, y is 0.2222 (neglecting g_y) if π is 0.1. If w is 0.2, which is equal to r, then, y is 0.25 (neglecting g_y) if π is 0.2. These levels of π may be plausible if y is right.

6. If MPK equals MPL and if this is applied to those in the S-I relationship, then, what happens?

First, let the author discuss in more detail the contents of $MPL_{S\text{-}I}$ using $(1-\alpha)=\frac{wL}{Y}$. Assume that the growth rate of population/workers is zero, then, the growth rate of output, g_Y, equals the growth rate of labour productivity, g_y. The author can use $g_Y=\frac{\pi}{\Omega_P+1-\pi}$.

$$w=(1-\alpha)y=(1-\pi)y=(1-\pi)y^0(1+g_y)=(1-\pi)y^0\frac{\Omega_P+1}{\Omega_P+1-\pi}=\frac{(1-\pi)(\Omega_P+1)y^0}{\Omega_P+1-\pi}$$

If r=w, then, $\frac{1}{\Omega_P}=\frac{(1-\pi)(\Omega_P+1)y^0}{\Omega_P+1-\pi}$ or $\Omega_P(\Omega_P+1)(1-\pi)y^0=\Omega_P+1-\pi$

Solving Ω_P in the above quadratic function of Ω_P,

$$\Omega_P=\frac{-((1-\pi)y^0-1)\pm\sqrt{((1-\pi)y^0-1)^2-4(1-\pi)^2\cdot y^0}}{2(1-\pi)y^0}$$

For example, if $\pi=0.2$ and $y^0=0.25$, then, $(1-\pi)y^0-1=-0.8$ and $((1-\pi)y^0-1)^2=0.64$, and Ω_P is $\frac{0.8\pm\sqrt{0.64-0.64}}{0.4}=2$. It shows that this solution is right if $((1-\pi)y^0-1)^2$ is equal to $4(1-\pi)^2\cdot y^0$. It implies that MPK=MPL or "r=w" is plausible since this ratio of the capital-output ratio is plausible and meaningful, where undistributed profit equals savings of wages and dividends. However, for another example, if $\pi=0.1$ and $y^0=0.2222$, then, $(1-\pi)y^0-1=-0.8$ and $((1-\pi)y^0-1)^2=0.64$, but $4(1-\pi)^2\cdot y^0=0.719928$ and Ω_P is $\frac{0.8\pm\sqrt{0.64-0.719928}}{0.4}$, which is undefined. If $\pi=0.3$ and $y^0=0.285714$ (=0.2/0.7 if w=0.2 and neglecting g_y), then, $(1-\pi)y^0-1=-0.8$ and $((1-\pi)y^0-1)^2=0.64$, but $4(1-\pi)^2\cdot y^0=0.56$ and Ω_P is

$$\frac{0.8+\sqrt{0.64-0.56}}{0.4}=\frac{0.8+0.282843}{0.4}=2.7071 \quad \text{or}$$

$$\frac{0.8-\sqrt{0.64-0.56}}{0.4}=\frac{0.8-0.282843}{0.4}=1.292893.$$

Compare $((1-\pi)y^0-1)^2$ with $4(1-\pi)^2\cdot y^0$.

$$((1-\pi)y^0-1)^2=y^{02}-2\pi y^{02}+\pi^2y^{02}+2\pi y^0-2y^0+1$$

$$4(1-\pi)^2\cdot y^0=4y^0-8\pi y^0+4\pi^2y^0$$

This condition is rather unstable even though w is given as $(1-\pi)y$. However, the above function, $\Omega_P=\Omega_P(\pi, y^0)$ always holds. It implies that the condition of MPK=MPL or r=w generally holds.

Next, let the author discuss a special condition that $((1-\pi)y^0-1)^2$ equals $4(1-\pi)^2\cdot y^0$. This is shown using the following two cases; using y^0 (before growth) and using $y=y^0(1+g_Y)$ (after growth) for MPK=MPL.

1. Suppose that $\mathbf{w=(1-\pi)y^0}$ and $w=\pi-1$, using the result of MPL in the production function (neglect g_y). Then,

$$\pi=\frac{y^0}{1+y^0} \qquad \text{or} \qquad y^0=\frac{\pi}{1-\pi}$$

If the equation between $((1-\pi)y^0-1)^2$ and $4(1-\pi)^2 \cdot y^0$ in the above root is assumed, then,

$$\Omega_P=\frac{-((1-\pi)y^0-1)}{2(1-\pi)y^0} \quad \text{or} \quad \Omega_P=\frac{-(w-1)}{2w} \quad \text{holds.}$$

However, in the case of $\pi=\frac{y^0}{1+y^0}$ or $y^0=\frac{\pi}{1-\pi}$, the above equation does not become equal as shown: $\left((1-\pi)\frac{\pi}{1-\pi}-1\right)^2=(\pi-1)^2=\pi^2-2\pi+1$

$$4(1-\pi)^2\frac{\pi}{1-\pi}=4\pi(1-\pi)=4\pi-4\pi^2$$

Thus, the assumption that $((1-\pi)y^0-1)^2=4(1-p)^2 \cdot y^0$ is necessary in this case.

7. Suppose that $\mathbf{w=(1-\pi)y}$ and $w=\pi-1$, where $y=y^0(1+gy)$ and assuming that the growth rate of population/workers is zero $(g_Y=g_y)$, using the result of MPL in the production function.

$$\pi=\frac{y}{1+y}=\frac{y^0(1+g_Y)}{1+y^0(1+g_Y)}=\frac{y^0\left(\frac{\Omega_P+1}{\Omega_P+1-\pi}\right)}{1+\left(\frac{\Omega_P+1}{\Omega_P+1-\pi}\right)}$$

$$\text{or} \quad y^0(1+g_Y)=\frac{\pi}{1-\pi} \qquad y^0=\frac{\pi}{1-\pi}\cdot\frac{\Omega_P+1-\pi}{\Omega_P+1}$$

When the above $\pi=\pi(y^0)$ or $y^0=y^0(\pi)$ is introduced, the function $\Omega_P=\Omega_P(\pi, y^0)$ is solved without assuming that the contents of the above root is zero. Furthermore, in this case, if the equation of $((1-\pi)y^0-1)^2=4(1-\pi)^2 \cdot y^0$ is proved, then, it implies that MPK=MPL holds under a specified condition that $\mathbf{w=(1-\alpha)y^0=r}$, in the same way as in the production function.

For this case, $\pi=\frac{y}{1+y}$ or $y=\frac{\pi}{1-\pi}$, the above equation is proved to be equal by using p as follows:

$$\Omega_P=\frac{-((1-\pi)y^0-1)\pm\sqrt{((1-\pi)y^0-1)^2-4(1-\pi)^2 \cdot y^0}}{2(1-\pi)y^0} \quad \text{(see above)}$$

$$((1-\pi)y^0-1)^2-4(1-\pi)^2y^0=0$$

Just replacing y^0 by y for simplicity, $(1-\pi)^2y^2-2\pi(1-\pi)y+1=0$.

Then, $y=\dfrac{1+2(1-\pi)\pm2\sqrt{(1-\pi)^2+(1-\pi)}}{1-\pi}=\dfrac{3-2\pi\pm2\sqrt{\pi^2-3\pi+2}}{1-\pi}$

8. MPK=MPL: in the production function and in the S-I relationship

In order to convert MPK and MPL in the production function to those in the S-I relationship, the distribution share becomes a common base: how can $\alpha=\dfrac{rK}{Y}$ and $(1-\alpha)=\dfrac{wL}{Y}$ be converted to π and 1−π? A trial is as follows:

(1) From r to $\rho=\dfrac{\pi}{\Omega_P}$ for α=π, then, $\alpha=\dfrac{rK}{Y}=\dfrac{\pi}{\Omega_P}\cdot\Omega_P=\pi.$

(2) From w(=(1−α)y) to w (unchanged) for 1−α=1−π, then,

$$1-\alpha=\frac{wL}{Y}=\frac{(1-\pi)y}{y}=1-\pi.$$

Next, an idea of MPK=MKL in the S-I relationship is to convert r=w to that in the S-I relationship using π, Ω_P, and ρ. This is possible if the growth rate of population/workers, n, is used as a dependent variable under r=w and MPK=MPL.

$$r=\frac{\pi}{\Omega_P}=\rho \quad w=(1-\alpha)y=(1-\pi)y=(1-\pi)y^0(1+g_y)$$

Furthermore,

$$g_y=\frac{g_Y-n}{1+n} \qquad 1+g_y=\frac{1+g_Y}{1+n}=\frac{\Omega_P+1}{(\Omega_P+1-\pi)(1+n)}$$

Then, $\dfrac{}{\Omega_P}=(1-\pi)y^0(1+g_y)$

$$\frac{\pi}{\Omega_P}=\frac{(1-\pi)(\Omega_P+1)y^0}{(\Omega_P+1-\pi)(1+n)}$$

$$\pi(\Omega_P+1-\pi)(1+n)=\Omega_P(1-\pi)(\Omega_P+1)y^0$$

$$(1+n)=\frac{\Omega_P(1-\pi)(\Omega_P+1)y^0}{\pi(\Omega_P+1-\pi)}$$

$$n=\frac{\Omega_P(1-\pi)(\Omega_P+1)y^0}{\pi(\Omega_P+1-\pi)}-1$$

Using the above example ($\Omega_P=2$, π=0.2, $y^0=0.25$; accordingly, ρ=0.1), n=1.1429, which is not plausible.

If Ω_P is one, then, $n=\dfrac{2(1-\pi)y^0}{\pi(2-\pi)}-1$. Using the similar example ($\Omega_P=1$, $\pi=0.2$, $y^0=0.25$; accordingly, $\rho=0.2$), $n=0.1111$, which is within a range of possibility depending on the ratio of y^0. Note that $\pi=\rho$ in this case. It implies that MPK=MPL and r=w hold also in discrete time if the capital output ratio is one.

If y is replaced by k ($\equiv y^0/\Omega_P$), $\pi=(1-\pi)k^0(1+g_y)$, and accordingly,

$$\pi=\frac{(1-\pi)(\Omega_P+1)k^0}{(\Omega_P+1-\pi)(1+n)}$$, and accordingly,

$$n=\frac{(1-\pi)(\Omega_P+1)k^0}{\pi(\Omega_P+1-\pi)}-1$$

If Ω_P is one, then, $n=\dfrac{2(1-\pi)k^0}{\pi(2-\pi)}-1$, where $y^0=k^0$. This again shows that MPK=MPL and r=w hold also in discrete time if the capital output ratio is one.

Appendix D What is the condition that the relative elasticity of substitution σ equals one?

Solow's elasticity of substitution, σ, is as follows:

$$\sigma=-\frac{\dfrac{dk}{k}}{\dfrac{d(r/w)}{r/w}}=-\frac{\dfrac{dk}{k}}{\dfrac{dr}{r}-\dfrac{dw}{w}}$$

where, r is the rental price of capital measured in terms of goods, and w is goods wage rate.

This is expressed in the case of discrete time as,

$\sigma=\dfrac{g_k}{g_r-g_w}$, where each g is corresponding growth rate.

Under a fixed capital-output ratio, $g_k=g_y$ (since $k=\Omega_P\cdot y$ under fixed Ω_P), and $g_y=\dfrac{m^*\cdot\Omega_P\cdot n}{1-m^*\cdot\Omega_P(1+n)}$ if the growth rate of population/workers n is given as a parameter. Furthermore, under a state that $g_Y=g_{KP}=n^*$, where n^* was shown as $n^*=\dfrac{\pi\cdot\Omega_P\cdot y^0}{(\Omega_P+1-\pi)}$. Then,

$$g_y = \frac{m^* \cdot \Omega_P \left(\dfrac{\pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi} \right)}{1 - m^* \cdot \Omega_P \left(\dfrac{(\Omega_P + 1 - \pi) + \pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi} \right)}$$

or, $g_y = \dfrac{g_Y - n}{1+n}$, then, replace n by n^*:

$$g_y = \frac{g_Y - \dfrac{\pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi}}{\dfrac{(\Omega_P + 1 - \pi) + \pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi}} = \frac{\dfrac{\pi}{\Omega_P + 1 - \pi} - \dfrac{\pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi}}{\dfrac{(\Omega_P + 1 - \pi) + \pi \cdot \Omega_P \cdot y^0}{\Omega_P + 1 - \pi}} = \frac{\pi(1 - \Omega_P \cdot y^0)}{(\Omega_P + 1 - \pi) + \pi \cdot \Omega_P \cdot y^0}$$

This indicates that g_y is shown without using n. However, the above two equations to derive the growth rate of labour productivity use both notions in the S-I relationship and in MPK=MPL of the production function. As a result, these two equations cannot be used. Empirical study shows these are inconsistent in the model.

Turning to the relative elasticity, the growth rate of r is shown as follows:

$$r = 1/\Omega_P \text{ and } g_r \equiv \frac{\dfrac{1}{\Omega_P^1} - \dfrac{1}{\Omega_P^0}}{\dfrac{1}{\Omega_P^0}} = \frac{\Omega_P^0 - \Omega_P^1}{\Omega_P^1} \qquad \text{C/f. } g_{\Omega P} \equiv \frac{\Omega_P^1 - \Omega_P^0}{\Omega_P^0}$$

In the S-I relationship, the balanced growth state holds even if the capital-output varies if sufficient conditions hold under a new capital-output ratio Ω_P. This differs from the balanced growth state in the production function.

The growth rate of w is as follows:

$w = (1-\pi)y$ and $g_w \equiv \dfrac{w^1 - w^0}{w^0} = \dfrac{y^1 - y^0}{y^0} = g_y$ under fixed π, where $g_y \equiv \dfrac{y^1 - y^0}{y^0}$. As a result, $\sigma = -\dfrac{g_k}{g_r - g_w} = \dfrac{g_y}{g_y} = 1$, if π is fixed and $g_r = 0$ under fixed Ω_P.

Note

A part of this paper was presented at the 10th World Productivity Congress, San Tiago on the 13th of October, 1997.

Japan m & gem by case

JAPAN(1)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	6717	7375	7895	8840	9950	11574	11850	17572	15357	15154	13963	13678	15941
Corporate saving S^0_P	6475	6546	8566	9630	10832	11801	14680	10461	10786	9460	9059	11012	7960
Profit P^0	13192	13921	16461	18470	20782	23375	26530	28033	26143	24614	23022	24690	23901
Net national income Y^0	234350	243564	260157	277780	290143	303914	325021	345618	369805	393351	402658	405019	406920
Household (incl.governmnet) W^0	221158	229643	243696	259310	269361	280539	298491	317585	343662	368737	379636	380329	383019
Corporate capital stock K^0_P	499061	520125	546204	586948	677556	830056	916155	1053442	1195793	1174569	1131085	1117852	1109858
Number of workers N^0_E	59591	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583
Growth rate of workers g^1_{NE} (actual)	NA	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013
Relative share $\pi^0=P^0/Y^0$	0.0563	0.0572	0.0633	0.0665	0.0716	0.0769	0.0816	0.0811	0.0707	0.0626	0.0572	0.0610	0.0587
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.1296	2.1355	2.0995	2.1130	2.3352	2.7312	2.8188	3.0480	3.2336	2.9861	2.8090	2.7600	2.7275
Rate of profit $\rho^0=P^0/K^0_P$	0.0264	0.0268	0.0301	0.0315	0.0307	0.0282	0.0290	0.0266	0.0219	0.0210	0.0204	0.0221	0.0215
Capital-labour ratio $k^0=K^0_P/N^0_E$	8.3748	8.5981	8.9986	9.6156	11.0459	13.4789	14.7060	16.6642	18.6061	17.9206	17.0758	16.8101	16.6688
Labour productivity $y^0=Y^0/N^0_E$	3.9326	4.0263	4.2860	4.5507	4.7301	4.9351	5.2172	5.4673	5.7540	6.0014	6.0789	6.0906	6.1115
R of tech. prog.(given) **under const.Ω_P**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Number of workers N_E	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583	67249
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.3195	0.3189	0.3226	0.3212	0.2998	0.2680	0.2619	0.2470	0.2362	0.2509	0.2625	0.2660	0.2683
Corporate propensity to save $s_{SP/Y}$	0.0180	0.0182	0.0204	0.0214	0.0215	0.0206	0.0214	0.0200	0.0167	0.0157	0.0150	0.0162	0.0158
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0183	0.0186	0.0208	0.0218	0.0219	0.0210	0.0218	0.0204	0.0170	0.0159	0.0152	0.0165	0.0160
Corporate capital stock K_P	508202	529782	557587	599758	692426	847526	936165	1074981	1216100	1193302	1148322	1136274	1127627
Corporate income (added value) Y	238643	248086	265579	283843	296511	310311	332120	352685	376085	399625	408794	411694	413435
Capital-labour ratio $k=K_P/N_E$	8.4010	8.7280	9.1346	9.7776	11.2440	13.6044	14.8090	16.7263	18.5542	18.0151	17.2683	17.0655	16.7680
Labour productivity $y=Y/N_E$	3.9450	4.0872	4.3508	4.6274	4.8149	4.9811	5.2537	5.4876	5.7380	6.0331	6.1474	6.1832	6.1478
Coef. of technical progress m^{*0}	0.0803	0.3811	0.3456	0.3653	0.3499	0.1620	0.1137	0.0598	-0.0507	0.1107	0.2633	0.3341	0.1363
Coef. of technical progress m^*	0.0883	0.4192	0.3801	0.4018	0.3848	0.1782	0.1251	0.0658	-0.0558	0.1218	0.2896	0.3675	0.1499
$A=1/(\Omega_P(1+g^e_{NE}))$	0.4626	0.4667	0.4736	0.4710	0.4265	0.3619	0.3496	0.3227	0.3032	0.3314	0.3546	0.3619	0.3630
$g_Y(g^*_m)$	0.0187	0.0335	0.0285	0.0334	0.0404	0.0229	0.0229	0.0209	0.0167	0.0168	0.0214	-0.0805	0.0170
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0035	0.0300	0.0228	0.0283	0.0363	0.0111	0.0081	0.0042	-0.0030	0.0061	0.0174	-0.0817	0.0070
$\pi(g^*_m)$	0.0552	0.0398	0.0500	0.0497	0.0495	0.0713	0.0779	0.0793	0.0717	0.0596	0.0445	0.0279	0.0555
$\rho(g^*_m)$	0.0259	0.0186	0.0238	0.0235	0.0212	0.0261	0.0277	0.0260	0.0222	0.0200	0.0159	0.0101	0.0203
$\xi_\pi=(g^*_m)$	-0.0202	-0.3042	-0.2091	-0.2527	-0.3087	-0.0735	-0.0451	-0.0218	0.0143	-0.0471	-0.2211	-0.5424	-0.0558
$K_P=K^0_P(1+g_{KP})$	508398	537533	561794	606523	704906	849067	937179	1075483	1215813	1194292	1155302	1027832	1128763
$Y=Y^0(1+g_Y)$	238735	251716	267582	287044	301855	310875	332480	352849	375996	399956	411279	372403	413851

Japan m & gem by case

JAPAN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (2)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	8.4043	8.8557	9.2035	9.8879	11.4466	13.6291	14.8250	16.7341	18.5499	18.0300	17.3732	15.4369	16.7849
Labour productivity $y=Y/N_E$	3.9465	4.1469	4.3836	4.6796	4.9017	4.9901	5.2594	5.4902	5.7366	6.0381	6.1847	5.5931	6.1540
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0035	0.0300	0.0228	0.0283	0.0363	0.0111	0.0081	0.0042	-0.0030	0.0061	0.0174	-0.0817	0.0070
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0004	0.0146	0.0075	0.0113	0.0180	0.0018	0.0011	0.0005	-0.0002	0.0008	0.0061	-0.0954	0.0010
R of tech. prog.(given) **under const.π**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.2649	0.0594	0.0885	0.0733	0.0549	0.1494	0.1779	0.2020	0.2750	0.1679	0.0684	0.0207	0.1686
$F=(E+m^{*0})/m^{*0}$	4.2981	1.1558	1.2562	1.2007	1.1568	1.9224	2.5641	4.3774	-4.4199	2.5163	1.2598	1.0619	2.2370
$G=\pi/(1-\pi)$	0.0596	0.0606	0.0675	0.0712	0.0772	0.0833	0.0889	0.0883	0.0761	0.0668	0.0606	0.0649	0.0624
$H=(1-E)/((1-\pi)m^{*0})$	9.6991	2.6178	2.8156	2.7178	2.9099	5.6881	7.8699	14.5199	-15.3794	8.0154	3.7533	3.1212	6.4820
$g_Y(g^*_m)$	0.0186	0.0197	0.0220	0.0231	0.0233	0.0219	0.0225	0.0208	0.0167	0.0164	0.0161	0.0176	0.0165
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0034	0.0162	0.0162	0.0181	0.0193	0.0101	0.0076	0.0041	-0.0031	0.0057	0.0122	0.0163	0.0065
$\xi_{\Omega P}(g^*_m)$	-0.0227	-0.0796	-0.0737	-0.0769	-0.0796	-0.0494	-0.0375	-0.0223	0.0231	-0.0382	-0.0735	-0.0861	-0.0428
$g_{KP}(g^*_m)$	-0.0046	-0.0615	-0.0534	-0.0556	-0.0581	-0.0287	-0.0159	-0.0020	0.0402	-0.0224	-0.0586	-0.0700	-0.0270
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.0233	0.0865	0.0796	0.0833	0.0864	0.0520	0.0390	0.0228	-0.0226	0.0397	0.0794	0.0942	0.0447
$\Omega_P(g^*_m)$	2.0811	1.9654	1.9447	1.9505	2.1494	2.5962	2.7129	2.9799	3.3084	2.8719	2.6025	2.5225	2.6108
$\rho(g^*_m)$	0.0270	0.0291	0.0325	0.0341	0.0333	0.0296	0.0301	0.0272	0.0214	0.0218	0.0220	0.0242	0.0225
$K_P=K^0_P(1+g_{KP})$	496790	488115	517040	554314	638159	806257	901586	1051340	1243884	1148232	1064801	1039638	1079935
$Y=Y^0(1+g_Y)$	238711	248351	265870	284184	296895	310556	332327	352808	375974	399812	409152	412152	413649
Capital-labour ratio $k=K_P/N_E$	8.2124	8.0416	8.4704	9.0368	10.3628	12.9419	14.2620	16.3584	18.9781	17.3347	16.0123	15.6142	16.0588
Labour productivity $y=Y/N_E$	3.9461	4.0915	4.3556	4.6329	4.8211	4.9850	5.2570	5.4896	5.7363	6.0359	6.1527	6.1900	6.1510
$g_k=(k-k_0)/k_0$	-0.0194	-0.0647	-0.0587	-0.0602	-0.0618	-0.0398	-0.0302	-0.0183	0.0200	-0.0327	-0.0623	-0.0711	-0.0366
$g_y=(y-y_0)/y_0$	0.0034	0.0162	0.0162	0.0181	0.0193	0.0101	0.0076	0.0041	-0.0031	0.0057	0.0122	0.0163	0.0065
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0225	-0.0786	-0.0727	-0.0758	-0.0784	-0.0487	-0.0369	-0.0220	0.0228	-0.0378	-0.0727	-0.0850	-0.0423
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0003	0.0011	0.0011	0.0012	0.0013	0.0008	0.0006	0.0003	-0.0003	0.0005	0.0009	0.0011	0.0005
Growth rate of output g^1_{KP}	NA	0.0422	0.0501	0.0746	0.1544	0.2251	0.1037	0.1499	0.1351	-0.0177	-0.0370	-0.0117	-0.0072
Growth rate of household wages g^1_W	NA	0.0384	0.0612	0.0641	0.0388	0.0415	0.0640	0.0640	0.0821	0.0730	0.0296	0.0018	0.0071
Growth rate of corporate profit g^1_P	NA	0.0553	0.1825	0.1220	0.1252	0.1248	0.1350	0.0567	-0.0674	-0.0585	-0.0647	0.0725	-0.0320
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0235	0.0310	0.0527	0.1297	0.1988	0.0810	0.1253	0.1124	-0.0342	-0.0521	-0.0265	-0.0232
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0229	0.0576	0.0581	0.0337	0.0374	0.0518	0.0485	0.0644	0.0521	0.0187	-0.0021	0.0058
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0363	0.1609	0.0991	0.1011	0.1006	0.1116	0.0341	-0.0861	-0.0742	-0.0794	0.0564	-0.0477
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	1.2361	9.8281	5.0656	6.8085	10.2315	1.9698	1.5573	1.2561	0.8446	1.5813	5.4546	(63.7514)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(0.8113)	(1.9146)	(2.7763)	(9.1262)	(21.8247)	(1.4854)	(6.9704)	1.5123	(0.3982)	(1.0518)	2.5708	31.1915

Japan m & gem by case

JAPAN(3)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	6717	7375	7895	8840	9950	11574	11850	17572	15357	15154	13963	13678	15941
Corporate saving S^0_P	6475	6546	8566	9630	10832	11801	14680	10461	10786	9460	9059	11012	7960
Profit P^0	13192	13921	16461	18470	20782	23375	26530	28033	26143	24614	23022	24690	23901
Net national income Y^0	234350	243564	260157	277780	290143	303914	325021	345618	369805	393351	402658	405019	406920
Household (incl.governmnet) W^0	221158	229643	243696	259310	269361	280539	298491	317585	343662	368737	379636	380329	383019
Corporate capital stock K^0_P	499061	520125	546204	586948	677556	830056	916155	1053442	1195793	1174569	1131085	1117852	1109858
Number of workers N^0_E	59591	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583
Growth rate of workers g^1_{NE} (actual)	NA	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013
Relative share $\pi^0=P^0/Y^0$	0.0563	0.0572	0.0633	0.0665	0.0716	0.0769	0.0816	0.0811	0.0707	0.0626	0.0572	0.0610	0.0587
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.1296	2.1355	2.0995	2.1130	2.3352	2.7312	2.8188	3.0480	3.2336	2.9861	2.8090	2.7600	2.7275
Rate of profit $\rho^0=P^0/K^0_P$	0.0264	0.0268	0.0301	0.0315	0.0307	0.0282	0.0290	0.0266	0.0219	0.0210	0.0204	0.0221	0.0215
Capital-labour ratio $k^0=K^0_P/N^0_E$	8.3748	8.5981	8.9986	9.6156	11.0459	13.4789	14.7060	16.6642	18.6061	17.9206	17.0758	16.8101	16.6688
Labour productivity $y^0=Y^0/N^0_E$	3.9326	4.0263	4.2860	4.5507	4.7301	4.9351	5.2172	5.4673	5.7540	6.0014	6.0789	6.0906	6.1115
R of tech. prog.(given) **under const.Ω_P**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
Number of workers N_E	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583	67249
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.3195	0.3189	0.3226	0.3212	0.2998	0.2680	0.2619	0.2470	0.2362	0.2509	0.2625	0.2660	0.2683
Corporate propensity to save $s_{SP/Y}$	0.0180	0.0182	0.0204	0.0214	0.0215	0.0206	0.0214	0.0200	0.0167	0.0157	0.0150	0.0162	0.0158
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0183	0.0186	0.0208	0.0218	0.0219	0.0210	0.0218	0.0204	0.0170	0.0159	0.0152	0.0165	0.0160
Corporate capital stock K_P	508202	529782	557587	599758	692426	847526	936165	1074981	1216100	1193302	1148322	1136274	1127627
Corporate income (added value) Y	238643	248086	265579	283843	296511	310311	332120	352685	376085	399625	408794	411694	413435
Capital-labour ratio $k=K_P/N_E$	8.4010	8.7280	9.1346	9.7776	11.2440	13.6044	14.8090	16.7263	18.5542	18.0151	17.2683	17.0655	16.7680
Labour productivity $y=Y/N_E$	3.9450	4.0872	4.3508	4.6274	4.8149	4.9811	5.2537	5.4876	5.7380	6.0331	6.1474	6.1832	6.1478
Coef. of technical progress m^{*0}	0.0803	0.3811	0.3456	0.3653	0.3499	0.1620	0.1137	0.0598	-0.0507	0.1107	0.2633	0.3341	0.1363
Coef. of technical progress m^*	0.0964	0.4573	0.4147	0.4383	0.4198	0.1944	0.1365	0.0718	-0.0609	0.1329	0.3159	0.4010	0.1635
$A=1/(\Omega_P(1+g^e_{NE}))$	0.4626	0.4667	0.4736	0.4710	0.4265	0.3619	0.3496	0.3227	0.3032	0.3314	0.3546	0.3619	0.3630
$g_Y(g^*_m)$	0.0191	0.1695	0.0453	0.0707	0.2511	0.0251	0.0242	0.0214	0.0165	0.0177	0.0360	-0.0117	0.0182
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0039	0.1655	0.0394	0.0654	0.2462	0.0133	0.0093	0.0047	-0.0032	0.0070	0.0319	-0.0129	0.0081
$\pi(g^*_m)$	0.0541	0.0305	0.0414	0.0397	0.0378	0.0664	0.0746	0.0776	0.0727	0.0569	0.0365	0.0181	0.0525
$\rho(g^*_m)$	0.0254	0.0143	0.0197	0.0188	0.0162	0.0243	0.0265	0.0255	0.0225	0.0191	0.0130	0.0066	0.0193
$\xi_\pi=(g^*_m)$	-0.0396	-0.4664	-0.3459	-0.4035	-0.4717	-0.1370	-0.0862	-0.0427	0.0290	-0.0899	-0.3622	-0.7033	-0.1058
$K_P=K^0_P(1+g_{KP})$	508603	608290	570934	628424	847671	850905	938301	1076008	1215534	1195392	1171783	1104780	1130054
$Y=Y^0(1+g_Y)$	238831	284850	271936	297409	362990	311548	332878	353022	375910	400325	417146	400283	414325

Japan m & gem by case

JAPAN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (4)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	8.4076	10.0214	9.3533	10.2449	13.7649	13.6586	14.8428	16.7423	18.5456	18.0467	17.6211	16.5925	16.8041
Labour productivity $y=Y/N_E$	3.9481	4.6928	4.4550	4.8485	5.8944	5.0009	5.2657	5.4929	5.7353	6.0436	6.2730	6.0118	6.1611
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0039	0.1655	0.0394	0.0654	0.2462	0.0133	0.0093	0.0047	-0.0032	0.0070	0.0319	-0.0129	0.0081
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0008	0.1482	0.0239	0.0478	0.2242	0.0040	0.0023	0.0010	-0.0005	0.0018	0.0204	-0.0277	0.0022
R of tech. prog.(given) **under const.π**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.2649	0.0594	0.0885	0.0733	0.0549	0.1494	0.1779	0.2020	0.2750	0.1679	0.0684	0.0207	0.1686
$F=(E+m^{*0})/m^{*0}$	4.2981	1.1558	1.2562	1.2007	1.1568	1.9224	2.5641	4.3774	-4.4199	2.5163	1.2598	1.0619	2.2370
$G=\pi/(1-\pi)$	0.0596	0.0606	0.0675	0.0712	0.0772	0.0833	0.0889	0.0883	0.0761	0.0668	0.0606	0.0649	0.0624
$H=(1-E)/((1-\pi)m^{*0})$	9.6991	2.6178	2.8156	2.7178	2.9099	5.6881	7.8699	14.5199	-15.3794	8.0154	3.7533	3.1212	6.4820
$g_Y(g^*_m)$	0.0189	0.0207	0.0230	0.0242	0.0245	0.0226	0.0231	0.0212	0.0164	0.0169	0.0170	0.0187	0.0171
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0037	0.0172	0.0173	0.0192	0.0205	0.0109	0.0082	0.0044	-0.0034	0.0062	0.0130	0.0174	0.0070
$\xi_{\Omega P}(g^*_m)$	-0.0445	-0.1475	-0.1373	-0.1428	-0.1474	-0.0942	-0.0724	-0.0437	0.0474	-0.0736	-0.1370	-0.1585	-0.0821
$g_{KP}(g^*_m)$	-0.0264	-0.1299	-0.1175	-0.1220	-0.1265	-0.0737	-0.0509	-0.0235	0.0645	-0.0580	-0.1224	-0.1428	-0.0664
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.0465	0.1730	0.1592	0.1666	0.1729	0.1040	0.0780	0.0457	-0.0452	0.0795	0.1588	0.1883	0.0894
$\Omega_P(g^*_m)$	2.0349	1.8205	1.8112	1.8113	1.9910	2.4739	2.6148	2.9148	3.3868	2.7662	2.4242	2.3226	2.5036
$\rho(g^*_m)$	0.0277	0.0314	0.0349	0.0367	0.0360	0.0311	0.0312	0.0278	0.0209	0.0226	0.0236	0.0262	0.0235
$K_P=K^0_P(1+g_{KP})$	485884	452571	482038	515329	591855	768862	869499	1028728	1272981	1106471	992691	958269	1036144
$Y=Y^0(1+g_Y)$	238779	248602	266147	284509	297262	310795	332530	352930	375862	399997	409496	412589	413858
Capital-labour ratio $k=K_P/N_E$	8.0321	7.4560	7.8970	8.4012	9.6108	12.3417	13.7544	16.0066	19.4221	16.7042	14.9279	14.3921	15.4076
Labour productivity $y=Y/N_E$	3.9472	4.0956	4.3601	4.6382	4.8271	4.9888	5.2602	5.4915	5.7346	6.0387	6.1579	6.1966	6.1541
$g_k=(k-k_0)/k_0$	-0.0409	-0.1328	-0.1224	-0.1263	-0.1299	-0.0844	-0.0647	-0.0395	0.0439	-0.0679	-0.1258	-0.1438	-0.0757
$g_y=(y-y_0)/y_0$	0.0037	0.0172	0.0173	0.0192	0.0205	0.0109	0.0082	0.0044	-0.0034	0.0062	0.0130	0.0174	0.0070
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0439	-0.1457	-0.1355	-0.1408	-0.1452	-0.0928	-0.0712	-0.0430	0.0468	-0.0728	-0.1355	-0.1567	-0.0811
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0006	0.0021	0.0021	0.0023	0.0025	0.0016	0.0012	0.0007	-0.0006	0.0009	0.0017	0.0022	0.0010
Growth rate of output g^1_{KP}	NA	0.0422	0.0501	0.0746	0.1544	0.2251	0.1037	0.1499	0.1351	-0.0177	-0.0370	-0.0117	-0.0072
Growth rate of household wages g^1_W	NA	0.0384	0.0612	0.0641	0.0388	0.0415	0.0640	0.0640	0.0821	0.0730	0.0296	0.0018	0.0071
Growth rate of corporate profit g^1_P	NA	0.0553	0.1825	0.1220	0.1252	0.1248	0.1350	0.0567	-0.0674	-0.0585	-0.0647	0.0725	-0.0320
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0235	0.0310	0.0527	0.1297	0.1988	0.0810	0.1253	0.1124	-0.0342	-0.0521	-0.0265	-0.0232
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0229	0.0576	0.0581	0.0337	0.0374	0.0518	0.0485	0.0644	0.0521	0.0187	-0.0021	0.0058
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0363	0.1609	0.0991	0.1011	0.1006	0.1116	0.0341	-0.0861	-0.0742	-0.0794	0.0564	-0.0477
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	1.2632	49.7766	8.0356	14.4261	63.6394	2.1603	1.6405	1.2860	0.8328	1.6695	9.1669	(9.2575)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(0.8291)	(9.6968)	(4.4040)	(19.3370)	(135.7486)	(1.6290)	(7.3424)	1.5484	(0.3927)	(1.1105)	4.3204	4.5294

Japan m & gem by case

JAPAN(5)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	6717	7375	7895	8840	9950	11574	11850	17572	15357	15154	13963	13678	15941
Corporate saving S^0_P	6475	6546	8566	9630	10832	11801	14680	10461	10786	9460	9059	11012	7960
Profit P^0	13192	13921	16461	18470	20782	23375	26530	28033	26143	24614	23022	24690	23901
Net national income Y^0	234350	243564	260157	277780	290143	303914	325021	345618	369805	393351	402658	405019	406920
Household (incl.governmnet) W^0	221158	229643	243696	259310	269361	280539	298491	317585	343662	368737	379636	380329	383019
Corporate capital stock K^0_P	499061	520125	546204	586948	677556	830056	916155	1053442	1195793	1174569	1131085	1117852	1109858
Number of workers N^0_E	59591	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583
Growth rate of workers g^1_{NE} (actual)	NA	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013
Relative share $\pi^0=P^0/Y^0$	0.0563	0.0572	0.0633	0.0665	0.0716	0.0769	0.0816	0.0811	0.0707	0.0626	0.0572	0.0610	0.0587
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.1296	2.1355	2.0995	2.1130	2.3352	2.7312	2.8188	3.0480	3.2336	2.9861	2.8090	2.7600	2.7275
Rate of profit $\rho^0=P^0/K^0_P$	0.0264	0.0268	0.0301	0.0315	0.0307	0.0282	0.0290	0.0266	0.0219	0.0210	0.0204	0.0221	0.0215
Capital-labour ratio $k^0=K^0_P/N^0_E$	8.3748	8.5981	8.9986	9.6156	11.0459	13.4789	14.7060	16.6642	18.6061	17.9206	17.0758	16.8101	16.6688
Labour productivity $y^0=Y^0/N^0_E$	3.9326	4.0263	4.2860	4.5507	4.7301	4.9351	5.2172	5.4673	5.7540	6.0014	6.0789	6.0906	6.1115
R of tech. prog.(given) **under const.Ω_P**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
Number of workers N_E	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583	67249
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.3195	0.3189	0.3226	0.3212	0.2998	0.2680	0.2619	0.2470	0.2362	0.2509	0.2625	0.2660	0.2683
Corporate propensity to save $s_{SP/Y}$	0.0180	0.0182	0.0204	0.0214	0.0215	0.0206	0.0214	0.0200	0.0167	0.0157	0.0150	0.0162	0.0158
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0183	0.0186	0.0208	0.0218	0.0219	0.0210	0.0218	0.0204	0.0170	0.0159	0.0152	0.0165	0.0160
Corporate capital stock K_P	508202	529782	557587	599758	692426	847526	936165	1074981	1216100	1193302	1148322	1136274	1127627
Corporate income (added value) Y	238643	248086	265579	283843	296511	310311	332120	352685	376085	399625	408794	411694	413435
Capital-labour ratio $k=K_P/N_E$	8.4010	8.7280	9.1346	9.7776	11.2440	13.6044	14.8090	16.7263	18.5542	18.0151	17.2683	17.0655	16.7680
Labour productivity $y=Y/N_E$	3.9450	4.0872	4.3508	4.6274	4.8149	4.9811	5.2537	5.4876	5.7380	6.0331	6.1474	6.1832	6.1478
Coef. of technical progress m^{*0}	0.0803	0.3811	0.3456	0.3653	0.3499	0.1620	0.1137	0.0598	-0.0507	0.1107	0.2633	0.3341	0.1363
Coef. of technical progress m^*	0.0723	0.3430	0.3110	0.3287	0.3149	0.1458	0.1024	0.0538	-0.0457	0.0997	0.2369	0.3007	0.1226
$A=1/(\Omega_P(1+g^e_{NE}))$	0.4626	0.4667	0.4736	0.4710	0.4265	0.3619	0.3496	0.3227	0.3032	0.3314	0.3546	0.3619	0.3630
$g_Y(g^*_m)$	0.0179	0.0128	0.0164	0.0162	0.0151	0.0195	0.0208	0.0200	0.0172	0.0152	0.0118	0.0075	0.0151
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0028	0.0094	0.0107	0.0113	0.0111	0.0078	0.0060	0.0033	-0.0025	0.0045	0.0079	0.0062	0.0051
$\pi(g^*_m)$	0.0575	0.1015	0.0860	0.1005	0.1294	0.0835	0.0857	0.0830	0.0697	0.0658	0.0798	-0.3293	0.0624
$\rho(g^*_m)$	0.0270	0.0475	0.0410	0.0475	0.0554	0.0306	0.0304	0.0272	0.0216	0.0220	0.0284	-0.1193	0.0229
$\xi_\pi=(g^*_m)$	0.0211	0.7766	0.3593	0.5110	0.8067	0.0862	0.0495	0.0228	-0.0139	0.0520	0.3965	-6.4020	0.0629
$K_P=K^0_P(1+g_{KP})$	508014	526807	555168	596468	687767	846217	935245	1074502	1216395	1192407	1144465	1126208	1126619
$Y=Y^0(1+g_Y)$	238554	246693	264426	282286	294516	309831	331793	352528	376176	399325	407421	408047	413065

Japan m & gem by case

JAPAN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (6)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	8.3979	8.6790	9.0950	9.7240	11.1683	13.5834	14.7944	16.7188	18.5587	18.0016	17.2103	16.9143	16.7530
Labour productivity $y=Y/N_E$	3.9435	4.0642	4.3319	4.6020	4.7825	4.9734	5.2486	5.4852	5.7394	6.0285	6.1267	6.1284	6.1423
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0028	0.0094	0.0107	0.0113	0.0111	0.0078	0.0060	0.0033	-0.0025	0.0045	0.0079	0.0062	0.0051
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0004	-0.0056	-0.0043	-0.0055	-0.0067	-0.0015	-0.0010	-0.0004	0.0002	-0.0008	-0.0034	-0.0089	-0.0009
R of tech. prog.(given) **under const.π**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.2649	0.0594	0.0885	0.0733	0.0549	0.1494	0.1779	0.2020	0.2750	0.1679	0.0684	0.0207	0.1686
$F=(E+m^{*0})/m^{*0}$	4.2981	1.1558	1.2562	1.2007	1.1568	1.9224	2.5641	4.3774	-4.4199	2.5163	1.2598	1.0619	2.2370
$G=\pi/(1-\pi)$	0.0596	0.0606	0.0675	0.0712	0.0772	0.0833	0.0889	0.0883	0.0761	0.0668	0.0606	0.0649	0.0624
$H=(1-E)/((1-\pi)m^{*0})$	9.6991	2.6178	2.8156	2.7178	2.9099	5.6881	7.8699	14.5199	-15.3794	8.0154	3.7533	3.1212	6.4820
$g_Y(g^*_m)$	0.0180	0.0174	0.0197	0.0205	0.0206	0.0202	0.0212	0.0201	0.0173	0.0155	0.0143	0.0153	0.0155
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0028	0.0140	0.0140	0.0156	0.0165	0.0085	0.0064	0.0034	-0.0025	0.0048	0.0103	0.0140	0.0054
$\xi_{\Omega P}(g^*_m)$	0.0238	0.0947	0.0865	0.0909	0.0946	0.0549	0.0406	0.0234	-0.0221	0.0414	0.0862	0.1040	0.0468
$g_{KP}(g^*_m)$	0.0423	0.1138	0.1079	0.1132	0.1171	0.0762	0.0626	0.0439	-0.0052	0.0575	0.1018	0.1208	0.0630
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.0233	-0.0865	-0.0796	-0.0833	-0.0864	-0.0520	-0.0390	-0.0228	0.0226	-0.0397	-0.0794	-0.0942	-0.0447
$\Omega_P(g^*_m)$	2.1803	2.3377	2.2811	2.3050	2.5562	2.8811	2.9332	3.1193	3.1620	3.1096	3.0513	3.0469	2.8551
$\rho(g^*_m)$	0.0258	0.0244	0.0277	0.0288	0.0280	0.0267	0.0278	0.0260	0.0224	0.0201	0.0187	0.0200	0.0206
$K_P=K^0_P(1+g_{KP})$	520156	579308	605113	653419	756914	893306	973540	1099724	1189542	1242091	1246201	1252934	1179769
$Y=Y^0(1+g_Y)$	238573	247807	265273	283483	296107	310059	331909	352560	376195	399433	408422	411213	413216
Capital-labour ratio $k=K_P/N_E$	8.5986	9.5439	9.9132	10.6524	12.2912	14.3392	15.4002	17.1113	18.1490	18.7517	18.7401	18.8176	17.5433
Labour productivity $y=Y/N_E$	3.9438	4.0826	4.3458	4.6215	4.8083	4.9770	5.2504	5.4857	5.7397	6.0302	6.1418	6.1759	6.1446
$g_k=(k-k_0)/k_0$	0.0267	0.1100	0.1016	0.1078	0.1127	0.0638	0.0472	0.0268	-0.0246	0.0464	0.0975	0.1194	0.0525
$g_y=(y-y_0)/y_0$	0.0028	0.0140	0.0140	0.0156	0.0165	0.0085	0.0064	0.0034	-0.0025	0.0048	0.0103	0.0140	0.0054
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0235	0.0935	0.0852	0.0895	0.0931	0.0540	0.0399	0.0230	-0.0218	0.0409	0.0852	0.1027	0.0462
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0003	-0.0011	-0.0012	-0.0013	-0.0014	-0.0008	-0.0006	-0.0004	0.0003	-0.0005	-0.0009	-0.0012	-0.0005
Growth rate of output g^1_{KP}	NA	0.0422	0.0501	0.0746	0.1544	0.2251	0.1037	0.1499	0.1351	-0.0177	-0.0370	-0.0117	-0.0072
Growth rate of household wages g^1_W	NA	0.0384	0.0612	0.0641	0.0388	0.0415	0.0640	0.0640	0.0821	0.0730	0.0296	0.0018	0.0071
Growth rate of corporate profit g^1_P	NA	0.0553	0.1825	0.1220	0.1252	0.1248	0.1350	0.0567	-0.0674	-0.0585	-0.0647	0.0725	-0.0320
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0235	0.0310	0.0527	0.1297	0.1988	0.0810	0.1253	0.1124	-0.0342	-0.0521	-0.0265	-0.0232
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0229	0.0576	0.0581	0.0337	0.0374	0.0518	0.0485	0.0644	0.0521	0.0187	-0.0021	0.0058
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0363	0.1609	0.0991	0.1011	0.1006	0.1116	0.0341	-0.0861	-0.0742	-0.0794	0.0564	-0.0477
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	1.1852	3.7726	2.9126	3.3114	3.8199	1.6746	1.4141	1.2002	0.8691	1.4301	3.0137	5.9177
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(0.7779)	(0.7349)	(1.5963)	(4.4386)	(8.1483)	(1.2627)	(6.3290)	1.4450	(0.4098)	(0.9513)	1.4204	(2.8953)

Japan m & gem by case

JAPAN(7)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	6717	7375	7895	8840	9950	11574	11850	17572	15357	15154	13963	13678	15941
Corporate saving S^0_P	6475	6546	8566	9630	10832	11801	14680	10461	10786	9460	9059	11012	7960
Profit P^0	13192	13921	16461	18470	20782	23375	26530	28033	26143	24614	23022	24690	23901
Net national income Y^0	234350	243564	260157	277780	290143	303914	325021	345618	369805	393351	402658	405019	406920
Household (incl.governmnet) W^0	221158	229643	243696	259310	269361	280539	298491	317585	343662	368737	379636	380329	383019
Corporate capital stock K^0_P	499061	520125	546204	586948	677556	830056	916155	1053442	1195793	1174569	1131085	1117852	1109858
Number of workers N^0_E	59591	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583
Growth rate of workers g^1_{NE} (actual)	NA	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013
Relative share $\pi^0=P^0/Y^0$	0.0563	0.0572	0.0633	0.0665	0.0716	0.0769	0.0816	0.0811	0.0707	0.0626	0.0572	0.0610	0.0587
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.1296	2.1355	2.0995	2.1130	2.3352	2.7312	2.8188	3.0480	3.2336	2.9861	2.8090	2.7600	2.7275
Rate of profit $\rho^0=P^0/K^0_P$	0.0264	0.0268	0.0301	0.0315	0.0307	0.0282	0.0290	0.0266	0.0219	0.0210	0.0204	0.0221	0.0215
Capital-labour ratio $k^0=K^0_P/N^0_E$	8.3748	8.5981	8.9986	9.6156	11.0459	13.4789	14.7060	16.6642	18.6061	17.9206	17.0758	16.8101	16.6688
Labour productivity $y^0=Y^0/N^0_E$	3.9326	4.0263	4.2860	4.5507	4.7301	4.9351	5.2172	5.4673	5.7540	6.0014	6.0789	6.0906	6.1115
R of tech. prog.(given) **under const.Ω_P**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
Number of workers N_E	60493	60699	61041	61340	61582	62298	63216	64269	65543	66239	66499	66583	67249
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0151	0.0034	0.0056	0.0049	0.0039	0.0116	0.0147	0.0167	0.0198	0.0106	0.0039	0.0013	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.3195	0.3189	0.3226	0.3212	0.2998	0.2680	0.2619	0.2470	0.2362	0.2509	0.2625	0.2660	0.2683
Corporate propensity to save $s_{SP/Y}$	0.0180	0.0182	0.0204	0.0214	0.0215	0.0206	0.0214	0.0200	0.0167	0.0157	0.0150	0.0162	0.0158
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0183	0.0186	0.0208	0.0218	0.0219	0.0210	0.0218	0.0204	0.0170	0.0159	0.0152	0.0165	0.0160
Corporate capital stock K_P	508202	529782	557587	599758	692426	847526	936165	1074981	1216100	1193302	1148322	1136274	1127627
Corporate income (added value) Y	238643	248086	265579	283843	296511	310311	332120	352685	376085	399625	408794	411694	413435
Capital-labour ratio $k=K_P/N_E$	8.4010	8.7280	9.1346	9.7776	11.2440	13.6044	14.8090	16.7263	18.5542	18.0151	17.2683	17.0655	16.7680
Labour productivity $y=Y/N_E$	3.9450	4.0872	4.3508	4.6274	4.8149	4.9811	5.2537	5.4876	5.7380	6.0331	6.1474	6.1832	6.1478
Coef. of technical progress m^{*0}	0.0803	0.3811	0.3456	0.3653	0.3499	0.1620	0.1137	0.0598	-0.0507	0.1107	0.2633	0.3341	0.1363
Coef. of technical progress m^*	0.0643	0.3049	0.2765	0.2922	0.2799	0.1296	0.0910	0.0478	-0.0406	0.0886	0.2106	0.2673	0.1090
$A=1/(\Omega_P(1+g^e_{NE}))$	0.4626	0.4667	0.4736	0.4710	0.4265	0.3619	0.3496	0.3227	0.3032	0.3314	0.3546	0.3619	0.3630
$g_Y(g^*_m)$	0.0176	0.0098	0.0135	0.0129	0.0115	0.0181	0.0199	0.0196	0.0175	0.0145	0.0097	0.0048	0.0143
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0024	0.0064	0.0079	0.0080	0.0075	0.0064	0.0051	0.0029	-0.0023	0.0038	0.0057	0.0036	0.0042
$\pi(g^*_m)$	0.0587	0.4545	0.1343	0.2055	0.6693	0.0914	0.0901	0.0849	0.0688	0.0694	0.1323	-0.0445	0.0666
$\rho(g^*_m)$	0.0276	0.2128	0.0639	0.0972	0.2866	0.0335	0.0320	0.0279	0.0213	0.0233	0.0471	-0.0161	0.0244
$\xi_\pi=(g^*_m)$	0.0430	6.9512	1.1218	2.0900	8.3448	0.1886	0.1042	0.0467	-0.0274	0.1096	1.3139	-1.7298	0.1342
$K_P=K^0_P(1+g_{KP})$	507834	525233	553597	594523	685331	845090	934405	1074044	1216699	1191593	1142019	1123256	1125720
$Y=Y^0(1+g_Y)$	238469	245956	263678	281365	293472	309419	331496	352377	376270	399052	406550	406977	412736

Japan m & gem by case

JAPAN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (8)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	8.3949	8.6531	9.0693	9.6923	11.1288	13.5653	14.7812	16.7117	18.5634	17.9893	17.1735	16.8700	16.7396
Labour productivity $y=Y/N_E$	3.9421	4.0521	4.3197	4.5870	4.7656	4.9667	5.2439	5.4828	5.7408	6.0244	6.1136	6.1123	6.1374
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0024	0.0064	0.0079	0.0080	0.0075	0.0064	0.0051	0.0029	-0.0023	0.0038	0.0057	0.0036	0.0042
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0007	-0.0086	-0.0072	-0.0087	-0.0102	-0.0029	-0.0019	-0.0009	0.0005	-0.0014	-0.0055	-0.0115	-0.0017
R of tech. prog.(given) **under const.π**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.2649	0.0594	0.0885	0.0733	0.0549	0.1494	0.1779	0.2020	0.2750	0.1679	0.0684	0.0207	0.1686
$F=(E+m^{*0})/m^{*0}$	4.2981	1.1558	1.2562	1.2007	1.1568	1.9224	2.5641	4.3774	-4.4199	2.5163	1.2598	1.0619	2.2370
$G=\pi/(1-\pi)$	0.0596	0.0606	0.0675	0.0712	0.0772	0.0833	0.0889	0.0883	0.0761	0.0668	0.0606	0.0649	0.0624
$H=(1-E)/((1-\pi)m^{*0})$	9.6991	2.6178	2.8156	2.7178	2.9099	5.6881	7.8699	14.5199	-15.3794	8.0154	3.7533	3.1212	6.4820
$g_Y(g^*_m)$	0.0177	0.0162	0.0184	0.0192	0.0191	0.0194	0.0205	0.0197	0.0176	0.0150	0.0134	0.0140	0.0149
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0025	0.0128	0.0127	0.0142	0.0151	0.0077	0.0057	0.0030	-0.0022	0.0043	0.0094	0.0128	0.0049
$\xi_{\Omega P}(g^*_m)$	0.0488	0.2092	0.1894	0.1999	0.2090	0.1161	0.0846	0.0479	-0.0433	0.0863	0.1887	0.2320	0.0982
$g_{KP}(g^*_m)$	0.0674	0.2289	0.2113	0.2229	0.2321	0.1377	0.1069	0.0685	-0.0265	0.1026	0.2046	0.2493	0.1146
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.0465	-0.1730	-0.1592	-0.1666	-0.1729	-0.1040	-0.0780	-0.0457	0.0452	-0.0795	-0.1588	-0.1883	-0.0894
$\Omega_P(g^*_m)$	2.2335	2.5823	2.4971	2.5353	2.8234	3.0484	3.0572	3.1939	3.0936	3.2439	3.3392	3.4004	2.9953
$\rho(g^*_m)$	0.0252	0.0221	0.0253	0.0262	0.0254	0.0252	0.0267	0.0254	0.0229	0.0193	0.0171	0.0179	0.0196
$K_P=K^0_P(1+g_{KP})$	532690	639157	661599	717754	834823	944379	1014063	1125647	1164130	1295082	1362500	1396580	1237014
$Y=Y^0(1+g_Y)$	238502	247513	264951	283105	295682	309800	331694	352434	376304	399238	408034	410709	412992
Capital-labour ratio $k=K_P/N_E$	8.8058	10.5299	10.8386	11.7012	13.5563	15.1591	16.0412	17.5146	17.7613	19.5516	20.4890	20.9750	18.3946
Labour productivity $y=Y/N_E$	3.9426	4.0777	4.3405	4.6153	4.8014	4.9729	5.2470	5.4837	5.7413	6.0272	6.1359	6.1684	6.1412
$g_k=(k-k_0)/k_0$	0.0515	0.2247	0.2045	0.2169	0.2273	0.1247	0.0908	0.0510	-0.0454	0.0910	0.1999	0.2478	0.1035
$g_y=(y-y_0)/y_0$	0.0025	0.0128	0.0127	0.0142	0.0151	0.0077	0.0057	0.0030	-0.0022	0.0043	0.0094	0.0128	0.0049
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0482	0.2065	0.1865	0.1967	0.2056	0.1143	0.0832	0.0471	-0.0427	0.0853	0.1865	0.2291	0.0970
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0006	-0.0023	-0.0024	-0.0026	-0.0028	-0.0016	-0.0013	-0.0007	0.0006	-0.0010	-0.0019	-0.0024	-0.0011
Growth rate of output g^1_{KP}	NA	0.0422	0.0501	0.0746	0.1544	0.2251	0.1037	0.1499	0.1351	-0.0177	-0.0370	-0.0117	-0.0072
Growth rate of household wages g^1_W	NA	0.0384	0.0612	0.0641	0.0388	0.0415	0.0640	0.0640	0.0821	0.0730	0.0296	0.0018	0.0071
Growth rate of corporate profit g^1_P	NA	0.0553	0.1825	0.1220	0.1252	0.1248	0.1350	0.0567	-0.0674	-0.0585	-0.0647	0.0725	-0.0320
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0235	0.0310	0.0527	0.1297	0.1988	0.0810	0.1253	0.1124	-0.0342	-0.0521	-0.0265	-0.0232
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0229	0.0576	0.0581	0.0337	0.0374	0.0518	0.0485	0.0644	0.0521	0.0187	-0.0021	0.0058
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0363	0.1609	0.0991	0.1011	0.1006	0.1116	0.0341	-0.0861	-0.0742	-0.0794	0.0564	-0.0477
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	1.1613	2.8841	2.4021	2.6347	2.9086	1.5578	1.3519	1.1741	0.8820	1.3649	2.4627	3.8267
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(0.7623)	(0.5618)	(1.3165)	(3.5316)	(6.2043)	(1.1747)	(6.0506)	1.4136	(0.4159)	(0.9079)	1.1607	(1.8723)

Sweden m & gem by case

SWEDEN(1)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	8412	10298	11996	15009	20642	27485	33447	36118	40806	41777	42033	47227	69687
Corporate saving S^0_P	27064	27121	40731	47467	43325	36283	46950	28951	1054	15607	9115	25375	62238
Profit P^0	35476	37419	52727	62476	63967	63768	80397	65069	41860	57384	51148	72602	131925
Net national income Y^0	543328	604663	677413	736239	810314	878889	951150	1043579	1140329	1214327	1195396	1184197	1261823
Household (incl.governmnet) W^0	507852	567244	624686	673763	746347	815121	870753	978510	1098469	1156943	1144248	1111595	1129898
Corporate capital stock K^0_P	736738	808323	875210	949331	1032030	1150027	1286292	1474431	1717101	1806434	1810915	1865045	1891216
Number of workers N^0_E	4232.6	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9
Growth rate of workers g^1_{NE} (actual)	NA	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102
Relative share $\pi^0=P^0/Y^0$	0.0653	0.0619	0.0778	0.0849	0.0789	0.0726	0.0845	0.0624	0.0367	0.0473	0.0428	0.0613	0.1046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.3560	1.3368	1.2920	1.2894	1.2736	1.3085	1.3524	1.4129	1.5058	1.4876	1.5149	1.5749	1.4988
Rate of profit $\rho^0=P^0/K^0_P$	0.0482	0.0463	0.0602	0.0658	0.0620	0.0554	0.0625	0.0441	0.0244	0.0318	0.0282	0.0389	0.0698
Capital-labour ratio $k^0=K^0_P/N^0_E$	174.0628	190.5389	204.6030	219.6661	237.3356	262.3775	289.4902	327.0626	377.4097	403.0869	422.9035	459.5858	470.8148
Labour productivity $y^0=Y^0/N^0_E$	128.3674	142.5319	158.3629	170.3587	186.3476	200.5177	214.0639	231.4898	250.6383	270.9644	279.1612	291.8107	314.1286
R of tech. prog.(given) **under const.Ω_P**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Number of workers N_E	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9	4057
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4245	0.4279	0.4363	0.4368	0.4398	0.4332	0.4251	0.4144	0.3991	0.4020	0.3976	0.3884	0.4002
Corporate propensity to save $s_{SP/Y}$	0.0277	0.0265	0.0340	0.0371	0.0347	0.0314	0.0359	0.0258	0.0146	0.0190	0.0170	0.0238	0.0418
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0285	0.0272	0.0352	0.0385	0.0360	0.0324	0.0373	0.0265	0.0149	0.0194	0.0173	0.0244	0.0437
Corporate capital stock K_P	757738	830311	905977	985873	1069151	1187345	1334234	1513543	1742630	1841414	1842258	1910535	1973801
Corporate income (added value) Y	558815	621111	701227	764578	839460	907408	986601	1071262	1157283	1237842	1216086	1213080	1316924
Capital-labour ratio $k=K_P/N_E$	178.6149	194.1069	209.6344	226.7208	243.9259	267.2214	295.9638	332.6688	388.8496	430.0260	453.9707	475.6241	486.5091
Labour productivity $y=Y/N_E$	131.7246	145.2009	162.2571	175.8298	191.5221	204.2195	218.8508	235.4577	258.2356	289.0735	299.6688	301.9941	324.5998
Coef. of technical progress m^{*0}	0.6766	0.5149	0.5414	0.6471	0.6061	0.4348	0.4436	0.4573	1.3540	2.3200	2.8017	0.9085	0.5093
Coef. of technical progress m^*	0.7443	0.5664	0.5956	0.7118	0.6667	0.4783	0.4880	0.5031	1.4894	2.5520	3.0819	0.9993	0.5602
$A=1/(\Omega_P(1+g^e_{NE}))$	0.7358	0.7419	0.7661	0.7708	0.7789	0.7539	0.7288	0.7013	0.6742	0.7035	0.6965	0.6415	0.6606
$g_Y(g^*_m)$	-0.1982	0.0352	0.0463	0.0807	0.0554	0.0376	0.0441	0.0326	0.0124	0.0169	0.0153	0.0182	0.0658
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	-0.2001	0.0266	0.0356	0.0741	0.0470	0.0235	0.0291	0.0232	0.0278	0.0643	0.0713	0.0286	0.0553
$\pi(g^*_m)$	0.0309	0.0507	0.0631	0.0564	0.0590	0.0641	0.0735	0.0527	0.0457	0.0550	0.0492	0.0918	0.0791
$\rho(g^*_m)$	0.0228	0.0379	0.0489	0.0438	0.0463	0.0490	0.0544	0.0373	0.0303	0.0370	0.0325	0.0583	0.0527
$\xi_\pi=(g^*_m)$	-0.5265	-0.1809	-0.1888	-0.3350	-0.2529	-0.1166	-0.1304	-0.1544	0.2442	0.1639	0.1505	0.4973	-0.2439
$K_P=K^0_P(1+g_{KP})$	590682	836766	915745	1025944	1089206	1193232	1343067	1522567	1738389	1837024	1838577	1898986	2015718
$Y=Y^0(1+g_Y)$	435615	625939	708787	795655	855206	911908	993132	1077649	1154467	1234890	1213656	1205748	1344891

Sweden m & gem by case

SWEDEN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (2)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	139.2362	195.6157	211.8947	235.9359	248.5012	268.5463	297.9231	334.6522	387.9035	429.0008	453.0635	472.7492	496.8409
Labour productivity $y=Y/N_E$	102.6836	146.3296	164.0066	182.9765	195.1145	205.2321	220.2995	236.8615	257.6072	288.3843	299.0700	300.1687	331.4932
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	-0.2001	0.0266	0.0356	0.0741	0.0470	0.0235	0.0291	0.0232	0.0278	0.0643	0.0713	0.0286	0.0553
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.2205	0.0078	0.0108	0.0406	0.0188	0.0050	0.0066	0.0060	-0.0024	-0.0024	-0.0020	-0.0060	0.0212
R of tech. prog.(given) **under const.π**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.0350	0.1334	0.1311	0.0724	0.1003	0.1867	0.1701	0.1466	-0.4146	-0.9854	-1.2901	-0.1673	0.0947
$F=(E+m^{*0})/m^{*0}$	1.0518	1.2590	1.2421	1.1118	1.1655	1.4295	1.3833	1.3206	0.6938	0.5753	0.5396	0.8158	1.1859
$G=\pi/(1-\pi)$	0.0699	0.0660	0.0844	0.0927	0.0857	0.0782	0.0923	0.0665	0.0381	0.0496	0.0447	0.0653	0.1168
$H=(1-E)/((1-\pi)m^{*0})$	1.5258	1.7940	1.7403	1.5666	1.6116	2.0168	2.0435	1.9900	1.0846	0.8982	0.8539	1.3688	1.9850
$g_Y(g^*_m)$	0.0300	0.0284	0.0368	0.0404	0.0377	0.0337	0.0388	0.0277	0.0161	0.0213	0.0191	0.0262	0.0459
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0277	0.0199	0.0262	0.0341	0.0295	0.0197	0.0239	0.0183	0.0316	0.0688	0.0754	0.0367	0.0355
$\xi_{\Omega P}(g^*_m)$	-0.0868	-0.0736	-0.0745	-0.0825	-0.0790	-0.0654	-0.0674	-0.0704	-0.1260	-0.1481	-0.1564	-0.1092	-0.0778
$g_{KP}(g^*_m)$	-0.0594	-0.0472	-0.0405	-0.0454	-0.0443	-0.0338	-0.0312	-0.0446	-0.1119	-0.1300	-0.1402	-0.0859	-0.0354
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.0951	0.0794	0.0805	0.0899	0.0858	0.0700	0.0723	0.0757	0.1441	0.1738	0.1853	0.1226	0.0843
$\Omega_P(g^*_m)$	1.2382	1.2384	1.1957	1.1830	1.1730	1.2229	1.2612	1.3134	1.3161	1.2673	1.2780	1.4030	1.3822
$\rho(g^*_m)$	0.0527	0.0500	0.0651	0.0717	0.0673	0.0593	0.0670	0.0475	0.0279	0.0373	0.0335	0.0437	0.0756
$K_P=K^0_P(1+g_{KP})$	692987	770133	839769	906218	986307	1111102	1246157	1408610	1524961	1571676	1557006	1704902	1824207
$Y=Y^0(1+g_Y)$	559654	621855	702309	766015	840861	908543	988086	1072485	1158694	1240175	1218278	1215201	1319743
Capital-labour ratio $k=K_P/N_E$	163.3518	180.0386	194.3144	208.4027	225.0250	250.0623	276.4263	309.6050	340.2792	367.0340	383.6785	424.4323	449.6366
Labour productivity $y=Y/N_E$	131.9224	145.3747	162.5076	176.1603	191.8417	204.4749	219.1801	235.7265	258.5504	289.6184	300.2091	302.5222	325.2948
$g_k=(k-k_0)/k_0$	-0.0615	-0.0551	-0.0503	-0.0513	-0.0519	-0.0469	-0.0451	-0.0534	-0.0984	-0.0894	-0.0928	-0.0765	-0.0450
$g_y=(y-y_0)/y_0$	0.0277	0.0199	0.0262	0.0341	0.0295	0.0197	0.0239	0.0183	0.0316	0.0688	0.0754	0.0367	0.0355
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0855	-0.0725	-0.0731	-0.0808	-0.0775	-0.0642	-0.0660	-0.0693	-0.1249	-0.1465	-0.1548	-0.1076	-0.0758
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0015	0.0012	0.0015	0.0019	0.0017	0.0013	0.0015	0.0011	0.0012	0.0019	0.0018	0.0017	0.0021
Growth rate of output g^1_{KP}	NA	0.0972	0.0827	0.0847	0.0871	0.1143	0.1185	0.1463	0.1646	0.0520	0.0025	0.0299	0.0140
Growth rate of household wages g^1_W	NA	0.1169	0.1013	0.0786	0.1077	0.0921	0.0682	0.1238	0.1226	0.0532	-0.0110	-0.0285	0.0165
Growth rate of corporate profit g^1_P	NA	0.0548	0.4091	0.1849	0.0239	-0.0031	0.2608	-0.1907	-0.3567	0.3709	-0.1087	0.4194	0.8171
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0668	0.0541	0.0479	0.0468	0.0756	0.0833	0.1051	0.1345	0.0366	-0.0166	0.0124	-0.0101
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.1144	0.0922	0.0676	0.1009	0.0835	0.0538	0.1076	0.1123	0.0693	0.0351	0.0251	0.0269
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0255	0.3718	0.1447	-0.0141	-0.0377	0.2211	-0.2197	-0.3733	0.3508	-0.1256	0.3953	0.7738
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(86.5054)	4.2287	4.4924	13.0625	6.9425	2.7353	3.0266	3.5379	(0.8271)	(0.3806)	(0.2920)	(1.7925)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	322.6082	(0.6234)	(1.5201)	32.5133	11.9248	(1.0521)	1.3765	1.2250	0.0870	0.0504	0.0091	(0.0234)

Sweden m & gem by case

SWEDEN(3)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	8412	10298	11996	15009	20642	27485	33447	36118	40806	41777	42033	47227	69687
Corporate saving S^0_P	27064	27121	40731	47467	43325	36283	46950	28951	1054	15607	9115	25375	62238
Profit P^0	35476	37419	52727	62476	63967	63768	80397	65069	41860	57384	51148	72602	131925
Net national income Y^0	543328	604663	677413	736239	810314	878889	951150	1043579	1140329	1214327	1195396	1184197	1261823
Household (incl.governmnet) W^0	507852	567244	624686	673763	746347	815121	870753	978510	1098469	1156943	1144248	1111595	1129898
Corporate capital stock K^0_P	736738	808323	875210	949331	1032030	1150027	1286292	1474431	1717101	1806434	1810915	1865045	1891216
Number of workers N^0_E	4232.6	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9
Growth rate of workers g^1_{NE} (actual)	NA	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102
Relative share $\pi^0=P^0/Y^0$	0.0653	0.0619	0.0778	0.0849	0.0789	0.0726	0.0845	0.0624	0.0367	0.0473	0.0428	0.0613	0.1046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.3560	1.3368	1.2920	1.2894	1.2736	1.3085	1.3524	1.4129	1.5058	1.4876	1.5149	1.5749	1.4988
Rate of profit $\rho^0=P^0/K^0_P$	0.0482	0.0463	0.0602	0.0658	0.0620	0.0554	0.0625	0.0441	0.0244	0.0318	0.0282	0.0389	0.0698
Capital-labour ratio $k^0=K^0_P/N^0_E$	174.0628	190.5389	204.6030	219.6661	237.3356	262.3775	289.4902	327.0626	377.4097	403.0869	422.9035	459.5858	470.8148
Labour productivity $y^0=Y^0/N^0_E$	128.3674	142.5319	158.3629	170.3587	186.3476	200.5177	214.0639	231.4898	250.6383	270.9644	279.1612	291.8107	314.1286
R of tech. prog.(given) **under const.Ω_P**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
Number of workers N_E	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9	4057
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4245	0.4279	0.4363	0.4368	0.4398	0.4332	0.4251	0.4144	0.3991	0.4020	0.3976	0.3884	0.4002
Corporate propensity to save $s_{SP/Y}$	0.0277	0.0265	0.0340	0.0371	0.0347	0.0314	0.0359	0.0258	0.0146	0.0190	0.0170	0.0238	0.0418
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0285	0.0272	0.0352	0.0385	0.0360	0.0324	0.0373	0.0265	0.0149	0.0194	0.0173	0.0244	0.0437
Corporate capital stock K_P	757738	830311	905977	985873	1069151	1187345	1334234	1513543	1742630	1841414	1842258	1910535	1973801
Corporate income (added value) Y	558815	621111	701227	764578	839460	907408	986601	1071262	1157283	1237842	1216086	1213080	1316924
Capital-labour ratio $k=K_P/N_E$	178.6149	194.1069	209.6344	226.7208	243.9259	267.2214	295.9638	332.6688	388.8496	430.0260	453.9707	475.6241	486.5091
Labour productivity $y=Y/N_E$	131.7246	145.2009	162.2571	175.8298	191.5221	204.2195	218.8508	235.4577	258.2356	289.0735	299.6688	301.9941	324.5998
Coef. of technical progress m^{*0}	0.6766	0.5149	0.5414	0.6471	0.6061	0.4348	0.4436	0.4573	1.3540	2.3200	2.8017	0.9085	0.5093
Coef. of technical progress m^*	0.8796	0.6694	0.7039	0.8412	0.7880	0.5652	0.5767	0.5946	1.7602	3.0160	3.6423	1.1810	0.6621
$A=1/(\Omega_P(1+g^e_{NE}))$	0.7358	0.7419	0.7661	0.7708	0.7789	0.7539	0.7288	0.7013	0.6742	0.7035	0.6965	0.6415	0.6606
$g_Y(g^*_m)$	-0.0117	0.0852	0.1269	-0.0676	-0.6886	0.0549	0.0699	0.0606	0.0093	0.0135	0.0124	0.0121	-4.3537
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	-0.0140	0.0763	0.1154	-0.0734	-0.6910	0.0406	0.0545	0.0509	0.0247	0.0607	0.0683	0.0225	-4.3205
$\pi(g^*_m)$	0.0151	0.0372	0.0458	0.0338	0.0392	0.0520	0.0583	0.0403	0.0893	0.0818	0.0704	17.1294	0.0531
$\rho(g^*_m)$	0.0111	0.0278	0.0355	0.0262	0.0307	0.0397	0.0431	0.0285	0.0593	0.0550	0.0465	10.8762	0.0354
$\xi_\pi=(g^*_m)$	-0.7694	-0.3986	-0.4112	-0.6017	-0.5039	-0.2836	-0.3103	-0.3539	1.4319	0.7313	0.6460	278.3941	-0.4918
$K_P=K^0_P(1+g_{KP})$	728101	877198	986262	885122	321421	1213147	1376192	1563810	1733081	1830886	1833315	1887557	-6342574
$Y=Y^0(1+g_Y)$	536958	656185	763367	686443	252369	927128	1017627	1106840	1150941	1230764	1210182	1198491	-4231778

Sweden m & gem by case

SWEDEN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (4)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	171.6288	205.0679	228.2116	203.5513	73.3319	273.0284	305.2709	343.7171	386.7189	427.5674	451.7668	469.9038	-1563.339
Labour productivity $y=Y/N_E$	126.5724	153.4003	176.6359	157.8611	57.5777	208.6574	225.7329	243.2775	256.8206	287.4207	298.2140	298.3621	-1043.063
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	-0.0140	0.0763	0.1154	-0.0734	-0.6910	0.0406	0.0545	0.0509	0.0247	0.0607	0.0683	0.0225	-4.3205
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0391	0.0565	0.0886	-0.1022	-0.6994	0.0217	0.0314	0.0332	-0.0055	-0.0057	-0.0049	-0.0120	-4.2134
R of tech. prog.(given) **under const.π**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.0350	0.1334	0.1311	0.0724	0.1003	0.1867	0.1701	0.1466	-0.4146	-0.9854	-1.2901	-0.1673	0.0947
$F=(E+m^{*0})/m^{*0}$	1.0518	1.2590	1.2421	1.1118	1.1655	1.4295	1.3833	1.3206	0.6938	0.5753	0.5396	0.8158	1.1859
$G=\pi/(1-\pi)$	0.0699	0.0660	0.0844	0.0927	0.0857	0.0782	0.0923	0.0665	0.0381	0.0496	0.0447	0.0653	0.1168
$H=(1-E)/((1-\pi)m^{*0})$	1.5258	1.7940	1.7403	1.5666	1.6116	2.0168	2.0435	1.9900	1.0846	0.8982	0.8539	1.3688	1.9850
$g_Y(g^*_m)$	0.0328	0.0307	0.0397	0.0440	0.0408	0.0361	0.0417	0.0298	0.0182	0.0245	0.0222	0.0293	0.0500
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0305	0.0222	0.0290	0.0375	0.0326	0.0221	0.0267	0.0204	0.0337	0.0722	0.0786	0.0399	0.0396
$\xi_{\Omega P}(g^*_m)$	-0.2219	-0.1924	-0.1945	-0.2125	-0.2047	-0.1735	-0.1782	-0.1851	-0.3019	-0.3428	-0.3573	-0.2689	-0.2019
$g_{KP}(g^*_m)$	-0.1964	-0.1677	-0.1626	-0.1779	-0.1723	-0.1436	-0.1439	-0.1608	-0.2891	-0.3267	-0.3431	-0.2474	-0.1620
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.2852	0.2383	0.2415	0.2698	0.2574	0.2099	0.2169	0.2272	0.4324	0.5215	0.5560	0.3677	0.2530
$\Omega_P(g^*_m)$	1.0550	1.0796	1.0407	1.0154	1.0129	1.0815	1.1113	1.1513	1.0512	0.9777	0.9736	1.1515	1.1962
$\rho(g^*_m)$	0.0619	0.0573	0.0748	0.0836	0.0779	0.0671	0.0761	0.0542	0.0349	0.0483	0.0439	0.0532	0.0874
$K_P=K^0_P(1+g_{KP})$	592042	672794	732906	780468	854260	984869	1101132	1237358	1220610	1216335	1189605	1403618	1584840
$Y=Y^0(1+g_Y)$	561157	623209	704276	768600	843390	910631	990817	1074728	1161108	1244052	1221887	1218931	1324895
Capital-labour ratio $k=K_P/N_E$	139.5567	157.2830	169.5874	179.4839	194.8987	221.6527	244.2564	271.9647	272.3664	284.0512	293.1433	349.4281	390.6366
Labour productivity $y=Y/N_E$	132.2767	145.6912	162.9627	176.7547	192.4186	204.9447	219.7859	236.2195	259.0891	290.5239	301.0982	303.4508	326.5646
$g_k=(k-k_0)/k_0$	-0.1982	-0.1745	-0.1711	-0.1829	-0.1788	-0.1552	-0.1563	-0.1685	-0.2783	-0.2953	-0.3068	-0.2397	-0.1703
$g_y=(y-y_0)/y_0$	0.0305	0.0222	0.0290	0.0375	0.0326	0.0221	0.0267	0.0204	0.0337	0.0722	0.0786	0.0399	0.0396
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.2187	-0.1897	-0.1910	-0.2083	-0.2010	-0.1705	-0.1747	-0.1825	-0.2996	-0.3395	-0.3543	-0.2653	-0.1971
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0042	0.0034	0.0043	0.0053	0.0047	0.0036	0.0043	0.0032	0.0033	0.0050	0.0048	0.0048	0.0061
Growth rate of output g^1_{KP}	NA	0.0972	0.0827	0.0847	0.0871	0.1143	0.1185	0.1463	0.1646	0.0520	0.0025	0.0299	0.0140
Growth rate of household wages g^1_W	NA	0.1169	0.1013	0.0786	0.1077	0.0921	0.0682	0.1238	0.1226	0.0532	-0.0110	-0.0285	0.0165
Growth rate of corporate profit g^1_P	NA	0.0548	0.4091	0.1849	0.0239	-0.0031	0.2608	-0.1907	-0.3567	0.3709	-0.1087	0.4194	0.8171
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0668	0.0541	0.0479	0.0468	0.0756	0.0833	0.1051	0.1345	0.0366	-0.0166	0.0124	-0.0101
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.1144	0.0922	0.0676	0.1009	0.0835	0.0538	0.1076	0.1123	0.0693	0.0351	0.0251	0.0269
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0255	0.3718	0.1447	-0.0141	-0.0377	0.2211	-0.2197	-0.3733	0.3508	-0.1256	0.3953	0.7738
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(5.1156)	10.2401	12.3077	(10.9476)	(86.2856)	3.9962	4.7924	6.5692	(0.6208)	(0.3042)	(0.2365)	(1.1889)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	19.0779	(1.5096)	(4.1645)	(27.2491)	(148.2078)	(1.5370)	2.1795	2.2746	0.0653	0.0403	0.0074	(0.0155)

Sweden m & gem by case

SWEDEN(5)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	8412	10298	11996	15009	20642	27485	33447	36118	40806	41777	42033	47227	69687
Corporate saving S^0_P	27064	27121	40731	47467	43325	36283	46950	28951	1054	15607	9115	25375	62238
Profit P^0	35476	37419	52727	62476	63967	63768	80397	65069	41860	57384	51148	72602	131925
Net national income Y^0	543328	604663	677413	736239	810314	878889	951150	1043579	1140329	1214327	1195396	1184197	1261823
Household (incl.govenmnet) W^0	507852	567244	624686	673763	746347	815121	870753	978510	1098469	1156943	1144248	1111595	1129898
Corporate capital stock K^0_P	736738	808323	875210	949331	1032030	1150027	1286292	1474431	1717101	1806434	1810915	1865045	1891216
Number of workers N^0_E	4232.6	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9
Growth rate of workers g^1_{NE} (actual)	NA	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102
Relative share $\pi^0=P^0/Y^0$	0.0653	0.0619	0.0778	0.0849	0.0789	0.0726	0.0845	0.0624	0.0367	0.0473	0.0428	0.0613	0.1046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.3560	1.3368	1.2920	1.2894	1.2736	1.3085	1.3524	1.4129	1.5058	1.4876	1.5149	1.5749	1.4988
Rate of profit $\rho^0=P^0/K^0_P$	0.0482	0.0463	0.0602	0.0658	0.0620	0.0554	0.0625	0.0441	0.0244	0.0318	0.0282	0.0389	0.0698
Capital-labour ratio $k^0=K^0_P/N^0_E$	174.0628	190.5389	204.6030	219.6661	237.3356	262.3775	289.4902	327.0626	377.4097	403.0869	422.9035	459.5858	470.8148
Labour productivity $y^0=Y^0/N^0_E$	128.3674	142.5319	158.3629	170.3587	186.3476	200.5177	214.0639	231.4898	250.6383	270.9644	279.1612	291.8107	314.1286
R of tech. prog.(given) **under const.Ω_P**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
Number of workers N_E	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9	4057
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4245	0.4279	0.4363	0.4368	0.4398	0.4332	0.4251	0.4144	0.3991	0.4020	0.3976	0.3884	0.4002
Corporate propensity to save $s_{SP/Y}$	0.0277	0.0265	0.0340	0.0371	0.0347	0.0314	0.0359	0.0258	0.0146	0.0190	0.0170	0.0238	0.0418
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0285	0.0272	0.0352	0.0385	0.0360	0.0324	0.0373	0.0265	0.0149	0.0194	0.0173	0.0244	0.0437
Corporate capital stock K_P	757738	830311	905977	985873	1069151	1187345	1334234	1513543	1742630	1841414	1842258	1910535	1973801
Corporate income (added value) Y	558815	621111	701227	764578	839460	907408	986601	1071262	1157283	1237842	1216086	1213080	1316924
Capital-labour ratio $k=K_P/N_E$	178.6149	194.1069	209.6344	226.7208	243.9259	267.2214	295.9638	332.6688	388.8496	430.0260	453.9707	475.6241	486.5091
Labour productivity $y=Y/N_E$	131.7246	145.2009	162.2571	175.8298	191.5221	204.2195	218.8508	235.4577	258.2356	289.0735	299.6688	301.9941	324.5998
Coef. of technical progress m^{*0}	0.6766	0.5149	0.5414	0.6471	0.6061	0.4348	0.4436	0.4573	1.3540	2.3200	2.8017	0.9085	0.5093
Coef. of technical progress m^*	0.6090	0.4634	0.4873	0.5824	0.5455	0.3913	0.3993	0.4116	1.2186	2.0880	2.5216	0.8176	0.4584
$A=1/(\Omega_P(1+g^e_{NE}))$	0.7358	0.7419	0.7661	0.7708	0.7789	0.7539	0.7288	0.7013	0.6742	0.7035	0.6965	0.6415	0.6606
$g_Y(g^*_m)$	0.0133	0.0222	0.0283	0.0253	0.0266	0.0286	0.0323	0.0223	0.0186	0.0226	0.0200	0.0370	0.0327
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0110	0.0137	0.0178	0.0190	0.0185	0.0146	0.0174	0.0130	0.0341	0.0702	0.0763	0.0476	0.0224
$\pi(g^*_m)$	-0.5826	0.0794	0.1015	0.1710	0.1193	0.0836	0.0994	0.0763	0.0307	0.0414	0.0378	0.0460	0.1543
$\rho(g^*_m)$	-0.4296	0.0594	0.0785	0.1326	0.0937	0.0639	0.0735	0.0540	0.0204	0.0278	0.0250	0.0292	0.1030
$\xi_\pi=(g^*_m)$	-9.9221	0.2835	0.3034	1.0147	0.5119	0.1520	0.1764	0.2234	-0.1641	-0.1234	-0.1157	-0.2493	0.4762
$K_P=K^0_P(1+g_{KP})$	746534	826245	900002	973324	1059512	1182870	1327780	1507368	1748979	1847276	1847070	1933994	1953000
$Y=Y^0(1+g_Y)$	550552	618069	696602	754846	831892	903988	981828	1066892	1161499	1241782	1219262	1227976	1303045

Sweden m & gem by case

SWEDEN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (6)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	175.9738	193.1561	208.2519	223.8349	241.7267	266.2142	294.5321	331.3116	390.2665	431.3949	455.1564	481.4643	481.3820
Labour productivity $y=Y/N_E$	129.7768	144.4897	161.1871	173.5917	189.7954	203.4498	217.7921	234.4971	259.1765	289.9937	300.4515	305.7023	321.1790
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0110	0.0137	0.0178	0.0190	0.0185	0.0146	0.0174	0.0130	0.0341	0.0702	0.0763	0.0476	0.0224
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0148	-0.0049	-0.0066	-0.0127	-0.0090	-0.0038	-0.0048	-0.0041	0.0036	0.0032	0.0026	0.0123	-0.0105
R of tech. prog.(given) **under const.π**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.0350	0.1334	0.1311	0.0724	0.1003	0.1867	0.1701	0.1466	-0.4146	-0.9854	-1.2901	-0.1673	0.0947
$F=(E+m^{*0})/m^{*0}$	1.0518	1.2590	1.2421	1.1118	1.1655	1.4295	1.3833	1.3206	0.6938	0.5753	0.5396	0.8158	1.1859
$G=\pi/(1-\pi)$	0.0699	0.0660	0.0844	0.0927	0.0857	0.0782	0.0923	0.0665	0.0381	0.0496	0.0447	0.0653	0.1168
$H=(1-E)/((1-\pi)m^{*0})$	1.5258	1.7940	1.7403	1.5666	1.6116	2.0168	2.0435	1.9900	1.0846	0.8982	0.8539	1.3688	1.9850
$g_Y(g^*_m)$	0.0268	0.0259	0.0334	0.0364	0.0341	0.0311	0.0356	0.0253	0.0135	0.0172	0.0152	0.0224	0.0413
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0245	0.0174	0.0229	0.0300	0.0259	0.0171	0.0207	0.0159	0.0289	0.0645	0.0712	0.0329	0.0310
$\xi_{\Omega P}(g^*_m)$	0.1051	0.0863	0.0876	0.0988	0.0939	0.0752	0.0779	0.0819	0.1684	0.2104	0.2275	0.1397	0.0921
$g_{KP}(g^*_m)$	0.1347	0.1144	0.1239	0.1388	0.1312	0.1086	0.1163	0.1093	0.1842	0.2312	0.2462	0.1653	0.1372
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.0951	-0.0794	-0.0805	-0.0899	-0.0858	-0.0700	-0.0723	-0.0757	-0.1441	-0.1738	-0.1853	-0.1226	-0.0843
$\Omega_P(g^*_m)$	1.4984	1.4522	1.4051	1.4169	1.3932	1.4069	1.4577	1.5286	1.7594	1.8006	1.8596	1.7950	1.6368
$\rho(g^*_m)$	0.0436	0.0426	0.0554	0.0599	0.0567	0.0516	0.0580	0.0408	0.0209	0.0262	0.0230	0.0342	0.0639
$K_P=K^0_P(1+g_{KP})$	835994	900802	983673	1081113	1167401	1274962	1435908	1635553	2033314	2224052	2256673	2173253	2150646
$Y=Y^0(1+g_Y)$	557908	620318	700069	763030	837955	906206	985027	1069963	1155704	1235169	1213554	1210756	1313921
Capital-labour ratio $k=K_P/N_E$	197.0615	210.5857	227.6126	248.6233	266.3414	286.9404	318.5173	359.4860	453.7128	519.3834	556.0911	541.0274	530.0984
Labour productivity $y=Y/N_E$	131.5108	145.0154	161.9893	175.4736	191.1786	203.9489	218.5016	235.1721	257.8832	288.4492	299.0450	301.4154	323.8596
$g_k=(k-k_0)/k_0$	0.1321	0.1052	0.1125	0.1318	0.1222	0.0936	0.1003	0.0991	0.2022	0.2885	0.3149	0.1772	0.1259
$g_y=(y-y_0)/y_0$	0.0245	0.0174	0.0229	0.0300	0.0259	0.0171	0.0207	0.0159	0.0289	0.0645	0.0712	0.0329	0.0310
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.1033	0.0849	0.0858	0.0966	0.0919	0.0738	0.0762	0.0806	0.1668	0.2078	0.2249	0.1375	0.0896
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0016	-0.0013	-0.0017	-0.0020	-0.0018	-0.0013	-0.0016	-0.0012	-0.0014	-0.0022	-0.0021	-0.0019	-0.0023
Growth rate of output g^1_{KP}	NA	0.0972	0.0827	0.0847	0.0871	0.1143	0.1185	0.1463	0.1646	0.0520	0.0025	0.0299	0.0140
Growth rate of household wages g^1_W	NA	0.1169	0.1013	0.0786	0.1077	0.0921	0.0682	0.1238	0.1226	0.0532	-0.0110	-0.0285	0.0165
Growth rate of corporate profit g^1_P	NA	0.0548	0.4091	0.1849	0.0239	-0.0031	0.2608	-0.1907	-0.3567	0.3709	-0.1087	0.4194	0.8171
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0668	0.0541	0.0479	0.0468	0.0756	0.0833	0.1051	0.1345	0.0366	-0.0166	0.0124	-0.0101
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.1144	0.0922	0.0676	0.1009	0.0835	0.0538	0.1076	0.1123	0.0693	0.0351	0.0251	0.0269
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0255	0.3718	0.1447	-0.0141	-0.0377	0.2211	-0.2197	-0.3733	0.3508	-0.1256	0.3953	0.7738
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	5.8018	2.6645	2.7477	4.0907	3.3370	2.0793	2.2116	2.4208	(1.2385)	(0.5081)	(0.3817)	(3.6414)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(21.6369)	(0.3928)	(0.9297)	10.1821	5.7318	(0.7997)	1.0058	0.8382	0.1302	0.0673	0.0120	(0.0476)

Sweden m & gem by case

SWEDEN(7)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	8412	10298	11996	15009	20642	27485	33447	36118	40806	41777	42033	47227	69687
Corporate saving S^0_P	27064	27121	40731	47467	43325	36283	46950	28951	1054	15607	9115	25375	62238
Profit P^0	35476	37419	52727	62476	63967	63768	80397	65069	41860	57384	51148	72602	131925
Net national income Y^0	543328	604663	677413	736239	810314	878889	951150	1043579	1140329	1214327	1195396	1184197	1261823
Household (incl.governmnet) W^0	507852	567244	624686	673763	746347	815121	870753	978510	1098469	1156943	1144248	1111595	1129898
Corporate capital stock K^0_P	736738	808323	875210	949331	1032030	1150027	1286292	1474431	1717101	1806434	1810915	1865045	1891216
Number of workers N^0_E	4232.6	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9
Growth rate of workers g^1_{NE} (actual)	NA	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102
Relative share $\pi^0=P^0/Y^0$	0.0653	0.0619	0.0778	0.0849	0.0789	0.0726	0.0845	0.0624	0.0367	0.0473	0.0428	0.0613	0.1046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.3560	1.3368	1.2920	1.2894	1.2736	1.3085	1.3524	1.4129	1.5058	1.4876	1.5149	1.5749	1.4988
Rate of profit $\rho^0=P^0/K^0_P$	0.0482	0.0463	0.0602	0.0658	0.0620	0.0554	0.0625	0.0441	0.0244	0.0318	0.0282	0.0389	0.0698
Capital-labour ratio $k^0=K^0_P/N^0_E$	174.0628	190.5389	204.6030	219.6661	237.3356	262.3775	289.4902	327.0626	377.4097	403.0869	422.9035	459.5858	470.8148
Labour productivity $y^0=Y^0/N^0_E$	128.3674	142.5319	158.3629	170.3587	186.3476	200.5177	214.0639	231.4898	250.6383	270.9644	279.1612	291.8107	314.1286
R of tech. prog.(given) **under const.Ω_P**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**
Number of workers N_E	4242.3	4277.6	4321.7	4348.4	4383.1	4443.3	4508.1	4549.7	4481.5	4282.1	4058.1	4016.9	4057
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	0.0023	0.0083	0.0103	0.0062	0.0080	0.0137	0.0146	0.0092	-0.0150	-0.0445	-0.0523	-0.0102	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4245	0.4279	0.4363	0.4368	0.4398	0.4332	0.4251	0.4144	0.3991	0.4020	0.3976	0.3884	0.4002
Corporate propensity to save $s_{SP/Y}$	0.0277	0.0265	0.0340	0.0371	0.0347	0.0314	0.0359	0.0258	0.0146	0.0190	0.0170	0.0238	0.0418
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0285	0.0272	0.0352	0.0385	0.0360	0.0324	0.0373	0.0265	0.0149	0.0194	0.0173	0.0244	0.0437
Corporate capital stock K_P	757738	830311	905977	985873	1069151	1187345	1334234	1513543	1742630	1841414	1842258	1910535	1973801
Corporate income (added value) Y	558815	621111	701227	764578	839460	907408	986601	1071262	1157283	1237842	1216086	1213080	1316924
Capital-labour ratio $k=K_P/N_E$	178.6149	194.1069	209.6344	226.7208	243.9259	267.2214	295.9638	332.6688	388.8496	430.0260	453.9707	475.6241	486.5091
Labour productivity $y=Y/N_E$	131.7246	145.2009	162.2571	175.8298	191.5221	204.2195	218.8508	235.4577	258.2356	289.0735	299.6688	301.9941	324.5998
Coef. of technical progress m^{*0}	0.6766	0.5149	0.5414	0.6471	0.6061	0.4348	0.4436	0.4573	1.3540	2.3200	2.8017	0.9085	0.5093
Coef. of technical progress m^*	0.4736	0.3605	0.3790	0.4529	0.4243	0.3044	0.3106	0.3201	0.9478	1.6240	1.9612	0.6359	0.3565
$A=1/(\Omega_P(1+g^e_{NE}))$	0.7358	0.7419	0.7661	0.7708	0.7789	0.7539	0.7288	0.7013	0.6742	0.7035	0.6965	0.6415	0.6606
$g_Y(g^*_m)$	0.0064	0.0162	0.0204	0.0150	0.0175	0.0230	0.0254	0.0170	0.0369	0.0340	0.0288	-1.1769	0.0217
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0041	0.0078	0.0100	0.0088	0.0095	0.0092	0.0107	0.0077	0.0527	0.0822	0.0856	-1.1787	0.0116
$\pi(g^*_m)$	-0.0279	0.1835	0.2581	-0.1661	-5.0266	0.1201	0.1537	0.1379	0.0231	0.0332	0.0307	0.0307	3.2439
$\rho(g^*_m)$	-0.0206	0.1373	0.1998	-0.1288	-3.9467	0.0918	0.1136	0.0976	0.0153	0.0223	0.0203	0.0195	2.1643
$\xi_\pi=(g^*_m)$	-1.4280	1.9649	2.3156	-2.9571	-64.6753	0.6555	0.8180	1.2117	-0.3706	-0.2970	-0.2819	-0.4991	30.0268
$K_P=K^0_P(1+g_{KP})$	741477	821406	893067	963554	1050118	1176516	1318979	1499464	1780533	1867864	1863090	-329960	1932302
$Y=Y^0(1+g_Y)$	546823	614449	691234	747270	824516	899133	975320	1061297	1182455	1255622	1229837	-209506	1289236

Sweden m & gem by case

SWEDEN, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (8)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	174.7818	192.0249	206.6472	221.5883	239.5835	264.7844	292.5798	329.5743	397.3075	436.2028	459.1039	-82.1430	476.2804
Labour productivity $y=Y/N_E$	128.8977	143.6435	159.9450	171.8494	188.1126	202.3570	216.3484	233.2675	263.8524	293.2257	303.0573	-52.1561	317.7752
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0041	0.0078	0.0100	0.0088	0.0095	0.0092	0.0107	0.0077	0.0527	0.0822	0.0856	-1.1787	0.0116
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0215	-0.0107	-0.0142	-0.0226	-0.0178	-0.0091	-0.0114	-0.0093	0.0218	0.0144	0.0113	-1.1727	-0.0210
R of tech. prog.(given) **under const.π**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	0.0350	0.1334	0.1311	0.0724	0.1003	0.1867	0.1701	0.1466	-0.4146	-0.9854	-1.2901	-0.1673	0.0947
$F=(E+m^{*0})/m^{*0}$	1.0518	1.2590	1.2421	1.1118	1.1655	1.4295	1.3833	1.3206	0.6938	0.5753	0.5396	0.8158	1.1859
$G=\pi/(1-\pi)$	0.0699	0.0660	0.0844	0.0927	0.0857	0.0782	0.0923	0.0665	0.0381	0.0496	0.0447	0.0653	0.1168
$H=(1-E)/((1-\pi)m^{*0})$	1.5258	1.7940	1.7403	1.5666	1.6116	2.0168	2.0435	1.9900	1.0846	0.8982	0.8539	1.3688	1.9850
$g_Y(g^*_m)$	0.0231	0.0230	0.0296	0.0317	0.0299	0.0281	0.0320	0.0225	0.0102	0.0116	0.0098	0.0179	0.0360
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0207	0.0145	0.0191	0.0253	0.0218	0.0142	0.0172	0.0132	0.0255	0.0587	0.0655	0.0283	0.0258
$\xi_{\Omega P}(g^*_m)$	0.3991	0.3128	0.3184	0.3695	0.3466	0.2656	0.2769	0.2939	0.7618	1.0899	1.2523	0.5816	0.3386
$g_{KP}(g^*_m)$	0.4313	0.3430	0.3575	0.4129	0.3870	0.3012	0.3178	0.3231	0.7797	1.1142	1.2744	0.6098	0.3869
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.2852	-0.2383	-0.2415	-0.2698	-0.2574	-0.2099	-0.2169	-0.2272	-0.4324	-0.5215	-0.5560	-0.3677	-0.2530
$\Omega_P(g^*_m)$	1.8971	1.7550	1.7034	1.7659	1.7151	1.6561	1.7269	1.8281	2.6529	3.1089	3.4121	2.4909	2.0063
$\rho(g^*_m)$	0.0344	0.0353	0.0457	0.0481	0.0460	0.0438	0.0489	0.0341	0.0138	0.0152	0.0125	0.0246	0.0521
$K_P=K^0_P(1+g_{KP})$	1054512	1085582	1188106	1341295	1431389	1496361	1695045	1950826	3055853	3819120	4118742	3002423	2622844
$Y=Y^0(1+g_Y)$	555856	618557	697495	759542	834579	903572	981577	1067105	1151905	1228455	1207102	1205366	1307287
Capital-labour ratio $k=K_P/N_E$	248.5708	253.7829	274.9164	308.4571	326.5701	336.7680	375.9999	428.7813	681.8817	891.8802	014.9435	747.4478	646.4875
Labour productivity $y=Y/N_E$	131.0270	144.6038	161.3937	174.6715	190.4084	203.3560	217.7362	234.5441	257.0355	286.8815	297.4550	300.0738	322.2244
$g_k=(k-k_0)/k_0$	0.4281	0.3319	0.3437	0.4042	0.3760	0.2835	0.2988	0.3110	0.8067	1.2126	1.3999	0.6264	0.3731
$g_y=(y-y_0)/y_0$	0.0207	0.0145	0.0191	0.0253	0.0218	0.0142	0.0172	0.0132	0.0255	0.0587	0.0655	0.0283	0.0258
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.3917	0.3074	0.3114	0.3605	0.3388	0.2603	0.2704	0.2889	0.7536	1.0740	1.2357	0.5715	0.3288
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0053	-0.0041	-0.0053	-0.0066	-0.0058	-0.0042	-0.0051	-0.0039	-0.0046	-0.0076	-0.0074	-0.0064	-0.0073
Growth rate of output g^1_{KP}	NA	0.0972	0.0827	0.0847	0.0871	0.1143	0.1185	0.1463	0.1646	0.0520	0.0025	0.0299	0.0140
Growth rate of household wages g^1_W	NA	0.1169	0.1013	0.0786	0.1077	0.0921	0.0682	0.1238	0.1226	0.0532	-0.0110	-0.0285	0.0165
Growth rate of corporate profit g^1_P	NA	0.0548	0.4091	0.1849	0.0239	-0.0031	0.2608	-0.1907	-0.3567	0.3709	-0.1087	0.4194	0.8171
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0668	0.0541	0.0479	0.0468	0.0756	0.0833	0.1051	0.1345	0.0366	-0.0166	0.0124	-0.0101
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.1144	0.0922	0.0676	0.1009	0.0835	0.0538	0.1076	0.1123	0.0693	0.0351	0.0251	0.0269
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	0.0255	0.3718	0.1447	-0.0141	-0.0377	0.2211	-0.2197	-0.3733	0.3508	-0.1256	0.3953	0.7738
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	2.8068	1.9451	1.9791	2.4251	2.1964	1.6771	1.7425	1.8399	(2.4644)	(0.7643)	(0.5508)	115.9236
$\sigma^1_R= -(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	(10.4674)	(0.2867)	(0.6697)	6.0362	3.7726	(0.6450)	0.7925	0.6371	0.2591	0.1013	0.0172	1.5142

UK m & gem by case

UK(1)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	2800	4600	6787	8394	10213	12807	17278	21544	24073	24631	27791	29426	32151
Corporate saving S^0_P	3436	10195	7734	10688	9475	13938	11600	5335	-1955	-4745	3617	15188	30448
Profit P^0	6236	14795	14521	19082	19688	26745	28878	26879	22118	19886	31408	44614	62599
Net national income Y^0	245262	268941	287608	315187	339528	373266	414977	454357	480853	502422	530521	560625	596600
Household (incl.governmnet) W^0	239026	254146	273087	296105	319840	346521	386099	427478	458735	482536	499113	516011	534001
Corporate capital stock K^0_P	253300	269700	356400	381700	416500	468200	565600	692300	716700	734300	722800	763100	740700
Number of workers N^0_E	24049	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400
Growth rate of workers g^1_{NE} (actual)	NA	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033
Relative share $\pi^0=P^0/Y^0$	0.0254	0.0550	0.0505	0.0605	0.0580	0.0717	0.0696	0.0592	0.0460	0.0396	0.0592	0.0796	0.1049
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.0328	1.0028	1.2392	1.2110	1.2267	1.2543	1.3630	1.5237	1.4905	1.4615	1.3624	1.3612	1.2415
Rate of profit $\rho^0=P^0/K^0_P$	0.0246	0.0549	0.0407	0.0500	0.0473	0.0571	0.0511	0.0388	0.0309	0.0271	0.0435	0.0585	0.0845
Capital-labour ratio $k^0=K^0_P/N^0_E$	10.5327	11.3486	14.5958	15.4516	16.8433	18.7273	21.6440	25.7093	26.3580	27.9148	28.0939	30.1418	29.1614
Labour productivity $y^0=Y^0/N^0_E$	10.1984	11.3167	11.7785	12.7591	13.7305	14.9300	15.8800	16.8730	17.6843	19.0999	20.6204	22.1442	23.4882
R of tech. prog.(given) **under const.Ω_P**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Number of workers N_E	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400	25654
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4919	0.4993	0.4466	0.4523	0.4491	0.4436	0.4232	0.3962	0.4015	0.4063	0.4233	0.4235	0.4461
Corporate propensity to save $s_{SP/Y}$	0.0125	0.0275	0.0225	0.0274	0.0260	0.0318	0.0295	0.0234	0.0185	0.0161	0.0251	0.0337	0.0468
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0127	0.0282	0.0231	0.0282	0.0267	0.0328	0.0303	0.0240	0.0188	0.0163	0.0257	0.0349	0.0491
Corporate capital stock K_P	256508	277317	364621	392446	427636	483570	582762	708918	730186	746300	741379	789716	777075
Corporate income (added value) Y	248369	276537	294243	324060	348606	385519	427569	465263	489901	510633	544157	580179	625898
Capital-labour ratio $k=K_P/N_E$	10.7935	11.3571	14.7602	15.8705	17.1048	18.5049	21.6415	26.0718	27.7585	29.0073	29.2838	31.0912	30.2906
Labour productivity $y=Y/N_E$	10.4510	11.3251	11.9112	13.1050	13.9437	14.7528	15.8782	17.1109	18.6239	19.8474	21.4938	22.8417	24.3977
Coef. of technical progress m^{*0}	1.8934	0.0263	0.3941	0.7953	0.4734	-0.2884	-0.0027	0.3855	1.8945	1.6385	1.2095	0.6634	0.6351
Coef. of technical progress m^*	2.0827	0.0289	0.4335	0.8748	0.5207	-0.3172	-0.0030	0.4240	2.0839	1.8024	1.3304	0.7298	0.6986
$A=1/(\Omega_P(1+g^e_{NE}))$	0.9798	0.9705	0.7977	0.8249	0.8063	0.7627	0.7120	0.6500	0.6935	0.6996	0.7459	0.7323	0.7975
$g_Y(g^*_m)$	0.0105	0.0283	0.0256	-0.0167	0.0312	0.0320	0.0303	0.0281	0.0163	0.0139	0.0204	0.9659	0.0806
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0226	0.0008	0.0137	-0.0177	0.0199	-0.0127	-0.0001	0.0182	0.0505	0.0367	0.0370	0.9595	0.0700
$\pi(g^*_m)$	0.0320	0.0549	0.0461	0.0168	0.0509	0.0736	0.0696	0.0518	0.0544	0.0478	0.0794	0.0412	0.0764
$\rho(g^*_m)$	0.0310	0.0547	0.0372	0.0139	0.0415	0.0587	0.0511	0.0340	0.0365	0.0327	0.0583	0.0303	0.0616
$\xi_\pi=(g^*_m)$	0.2573	-0.0027	-0.0871	-0.7229	-0.1216	0.0273	0.0004	-0.1246	0.1832	0.2073	0.3411	-0.4822	-0.2716
$K_P=K^0_P(1+g_{KP})$	255958	277338	365511	375311	429482	483159	582756	711754	728349	744517	737535	1500201	800437
$Y=Y^0(1+g_Y)$	247835	276558	294960	309911	350111	385192	427564	467124	488668	509413	541336	1102150	644716

UK m & gem by case

UK, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (2)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	10.7704	11.3580	14.7962	15.1776	17.1786	18.4892	21.6413	26.1761	27.6886	28.9380	29.1320	59.0630	31.2013
Labour productivity $y=Y/N_E$	10.4286	11.3260	11.9403	12.5328	14.0039	14.7402	15.8780	17.1794	18.5770	19.7999	21.3823	43.3917	25.1312
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0226	0.0008	0.0137	-0.0177	0.0199	-0.0127	-0.0001	0.0182	0.0505	0.0367	0.0370	0.9595	0.0700
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0021	0.0001	0.0024	-0.0437	0.0043	-0.0008	0.0000	0.0040	-0.0025	-0.0024	-0.0052	0.8997	0.0301
R of tech. prog.(given) **under const.π**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-0.4700	0.4861	0.2285	0.0167	0.1883	0.6040	0.4248	0.1635	-0.7323	-0.5666	-0.2742	0.0411	0.0944
$F=(E+m^{*0})/m^{*0}$	0.7518	19.4766	1.5799	1.0210	1.3978	-1.0947	-153.5807	1.4241	0.6135	0.6542	0.7733	1.0619	1.1486
$G=\pi/(1-\pi)$	0.0261	0.0582	0.0532	0.0644	0.0616	0.0772	0.0748	0.0629	0.0482	0.0412	0.0629	0.0865	0.1172
$H=(1-E)/((1-\pi)m^{*0})$	0.7967	20.6686	2.0618	1.3161	1.8203	-1.4791	-224.9818	2.3064	0.9585	0.9955	1.1198	1.5704	1.5932
$g_Y(g^*_m)$	0.0135	0.0283	0.0239	0.0296	0.0278	0.0310	0.0303	0.0250	0.0206	0.0178	0.0276	0.0368	0.0515
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0256	0.0008	0.0121	0.0286	0.0166	-0.0136	-0.0001	0.0151	0.0550	0.0406	0.0443	0.0334	0.0411
$\xi_{\Omega P}(g^*_m)$	-0.1174	-0.0051	-0.0595	-0.0892	-0.0668	0.1005	0.0007	-0.0656	-0.1402	-0.1326	-0.1145	-0.0861	-0.0801
$g_{KP}(g^*_m)$	-0.1055	0.0231	-0.0371	-0.0622	-0.0408	0.1347	0.0310	-0.0422	-0.1225	-0.1172	-0.0901	-0.0525	-0.0327
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.1330	0.0051	0.0633	0.0979	0.0715	-0.0913	-0.0007	0.0702	0.1630	0.1529	0.1293	0.0942	0.0871
$\Omega_P(g^*_m)$	0.9115	0.9977	1.1654	1.1030	1.1448	1.3804	1.3639	1.4237	1.2816	1.2677	1.2064	1.2440	1.1421
$\rho(g^*_m)$	0.0279	0.0551	0.0433	0.0549	0.0507	0.0519	0.0510	0.0416	0.0359	0.0312	0.0491	0.0640	0.0919
$K_P=K^0_P(1+g_{KP})$	226575	275921	343186	357955	399493	531261	583135	663061	628928	648252	657678	723065	716471
$Y=Y^0(1+g_Y)$	248568	276557	294474	324530	348962	384850	427564	465724	490747	511347	545148	581237	627328
Capital-labour ratio $k=K_P/N_E$	9.5340	11.2999	13.8925	14.4757	15.9791	20.3299	21.6554	24.3853	23.9091	25.1964	25.9777	28.4671	27.9283
Labour productivity $y=Y/N_E$	10.4594	11.3259	11.9206	13.1240	13.9579	14.7272	15.8780	17.1279	18.6560	19.8751	21.5329	22.8834	24.4534
$g_k=(k-k_0)/k_0$	-0.0948	-0.0043	-0.0482	-0.0632	-0.0513	0.0856	0.0005	-0.0515	-0.0929	-0.0974	-0.0753	-0.0556	-0.0423
$g_y=(y-y_0)/y_0$	0.0256	0.0008	0.0121	0.0286	0.0166	-0.0136	-0.0001	0.0151	0.0550	0.0406	0.0443	0.0334	0.0411
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.1167	-0.0050	-0.0588	-0.0879	-0.0658	0.0986	0.0006	-0.0647	-0.1387	-0.1314	-0.1129	-0.0844	-0.0780
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0008	0.0001	0.0008	0.0014	0.0010	-0.0017	0.0000	0.0010	0.0017	0.0014	0.0018	0.0018	0.0023
Growth rate of output g^1_{KP}	NA	0.0647	0.3215	0.0710	0.0912	0.1241	0.2080	0.2240	0.0352	0.0246	-0.0157	0.0558	-0.0294
Growth rate of household wages g^1_W	NA	0.0633	0.0745	0.0843	0.0802	0.0834	0.1142	0.1072	0.0731	0.0519	0.0344	0.0339	0.0349
Growth rate of corporate profit g^1_P	NA	1.3725	-0.0185	0.3141	0.0318	0.3584	0.0798	-0.0692	-0.1771	-0.1009	0.5794	0.4205	0.4031
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0514	0.2852	0.0468	0.0613	0.0949	0.1696	0.1880	0.0110	0.0056	-0.0315	0.0293	-0.0621
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0760	0.0458	0.0718	0.0791	0.0716	0.0660	0.0744	0.0627	0.0873	0.0576	0.0506	0.0315
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.3428	-0.0455	0.2845	0.0035	0.3231	0.0454	-0.0966	-0.1964	-0.1175	0.5540	0.3849	0.3558
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.8884)	1.0307	2.1903	(16.5405)	2.8233	0.7063	0.9958	2.8771	(0.4988)	(0.6343)	(1.2761)	294.6320
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0341	5.0214	(0.3650)	(756.6834)	(0.8467)	(3.4991)	1.6919	0.1602	(0.0238)	(0.0359)	0.0975	51.1118

UK m & gem by case

UK(3)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	2800	4600	6787	8394	10213	12807	17278	21544	24073	24631	27791	29426	32151
Corporate saving S^0_P	3436	10195	7734	10688	9475	13938	11600	5335	-1955	-4745	3617	15188	30448
Profit P^0	6236	14795	14521	19082	19688	26745	28878	26879	22118	19886	31408	44614	62599
Net national income Y^0	245262	268941	287608	315187	339528	373266	414977	454357	480853	502422	530521	560625	596600
Household (incl.governmnet) W^0	239026	254146	273087	296105	319840	346521	386099	427478	458735	482536	499113	516011	534001
Corporate capital stock K^0_P	253300	269700	356400	381700	416500	468200	565600	692300	716700	734300	722800	763100	740700
Number of workers N^0_E	24049	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400
Growth rate of workers g^1_{NE} (actual)	NA	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033
Relative share $\pi^0=P^0/Y^0$	0.0254	0.0550	0.0505	0.0605	0.0580	0.0717	0.0696	0.0592	0.0460	0.0396	0.0592	0.0796	0.1049
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.0328	1.0028	1.2392	1.2110	1.2267	1.2543	1.3630	1.5237	1.4905	1.4615	1.3624	1.3612	1.2415
Rate of profit $\rho^0=P^0/K^0_P$	0.0246	0.0549	0.0407	0.0500	0.0473	0.0571	0.0511	0.0388	0.0309	0.0271	0.0435	0.0585	0.0845
Capital-labour ratio $k^0=K^0_P/N^0_E$	10.5327	11.3486	14.5958	15.4516	16.8433	18.7273	21.6440	25.7093	26.3580	27.9148	28.0939	30.1418	29.1614
Labour productivity $y^0=Y^0/N^0_E$	10.1984	11.3167	11.7785	12.7591	13.7305	14.9300	15.8800	16.8730	17.6843	19.0999	20.6204	22.1442	23.4882
R of tech. prog.(given) **under const.Ω_P**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
Number of workers N_E	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400	25654
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4919	0.4993	0.4466	0.4523	0.4491	0.4436	0.4232	0.3962	0.4015	0.4063	0.4233	0.4235	0.4461
Corporate propensity to save $s_{SP/Y}$	0.0125	0.0275	0.0225	0.0274	0.0260	0.0318	0.0295	0.0234	0.0185	0.0161	0.0251	0.0337	0.0468
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0127	0.0282	0.0231	0.0282	0.0267	0.0328	0.0303	0.0240	0.0188	0.0163	0.0257	0.0349	0.0491
Corporate capital stock K_P	256508	277317	364621	392446	427636	483570	582762	708918	730186	746300	741379	789716	777075
Corporate income (added value) Y	248369	276537	294243	324060	348606	385519	427569	465263	489901	510633	544157	580179	625898
Capital-labour ratio $k=K_P/N_E$	10.7935	11.3571	14.7602	15.8705	17.1048	18.5049	21.6415	26.0718	27.7585	29.0073	29.2838	31.0912	30.2906
Labour productivity $y=Y/N_E$	10.4510	11.3251	11.9112	13.1050	13.9437	14.7528	15.8782	17.1109	18.6239	19.8474	21.4938	22.8417	24.3977
Coef. of technical progress m^{*0}	1.8934	0.0263	0.3941	0.7953	0.4734	-0.2884	-0.0027	0.3855	1.8945	1.6385	1.2095	0.6634	0.6351
Coef. of technical progress m^*	2.2720	0.0316	0.4729	0.9543	0.5680	-0.3460	-0.0033	0.4626	2.2734	1.9662	1.4514	0.7961	0.7621
$A=1/(\Omega_P(1+g^e_{NE}))$	0.9798	0.9705	0.7977	0.8249	0.8063	0.7627	0.7120	0.6500	0.6935	0.6996	0.7459	0.7323	0.7975
$g_Y(g^*_m)$	0.0090	0.0284	0.0287	-0.0065	0.0374	0.0311	0.0303	0.0339	0.0143	0.0121	0.0169	-0.0376	0.2255
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0210	0.0009	0.0168	-0.0075	0.0260	-0.0135	-0.0001	0.0239	0.0485	0.0348	0.0334	-0.0407	0.2133
$\pi(g^*_m)$	0.0430	0.0547	0.0424	0.0097	0.0454	0.0757	0.0696	0.0460	0.0666	0.0603	0.1205	0.0278	0.0601
$\rho(g^*_m)$	0.0417	0.0546	0.0342	0.0080	0.0370	0.0603	0.0511	0.0302	0.0447	0.0412	0.0885	0.0204	0.0484
$\xi_\pi=(g^*_m)$	0.6930	-0.0054	-0.1603	-0.8391	-0.2169	0.0561	0.0007	-0.2216	0.4486	0.5230	1.0355	-0.6507	-0.4271
$K_P=K^0_P(1+g_{KP})$	255568	277360	366617	379237	432061	482770	582749	715756	726952	743196	735008	734412	907692
$Y=Y^0(1+g_Y)$	247458	276579	295853	313154	352214	384882	427559	469751	487731	508509	539482	539549	731104

UK m & gem by case

UK, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (4)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	10.7540	11.3588	14.8410	15.3364	17.2818	18.4743	21.6410	26.3233	27.6355	28.8866	29.0322	28.9139	35.3821
Labour productivity $y=Y/N_E$	10.4127	11.3269	11.9764	12.6639	14.0880	14.7284	15.8779	17.2760	18.5414	19.7648	21.3091	21.2421	28.4986
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0210	0.0009	0.0168	-0.0075	0.0260	-0.0135	-0.0001	0.0239	0.0485	0.0348	0.0334	-0.0407	0.2133
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0037	0.0002	0.0055	-0.0337	0.0103	-0.0017	0.0000	0.0096	-0.0044	-0.0042	-0.0086	-0.0700	0.1681
R of tech. prog.(given) **under const.π**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-0.4700	0.4861	0.2285	0.0167	0.1883	0.6040	0.4248	0.1635	-0.7323	-0.5666	-0.2742	0.0411	0.0944
$F=(E+m^{*0})/m^{*0}$	0.7518	19.4766	1.5799	1.0210	1.3978	-1.0947	-153.5807	1.4241	0.6135	0.6542	0.7733	1.0619	1.1486
$G=\pi/(1-\pi)$	0.0261	0.0582	0.0532	0.0644	0.0616	0.0772	0.0748	0.0629	0.0482	0.0412	0.0629	0.0865	0.1172
$H=(1-E)/((1-\pi)m^{*0})$	0.7967	20.6686	2.0618	1.3161	1.8203	-1.4791	-224.9818	2.3064	0.9585	0.9955	1.1198	1.5704	1.5932
$g_Y(g^*_m)$	0.0142	0.0284	0.0246	0.0310	0.0288	0.0291	0.0303	0.0260	0.0221	0.0190	0.0293	0.0385	0.0537
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0263	0.0009	0.0128	0.0300	0.0175	-0.0154	-0.0001	0.0161	0.0566	0.0419	0.0460	0.0351	0.0433
$\xi_{\Omega P}(g^*_m)$	-0.2101	-0.0102	-0.1124	-0.1638	-0.1252	0.2235	0.0013	-0.1231	-0.2459	-0.2341	-0.2055	-0.1585	-0.1483
$g_{KP}(g^*_m)$	-0.1989	0.0179	-0.0905	-0.1379	-0.1000	0.2591	0.0317	-0.1004	-0.2292	-0.2196	-0.1822	-0.1261	-0.1025
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.2660	0.0103	0.1266	0.1959	0.1431	-0.1827	-0.0013	0.1404	0.3260	0.3057	0.2586	0.1883	0.1741
$\Omega_P(g^*_m)$	0.8157	0.9926	1.0999	1.0127	1.0732	1.5347	1.3647	1.3361	1.1240	1.1193	1.0825	1.1454	1.0574
$\rho(g^*_m)$	0.0312	0.0554	0.0459	0.0598	0.0540	0.0467	0.0510	0.0443	0.0409	0.0354	0.0547	0.0695	0.0992
$K_P=K^0_P(1+g_{KP})$	202914	274538	324145	329076	374851	589526	583509	622820	552457	573074	591074	666891	664753
$Y=Y^0(1+g_Y)$	248745	276577	294693	324962	349298	384124	427559	466162	491497	511984	546044	582221	628661
Capital-labour ratio $k=K_P/N_E$	8.5383	11.2433	13.1217	13.3078	14.9934	22.5595	21.6692	22.9054	21.0020	22.2743	23.3469	26.2556	25.9123
Labour productivity $y=Y/N_E$	10.4669	11.3268	11.9295	13.1415	13.9714	14.6994	15.8779	17.1440	18.6845	19.8999	21.5683	22.9221	24.5054
$g_k=(k-k_0)/k_0$	-0.1893	-0.0093	-0.1010	-0.1387	-0.1098	0.2046	0.0012	-0.1091	-0.2032	-0.2021	-0.1690	-0.1289	-0.1114
$g_y=(y-y_0)/y_0$	0.0263	0.0009	0.0128	0.0300	0.0175	-0.0154	-0.0001	0.0161	0.0566	0.0419	0.0460	0.0351	0.0433
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.2089	-0.0100	-0.1110	-0.1615	-0.1234	0.2191	0.0013	-0.1214	-0.2434	-0.2321	-0.2027	-0.1555	-0.1445
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0015	0.0001	0.0015	0.0028	0.0020	-0.0036	0.0000	0.0019	0.0033	0.0026	0.0035	0.0035	0.0044
Growth rate of output g^1_{KP}	NA	0.0647	0.3215	0.0710	0.0912	0.1241	0.2080	0.2240	0.0352	0.0246	-0.0157	0.0558	-0.0294
Growth rate of household wages g^1_W	NA	0.0633	0.0745	0.0843	0.0802	0.0834	0.1142	0.1072	0.0731	0.0519	0.0344	0.0339	0.0349
Growth rate of corporate profit g^1_P	NA	1.3725	-0.0185	0.3141	0.0318	0.3584	0.0798	-0.0692	-0.1771	-0.1009	0.5794	0.4205	0.4031
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0514	0.2852	0.0468	0.0613	0.0949	0.1696	0.1880	0.0110	0.0056	-0.0315	0.0293	-0.0621
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0760	0.0458	0.0718	0.0791	0.0716	0.0660	0.0744	0.0627	0.0873	0.0576	0.0506	0.0315
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.3428	-0.0455	0.2845	0.0035	0.3231	0.0454	-0.0966	-0.1964	-0.1175	0.5540	0.3849	0.3558
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.7583)	1.0336	2.4560	(6.3750)	3.3843	0.6879	0.9954	3.4691	(0.4390)	(0.5523)	(1.0573)	(11.4670)
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0291	5.0354	(0.4092)	(291.6384)	(1.0150)	(3.4081)	1.6912	0.1932	(0.0210)	(0.0313)	0.0808	(1.9893)

UK m & gem by case

UK(5)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	2800	4600	6787	8394	10213	12807	17278	21544	24073	24631	27791	29426	32151
Corporate saving S^0_P	3436	10195	7734	10688	9475	13938	11600	5335	-1955	-4745	3617	15188	30448
Profit P^0	6236	14795	14521	19082	19688	26745	28878	26879	22118	19886	31408	44614	62599
Net national income Y^0	245262	268941	287608	315187	339528	373266	414977	454357	480853	502422	530521	560625	596600
Household (incl.governmnet) W^0	239026	254146	273087	296105	319840	346521	386099	427478	458735	482536	499113	516011	534001
Corporate capital stock K^0_P	253300	269700	356400	381700	416500	468200	565600	692300	716700	734300	722800	763100	740700
Number of workers N^0_E	24049	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400
Growth rate of workers g^1_{NE} (actual)	NA	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033
Relative share $\pi^0=P^0/Y^0$	0.0254	0.0550	0.0505	0.0605	0.0580	0.0717	0.0696	0.0592	0.0460	0.0396	0.0592	0.0796	0.1049
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.0328	1.0028	1.2392	1.2110	1.2267	1.2543	1.3630	1.5237	1.4905	1.4615	1.3624	1.3612	1.2415
Rate of profit $\rho^0=P^0/K^0_P$	0.0246	0.0549	0.0407	0.0500	0.0473	0.0571	0.0511	0.0388	0.0309	0.0271	0.0435	0.0585	0.0845
Capital-labour ratio $k^0=K^0_P/N^0_E$	10.5327	11.3486	14.5958	15.4516	16.8433	18.7273	21.6440	25.7093	26.3580	27.9148	28.0939	30.1418	29.1614
Labour productivity $y^0=Y^0/N^0_E$	10.1984	11.3167	11.7785	12.7591	13.7305	14.9300	15.8800	16.8730	17.6843	19.0999	20.6204	22.1442	23.4882
R of tech. prog.(given) **under const.Ω_P**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
Number of workers N_E	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400	25654
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4919	0.4993	0.4466	0.4523	0.4491	0.4436	0.4232	0.3962	0.4015	0.4063	0.4233	0.4235	0.4461
Corporate propensity to save $s_{SP/Y}$	0.0125	0.0275	0.0225	0.0274	0.0260	0.0318	0.0295	0.0234	0.0185	0.0161	0.0251	0.0337	0.0468
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0127	0.0282	0.0231	0.0282	0.0267	0.0328	0.0303	0.0240	0.0188	0.0163	0.0257	0.0349	0.0491
Corporate capital stock K_P	256508	277317	364621	392446	427636	483570	582762	708918	730186	746300	741379	789716	777075
Corporate income (added value) Y	248369	276537	294243	324060	348606	385519	427569	465263	489901	510633	544157	580179	625898
Capital-labour ratio $k=K_P/N_E$	10.7935	11.3571	14.7602	15.8705	17.1048	18.5049	21.6415	26.0718	27.7585	29.0073	29.2838	31.0912	30.2906
Labour productivity $y=Y/N_E$	10.4510	11.3251	11.9112	13.1050	13.9437	14.7528	15.8782	17.1109	18.6239	19.8474	21.4938	22.8417	24.3977
Coef. of technical progress m^{*0}	1.8934	0.0263	0.3941	0.7953	0.4734	-0.2884	-0.0027	0.3855	1.8945	1.6385	1.2095	0.6634	0.6351
Coef. of technical progress m^*	1.7040	0.0237	0.3547	0.7157	0.4260	-0.2595	-0.0025	0.3469	1.7050	1.4747	1.0885	0.5971	0.5716
$A=1/(\Omega_P(1+g^e_{NE}))$	0.9798	0.9705	0.7977	0.8249	0.8063	0.7627	0.7120	0.6500	0.6935	0.6996	0.7459	0.7323	0.7975
$g_Y(g^*_m)$	0.0160	0.0282	0.0210	0.0076	0.0234	0.0338	0.0304	0.0209	0.0223	0.0198	0.0348	0.0178	0.0353
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0281	0.0007	0.0092	0.0066	0.0122	-0.0110	-0.0001	0.0111	0.0568	0.0427	0.0516	0.0144	0.0251
$\pi(g^*_m)$	0.0211	0.0552	0.0558	-0.0376	0.0673	0.0698	0.0696	0.0690	0.0398	0.0338	0.0472	1.1601	0.1673
$\rho(g^*_m)$	0.0204	0.0550	0.0450	-0.0311	0.0549	0.0556	0.0510	0.0453	0.0267	0.0231	0.0346	0.8523	0.1347
$\xi_\pi=(g^*_m)$	-0.1699	0.0027	0.1055	-1.6217	0.1607	-0.0259	-0.0004	0.1660	-0.1341	-0.1465	-0.2028	13.5782	0.5943
$K_P=K^0_P(1+g_{KP})$	257347	277296	363890	384619	426250	484003	582769	706804	732712	748837	747937	776653	766849
$Y=Y^0(1+g_Y)$	249181	276516	293652	317597	347476	385865	427574	463876	491596	512368	548971	570582	617661

UK m & gem by case

UK, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (6)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	10.8288	11.3562	14.7306	15.5540	17.0493	18.5215	21.6417	25.9940	27.8545	29.1059	29.5429	30.5769	29.8920
Labour productivity $y=Y/N_E$	10.4852	11.3243	11.8873	12.8436	13.8985	14.7660	15.8784	17.0599	18.6883	19.9148	21.6839	22.4638	24.0766
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0281	0.0007	0.0092	0.0066	0.0122	-0.0110	-0.0001	0.0111	0.0568	0.0427	0.0516	0.0144	0.0251
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0033	-0.0001	-0.0020	-0.0199	-0.0032	0.0009	0.0000	-0.0030	0.0035	0.0034	0.0088	-0.0165	-0.0132
R of tech. prog.(given) **under const.**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-0.4700	0.4861	0.2285	0.0167	0.1883	0.6040	0.4248	0.1635	-0.7323	-0.5666	-0.2742	0.0411	0.0944
$F=(E+m^{*0})/m^{*0}$	0.7518	19.4766	1.5799	1.0210	1.3978	-1.0947	-153.5807	1.4241	0.6135	0.6542	0.7733	1.0619	1.1486
$G=\pi/(1-\pi)$	0.0261	0.0582	0.0532	0.0644	0.0616	0.0772	0.0748	0.0629	0.0482	0.0412	0.0629	0.0865	0.1172
$H=(1-E)/((1-\pi)m^{*0})$	0.7967	20.6686	2.0618	1.3161	1.8203	-1.4791	-224.9818	2.3064	0.9585	0.9955	1.1198	1.5704	1.5932
$g_Y(g^*_m)$	0.0117	0.0282	0.0222	0.0265	0.0256	0.0345	0.0304	0.0229	0.0168	0.0147	0.0236	0.0328	0.0465
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0238	0.0007	0.0104	0.0255	0.0144	-0.0103	-0.0001	0.0130	0.0511	0.0375	0.0402	0.0295	0.0362
$\xi_{\Omega P}(g^*_m)$	0.1534	0.0052	0.0676	0.1086	0.0771	-0.0837	-0.0007	0.0755	0.1948	0.1804	0.1485	0.1040	0.0954
$g_{KP}(g^*_m)$	0.1670	0.0335	0.0913	0.1380	0.1046	-0.0521	0.0297	0.1002	0.2148	0.1978	0.1757	0.1402	0.1463
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.1330	-0.0051	-0.0633	-0.0979	-0.0715	0.0913	0.0007	-0.0702	-0.1630	-0.1529	-0.1293	-0.0942	-0.0871
$\Omega_P(g^*_m)$	1.1912	1.0080	1.3229	1.3425	1.3212	1.1493	1.3621	1.6388	1.7807	1.7252	1.5648	1.5027	1.3599
$\rho(g^*_m)$	0.0213	0.0546	0.0382	0.0451	0.0439	0.0623	0.0511	0.0361	0.0258	0.0229	0.0378	0.0530	0.0772
$K_P=K^0_P(1+g_{KP})$	295594	278728	388937	434370	460086	443805	582390	761659	870680	879574	849771	870100	849090
$Y=Y^0(1+g_Y)$	248141	276517	293998	323549	348227	386138	427574	464777	488941	509827	543056	579037	624360
Capital-labour ratio $k=K_P/N_E$	12.4382	11.4149	15.7445	17.5659	18.4027	16.9832	21.6277	28.0114	33.0994	34.1874	33.5652	34.2559	33.0978
Labour productivity $y=Y/N_E$	10.4415	11.3243	11.9013	13.0843	13.9285	14.7765	15.8784	17.0930	18.5874	19.8160	21.4503	22.7967	24.3377
$g_k=(k-k_0)/k_0$	0.1809	0.0058	0.0787	0.1368	0.0926	-0.0931	-0.0008	0.0895	0.2558	0.2247	0.1948	0.1365	0.1350
$g_y=(y-y_0)/y_0$	0.0238	0.0007	0.0104	0.0255	0.0144	-0.0103	-0.0001	0.0130	0.0511	0.0375	0.0402	0.0295	0.0362
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.1524	0.0051	0.0667	0.1068	0.0759	-0.0822	-0.0006	0.0744	0.1924	0.1786	0.1462	0.1018	0.0927
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0009	-0.0001	-0.0008	-0.0016	-0.0011	0.0016	0.0000	-0.0010	-0.0020	-0.0016	-0.0020	-0.0020	-0.0025
Growth rate of output g^1_{KP}	NA	0.0647	0.3215	0.0710	0.0912	0.1241	0.2080	0.2240	0.0352	0.0246	-0.0157	0.0558	-0.0294
Growth rate of household wages g^1_W	NA	0.0633	0.0745	0.0843	0.0802	0.0834	0.1142	0.1072	0.0731	0.0519	0.0344	0.0339	0.0349
Growth rate of corporate profit g^1_P	NA	1.3725	-0.0185	0.3141	0.0318	0.3584	0.0798	-0.0692	-0.1771	-0.1009	0.5794	0.4205	0.4031
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0514	0.2852	0.0468	0.0613	0.0949	0.1696	0.1880	0.0110	0.0056	-0.0315	0.0293	-0.0621
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0760	0.0458	0.0718	0.0791	0.0716	0.0660	0.0744	0.0627	0.0873	0.0576	0.0506	0.0315
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.3428	-0.0455	0.2845	0.0035	0.3231	0.0454	-0.0966	-0.1964	-0.1175	0.5540	0.3849	0.3558
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(1.3530)	1.0250	1.8006	7.5556	2.1204	0.7461	0.9965	2.1450	(0.6856)	(0.9025)	(2.1770)	5.4173
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0$	NA	0.0520	4.9935	(0.3000)	345.6455	(0.6359)	(3.6965)	1.6932	0.1195	(0.0327)	(0.0511)	0.1664	0.9398

UK m & gem by case

UK(7)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	2800	4600	6787	8394	10213	12807	17278	21544	24073	24631	27791	29426	32151
Corporate saving S^0_P	3436	10195	7734	10688	9475	13938	11600	5335	-1955	-4745	3617	15188	30448
Profit P^0	6236	14795	14521	19082	19688	26745	28878	26879	22118	19886	31408	44614	62599
Net national income Y^0	245262	268941	287608	315187	339528	373266	414977	454357	480853	502422	530521	560625	596600
Household (incl.governmnet) W^0	239026	254146	273087	296105	319840	346521	386099	427478	458735	482536	499113	516011	534001
Corporate capital stock K^0_P	253300	269700	356400	381700	416500	468200	565600	692300	716700	734300	722800	763100	740700
Number of workers N^0_E	24049	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400
Growth rate of workers g^I_{NE} (actual)	NA	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033
Relative share $\pi^0=P^0/Y^0$	0.0254	0.0550	0.0505	0.0605	0.0580	0.0717	0.0696	0.0592	0.0460	0.0396	0.0592	0.0796	0.1049
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	1.0328	1.0028	1.2392	1.2110	1.2267	1.2543	1.3630	1.5237	1.4905	1.4615	1.3624	1.3612	1.2415
Rate of profit $\rho^0=P^0/K^0_P$	0.0246	0.0549	0.0407	0.0500	0.0473	0.0571	0.0511	0.0388	0.0309	0.0271	0.0435	0.0585	0.0845
Capital-labour ratio $k^0=K^0_P/N^0_E$	10.5327	11.3486	14.5958	15.4516	16.8433	18.7273	21.6440	25.7093	26.3580	27.9148	28.0939	30.1418	29.1614
Labour productivity $y^0=Y^0/N^0_E$	10.1984	11.3167	11.7785	12.7591	13.7305	14.9300	15.8800	16.8730	17.6843	19.0999	20.6204	22.1442	23.4882
R of tech. prog.(given) **under const.Ω_P**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
Number of workers N_E	23765	24418	24703	24728	25001	26132	26928	27191	26305	25728	25317	25400	25654
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0118	0.0275	0.0117	0.0010	0.0110	0.0452	0.0305	0.0098	-0.0326	-0.0219	-0.0160	0.0033	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.4919	0.4993	0.4466	0.4523	0.4491	0.4436	0.4232	0.3962	0.4015	0.4063	0.4233	0.4235	0.4461
Corporate propensity to save $s_{SP/Y}$	0.0125	0.0275	0.0225	0.0274	0.0260	0.0318	0.0295	0.0234	0.0185	0.0161	0.0251	0.0337	0.0468
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0127	0.0282	0.0231	0.0282	0.0267	0.0328	0.0303	0.0240	0.0188	0.0163	0.0257	0.0349	0.0491
Corporate capital stock K_P	256508	277317	364621	392446	427636	483570	582762	708918	730186	746300	741379	789716	777075
Corporate income (added value) Y	248369	276537	294243	324060	348606	385519	427569	465263	489901	510633	544157	580179	625898
Capital-labour ratio $k=K_P/N_E$	10.7935	11.3571	14.7602	15.8705	17.1048	18.5049	21.6415	26.0718	27.7585	29.0073	29.2838	31.0912	30.2906
Labour productivity $y=Y/N_E$	10.4510	11.3251	11.9112	13.1050	13.9437	14.7528	15.8782	17.1109	18.6239	19.8474	21.4938	22.8417	24.3977
Coef. of technical progress m^{*0}	1.8934	0.0263	0.3941	0.7953	0.4734	-0.2884	-0.0027	0.3855	1.8945	1.6385	1.2095	0.6634	0.6351
Coef. of technical progress m^*	1.5147	0.0210	0.3153	0.6362	0.3787	-0.2307	-0.0022	0.3084	1.5156	1.3108	0.9676	0.5308	0.5081
$A=1/(\Omega_P(1+g^e_{NE}))$	0.9798	0.9705	0.7977	0.8249	0.8063	0.7627	0.7120	0.6500	0.6935	0.6996	0.7459	0.7323	0.7975
$g_Y(g^*_m)$	0.0216	0.0281	0.0193	0.0044	0.0208	0.0347	0.0304	0.0186	0.0275	0.0251	0.0538	0.0119	0.0276
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0338	0.0006	0.0075	0.0034	0.0097	-0.0101	-0.0001	0.0087	0.0621	0.0481	0.0709	0.0086	0.0174
$\pi(g^*_m)$	0.0180	0.0553	0.0624	-0.0144	0.0802	0.0680	0.0695	0.0827	0.0351	0.0295	0.0392	-0.0922	0.4124
$\rho(g^*_m)$	0.0175	0.0552	0.0504	-0.0119	0.0654	0.0542	0.0510	0.0543	0.0236	0.0202	0.0288	-0.0678	0.3322
$\xi_\pi=(g^*_m)$	-0.2904	0.0054	0.2359	-1.2371	0.3831	-0.0504	-0.0007	0.3980	-0.2364	-0.2556	-0.3372	-2.1590	2.9302
$K_P=K^0_P(1+g_{KP})$	258780	277275	363278	383389	425171	484462	582776	705167	736402	752734	761652	772191	761110
$Y=Y^0(1+g_Y)$	250568	276495	293159	316581	346596	386231	427579	462801	494072	515035	559038	567304	613040

UK m & gem by case

UK, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (8)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	10.8891	11.3553	14.7058	15.5042	17.0061	18.5390	21.6420	25.9338	27.9948	29.2574	30.0846	30.4012	29.6683
Labour productivity $y=Y/N_E$	10.5436	11.3234	11.8673	12.8025	13.8633	14.7800	15.8786	17.0204	18.7824	20.0185	22.0815	22.3348	23.8965
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0338	0.0006	0.0075	0.0034	0.0097	-0.0101	-0.0001	0.0087	0.0621	0.0481	0.0709	0.0086	0.0174
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0089	-0.0002	-0.0037	-0.0231	-0.0058	0.0018	0.0000	-0.0053	0.0085	0.0086	0.0273	-0.0222	-0.0205
R of tech. prog.(given) **under const.π**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-0.4700	0.4861	0.2285	0.0167	0.1883	0.6040	0.4248	0.1635	-0.7323	-0.5666	-0.2742	0.0411	0.0944
$F=(E+m^{*0})/m^{*0}$	0.7518	19.4766	1.5799	1.0210	1.3978	-1.0947	-153.5807	1.4241	0.6135	0.6542	0.7733	1.0619	1.1486
$G=\pi/(1-\pi)$	0.0261	0.0582	0.0532	0.0644	0.0616	0.0772	0.0748	0.0629	0.0482	0.0412	0.0629	0.0865	0.1172
$H=(1-E)/((1-\pi)m^{*0})$	0.7967	20.6686	2.0618	1.3161	1.8203	-1.4791	-224.9818	2.3064	0.9585	0.9955	1.1198	1.5704	1.5932
$g_Y(g^*_m)$	0.0107	0.0281	0.0213	0.0248	0.0244	0.0360	0.0304	0.0218	0.0145	0.0129	0.0213	0.0306	0.0437
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0228	0.0006	0.0095	0.0237	0.0132	-0.0088	-0.0001	0.0119	0.0487	0.0356	0.0379	0.0273	0.0334
$\xi_{\Omega P}(g^*_m)$	0.3625	0.0104	0.1449	0.2436	0.1670	-0.1545	-0.0013	0.1634	0.4837	0.4403	0.3489	0.2320	0.2108
$g_{KP}(g^*_m)$	0.3770	0.0388	0.1694	0.2744	0.1955	-0.1240	0.0290	0.1887	0.5053	0.4589	0.3776	0.2698	0.2638
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.2660	-0.0103	-0.1266	-0.1959	-0.1431	0.1827	0.0013	-0.1404	-0.3260	-0.3057	-0.2586	-0.1883	-0.1741
$\Omega_P(g^*_m)$	1.4071	1.0132	1.4188	1.5060	1.4315	1.0606	1.3612	1.7726	2.2114	2.1051	1.8378	1.6770	1.5033
$\rho(g^*_m)$	0.0181	0.0543	0.0356	0.0402	0.0405	0.0676	0.0511	0.0334	0.0208	0.0188	0.0322	0.0475	0.0698
$K_P=K^0_P(1+g_{KP})$	348799	280153	416757	486436	497918	410136	582018	822969	1078821	1071300	995738	968980	936107
$Y=Y^0(1+g_Y)$	247880	276496	293739	322990	347823	386713	427579	464263	487840	508909	541825	577801	622701
Capital-labour ratio $k=K_P/N_E$	14.6770	11.4732	16.8707	19.6715	19.9159	15.6948	21.6138	30.2662	41.0120	41.6395	39.3308	38.1488	36.4897
Labour productivity $y=Y/N_E$	10.4305	11.3235	11.8908	13.0617	13.9124	14.7984	15.8786	17.0741	18.5455	19.7804	21.4016	22.7481	24.2730
$g_k=(k-k_0)/k_0$	0.3935	0.0110	0.1559	0.2731	0.1824	-0.1619	-0.0014	0.1772	0.5560	0.4917	0.4000	0.2656	0.2513
$g_y=(y-y_0)/y_0$	0.0228	0.0006	0.0095	0.0237	0.0132	-0.0088	-0.0001	0.0119	0.0487	0.0356	0.0379	0.0273	0.0334
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.3598	0.0102	0.1430	0.2395	0.1643	-0.1519	-0.0013	0.1609	0.4775	0.4355	0.3431	0.2270	0.2047
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0020	-0.0001	-0.0017	-0.0033	-0.0022	0.0031	0.0000	-0.0022	-0.0042	-0.0034	-0.0043	-0.0041	-0.0051
Growth rate of output g^1_{KP}	NA	0.0647	0.3215	0.0710	0.0912	0.1241	0.2080	0.2240	0.0352	0.0246	-0.0157	0.0558	-0.0294
Growth rate of household wages g^1_W	NA	0.0633	0.0745	0.0843	0.0802	0.0834	0.1142	0.1072	0.0731	0.0519	0.0344	0.0339	0.0349
Growth rate of corporate profit g^1_P	NA	1.3725	-0.0185	0.3141	0.0318	0.3584	0.0798	-0.0692	-0.1771	-0.1009	0.5794	0.4205	0.4031
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0514	0.2852	0.0468	0.0613	0.0949	0.1696	0.1880	0.0110	0.0056	-0.0315	0.0293	-0.0621
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0760	0.0458	0.0718	0.0791	0.0716	0.0660	0.0744	0.0627	0.0873	0.0576	0.0506	0.0315
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.3428	-0.0455	0.2845	0.0035	0.3231	0.0454	-0.0966	-0.1964	-0.1175	0.5540	0.3849	0.3558
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(1.8320)	1.0222	1.6535	4.3714	1.8856	0.7678	0.9969	1.9029	(0.8437)	(1.1445)	(3.3648)	3.6338
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0704	4.9796	(0.2755)	199.9806	(0.5655)	(3.8038)	1.6938	0.1060	(0.0403)	(0.0648)	0.2571	0.6304

Germany m & gem by case

GERMANY(1)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	39550	39990	45500	53380	61060	53780	54190	61630	78130	74590	88170	5607	
Corporate saving S^0_P	-22330	10180	3010	-2380	33220	35640	64800	54880	74420	39680	15510	-17410	11790
Profit P^0	17220	50170	48510	51000	94280	89420	118990	116510	152550	114270	103680	-11803	11790
Net national income Y^0	1386610	1460770	1536930	1599140	1692410	1750700	1844910	1969650	2145590	2334910	2461400	2464210	2568570
Household (incl.governmnet) W^0	1369390	1410600	1488420	1548140	1598130	1661280	1725920	1853140	1993040	2220640	2357720	2476013	2556780
Corporate capital stock K^0_P	4074760	4174110	4279480	4376270	4481350	4594690	4713270	4843070	4987070	5158180	5350890	5525100	5638020
Number of workers N^0_E	26630	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654
Growth rate of workers g^1_{NE} (actual)	NA	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121
Relative share $\pi^0=P^0/Y^0$	0.0124	0.0343	0.0316	0.0319	0.0557	0.0511	0.0645	0.0592	0.0711	0.0489	0.0421	-0.0048	0.0046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.9386	2.8575	2.7844	2.7366	2.6479	2.6245	2.5547	2.4588	2.3243	2.2092	2.1739	2.2421	2.1950
Rate of profit $\rho^0=P^0/K^0_P$	0.0042	0.0120	0.0113	0.0117	0.0210	0.0195	0.0252	0.0241	0.0306	0.0222	0.0194	-0.0021	0.0021
Capital-labour ratio $k^0=K^0_P/N^0_E$	153.0139	159.0077	162.7612	165.2108	166.8659	169.8591	172.8942	175.1056	175.1139	176.7166	181.6632	190.4878	196.7621
Labour productivity $y^0=Y^0/N^0_E$	52.0695	55.6463	58.4540	60.3700	63.0179	64.7209	67.6758	71.2145	75.3394	79.9928	83.5648	84.9581	89.6409
R of tech. prog.(given) **under const.Ω_P**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Number of workers N_E	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654	28941
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.2539	0.2592	0.2642	0.2676	0.2741	0.2759	0.2813	0.2891	0.3008	0.3116	0.3151	0.3084	0.3130
Corporate propensity to save $s_{SP/Y}$	0.0032	0.0089	0.0083	0.0085	0.0153	0.0141	0.0181	0.0171	0.0214	0.0153	0.0133	-0.0015	0.0014
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0032	0.0090	0.0084	0.0086	0.0155	0.0143	0.0185	0.0174	0.0219	0.0155	0.0134	-0.0015	0.0014
Corporate capital stock K_P	4087649	4211608	4315472	4413943	4550846	4660364	4800367	4927336	5096062	5238061	5422859	5516950	5646132
Corporate income (added value) Y	1390996	1473893	1549856	1612906	1718656	1775724	1879002	2003921	2192482	2371069	2494506	2460575	2572265
Capital-labour ratio $k=K_P/N_E$	155.7140	160.1798	162.9156	164.3559	168.2383	170.9535	173.5616	173.0165	174.5884	177.8326	186.9629	192.5368	195.0942
Labour productivity $y=Y/N_E$	52.9883	56.0565	58.5094	60.0576	63.5363	65.1379	67.9370	70.3649	75.1133	80.4980	86.0026	85.8720	88.8810
Coef. of technical progress m^{*0}	1.8985	0.2872	0.0405	-0.2197	0.2003	0.1718	0.0818	-0.2789	-0.0591	0.1846	0.9977	-3.2521	-2.6842
Coef. of technical progress m^*	2.0883	0.3159	0.0446	-0.2416	0.2203	0.1889	0.0899	-0.3067	-0.0650	0.2031	1.0975	-3.5773	-2.9526
$A=1/(\Omega_P(1+g^e_{NE}))$	0.3452	0.3494	0.3565	0.3604	0.3749	0.3781	0.3858	0.3950	0.4198	0.4486	0.4671	0.4515	0.4511
$g_Y(g^*_m)$	0.0028	0.0167	0.0085	0.0083	0.0175	0.0156	0.0190	0.0167	0.0216	0.0167	0.0113	-0.0014	0.0013
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0173	0.0151	0.0011	-0.0055	0.0102	0.0077	0.0044	-0.0126	-0.0033	0.0075	0.0270	0.0109	-0.0086
$\pi(g^*_m)$	0.0141	0.0236	0.0312	0.0331	0.0501	0.0472	0.0628	0.0617	0.0720	0.0458	0.0517	-0.0053	0.0050
$\rho(g^*_m)$	0.0048	0.0082	0.0112	0.0121	0.0189	0.0180	0.0246	0.0251	0.0310	0.0207	0.0238	-0.0023	0.0023
$\xi_\pi=(g^*_m)$	0.1387	-0.3138	-0.0126	0.0390	-0.1015	-0.0758	-0.0257	0.0424	0.0122	-0.0644	0.2278	0.0964	0.0935
$K_P=K^0_P(1+g_{KP})$	4086245	4243742	4315939	4412568	4559849	4666328	4802773	4923988	5094734	5244067	5411468	5517607	5645492
$Y=Y^0(1+g_Y)$	1390518	1485139	1550024	1612404	1722055	1777996	1879944	2002559	2191910	2373788	2489266	2460868	2571974

Germany m & gem by case

GERMANY, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (2)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	155.6605	161.4020	162.9333	164.3048	168.5711	171.1723	173.6486	172.8989	174.5429	178.0366	186.5702	192.5598	195.0721
Labour productivity $y=Y/N_E$	52.9701	56.4842	58.5158	60.0389	63.6619	65.2212	67.9711	70.3170	75.0937	80.5903	85.8220	85.8822	88.8710
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0173	0.0151	0.0011	-0.0055	0.0102	0.0077	0.0044	-0.0126	-0.0033	0.0075	0.0270	0.0109	-0.0086
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0003	0.0076	0.0001	-0.0003	0.0020	0.0013	0.0005	-0.0007	-0.0003	0.0011	-0.0021	0.0001	-0.0001
R of tech. prog.(given) **under const.π**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-1.1626	0.0465	0.2344	0.4285	0.1287	0.1515	0.2226	0.4874	0.3421	0.1845	-0.3683	2.5575	2.1570
$F=(E+m^{*0})/m^{*0}$	0.3876	1.1620	6.7861	-0.9508	1.6428	1.8823	3.7220	-0.7476	-4.7913	1.9996	0.6308	0.2136	0.1964
$G=\pi/(1-\pi)$	0.0126	0.0356	0.0326	0.0329	0.0590	0.0538	0.0689	0.0629	0.0765	0.0515	0.0440	-0.0048	0.0046
$H=(1-E)/((1-\pi)m^{*0})$	1.1534	3.4384	19.5112	-2.6876	4.6065	5.2060	10.1643	-1.9539	-11.9889	4.6447	1.4317	0.4766	0.4330
$g_Y(g^*_m)$	0.0037	0.0095	0.0085	0.0079	0.0162	0.0148	0.0188	0.0157	0.0215	0.0160	0.0149	-0.0019	0.0019
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0182	0.0079	0.0010	-0.0059	0.0089	0.0070	0.0042	-0.0136	-0.0033	0.0068	0.0306	0.0103	-0.0080
$\xi_{\Omega P}(g^*_m)$	-0.2051	-0.0792	-0.0145	0.1175	-0.0574	-0.0504	-0.0262	0.1544	0.0213	-0.0476	-0.1368	-0.3189	-0.3374
$g_{KP}(g^*_m)$	-0.2021	-0.0704	-0.0061	0.1264	-0.0421	-0.0364	-0.0078	0.1725	0.0433	-0.0324	-0.1240	-0.3202	-0.3362
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.2580	0.0861	0.0147	-0.1052	0.0609	0.0531	0.0269	-0.1338	-0.0209	0.0500	0.1585	0.4682	0.5092
$\Omega_P(g^*_m)$	2.3360	2.6310	2.7440	3.0583	2.4960	2.4921	2.4879	2.8385	2.3739	2.1039	1.8765	1.5272	1.4544
$\rho(g^*_m)$	0.0053	0.0131	0.0115	0.0104	0.0223	0.0205	0.0259	0.0208	0.0300	0.0233	0.0224	-0.0031	0.0032
$K_P=K^0_P(1+g_{KP})$	3251240	3880046	4253189	4929409	4292612	4427666	4676424	5678374	5203021	4991199	4687382	3756122	3742741
$Y=Y^0(1+g_Y)$	1391791	1474719	1549997	1611806	1719815	1776687	1879668	2000478	2191778	2372314	2497980	2459548	2573383
Capital-labour ratio $k=K_P/N_E$	123.8520	147.5695	160.5643	183.5496	158.6917	162.4176	169.0803	199.3881	178.2528	169.4517	161.6060	131.0854	129.3252
Labour productivity $y=Y/N_E$	53.0186	56.0879	58.5147	60.0166	63.5791	65.1732	67.9611	70.2440	75.0892	80.5403	86.1224	85.8361	88.9196
$g_k=(k-k_0)/k_0$	-0.1906	-0.0719	-0.0135	0.1110	-0.0490	-0.0438	-0.0221	0.1387	0.0179	-0.0411	-0.1104	-0.3118	-0.3427
$g_y=(y-y_0)/y_0$	0.0182	0.0079	0.0010	-0.0059	0.0089	0.0070	0.0042	-0.0136	-0.0033	0.0068	0.0306	0.0103	-0.0080
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.2046	-0.0787	-0.0144	0.1168	-0.0567	-0.0499	-0.0258	0.1524	0.0210	-0.0471	-0.1356	-0.3192	-0.3371
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0006	0.0006	0.0001	-0.0007	0.0007	0.0005	0.0004	-0.0017	-0.0003	0.0005	0.0014	-0.0004	0.0004
Growth rate of output g^1_{KP}	NA	0.0244	0.0252	0.0226	0.0240	0.0253	0.0258	0.0275	0.0297	0.0343	0.0374	0.0326	0.0204
Growth rate of household wages g^1_W	NA	0.0301	0.0552	0.0401	0.0323	0.0395	0.0389	0.0737	0.0755	0.1142	0.0617	0.0502	0.0326
Growth rate of corporate profit g^1_P	NA	1.9135	-0.0331	0.0513	0.8486	-0.0515	0.3307	-0.0208	0.3093	-0.2509	-0.0927	-1.1138	-1.9989
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0212	0.0161	0.0141	0.0153	0.0096	0.0114	0.0089	0.0121	0.0122	0.0215	0.0189	0.0219
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0450	0.0535	0.0324	0.0182	0.0321	0.0309	0.0583	0.0445	0.0871	0.0521	0.0665	0.0453
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.9043	-0.0417	0.0426	0.8328	-0.0660	0.3119	-0.0386	0.2869	-0.2670	-0.1065	-1.1123	-2.0004
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.1980)	10.4266	1.1429	0.5987	2.4249	1.9988	1.3040	0.5629	0.8659	1.8271	(0.7410)	0.1121
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0022	3.9482	(0.3824)	(0.0110)	0.3521	(0.0728)	0.2965	(0.0238)	0.0394	0.3657	(0.0125)	0.0012

Germany m & gem by case

GERMANY(3)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	39550	39990	45500	53380	61060	53780	54190	61630	78130	74590	88170	5607	
Corporate saving S^0_P	-22330	10180	3010	-2380	33220	35640	64800	54880	74420	39680	15510	-17410	11790
Profit P^0	17220	50170	48510	51000	94280	89420	118990	116510	152550	114270	103680	-11803	11790
Net national income Y^0	1386610	1460770	1536930	1599140	1692410	1750700	1844910	1969650	2145590	2334910	2461400	2464210	2568570
Household (incl.governmnet) W^0	1369390	1410600	1488420	1548140	1598130	1661280	1725920	1853140	1993040	2220640	2357720	2476013	2556780
Corporate capital stock K^0_P	4074760	4174110	4279480	4376270	4481350	4594690	4713270	4843070	4987070	5158180	5350890	5525100	5638020
Number of workers N^0_E	26630	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654
Growth rate of workers g^1_{NE} (actual)	NA	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121
Relative share $\pi^0=P^0/Y^0$	0.0124	0.0343	0.0316	0.0319	0.0557	0.0511	0.0645	0.0592	0.0711	0.0489	0.0421	-0.0048	0.0046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.9386	2.8575	2.7844	2.7366	2.6479	2.6245	2.5547	2.4588	2.3243	2.2092	2.1739	2.2421	2.1950
Rate of profit $\rho^0=P^0/K^0_P$	0.0042	0.0120	0.0113	0.0117	0.0210	0.0195	0.0252	0.0241	0.0306	0.0222	0.0194	-0.0021	0.0021
Capital-labour ratio $k^0=K^0_P/N^0_E$	153.0139	159.0077	162.7612	165.2108	166.8659	169.8591	172.8942	175.1056	175.1139	176.7166	181.6632	190.4878	196.7621
Labour productivity $y^0=Y^0/N^0_E$	52.0695	55.6463	58.4540	60.3700	63.0179	64.7209	67.6758	71.2145	75.3394	79.9928	83.5648	84.9581	89.6409
R of tech. prog.(given) **under const.Ω_P**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
Number of workers N_E	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654	28941
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.2539	0.2592	0.2642	0.2676	0.2741	0.2759	0.2813	0.2891	0.3008	0.3116	0.3151	0.3084	0.3130
Corporate propensity to save $s_{SP/Y}$	0.0032	0.0089	0.0083	0.0085	0.0153	0.0141	0.0181	0.0171	0.0214	0.0153	0.0133	-0.0015	0.0014
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0032	0.0090	0.0084	0.0086	0.0155	0.0143	0.0185	0.0174	0.0219	0.0155	0.0134	-0.0015	0.0014
Corporate capital stock K_P	4087649	4211608	4315472	4413943	4550846	4660364	4800367	4927336	5096062	5238061	5422859	5516950	5646132
Corporate income (added value) Y	1390996	1473893	1549856	1612906	1718656	1775724	1879002	2003921	2192482	2371069	2494506	2460575	2572265
Capital-labour ratio $k=K_P/N_E$	155.7140	160.1798	162.9156	164.3559	168.2383	170.9535	173.5616	173.0165	174.5884	177.8326	186.9629	192.5368	195.0942
Labour productivity $y=Y/N_E$	52.9883	56.0565	58.5094	60.0576	63.5363	65.1379	67.9370	70.3649	75.1133	80.4980	86.0026	85.8720	88.8810
Coef. of technical progress m^{*0}	1.8985	0.2872	0.0405	-0.2197	0.2003	0.1718	0.0818	-0.2789	-0.0591	0.1846	0.9977	-3.2521	-2.6842
Coef. of technical progress m^*	2.2782	0.3446	0.0486	-0.2636	0.2404	0.2061	0.0981	-0.3346	-0.0709	0.2215	1.1973	-3.9025	-3.2210
$A=1/(\Omega_P(1+g^e_{NE}))$	0.3452	0.3494	0.3565	0.3604	0.3749	0.3781	0.3858	0.3950	0.4198	0.4486	0.4671	0.4515	0.4511
$g_Y(g^*_m)$	0.0025	0.1166	0.0086	0.0080	0.0201	0.0171	0.0195	0.0161	0.0213	0.0180	0.0098	-0.0013	0.0012
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0170	0.1148	0.0012	-0.0058	0.0128	0.0093	0.0049	-0.0132	-0.0035	0.0088	0.0254	0.0110	-0.0087
$\pi(g^*_m)$	0.0164	0.0179	0.0308	0.0345	0.0454	0.0439	0.0613	0.0644	0.0729	0.0430	0.0670	-0.0058	0.0055
$\rho(g^*_m)$	0.0056	0.0063	0.0111	0.0126	0.0172	0.0167	0.0240	0.0262	0.0313	0.0195	0.0308	-0.0026	0.0025
$\xi_\pi=(g^*_m)$	0.3222	-0.4777	-0.0248	0.0812	-0.1842	-0.1410	-0.0502	0.0886	0.0247	-0.1211	0.5900	0.2134	0.2062
$K_P=K^0_P(1+g_{KP})$	4085117	4660937	4316419	4411291	4571530	4673482	4805317	4920895	5093438	5251050	5403190	5518167	5644946
$Y=Y^0(1+g_Y)$	1390134	1631140	1550196	1611937	1726467	1780722	1880940	2001301	2191353	2376949	2485458	2461118	2571725

Germany m & gem by case

GERMANY, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (4)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	155.6176	177.2691	162.9514	164.2572	169.0030	171.4347	173.7406	172.7903	174.4985	178.2737	186.2848	192.5793	195.0532
Labour productivity $y=Y/N_E$	52.9555	62.0370	58.5223	60.0215	63.8250	65.3212	68.0071	70.2729	75.0746	80.6976	85.6907	85.8909	88.8624
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0170	0.1148	0.0012	-0.0058	0.0128	0.0093	0.0049	-0.0132	-0.0035	0.0088	0.0254	0.0110	-0.0087
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.0006	0.1067	0.0002	-0.0006	0.0045	0.0028	0.0010	-0.0013	-0.0005	0.0025	-0.0036	0.0002	-0.0002
R of tech. prog.(given) **under const.π**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-1.1626	0.0465	0.2344	0.4285	0.1287	0.1515	0.2226	0.4874	0.3421	0.1845	-0.3683	2.5575	2.1570
$F=(E+m^{*0})/m^{*0}$	0.3876	1.1620	6.7861	-0.9508	1.6428	1.8823	3.7220	-0.7476	-4.7913	1.9996	0.6308	0.2136	0.1964
$G=\pi/(1-\pi)$	0.0126	0.0356	0.0326	0.0329	0.0590	0.0538	0.0689	0.0629	0.0765	0.0515	0.0440	-0.0048	0.0046
$H=(1-E)/((1-\pi)m^{*0})$	1.1534	3.4384	19.5112	-2.6876	4.6065	5.2060	10.1643	-1.9539	-11.9889	4.6447	1.4317	0.4766	0.4330
$g_Y(g^*_m)$	0.0042	0.0101	0.0086	0.0072	0.0169	0.0154	0.0192	0.0138	0.0212	0.0165	0.0161	-0.0022	0.0022
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0187	0.0085	0.0011	-0.0066	0.0096	0.0075	0.0046	-0.0155	-0.0036	0.0074	0.0319	0.0100	-0.0077
$\xi_{\Omega P}(g^*_m)$	-0.3403	-0.1468	-0.0286	0.2664	-0.1085	-0.0960	-0.0510	0.3652	0.0436	-0.0909	-0.2407	-0.4836	-0.5046
$g_{KP}(g^*_m)$	-0.3375	-0.1382	-0.0203	0.2755	-0.0935	-0.0821	-0.0328	0.3840	0.0657	-0.0759	-0.2285	-0.4847	-0.5035
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	0.5160	0.1721	0.0295	-0.2104	0.1217	0.1063	0.0537	-0.2675	-0.0417	0.1000	0.3170	0.9364	1.0184
$\Omega_P(g^*_m)$	1.9385	2.4379	2.7047	3.4657	2.3605	2.3724	2.4245	3.3568	2.4256	2.0083	1.6506	1.1579	1.0875
$\rho(g^*_m)$	0.0064	0.0141	0.0117	0.0092	0.0236	0.0215	0.0266	0.0176	0.0293	0.0244	0.0255	-0.0041	0.0042
$K_P=K^0_P(1+g_{KP})$	2699325	3597089	4192686	5581973	4062319	4217254	4558779	6702767	5314618	4766710	4128440	2847036	2799438
$Y=Y^0(1+g_Y)$	1392495	1475511	1550137	1610643	1720938	1777623	1880324	1996760	2191066	2373523	2501147	2458752	2574230
Capital-labour ratio $k=K_P/N_E$	102.8275	136.8078	158.2803	207.8482	150.1781	154.6992	164.8268	235.3582	182.0761	161.8303	142.3355	99.3591	96.7307
Labour productivity $y=Y/N_E$	53.0454	56.1180	58.5200	59.9733	63.6206	65.2075	67.9848	70.1134	75.0648	80.5813	86.2316	85.8084	88.9489
$g_k=(k-k_0)/k_0$	-0.3280	-0.1396	-0.0275	0.2581	-0.1000	-0.0893	-0.0467	0.3441	0.0398	-0.0842	-0.2165	-0.4784	-0.5084
$g_y=(y-y_0)/y_0$	0.0187	0.0085	0.0011	-0.0066	0.0096	0.0075	0.0046	-0.0155	-0.0036	0.0074	0.0319	0.0100	-0.0077
$\xi_k=(k-k_{cons.})/k_{cons.}$	-0.3396	-0.1459	-0.0285	0.2646	-0.1073	-0.0951	-0.0503	0.3603	0.0429	-0.0900	-0.2387	-0.4839	-0.5042
$\xi_y=(y-y_{cons.})/y_{cons.}$	0.0011	0.0011	0.0002	-0.0014	0.0013	0.0011	0.0007	-0.0036	-0.0006	0.0010	0.0027	-0.0007	0.0008
Growth rate of output g^1_{KP}	NA	0.0244	0.0252	0.0226	0.0240	0.0253	0.0258	0.0275	0.0297	0.0343	0.0374	0.0326	0.0204
Growth rate of household wages g^1_W	NA	0.0301	0.0552	0.0401	0.0323	0.0395	0.0389	0.0737	0.0755	0.1142	0.0617	0.0502	0.0326
Growth rate of corporate profit g^1_P	NA	1.9135	-0.0331	0.0513	0.8486	-0.0515	0.3307	-0.0208	0.3093	-0.2509	-0.0927	-1.1138	-1.9989
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0212	0.0161	0.0141	0.0153	0.0096	0.0114	0.0089	0.0121	0.0122	0.0215	0.0189	0.0219
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0450	0.0535	0.0324	0.0182	0.0321	0.0309	0.0583	0.0445	0.0871	0.0521	0.0665	0.0453
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.9043	-0.0417	0.0426	0.8328	-0.0660	0.3119	-0.0386	0.2869	-0.2670	-0.1065	-1.1123	-2.0004
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.1786)	72.8966	1.1579	0.5776	2.7857	2.1984	1.3410	0.5413	0.8555	1.9757	(0.6398)	0.1037
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0020	27.6037	(0.3874)	(0.0106)	0.4045	(0.0801)	0.3049	(0.0229)	0.0389	0.3954	(0.0108)	0.0011

Germany m & gem by case

GERMANY(5)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	39550	39990	45500	53380	61060	53780	54190	61630	78130	74590	88170	5607	
Corporate saving S^0_P	-22330	10180	3010	-2380	33220	35640	64800	54880	74420	39680	15510	-17410	11790
Profit P^0	17220	50170	48510	51000	94280	89420	118990	116510	152550	114270	103680	-11803	11790
Net national income Y^0	1386610	1460770	1536930	1599140	1692410	1750700	1844910	1969650	2145590	2334910	2461400	2464210	2568570
Household (incl.governmnet) W^0	1369390	1410600	1488420	1548140	1598130	1661280	1725920	1853140	1993040	2220640	2357720	2476013	2556780
Corporate capital stock K^0_P	4074760	4174110	4279480	4376270	4481350	4594690	4713270	4843070	4987070	5158180	5350890	5525100	5638020
Number of workers N^0_E	26630	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654
Growth rate of workers g^1_{NE} (actual)	NA	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121
Relative share $\pi^0=P^0/Y^0$	0.0124	0.0343	0.0316	0.0319	0.0557	0.0511	0.0645	0.0592	0.0711	0.0489	0.0421	-0.0048	0.0046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.9386	2.8575	2.7844	2.7366	2.6479	2.6245	2.5547	2.4588	2.3243	2.2092	2.1739	2.2421	2.1950
Rate of profit $\rho^0=P^0/K^0_P$	0.0042	0.0120	0.0113	0.0117	0.0210	0.0195	0.0252	0.0241	0.0306	0.0222	0.0194	-0.0021	0.0021
Capital-labour ratio $k^0=K^0_P/N^0_E$	153.0139	159.0077	162.7612	165.2108	166.8659	169.8591	172.8942	175.1056	175.1139	176.7166	181.6632	190.4878	196.7621
Labour productivity $y^0=Y^0/N^0_E$	52.0695	55.6463	58.4540	60.3700	63.0179	64.7209	67.6758	71.2145	75.3394	79.9928	83.5648	84.9581	89.6409
R of tech. prog.(given) **under const.Ω_P**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
Number of workers N_E	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654	28941
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.2539	0.2592	0.2642	0.2676	0.2741	0.2759	0.2813	0.2891	0.3008	0.3116	0.3151	0.3084	0.3130
Corporate propensity to save $s_{SP/Y}$	0.0032	0.0089	0.0083	0.0085	0.0153	0.0141	0.0181	0.0171	0.0214	0.0153	0.0133	-0.0015	0.0014
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0032	0.0090	0.0084	0.0086	0.0155	0.0143	0.0185	0.0174	0.0219	0.0155	0.0134	-0.0015	0.0014
Corporate capital stock K_P	4087649	4211608	4315472	4413943	4550846	4660364	4800367	4927336	5096062	5238061	5422859	5516950	5646132
Corporate income (added value) Y	1390996	1473893	1549856	1612906	1718656	1775724	1879002	2003921	2192482	2371069	2494506	2460575	2572265
Capital-labour ratio $k=K_P/N_E$	155.7140	160.1798	162.9156	164.3559	168.2383	170.9535	173.5616	173.0165	174.5884	177.8326	186.9629	192.5368	195.0942
Labour productivity $y=Y/N_E$	52.9883	56.0565	58.5094	60.0576	63.5363	65.1379	67.9370	70.3649	75.1133	80.4980	86.0026	85.8720	88.8810
Coef. of technical progress m^{*0}	1.8985	0.2872	0.0405	-0.2197	0.2003	0.1718	0.0818	-0.2789	-0.0591	0.1846	0.9977	-3.2521	-2.6842
Coef. of technical progress m^*	1.7086	0.2585	0.0365	-0.1977	0.1803	0.1546	0.0736	-0.2510	-0.0532	0.1661	0.8980	-2.9269	-2.4157
$A=1/(\Omega_P(1+g^e_{NE}))$	0.3452	0.3494	0.3565	0.3604	0.3749	0.3781	0.3858	0.3950	0.4198	0.4486	0.4671	0.4515	0.4511
$g_Y(g^*_m)$	0.0036	0.0061	0.0083	0.0089	0.0139	0.0132	0.0180	0.0182	0.0221	0.0145	0.0166	-0.0016	0.0016
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0181	0.0045	0.0008	-0.0048	0.0066	0.0054	0.0034	-0.0112	-0.0027	0.0053	0.0323	0.0106	-0.0083
$\pi(g^*_m)$	0.0111	0.0633	0.0320	0.0307	0.0628	0.0556	0.0662	0.0568	0.0703	0.0526	0.0355	-0.0044	0.0042
$\rho(g^*_m)$	0.0038	0.0222	0.0115	0.0112	0.0237	0.0212	0.0259	0.0231	0.0302	0.0238	0.0163	-0.0020	0.0019
$\xi_{\pi}=(g^*_m)$	-0.1086	0.8429	0.0129	-0.0362	0.1273	0.0894	0.0271	-0.0391	-0.0119	0.0740	-0.1565	-0.0808	-0.0788
$K_P=K^0_P(1+g_{KP})$	4089443	4199767	4315016	4415426	4543696	4655318	4798086	4930974	5097424	5232839	5439526	5516165	5646891
$Y=Y^0(1+g_Y)$	1391607	1469749	1549692	1613448	1715956	1773801	1878109	2005400	2193068	2368705	2502172	2460225	2572611

Germany m & gem by case

GERMANY, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (6)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	155.7824	159.7295	162.8984	164.4111	167.9740	170.7684	173.4791	173.1442	174.6351	177.6554	187.5375	192.5094	195.1204
Labour productivity $y=Y/N_E$	53.0116	55.8989	58.5032	60.0777	63.4364	65.0673	67.9047	70.4168	75.1334	80.4178	86.2669	85.8597	88.8930
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0181	0.0045	0.0008	-0.0048	0.0066	0.0054	0.0034	-0.0112	-0.0027	0.0053	0.0323	0.0106	-0.0083
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0004	-0.0028	-0.0001	0.0003	-0.0016	-0.0011	-0.0005	0.0007	0.0003	-0.0010	0.0031	-0.0001	0.0001
R of tech. prog.(given) **under const.π**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-1.1626	0.0465	0.2344	0.4285	0.1287	0.1515	0.2226	0.4874	0.3421	0.1845	-0.3683	2.5575	2.1570
$F=(E+m^{*0})/m^{*0}$	0.3876	1.1620	6.7861	-0.9508	1.6428	1.8823	3.7220	-0.7476	-4.7913	1.9996	0.6308	0.2136	0.1964
$G=\pi/(1-\pi)$	0.0126	0.0356	0.0326	0.0329	0.0590	0.0538	0.0689	0.0629	0.0765	0.0515	0.0440	-0.0048	0.0046
$H=(1-E)/((1-\pi)m^{*0})$	1.1534	3.4384	19.5112	-2.6876	4.6065	5.2060	10.1643	-1.9539	-11.9889	4.6447	1.4317	0.4766	0.4330
$g_Y(g^*_m)$	0.0025	0.0084	0.0083	0.0093	0.0148	0.0137	0.0181	0.0190	0.0222	0.0149	0.0119	-0.0009	0.0008
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0170	0.0068	0.0009	-0.0045	0.0075	0.0059	0.0035	-0.0104	-0.0027	0.0058	0.0276	0.0113	-0.0091
$\xi_{\Omega P}(g^*_m)$	0.3477	0.0942	0.0150	-0.0952	0.0648	0.0561	0.0276	-0.1180	-0.0204	0.0526	0.1884	0.8803	1.0375
$g_{KP}(g^*_m)$	0.3511	0.1033	0.0234	-0.0868	0.0806	0.0706	0.0462	-0.1012	0.0013	0.0684	0.2025	0.8786	1.0392
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.2580	-0.0861	-0.0147	0.1052	-0.0609	-0.0531	-0.0269	0.1338	0.0209	-0.0500	-0.1585	-0.4682	-0.5092
$\Omega_P(g^*_m)$	3.9603	3.1265	2.8261	2.4762	2.8195	2.7717	2.6253	2.1688	2.2768	2.3255	2.5834	4.2159	4.4724
$\rho(g^*_m)$	0.0031	0.0110	0.0112	0.0129	0.0198	0.0184	0.0246	0.0273	0.0312	0.0210	0.0163	-0.0011	0.0010
$K_P=K^0_P(1+g_{KP})$	5505205	4605499	4379615	3996445	4842452	4919099	4931128	4352972	4993458	5510825	6434517	10379432	11497297
$Y=Y^0(1+g_Y)$	1390090	1473030	1549714	1613947	1717459	1774733	1878327	2007118	2193177	2369785	2490677	2461949	2570726
Capital-labour ratio $k=K_P/N_E$	209.7141	175.1606	165.3371	148.8101	179.0185	180.4445	178.2894	152.8485	171.0733	187.0930	221.8417	362.2333	397.2731
Labour productivity $y=Y/N_E$	52.9538	56.0237	58.5041	60.0963	63.4920	65.1015	67.9126	70.4771	75.1371	80.4544	85.8706	85.9199	88.8279
$g_k=(k-k_0)/k_0$	0.3706	0.1016	0.0158	-0.0993	0.0728	0.0623	0.0312	-0.1271	-0.0231	0.0587	0.2212	0.9016	1.0191
$g_y=(y-y_0)/y_0$	0.0170	0.0068	0.0009	-0.0045	0.0075	0.0059	0.0035	-0.0104	-0.0027	0.0058	0.0276	0.0113	-0.0091
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.3468	0.0935	0.0149	-0.0946	0.0641	0.0555	0.0272	-0.1166	-0.0201	0.0521	0.1866	0.8814	1.0363
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0007	-0.0006	-0.0001	0.0006	-0.0007	-0.0006	-0.0004	0.0016	0.0003	-0.0005	-0.0015	0.0006	-0.0006
Growth rate of output g^1_{KP}	NA	0.0244	0.0252	0.0226	0.0240	0.0253	0.0258	0.0275	0.0297	0.0343	0.0374	0.0326	0.0204
Growth rate of household wages g^1_W	NA	0.0301	0.0552	0.0401	0.0323	0.0395	0.0389	0.0737	0.0755	0.1142	0.0617	0.0502	0.0326
Growth rate of corporate profit g^1_P	NA	1.9135	-0.0331	0.0513	0.8486	-0.0515	0.3307	-0.0208	0.3093	-0.2509	-0.0927	-1.1138	-1.9989
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0212	0.0161	0.0141	0.0153	0.0096	0.0114	0.0089	0.0121	0.0122	0.0215	0.0189	0.0219
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0450	0.0535	0.0324	0.0182	0.0321	0.0309	0.0583	0.0445	0.0871	0.0521	0.0665	0.0453
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.9043	-0.0417	0.0426	0.8328	-0.0660	0.3119	-0.0386	0.2869	-0.2670	-0.1065	-1.1123	-2.0004
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.2532)	3.8419	1.1139	0.6458	1.9259	1.6916	1.2357	0.6115	0.8876	1.5883	(1.0842)	0.1336
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0028	1.4548	(0.3727)	(0.0118)	0.2797	(0.0616)	0.2809	(0.0259)	0.0404	0.3179	(0.0184)	0.0015

Germany m & gem by case

GERMANY(7)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Given initial values and ratios:													
Dividend paid D^0_I	39550	39990	45500	53380	61060	53780	54190	61630	78130	74590	88170	5607	
Corporate saving S^0_P	-22330	10180	3010	-2380	33220	35640	64800	54880	74420	39680	15510	-17410	11790
Profit P^0	17220	50170	48510	51000	94280	89420	118990	116510	152550	114270	103680	-11803	11790
Net national income Y^0	1386610	1460770	1536930	1599140	1692410	1750700	1844910	1969650	2145590	2334910	2461400	2464210	2568570
Household (incl.governmnet) W^0	1369390	1410600	1488420	1548140	1598130	1661280	1725920	1853140	1993040	2220640	2357720	2476013	2556780
Corporate capital stock K^0_P	4074760	4174110	4279480	4376270	4481350	4594690	4713270	4843070	4987070	5158180	5350890	5525100	5638020
Number of workers N^0_E	26630	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654
Growth rate of workers g^1_{NE} (actual)	NA	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121
Relative share $\pi^0=P^0/Y^0$	0.0124	0.0343	0.0316	0.0319	0.0557	0.0511	0.0645	0.0592	0.0711	0.0489	0.0421	-0.0048	0.0046
Capital-output ratio $\Omega^0_P=K^0_P/Y^0$	2.9386	2.8575	2.7844	2.7366	2.6479	2.6245	2.5547	2.4588	2.3243	2.2092	2.1739	2.2421	2.1950
Rate of profit $\rho^0=P^0/K^0_P$	0.0042	0.0120	0.0113	0.0117	0.0210	0.0195	0.0252	0.0241	0.0306	0.0222	0.0194	-0.0021	0.0021
Capital-labour ratio $k^0=K^0_P/N^0_E$	153.0139	159.0077	162.7612	165.2108	166.8659	169.8591	172.8942	175.1056	175.1139	176.7166	181.6632	190.4878	196.7621
Labour productivity $y^0=Y^0/N^0_E$	52.0695	55.6463	58.4540	60.3700	63.0179	64.7209	67.6758	71.2145	75.3394	79.9928	83.5648	84.9581	89.6409
R of tech. prog.(given) **under const.Ω_P**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
Number of workers N_E	26251	26293	26489	26856	27050	27261	27658	28479	29189	29455	29005	28654	28941
GR of workers $g^e_{NE}=g^0_{NE}$ (given)	-0.0142	0.0016	0.0075	0.0139	0.0072	0.0078	0.0146	0.0297	0.0249	0.0091	-0.0153	-0.0121	0.0100
Retention ratio $s_{SP}=S_P/P=1/(\Omega_P+1)$	0.2539	0.2592	0.2642	0.2676	0.2741	0.2759	0.2813	0.2891	0.3008	0.3116	0.3151	0.3084	0.3130
Corporate propensity to save $s_{SP/Y}$	0.0032	0.0089	0.0083	0.0085	0.0153	0.0141	0.0181	0.0171	0.0214	0.0153	0.0133	-0.0015	0.0014
Growth rates $g_Y=g_{KP}=s_{SP/Y}/(1-s_{SP/Y})$	0.0032	0.0090	0.0084	0.0086	0.0155	0.0143	0.0185	0.0174	0.0219	0.0155	0.0134	-0.0015	0.0014
Corporate capital stock K_P	4087649	4211608	4315472	4413943	4550846	4660364	4800367	4927336	5096062	5238061	5422859	5516950	5646132
Corporate income (added value) Y	1390996	1473893	1549856	1612906	1718656	1775724	1879002	2003921	2192482	2371069	2494506	2460575	2572265
Capital-labour ratio $k=K_P/N_E$	155.7140	160.1798	162.9156	164.3559	168.2383	170.9535	173.5616	173.0165	174.5884	177.8326	186.9629	192.5368	195.0942
Labour productivity $y=Y/N_E$	52.9883	56.0565	58.5094	60.0576	63.5363	65.1379	67.9370	70.3649	75.1133	80.4980	86.0026	85.8720	88.8810
Coef. of technical progress m^{*0}	1.8985	0.2872	0.0405	-0.2197	0.2003	0.1718	0.0818	-0.2789	-0.0591	0.1846	0.9977	-3.2521	-2.6842
Coef. of technical progress m^*	1.5188	0.2297	0.0324	-0.1757	0.1602	0.1374	0.0654	-0.2231	-0.0473	0.1477	0.7982	-2.6017	-2.1473
$A=1/(\Omega_P(1+g^e_{NE}))$	0.3452	0.3494	0.3565	0.3604	0.3749	0.3781	0.3858	0.3950	0.4198	0.4486	0.4671	0.4515	0.4511
$g_Y(g^*_m)$	0.0042	0.0047	0.0082	0.0093	0.0126	0.0123	0.0175	0.0190	0.0224	0.0136	0.0216	-0.0018	0.0017
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0187	0.0031	0.0007	-0.0045	0.0054	0.0044	0.0029	-0.0104	-0.0025	0.0044	0.0374	0.0104	-0.0082
$\pi(g^*_m)$	0.0100	0.4029	0.0324	0.0297	0.0720	0.0611	0.0681	0.0547	0.0694	0.0568	0.0307	-0.0041	0.0039
$\rho(g^*_m)$	0.0034	0.1410	0.0116	0.0108	0.0272	0.0233	0.0267	0.0222	0.0299	0.0257	0.0141	-0.0018	0.0018
$\xi_\pi=(g^*_m)$	-0.1959	10.7312	0.0261	-0.0698	0.2918	0.1964	0.0557	-0.0752	-0.0236	0.1597	-0.2706	-0.1496	-0.1460
$K_P=K^0_P(1+g_{KP})$	4091819	4193610	4314572	4417030	4537880	4650991	4795922	4934941	5098820	5228259	5466238	5515213	5647807
$Y=Y^0(1+g_Y)$	1392415	1467594	1549533	1614034	1713759	1772152	1877262	2007013	2193668	2366632	2514460	2459800	2573029

Germany m & gem by case

GERMANY, $\pi(g^*_m)$ and $\Omega_P(g^*_m)$ (8)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Capital-labour ratio $k=K_P/N_E$	155.8729	159.4953	162.8816	164.4709	167.7590	170.6097	173.4009	173.2835	174.6829	177.4999	188.4585	192.4762	195.1521
Labour productivity $y=Y/N_E$	53.0424	55.8169	58.4972	60.0996	63.3552	65.0069	67.8741	70.4734	75.1539	80.3474	86.6906	85.8449	88.9074
$g_k=(k-k^0)/k^0=g_y=(y-y^0)/y^0$	0.0187	0.0031	0.0007	-0.0045	0.0054	0.0044	0.0029	-0.0104	-0.0025	0.0044	0.0374	0.0104	-0.0082
$\xi_k=(k-k_{cons.})/k_{cons.}$	0.0010	-0.0043	-0.0002	0.0007	-0.0028	-0.0020	-0.0009	0.0015	0.0005	-0.0019	0.0080	-0.0003	0.0003
R of tech. prog.(given) **under const.π**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**	**-0.2**
$E=g^e_{NE}/(\pi(1+g^e_{NE}))$	-1.1626	0.0465	0.2344	0.4285	0.1287	0.1515	0.2226	0.4874	0.3421	0.1845	-0.3683	2.5575	2.1570
$F=(E+m^{*0})/m^{*0}$	0.3876	1.1620	6.7861	-0.9508	1.6428	1.8823	3.7220	-0.7476	-4.7913	1.9996	0.6308	0.2136	0.1964
$G=\pi/(1-\pi)$	0.0126	0.0356	0.0326	0.0329	0.0590	0.0538	0.0689	0.0629	0.0765	0.0515	0.0440	-0.0048	0.0046
$H=(1-E)/((1-\pi)m^{*0})$	1.1534	3.4384	19.5112	-2.6876	4.6065	5.2060	10.1643	-1.9539	-11.9889	4.6447	1.4317	0.4766	0.4330
$g_Y(g^*_m)$	0.0018	0.0078	0.0082	0.0099	0.0141	0.0131	0.0177	0.0205	0.0225	0.0144	0.0102	-0.0001	0.0000
$g_{Y/NE}(g^*_m)=g_y(g^*_m)$	0.0162	0.0062	0.0008	-0.0039	0.0068	0.0053	0.0031	-0.0089	-0.0024	0.0052	0.0258	0.0121	-0.0099
$\xi_{\Omega P}(g^*_m)$	1.0659	0.2079	0.0304	-0.1738	0.1386	0.1189	0.0568	-0.2110	-0.0401	0.1111	0.4642	14.7114	-55.2861
$g_{KP}(g^*_m)$	1.0696	0.2173	0.0388	-0.1656	0.1546	0.1336	0.0755	-0.1948	-0.0185	0.1271	0.4791	14.7093	-55.2839
$g_{Y/KP}(g^*_m)=g_{1/\Omega P}(g^*_m)$	-0.5160	-0.1721	-0.0295	0.2104	-0.1217	-0.1063	-0.0537	0.2675	0.0417	-0.1000	-0.3170	-0.9364	-1.0184
$\Omega_P(g^*_m)$	6.0710	3.4516	2.8690	2.2610	3.0150	2.9365	2.6998	1.9399	2.2312	2.4547	3.1831	35.2271	-119.1581
$\rho(g^*_m)$	0.0020	0.0100	0.0110	0.0141	0.0185	0.0174	0.0239	0.0305	0.0319	0.0199	0.0132	-0.0001	0.0000
$K_P=K^0_P(1+g_{KP})$	8432945	5081148	4445703	3651386	5174361	5208508	5069288	3899399	4894947	5813807	7914481	86795605	########
$Y=Y^0(1+g_Y)$	1389050	1472128	1549571	1614934	1716223	1773714	1877642	2010094	2193864	2368462	2486438	2463884	2568470
Capital-labour ratio $k=K_P/N_E$	321.2428	193.2510	167.8320	135.9616	191.2888	191.0608	183.2847	136.9219	167.6983	197.3793	272.8661	029.0921	########
Labour productivity $y=Y/N_E$	52.9142	55.9893	58.4987	60.1331	63.4463	65.0642	67.8878	70.5816	75.1606	80.4095	85.7245	85.9874	88.7499
$g_k=(k-k_0)/k_0$	1.0994	0.2154	0.0312	-0.1770	0.1464	0.1248	0.0601	-0.2181	-0.0423	0.1169	0.5020	14.9018	-54.7465
$g_y=(y-y_0)/y_0$	0.0162	0.0062	0.0008	-0.0039	0.0068	0.0053	0.0031	-0.0089	-0.0024	0.0052	0.0258	0.0121	-0.0099
$\xi_k=(k-k_{cons.})/k_{cons.}$	1.0630	0.2065	0.0302	-0.1728	0.1370	0.1176	0.0560	-0.2086	-0.0395	0.1099	0.4595	14.7325	-55.2060
$\xi_y=(y-y_{cons.})/y_{cons.}$	-0.0014	-0.0012	-0.0002	0.0013	-0.0014	-0.0011	-0.0007	0.0031	0.0006	-0.0011	-0.0032	0.0013	-0.0015
Growth rate of output g^1_{KP}	NA	0.0244	0.0252	0.0226	0.0240	0.0253	0.0258	0.0275	0.0297	0.0343	0.0374	0.0326	0.0204
Growth rate of household wages g^1_W	NA	0.0301	0.0552	0.0401	0.0323	0.0395	0.0389	0.0737	0.0755	0.1142	0.0617	0.0502	0.0326
Growth rate of corporate profit g^1_P	NA	1.9135	-0.0331	0.0513	0.8486	-0.0515	0.3307	-0.0208	0.3093	-0.2509	-0.0927	-1.1138	-1.9989
Under $\pi(g^*_m)$: Ω_P= a constant													
$g^{PAA(p)}_{KP}=(g^1_{KP}-g_{KP})/(1+g_{KP})$	NA	0.0212	0.0161	0.0141	0.0153	0.0096	0.0114	0.0089	0.0121	0.0122	0.0215	0.0189	0.0219
$\Delta w_{RATE}/w^0_{RATE}=(g^1_W-g^1_{NE})/(1+g^1_{NE})$	NA	0.0450	0.0535	0.0324	0.0182	0.0321	0.0309	0.0583	0.0445	0.0871	0.0521	0.0665	0.0453
$g^{PAA(p)}_P=(g^1_P-g_P)/(1+g_P)$	NA	1.9043	-0.0417	0.0426	0.8328	-0.0660	0.3119	-0.0386	0.2869	-0.2670	-0.1065	-1.1123	-2.0004
$\Delta k/k^0=g_{KP}/g_{NE}$	NA	(0.2942)	2.9199	1.1000	0.6722	1.7463	1.5709	1.2041	0.6390	0.8988	1.4908	(1.4110)	0.1479
$\sigma^1_R=-(\Delta k/k^0)/((\Delta\rho_{RA}/\rho^0_{RA})-(\Delta w_{RA}/w^0_{RA}))$	NA	0.0033	1.1057	(0.3681)	(0.0123)	0.2536	(0.0572)	0.2738	(0.0271)	0.0409	0.2983	(0.0239)	0.0016