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Author: Hideyuki Kamiryo
Hiroshima Shudo University

For additional information please contact:

Author Name: Hideyuki Kamiryo
Author Address: 5-28-5, Satsukigaoka, Saeki-ku, Hiroshima, Japan 731-5101

Author E-Mail: kamiryo@ms3.megaegg.ne.jp
Author Telephones: 81-82-941-0928

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Productivity comparisons by country: The government sector versus the private sector

Hideyuki Kamiryo
Hiroshima Shudo University

Abstract

The purpose of this paper is (1) how to divide the total economy into the government sector and the private sector, without breaking the framework of national accounts and with its consistent matching the Cobb-Douglas production function, where each data of the total economy is the sum of the government and private sectors, and (2) what results are shown to the relationship between the budget surplus/deficit and the growth rate of output by sector based on my endogenous growth model, using thirty countries 1995-2004 by country and by sector. For these purposes, I will present a method for estimating capital and returns/rents, introducing into each sector the equation that the balance of payment = budget surplus/deficit (where government saving = government rents) + the difference between saving and net investment in the private sector, and determining two necessary external parameters by sector at the same time. I estimated both capital and the rate of return (or rents to capital) at the same time, based on national disposable income (*NDI*, instead of *GDP*) after taxes and depreciation, starting with my function of consumption based on national taste instead of using the function of utility (although both roots are the same), and adding another external ratio of the wage rate to the rate of return on the above national taste. Also for the above purposes, I will find a method for clarifying an unclear relationship between the flow-base to the current investment and the stock-base inherent in the Cobb-Douglas production function. I will introduce a specified production function under increasing returns to scale (IRS) in parallel with the Cobb-Douglas production function under constant returns to scale (CRS). I call this specified production functions the "bypass" production function, where the essence of total factor productivity (*TFP*) and its residual is clarified more definitely than the conventional *TFP* as a residual that is the measure of our ignorance (Jorgenson and Griliches (1967)). My contributions are: (1) My data-sets of thirty countries by sector 1995-2004 modify IMF original data. The data-sets are consistent between national accounts and Cobb-Douglas production function, matching my endogenous growth model. (2) Productivity comparisons among countries whose essence is *TFP* as a residual are now traced back to each of the two sectors, clarifying cause and effect relationship useful to economic and fiscal policies. (3) The numerical relationships among the deficit, the current investment, the rate of technological progress, *TFP* and its residual, and endogenous variables are now measured and connected with growth policies, where I raise three propositions in the transitional path, comparing the results at the current situation with those at convergence.

Codes JEL: E01, E13, E21, E 22, E62

Key words: *BOP*, the budget surplus/deficit, capital estimation at the macro-level, the government sector and the private sector, the equations at convergence, *TFP* and *TFP* as a residual, the capital-output ratio, and DRC/IRC and DRS/IRS

1. Introduction

The purpose of this paper is to present how vital to divide the data of the total economy into those of the government sector and the private sector. A typical case is shown theoretically and empirically by the fact that a huge budget deficit decreases not only the growth rate of output of the government sector but also that of the private sector, resulting in a low growth rate of output of the total economy for many years until the deficit decreases to an moderate level. For this purpose, I connect the balance of payment (the current external balance) and the budget surplus/deficit with the data and ratios of national accounts by sector (to the government sector and the private sector). I use Solow's total factor productivity (*TFP*), and my own *TFP* as a residual that is not "the measure of our ignorance" (Jorgenson-Griliches (1967, p.249) but an ultimate one that shows the ratio of qualitative investment to quantitative investment. The current net investment is divided into qualitative investment and quantitative investment. *TFP* is qualitative investments accumulated in the past by year and capital is quantitative investments accumulated in the past by year. All the concepts in the micro-level such as vintages, ages, embodiment, and disembodiment by assets based on the perpetual inventory method (PIM) are implicitly absorbed into this macro-level.

However, I cannot get the data that makes it possible to divide the data of the total economy into the two sectors. I cannot execute the above purpose without getting capital stock (hereafter capital) by country and that by sector. Nevertheless, I cannot find capital mostly except for advanced countries that publish capital in national accounts yearbooks. Developing countries do not publish capital in spite that they need capital for pertinent economic policies more urgently than advanced countries. Among others the principal and leading method for measuring capital is Jorgenson's (1963, 1966, 1967)[1] formula but only to the business sector, starting with the micro-level. At this current moment, OECD[2] publishes capital of the corporate sector using the method of Paul Schreyer (2004) and, PWT has stopped the estimation of capital-labor ratio by country, which I confirmed directly from PWT.[3] Why PWT does not publish capital by country any more? I need PWT data to compare its capital with mine as I have done. PWT says that it is due to some reasons. I infer one of definite reasons, derived from my long research, that the flow-base to the current investment and the stock-base to capital, labor, and *TFP* expressed by the Cobb-Douglas production function cannot match satisfactorily, which makes the errors to expand. Furthermore, I find some inconsistencies between the capital of the total economy and each capital of the government and private sectors, as long as I use published values of capital in several national accounts yearbooks. This fact indicates that capital should be consistently measured being not based on the micro-level but on the macro-level. Of course, PWT has taken some methods for the macro-level

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[1] For the estimation of capital, Jorgenson's aggregation formula and its user cost of capital are used for "the business sector." Dr. Koji Nomura cooperates with Dale Jorgenson at Harvard. I am really thankful to Dr. Koji Nomura, who kindly met me soon after he returned back from Harvard on the 16th of June 2006. I could confirm several points I had in mind by the four hour discussion with him on that date. At the same time, I am really thankful to Dr. Elsa Fontainha for her comments step by step (since her PhD was about capital utilization starting with Jorgenson). For the presentation of this paper, I am much obliged to Dr. Andrew Sharpe and Dr. Harry Wu as a chair who well understood my intention.

[2] I am thankful to the communication with Dr. Paul Schreyer, regarding the range of capital estimation.

[3] I am thankful to Dr. Alan Heston and Dr. Ye Wang for this information (see more in 2.2).

adjustment, yet it becomes more difficult to estimate capital at the macro-level. A reason is, from my experiments, that there is some inconsistency between the GDP-base and the national disposable income (NDI)-base. I solved this problem lying between wages and consumption by formulating a function of consumption that shows national taste, which is another expression of the function of utility. Furthermore, the estimation of capital is inseparably related to the estimation of returns/rents[4] (to capital). In other words, there is another inconsistency between returns/operating surplus and capital in national accounts. If statistics estimate capital independently of returns, this will lead to Alan Heston's decision that PWT will not publish capital any more. Thus, without proper estimation of capital and rents by sector, I cannot execute the purpose of this paper. The estimation of capital and rents and the relationship between the deficit and the growth rate are one unique issue.[5] As a result, productivity comparisons are reliably done among countries. These comparisons are possible by country, but I stress here that without dividing the data by sector, the comparisons of the total economy cannot suggest true economic and fiscal policies.

For my estimation of capital and rents, I use the original data such as the budget surplus/deficit, government investment, and some others to judge the level of capital and rents by sector and by year. I take the original data from "International Financial Statistics Yearbook" and "Government Finance Statistics Yearbook," IMF. In this paper, I use my data-sets of thirty countries 1995-2004 by sector. The data-sets satisfy the additive/sum rule to data by sector and the multiplicative rule to any ratio of the total economy as a weighted average of the two sectors. Without the above two rules, I cannot measure the rate of technological progress to the current investment and the growth rate of *TFP* or clarify a vague relationship between the flow-base and the stock-base.

Let me here briefly compare my method with the literature, first how to treat the relationship between increasing, diminishing, and constant returns each to scale and capital (IRS/DRS and CRS, and IRC/DRC and CRC). The Cobb-Douglas production function holds under CRS and expresses DRC, CRC, and IRC. DRC always occurs due to capital-deepening and thus technology must guarantee CRC. This is also a general consent from the literature. When I introduce an ultimate *TFP* as a residual i.e., the ratio of qualitative investment to quantitative investment, *B*, this *B* decreases in the transitional path and the capital-labor ratio, k^(1+α), shows IRS, reaching CRC at convergence: $y = B \cdot k^{1+\alpha}$. I call this production function an ultimate bypass production function, whose root is the same as the Cobb-Douglas production function. This idea differs from the literature to separate a devised production function from the Cobb-Douglas production function. This will be discussed in a separate paper in detail, compared with the AK model (of Khaled Hussein, and A. P. Thirlwall (2000)).

Second, my method for productivity comparisons is not econometric. I use an endogenous growth model that enables to show the equations of variables in the transitional path (that connects the current situation with the situation at convergence).

[4] I use the terminology of "rents" as a kind of returns, to distinguish "returns" connected with the micro-level with rents directly estimated by the macro-level. However, to avoid confusion I leave the terminology of the rate of return, which is so generally used in the literature: my rate of return is rents divided by capital.

[5] I do not enter the problem of capital controversy in this paper, although I stayed at Kaldor's Kings College, University of Cambridge, in autumn 1996 and learned this problem from Dr. Geoffrey Harcourt.

These equations hold at the macro-level, based on the data of a whole economy (taking no process to aggregate and using no perpetual inventory method (PIM) by a sort of assets). These equations use two parameters in the transitional path, *beta* and *delta*, as shown in 2.1. A whole economy works for equilibrium and there marginal productivities of both capital (*MPK=r*) and labor (*MPL=w*) prevail as shown in traditional Euler theorem. For these devices, I use national disposable income (*NDI*) after redistribution of taxes and after depreciation. As a result, the relative share of capital and the rate of return are shown by 'net' after taxes and depreciation. The relative share of capital/rents, *alpha*, is constant in the transitional path. If the growth rate of *TFP* differs from the rate of technological progress to the current investment, *alpha* changes by year and the production function will shift. This is shown in my data-sets. The change in *alpha* comes from the relationship between the flow-base of the current investment and the stock-base of the production function. For this reason, I need the above bypass production function where an ultimate *TFP* as a residual is the above *B*.

I will clarify the relationship between the deficit and the growth rate of output using related equations, which is a clue of this paper. This relationship is expressed as three propositions, [6] supported by a theoretical mechanism and empirical results using my data-sets. The EU rule of 3 % for the deficit to output was empirically set. Fabrizio Balassone and Daniele Franco (2000) reviews/discusses several combinations of the deficit and government consumption and investment, citing/comparing three models, but without a theory behind supporting these models. Some reasons, again, traced back from whether or not the data and method are consistently arranged at the macro-level.

Finally, I raise a few questions related to the would-be SNA review of 2008:[7] (1) Do we accept that "the output/goods and services (products) of the government sector equal taxes," where government products are assumingly shifted from the private sector? (2) Do we accept that the government investment and capital promote the growth rate of government output, whose rate of return is plus or minus depending on the quality of investment and the budget surplus/deficit? (3) Without government products, how do we connect the *BOP* and the budget deficit with the total economy and the government and private sectors? If an opportunity-cost rate of return (or the user cost of capital) is used for the business/private sector, we cannot guarantee the additive/sum rule to the government and private sectors. If an expected plus rate of return is used for the government sector in the would-be SNA review 2008, how do we connect the data of the total economy with the data sum of the two sectors? Above questions are related to each other. We may need a supplemental data/statistics in parallel to the 2008 SNA reform. If we avoid overall challenges for solving these questions, a hidden relationship between a huge deficit and a miserable low level of economic activities for long years will remain as in some huge deficit countries.

2. Method for data-setting and the structure of productivity

[6] Three propositions in this paper will be added to my last proposition in Kamiryo (2004c). The last proposition shows that the capital-output ratio has its upper and lower limits by country, where I referred to Quah's (1993, 1996) twin-peaks of per capita output by country. The last proposition improves in that an upper limit of the capital-output ratio is proved in this paper using the structure of productivity that connects total factor productivity with the capital-output ratio.

[7] Peter Hill (1998, 1999) summarizes agenda items by Canberra group for SNA, however I cannot get the information of the latest discussions to the government sector.

2.1 Equations at convergence in my endogenous growth model

Section 2 will discuss my method to estimate capital and rents and also clarifies my structure of productivity, using SNA data and the Cobb-Douglas production function and its bypass production functions. As a preliminary step, I will first summarize the equations[8]at convergence in my endogenous growth model. These equations also exist in the transitional path. These equations for the business sector may be a surrogate of "an arbitrage in equilibrium" or market equilibrium of Jorgenson's assumption.[9] First, my idea to establish equations is justified by introducing two parameters, *beta* and *delta*, and second, basic equations are shown conclusively (for step by step, see Kamiryo (2004a, 2005c); a few equations were revised in 2006b).

The above equations make it possible to estimate capital and rents by sector without relying on the user cost of capital as in Jorgenson's formula. These equations are basically related to Solow's (1956) model, but, I change his exogenous rate of technological progress to an endogenous rate of technological progress, combining the ratio of net investment to output with *beta*. I divide net investment into quantitative investment and qualitative investment by introducing a structural reform parameter, *beta*, as the ratio of quantitative investment to total net investment. The value of *beta* is obtained using "the current/initial basic parameters" such as the relative share of capital or rents (*alpha*), the growth rate of population/employed persons (*n*), the rate of saving (*s*), the ratio of net investment to output (i), the capital-output ratio ($\Omega(0)$), the capital-labor ratio ($k(0)$). An external parameter θ is set as *i/s*, where the balance of payment and the budget surplus/deficit are included each in the total economy and the two sectors. I derive an endogenous rate of technological progress as the product of *i* and 1-*beta**: $g_A^* = i\,(1-\beta^*)$ [10] using Solow's (1956) $g_Y^* = g_K^*$ or $g_y^* = g_k^*$ at convergence.

In this case, why the rate of return shown as DRC/IRC at the current situation turns to CRC at convergence? This is because I set another parameter *delta* in parallel to *beta*. The parameter of neutralizing DRC/IRC to CRC is defined as *delta*. The current $\delta(0)$ decreases under DRC (or $\delta(0)$ increases under IRC, though this case is rare; see Russia) and becomes equal to *alpha* at convergence: $\delta(t) \to \alpha$. The Cobb-Douglas production function is expressed by $y = A(k)k^{\alpha}$ in the transitional path. At convergence, this function reduces to $y = A \cdot k^{\alpha}$, where $\delta^*(t) = \alpha$. When $\delta(0)$ at the current situation

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[8] My PhD thesis (Nov., 2003) tried to express the Cobb-Douglas production function by a discrete case yet, remained a preliminary step towards the establishment of the equations at convergence. The equations at convergence completed in Kamiryo (2005c). I have investigated the existence of some equations at convergence using yearly Handbook of Economic Growth, Elsevier: I find no similar equations in the literature. This is because it is difficult to introduce the interrelationship of *beta* and *delta* into the transitional path as in this paper.

[9] More accurately, the user cost of capital needs assumptions of both marginal productivities and an arbitrage in equilibrium. My capital estimation does not need both assumptions by the equations in the transitional path and by a consistency between the current investment and the stocks of capital, labor, and *TFP* in the Cobb-Douglas production function.

[10] See Eq.6 below. This is the most important equation and derived by combining $g_y^* = g_k^* = g_A^* / (1-\alpha)$ in Solow (1956) with $g_k(t) = \frac{1}{1+n}\left(i_K \cdot A(t) \cdot k(t)^{\alpha-1} - n\right)$ first presented in Kamiryo (2004a).

converges to *alpha*, $\beta(0)$ converges to $\beta^*(t)$.

Second, related equations at the current situation and at convergence (with *) are shown each by each (omitting time, *t*).

For basic parameters:

(1) $\beta^*_{\delta=\alpha} = \dfrac{\Omega^*\left(n(1-\alpha)+i\ (1+n)\right)}{i\,(1-\alpha)+\Omega^*\cdot i\,(1+n)}$, where $\beta^* = \beta^*_{\delta=\alpha}$.

(2) $\beta = \dfrac{\Omega^*\left(n(1-\alpha)k(0)^{0-\alpha}+i\ (1+n)\right)}{i\,(1-\alpha)k(0)^{0-\alpha}+\Omega^*\cdot i\,(1+n)}$, where $\beta = \beta(0)$ is at the current situation.

(3) $\Omega^* = \dfrac{\beta^*\cdot i\ (1-\alpha)}{i\ (1-\beta^*)(1+n)+n(1-\alpha)}$.

(4) $\delta = 1-\dfrac{LN(1/\Omega^*)}{LN((1-\beta^*)/\beta^*)}$, where $\delta = \delta(0)$.[11]

The relationship between *delta* in Eq.4 and *alpha* controls DRC/IRC and CRC.[12] The foundation of Eq.4 is tied up with the structure of productivity (in detail, see section 2.3).

For variables and relationships between variables at convergence:

where $i \equiv I/Y$, $i_K \equiv I_K/Y$, $i_A \equiv I_A/Y$, $i = i_K + i_A$, $i_K = i\cdot\beta^*$, and $i_A = i\cdot(1-\beta^*)$:

(5) $r^* \equiv \dfrac{\alpha}{\Omega^*} = \alpha\left(\dfrac{i\,(1-\beta^*)(1+n)+n(1-\alpha)}{\beta^*\cdot i\,(1-\alpha)}\right)$.[13]

(6) $g^*_A = i\ (1-\beta^*)$ and $g^*_Y = \dfrac{g^*_A(1+n)}{1-\alpha}+n = \dfrac{i\,(1-\beta^*)(1+n)}{1-\alpha}+n$.

(7) $r^* = \left(\dfrac{\alpha}{\beta^*\cdot i}\right)\cdot g^*_Y$.

For the coefficient of convergence, λ, and the years for convergence:

(8) $\lambda = (1-\alpha)n + (1-\delta)g^*_A$ [14] and the years for convergence: $Years_{1/\lambda} = 1/\lambda$.

For the discount rates of delta and beta in the transitional path:

(9) $r_{CONVERGE(\delta)} = POWER(2.7182818,((LN(\alpha)-LN(\delta))/\,years_{(1/\lambda)}))-1$.

(10) $r_{CONVERGE(\beta)} = POWER(2.7182818,((LN(\beta^*)-LN(\beta))/\,years_{(1/\lambda)}))-1$.

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[11] The *delta* is obtained by $1=\Omega\cdot B^{1-\delta}$, using $A = k^{1-\alpha}/\Omega$ and $A=(Bk)^{1-\delta}$, where $B\equiv(1-\beta)/\beta$ and $k^{\delta-\alpha}=1$ at convergence (in detail, see Eq.26 below and Kamiryo (2006b) that assumes $\Omega(0)=\Omega^*$ and $\Omega^*_{\delta-\alpha}=\Omega^*$).

[12] If $\delta > \alpha$, it is DRC and if $\delta < \alpha$, it is IRC in the transitional path. If $\delta = \alpha$ at the current situation, the transitional path is always under CRC. I proved these cases using relaed equations.

[13] The values of *r* is the rate of return at the current situation and, r^* is the rate of return at convergence. In the transitional path, the rate of return shows diminishing, increasing, and constant returns to capital (DRC/IRC and CRC). These are distinguished with increasing/diminishing/constant returns to scale (IRS/DRS/CRS), which are expressed by bypass production functions (for equations, see 2.3 below).

[14] Barro and Sala-i-Martin (1995, Eq.1.31, p. 36) shows $conv.coeffi. = (1-\alpha)(n+g^*_A)$ using my notations after depreciation. If they could find *delta*, the formation of the convergence coefficient may be the same.

For the transitional path:

Using variables such as $i(t) = i_K(t) + i_A(t)$, $i(t) = i \cdot y(t)$, $i_K(t) = i(t) \cdot \beta(t)$, and $i_A(t) = i(t) \cdot (1 - \beta(t))$, where $i \equiv \Delta K(0) / Y(0)$ and $i(t) \equiv \Delta K(t) / L(t)$.

(11) $\Delta k(t) = \dfrac{i\,(t) \cdot \beta(t) - n \cdot k(t)}{1+n}$ [15] and $g_k(t) = \dfrac{1}{1+n}\big((i(t) \cdot \beta(t) / k(t)) - n\big)$.

(12) $\Delta A(t) = i\,(1 - \beta(t)) \cdot y(t) / k(t)^{\delta(t)}$ and

$$g_A(t) = i\,(1 - \beta(t)) \cdot k(t)^{\alpha - \delta(t)} = \frac{i \cdot y(t)(1 - \beta(t))}{A(t) \cdot k(t)^{\delta(t)}}$$

(13) $\Delta K(t) = i \cdot \beta(t) \cdot Y(t) = i \cdot \beta(t) \cdot A(t) \cdot K(t)^{\alpha} \cdot L(t)^{1-\alpha}$

and $g_K(t) = i \cdot \beta(t) \cdot A(t) \cdot k(t)^{\alpha - 1}$.

For the cost of capital for valuation value of capital and the valuation ratio:

(14) $r^* - g_Y^* = g_Y^* \left(\dfrac{\alpha}{s \cdot \theta \cdot \beta^*} - 1 \right)$.

(15) $v_K \equiv V_K / K$ and $v_K = \dfrac{g_Y^* \cdot \alpha / i \cdot \beta^*}{g_Y^* (\alpha / i \cdot \beta^* - 1)}$ and accordingly, $v_K = \dfrac{-\alpha / i}{\beta^* - \alpha / i}$.

I distinguish the rate of return, *r*(*t*), with the cost of capital, $r(t) - g_Y(t)$. The rate of return is used for the estimation of capital while the cost of capital is used for the estimation of the valuation value of capital and the valuation ratio. The rate of return does not include Jorgenson's "the capital movement opportunity cost" contained in the user cost of capital.[16] Instead, I measure separately the above ratio of valuation to capital: $v_K \equiv V_K / K$. I find that the valuation ratio is a function of *beta**, whose asymptote is shown by i / α . The Petersburg paradox happens only when $r^* - g_Y^*$ equals zero.[17] For instance, China's cost of capital is minus and its valuation value of the total economy is minus due to too high growth rates.

2.2 Method for estimating capital and rents by sector

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[15] See Kamiryo (Feb, 2006c), where I distinguish $i \equiv s \cdot \theta = S_0 \cdot \theta / Y_0$ with $i(t) = I(t) / L(t) = i \cdot y(t)$. In the continuous case of *Δk*(*t*), starting with *k=K/L*, $\dfrac{dk}{dt} = \dfrac{1}{L}\dfrac{dK}{dt} - \dfrac{K}{L^2}\dfrac{dL}{dt}$ and thus, $\dfrac{dk}{dt} = \dfrac{1}{L} i \cdot \beta \cdot Y - k \dfrac{dL}{dt} / L$. Therefore, $\dot{k} = i \cdot \beta \cdot y - k \cdot n$. This was kindly confirmed by Dr. Toshimi Fujimoto.

[16] Jorgenson's user cost of capital for the business sector is the gross rate of return less the depreciation rate plus capital movement opportunity cost.

[17] David Durand (1956) investigated the Petersburg paradox (whose concept is under what condition the rate of return equals the growth rate of output) historically after the Eighteenth Century and concluded that there is no solution to this paradox. However, I (Kamiryo, June, 2004b; Russian Academy of Sciences, St. Petersburg) proved its existence by using the equations at convergence. For international comparisons in this respect, see Kamiryo (*Finance India* 20 (March, 1), forthcoming, 2007a).

My method for estimating capital and rents differs from the literature. I start with the macro-level, supported by the equations in the transitional path. The literature starts with the micro-level assuming market equilibrium. Penn World Table (PWT) had published the capital-labor ratio (which I converted to capital using labor) by using its own method[18] that differs from Jorgenson's user cost of capital for the business sector. In Dec 2005, I directly confirmed that PWT 6.2, 6.5, and after would not publish capital any more due to some reasons. This indicates that capital estimation by country has unconquerable difficulties. My data-sets erase most difficulties helped by the equations in the transitional path and an assumption that the capital-output ratio has a moderate level or an upper limit; say 2.5 (for proof, see Kamiryo, 2007b).

For the Keynesians' claim of the shortage of demand-side (e.g., Thomas Palley 113-114, 1996), my data-sets before estimating capital and rents takes into consideration an investment-side to some extent by starting with the balance of payment and the budget surplus/deficit.[19] My capital estimation starts with the relationship between saving and investment using the equation that the *BOP* (the current external balance) = the budget surplus/deficit + the difference between saving and net investment of the private sector: $BOP = (S_G - I_G) + (S_{PRI} - I_{PRI})$. In this sense, the accounting framework among the total economy, the government sector, and the private sector is the first step to capital estimation. A set of basic values[20] is involved in the accounting framework. For the accounting framework, I need several assumptions: (1) Output is the output after redistribution of taxes and after capital consumption/depreciation[21] and is equal to national disposable income: $Y=NDI$, where *NDI* is the sum of saving and consumption, $NDI=C+S$. Similarly, $Y=C+S=(C_G+S_G)+(C_{PRI}+S_{PRI})$, where $Y=Y_G+Y_{PRI}$. (2)

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[18] I am much obliged to PWT's information about its method for estimating capital stock, after visiting PWT, University of Pennsylvania, on the 8th of Dec 2005. I was disappointed to confirm that PWT would not publish capital stock in the future (thanks again to Dr. Alan Heston and Dr. Ye Wang). A reason for this, I guess, is that it is difficult for national accounts to be consistent with capital stock unless capital stock is consistently estimated in the macro-level. Also, both PWT and my data-sets have the same difficulty in estimating the initial (as a starting year) capital stock, for which PWT takes into consideration the capital-output ratio as a country's "specific" ratio. In my view, the capital-labor ratio is able to set as purely as quantitative but the capital-output ratio must be partly qualitative. It is difficult to treat the capital-output ratio since it is a mixture of a stock of *K* and a flow of *Y* (see Eqs.27 to 29 in 2.3 below).

[19] In addition, I have my own function of investment using the equations in the transitional path (see Kamiryo (2007a)).

[20] Here a set of basic values includes saving, consumption, wages, rents, output, capital, depreciation, investment. Principally, consumption equals consumption goods and saving equals capital goods. I connect $BOP = (S_G - I_G) + (S_{PRI} - I_{PRI})$ with three parameters of θ, θ_G, and θ_{PRI} , whose definition is each saving divided by investment. Of course, population and employed persons follow the additive/sum rule to the government and private sectors.

[21] When $Y=GDP$ is used as in the literature, the relative share of capital is twice as high as that when $Y=NDI$ is used as in my model. Koji Nomura (2005) follows $Y=GDP$, where the relative share of capital indicates 0.33 and this value is consistent with Jorgenson's user cost of capital by adjusting the depreciation rate and introducing capital movement opportunity cost. In the literature, one-third of *alpha* has been shown historically, without directly connecting *alpha* with the rate of saving (as "net"). Robert Solow, Robert Barro, Charles Jones, and all others use α=0.33 to *GDP* as a base, with no exception (see, e.g., Paul Romer (1994, p. 9). If I used the function of utility, as in Paul Romer (1990) and Gene Grossman and Elhanan Helpman (1991), instead of my national taste derived from the function of consumption, I would use α=0.33 roughly.

Government services to people[22] correspond with government output, which in turn equals taxes. (3) Output by sector is equal to the sum of "modified" wages and rents by sector (for "modified," see below soon). Under these assumptions, the equation of $BOP = (S_G - I_G) + (S_{PRI} - I_{PRI})$ is well introduced into my estimation (see more in 2.4 and 3).

In my model, the relative share of rents/capital *alpha*, is fixed in the transitional path and this *alpha* changes when the production function shifts. This *alpha*, however, remains unknown when I estimate capital and rents. The change in *alpha* is tightly related to the difference between the growth rate of technological progress, $g_A(t)$, to the current investment and the growth rate of *TFP* as a stock, $g_{TFP}(t)$, (see Eq.19 below). The estimation of *alpha* is an obstacle before estimating capital and rents. [23]

Then, how do I estimate capital and rents together with *alpha* simultaneously? I need, at the same time, the formations of "1-α" and the formation of the capital-labor ratio and the capital-output ratio "*k* and *Ω*." The rate of return ($r = \Pi / K$) is derived using $\alpha = r \cdot \Omega$. Let me show related equations in detail.

The formation of 1−*alpha*:

To estimate wages, I use my function of consumption/utility at the macro-level (Sep, 2005b).[24] I estimate the relative share of labor, 1-α, and accordingly, the relative share of capital, α. The function of consumption is expressed as,[25]

(16) $1 - \alpha = c / (rho / r)$,

where c is the ratio of consumption to output and (*rho/r*) is the coefficient of consumption/utility that is given externally. The determinant of the coefficient (*rho/r*) is 'national taste,' expressed for a whole economy of a country. Two externalities, (*rho/r*) and (*r/w*) (see below), make my model to be endogenous.[26] It is true that an individual consumer originally decides the utility function that determines the utility by object/consumer goods. My function of consumption, however, is estimated by national

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22 Government services here imply commodities and services as government expenditures. For earlier discussions related to the essence of SNA, see Yoshimasa Kurebayashi and Itsuo Sakuma (Chap.2 Extended concepts of consumption expenditures, 1990).

23 My previous paper at IARIW, Cork (2004c), presented the productivity comparisons of African countries using the same IMF data. However, I assumed that the relative share of capital was arbitrarily *constant* using the Cobb-Douglas production function under CRS. In contrast, this paper uses the function of consumption and the relative share of rents/capital that change by year, by country, and by sector.

24 The background of this function is justified by the form of M. J. Farrell (1959) and James M. Buchanan (1967), although the idea of utility comes from Plumpton Ramsey (1928) and Jan Tinbergen (1960). I apply the idea of an individual's utility to a country's as a whole, where national taste determines the relationship between the *consumption* that uses the discount rate, *rho*, and the wages as income that uses the rate of return, *r*. By assuming each present value becomes the same under a common output/income in equilibrium, the function of consumption holds, as discussed by Farrell and Buchanan above. For the simulation of an accounting identity between rents and saving, see Kamiryo (Feb, 2005b), where national taste was not externally furnished yet. Note that the rate of return, *r*, is commonly used for *Y*, *W*, *Π*, and *K*.

25 For this final settlement and review, I am much obliged to Dr. Toshimi Fujimoto (see Appendix of Kamiryo, *JES* 10 (Sep, 1) 2006b)). Eq.15 is consistent with all the values in the transitional path. The years for convergence come from the idea of Barro and Sala-i-Martin (1995, pp. 36-38, pp. 80-82). They assume the situation at convergence while I compare the current situation with the situation at convergence by using *delta*(*t*). I am discussing the years for convergence in Kamiryo (2007b).

26 An endogenous rate of technological progress is derived after using external values of (*rho/r*) and (*r/w*).

taste that is a collective taste of people of a country. I find, after hundred experiments by country, that consumption and wages (or, saving and rents) are inseparably related to each other. The relationship between consumption and wages is close to an accounting identity that uses household, corporate, and dividend saving ratios, yet it differs by country, year, and sector. The variance R^2 values of wages to consumption spread between 60% and 95%, reflecting the differences of national tastes. In this respect, I recall that Thomas M. Stoker (2000) supports Jorgenson's formula and applies a Cobb-Douglas utility function to the household sector, connecting it with the cost of capital. My approach, as seen above, differs from Jorgenson's, and Stoker's approach is limited to the household sector and has no intention to connect it with wages of the macro-level.

The formation of *k* and *Ω*:

For reliable estimation of capital and rents, I connect the formation of $1-\alpha$ with the following formation of k and Ω. Repeating adjustments for each value of *alpha*, k, and Ω are essential to a final reliable estimation of capital and rents by sector. To make these adjustments robust, I also take into consideration "supporting indicators" in parallel.[27]

The formation of k and Ω is shown by,

(17) $k = (\alpha/(1-\alpha))/(r/w)$,

where w is the wage rate: $w = W/L$. The value of (r/w) is one of the two externalities in my model as I indicated above. The literature including Uzawa (1959, 1964) uses (w/r), but I prefer (r/w) to (w/r). Because as shown in Eq.17: (1) If I use(w/r), $k \approx \alpha(w/r)$ holds but I prefer the form of $\alpha \approx k(r/w)$ to $k \approx \alpha(w/r)$ and (2) I need the hyperbolic form of $\alpha = \Omega \cdot r$ since if α is fixed over years (as in the transitional path), the current situation will be CRS, where the relationship between Ω and r are well designed. If a reliable wage rate w is externally given from statistics, I can replace (r/w) by w. Both (r/w) and w are reviewed using supporting indicators. After estimating the capital-labor ratio k, capital K is obtained by multiplying labor L. At the same time, the capital-output ratio Ω is calculated using K divided by $Y=NDI$ and accordingly, $r = \alpha/\Omega$ is confirmed (see the bottom of Figure 1). The ratio of rents to capital as the rate of return, r, equals the marginal productivity of capital under CRS. Thus, $r = MPK = \alpha/\Omega$ holds at the same time.[28] The relationship between *alpha*, the capital-output ratio, and the rate of return is examined repeatedly using the above supporting indicators. Furthermore, the formation of $1-\alpha$ and the formation of k and Ω are extended to those by sector. And, finally, the estimation of capital and rents are fixed by country and by year.

In the government sector, I need to assume that the coefficient of consumption/utility (hereafter, I omit utility) is 1.0, where wages = consumption and rents = saving: $S_G = \Pi_G$ or $s_G = \alpha_G$. The assumption of $(rho/r)_G$=1.0 in the government

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[27] My supporting indicators are calculated internally using the data of IMF. These indicators are composed of the *CPI* and its rate of change, g_{CPI}, the discount rate/market rate of the central bank, r_{CB}, and the differences between the level of technology accumulated in the past, $g_{A(TFP)}$ or g_{TFP}, and that at the current situation derived from new qualitative investment, $g_{A(FLOW)}$. The financial assets-neutrality relationship among parameters and variables, see Eq.20 below.

[28] Jorgenson' formula divides capital into price and quantity. They need data from the stock market to estimate the user cost of capital. My model uses qualitative and quantitative investment and capital, where capital is limited to quantitative capital and, qualitative capital is included in the level of technology and thus, the cost of capital is shown by $r^* - g_Y^*$ under $MPK=r^*$ at convergence.

sector is justified since it is consistent with the essential of the budget surplus/deficit. As a result, wages and rents of the government sector are estimated. Then, wages and rents of the private sector are obtained each as the difference between that of the total economy and that of the government sector.

Finally, I will briefly show the supporting indicators to determine (*rho/r*) and (*r/w*).[29] These indicators are composed of (1) the consumers' price index (*CPI*) and its rate of change, (2) comparison of the each term in a specific equation related to the neutrality of financial assets, and (3) the difference of the rate of technological progress in the current investment and the growth rate of *TFP* (or more fundamentally, the difference between the *beta* at the current investment and the $beta_{TFP}$ in the level of technology). I cannot use the exchange rate here since I cannot still formulate reliable equations between the exchange rate, parity, the market interest rate, and the price level.

First, I must pay attention to the *CPI* as a related external parameter that is useful to determine (*r/w*). The *CPI* is related tightly to the difference between the growth rate of wages and the growth rate of per capita output.

(18) $g_w(t) = (w(t) - w(t-1)) / w(t-1)$ and $g_y(t) = (y(t) - y(t-1)) / y(t-1)$.

(19) $g_A(t) = \alpha \cdot g_r(t) + (1-\alpha) g_w(t)$.[30]

If a reliable wage rate *w* is available by sector in statistics by country, the second external parameter (*r/w*) will be reconsidered in corporation with the first external parameter of (*rho/r*). In my current data-sets, I assume that $w = w_G = w_{PRI}$.

Second, I must pay attention to a specific equation formulated for a neutrality of financial assets prevailing empirically,

(20) $$\frac{rho}{r_{CB}} = \frac{rho}{r^* - g_Y^*} \cdot \frac{r^* - g_Y^*}{r_{CB}} \text{ or, } \frac{rho}{r_{CB}} = \frac{rho}{r} \cdot \frac{r}{r^* - g_Y^*} \cdot \frac{r^* - g_Y^*}{r_{CB}}.$$

The equation shows a combining relationship between consumers' discount rate (*rho*), the market rate of the central bank (r_{CB}), the rate of return (*r*), and the cost of capital, $r^* - g_Y^*$, by sector. Supported by empirical results, I find Eq.20 is surprisingly helpful. If a result is abnormal, the situation is highly undesirable to a stable economic growth.

Third, I must pay attention to a theoretical relationship between $g_A(t) = i\,(1-\beta(t))k(t)^{\alpha-\delta(t)}$ in Eq.12, and the growth rate of $TFP(t)$, $g_{TFP}(t)$, where $TFP(t) = B_{TFP}(t) \cdot k(t) = ((1-\beta_{TFP}(t)) / \beta_{TFP}(t)) \cdot k(t)$ in Eq.22 below. This is a qualitative comparison of the current investment and *TFP* (in detail, see 2.3 soon below).

2.3 The structure of productivity and the C-D and its bypass production functions

I will explain conclusively the structure of productivity together with the relationship between the Cobb-Douglas production function under CRS, $y = Ak^{\alpha}$, and two bypass production functions under IRS (in detail and for discussions, see Kamiryo (2007b)). The above relationship derives from the relationship between the flow-base

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[29] I cannot include the exchange rate into the indicators until in the future I could simply formulate the relationship between the Central Bank discount rate, the exchange rate, the parity, and the price level.

[30] If $g_A(t) = g_{TFP}(t)$, *alpha* is constant and there is no shift of a production function. Chang-Tai Hsieh (Eq.5, p.135, 1999) discussed Solow's residual, but without distinguishing the flow-base with the stock-base.

items such as the current net investment, $i(t)$, and *beta*(*t*) and the stock-base items such as capital, labor, *TFP=A*, and $beta_{TFP}$ (*t*) (defined as a *beta* consistent with the stock-base). Based on the Cobb-Douglas production function, I will summarize here (1) two types of Total Factor Productivity as a residual (TFP_{RESI}) and each corresponding production function, and (2) three types of the capital-output ratios, distinguished by the relationship between the stock-base and the flow-base

I generally define Total Factor Productivity as a residual (TFP_{RESI}) as *TFP* divided by the capital-labor ratio with a power of *x*: $TFP = TFP_{RESI:x} \cdot k^x$, staring with $TFP_{RESI:x} \equiv TFP / k^x$. [31] First, if I set the power of the capital-labor ratio as "*delta−alpha*," the following Eq.21 is obtained.

(21) $TFP = TFP_{RESI:\delta-\alpha} \cdot k^{\delta-\alpha}$ or $TFP_{RESI:\delta-\alpha} \equiv TFP / k^{\delta-\alpha}$, $k(t)^{\delta}$ $k(t)^{2\alpha-\delta}$.

Accordingly, using $y(t) = TFP(t)k(t)^{\alpha}$ (i..e., $y = Ak^{\alpha}$), the corresponding production function becomes:

(22) $y(t) = TFP_{RESI:\delta-\alpha} k(t)^{\delta(t)}$, where $\delta(t) = \delta(t) - \alpha + \alpha$.

This function differs from the C-D production function except for "at convergence," where Eq.22 equals the C-D production function. I call it as a conventional bypass production function. At convergence, $TFP = TFP_{RESI:\delta-\alpha}$ holds. This is an important conclusion in Eq.22. Before convergence, this function is under IRS while after convergence, it is under DRS. However, the above *TFP* as a residual is similar to Jorgenson and Griliches (1967) since it cannot tell us any specific value. $TFP_{RESI:\delta-\alpha}$ still remains an unknown residual.

When the above $TFP_{RESI:\delta-\alpha}$ is used, however, I am able to clarify the relationship between "to capital" and "to scale", more properly than the literature. In the case of the C-D production function, diminishing returns to capital (DRC) holds before convergence under CRS as in the literature. And further, increasing returns to capital (IRC) holds after convergence under CRS. The literature only assumes DRC under CRS. The literature cannot clarify what offsets the assumption of DRC before convergence. When the conventional bypass production function is used in parallel to the C-D production function, I prove that IRS offsets DRC before convergence and DRS offsets IRC after convergence. Furthermore, as shown using the Euler Theorem condition, when the relative share of rents/capital, *alpha*, is fixed/constant over time, all production is equal to all factors income and by consequence marginal productivities equal the factors-labor and capital. And, if *alpha* changes, it implies a shift of a production function (see Eq.19 with its note).

The second Total Factor Productivity as a residual ($TFP_{RESI:BTFP}$) differs from the above $TFP_{RESI:\delta-\alpha}$. The second $TFP_{RESI:BTFP}$ gives a final reply to the residual that remains "the measure of our ignorance" as indicated in Jorgenson and Griliches (1967, 249).

(22) $B_{TFP} \equiv TFP / k$ and $TFP = B_{TFP} \cdot k$, where $B_{TFP} = (1-\beta_{TFP}) / \beta_{TFP}$.

$B_{TFP} \equiv TFP / k$ holds in the C-D production function (for proof, see after Eq.24). Using Eq.22, the related bypass production function is shown as,

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[31] In this respect, *TFP* involves the capital-deepening, similarly to Jorgenson's (1967) approach. But, in my case, I distinguish qualitative investment and its accumulated *TFP* with capital and capital-deepening.

(23) $y(t) = B_{TFP}(t)k(t)^{1+\alpha}$, where $B_{TFP}(t) = TFP_{RESI:BTFP}(t)$.

Again, this holds under IRS, but differently from Eq.21. Now Eq.23 reduces to the C-D production function. Reformulating Eq.23,

(24) $k(t)^{1-\alpha} = TFP(t)\cdot\Omega_{TFP}(t)$ holds.

This is the same form as the C-D production function.

Setting $TFP(t) = B_{TFP}(t)\cdot k(t)$ in Eq.22 equalize $TFP(t) = k(t)^{1-\alpha}/\Omega_{TFP}(t)$ in Eq.24,

(25) $B_{TFP}(t) = 1/(k(t)^{\alpha}\cdot\Omega_{TFP}(t))$.

Inputting Eq.25 into Eq.23,

(26) $y(t) = k(t)/\Omega_{TFP}(t)$ since $k(t) = k(t)^{1+\alpha}/k(t)^{\alpha}$.

Eq.26 holds as an accounting identity in both the C-D and bypass production functions so that the above $B_{TFP} \equiv TFP/k$ is justified and proved to be an accounting identity. $y(t) = B_{TFP}(t)k(t)^{1+\alpha}$ under IRS holds before and after convergence. This implies that $B_{TFP}(t)$ decreases in the transitional path and is neutralized by $k(t)$^(1+α) under IRS. In short, an ultimate TFP_{RESI} cooperates with the capital-labor ratio with a power=1. This case shows an essential characteristic of TFP_{RESI} in the production function. The *TFP* as a residual in Jorgenson may be similar after excluding the capital-labor ratio or capital-deepening, but without presenting what is the residual.

Next, I will clarify the three different capital-output ratios: (1) Ω_{TFP} as a stock-base. (2) Ω_{TFP} as a flow-base that is consistent with the current investment. (3) The current $\Omega(0)$ or $\Omega(t)$ that is a mixture of a stock-base of *K* and a flow-base of *Y*.

(27) $\Omega_{TFP}(t) = 1/(B_{TFP}(t)\cdot k(t)^{\alpha})$ using Eq.25,

where $TFP_{RESI:k}$ is $B_{TFP} \equiv TFP/k$ and $y(t) = B_{TFP}(t)k(t)^{1+\alpha}$ holds consistently.

(28) $\Omega_B(t) \equiv 1/B(t)^{1-\delta(t)}$,

where $1 = \Omega_B(t)\cdot B(t)^{1-\delta(t)}$ is not an accounting identity but an assumption and, $TFP_{RESI:1-\delta}$ is shown as $B(t)^{1-\delta(t)}$ and *TFP* is shown as $B(t)^{1-\delta(t)}\cdot k(t)^{1-\delta(t)}$.[32]

In this case, the flow of the current investment and *B*(*t*) are consistent with $\Omega_B(t)$. However, the corresponding bypass production function does not consistent with the C-D production function and cannot be used.

(29) $\Omega(t) = 1/B(t)^{1-\delta(t)}$ as a special case that uses $\Omega(t)$ instead of $\Omega_B(t)$.

The purpose of this equation is to measure the value of *delta*(0), where $\delta(0) = 1 - \left(LN(1/\Omega(0))/(LN((1-\beta^*)/\beta^*)\right)$ (see Eq.4).

In short, $\Omega(t) = 1/(B_{TFP}(t)\cdot k(t)^{\alpha})$ is consistent with $TFP(t) = B_{TFP}(t)\cdot k(t)$. However, Eqs.28 and 29 are inconsistent with $TFP(t) = B_{TFP}(t)\cdot k(t)$. Only if *delta*=0, then, $TFP(t) = B(t)k(t) = B(t)^{1-\delta(t)}\cdot k(t)^{1-\delta(t)}$ holds. And, *delta*(*t*) is, in a sense, a product required for solving an inconsistent difference between the stock-base and the flow-base. The literature such as Solow (1956), Jorgenson (1963), and Denison (1964), uses *TFP* in

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32 The corresponding production function is shown as $y(t) = B(t)^{1-\delta(t)}k(t)^{1-\delta(t)+\alpha}$. At convergence, this bypass production function is shown as $y(t) = B(t)^{1-\alpha}k(t)$. This is a kind of Ak model, whose characteristics differ from the AK model discussed by Khaled Hussein and Anthony P. Thirlwall (1998). For comparison, see Kamiryo (2007b).

the Cobb-Douglas production function, $y = A \cdot k^{\alpha}$ under constant returns to scale (CRS). Do these approaches under CRS explain DRS or IRS as an assumption or as a fact at the current situation?[33]

2.4 The relationship between the budget deficit and the growth rates: propositions

I intend to clarify the mechanism why the budget deficit influences the rate of technological progress and the *TFP* as a whole economy. This is my motivation to settle this paper since there is no literature to solve the above mechanism due to a fact that it is impossible to divide the total economy into the two sectors if SNA is directly used. The mechanism is justified by approving the additive/sum and multiplicative rules to the government and private sectors, where e.g., α of the total economy becomes a weighted average of α_G and α_{PRI}.

The mechanism is clarified, starting with the basics of government accounts:

1. The basics of government accounts are summarized by the relationship among wages, consumption, rents of the government sector and the budget surplus/deficit. Government output $Y_G \equiv S_G + C_G$ holds, where wages equal consumption, $W_G = C_G$, using(*rho/r*)=1.0 by assumption. Thus, $Y_G \equiv S_G + W_G$, holds and rents are derived as $\Pi_G = Y_G - W_G$. The budget surplus/deficit is $S_G - I_G$, where $S_G \equiv T_{AXES} - C_G$. In short, $Y_G = T_{AXES}$ holds, where $S_G - I_G = T_{AXES} - C_G - I_G$.
2. The relationship between the rate of return and the growth rate of output at convergence is obtained as in Eq.7 using the equations at convergence: $r^* = (\alpha/(i \cdot \beta^*))g_Y^*$. $(\alpha/(i \cdot \beta^*)$.
3. In the case that the budget is minus: $0 > S_G = \Pi_G$ (under $0 > I_G$) and thus, $0 > s_G = \alpha_G$ and $0 > r^*$ hold under an assumption of $r(0) = r^*$ that corresponds with $\Omega(0) = \Omega^*$ by assumption (see Eq.4 and its note).
4. Recall that $B^* \equiv (1-\beta^*)/\beta^*$: the higher the *beta** the lower the B^*. Also the higher the capital-output ratio the lower the B^* (this will be discussed using simulation for the equations at convergence in Kamiryo (2007b)). The higher the capital-output ratio is the higher the *beta**. This implies that the rate of technological progress is lowered along with a higher capital-output ratio.
5. In conclusion: (1) If the deficit is huge, saving and rents are significantly minus, resulting in $0 >> s_G = \alpha_G$ and $0 >> r^*$. Thus, in $r_G^* = (\alpha_G/(i_G \cdot \beta_G^*))g_Y^*$ of the government sector, the growth rate of output, g_Y^*, will be significantly minus. (2) If the capital-output ratio is significantly high as in Japan due to huge public investment, B^* will approach zero or *beta** will approach 1.0. (3) As a result, the value of $\alpha/(i \cdot \beta^*)$ lying between r^* and g_Y^* will be roughly shown as α/i and be lower than −1.0. This implies that $0>r^*$ and $0<g_Y^*$, whose cost of capital, $r^* - g_Y^*$, shows a minus value. (4) Since the total economy obeys the above rule of the government and private sectors,

[33] After convergence, the situation is reversed assuming the same use of *delta* (*t*): from DRS to IRS or from IRS to DRS (in detail, see Kamiryo (*JES* 10 (Sep), 2006b).

an aggravated result of the government sector influences that of the total economy, even if the private sector is competitive as in Japan, depending on the actual relationship between the balance of payment (the current external balance) and the budget surplus/deficit. Note that the current situation and the situation at convergence in the transitional path are related to each other. And remember that an ultimate *TFP* as a residual equals B_{TFP} as a weighted average of qualitative investment to quantitative investment accumulated in the past. [34] If the current situation is closer to CRC as in Japan, B is closer to B^* and B_{TFP} is closer to B^*_{TFP} (in detail, see Kamiryo (2007b)). Then, B is related to the current investment while B_{TFP} is related to national debts accumulated in the past.

I raise the three propositions. These will be justified empirically in Section 4.

Proposition 1: If the current basic parameters are given, it is possible for an economy to reveal the relationship between the budget surplus/deficit and the growth rate of output both at the current situation and at convergence, by using the ratio of qualitative investment to quantitative investment.

Proposition 2: If the budget deficit shows a highly minus (quantitatively), both the rate of return and the growth rate of output in the government sector will be highly minus, which decreases the growth rate of output of the total economy even when the growth rate in the private sector is still robust.

Proposition 3: Similarly, if national debts are extremely huge, these will aggravate a weighted average of the ratio of qualitative investment to quantitative investment accumulated in the past, B_{TFP}, which equals *TFP* as a residual. As a result, an average current growth rate of output that corresponds with national debts will be depressed in the long-run until national debts will decrease to a moderate level.

The above propositions consistently correspond with Glaeser, Edward, L., Rafael, La Porta, and Florencio, Lopez-De-Silanes (2004) in that human capital is a more basic source of growth than the institutions. In my model, qualitative investment and its accumulation reflect human capital, education, and learning by doing.

Finally, let me compare the above propositions with related statements in the literature. Balassone and Franco (2000) reviewed the 3 % EU rule, comparing the Modigliani, the UK, and Germany models, but these models were shown by changing the ratio of net/gross investment to the current expenditures quantitatively. Alberrto Alesina, Silvia Ardagna, Roberto Perotti, and Fabio Schantarelli (2002) found, by using OECD data, that the ratio of the increase in taxes to the decrease in current expenditures would lead to a good or bad result in budget stabilization and that fiscal policy might determine the decrease in private investment. However, these researches do not step into *TFP* due to the shortage of data and methods. I indicate that the budget surplus/deficit must be tested qualitatively; evaluating the rate of technological progress to the current investment, and *TFP* and its growth, each by sector.

3. Data setting

[34] The relationship between B^* and B^*_{TFP} (see Eqs.22 and 28) solves an unclear relationship between the current investment and the stocks in the Cobb-Douglas production function or the relationship between embodiment and disembodiment.

In this section, I will explain the contents of my data-sets for thirty countries 1995-2004 by sector, whose basic values come from the data of IMF.[35] For my model and method, it is indispensable to get the data of the budget surplus/deficit and the gross investment for both the total economy and the government sector (or the G sector). The data of the private sector (or the G sector) will be calculated as the differences. For this reason, I excluded some countries (e.g., Chile, Ireland, Poland, Turkish, and Vietnam) from my data-sets. For my data-arrangement, I use nine big working sheets by country, year, area, group of the saving level, and sector. In this paper, I will select, in my data-sets, fundamental results useful to productivity comparisons by country, sector, and year. For my notation and method are summarized in Tables **S-1** and **S-2** in Appendix. Other huge values will be sent to readers if requested.

Before starting, I will raise some reminding regarding capital and rents of the government sector. The reminding is essential to the productivity comparisons between the government and private sectors. Arrow (1970) stresses the doctrine that the rate of return on government capital should be equal to that on private capital. This is possible only when the budget surplus/deficit is zero or the saving of the government sector equals its net investment ($S_G=I_G$). The government saving is equal to taxes less the current expenditures ($S_G=Taxes-C_G$), by an accounting identity, where C_G is government expenditures. The rate of return of the government sector used in the literature cannot take into consideration a fact that many countries suffer from severe deficits: $S_G<0$ and $I_G>0$. This shows that we cannot directly satisfy both the rate of return of the government sector and a system of national accounts.

Taxes equal government output by an accounting identity, whose products shift between the government sector and the private sector (without breaking the whole framework of the input-output table[36]): $Y_G = S_G + C_G$.[37] This corresponds with the shift of wages (for government employees) spent in the household to the government sector. And, for the government sector, I define rents as output less wages and assume that consumption equals wages.[38] Saving equals rents in the government sector by an accounting identity: $S_G=\Pi_G$. Also I assume that government capital and its current investment increase the output of the government sector, similarly to the private sector.

Back to the data, my data-sets are composed of basic values such as capital (stock), labor, output, wages, and rents, and also various parameters and variables, each by sector (the total economy, the G sector, and the PRI sector) and by year (1995 to 2004). I will show main values of productivity comparisons in Appendix. Tables A-1 to A-3 show the contribution shares of *TFP*, capital, and labor each to the growth rate of output. Tables B-1 to B-3 show the contribution share of *TFP* to the growth rate of output and the contribution shares of the net investment/output "i" and qualitative "1-β" each to the rate

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35 I visited Washington and Ottawa in October 2005 to investigate SNA data and its contents available today in the world. I am thankful to Shigeru Endo, the auditor of Shibuya Kogyo, and Dr. Carole Brookings, a former director of the World Bank, New York, and also, Drs. Francois Bourguignon, Serven Luise, and Laliberte Lucie of the World Bank. At the same time, I cannot forget the discussions with Dr. Steve Landefeld, Director, and the staff of BEA.

36 When national disposable income includes income from abroad as in my data-sets, the situation is consistent with the input-output table.

37 $Taxes-(C_G+I_G)=S_G-I_G$. $Taxes=S_G-I_G+(C_G+I_G)$, which equals Y_G. Here I do not discuss the primary balance that excludes national debt interest paid.

38 This comes from my assumption to the function of consumption in the government sector or (rho/r)=1.

of technological progress at convergence.

Tables C, D, and E in Appendix show each five countries: the US, Russia, China, India, and Japan. Tables C-1 to C-3 show (1) basic values such as *L*, *Y*, *K*, *TFP=A*, and *Π*, and (2) basic current parameters such as *i, s,* α, *n,* and *k*. Tables D-1 to D-3 show (1) the capital-output ratio Ω (as the inverse number of *ACP*), the rate of return *r*, the cost of capital, *ALP=y*, and its growth rate, and (2) the contribution shares of *TFP, K,* and *L* each to the growth rate of output, and the contribution shares of "i" and qualitative "1-β" each to the rate of technological progress at convergence. Tables E-1 to E-3 show the structure of productivity (*ALP*, *TFP*, *ACP*, and B_{TFP}), and Table E-4 shows *beta*, $beta^*$, and the years for convergence, comparing the G sector with the PRI sector.

The US, Russia, China, India, and Japan were selected by taking into consideration (1) the plus/minus combinations among the *BOP*, the budget surplus/deficit, and the *S−I* of the private sector (the PRI sector), scored by five stages[39]; 8, 6, 2, 1, and 0, and (2) the level of saving (ranking saving levels using clubs; Clubs c-cc, s, and ss-sss). In 2004, the US shows Score 0 and Club c-cc (including Clubs c and cc), Russia shows Score 8 and Club ss-sss (including Clubs ss and sss), China shows Score 6 and Club ss-sss, India shows Score 2 and Club s, and Japan shows Score 6 and Club c-cc. Among these, Japan is unique in that the *BOP* is robust but the deficit is too huge after 1995. Japan and China both show Score 6, where the budget shows each deficit. Nevertheless, each background differs significantly as clarified by the structure of productivity: China is robust under a low deficit and the control of the exchange rate. Up to date in the literature, strictly qualitative differences of results among countries have been hidden. These hidden differences are traced back to the character of a system of national accounts, where the statistics of the G sector have not been separated from those of the total economy.

Basically, Table series B and C in Appendix concentrate on *TFP*, *ALP*, and *ACP*. I find, after comparisons with several statistics, that if data and method differ, it is meaningless to compare with each other. For more convergency, I have prepared, as in Table series E, essential parameters such as *beta*, $beta_{TFP}$, $beta^*$, $beta_{TFP}{}^*$ (or straightforwardly, *B* and B^* and B_{TFP} and $B_{TFP}{}^*$), *delta*, *alpha*, and, *theta=i/s*. These parameters adjust the flow-base of investment and the stock-base of accumulated technology and reveal hidden qualitative facts.

4. Productivity comparisons

In this section, I will conclusively summarize productivity comparisons, with tables and figures (also see tables in Appendix). Before starting, I will briefly summarize the results of preparatory steps for estimating capital and the rate of return (or rents to capital), in particular, the function of consumption. After that, I will first roughly show productivity comparisons for thirty countries and then, I will compare five countries in more detail, where my research questions are tested more clearly.

First, the differences of national taste in the function of consumption, $1-\alpha = c/(rho/r)$, are clarified by dividing countries into three clubs/groups that are determined using the level of consumption to output, *c*. **Table 1** shows thirty countries

[39] The following three scores for the combination +/− do not exist in the real world: (1) Score 5 (*BOP* +, budget +, and the PRI sector −), (2) Score 4 (*BOP* −, budget +, and the PRI sector +), and (3) Score 3 (*BOP* +, budget −, and the PRI sector −).

classified by club: Club c-cc that includes Club c and Club cc, Club s, and Club ss-sss that includes Club ss and Club sss. This classification changes by year during the last ten years: some countries are more consumption-oriented while others are more saving-oriented. Let me compare the top of **Figure 1** that shows $(rho/r)(c)$ with **Figure 2** that shows $(rho/r)(c)$ by club. The R^2 between *c* and (*rho/r*) is 87.71% for thirty countries, yet it is 80.94% for Club cc-c, 46.43% for Club s, and 94.05% for Club ss-sss. The above results indicate that saving-oriented Asian countries (whose ratio of saving to output is more than 20%) have similar/same national taste and, consumption-oriented advanced countries (whose ratio of saving to output is less than 10%) have slightly different national taste. Yet, moderate countries whose ratio of saving to output is between 10 to 20% have each specific national taste by country. This implies that moderate countries may widely take their own selected policies. It is better for an economy to have longer data of the function of consumption even if national taste significantly changes as in Japan.

Turning to another external parameter (*r/w*), the middle of Figure 1 shows that the relationship between the relative share of labor ($1-\alpha$) and the (*r/w*) spreads over and it is difficult to get a high R^2 between $1-\alpha$ and (*r/w*), even though $1-\alpha$ stays at 88% to 92%. This implies that the rate of return and the wage rate have varieties by country, influenced by different policies. If I could get reliable wage rates over years from statistics for many countries, I may in the future replace this external parameter (*r/w*) by the wage rate by country. In short, the more trustworthy the above two parameters, (*rho/r*) and (*r/w*), are, the better results are expected at the current and convergence situations.

4.1 The government sector versus the private sector

Now let me summarize productivity comparisons by sector among thirty countries 1995-2004. I will show productivity comparisons by using the "G/PRI," which shows the value of the G sector divided by the corresponding value of the PRI sector. **Table 2** compares *ALP*, *TFP*, and *ACP*, using the G/PRI: $ALP_{(G/PRI)}$, $TFP_{(G/PRI)}$, and $ACP_{(G/PRI)}$. I give "scores-1" by country to the combinations of the *BOP*, the budget surplus/deficit, and the difference between saving and net investment of the PRI sector, together with $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$. I will indicate several points:

1. Many countries have score 6, where $(S-I)_G/Y<0$. Canada, Argentina, Italy, Finland, Norway, Russia, Korea, Singapore, and Thailand each shows score 8 in 2004, where $(S-I)/Y>0$, $(S-I)_G/Y>0$, and $(S-I)_{PRI}/Y>0$. These countries have recovered from $(S-I)_G/Y<0$. The US, Mexico, and Kenya each shows score 0, where $(S-I)_{PRI}/Y<0$ under twin deficits.
2. The relationship between $ALP_{(G/PRI)}$, $TFP_{(G/PRI)}$, and $ACP_{(G/PRI)}$ seems not to reflect the above scores. Each country has its own characters of $ALP_{(G/PRI)}$, $TFP_{(G/PRI)}$, and $ACP_{(G/PRI)}$.[40] If $ALP_{(G/PRI)}>1.0$ (if the G sector is more effective in *ALP* than the PRI sector), $TFP_{(G/PRI)}$ will be less than 1.0 and $ACP_{(G/PRI)}$ will be more than 1.0. Exceptions

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[40] For confirmation, $ALP = TFP \cdot k^{\alpha}$ and $ALP = ACP \cdot k$ or $TFP = ACP \cdot k^{1-\alpha}$ hold in the structure of productivity. If *ALP* is high, both *TFP* and *ACP* will be high under the condition that the capital-labor ratio and the relative share of capital usually change slightly. However, a country cannot continuously enjoy a certain level of *ACP* when the capital-output ratio reaches an upper level after enjoying some periods of high investment growth (Kamiryo 2004c).

are China and Singapore. The movements of *TFP* are sensitive and most suggestive.

Figure 3 shows each (G/PRI) of *ALP*, *TFP*, and *ACP*: (1) The top panel is "by country" in Club c-cc that includes Club c and Club cc. (2) The bottom panel is "by country" in other clubs (or, Clubs s, ss, and sss). The values of (G/PRI) in *ALP* do not fluctuate much by country and by club. Nevertheless, the values of (G/PRI) in both *TFP* and *ACP* differ significantly by country and by club. These countries are divided into two classes: stable and fluctuating. Canada, Mexico, Peru, Argentina, Sweden, Italy, and most Asian countries are stable, and Japan, Philippines, and Hungary are extremely unstable. As in Table 1, deficits of many countries show a burden below or above 3% yet, "stable" countries are those that have decreased the ratio of the deficit to output and "fluctuating" countries are those that have not succeeded in decreasing this ratio. A typical case is Japan as will be clarified in detail in the next section. Here I just indicate that an extremely high value of (G/PRI) in *TFP* shows a qualitative aggravation of the deficit and its accumulation/national debts with an undesirable minus relative share of capital, *alpha*. Therefore, the character of *TFP* is powerful as a weighted average. And, *ACP* will show a result of inefficient government investment, most related to *TFP*.

Table 3 shows (1) on the left, the growth rate of *ALP*, *TFP*, and *ACP* as the ratio of G/PRI, and (2) on the right, the contribution shares of *TFP*, *K*, and *L* each to the growth rate of output. I showed "bold" for the countries that have more than 3% of the deficit to output. For (1), each country has its own changing movements, regardless of the level of the deficit. For (2), the contribution share of *TFP* to the growth rate of output and the contribution share of *K* to the growth rate of output move adversely among countries, regardless of the level of the deficit, yet the contribution share of *L* to the growth rate of output is significantly low (within a certain range) among countries. I will more clarify these movements using five selected countries below.

4.2 Fact findings in the structure of ALP, TFP, and ACP using five countries

The above results are wholly suggestive from the viewpoint of the deficit. In this section, I will clarify facts in more detail by using interesting relationships between basic parameters and variables. I will present three propositions that if the deficit and national debts qualitatively aggravate in an economy (even if economic activities of the private sector seem to be robust), the economy will suffer from a sort of cancer before falling into the limit of debt-hell. The current data using national accounts and/or the data of IMF cannot directly reveal it. However, if we use *beta*, $beta_{TFP}$, $beta^{*}$, $beta^{*}_{TFP}$, hidden in the current investment and *TFP* as in this paper, a true situation under abnormal deficits and debts will be revealed. *ALP* and *ACP* as the inverse number of the capital-output ratio show always plus and cannot seriously show a real picture. However, if government saving falls into a huge minus, the relative share of capital and the rate of return of the G sector become minus and aggravate the contents of *TFP* and $beta_{TFP}$, exposing an unbalanced duality between quality and quantity by sector.

Tables 4 and **5** show essential data of the US, Russia, China, India, and Japan 1995-2004. The data are composed of data of the G sector, the PRI sector, and the total economy, where the ratio of government saving to output, s_G, and TFP_G are directly related to the extent of the deficit. The capital-output ratio as the inverse number of *ACP* shows a reserve power to sustainable growth: if it is low it is easier to grow and if it is too high it is difficult to grow. And, *ACP* is related to *TFP* due to $TFP = ACP \cdot k^{1-\alpha}$. **Table 5** directly compares the G sector with the PRI sector, using qualitative values. Table 5 shows how the deficit aggravates qualitative parameters each by each, which in turn influences those qualitative parameters in the private sector. Conclusively, the US is overall much better than Japan despite of notorious twin deficits. The PRI sector of Japan is not supreme since it includes notorious thirty-one special public accounts related to budget and being not included in budget: the G sector eats up the reserve power of the PRI sector (see TFP_{PRI}). China is most stable and robust in every respect, despite of a minus deficit to output of −2.8%. This is proved by **Note to Table 5**, where in China the values of both β_G / β_G^* and $\beta_{PRI} / \beta_{PRI}^*$ are stable and close to 1.0 during the last ten years. This implies that China is a good hand in balancing quantitative and qualitative investment: China's *TFP* and TFP_{PRI} are stable, despite of a high ratio of net investment to output and bad conditions of *eco-preservation*. And, I warn: China's capital-output ratio has increased rapidly and already approaches a moderate limit of growth, which implies that China will soon face at entering one of advanced countries or decrease the growth rate. China must carefully control a moderate rate of investment to output.

Finally, I will compare the US with Japan using Tables 6, 7, 8. **Table 6** shows ALP_G, TFP_G, k_G, α_G, and Ω_G of the US and Japan 1995-2004 (look at the aggravation of TFP_G in Japan and also Figure 4). Table 6 implies that government investment and TFP_G are much more stable in the US than those in Japan. **Table 7** shows five policy-oriented values (taxes/Y, deficit/Y, consumption C_G/Y, saving S_G/Y, and the ratio of Y_G to Y) of the US and Japan. Table 7 implies that government current expenditures in Japan have increased continuously over the last ten years together with the deficit, resulting in an extremely minus level of government saving. Note that government net investment can be minus (by investing within the range of depreciation): if net investment is plus, it still aggravates the deficit when government saving suffers from a minus value. Moreover, government investment by year is related to ineffective government *TFP* through $beta_G$. Table 7 also implies that there is much room for increasing taxes in Japan compared with the US. However, taxes should be raised after boldly cutting both current expenditures and net investment towards an international level. These policies, if democracy is true, are the responsibility of the current people to the next generations.

Table 8 shows how fiscal policy will directly influence the rate of technological progress of the current investment and the growth rate of *TFP*, both in the private sector. As a result, in the case of Japan PRI sector, the ratio of net investment to output decreases from 12.6% to 5.4% during the last ten years. Despite of twin deficits, the US' PRI sector has enjoyed a stable tendency of the rate of technological progress except for 2002, whose tendency is close to the growth rate of *ALP*. Also, the growth rate of *TFP* is high and stable in the US' PRI sector, compared with that in Japan. In Japan, both the G and PRI sectors have suffered from undesirable and unstable results.[41] I indicate that Japan

[41] I comment Japan's case in this respect. The PRI sector seems to have recovered its robust performances. However, this comes mainly from the decrease of the relative share of labor due to the average low wage rate by increasing non-regular workers or part-timers. If this tendency turns adversely to strengthen labor qualitatively, the relative share of labor will increase. Also, if the ratio of net investment to output recovers up to 10% from 5% (see Table 8), crowding-out will occur. Ineffectiveness of the G sector spreads over the PRI sector since most of the thirty-one special public accounts related to the deficit are ineffectively preserved in the PRI sector.

TFP of the G sector fluctuates extremely, which will in turn aggravate qualitative performances or the structure of productivity as a whole economy.

From the viewpoint of qualitative and quantitative investment and each accumulation, the deficit directly turns the government saving to a minus value and government investment increases its capital-output ratio highly beyond the limit of a stable range of 2.0 to 2.5 accepted under international competition. *TFP* of the total economy reflects these signs since the relative share of capital and the capital-output ratio are each a weighted average of the two sectors. Excessive current expenditures of the G sector (that is related to taxes) influence the level of the relative share of rents/capital and, the ineffective investment of the G sector aggravates the level of the capital-output ratio, driving government saving more minus. Qualitative and quantitative capital and labor are dual to each other.[42] The EU 3% rule for fiscal policy does not measure this duality but just treats the related ratios quantitatively. I must appeal this point using an extreme case of Japan. For example, the US fiscal results are much more qualitative while the Japan's fiscal results are much less qualitative. The above empirical results will support my three propositions raised in 2.4, based on the duality between quality (*TFP*) and quantity (*K* and *L*).

5. Conclusions

My motivation to this paper was how I could appeal the importance of modified national accounts data that shows the relationship between the budget deficit, an endogenous rate of technological progress, the growth rate of output, and *TFP*. There are three obstacles before satisfying this motivation: (1) how to divide the total economy into the two sectors using the additive/sum rule to data by sector and the multiplicative rule to any ratio, (2) how to modify the data by changing such data as wages and rents from GDP-base to the NDI-base, and set up the data-sets by country and by sector, and (3) how to clarify the relationship between the national accounts data and the Cobb-Douglas production function data and measure the essence of *TFP* and an ultimate *TFP* as a residual. I found that the above three obstacles come from the same root, where data and methods are inseparable. I started with the current net investment, which I divided into qualitative investment and quantitative investment. Then, *TFP* is a purely accumulated stock of qualitative investments and capital is a purely accumulated stock of quantitative investments. There are some inconsistencies between the flow-base of the current investment and the stock-base of the Cobb-Douglas production function. As in Jorgenson (1966), the discrepancies have been partially disposed by using embodiment and disembodiment aggregated from the micro-level and also by the shift of the production function that changes the relative share of rents/capital.

I solved the above obstacles by using my methods for measuring *alpha*, capital, and rents at the same time and also using the equations in the transitional, where I found the essence of productivity: An ultimate *TFP* as a residual is now the ratio of qualitative

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[42] In the literature, the dual relationship between quality and quantity is discussed using price and quantity. This is reformed in my structure of productivity, where two factors are divided into qualitative (such as *TFP* and the rate of technological progress) and quantitative (K, L, α, Ω, r, and k). Robert Hall (1968) applied the duality to productivity. Jorgenson's formula takes the duality, where both capital and labor have each duality, *TFP* being a residual.

investment to quantitative investment that decreases over time in the transitional path. Another *TFP* as a residual was shown by Eq.21, but his residual is the same as "the measure of our ignorance" in Jorgenson and Griliches (1967). These findings differ from the literature and I applied my model and the structure of productivity to my data-sets of thirty countries 1995-2004 by sector. As a result, I set up three propositions to the relationship between the deficit and endogenous variables. The EU rule of 3 % rule of the deficit/*GDP* is moderate empirically, but there is no literature to numerically justify its background. This is because national accounts cannot directly divide its system as statistics into the two sectors. It is almost impossible to modify the system under the *GDP*-base, even in the coming review of SNA 2008. This is because SNA cannot directly introduce the function of utility in the literature or my function of consumption as a surrogate of the function of utility.

My data-sets by country and by sector are able to arrange for any country (together with *alpha*, capital, and rents by sector) if the data of the budget surplus/deficit, government investment, and a few others are obtained using the raw data of IMF. And, resultant productivity comparisons by sector are consistent among countries; advanced versus developing countries and saving-oriented versus consumption-oriented countries. Economic and fiscal policies need suitable data and reliable productivity comparisons among countries and by sector of each country. I indicate that it is better to get capital and rents by country and by sector as in this paper rather than to have no data of capital by country since developing countries have not accumulated/suitable technique for estimating capital. PWT has stopped the statistics of capital by country and OECD publishes only capital of the corporate sector. I indicate that capital and rents should be consistent in the macro-level.

In short, without the improvement of the budget deficit, there is no growth of a country. With growth policy, the improvement of the budget deficit may be possible to some extent only if the level of deficit is within a certain international level such as the 3 % EU rule, which I confirmed by simulation. This is a conclusion derived from theoretical and empirical results for productivity comparisons by sector, which guarantees a base of growth. It will be proved in the near future that this conclusion is true in Japan if Japanese policy insists on growth rather than the decrease in national debt and also if qualitative investment and *TFP* do not improve with the decrease in *beta*. Note that *beta* of a country is definitely influenced by the deficit. Lastly I need to extend the function of consumption and connect the difference of the wage rate with the relative poverty rate by country.[43]

[43] My interpretation above is consistent with the Survey of OECD (20 July 2006) from the viewpoint of the relative poverty rate by country. This survey shows "international comparisons for the relative poverty rate" by country and criticizes the Japanese situation that the relative poverty rate turned to be the highest already in 2000; next to the US. As I indicated above, the Japanese economy has been supported by the private sector, shifting wages to rents/returns and scarifying future human capital and robust consumption; due to the increase in non-regular workers with low wages (see propositions in 2.4).

Table 1 Comparison of consumption and (*rho/r*) by country: using three clubs for saving level

	by club	1995 c	1995 rho/r	2004 c	2004 rho/r	Trend to be
1. The US	c-cc	0.9174	1.0495	0.9525	1.0900	More C
2. Canada	c-cc	0.9150	0.9890	0.8571	0.9480	More S
7. Mexico	c-cc	0.8979	0.9999	0.9051	1.0070	
8. Peru	c-cc	0.9060	0.9950	0.8727	0.9800	More S
6. Argentina	c-cc	0.9349	1.0300	0.8623	0.9450	More S
5. Brazil	c-cc	0.8962	1.0000	0.8510	0.9500	More S
6. The UK	c-cc	0.9389	1.0580	0.9384	1.0887	More C
9. France	c-cc	0.9019	0.9950	0.8894	0.9956	
1. Japan	c-cc	0.8536	0.9788	0.9001	1.0532	More C
10. Philippine	c-cc	0.9133	1.0350	0.8298	1.0000	More S
9. Kenya	c-cc	0.9392	1.0500	1.0316	1.1600	More C
Average of 11 countries		**0.9104**	**1.0164**	**0.8991**	**1.0198**	
7. Sweden	s	0.8826	0.9800	0.8549	0.9750	
8. Germany	s	0.8692	0.9770	0.8698	0.9755	
10. Italy	s	0.8745	0.9730	0.8855	0.9800	More C
4. Spain	s	0.8572	0.9610	0.7895	0.9100	
5. Hungary	s	0.8659	0.9730	0.8908	0.9810	More C
4. Australia	s	0.8953	0.9780	0.9051	0.9790	More C
5. New Zealand	s	0.9080	0.9770	0.9046	0.9770	
4. India	s	0.8615	0.9700	0.8460	0.9670	
Average of 8 countries		**0.8768**	**0.9736**	**0.8683**	**0.9681**	
1. Finland	ss-sss	0.8498	0.9720	0.8245	0.9620	
2. Norway	ss-sss	0.8269	0.9630	0.7456	0.9200	More S
3. Netherlands	ss-sss	0.7899	0.9580	0.8178	0.9640	
3. Russia	ss-sss	0.8125	0.9300	0.7429	0.8430	More S
2. Korea	ss-sss	0.7272	0.8080	0.7590	0.8820	More C
3. China	ss-sss	0.6693	0.7700	0.5755	0.6900	More S
6. Singapore	ss-sss	0.5305	0.6600	0.5506	0.6300	
7. Malaysia	ss-sss	0.6908	0.8504	0.6236	0.8083	More S
8. Indonesia	ss-sss	0.7837	0.9410	0.8187	0.9724	More C
9. Thailand	ss-sss	0.7464	0.9000	0.7878	0.9370	More C
10. South Africa	ss-sss	0.6265	0.7480	0.6178	0.7390	
Average of 11 countries		**0.7321**	**0.8637**	**0.7149**	**0.8498**	
Average of 30 countries		**0.8361**	**0.9490**	**0.8233**	**0.9143**	

Note: Classification of Clubs by the level of saving/consumption

cc-c	**1. The US**	**2. Canada**	**3.Mexico**	**4. Peru**	**5. Argentina**	**6. Brazil**
	7. The UK	**8. France**	**9. Japan (from s to cc)**		**10. Philippine**	**11. Kenya**
s	**1. Sweden**	**2. Germany**	**3. Italy**	**4. Spain**	**5. Hungary**	
	6. Australia	**7. New Zealan**	**8. India**			
ss-sss	1. Finland	**2. Norway**	**3. Nethreland**	**4. Russia**	**5. Korea**	
	6. China	**7. Singapore**	**8. Malaysia**	**9. Indonesia**	**10. Thailand**	**11. S. Africa**

by club	s	c
cc	below 0.08	above 0.92
c	around 0.1	around 0.9
s	around 0.15	around 0.85
ss	0.2 to.0.25	0.80 to 0.75
sss	0.3 to 0.45	0.70 to 0.55

Table 2 The ratio of **G/PRI** for each *ALP*=y, *TFP=A*, and *ACP=Y/K* in 2004 by country

Government/private	by club	$ALP_{(G/PRI)}$	$TFP_{(G/PRI)}$	$ACP_{(G/PRI)}$	(S-I)/Y	$(S\text{-}I)_G/Y$	$(S\text{-}I)_{PRI}/Y$	Scores-1*
1. The US	c-cc	0.672	3.278	1.907	(0.054)	**(0.038)**	(0.016)	**0**
2. Canada	c-cc	0.978	1.130	2.031	0.028	0.000	0.028	8
7. Mexico	c-cc	0.811	1.755	3.385	(0.020)	(0.012)	(0.009)	**0**
8. Peru	c-cc	0.930	1.059	0.828	0.032	(0.014)	0.046	6
6. Argentina	c-cc	1.256	0.938	1.843	0.031	0.025	0.007	8
5. Brazil	c-cc	0.819	1.175	8.561	0.016	(0.008)	0.024	6
6. The UK	c-cc	0.701	2.280	3.972	(0.012)	(0.028)	0.016	2
9. France	c-cc	0.642	3.016	2.402	0.009	**(0.053)**	0.062	6
1. Japan	c-cc	0.390	*16121*	0.333	0.046	**(0.091)**	0.138	6
10. Philippine	c-cc	0.563	6.700	0.854	0.080	**(0.040)**	0.120	6
9. Kenya	c-cc	0.857	1.348	0.508	(0.103)	(0.004)	(0.099)	**0**
7. Sweden	s	0.741	3.827	7.011	0.077	(0.024)	0.101	6
8. Germany	s	0.638	2.984	2.156	0.050	**(0.046)**	0.095	6
10. Italy	s	0.914	1.313	2.933	0.009	0.000	0.009	8
4. Spain	s	0.936	1.198	1.866	0.024	(0.002)	0.026	6
5. Hungary	s	0.434	*1506*	0.539	(0.033)	**(0.071)**	0.038	2
4. Australia	s	0.845	1.522	5.225	(0.075)	0.000	(0.075)	1
5. New Zealand	s	1.060	1.030	5.189	(0.061)	0.017	(0.077)	1
4. India	s	0.525	1.826	7.286	(0.013)	**(0.043)**	0.031	2
1. Finland	ss-sss	0.886	1.560	11.289	0.057	0.012	0.045	8
2. Norway	ss-sss	0.908	1.846	4.456	0.165	0.033	0.132	8
3. Netherlands	ss-sss	0.735	2.027	5.372	0.045	(0.017)	0.062	6
3. Russia	ss-sss	1.334	0.504	3.026	0.144	0.056	0.087	8
2. Korea	ss-sss	0.898	2.628	2.805	0.052	0.000	0.052	8
3. China	ss-sss	1.216	0.663	0.651	0.024	(0.028)	0.052	6
6. Singapore	ss-sss	1.353	0.089	1.005	0.283	0.058	0.224	8
7. Malaysia	ss-sss	0.942	1.232	0.348	0.237	**(0.042)**	0.280	6
8. Indonesia	ss-sss	0.893	2.044	0.367	0.006	(0.014)	0.020	6
9. Thailand	ss-sss	0.934	0.979	0.173	0.037	0.000	0.037	8
10. South Africa	ss-sss	0.709	1.950	5.194	0.334	(0.019)	0.353	6
Average of Club c-cc, 11 count.		**0.7835**	**1468**	**2.4203**	**0.0048**	**(0.0240)**	**0.0288**	
Average of Club s, 8 countries		**0.7615**	**190**	**4.0257**	**(0.0026)**	**(0.0212)**	**0.0185**	
Average of Club ss-sss, 11 count.		**0.9826**	**1.4109**	**3.1532**	**0.1259**	**0.0036**	**0.1222**	
Average of 30 countries		**0.8506**	**589**	**3.1171**	**0.0472**	**(0.0131)**	**0.0603**	

Notes: 1. $(S-I)/Y$ is the balance of payment (BOP), $(S-I)_G/Y$ is the budget surplus/deficit, and $(S-I)_{PRI}/Y$ is the difference between $(S-I)/Y$ and $(S-I)_G/Y$. Deficit over 3% is shown in bold.
$(S\text{-}I)_G/Y$=−9.1% in Japan 2004, where the rate of return is −10.3% and the relative share of capital is −85.6%.

2. Scores-1* between BOP, budget surplus/deficit, and $(S-I)/Y$ of the private sector are as follows:

Scores-1	BOP	Budget	$(S-I)_{PRI}$	For example,
8	+	+	+	Canada, Italy, Finaland, Norway, Russia, Korea, & Singapore.
6	+	−	+	France, Germany, Sweden, Netherlands, Spain, Japan, & China.
5	+	+	−	**No case** It is impossible to have these cases.
4	−	+	+	**No case**
3	+	−	−	**No case**
2	−	−	+	UK, Hungary, and India.
1	−	+	−	Australia and New Zealand.
0	−	−	−	US, Mexico, and Kenya.

Table 3 The ratio of **G/PRI** for growth rates and contribution shares of *TFP* of g_Y in 2004

Government/private	by club	$g_{ALP(G/PRI)}$	$g_{TFP(G/PRI)}$	$g_{ACP(G/PRI)}$	$C_{S(TFP/gY)}$	$C_{S(K/gY)}$	$C_{S(L/gY)}$	Scores-1*
1. The US	c-cc	**1.213**	0.608	0.912	**0.800**	0.060	0.131	**0**
2. Canada	c-cc	0.338	(11.266)	2.257	0.724	0.131	0.137	8
7. Mexico	c-cc	0.989	1.386	0.443	0.747	0.133	0.108	**0**
8. Peru	c-cc	1.325	0.543	1.016	0.709	0.156	0.123	6
6. Argentina	c-cc	2.635	0.445	(0.268)	0.783	0.168	0.042	8
5. Brazil	c-cc	1.004	2.278	(0.815)	0.666	0.246	0.078	6
6. The UK	c-cc	2.810	(0.928)	(6.950)	0.811	0.133	0.052	2
9. France	c-cc	**0.056**	(6.217)	(0.138)	**0.482**	0.406	0.109	6
1. Japan	c-cc	**(0.328)**	*(5)*	0.209	**0.978**	(0.043)	0.064	6
10. Philippine	c-cc	**1.695**	(3.724)	1.135	**0.731**	0.147	0.107	6
9. Kenya	c-cc	13.800	(3.381)	(5.069)	0.612	0.096	0.271	**0**
7. Sweden	s	0.314	(8.286)	(0.211)	0.932	(0.051)	0.114	6
8. Germany	s	**(0.755)**	(2.441)	0.591	**0.503**	0.457	0.039	6
10. Italy	s	2.590	(1.570)	(0.384)	0.694	0.284	0.022	8
4. Spain	s	0.537	(16.941)	9.945	0.780	0.155	0.054	6
5. Hungary	s	**(0.573)**	*167*	(15.379)	**0.936**	0.096	(0.029)	2
4. Australia	s	1.527	0.540	(5.554)	0.610	0.129	0.252	1
5. New Zealand	s	(0.214)	2.553	2.891	0.627	0.157	0.207	1
4. India	s	**1.737**	1.203	(1.353)	**0.647**	0.242	0.100	2
1. Finland	ss-sss	3.812	0.663	0.323	0.430	0.493	0.075	8
2. Norway	ss-sss	0.932	(5.822)	(0.061)	0.690	0.257	0.050	8
3. Netherlands	ss-sss	1.773	0.037	(0.087)	(0.018)	0.869	0.148	6
3. Russia	ss-sss	0.988	0.922	(0.332)	0.848	0.174	(0.019)	8
2. Korea	ss-sss	0.478	(0.973)	(0.051)	0.489	0.461	0.048	8
3. China	ss-sss	1.412	(0.507)	0.474	0.427	0.518	0.052	6
6. Singapore	ss-sss	1.074	0.626	0.419	0.778	0.034	0.176	8
7. Malaysia	ss-sss	**0.691**	0.366	0.560	**0.584**	0.323	0.081	6
8. Indonesia	ss-sss	0.496	11.045	0.216	0.588	0.305	0.098	6
9. Thailand	ss-sss	0.175	23.626	(0.246)	0.706	0.213	0.074	8
10. South Africa	ss-sss	0.693	4.136	0.308	0.634	0.325	0.036	6
Average of Club c–cc, 11 count.		**2.3215**	**(2.3016)**	**(0.6609)**	**0.7313**	**0.1484**	**0.1110**	
Average of Club s, 8 countries		**0.6454**	**17.7487**	**(1.1815)**	**0.7161**	**0.1837**	**0.0949**	
Average of Club ss–sss, 11 count.		**1.1385**	**3.1018**	**0.1385**	**0.5597**	**0.3611**	**0.0745**	
Average of 30 countries		**1.4408**	**5.0264**	**(0.5066)**	**0.6644**	**0.2358**	**0.0933**	

Notes: 1. $(S-I)/Y$ is the balance of payment (BOP), $(S-I)_G/Y$ is the budget surplus/deficit, and $(S-I)_{PRI}/Y$ is the difference between $(S-I)/Y$ and $(S-I)_G/Y$. Deficit over 3% is shown in bold.
$(S\text{-}I)_G/Y$=−9.1% in Japan 2004, where the rate of return is −10.3% and the relative share of capital is −85.6%.

2. Scores-1* between BOP, budget surplus/deficit, and $(S-I)/Y$ of the private sector are as follows:

Scores-1	BOP	Budget	$(S-I)_{PRI}$	For example,
8	+	+	+	Canada, Italy, Finaland, Norway, Russia, Korea, & Singapore.
6	+	−	+	France, Germany, Sweden, Netherlands, Spain, Japan, & China.
5	+	+	−	**No case** It is impossible to have these cases.
4	−	+	+	**No case**
3	+	−	−	**No case**
2	−	−	+	UK, Hungary, and India.
1	−	+	−	Australia and New Zealand.
0	−	−	−	US, Mexico, and Kenya.

Table 4 Influences of the deficit to basic parameters & variables: US, Russia, China, India, Japan

	$s_G=\alpha_G$	$s_{PRI}=S_{PRI}/Y_{PRI}$	α_{PRI}	s	α	TFP_G	TFP_{PRI}	TFP	$1/ACP=\Omega$	ALP=y(0)
(0) U S										
1995	(0.085)	0.114	0.165	0.083	0.1259				2.333	24.68
1996	(0.045)	0.112	0.159	0.087	0.1262	25.05	13.83	15.48	2.236	25.83
1997	0.044	0.100	0.145	0.090	0.1278	21.28	14.96	16.01	2.215	26.99
1998	0.086	0.088	0.135	0.088	0.1263	20.11	16.07	16.73	2.161	28.10
1999	0.143	0.070	0.121	0.083	0.1253	18.55	17.58	17.60	2.108	29.54
2000	0.189	0.047	0.102	0.075	0.1190	17.58	19.49	18.68	2.292	31.03
2001	0.105	0.061	0.125	0.069	0.1217	21.85	18.50	19.00	2.277	32.02
2002	(0.103)	0.078	0.169	0.050	0.1267	36.81	16.14	18.85	2.307	32.58
2003	(0.225)	0.094	0.186	0.048	0.1270	52.69	15.73	19.47	2.343	33.92
2004	(0.216)	0.092	0.183	0.048	0.1261	54.57	16.65	20.53	2.269	35.74
(8) Russia										
1995	(0.220)	0.276	0.202	0.187	0.1263				0.634	8.45
1996	(0.420)	0.297	0.224	0.185	0.1235	12.45	8.16	9.23	0.658	11.90
1997	(0.299)	0.241	0.197	0.141	0.1056	14.89	9.59	11.01	0.702	14.01
1998	(0.190)	0.237	0.183	0.163	0.1187	17.05	10.58	11.93	0.829	16.24
1999	0.010	0.303	0.138	0.256	0.1176	26.16	19.20	20.42	0.887	30.04
2000	0.229	0.346	0.099	0.320	0.1275	27.15	29.16	27.38	1.084	44.94
2001	0.304	0.249	0.066	0.264	0.1285	25.47	38.50	32.08	1.171	54.76
2002	0.278	0.214	0.034	0.231	0.1009	29.28	53.20	42.85	1.202	66.67
2003	0.285	0.224	0.043	0.240	0.1095	31.50	61.89	48.97	1.351	81.99
2004	0.293	0.244	0.057	0.257	0.1188	35.81	71.07	56.14	1.471	101.78
(6) China										
1995	0.176	0.360	0.122	0.331	0.1308				0.575	4.12
1996	0.202	0.350	0.116	0.326	0.1300	3.58	4.36	4.22	0.574	4.82
1997	0.211	0.361	0.122	0.336	0.1372	3.71	4.60	4.44	0.669	5.28
1998	0.214	0.371	0.131	0.344	0.1451	3.76	4.77	4.58	0.751	5.65
1999	0.182	0.369	0.131	0.337	0.1394	3.99	4.97	4.76	0.827	5.94
2000	0.166	0.372	0.133	0.337	0.1385	4.32	5.19	4.99	0.995	6.46
2001	0.097	0.393	0.156	0.346	0.1468	5.07	5.23	5.12	1.225	7.02
2002	0.204	0.400	0.142	0.365	0.1532	4.46	5.53	5.33	1.390	7.65
2003	0.267	0.424	0.138	0.396	0.1611	4.19	5.94	5.62	1.620	8.59
2004	0.291	0.454	0.139	0.425	0.1660	4.10	6.19	5.80	1.929	9.38
(2) India										
1995	(0.865)	0.210	0.181	0.138	0.1118				0.436	11.10
1996	(0.844)	0.191	0.168	0.122	0.1008	17.73	10.01	10.52	0.458	12.55
1997	(0.751)	0.183	0.163	0.112	0.0943	16.75	10.46	11.19	0.508	13.40
1998	(0.743)	0.182	0.172	0.107	0.0978	17.98	11.30	12.42	0.569	15.35
1999	(0.723)	0.186	0.177	0.109	0.0999	19.09	11.87	13.38	0.652	17.02
2000	(0.691)	0.197	0.177	0.122	0.1036	20.25	12.13	13.82	0.751	18.11
2001	(0.653)	0.196	0.176	0.124	0.1059	20.27	12.39	14.35	0.921	19.48
2002	(0.607)	0.196	0.175	0.128	0.1088	21.65	12.55	14.61	1.067	20.43
2003	(0.660)	0.215	0.186	0.147	0.1207	23.22	12.91	15.24	1.208	22.73
2004	(0.556)	0.214	0.183	0.154	0.1251	25.39	13.91	16.33	1.341	25.39
(6) Japan										
1995	(0.062)	0.188	0.166	0.146	0.1279				2.908	3264
1996	(0.053)	0.186	0.168	0.145	0.1299	4566	750	1005	3.090	3337
1997	(0.029)	0.187	0.163	0.150	0.1299	3803	782	1017	3.255	3411
1998	(1.079)	0.256	0.245	0.137	0.1277	41563714	390	1011	3.629	3363
1999	(0.384)	0.206	0.206	0.124	0.1240	82051	529	1031	3.690	3310
2000	(0.353)	0.203	0.204	0.121	0.1219	62111	539	1051	3.710	3312
2001	(0.544)	0.204	0.234	0.103	0.1289	321700	414	970	3.752	3264
2002	(0.843)	0.214	0.256	0.091	0.1282	4415684	350	973	3.469	3213
2003	(0.827)	0.215	0.267	0.092	0.1381	3695951	316	883	3.483	3199
2004	(0.856)	0.225	0.276	0.100	0.1454	4796512	298	841	3.399	3255

Notes: 1. The relationship between b or $B=(1-\beta)/\beta$ and TFP is shown by $TFP=B_{TFP}\hat{}(1-\delta)\cdot k\hat{}(1-\delta)$.

2. The charcter of TFP is unique in that if α is minus, TFP increases but it implies that TFP aggavates: $TFP=k\hat{}(1-\alpha)\cdot ACP$.

3. The capital-output ratio Ω does not increase in the private sector due to competition, but Ω_G increases as in Japan.

4. Deficits beyond a certain limit finally destroys an economy even if economic activities of the private sector is supreme.

Data cannot hide inefficient public corporations: Japan's private sector will be much beter than above if these are excluded.

5. Defict leads to a minus saving and the relative share of capital in the G sector, where TFP must be interpreted adversely.

Table 5 The G vs. the PRI sector for US, Russia, China, India, and Japan: using qualitative values

	The G sector					The PRI sector				
	β_G	$\beta_{TFP(G)}$	β^*_G	Ω_G	$\theta_G=i_G/s_G$	β_{PRI}	$\beta_{TFP(PRI)}$	β^*_{PRI}	Ω_{PRI}	$\theta_{PRI}=i_{PRI}/s_{PRI}$
(0) U S										
1995				1.242	(0.636)				2.537	0.858
1996	0.324	0.012	0.374	1.215	(1.174)	0.905	0.409	0.838	2.430	0.925
1997	0.531	0.000	0.492	1.115	1.043	0.892	0.433	0.824	2.442	1.108
1998	0.519	0.019	0.432	1.079	0.540	0.885	0.415	0.819	2.392	1.339
1999	0.731	0.050	0.641	0.995	0.294	0.856	0.488	0.785	2.365	1.816
2000	0.715	0.024	0.575	0.929	0.229	0.864	0.499	0.806	2.629	2.798
2001	0.856	0.045	0.822	1.018	0.475	0.857	0.597	0.777	2.558	1.908
2002	1.249	#NUM!	1.209	1.219	(0.524)	0.855	0.779	0.734	2.507	1.261
2003	0.847	0.029	0.890	1.315	(0.241)	0.891	0.621	0.783	2.514	1.046
2004	0.447	0.138	0.597	1.277	(0.223)	0.902	0.501	0.807	2.435	1.205
(8) Russia										
1995				0.445	(0.413)				0.675	0.586
1996	(0.585)	0.189	(0.012)	0.478	(0.276)	0.580	0.900	0.653	0.691	0.475
1997	(0.219)	0.878	(0.115)	0.443	(0.323)	0.552	0.440	1.048	0.760	0.504
1998	(0.608)	#NUM!	0.205	0.523	(0.614)	0.813	0.066	(0.175)	0.894	0.355
1999	0.004	#NUM!	0.066	0.395	9.221	0.998	0.049	(0.543)	0.982	0.218
2000	0.125	0.997	(0.039)	0.304	0.471	0.605	0.000	0.841	1.300	0.277
2001	0.537	0.000	(0.183)	0.379	0.571	0.538	0.000	1.129	1.455	0.414
2002	0.759	1.000	(0.075)	0.513	0.757	0.523	0.000	0.998	1.461	0.343
2003	0.572	0.999	(0.021)	0.607	0.660	0.647	0.880	0.754	1.631	0.384
2004	0.241	0.186	0.024	0.590	0.267	0.744	0.383	0.368	1.785	0.516
(6) China										
1995				1.177	1.634				0.459	0.874
1996	0.286	0.411	0.055	1.262	1.435	0.362	0.368	1.797	0.437	0.866
1997	0.449	0.408	0.059	1.418	1.398	0.408	0.451	1.805	0.518	0.808
1998	0.573	0.460	0.066	1.618	1.487	0.442	0.531	1.778	0.573	0.802
1999	0.772	0.490	0.050	1.879	1.881	0.459	0.576	1.817	0.613	0.805
2000	0.337	0.522	0.026	2.064	2.192	0.530	0.939	1.621	0.775	0.803
2001	0.679	0.555	0.014	2.407	4.126	0.619	0.160	1.447	1.000	0.778
2002	0.185	0.756	0.121	2.369	1.870	0.668	0.311	1.214	1.180	0.819
2003	0.350	0.882	0.116	2.466	1.541	0.724	0.410	1.069	1.433	0.856
2004	0.622	0.834	0.106	2.704	1.530	0.766	0.528	1.089	1.759	0.860
(2) India										
1995				0.657	(0.002)				0.421	0.842
1996	(0.025)	#NUM!	0.128	0.577	(0.003)	0.466	0.773	(4.540)	0.450	0.823
1997	(0.022)	#NUM!	0.060	0.467	(0.004)	0.470	0.673	28.039	0.511	0.810
1998	(0.033)	#NUM!	0.028	0.378	(0.006)	0.524	0.858	16.001	0.586	0.813
1999	(0.065)	#NUM!	0.061	0.324	(0.007)	0.585	1.000	6.781	0.683	0.819
2000	(0.153)	#NUM!	0.213	0.307	(0.007)	0.658	0.004	(0.414)	0.792	0.783
2001	0.537	0.102	0.177	0.258	0.034	0.716	0.067	0.269	0.983	0.791
2002	(0.538)	#NUM!	0.267	0.257	(0.022)	0.756	0.139	(0.098)	1.142	0.822
2003	1.798	0.288	0.135	0.225	0.035	0.796	0.197	0.498	1.290	0.825
2004	(0.021)	#NUM!	0.146	0.197	(0.002)	0.820	0.241	(7.764)	1.438	0.844
(6) Japan										
1995				4.616	(4.382)				2.565	0.476
1996	(0.074)	0.329	(0.031)	4.696	(5.290)	0.938	0.795	1.140	2.759	0.506
1997	(0.034)	0.831	0.143	4.729	(8.126)	0.948	0.610	1.019	2.944	0.514
1998	0.110	0.000	(0.041)	9.844	(0.438)	0.970	0.968	1.252	3.022	0.245
1999	(0.031)	0.000	0.093	6.655	(0.735)	0.950	0.996	1.387	3.211	0.289
2000	(0.176)	#NUM!	0.824	6.455	(0.563)	0.952	0.992	1.411	3.235	0.340
2001	0.038	#NUM!	(4.127)	7.212	(0.092)	0.960	0.999	2.985	3.213	0.389
2002	0.005	#NUM!	(0.865)	8.461	(0.008)	0.967	0.991	11.539	2.810	0.289
2003	0.553	0.000	0.486	8.344	0.057	0.976	0.907	0.431	2.833	0.303
2004	(2.954)	0.999	0.009	8.298	0.076	0.980	0.780	0.889	2.760	0.308

Notes: 1. The parameter, $\theta=I/S=i/s$, typically reveals the relationship between the G sector and the PRI sector.
When the θ_{PRI} is close to 0.8, it is moderate as in China and India. Japan must be more tech-oriented since the θ_{PRI} is low.
2. If the *beta* is stable and higher than the *beta* $_{TFP}$, the situation is robust as in the US, Russia, China, and India.
3. If the Ω_G is lower than the Ω_{PRI}, the situation is robust as in the US, Russia, and India.
Japan is the worst in the world in that public investment is huge and ineffective as shown by the capital-output ratio.
5. This table indicates that the private sector is significantly influenced by the aggravation of the govrnment sector.

Note to Table 5: The difference bet. the current situation and at convergence using G/PRI of *beta* to *beta**

	(0) The U S		(8) Russia		(6) China		(2) India		(6) Japan	
	β_G/β^*_G	$\beta_{\Pi PI}/\beta^*_{PRI}$	β_G/β^*_G	$\beta_{\Pi PI}/\beta^*_{PRI}$	β_G/β^*_G	$\beta_{\Pi PI}/\beta^*_{PRI}$	β_G/β^*_G	$\beta_{\Pi PI}/\beta^*_{PRI}$	β_G/β^*_G	$\beta_{\Pi PI}/\beta^*_{PRI}$
1996	0.867	1.080	0.722	1.283	1.138	1.054	1.284	1.169	0.928	1.229
1997	1.081	1.082	0.868	1.324	1.121	1.074	1.139	1.199	0.945	1.180
1998	1.202	1.080	1.769	1.087	1.116	1.090	1.102	1.222	0.695	1.290
1999	1.141	1.090	0.985	1.001	1.090	1.098	1.067	1.224	0.968	1.328
2000	1.243	1.071	1.291	1.232	1.083	1.111	1.470	1.193	1.121	1.304
2001	1.041	1.102	1.379	1.203	1.049	1.136	0.645	1.181	3.496	1.362
2002	1.033	1.166	1.485	1.100	1.144	1.118	2.160	1.167	5.159	1.359
2003	0.951	1.138	1.622	1.087	1.219	1.108	0.885	1.166	(8.341)	1.269
2004	0.748	1.118	2.566	1.083	1.187	1.107	1.059	1.155	(0.868)	1.234

This is a supplement to Table 5:

1. The current situation is related to the situation at convergence for both β and β^* to the current investment and β_{TFP} and β_{TFP}^* to the accumulated *TFP*.
2. Under special circumstances such as financial crisis, the above ratios become far from 1.0.

Table 6 The relationship between TFP_G and the relative share of capital α_G: The US vs. Japan

	The US					**Japan**				
G sector	$ALP{=}y_G$	$\boldsymbol{TFP_G}$	k_G	α_G	$1/ACP_G{=}\Omega_G$	$ALP{=}y_G$	$\boldsymbol{TFP_G}$	k_G	α_G	$1/ACP_G{=}\Omega_G$
1995	19.88	26.13	24.69	(0.085)	1.242	5.68	4808	12374	(0.062)	4.616
1996	21.59	25.05	26.22	(0.045)	1.215	5.16	4566	12947	(0.053)	4.696
1997	24.64	21.28	27.46	0.044	1.115	5.72	3803	13638	(0.029)	4.729
1998	26.86	20.11	28.99	0.086	1.079	5.88	41563714	13890	(1.079)	9.844
1999	30.14	18.55	29.99	0.143	0.995	4.97	82051	13940	(0.384)	6.655
2000	33.71	17.58	31.33	0.189	0.929	5.06	62111	13878	(0.353)	6.455
2001	31.42	21.85	31.98	0.105	1.018	4.43	321700	13282	(0.544)	7.212
2002	25.79	36.81	31.44	(0.103)	1.219	6.75	4415684	12861	(0.843)	8.461
2003	24.17	52.69	31.78	(0.225)	1.315	8.55	3695951	12593	(0.827)	8.344
2004	25.69	54.57	32.81	(0.216)	1.277	12.12	4796512	12435	(0.856)	8.298

Notes:

1. *ALP*, *TFP*, and *ACP* are tightly related to three parameters, the relative share of capital *alpha*, the capital-output ratio, and the capital-labor ratio, where $alpha_G$ immediately reflects the deficit.
2. *K*, *L*, *Y*, *W*, and Π of the total economy each changes aggregately like $K{=}K_G{+}K_{PRI}$. However, α, Ω, and *k* of the total economy each changes as a weighted average of the G sector and the PRI sector, using Y_G/Y and L_G/L.
3. $TFP = k^{1-\alpha} \cdot ACP = k^{1-\alpha} / \Omega$ holds. The more minus the $alpha_G$, the more rapidly the TFP_G increases.

Table 7 The relationship between Taxes, the deficit, G expenditures and G saving to Y: The US vs. Japan

	The US					Japan				
	$Taxes/Y$	$(S\text{-}I)_G/Y$	C_G/Y	S_G/Y	Y_G/Y	$Taxes/Y$	$(S\text{-}I)_G/Y$	C_G/Y	S_G/Y	Y_G/Y
1995	0.157	(0.022)	0.171	(0.013)	0.157	0.167	(0.056)	0.178	(0.010)	0.167
1996	0.159	(0.016)	0.166	(0.007)	0.159	0.171	(0.057)	0.180	(0.009)	0.171
1997	0.171	(0.000)	0.164	0.008	0.171	0.174	(0.046)	0.179	(0.005)	0.174
1998	0.176	0.007	0.161	0.015	0.176	0.089	(0.138)	0.185	(0.096)	0.089
1999	0.187	0.019	0.161	0.027	0.187	0.139	(0.093)	0.193	(0.053)	0.139
2000	0.198	0.029	0.161	0.037	0.198	0.148	(0.081)	0.200	(0.052)	0.148
2001	0.183	0.010	0.163	0.019	0.183	0.135	(0.080)	0.208	(0.073)	0.135
2002	0.155	(0.024)	0.171	(0.016)	0.155	0.117	(0.099)	0.215	(0.098)	0.117
2003	0.143	(0.040)	0.175	(0.032)	0.143	0.118	(0.092)	0.215	(0.097)	0.118
2004	0.144	(0.038)	0.175	(0.031)	0.144	0.115	(0.091)	0.214	(0.099)	0.115

Notes:

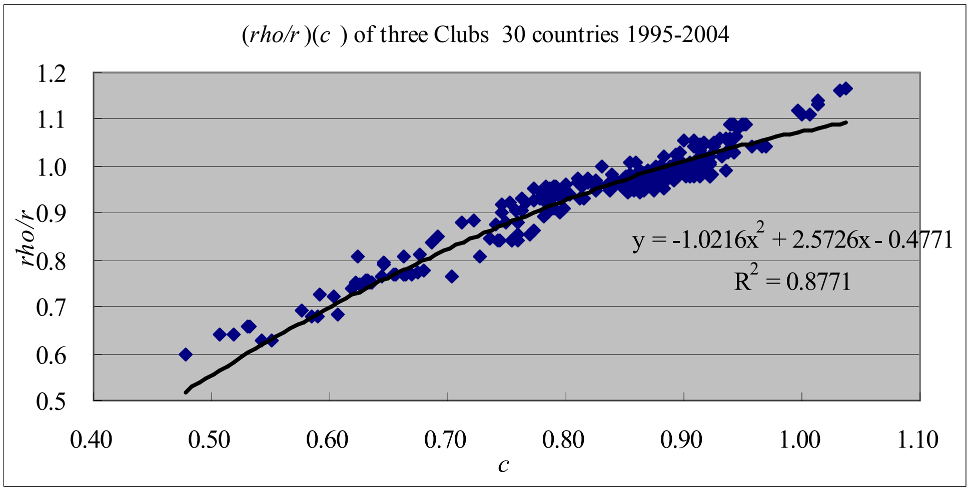
1. By accounting identity, $Taxes-(C_G+I_G)=(S_G-I_G)$ holds. Thus, $Taxes=Y_G=S_G+C_G$ holds.
2. The Japanese deficit is three times higher than that of the US. The level of Japanese expenditures is 4% higher than that of the US. The value of Y_G/Y decreases in Japan while it remains constant.

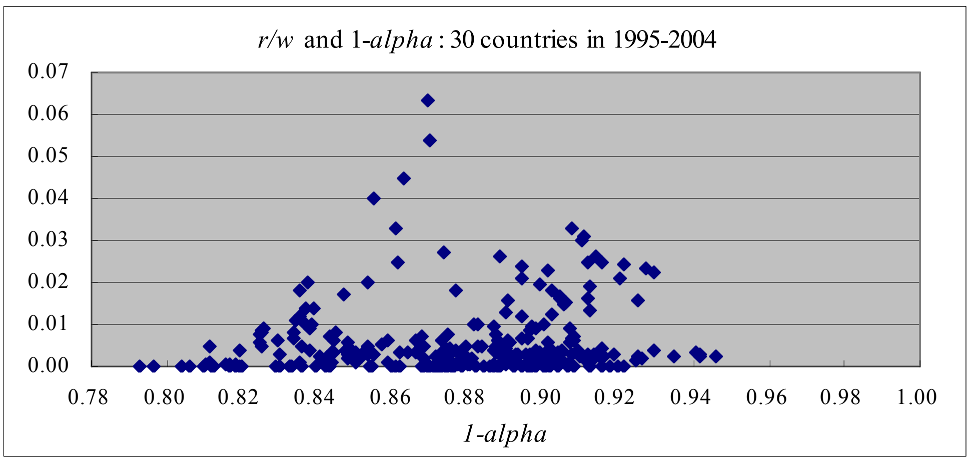
Table 8 The rate of technological progress for the current investment and TFP: The US vs. Japan

	The US	The G sector versus the total economy				Japan	The G sector versus the total economy			
	$g_{A\,(\mathrm{FLOW})\mathrm{G}}$	$g_{A\,(\mathrm{TFP})\mathrm{G}}$	$g_{A\,(FLOW)}$	$g_{A\,(TFP)}$	$i=I/Y$	$g_{A\,(\mathrm{FLOW})\mathrm{G}}$	$g_{A\,(\mathrm{TFP})\mathrm{G}}$	$g_{A\,(FLOW)}$	$g_{A\,(TFP)}$	$i=I/Y$
1996	0.089	(0.041)	0.046	0.045	0.096	0.031	(0.050)	0.011	(0.007)	0.126
1997	0.139	(0.151)	0.040	0.034	0.099	0.048	(0.167)	0.012	0.012	0.121
1998	0.086	(0.055)	0.039	0.045	0.106	(0.492)	10928	(0.027)	(0.006)	0.099
1999	0.117	(0.077)	0.048	0.052	0.111	0.483	(0.998)	(0.016)	0.020	0.091
2000	0.110	(0.053)	0.034	0.061	0.114	0.023	(0.243)	(0.000)	0.019	0.088
2001	(0.071)	0.243	0.029	0.017	0.104	(0.171)	4.179	(0.014)	(0.077)	0.075
2002	(0.185)	0.685	0.013	(0.008)	0.092	(0.203)	12.726	(0.004)	0.003	0.056
2003	(0.061)	0.432	0.034	0.033	0.092	(0.025)	(0.163)	(0.004)	(0.093)	0.052
2004	0.070	0.036	0.051	0.055	0.102	(0.018)	0.298	0.019	(0.048)	0.054

Notes:

1. $g_{A(FLOW)}$ is the actual ate of tech. progress for the current investment. $g_{\mathrm{A(TFP)}}$ is the growth rate of TFP. If both are the same, the situation is under CRS.
2. This table suggests that the same value of the deficit to output has a different result in qualitative effects/technology of the G sector and that a bad sign of the G sector reduces the reserve power of the total economy much more than expected.





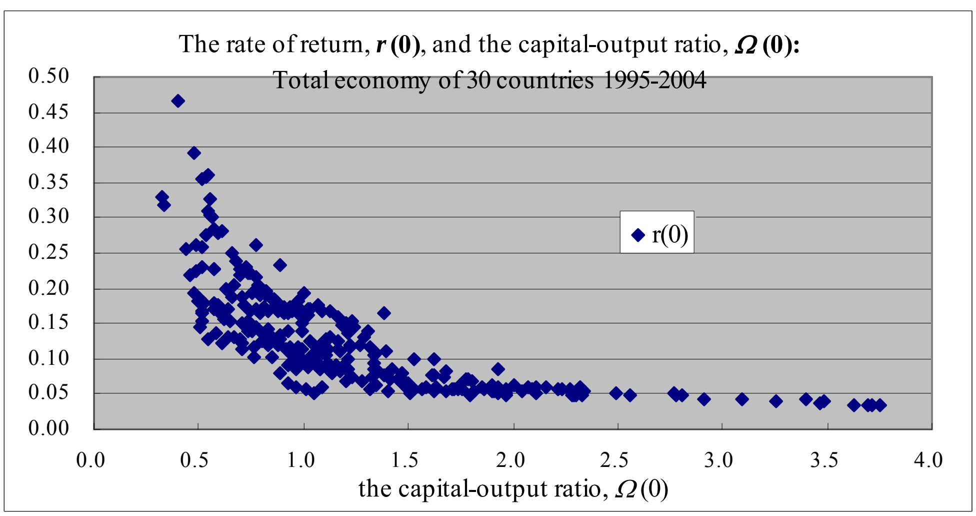


Figure 1 Two external parameters, (rho/r) and (r/w), and $\alpha=\Omega r$: $1-\alpha=c/(rho/r)$, $k=(\alpha/(1-\alpha))/(r/w)$ and a hyperbolic curve of $\alpha=\Omega r$

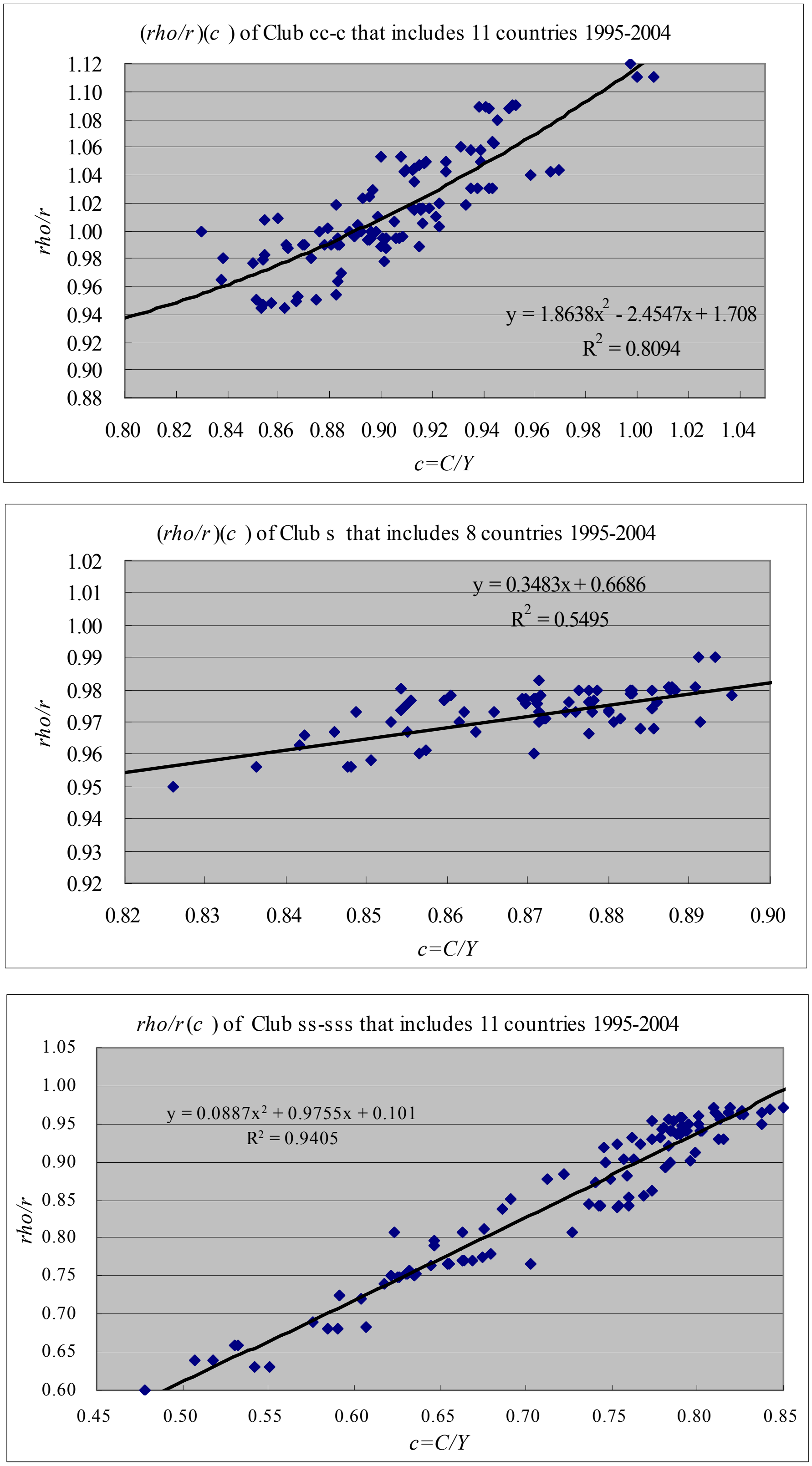
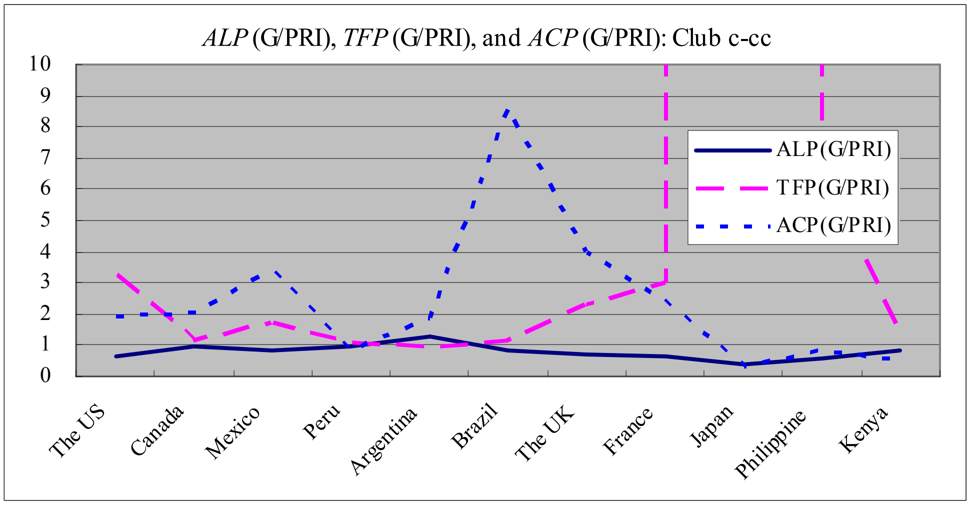


Figure 2 (*rho/r*) and (*r/w*) by club of the saving-level: $1\text{-}\alpha = c/(rho/r)$ and $k = (\alpha/(1-\alpha))/(r/w)$



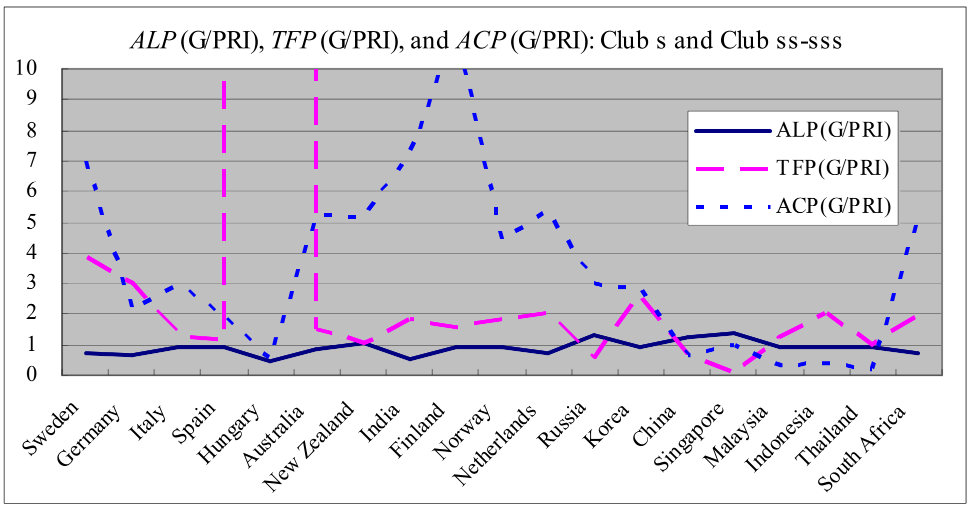


Figure 3 The G sector/the PRI sector in each *ALP*, *TFP*, and *ACP*: 30 countries 1995-2004

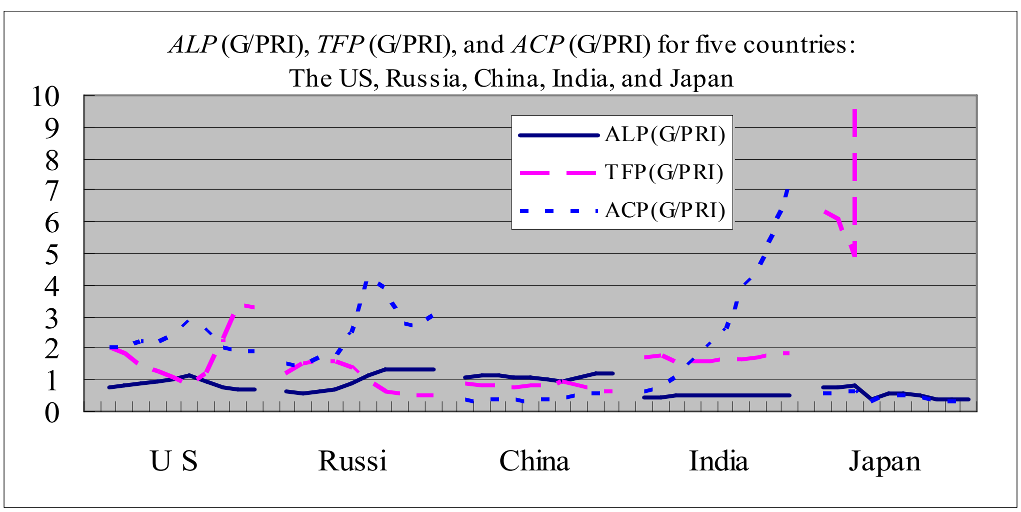


Figure 4 The G sector/the PRI sector in each *ALP*, *TFP*, and *ACP*: five countries 1995-2004

REFERENCES

Aghion, Philippe, and Steven, N. Durlauf (eds), "*Handbook of Economic Growth* (1A and 1B)," 1821pp, 2005.

Aiyar Shekhar, and Carl-Johan Dalgaard, "Total factor Productivity Revisited: A Dual Approach to Development Accounting," *IMF Staff Papers* 52 (1): 82-102, 2005.

Alesina Alberto, and Silvia Ardagna, Roberto Perotti, and Fabio Schantarelli, "Fiscal Policy, Profits, and Investment," *American Economic Review* 92 (June, 3): 571-589, 2002.

Arrow Kenneth J., and Mordecal Kurz, "*Public Investment, the Rate of Return, and Optimal Fiscal Policy*," The John Hopkins University Press, Baltimore and London, 218, 1970.

Bailey, Martin, J., "*National Income and the Price Level: A study in Macro-Economic Theory*," McGraw-Hill, 278pp., 1971.

Balassone Fabrizio, and Daniele Franco, "Public Investment, the Stability Pact and the 'Golden Rule,' *Fiscal Studies* 21 (2): 207-229, 2000.

Barro, Robert, J., and Xavier Sala-i-Martin, "*Economic Growth*," New York and London: McGraw-Hill, , 539pp., 1995.

Baumol, William, J., "On the Social Rate of Discount," *American Economic Review* 58(4. Sep): 788-802, 1968.

Buchanan, James M., "*Public Finance in Democratic Process: Fiscal Institutions and Individual Choice*," The University of North Carolina Press, 307+14, 1967

Denison, Edward, F., "The Unimportance of the Embodied Question," *American Economic Review* 54 (March, 2): 90-93, 1964.

Durand, Durand., "Growth Stocks and the Petersburg Paradox," *Journal of Finance* 12 (3, Sep): 348-363, Sep 1957.

Farrell, M. J., "The New Theories of the Consumption Function," *Economic Journal* 69(Dec): 678-696, 1959.

Fraumeni Barbara, M., "The Jorgenson System of National Accounting," 111-142, in ed., Lau Lawrence J., *Econometrics and the Cost of Capital: Essays in Honor of Dale W. Jorgenson*, MIT Press, 2000, 455+34pp, 2000.

Glaeser, Edward, L., Rafael, La Porta, and Florencio, Lopez-De-Silanes, "Do Institutions Cause Growth?," *Journal of Economic Growth* 9: 271-303, 2004.

Gollop, Frank M., "The Cost of Capital and the Measurement of Productivity," 85-109, in ed., Lau Lawrence J., *Econometrics and the Cost of Capital: Essays in Honor of Dale W. Jorgenson*, MIT Press, 455+34pp, 2000.

Griliches, Zvi, "Capital Stock in Investment Functions: Some Problems of Concept and Measurement," pp. 115-137, in *Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld*, Stanford: Stanford University press, 1963.

Griliches, Zvi, and Dale W., Jorgenson, "Sources of Measured Productivity Change: Capital Input," *American Economic Review* 56 (Jan, 1): 50-61, 1966.

Griliches, Zvi, "The Discovery of the Residuals: A Historical Note," *Journal of Economic Literature* 34 (Sep, 3): 1324-1330, 1996.

Grossman, Gene, and Elhanan Helpman, "*Innovation and Growth in the Global Economy*," Cambridge: MIT Press, 359, 1991.

Hall, Robert E., and Dale W. Jorgenson, "Tax Policy and Investment Behaviour," *American Economic Review* 57 (June, 3): 391-414, 1967.

Hall, Robert E., "Technical Change and Capital from the Point of View of the Dual," *Review of Economic Studies* 35 (1, Jan) : 35-46, 1968.

Hill Peter, "Gross, Productive and Net Capital Stock," Second Meeting of the Canberra Group on Capital Stock Statistics, Agenda Item 5, No. 10, 1998.

Hill Peter, "The Productive Capital Stock and the Quantity Index for Flow of Capital Services," Third Meeting of the Canberra Group on Capital Stock Statistics, Agenda Item 5, No. 3, 1999.

Holtz-Eakin, Douglas, "Public-Sector Capital and the Productivity Puzzle," *Review of Economics and Statistics* 76 (Feb, 1): 12-21, 1994.

Horvat, Branko, "The Optimum Rate of Saving: A Note," *The Economic Journal* 68 (March, 1): 157-158, 1958.

Hsieh, Chang-Tai, "Productivity Growth and Factor Prices in East Asia," *American Economic Review* 89 (May, 2): 133-143, 1999.

Hulten Charles R., "Growth Accounting When Technical Change Is Embodied in Capital," *American Economic Review* 82 (Sep, 4): 964-980, 1992.

Hussein, Khaled and Anthony, P. Thirwall, "The AK Model of "New" Growth Theory is Harrod-Domar Growth Equation: Investment and Growth Revisited," *Journal of Post Keynesian Economics* 22 (Spring, 3): 427-435, 2000.

IMF, "*International Financia Statistics Yearbook*," 2005 (by year), International Monetary Fund, 625pp., Nov, 2005.

IMF, "*Government Finance Statistics Yearbook*," 2005 (by year), International Monetary Fund, 557pp., Feb, 2006.

Jorgenson, Dale W., "Capital Theory and Investment Behaviour," *American Economic Review*: 53 (May, 2): 247-259, 1963.

Jorgenson, Dale, W., "The Embodiment Hypothesis" *Journal of Political Economy* 74 (Feb, 1): 1-17, 1966.

Jorgenson, Dale, W., and Zvi, Griliches, "The Explanation of Productivity Change," *Review of Economic Studies* 34 (2, April): 249-283, 1967.

Kamiryo, Hideyuki, "*Furthering the Role of Corporate Finance in Economic Growth*," The University of Auckland (PhD thesis), 129pp., Nov 2003.

Kamiryo, Hideyuki, "Basics of an Endogenous Growth Model: the Optimum CRC* Situation and Conditional Convergence," *Journal of Economic Sciences* 7 (Feb, 2), 51-80, Feb 2004a.

Kamiryo, Hideyuki, "Risk of Growth in My Endogenous Growth Model: Integrating the Penrose Curve with the Petersburg Paradox," Proceedings of *Modelling and Analysis of Safety and Risk in Complex Systems, International Scientific School Conference,* St. Petersburg, Russia, June/2004b.

Kamiryo, Hideyuki, "What Numerically Determines the Differences between Catching Up and Endless Poverty in African Countries?, Proceedings, *International Association for Research in Income and Wealth,* Cork, Ireland, Aug/2004c.

Kamiryo, Hideyuki, "Empirics of A Consumption Function Consistent with A Technology-Golden Rule: Using Three Dimensional Graphs," *Papers of the Research Society of Commerce and Economics* 46 (Sep, 1): 159-212, 2005b.

Kamiryo, Hideyuki, "Loci of Transitional Paths from Current to Optimum CRC situation: Extended Equations with empirical results," *Journal of Economic Sciences* 9 (Sep, 1): 73-104, 2005c.

Kamiryo, Hideyuki, "Basics of the Cost of Capital and the Valuation Ratio: Capital versus Consumption Using Extended Equations," *Journal of Economic Sciences* 9 (Feb, 2): 71-103, 2006a.

Kamiryo, Hideyuki, "Towards the Relationship between Constant Returns to Scale and Diminishing /Increasing Returns to Scale Using Two Production Functions, " *Journal of Economic Sciences* 10 (Sep, 1): 131-166, 2006b.

Kamiryo, Hideyuki, "Note: A C-D Production Function that Introduce (*rho/r*) into *alpha*: Results by Sector Using Data-sets Derived from IMF Data," *Papers of the Research Society of Commerce and Economics* 46 (Feb, 2): 199-252., 2006c.

Kamiryo, Hideyuki, "The Cost of Capital and the Valuation Ratio Functions Based on Aggregative Functions of Investment: with Differences between India and China," *Finance India* 21 (March, 1): forthcoming, 2007a.

Kamiryo, Hideyuki, "An Extension of the Solow Model Using the Years for Convergence in the Transitional Path: by Country and among Countries,"(forthcoming, 2007b).

Kurebayashi Yoshimasa and Itsuo Sakuma, "*Studies in International Comparisons of Real Product and Prices*," Tokyo: Kinokuniya Co., 1990.

Lau Lawrence J., "Preface," pp. xiii-xxix, in ed., Lau Lawrence J., *Econometrics and the Cost of Capital: Essays in Honor of Dale W. Jorgenson*, MIT Press, 2000, 455+34pp, 2000.

Modigliani Franco, "Long-Run Implications of Alternative Fiscal Policies and the Burden of the National Debt," *Economic Journal* 71 (284, Sep): 730-755, Dec 1961.

Normandin, Michel, "Budget Deficit Persistence and the Twin Deficits Hypothesis," *Journal of International Economics* 49 (1, Oct): 171-193, 1999.

Nomura, Koji, "*Measurement of Capital*," Keio University Press, 633pp (in Japanese), 2005.

OECD, "*Measuring Capital: Measurement of Capital Stocks, Consumption of Fixed Capital and Capital Services, OECD Manual,*" OECD, 131pp., 2001.

OECD, "*OECD Economic Surveys 2003-2004: Japan*," OECD, 214pp., 2004.

Phelps Edmund S, "Inflation in the Theory of Public Finance," *Swedish* (current *Scandinavian*) *Journal of Economics* 75: 67-82, 1972.

Phelps Edmund S, "*Inflation Policy and Unemployment Theory: the Cost-Benefit Approach to Monetary Planning*," Macmillan, 322pp, 1972.

Quah, Danny, "Twin-peaks: Growth and Convergence in Models of Distribution Dynamics," *Economic Journal* 106 (437),1045-55, July 1996.

Ramsey Plumpton,"A Mathematical Theory of Saving," *The Economic Journal* 38 (Dec, 4): 543-559, 1928.

Robinson, Joan, "A Neoclassical Theorem," Review of Economic Studies 29 (June): 219-226, 1962.

Romer Paul, M., "Endogenous Technological Change," *Journal of Political Economy* 98 (Oct, 5): 71-102, 1990.

Schreyer, Paul, "Capital Stocks, Capital Services and Multi-Factor Productivity Measures," *OECD Economic Studies*, No. 37 (Feb): 163-184, 2004.

Sen Amarta Kumar, "A Note on Tinbergen on the Optimum Rate of Saving," *The Economic Journal*, 67 (Dec, 4): 479-496, 1957.

Sen Amarta Kumar, "On Optimising the Rate of Saving," *The Economic Journal*, 71 (Sep, 3): 479-496, 1961.

Solow, Robert, M., "A Skeptical Notes on the Constancy of Relative Shares," *American Economic Review* 48 (Sep): 618-631, 1958.

Stoker, Thomas M., "The Cost of Capital and Consumer Behavior," 165-186, in ed., Lau Lawrence J., *Econometrics and the Cost of Capital: Essays in Honor of Dale W. Jorgenson*, MIT Press, 2000, 455+34pp, 2000.

Tinbergen Jan, "Optimum Saving and Utility Maximization over Time," *Econometrica* 28 (April, 2): 481-489, 1960.

Tobin James, "*Asset Accumulation and Economic Activity*," Basil Blackwell & Mott Ltd., London, 99pp. Reflections on Co, 1980.

Appendix for *Productivity comparisons by country: the government sector versus the private sector*

Author: #5 of Session No.6c, Hideyuki Kamiryo
Institution/Country: Hiroshima Shudo University

Appendixes:

Appendix S: Summary of data, method, and comparisons

Table S-1 Data of IMF and methods for estimating rents and capital by sector
Table S-2 Summary of notation used in the data-sets by country

Appendixes A & B: for 30 countries

Table A-1 Contribution of ALP, *TFP*, and *ACP* to the growth rate of *Y=NDI*: Total economy
Table A-2 Contribution of ALP, *TFP*, and *ACP* to the growth rate of *Y=NDI*: the G sector
Table A-3 Contribution of ALP, *TFP*, and *ACP* to the growth rate of *Y=NDI*: the PRI sector
Table B-1 Contribution of *TFP to* g_y, and those of investment, i, and $1\text{-}\beta^*$ to $g_A{}^*$: Total economy
Table B-2 Contribution of *TFP to* g_y, and those of investment, i, and $1\text{-}\beta^*$ to $g_A{}^*$: the G sector
Table B-3 Contribution of *TFP to* g_y, and those of investment, i, and $1\text{-}\beta^*$ to $g_A{}^*$: the PRI sector

Appendixes C, D, and E: for 5 countries

Table C-1 Basic data and parameters of the G sector: US, Russia, China, India, and Japan
Table C-2 Basic data and parameters of the PRI sector: US, Russia, China, India, and Japan
Table C-3 Basic data and parameters of the Total economy: US, Russia, China, India, and Japan
Table D-1 Productivity and contribution shares of the G sector: US, Russia, China, India, and Japan
Table D-2 Productivity and contribution shares of the PRI sector: US, Russia, China, India, and Japan
Table D-3 Productivity and contribution shares of the Total economy: US, Russia, China, India, and Japan

Table E-1 Structure of *ALP, TFP*, and *ACP*: the Total economy, the US, Russia, China, India, and Japan
Table E-2 Structure of *ALP, TFP*, and *ACP*: the G sector, the US, Russia, China, India, and Japan
Table E-3 Structure of *ALP, TFP*, and *ACP*: the PRI sector, the US, Russia, China, India, and Japan
Table E-4 **G/PRI** of each β & β^* and the years for converg.: US, Russia, China, India, Japan

Note for C and D series:

Notes: 1. *TFP=A* is obtained as the capital-labor ratio *k*^(1-*alpha*) divided by the capital-output ratio Ω, where *K* and *L* are purely quatitative.
2. Output equals the sum of consumption and saving, which in turn equals the sum of wages and rents by using my function of consumption.
3. The difference between saving and net invetemnt comes from the equation that *BOP* = budget surplus/deficit + (*S*−*I*) of the private sector.
4. Saving-oriented countries show better scores of the above BOP equation, yet if the deficit is significant with plus BOP, the dual relationship between quality (TFP) and quantity (K, L) will show an extreme unblance, reflecting a true aspect.
5. The surplus/deficit to output in 2004 is US −3.8%, Russia 5.6%, China −2.8, India −4.3, and Japan −9.1%. The EU rule of 3% is justified.
Notes: 6. The product of *TFP* and the inverse number of *ACP* (=the capital-output ratio, Ω) is equal to *k*^(1-*alpha*).
7. From the viewpoint of neutrality, the rate of return is compared with r_{CB}, the disount rate of rho, and the cost of capital, $r^*\text{-}g_Y{}^*$.
8. The user cost of capital in Jorgenson's approach, if available, will be compared with the rate of return in the private sector.
9. Currrent contribution shares show each the share of *TFP*, *K*, and *L* to the growth rate of output g^Y at the current situation.
10. Contribution shares to the rate of technological progress at convergence, $g_A{}^*$, is divided into two, i and 1-*beta*: $g_A{}^*=i\ (1\text{-}b^*)$, where i is the ratio of net investment to ouput and $1\text{-}\beta^*$ is the ratio of qualitative net invetment to total net invetment.

Note for E series:

Notes: 1. The relationship between b or $B=(1\text{-}\beta)/\beta$ and *TFP* is shown by $TFP=B_{TFP}$^(1-δ)·*k*^(1-δ).
2. The charcter of *TFP* is unique in that if α is minus, *TFP* increases but it implies that *TFP* aggavates: *TFP=k*^(1-α)·*ACP*.
3. The capital-output ratio Ω does not increase in the private sector due to competition, but Ω_G increases as in Japan.
4. Deficits beyond a certain limit finally destroys an economy even if economic activities of the private sector is supreme.
Data cannot hide inefficient public corporations: Japan's private sector will be much beter than above if these are excluded.
5. Defict leads to a minus saving and the relative share of capital in the G sector, where *TFP* must be interpreted adversely.

Table S-1 Data of IMF and methods for estimating rents and capital by sector

(1) Prepration of raw data in IFSY and GFSY, IMF with each number

In IFSY: 96: Households consumption expenditures, C_{PRI}.
91f: Government consumption expenditures, C_G.
93e: Gross capital formation, $\Delta K_{GROSS} = I_{GROSS}$.
99cf: Consumption of fixed capital, D_{EP}.
99zz: Population, L.
60 or 50b: Discount rate or money market rate of the central bank, r_{CB}.
80: Deficit or surplus, $\boldsymbol{S_G - I_G}$. (**$\boldsymbol{BOP = S - I = E_X - I_M}$+net primary income from abroad**).
90n or 90c-98c: Exports of goods and services, net: $E_X - I_M$.
98nc: Net primary income from abroad

Indirectly,
99b.c: *GDP* 64: *CPI*
78cad: Net errors and omissions
ae: Market exchange rate
79dbd: Reserve assets

In GFSY: 3.1: Taxes, T_{AX} 9: Capital expenditures 15: Government debt end period
7: Total expenditures 11: Overall deficit/surplus (#, after yearbook 2004 differs).

(2) Relationship among basic values/amounts by sector

C =consumption: $C = C_G + C_{PRI}$. W=modified wages/compensation: $W = W_G + W_{PRI}$.
S =saving: $S = S_G + S_{PRI}$. Π=modified rents/returns: $\Pi = \Pi_G + \Pi_{PRI}$.
Y =*NDI*: $Y = C + S = W + \Pi$. Y is made in the PRI sector, but I assume the Y_G is shifted to the G sector.

Note: $S - I = (S_G - I_G) + (S_{PRI} - I_{PRI})$. Given $S - I$, $S_G - I_G$, and I and I_G, *then* S, S_G, and S_{PRI} are obtained.

(3) Methods for estimating rents by sector

1. The ratio of wages to output, $1-\alpha$, is obtained using the function of consumption, where $1-\alpha = c/(rho/r)$.
For α, k, and Ω, the two parameters, (rho/r) and (r/w), are used: $k = (\alpha/(1-\alpha))/(r/w)$ is a key equation.
The coefficient of consumption, (rho/r), is an external parameter, as well as the ratio of r to w, (r/w).
Once k and K are obtained, $\alpha = r \cdot \Omega$ is useful. If a reliabe wage rate is given, (r/w) will be replaced by w.
For the G sector, I assume that $1-\alpha_G = c_G$ or $(rho/r)_G = 1.0$, which is required to connect the deficit with r_G.
2. Wages of the total economy, W, is the product of $1-\alpha$ and Y. And rents, Π, are the product of α and Y.
3. The output of the G sector, Y_G, is equal to the sum of C_G and S_G, where S_G=Taxes$-_{CG}$.
4. Output=*NDI* of the private sector, Y_{PRI}, is obtained as the difference between Y and Y_G: $Y - Y_G$.
5. Wages of the G sector, W_G, is obtained as the product of $1-\alpha_G$ and Y_G assumpting that $(rho/r)_G = 1.0$.
6. Wages of the private sector, W_{PRI}, is obtained as the difference between W and W_G: $W_{PRI} = W - W_G$.
7. Rents of the government sector, Π_G, is obtained as the difference between Y_G and W_G: $\Pi_G = Y_G - W_G$.
8. Rents of the private sector, $\Pi_{\Pi PI}$, is obtained as the difference bet. Y_{PRI} and W_{PRI}: $\Pi_{\Pi PI} = Y_{PRI} - W_{PRI}$.
9. The number of population/employed persons is divided into the two sectors, using W_G/W and W_{PRI}/W.
In other words, I assume that the wage rate, $w = W/L$, is the same between sectors.

(4) Concept of capital in my model

1. Capital stock may be supposed to be non-financial produced assets (excluding land and inventories).
Yet here, capital is an aggregated pure stock, estimated as a whole economy and divided into two sectors.
Capital stock aggregated using the perpetual inventory mehtod (PIM) is just for information and comparison.
2. Capital is accummulated purely as quantitative net investment, separated from the level of technology.
3. Investment by sector is set as net investment after depreciation and compared with saving (net).
4. The depreciation rate=the growth rate of capital at convergence assuming that gross investment is zero.

(5) Methods for estimating capital stock by sector

1. The capital-labor ratio, k, is obtained by $\alpha/(1-\alpha)$ divided by (r/w), which is an external parameter.
The supporting indicators such as shown in 6. below are useful to the review of (r/w).
2. Capital of the total economy, K, is calculated as the product of k and labor L.
3. When K is estimated, the capital-output ratio Ω is given as K/Y and the rate of return is given as α/Ω.
4. Capital of the government sector, K_G(t), is the sum of net investemnt, $I_G(t)$, and capital stock, $K_G(t-1)$.
At the first year of estimation, capital K_G is estimated as the product of the capital of the total economy
and an assumed share of the capital of the government sector to the capital of the total economy.
5. Capital of the private sector, K_{PRI}, is obtained as the difference between K and K_G: $K_{PRI} = K - K_G$.
6. The supporting indicators are: (1) the *CPI* and its rate of change g_{CPI}, (2) the structure of the neutrality
of financial assets: $(rho/r_{CB}) = (\text{rho}/(r - g_Y)) \cdot ((r - g_Y)/r_{CB})$ (cf. the market rate with the cost of capital),
and (3) the difference bet. the change in the level of tech., $g_{A(TFP)}$, and the rate of tech. progress, $g_{A(FLOW)}$:
If $g_{A(FLOW)}/g_{A(TFP)} = 1.0$, it means the accumulated average β equals the current β, under CRS.
If $g_{A(FLOW)}/g_{A(TFP)} > 1.0$, it implies that new investment is more technology-oriented than the level of tech.

Table S-2 Summary of notation used in the data-sets by country

Data-set 1: Basic table, starting with IMF data

(S-I)/Y	=the ratio of the balance of payment (*BOP*) to output, *Y* (= national disposable income, *NDI*).
(S-I) $_G$***/Y***	=the ratio of budget deficit to output.
(S-I) $_{PRI}$***/Y***	=the ratio of the differnce between saving and net investment in the private sector to output.
(rho/r)	=the coefficent of consumption: *rho* is the discount rate of consumption and *r* is rents to *K*.
(r/w)	=the ratio of *r* to *w*, where *r* is rents to capital and *w* is per capita wages/compensation.
(64) CPI	=the consumers' price index. (*rho/r*) delicately reflects "*national taste*" by country.
(60b) r_{CB}	=the discount rate or the market rate set by the central bank.
$i=I/Y$	=the ratio of net investment to output. $s=S/Y$ =the ratio of saving to output.
$\alpha=\Pi/Y$	=the relative share of capital/rents or the ratio of rents to output.
n	=the growth rate of population/employed persons.
$k=K/L$	=the current/initial per capita capital or the ratio of capital to labor.
$\Omega=K/Y$	=the current/initial capital-output ratio. (By assumption, $r(0)=r^*$ and $\Omega(0)=\Omega^*$ yet,
$r=\Pi/K$	=the current/initial ratio of rents to capital. $r(t)$ and $\Omega(t)$ change in the transitional path.)
	(*r*=the rate of return, which corresponds with the rate of return in Jorgenson's user cost).
	Note: (*rho/r*) and (*r/w*) are the two external parameters in my endogenous growth model.
	For neutrality of financial asets, r/r_{CB}, rho/r_{CB}, $(r^*-g_Y^*)/r_{CB}$, and $(r^*-g_Y^*)/rho$ are used.

Data-set 2: Derived table

$c_{CB}=r/r_{CB}$	=the ratio of rents to capital divided by the discount rate of the central bank.
$A=k^{1-\alpha}/\Omega$	=the current level of technology acccumulated as qualitative investemnt in the past.
$y=Ak^{\alpha}$	=the current per capita output or labor productivity.
beta*	=structural reform parameter at convergence calculated using an equation (see note below).
beta	=the current structural reform parameter calculated using an equation (see note below).
delta	=the parameter that nuetralizes diminishing/increasing returns to scale (see note below).
theta=i/s	=the ratio of net investment to saving as a financial parameter (by sector).
$g_A^*=i(1-\beta^*)$	=the endogenous rate of technological progress at convergence shown by *.
$\boldsymbol{\lambda=(1-\alpha)n+(1-\delta)g_A^*}$	=the coefficient of convergence/speed by Toshimi Fujimoto in 10 (1) 2006.
$\boldsymbol{1/\lambda}$	=the years for convergence. This is comparable to Barro and Sala-i-Martin's (1995, p. 36).
$\Omega^*_{\alpha\to\alpha}$	=the capital-output ratio always under convergence (throughout the transitional path).
g_{CPI}	=the rate of increase in the consumers' price index.
$r^*-g_Y^*$	=an endogenous cost of capital, where g_Y^* is the growth rate of output at convergence.
$v_K=V/K$	=the ratio of valuation value (= the yearly rents divided by the cost of capital) to capital.
beta $_{TFP}$	=the beta for TFP as accumulated technology: ***beta*** $_{TFP}$ ***=TFP/k***.
	Note: $\beta=(\Omega^*(n(1-\alpha)k\hat{}(-\alpha)+i(1+n)))/(i(1-\alpha)k\hat{}(-\alpha)+\Omega^* i(1+n))$.
	$\beta^*=(\Omega^*(n(1-\alpha)+i(1+n)))/(i(1-\alpha)+\Omega^* i(1+n))$. $delta=1-(\mathrm{LN}(1/\Omega^*)/(\mathrm{LN}((1-\beta^*)/\beta^*)$.
	$1-\beta^*$ is the qualitative investment to the sum of quantitative and qualitative investments.

Data-set 3: Table for growth rates

$i\cdot\beta^*/\alpha$	=the coefficient of the golden rule that shows the relationship bet. r^* and g_Y^* at convergence.
g_{Y^*}	=the growth rate of output at convergence: $g_Y^*=(i\ \beta^*/\alpha)r^*$ and/or $g_Y^*=(g_A^*(1+n)/(1-\alpha))+n$.
g_{y^*}	=the growth rate of per capita output at convergence: $g_A^*/(1-\alpha)$.
$\boldsymbol{\beta}_{\alpha\to\alpha}$	=the structural reform parameter always at convergence (throughout the transitional path).
IMF $g_{Y(GDP)}$	=the growth rate of *GDP* shown by IMF: compared with the above grwoth rate of *Y=NDI*.
$g_{Y(actual)}$	=the actual growth rate of *Y=NDI*: pay attention to the difference between $g_{Y(actual)}$ and g_Y^*.
$g_{K(actual)}$	=the actual growth rate of capital: compared with $g_{Y(actual)}$ and g_Y^*.
$g_{W/L(actual)}$	=the actual growth rate of wages/compensation: compare with $g_{Y(actual)}$ and $g_{y(actual)}$.
$g_{W/L(a)}-g_{y(a)}$	=the difference between the growth rates of wages and per capita output.
$g_{A(TFP)}$	=the actual growth rate of *TFP* (the level of technology) accumulated as a stock.
$g_{y(FLOW)}$	=the actual growth rate of per capita output.
$g_{k(FLOW)}$	=the actual growth rate of per capita capital.
$g_{A(FLOW)}$	=the actual rate of technological progress: $g_{A(FLOW)}=g_{y(actual)}-\alpha g_{k(actual)}$.
$g_{A(FLOW/TFP)}$	=the actual rate of technological progress divided by the actual growth rate of *TFP*.
	Note: $g_{A(FLOW)}/g_{A(TFP)}$ reflects the differences between current $(1-\beta)$ and accumulated $(1-\beta_{TFP})$.

Table A-1 Contribution of *ALP*, *TFP*, and *ACP* to the growth rate of *Y=NDI*: Total economy

The total economy	by club	1996 $C_{S(TFP/gY)}$	1996 $C_{S(K/gY)}$	1996 $C_{S(L/gY)}$	2004 $C_{S(TFP/gY)}$	2004 $C_{S(K/gY)}$	2004 $C_{S(L/gY)}$	2004 Scores-2*
1. The US	c-cc	0.816	0.028	0.146	0.800	0.060	0.131	**3**
2. Canada	c-cc	0.363	0.428	0.204	0.724	0.131	0.137	2
7. Mexico	c-cc	0.830	0.111	0.043	0.747	0.133	0.108	2
8. Peru	c-cc	0.712	0.157	0.117	0.709	0.156	0.123	2
6. Argentina	c-cc	0.528	0.176	0.285	0.783	0.168	0.042	2
5. Brazil	c-cc	0.833	0.088	0.066	0.666	0.246	0.078	2
6. The UK	c-cc	0.813	0.140	0.044	0.811	0.133	0.052	**3**
9. France	c-cc	0.638	0.269	0.091	0.482	0.406	0.109	
1. Japan	c-cc	0.442	0.460	0.096	0.978	(0.043)	0.064	**3**
10. Philippine	c-cc	0.535	0.335	0.116	0.731	0.147	0.107	2
9. Kenya	c-cc	0.664	0.139	0.174	0.612	0.096	0.271	2
7. Sweden	s	0.893	0.047	0.058	0.932	(0.051)	0.114	**3**
8. Germany	s	0.492	0.385	0.121	0.503	0.457	0.039	1
10. Italy	s	0.607	0.371	0.021	0.694	0.284	0.022	2
4. Spain	s	0.732	0.228	0.039	0.780	0.155	0.054	2
5. Hungary	s	0.810	0.194	(0.004)	0.936	0.096	(0.029)	**3**
4. Australia	s	0.573	0.249	0.168	0.610	0.129	0.252	2
5. New Zealand	s	0.633	0.114	0.243	0.627	0.157	0.207	2
4. India	s	0.735	0.139	0.110	0.647	0.242	0.100	2
1. Finland	ss-sss	0.668	0.276	0.053	0.430	0.493	0.075	
2. Norway	ss-sss	0.624	0.323	0.048	0.690	0.257	0.050	2
3. Netherlands	ss-sss	0.439	0.438	0.120	(0.018)	0.869	0.148	
3. Russia	ss-sss	0.865	0.139	(0.003)	0.848	0.174	(0.019)	**3**
2. Korea	ss-sss	0.692	0.220	0.081	0.489	0.461	0.048	
3. China	ss-sss	0.816	0.129	0.046	0.427	0.518	0.052	
6. Singapore	ss-sss	0.600	0.154	0.220	0.778	0.034	0.176	2
7. Malaysia	ss-sss	0.395	0.455	0.137	0.584	0.323	0.081	1
8. Indonesia	ss-sss	0.735	0.198	0.056	0.588	0.305	0.098	1
9. Thailand	ss-sss	0.216	0.686	0.094	0.706	0.213	0.074	2
10. South Africa	ss-sss	0.633	0.204	0.146	0.634	0.325	0.036	2
Average of Club c−cc, 11 count.		**0.6521**	**0.2119**	**0.1257**	**0.7313**	**0.1484**	**0.1110**	
Average of Club s, 8 countries		**0.6845**	**0.2160**	**0.0944**	**0.7161**	**0.1837**	**0.0949**	
Average of Club ss−sss, 11 count.		**0.6076**	**0.2929**	**0.0907**	**0.5597**	**0.3611**	**0.0745**	
Average of 30 countries		**0.6444**	**0.2427**	**0.1045**	**0.6644**	**0.2358**	**0.0933**	

Notes: 1. $C_{S(A/gY)}$ is the contribution share of A to output, $C_{S(K/gY)}$ is that of capital, and $C_{S(L/gY)}$ is that of labor.

No number in scores* shows that the situation is irregular, or unstably changing from 1996 to 2004.

2. Scores-2* in Tables 2- show the contribution share of A to g_Y as follows:

Scores-2	$C_{S(TFP/gY)}$	where A is *TFP*, y is *ALP*, and (Y/K)=*ACP*, but K and L are purely quantitative.
3	above 0.8	US, UK, Sweden, Hungary, Russia, and Japan.
2	above 0.6	Canada, Mexico, Norway, Italy, Spain, Australia, NZ, India, Singapore, Thailand,
1	above 0.5	Germany, Malaysia, and Indonesia.

Table A-2 Contribution of *ALP*, *TFP*, and ACP to the growth rate of *Y=NDI*: the G sector

Government sector	by club	1996 $C_{S(TFP/gY)G}$	1996 $C_{S(K/gY)G}$	1996 $C_{S(L/gY)G}$	2004 $C_{S(TFP/gY)G}$	2004 $C_{S(K/gY)G}$	2004 $C_{S(L/gY)G}$	2004 Scores-2*
1. The US	c-cc	1.272	(0.030)	(0.226)	1.002	(0.121)	0.112	**3**
2. Canada	c-cc	1.339	0.001	(0.314)	0.343	0.149	0.486	2
7. Mexico	c-cc	1.110	0.018	(0.097)	2.343	(0.099)	(1.194)	**3**
8. Peru	c-cc	0.785	0.044	0.125	0.906	0.071	0.021	**3**
6. Argentina	c-cc	0.647	0.016	0.378	0.838	0.210	(0.034)	**3**
5. Brazil	c-cc	3.894	(0.864)	(1.945)	1.533	0.016	(0.506)	**3**
6. The UK	c-cc	1.189	(0.057)	(0.116)	0.863	(0.008)	0.130	**3**
9. France	c-cc	1.057	(0.154)	0.089	(0.039)	(0.052)	1.077	
1. Japan	c-cc	0.670	(0.074)	0.387	7.904	(2.954)	(3.969)	**3**
10. Philippine	c-cc	0.165	0.338	0.457	2.040	(0.324)	(0.643)	**3**
9. Kenya	c-cc	0.145	0.591	0.220	0.919	(0.000)	0.066	**3**
7. Sweden	s	0.960	(0.019)	0.045	1.715	(0.204)	(0.507)	**3**
8. Germany	s	(0.959)	(1.591)	3.533	0.459	0.003	0.551	
10. Italy	s	1.787	(1.002)	0.196	1.126	0.016	(0.131)	**3**
4. Spain	s	1.750	(0.668)	(0.080)	1.183	0.180	(0.340)	**3**
5. Hungary	s	1.129	(0.043)	(0.047)	(0.928)	1.227	0.694	
4. Australia	s	0.832	0.016	0.133	0.508	0.130	0.345	1
5. New Zealand	s	0.874	0.147	(0.016)	(0.815)	0.591	1.206	
4. India	s	1.184	(0.025)	(0.147)	1.423	(0.021)	(0.367)	**3**
1. Finland	ss-sss	1.038	(0.047)	0.007	0.731	0.089	0.162	2
2. Norway	ss-sss	1.701	0.524	(1.211)	1.121	0.129	(0.239)	**3**
3. Netherlands	ss-sss	1.361	(0.018)	(0.313)	0.873	(0.039)	0.159	**3**
3. Russia	ss-sss	1.481	(0.585)	0.083	0.966	0.241	(0.173)	**3**
2. Korea	ss-sss	0.301	0.251	0.389	0.424	0.054	0.484	
3. China	ss-sss	0.702	0.286	0.010	0.592	0.622	(0.205)	1
6. Singapore	ss-sss	(0.015)	0.883	0.119	129.045	(19.832)	(107.184)	**3**
7. Malaysia	ss-sss	7.115	(10.132)	5.016	0.742	0.290	(0.029)	2
8. Indonesia	ss-sss	(11.074)	13.753	(2.258)	0.440	0.085	0.434	
9. Thailand	ss-sss	69.245	(63.005)	(7.174)	0.274	0.058	0.626	
10. South Africa	ss-sss	1.817	(1.609)	0.605	1.161	(0.166)	0.004	**3**
Average of Club c-cc, 11 count.		**1.1155**	**(0.0156)**	**(0.0948)**	**1.6954**	**(0.2830)**	**(0.4048)**	
Average of Club s, 8 countries		**0.9445**	**(0.3980)**	**0.4522**	**0.5841**	**0.2403**	**0.1813**	
Average of Club ss-sss, 11 count.		**6.6974**	**(5.4271)**	**(0.4297)**	**12.3972**	**(1.6788)**	**(9.6327)**	
Average of 30 countries		**3.1166**	**(2.1018)**	**(0.0718)**	**5.3231**	**(0.6552)**	**(3.6321)**	

Notes: 1. $C_{S(A/gY)}$ is the contribution share of A to output, $C_{S(K/gY)}$ is that of capital, and $C_{S(L/gY)}$ is that of labor.

No number in scores* shows that the situation is irregular, or unstably changing from 1996 to 2004.

2. Scores-2* in Tables 2- show the contribution share of A to g_Y as follows:

Scores-2	$C_{S(TFP/gY)}$	where A is TFP, y is ALP, and $(Y/K)=ACP$, but K and L are purely quantitative.
3	above 0.8	US, UK, Norway, Nethrlands, Russia, Brazil, Argentina, Peru, Japan, Singapore,
2	above 0.6	Canada, Finland, Malaysia, and South Africa.
1	above 0.5	Australia and China.

Table A-3 Contribution of *ALP*, *TFP*, and *ACP* to the growth rate of *Y=NDI*: the PRI sector

		1996	1996	1996	2004	2004	2004	2004
Private sector	by club	$C_{S(TFP/gY)PRI}$	$C_{S(K/gY)PRI}$	$C_{S(L/gY)PR}$	$C_{S(TFP/gY)PRI}$	$C_{S(K/gY)PRI}$	$C_{S(L/gY)PRI}$	Scores-2*
1. The US	c-cc	0.717	0.028	0.240	0.770	0.086	0.134	2
2. Canada	c-cc	(0.387)	0.769	0.613	0.806	0.126	0.063	**3**
7. Mexico	c-cc	0.789	0.128	0.061	0.648	0.156	0.176	2
8. Peru	c-cc	0.682	0.199	0.109	0.681	0.167	0.138	2
6. Argentina	c-cc	0.525	0.159	0.296	0.785	0.126	0.076	2
5. Brazil	c-cc	0.703	0.151	0.116	0.500	0.316	0.161	1
6. The UK	c-cc	0.554	0.287	0.152	0.711	0.303	(0.014)	2
9. France	c-cc	0.050	0.861	0.088	0.245	0.756	(0.001)	
1. Japan	c-cc	0.248	0.783	(0.031)	1.052	(0.061)	0.009	**3**
10. Philippine	c-cc	0.580	0.332	0.078	0.623	0.189	0.164	2
9. Kenya	c-cc	0.832	0.071	0.090	0.167	0.302	0.513	
7. Sweden	s	0.981	(0.040)	0.062	0.906	(0.073)	0.157	**3**
8. Germany	s	0.476	0.463	0.060	0.300	0.549	0.148	
10. Italy	s	0.322	0.686	(0.007)	0.448	0.441	0.108	
4. Spain	s	0.562	0.389	0.047	0.741	0.150	0.089	2
5. Hungary	s	0.637	0.334	0.026	0.845	0.140	0.013	**3**
4. Australia	s	0.368	0.434	0.192	0.532	0.251	0.211	1
5. New Zealand	s	1.456	0.028	(0.500)	0.877	0.112	0.011	**3**
4. India	s	0.598	0.256	0.128	0.479	0.361	0.146	
1. Finland	ss-sss	(1.200)	1.998	0.206	(0.124)	1.215	(0.091)	
2. Norway	ss-sss	0.573	0.303	0.110	0.604	0.266	0.121	2
3. Netherlands	ss-sss	(0.940)	1.185	0.760	(0.768)	1.629	0.141	
3. Russia	ss-sss	0.775	0.241	(0.012)	0.887	0.083	0.024	**3**
2. Korea	ss-sss	0.812	0.218	(0.028)	0.493	0.552	(0.043)	
3. China	ss-sss	0.855	0.080	0.055	0.403	0.484	0.106	
6. Singapore	ss-sss	0.558	0.013	0.407	0.676	0.028	0.275	2
7. Malaysia	ss-sss	0.459	0.293	0.212	0.511	0.379	0.095	1
8. Indonesia	ss-sss	0.818	0.089	0.074	0.564	0.362	0.067	1
9. Thailand	ss-sss	0.575	0.363	0.057	0.582	0.397	0.019	1
10. South Africa	ss-sss	0.655	0.264	0.073	0.559	0.397	0.039	1
Average of Club c−cc, 11 count.		**0.4812**	**0.3426**	**0.1647**	**0.6352**	**0.2242**	**0.1292**	
Average of Club s, 8 countries		**0.6750**	**0.3189**	**0.0010**	**0.6410**	**0.2414**	**0.1104**	
Average of Club ss−sss, 11 count.		**0.3583**	**0.4586**	**0.1741**	**0.3989**	**0.5267**	**0.0685**	
Average of 30 countries		**0.4878**	**0.3788**	**0.1245**	**0.5501**	**0.3397**	**0.1019**	

Notes: 1. $C_{S(A/gY)}$ is the contribution share of A to output, $C_{S(K/gY)}$ is that of capital, and $C_{S(L/gY)}$ is that of labor.

No number in scores* shows that the situation is irregular, or unstably changing from 1996 to 2004.

2. Scores-2* in Tables 2- show the contribution share of A to g_Y as follows:

Scores-2	$C_{S(TFP/gY)}$	
		where A is *TFP*, y is *ALP*, and (Y/K)=*ACP*, but K and L are purely quantitative.
3	above 0.8	Canada, Sweden, Hungary, Russia, NZ, and Japan.
2	above 0.6	US, UK, Norway, Spain, Singapore, Philippines, Mexico, Peru, andArgentina.
1	above 0.5	Brazil, Australia, Malaysia, Indonesia, Thailand, and South Africa.

Table B-1 Contribution of *TFP to* g_y, and those of investment, *i*, and 1-β^* to g_A^*: Total economy

		1996	1996	1996	2004	2004	2004	2004
The total economy	by club	$C_{S(TFP/gy)}$	$C_{S(i/gA^*)}$	$C_{S((1-\beta^*)/gA^*)}$	$C_{S(TFP/gy)}$	$C_{S(i/gA^*)}$	$C_{S((1-\beta^*)/gA^*)}$	Scores-3*
1. The US	**c-cc**	0.992	0.606	0.394	0.952	0.600	0.400	**4**
2. Canada	**c-cc**	0.474	0.672	0.328	0.863	0.636	0.364	**3**
7. Mexico	**c-cc**	0.889	0.759	0.241	0.862	0.702	0.298	2
8. Peru	**c-cc**	0.833	0.733	0.267	0.836	0.711	0.289	2
6. Argentina	**c-cc**	0.784	0.824	0.176	0.828	0.776	0.224	2
5. Brazil	**c-cc**	0.913	0.782	0.218	0.741	0.682	0.318	**3**
6. The UK	**c-cc**	0.859	0.651	0.349	0.867	0.623	0.377	**3**
9. France	**c-cc**	0.712	0.677	0.323	0.552	0.636	0.364	**3**
1. Japan	**c-cc**	0.498	0.566	0.434	1.059	0.632	0.368	**3**
10. Philippine	**c-cc**	0.632	0.744	0.256	0.856	0.658	0.342	**3**
9. Kenya	**c-cc**	0.853	0.845	0.155	0.910	0.744	0.256	2
7. Sweden	**s**	0.957	0.756	0.244	1.077	0.683	0.317	**3**
8. Germany	**s**	0.572	0.638	0.362	0.526	0.675	0.325	**3**
10. Italy	**s**	0.623	0.711	0.289	0.712	0.656	0.344	**3**
4. Spain	**s**	0.767	0.721	0.279	0.843	0.642	0.358	**3**
5. Hungary	**s**	0.806	0.724	0.276	0.904	0.712	0.288	2
4. Australia	**s**	0.714	0.685	0.315	0.851	0.623	0.377	**3**
5. New Zealand	**s**	0.866	0.708	0.292	0.818	0.644	0.356	**3**
4. India	**s**	0.855	0.801	0.199	0.743	0.626	0.374	**3**
1. Finland	**ss-sss**	0.714	0.768	0.232	0.474	0.696	0.304	**3**
2. Norway	**ss-sss**	0.667	0.731	0.269	0.739	0.710	0.290	2
3. Netherlands	**ss-sss**	0.517	0.696	0.304	(0.022)	0.646	0.354	**3**
3. Russia	**ss-sss**	0.861	0.783	0.217	0.827	0.704	0.296	2
2. Korea	**ss-sss**	0.768	0.633	0.367	0.520	0.551	0.449	**4**
3. China	**ss-sss**	0.871	0.694	0.306	0.458	0.426	0.574	**4**
6. Singapore	**ss-sss**	0.860	0.670	0.330	0.989	0.604	0.396	**3**
7. Malaysia	**ss-sss**	0.490	0.650	0.350	0.666	0.614	0.386	**3**
8. Indonesia	**ss-sss**	0.800	0.705	0.295	0.675	0.693	0.307	**3**
9. Thailand	**ss-sss**	0.247	0.619	0.381	0.782	0.679	0.321	**3**
10. South Africa	**ss-sss**	0.788	0.782	0.218	0.667	0.765	0.235	2
Average of Club c-cc, 11 count.		**0.7672**	**0.7144**	**0.2856**	**0.8479**	**0.6728**	**0.3272**	
Average of Club s, 8 countries		**0.7699**	**0.7180**	**0.2820**	**0.8094**	**0.6577**	**0.3423**	
Average of Club ss-sss, 11 count.		**0.6894**	**0.7028**	**0.2972**	**0.6159**	**0.6444**	**0.3556**	
Average of 30 countries		**0.7394**	**0.7111**	**0.2889**	**0.7526**	**0.6583**	**0.3417**	

Notes: 1.$C_S(A/g_y)$ is contribution share of *A to* g_y. $C_S(i/g_A^*)$ is that of *i* to g_A^*. $C_{S(}(1-\beta^*)/g_A^*)$ is that of (1-β*).

2. Scores-3* in Tables 3- show the contribution share of 1-β^* to g_A^* at convergence as follows:

Scores-3	$C_{S((1-\beta^*)/gA^*)G}$	where *A* is *TFP*, *y* is *ALP*, and (*Y/K*)=*ACP*, but *K* and *L* are purely quantitative.
4	above 0.4	US, Korea, and China.
3	above 0.3	Canada, Brazil, Finaland, Nether., UK, France, Germany, Italy, Spain, Australia, NZ, Japan,
2	above 0.2	Norway, Russia, Hungary, Mexico, Peru, Argentina, South Africa, and Kenya.
1	above 0.1	None.

Table B-2 Contribution of *TFP to* g_y, and those of investment, *i*, and 1-β^* to $g_A{}^*$: the G sector

		1996	1996	1996	2004	2004	2004	2004
Government sector	by club	$C_{S(TFP/gy)G}$	$C_{S(i/gA^*)G}$	$C_{S((1-\beta^*)/gA^*)G}$	$C_{S(TFP/gy)G}$	$C_{S(i/gA^*)G}$	$C_{S((1-\beta^*)/gA^*)G}$	Scores-3*
1. The US	c-cc	2.372	0.862	0.138	1.382	0.769	0.231	2
2. Canada	c-cc	11.077	0.881	0.119	0.261	0.695	0.305	**3**
7. Mexico	c-cc	1.252	0.928	0.072	1.096	1.104	(0.104)	
8. Peru	c-cc	3.031	0.605	0.395	1.284	0.673	0.327	**3**
6. Argentina	c-cc	(1.897)	1.300	(0.300)	2.235	0.860	0.140	1
5. Brazil	c-cc	0.705	1.091	(0.091)	1.061	#NUM!	#NUM!	
6. The UK	c-cc	4.275	0.825	0.175	2.834	#NUM!	#NUM!	
9. France	c-cc	5.183	0.810	0.190	(0.017)	#NUM!	#NUM!	
1. Japan	c-cc	1.411	0.383	0.617	(0.839)	#NUM!	#NUM!	
10. Philippine	c-cc	0.132	0.683	0.317	2.354	0.900	0.100	1
9. Kenya	c-cc	0.860	0.782	0.218	13.891	#NUM!	#NUM!	
7. Sweden	s	(6.567)	0.857	0.143	0.371	0.977	0.023	
8. Germany	s	(0.072)	0.804	0.196	(0.609)	1.646	(0.646)	
10. Italy	s	1.646	0.748	0.252	2.586	0.910	0.090	
4. Spain	s	0.764	0.911	0.089	0.494	0.867	0.133	1
5. Hungary	s	7.638	0.822	0.178	0.844	0.783	0.217	2
4. Australia	s	3.404	0.854	0.146	1.190	#NUM!	#NUM!	
5. New Zealand	s	(5.483)	0.957	0.043	(0.516)	0.815	0.185	1
4. India	s	1.447	1.208	(0.208)	2.034	1.377	(0.377)	
1. Finland	ss-sss	25.328	0.932	0.068	3.476	0.929	0.071	
2. Norway	ss-sss	0.290	0.957	0.043	0.835	0.981	0.019	
3. Netherlands	ss-sss	(1063)	1.070	(0.070)	1.853	0.894	0.106	1
3. Russia	ss-sss	0.911	0.860	0.140	0.819	0.897	0.103	1
2. Korea	ss-sss	0.600	0.629	0.371	0.451	0.630	0.370	**3**
3. China	ss-sss	0.990	0.562	0.438	0.659	0.366	0.634	**4**
6. Singapore	ss-sss	(0.130)	0.500	0.500	0.844	#NUM!	#NUM!	
7. Malaysia	ss-sss	(0.699)	0.780	0.220	0.532	0.364	0.636	**4**
8. Indonesia	ss-sss	(0.601)	0.473	0.527	0.447	0.472	0.528	**4**
9. Thailand	ss-sss	(1.608)	0.508	0.492	0.177	#NUM!	#NUM!	
10. South Africa	ss-sss	2.669	0.926	0.074	0.864	0.953	0.047	
Average of Club c-cc, 11 count.		**2.5821**	**0.8319**	**0.1681**	**2.3220**	**#NUM!**	**#NUM!**	
Average of Club s, 8 countries		**0.3470**	**0.8952**	**0.1048**	**0.7992**	**#NUM!**	**#NUM!**	
Average of Club ss-sss, 11 count.		**(94.1472)**	**0.7452**	**0.2548**	**0.9960**	**#NUM!**	**#NUM!**	
Average of 30 countries		**(33.4813)**	**0.8170**	**0.1830**	**1.4297**	**#NUM!**	**#NUM!**	

Notes: 1.$C_S(A/g_y)$ is contribution share of *A to* g_y. $C_S(i/g_A{}^*)$ is that of *i* to $g_A{}^*$. $C_S((1\text{-}\beta^*)/g_A{}^*)$ is that of (1-β*).

2. Scores-3* in Tables 3- show the contribution share of 1-β^* to $g_A{}^*$ at convergence as follows:

Scores-3	$C_{S((1-\beta^*)/gA^*)G}$	
		where *A* is *TFP*, *y* is *ALP*, and (*Y/K*)=*ACP*, but *K* and *L* are purely quantitative.
4	above 0.4	China, Malaysia, and Indonesia.
3	above 0.3	Canada, Peru, and Korea.
2	above 0.2	US and Hungary.
1	above 0.1	Netherlands, Russia, Spain, NZ, Argentina, and Philipplines.

Table B-3 Contribution of *TFP to* g_y, and those of investment, *i*, and 1-β^* to $g_A{}^*$: the PRI sector

		1996	1996	1996	2004	2004	2004	2004
Private sector	by club	$C_{S(TFP/gy)PRI}$	$C_{S(i/gA*)PRI}$	$C_{S((1-\beta*)/gA*)P}$	$C_{S(TFP/gy)PRI}$	$C_{S(i/gA*)PRI}$	$C_{S((1-\beta*)/gA*)P}$	Scores-3*
1. The US	**c-cc**	1.038	0.555	0.445	0.955	0.572	0.428	**4**
2. Canada	**c-cc**	(1.296)	0.581	0.419	0.900	0.625	0.375	3
7. Mexico	**c-cc**	1.003	0.734	0.266	0.868	0.650	0.350	3
8. Peru	**c-cc**	0.822	0.751	0.249	0.856	0.713	0.287	2
6. Argentina	**c-cc**	0.831	0.793	0.207	0.934	0.759	0.241	2
5. Brazil	**c-cc**	0.933	0.723	0.277	0.680	0.580	0.420	**4**
6. The UK	**c-cc**	0.700	0.590	0.410	0.712	0.598	0.402	**4**
9. France	**c-cc**	0.057	0.646	0.354	0.249	0.596	0.404	**4**
1. Japan	**c-cc**	0.242	0.622	0.378	1.077	0.628	0.372	3
10. Philippine	**c-cc**	0.694	0.753	0.247	0.855	0.610	0.390	3
9. Kenya	**c-cc**	0.960	0.868	0.132	0.427	0.761	0.239	2
7. Sweden	**s**	1.032	0.719	0.281	1.159	0.588	0.412	**4**
8. Germany	**s**	0.520	0.599	0.401	0.373	0.616	0.384	3
10. Italy	**s**	0.331	0.711	0.289	0.523	0.599	0.401	**4**
4. Spain	**s**	0.617	0.684	0.316	0.928	0.590	0.410	**4**
5. Hungary	**s**	0.710	0.710	0.290	0.904	0.702	0.298	2
4. Australia	**s**	0.483	0.646	0.354	0.711	0.559	0.441	**4**
5. New Zealand	**s**	0.966	0.635	0.365	0.909	0.608	0.392	3
4. India	**s**	0.768	0.784	0.216	0.627	0.580	0.420	**4**
1. Finland	**ss-sss**	(1.670)	0.717	0.283	(0.113)	0.639	0.361	3
2. Norway	**ss-sss**	0.721	0.653	0.347	0.746	0.624	0.376	3
3. Netherlands	**ss-sss**	161.4	0.600	0.400	(0.953)	0.565	0.435	**4**
3. Russia	**ss-sss**	0.920	0.765	0.235	1.024	0.641	0.359	3
2. Korea	**ss-sss**	0.820	0.626	0.374	0.485	0.531	0.469	**4**
3. China	**ss-sss**	0.995	0.739	0.261	0.485	0.444	0.556	**4**
6. Singapore	**ss-sss**	0.962	0.707	0.293	1.012	0.565	0.435	**4**
7. Malaysia	**ss-sss**	0.693	0.640	0.360	0.645	0.671	0.329	3
8. Indonesia	**ss-sss**	1.011	0.772	0.228	0.650	0.724	0.276	2
9. Thailand	**ss-sss**	0.656	0.647	0.353	0.628	0.759	0.241	2
10. South Africa	**ss-sss**	0.769	0.795	0.205	0.633	0.736	0.264	2
Average of Club c-cc, 11 count.		**0.7740**	**0.6923**	**0.3077**	**0.7740**	**0.6446**	**0.3554**	
Average of Club s, 8 countries		**0.7670**	**0.6858**	**0.3142**	**0.7670**	**0.6052**	**0.3948**	
Average of Club ss-sss, 11 count.		**0.4766**	**0.6964**	**0.3036**	**0.4766**	**0.6272**	**0.3728**	
Average of 30 countries		**0.6631**	**0.6921**	**0.3079**	**0.6631**	**0.6277**	**0.3723**	

Notes: 1.$C_S(A/g_y)$ is contribution share of *A to* g_y. $C_S(i/g_A{}^*)$ is that of *i* to $g_A{}^*$. $C_{S(}(1-\beta^*)/g_A{}^*)$ is that of (1-β*).

2. Scores-3* in Tables 3- show the contribution share of 1-β^* to $g_A{}^*$ at convergence as follows:

Scores-3	$C_{S((1-\beta*)/gA*)G}$	where *A* is *TFP*, *y* is *ALP*, and (*Y/K*)=*ACP*, but *K* and *L* are purely quantitative.
4	above 0.4	US,UK, France, Nether., Sweden, Italy, Spain, Aust., India, China, Korea, Singa., & Brazil.
3	above 0.3	Canada, Mexico, Germany, Finland, Norway, Russia, NZ, Japan, Malaysia, & Philippines.
2	above 0.2	Hungary, Indonesia, Thailand, Peru, Argentina, South Africa, and Kenya.
1	above 0.1	None.

Table C-1 Basic data and parameters of the G sector: US, Russia, China, India, and Japan

G sector	L_G=L(W_G/W	Y_G	K_G	TFP_G	Π_G=rents	$i_G=I_G/Y_G$	$s_G=S_G/Y_G$	α_G	n_G	$k_G(0)$
(0) U S	**c-cc**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **0**								
1995	52.68	1047	1301	26.13	(89)	0.054	(0.085)	(0.085)		24.69
1996	51.88	1120	1360	25.05	(51)	0.053	(0.045)	(0.045)	-0.0151	26.22
1997	51.67	1273	1419	21.28	56	0.046	0.044	0.044	-0.0041	27.46
1998	51.15	1374	1483	20.11	118	0.046	0.086	0.086	-0.0100	28.99
1999	51.63	1556	1548	18.55	222	0.042	0.143	0.143	0.0093	29.99
2000	51.84	1747	1624	17.58	330	0.043	0.189	0.189	0.0040	31.33
2001	53.39	1678	1707	21.85	176	0.050	0.105	0.105	0.0300	31.98
2002	56.83	1466	1787	36.81	(151)	0.054	(0.103)	(0.103)	0.0645	31.44
2003	58.64	1417	1864	52.69	(319)	0.054	(0.225)	(0.225)	0.0318	31.78
2004	59.02	1516	1937	54.57	(327)	0.048	(0.216)	(0.216)	0.0065	32.81
(8) Russia	**ss-sss**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **8**								
1995	37.00	224	100	7.52	(49)	0.091	(0.220)	(0.220)		2.69
1996	37.49	275	132	12.45	(116)	0.116	(0.420)	(0.420)	0.0134	3.51
1997	39.42	380	168	14.89	(114)	0.096	(0.299)	(0.299)	0.0513	4.27
1998	34.45	414	217	17.05	(79)	0.117	(0.190)	(0.190)	(0.1260)	6.29
1999	26.52	710	280	26.16	7	0.089	0.010	0.010	(0.2300)	10.56
2000	28.10	1430	435	27.15	328	0.108	0.229	0.229	0.0595	15.46
2001	30.80	2112	801	25.47	642	0.174	0.304	0.304	0.0961	26.01
2002	31.91	2649	1358	29.28	736	0.210	0.278	0.278	0.0359	42.56
2003	31.75	3242	1968	31.50	924	0.188	0.285	0.285	(0.0051)	61.98
2004	30.30	3845	2269	35.81	1127	0.078	0.293	0.293	(0.0455)	74.87
(6) China	**ss-sss**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **6**								
1995	186.76	812	957	3.26	143	0.288	0.176	0.176		5.12
1996	187.26	984	1242	3.58	199	0.290	0.202	0.202	0.0026	6.63
1997	191.53	1106	1568	3.71	233	0.295	0.211	0.211	0.0228	8.19
1998	196.51	1207	1952	3.76	258	0.318	0.214	0.214	0.0260	9.93
1999	203.36	1270	2386	3.99	231	0.342	0.182	0.182	0.0348	11.73
2000	210.24	1403	2896	4.32	233	0.363	0.166	0.166	0.0338	13.77
2001	217.52	1443	3474	5.07	140	0.401	0.097	0.097	0.0346	15.97
2002	214.71	1748	4140	4.46	356	0.381	0.204	0.204	(0.0129)	19.28
2003	204.90	2015	4970	4.19	539	0.412	0.267	0.267	(0.0457)	24.26
2004	199.42	2202	5952	4.10	642	0.446	0.291	0.291	(0.0267)	29.85
(2) India	**s**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **2**								
1995	130.68	691	454	15.52	(598)	0.001	(0.865)	(0.865)		3.47
1996	129.17	790	456	17.73	(667)	0.002	(0.844)	(0.844)	(0.0115)	3.53
1997	141.86	983	459	16.75	(739)	0.003	(0.751)	(0.751)	0.0982	3.24
1998	154.55	1228	464	17.98	(912)	0.004	(0.743)	(0.743)	0.0894	3.00
1999	163.95	1457	472	19.09	(1054)	0.005	(0.723)	(0.723)	0.0608	2.88
2000	162.79	1563	480	20.25	(1080)	0.005	(0.691)	(0.691)	(0.0071)	2.95
2001	162.34	1711	442	20.27	(1117)	(0.022)	(0.653)	(0.653)	(0.0028)	2.72
2002	160.38	1817	466	21.65	(1103)	0.013	(0.607)	(0.607)	(0.0121)	2.91
2003	156.16	1880	422	23.22	(1241)	(0.023)	(0.660)	(0.660)	(0.0263)	2.71
2004	150.82	2152	425	25.39	(1198)	0.001	(0.556)	(0.556)	(0.0342)	2.82
(6) Japan	**c-cc**	Score of (but extreme) (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **6 but extreme**								
1995	25.57	68540	316362	4808	(4249)	0.272	(0.062)	(0.062)		12374
1996	26.00	71672	336567	4566	(3819)	0.282	(0.053)	(0.053)	0.0168	12947
1997	25.97	74918	354250	3803	(2176)	0.236	(0.029)	(0.029)	(0.0008)	13638
1998	26.79	37801	372117	41563714	(40781)	0.473	(1.079)	(1.079)	0.0314	13890
1999	27.88	58397	388616	82051	(22446)	0.283	(0.384)	(0.384)	0.0406	13940
2000	28.89	62115	400942	62111	(21904)	0.198	(0.353)	(0.353)	0.0363	13878
2001	30.40	55978	403738	321700	(30441)	0.050	(0.544)	(0.544)	0.0522	13282
2002	31.42	47756	404057	4415684	(40247)	0.007	(0.843)	(0.843)	0.0335	12861
2003	31.91	48155	401800	3695951	(39802)	(0.047)	(0.827)	(0.827)	0.0156	12593
2004	32.06	48046	398670	4796512	(41130)	(0.065)	(0.856)	(0.856)	0.0048	12435

Table C-2 Basic data and parameters of the **PRI** sector: US, Russia, China, India, and Japan

PRI sector	$L_{PRI}=L(W_P/W$	Y_{PRI}	K_{PRI}	TFP_{PRI}	Π_{PRI}=rents	$i_{PRI}=I_{PRI}/Y_{PR}$	$s_{PRI}=S_{PRI}/Y_P$	α_{PRI}	n_{PRI}	$k_{PRI}(0)$
(0) U S	**c-cc**	Score of $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$: **0**								
1995	217.27	5615	14246	12.95	928	0.098	0.114	0.165		65.57
1996	220.63	5919	14382	13.83	939	0.104	0.112	0.159	0.0154	65.18
1997	223.76	6162	15048	14.96	894	0.110	0.100	0.145	0.0142	67.25
1998	227.21	6449	15426	16.07	870	0.118	0.088	0.135	0.0154	67.89
1999	229.64	6753	15967	17.58	819	0.126	0.070	0.121	0.0107	69.53
2000	232.31	7070	18585	19.49	719	0.131	0.047	0.102	0.0116	80.00
2001	233.61	7513	19217	18.50	942	0.116	0.061	0.125	0.0056	82.26
2002	232.99	7976	19996	16.14	1347	0.099	0.078	0.169	-0.0027	85.83
2003	233.98	8510	21391	15.73	1580	0.098	0.094	0.186	0.0043	91.42
2004	236.39	9043	22021	16.65	1659	0.110	0.092	0.183	0.0103	93.15
(8) Russia	**ss-sss**	Score of $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$: **8**								
1995	111.19	1028	694	6.39	207	0.162	0.276	0.202		6.24
1996	110.46	1485	1026	8.16	333	0.141	0.297	0.224	(0.0066)	9.29
1997	108.27	1689	1285	9.59	332	0.121	0.241	0.197	(0.0198)	11.86
1998	112.95	1979	1769	10.58	363	0.084	0.237	0.183	0.0432	15.66
1999	120.51	3706	3639	19.20	512	0.066	0.303	0.138	0.0669	30.20
2000	118.46	5157	6704	29.16	512	0.096	0.346	0.099	(0.0170)	56.59
2001	115.19	5883	8561	38.50	386	0.103	0.249	0.066	(0.0276)	74.33
2002	113.42	7040	10286	53.20	241	0.073	0.214	0.034	(0.0153)	90.69
2003	112.87	8616	14053	61.89	375	0.086	0.224	0.043	(0.0048)	124.50
2004	113.60	10801	19282	71.07	612	0.126	0.244	0.057	0.0064	169.74
(6) China	**ss-sss**	Score of $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$: **6**								
1995	1032.54	4213	1932	3.78	514	0.315	0.360	0.122		1.87
1996	1043.74	4949	2165	4.36	572	0.303	0.350	0.116	0.0109	2.07
1997	1050.87	5454	2823	4.60	667	0.292	0.361	0.122	0.0068	2.69
1998	1056.99	5870	3365	4.77	769	0.298	0.371	0.131	0.0058	3.18
1999	1060.74	6234	3818	4.97	815	0.297	0.369	0.131	0.0036	3.60
2000	1063.76	6830	5297	5.19	908	0.298	0.372	0.133	0.0028	4.98
2001	1065.68	7565	7563	5.23	1182	0.306	0.393	0.156	0.0018	7.10
2002	1077.09	8140	9606	5.53	1159	0.327	0.400	0.142	0.0107	8.92
2003	1095.10	9150	13117	5.94	1260	0.363	0.424	0.138	0.0167	11.98
2004	1108.58	10066	17709	6.19	1394	0.390	0.454	0.139	0.0123	15.97
(2) India	**s**	Score of $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$: **2**								
1995	804.89	9693	4076	8.97	1759	0.177	0.210	0.181		5.06
1996	823.66	11164	5022	10.01	1872	0.157	0.191	0.168	0.0233	6.10
1997	828.18	12016	6139	10.46	1964	0.148	0.183	0.163	0.0055	7.41
1998	832.63	13925	8164	11.30	2394	0.148	0.182	0.172	0.0054	9.80
1999	840.25	15630	10675	11.87	2761	0.153	0.186	0.177	0.0091	12.70
2000	858.29	16926	13401	12.13	2995	0.154	0.197	0.177	0.0215	15.61
2001	875.47	18507	18184	12.39	3258	0.155	0.196	0.176	0.0200	20.77
2002	893.99	19719	22520	12.55	3446	0.161	0.196	0.175	0.0212	25.19
2003	914.64	22461	28984	12.91	4180	0.177	0.215	0.186	0.0231	31.69
2004	936.30	25448	36591	13.91	4651	0.181	0.214	0.183	0.0237	39.08
(6) Japan	**c-cc**	Score of (but extreme) $(S-I)/Y=(S-I)_G/Y+(S-I)_{PRI}/Y$: **6 but extreme**								
1995	99.90	341036	874603	756	56619	0.090	0.188	0.166		8755
1996	99.82	348233	960880	750	58356	0.094	0.186	0.168	(0.0008)	9626
1997	100.18	355407	1046380	782	58081	0.096	0.187	0.163	0.0035	10445
1998	99.68	387466	1171050	390	95084	0.063	0.256	0.245	(0.0049)	11748
1999	98.89	361248	1159958	529	74464	0.060	0.206	0.206	(0.0079)	11729
2000	98.14	358590	1160076	539	73182	0.069	0.203	0.204	(0.0076)	11821
2001	96.89	359436	1154788	414	83983	0.079	0.204	0.234	(0.0127)	11918
2002	96.10	361954	1017094	350	92764	0.062	0.214	0.256	(0.0081)	10583
2003	95.83	360425	1021252	316	96241	0.065	0.215	0.267	(0.0028)	10657
2004	95.86	368276	1016330	298	101644	0.069	0.225	0.276	0.0003	10602

Table C-3 Basic data and parameters of the **Total** economy: US, Russia, China, India, and Japan

Total	L	Y	K	TFP=A	Π=rents	i=I/Y	s	α	n	k(0)
(0) U S	c-cc	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **0**								
1995	269.95	6663	15547	14.82	839	0.0909	0.083	0.1259		57.59
1996	272.51	7039	15742	15.48	888	0.0956	0.087	0.1262	0.0095	57.77
1997	275.43	7435	16467	16.01	950	0.0995	0.090	0.1278	0.0107	59.79
1998	278.36	7823	16909	16.73	988	0.1056	0.088	0.1263	0.0106	60.75
1999	281.27	8309	17515	17.60	1041	0.1106	0.083	0.1253	0.0105	62.27
2000	284.15	8818	20209	18.68	1050	0.1136	0.075	0.1190	0.0102	71.12
2001	287.00	9191	20925	19.00	1118	0.1042	0.069	0.1217	0.0100	72.91
2002	289.82	9441	21783	18.85	1196	0.0919	0.050	0.1267	0.0098	75.16
2003	292.62	9927	23254	19.47	1260	0.0920	0.048	0.1270	0.0097	79.47
2004	295.41	10559	23958	20.53	1332	0.1015	0.048	0.1261	0.0095	81.10
(8) Russia	**ss-sss**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **8**								
1995	148.19	1252	794	6.83	158	0.1491	0.1875	0.1263		5.36
1996	147.95	1760	1158	9.23	217	0.1371	0.1848	0.1235	(0.0016)	7.83
1997	147.69	2070	1453	11.01	219	0.1167	0.1414	0.1056	(0.0018)	9.84
1998	147.40	2394	1985	11.93	284	0.0897	0.1628	0.1187	(0.0020)	13.47
1999	147.03	4416	3919	20.42	519	0.0698	0.2561	0.1176	(0.0025)	26.66
2000	146.56	6587	7138	27.38	840	0.0983	0.3204	0.1275	(0.0032)	48.71
2001	145.99	7994	9362	32.08	1028	0.1218	0.2636	0.1285	(0.0039)	64.13
2002	145.33	9690	11644	42.85	977	0.1107	0.2312	0.1009	(0.0045)	80.12
2003	144.62	11858	16020	48.97	1298	0.1137	0.2404	0.1095	(0.0049)	110.77
2004	143.90	14646	21550	56.14	1740	0.1135	0.2571	0.1188	(0.0050)	149.76
(6) China	**ss-sss**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6**								
1995	1219.30	5026	2889	3.68	657	0.3108	0.3307	0.1308		2.37
1996	1231.00	5933	3407	4.22	771	0.3012	0.3258	0.1300	0.0096	2.77
1997	1242.40	6560	4391	4.44	900	0.2921	0.3357	0.1372	0.0093	3.53
1998	1253.50	7077	5317	4.58	1027	0.3011	0.3443	0.1451	0.0089	4.24
1999	1264.10	7503	6204	4.76	1046	0.3047	0.3373	0.1394	0.0085	4.91
2000	1274.00	8233	8192	4.99	1140	0.3094	0.3366	0.1385	0.0078	6.43
2001	1283.20	9008	11037	5.12	1322	0.3211	0.3456	0.1468	0.0072	8.60
2002	1291.80	9888	13746	5.33	1515	0.3366	0.3649	0.1532	0.0067	10.64
2003	1300.00	11166	18087	5.62	1799	0.3719	0.3960	0.1611	0.0063	13.91
2004	1308.00	12268	23661	5.80	2036	0.4001	0.4245	0.1660	0.0062	18.09
(2) India	**s**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **2**								
1995	935.57	10384	4530	9.30	1161	0.1651	0.1385	0.1118		4.84
1996	952.83	11955	5478	10.52	1205	0.1467	0.1222	0.1008	0.0184	5.75
1997	970.04	12999	6598	11.19	1225	0.1373	0.1124	0.0943	0.0181	6.80
1998	987.18	15153	8628	12.42	1482	0.1361	0.1068	0.0978	0.0177	8.74
1999	1004.20	17088	11147	13.38	1707	0.1402	0.1089	0.0999	0.0172	11.10
2000	1021.08	18489	13881	13.82	1915	0.1413	0.1215	0.1036	0.0168	13.59
2001	1037.81	20218	18626	14.35	2141	0.1398	0.1238	0.1059	0.0164	17.95
2002	1054.37	21536	22986	14.61	2343	0.1487	0.1284	0.1088	0.0160	21.80
2003	1070.80	24340	29406	15.24	2939	0.1617	0.1471	0.1207	0.0156	27.46
2004	1087.12	27600	37016	16.33	3453	0.1667	0.1540	0.1251	0.0152	34.05
(6) Japan	**c-cc**	Score of (but extreme) (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6 but extreme**								
1995	125.47	409576	1190965	1012	52370	0.1200	0.1464	0.1279		9492
1996	125.82	419905	1297446	1005	54537	0.1261	0.1452	0.1299	0.0028	10312
1997	126.15	430325	1400630	1017	55905	0.1207	0.1498	0.1299	0.0026	11103
1998	126.47	425267	1543167	1011	54303	0.0992	0.1370	0.1277	0.0025	12202
1999	126.77	419645	1548574	1031	52018	0.0906	0.1240	0.1240	0.0024	12216
2000	127.03	420705	1561018	1051	51278	0.0880	0.1206	0.1219	0.0021	12289
2001	127.29	415414	1558526	970	53542	0.0754	0.1031	0.1289	0.0020	12244
2002	127.52	409710	1421151	973	52517	0.0555	0.0912	0.1282	0.0018	11145
2003	127.74	408580	1423052	883	56438	0.0519	0.0923	0.1381	0.0017	11140
2004	127.92	416322	1415000	841	60514	0.0537	0.0999	0.1454	0.0014	11062

Table D-1 Productivity and contribution shares of the **G** sector: US, Russia, China, India, and Japan

G sector	1/**ACP**$_G$=$\Omega_($	$r_G(0)$	$(r^*\text{-}g_Y{}^*)_G$	**ALP**$_G$=$y_G(0$	gy_G	$C_{S(TFP/gY)G}$	$C_{S(K/gY)G}$	$C_{S(L/gY)G}$	$C_{S(i/gA^*)G}$	$C_{S((1-\beta^*)/gA^*)G}$
(0) U S	**c-cc**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **0**								
1995	1.242	(0.069)		19.88						
1996	1.215	(0.037)	(0.054)	21.59	0.083	1.272	(0.030)	(0.226)	0.862	0.138
1997	1.115	0.040	0.019	24.64	0.132	1.019	0.014	(0.029)	0.820	0.180
1998	1.079	0.080	0.061	26.86	0.087	1.076	0.049	(0.115)	0.845	0.155
1999	0.995	0.143	0.116	30.14	0.115	0.884	0.047	0.060	0.756	0.244
2000	0.929	0.203	0.177	33.71	0.112	0.895	0.075	0.027	0.786	0.214
2001	1.018	0.103	0.063	31.42	(0.070)	1.771	(0.135)	(0.670)	0.635	0.365
2002	1.219	(0.085)	(0.138)	25.79	(0.198)	1.463	0.038	(0.563)	#NUM!	#NUM!
2003	1.315	(0.171)	(0.208)	24.17	(0.065)	1.864	0.294	(1.181)	0.568	0.432
2004	1.277	(0.169)	(0.191)	25.69	0.061	1.002	(0.121)	0.112	0.769	0.231
(8) Russia	**ss-sss**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **8**								
1995	0.445	(0.494)		6.05						
1996	0.478	(0.879)	(0.950)	7.34	0.194	1.481	(0.585)	0.083	0.860	0.140
1997	0.443	(0.676)	(0.771)	9.65	0.273	0.981	(0.219)	0.175	0.803	0.197
1998	0.523	(0.363)	(0.334)	12.03	0.220	3.485	(0.608)	(1.674)	1.061	(0.061)
1999	0.395	0.025	0.147	26.76	0.800	1.544	0.004	(0.319)	1.218	(0.218)
2000	0.304	0.755	0.608	50.88	0.642	0.778	0.125	0.045	0.807	0.193
2001	0.379	0.801	0.570	68.56	0.298	0.278	0.537	0.140	0.713	0.287
2002	0.513	0.542	0.348	83.02	0.191	0.130	0.759	0.102	0.708	0.292
2003	0.607	0.470	0.330	102.11	0.207	0.447	0.572	(0.016)	0.737	0.263
2004	0.590	0.497	0.463	126.88	0.217	0.966	0.241	(0.173)	0.897	0.103
(6) China	**ss-sss**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6**								
1995	1.177	0.150		4.35						
1996	1.262	0.160	0.018	5.26	0.189	0.702	0.286	0.010	0.562	0.438
1997	1.418	0.149	0.006	5.77	0.094	0.392	0.449	0.146	0.513	0.487
1998	1.618	0.132	(0.010)	6.14	0.062	0.192	0.573	0.224	0.473	0.527
1999	1.879	0.097	(0.042)	6.24	0.017	(0.324)	0.772	0.544	0.429	0.571
2000	2.064	0.080	(0.056)	6.67	0.066	0.371	0.337	0.269	0.406	0.594
2001	2.407	0.040	(0.091)	6.63	(0.006)	(0.784)	0.679	1.094	0.370	0.630
2002	2.369	0.086	(0.031)	8.14	0.204	0.874	0.185	(0.049)	0.427	0.573
2003	2.466	0.108	(0.008)	9.84	0.189	0.898	0.350	(0.219)	0.426	0.574
2004	2.704	0.108	(0.016)	11.04	0.116	0.592	0.622	(0.205)	0.366	0.634
(2) India	**s**	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **2**								
1995	0.657	(1.316)		5.28						
1996	0.577	(1.463)	(1.455)	6.12	0.147	1.184	(0.025)	(0.147)	1.208	(0.208)
1997	0.467	(1.609)	(1.686)	6.93	0.125	0.216	(0.022)	0.705	#NUM!	#NUM!
1998	0.378	(1.965)	(2.040)	7.95	0.137	0.315	(0.033)	0.626	#NUM!	#NUM!
1999	0.324	(2.233)	(2.286)	8.89	0.112	0.439	(0.065)	0.562	#NUM!	#NUM!
2000	0.307	(2.251)	(2.248)	9.60	0.077	1.326	(0.153)	(0.165)	1.040	(0.040)
2001	0.258	(2.526)	(2.512)	10.54	0.093	0.513	0.537	(0.048)	#NUM!	#NUM!
2002	0.257	(2.364)	(2.361)	11.33	0.072	1.870	(0.538)	(0.313)	1.015	(0.015)
2003	0.225	(2.939)	(2.903)	12.04	0.061	0.444	1.798	(1.263)	#NUM!	#NUM!
2004	0.197	(2.820)	(2.790)	14.27	0.170	1.423	(0.021)	(0.367)	1.377	(0.377)
(6) Japan	**c-cc**	Score of (but extreme) (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6 but extreme**								
1995	4.616	(0.013)		2681						
1996	4.696	(0.011)	(0.064)	2757	0.028	0.670	(0.074)	0.387	0.383	0.617
1997	4.729	(0.006)	(0.047)	2884	0.045	1.054	(0.034)	(0.019)	0.459	0.541
1998	9.844	(0.110)	(0.155)	1411	(0.715)	0.994	0.110	(0.132)	0.209	0.791
1999	6.655	(0.058)	(0.100)	2095	0.395	0.886	(0.031)	0.103	0.205	0.795
2000	6.455	(0.055)	(0.086)	2150	0.026	0.361	(0.176)	0.772	#NUM!	#NUM!
2001	7.212	(0.075)	(0.090)	1841	(0.155)	1.727	0.038	(0.815)	#NUM!	#NUM!
2002	8.461	(0.100)	(0.106)	1520	(0.192)	1.383	0.005	(0.421)	#NUM!	#NUM!
2003	8.344	(0.099)	(0.097)	1509	(0.007)	(2.965)	0.553	3.405	#NUM!	#NUM!
2004	8.298	(0.103)	(0.098)	1499	(0.007)	7.904	(2.954)	(3.969)	#NUM!	#NUM!

Table D-2 Productivity and contribution shares of the **PRI** sector: US, Russia, China, India, and Japan

PRI sector	$1/ACP_P=\Omega($	$r_{PRI}(0)$	$(r^*-g_Y^*)_{PRI}$	$ALP_P=y_P(0)$	gy_{PRI}	$C_{S(TFP/gY)PRI}$	$C_{S(K/gY)PRI}$	$C_{S(L/gY)PRI}$	$C_{S(i/gA^*)PRI}$	$C_{S((1-\beta^*)/gA^*)P}$
(0) U S	c-cc	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **0**								
1995	2.537	0.065		25.84						
1996	2.430	0.065	0.030	26.83	0.037	0.717	0.028	0.240	0.555	0.445
1997	2.442	0.059	0.022	27.54	0.026	0.528	0.164	0.296	0.559	0.441
1998	2.392	0.056	0.016	28.38	0.030	0.626	0.073	0.287	0.555	0.445
1999	2.365	0.051	0.009	29.40	0.035	0.700	0.090	0.200	0.574	0.426
2000	2.629	0.039	(0.001)	30.43	0.034	0.416	0.355	0.222	0.553	0.447
2001	2.558	0.049	0.014	32.16	0.055	0.849	0.068	0.078	0.589	0.411
2002	2.507	0.067	0.038	34.23	0.062	0.927	0.111	(0.036)	0.636	0.364
2003	2.514	0.074	0.043	36.37	0.061	0.751	0.193	0.052	0.603	0.397
2004	2.435	0.075	0.039	38.25	0.051	0.770	0.086	0.134	0.572	0.428
(8) Russia	ss-sss	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **8**								
1995	0.675	0.299		9.24						
1996	0.691	0.325	0.232	13.44	0.375	0.775	0.241	(0.012)	0.765	0.235
1997	0.760	0.259	0.192	15.60	0.149	0.768	0.360	(0.115)	0.796	0.204
1998	0.894	0.205	0.135	17.52	0.116	0.366	0.402	0.205	0.643	0.357
1999	0.982	0.141	0.074	30.76	0.563	0.711	0.168	0.066	0.310	0.690
2000	1.300	0.076	0.040	43.53	0.347	0.839	0.214	(0.039)	0.777	0.223
2001	1.455	0.045	0.013	51.07	0.160	1.078	0.129	(0.183)	0.793	0.207
2002	1.461	0.023	(0.000)	62.07	0.195	1.055	0.035	(0.075)	0.802	0.198
2003	1.631	0.027	(0.005)	76.33	0.207	0.954	0.071	(0.021)	0.731	0.269
2004	1.785	0.032	(0.017)	95.08	0.220	0.887	0.083	0.024	0.641	0.359
(6) China	ss-sss	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6**								
1995	0.459	0.266		4.08						
1996	0.437	0.264	0.026	4.74	0.150	0.855	0.080	0.055	0.739	0.261
1997	0.518	0.236	0.022	5.19	0.090	0.573	0.364	0.059	0.720	0.280
1998	0.573	0.228	0.018	5.55	0.068	0.600	0.330	0.066	0.700	0.300
1999	0.613	0.213	0.010	5.88	0.056	0.663	0.285	0.050	0.691	0.309
2000	0.775	0.171	(0.012)	6.42	0.089	0.435	0.538	0.026	0.651	0.349
2001	1.000	0.156	(0.011)	7.10	0.100	0.364	0.621	0.014	0.600	0.400
2002	1.180	0.121	(0.045)	7.56	0.063	0.368	0.506	0.121	0.551	0.449
2003	1.433	0.096	(0.069)	8.36	0.100	0.468	0.405	0.116	0.489	0.511
2004	1.759	0.079	(0.075)	9.08	0.083	0.403	0.484	0.106	0.444	0.556
(2) India	s	Score of (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **2**								
1995	0.421	0.431		12.04						
1996	0.450	0.373	0.234	13.55	0.118	0.598	0.256	0.128	0.784	0.216
1997	0.511	0.320	0.206	14.51	0.068	0.461	0.476	0.060	0.793	0.207
1998	0.586	0.293	0.185	16.72	0.142	0.612	0.357	0.028	0.774	0.226
1999	0.683	0.259	0.152	18.60	0.106	0.490	0.444	0.061	0.743	0.257
2000	0.792	0.223	0.116	19.72	0.058	0.232	0.545	0.213	0.700	0.300
2001	0.983	0.179	0.084	21.14	0.069	0.144	0.673	0.177	0.667	0.333
2002	1.142	0.153	0.062	22.06	0.043	0.090	0.636	0.267	0.636	0.364
2003	1.290	0.144	0.050	24.56	0.107	0.466	0.384	0.135	0.601	0.399
2004	1.438	0.127	0.038	27.18	0.101	0.479	0.361	0.146	0.580	0.420
(6) Japan	c-cc	Score of (but extreme) (S-I)/Y=(S-I)$_G$/Y+(S-I)$_{PRI}$/Y: **6 but extreme**								
1995	2.565	0.065		3414						
1996	2.759	0.061	0.035	3488	0.022	0.248	0.783	(0.031)	0.622	0.378
1997	2.944	0.056	0.029	3548	0.017	0.150	0.706	0.143	0.590	0.410
1998	3.022	0.081	0.066	3887	0.091	0.721	0.324	(0.041)	0.665	0.335
1999	3.211	0.064	0.051	3653	(0.062)	0.886	0.029	0.093	0.692	0.308
2000	3.235	0.063	0.048	3654	0.000	0.187	(0.003)	0.824	0.671	0.329
2001	3.213	0.073	0.055	3710	0.015	5.597	(0.451)	(4.127)	0.675	0.325
2002	2.810	0.091	0.076	3766	0.015	6.272	(4.363)	(0.865)	0.691	0.309
2003	2.833	0.094	0.077	3761	(0.001)	0.776	(0.259)	0.486	0.651	0.349
2004	2.760	0.100	0.080	3842	0.021	1.052	(0.061)	0.009	0.628	0.372

Table D-3 Productivity and contribution shares of the **Total** economy: US, Russia, China, India, and Japan

Total	1/**ACP**=Ω(0	r(0)	r*-g_Y*	**ALP**=y(0)	gy	$C_{S(TFP/gY)}$	$C_{S(K/gY)}$	$C_{S(L/gY)}$	$C_{S(i/gA^*)}$	$C_{S((1-\beta^*)/gA^*)}$
(0) U S	**c-cc**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **0**								
1995	2.333	0.0539		24.68						
1996	2.236	0.0564	0.023	25.83	0.0456	0.816	0.028	0.146	0.606	0.394
1997	2.215	0.0577	0.022	26.99	0.0440	0.719	0.105	0.166	0.599	0.401
1998	2.161	0.0584	0.021	28.10	0.0403	0.747	0.065	0.178	0.600	0.400
1999	2.108	0.0594	0.019	29.54	0.0498	0.771	0.072	0.147	0.602	0.398
2000	2.292	0.0519	0.013	31.03	0.0493	0.547	0.299	0.147	0.589	0.411
2001	2.277	0.0534	0.018	32.02	0.0314	0.681	0.102	0.208	0.596	0.404
2002	2.307	0.0549	0.023	32.58	0.0171	0.487	0.190	0.315	0.601	0.399
2003	2.343	0.0542	0.023	33.92	0.0405	0.661	0.167	0.164	0.600	0.400
2004	2.269	0.0556	0.021	35.74	0.0523	0.800	0.060	0.131	0.600	0.400
(8) Russia	**ss-sss**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **8**								
1995	0.634	0.1992		8.45						
1996	0.658	0.1877	0.099	11.90	0.3427	0.865	0.139	(0.003)	0.783	0.217
1997	0.702	0.1504	0.078	14.01	0.1636	0.857	0.153	(0.009)	0.791	0.209
1998	0.829	0.1431	0.092	16.24	0.1474	0.735	0.278	(0.011)	0.789	0.211
1999	0.887	0.1325	0.094	30.04	0.6150	0.869	0.136	(0.003)	0.801	0.199
2000	1.084	0.1176	0.069	44.94	0.4030	0.795	0.213	(0.006)	0.751	0.249
2001	1.171	0.1098	0.052	54.76	0.1976	0.832	0.187	(0.016)	0.721	0.279
2002	1.202	0.0839	0.033	66.67	0.1968	0.907	0.116	(0.019)	0.734	0.266
2003	1.351	0.0810	0.032	81.99	0.2068	0.840	0.184	(0.019)	0.716	0.284
2004	1.471	0.0807	0.034	101.78	0.2162	0.848	0.174	(0.019)	0.704	0.296
(6) China	**ss-sss**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **6**								
1995	0.575	0.2275		4.12						
1996	0.574	0.2264	0.011	4.82	0.1565	0.816	0.129	0.046	0.694	0.306
1997	0.669	0.2050	0.008	5.28	0.0912	0.543	0.375	0.076	0.672	0.328
1998	0.751	0.1931	(0.000)	5.65	0.0670	0.510	0.388	0.097	0.646	0.354
1999	0.827	0.1686	(0.017)	5.94	0.0501	0.488	0.386	0.121	0.629	0.371
2000	0.995	0.1392	(0.032)	6.46	0.0850	0.470	0.456	0.069	0.595	0.405
2001	1.225	0.1198	(0.038)	7.02	0.0828	0.390	0.541	0.065	0.552	0.448
2002	1.390	0.1102	(0.043)	7.65	0.0865	0.553	0.385	0.058	0.520	0.480
2003	1.620	0.0994	(0.054)	8.59	0.1152	0.561	0.394	0.041	0.472	0.528
2004	1.929	0.0860	(0.061)	9.38	0.0880	0.427	0.518	0.052	0.426	0.574
(2) India	**s**	Score of (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **2**								
1995	0.436	0.2563		11.10						
1996	0.458	0.2200	0.098	12.55	0.1226	0.735	0.139	0.110	0.801	0.199
1997	0.508	0.1857	0.076	13.40	0.0659	0.578	0.221	0.187	0.792	0.208
1998	0.569	0.1717	0.067	15.35	0.1358	0.708	0.182	0.096	0.777	0.223
1999	0.652	0.1532	0.052	17.02	0.1031	0.637	0.228	0.122	0.755	0.245
2000	0.751	0.1380	0.042	18.11	0.0622	0.495	0.310	0.184	0.734	0.266
2001	0.921	0.1150	0.029	19.48	0.0731	0.446	0.387	0.157	0.703	0.297
2002	1.067	0.1019	0.018	20.43	0.0473	0.381	0.391	0.218	0.675	0.325
2003	1.208	0.0999	0.015	22.73	0.1069	0.624	0.259	0.105	0.646	0.354
2004	1.341	0.0933	0.012	25.39	0.1106	0.647	0.242	0.100	0.626	0.374
(6) Japan	**c-cc**	Score of (but extreme) (S-I)/Y=$(S-I)_G$/Y+$(S-I)_{PRI}$/Y: **6 but extreme**								
1995	2.908	0.0440		3264						
1996	3.090	0.0420	0.010	3337	0.0221	0.442	0.460	0.096	0.566	0.434
1997	3.255	0.0399	0.010	3411	0.0219	0.490	0.416	0.092	0.564	0.436
1998	3.629	0.0352	0.013	3363	(0.0144)	2.288	(1.106)	(0.188)	0.570	0.430
1999	3.690	0.0336	0.013	3310	(0.0157)	1.188	(0.033)	(0.157)	0.578	0.422
2000	3.710	0.0328	0.013	3312	0.0005	(0.102)	0.388	0.713	0.582	0.418
2001	3.752	0.0344	0.018	3264	(0.0147)	1.123	0.016	(0.142)	0.592	0.408
2002	3.469	0.0370	0.024	3213	(0.0156)	0.292	0.823	(0.115)	0.626	0.374
2003	3.483	0.0397	0.027	3199	(0.0045)	1.604	(0.067)	(0.539)	0.629	0.371
2004	3.399	0.0428	0.030	3255	0.0174	0.978	(0.043)	0.064	0.632	0.368

Table E-1 The structure of *ALP, TFP*, *ACP* and B_{TFP}: the G sector, the US, Russia, China, India, and Japan

G sector	$delta_G$	$beta_G$	***beta*** $_{TFP(G)}$	***B*** $_{TFP(G)}$	ACP_G	TFP_G	***TFP*** $_{RESI(G)}$	$beta^*_G$	***beta*** $^*_{TFP(G)}$	***B**** $_{TFP(G)}$
(0) U S	At the current situation			TFP_G/k_G	At the current situation			At convergence		
1995								assuming that $beta^*=beta^*_{TFP}$		
1996	1.376	0.324	0.511	0.955	0.823	25.05	2600.49	0.374	0.374	1.677
1997	4.221	0.531	0.563	0.775	0.897	21.28	########	0.492	0.492	1.034
1998	1.277	0.519	0.590	0.694	0.927	20.11	1108.39	0.432	0.432	1.317
1999	1.009	0.731	0.618	0.619	1.005	18.55	352.78	0.641	0.641	0.560
2000	1.242	0.715	0.641	0.561	1.076	17.58	660.62	0.575	0.575	0.739
2001	0.988	0.856	0.594	0.683	0.983	21.85	466.90	0.822	0.822	0.217
2002	#NUM!	1.249	0.461	1.171	0.820	36.81	#NUM!	1.209	1.209	(0.173)
2003	0.869	0.847	0.376	1.658	0.761	52.69	2323.64	0.890	0.890	0.123
2004	0.378	0.447	0.376	1.663	0.783	54.57	433.73	0.597	0.597	0.675
(8) Russia										
1995										
1996	0.150	0.214	0.220	3.545	2.092	12.45	25.48	0.277	0.277	2.604
1997	(2.222)	0.379	0.223	3.487	2.259	14.89	0.91	0.278	0.278	2.598
1998	#NUM!	(0.232)	0.269	2.712	1.913	17.05	#NUM!	0.439	0.439	1.280
1999	#NUM!	(0.533)	0.288	2.477	2.534	26.16	#NUM!	0.335	0.335	1.982
2000	(2.382)	0.533	0.363	1.756	3.290	27.15	0.02	0.472	0.472	1.120
2001	45.936	0.697	0.505	0.979	2.636	25.47	########	0.572	0.572	0.749
2002	(5.487)	0.704	0.592	0.688	1.951	29.28	0.00	0.588	0.588	0.701
2003	(1.434)	0.728	0.663	0.508	1.648	31.50	0.03	0.613	0.613	0.631
2004	0.513	0.649	0.676	0.478	1.695	35.81	92.47	0.669	0.669	0.495
(6) China										
1995										
1996	0.515	0.703	0.649	0.540	0.792	3.58	6.48	0.191	0.191	4.237
1997	0.554	0.770	0.688	0.453	0.705	3.71	7.62	0.611	0.611	0.638
1998	0.494	0.805	0.726	0.378	0.618	3.76	7.14	0.509	0.509	0.966
1999	0.454	0.829	0.746	0.340	0.532	3.99	7.80	0.856	0.856	0.168
2000	0.409	0.837	0.761	0.314	0.485	4.32	8.17	0.467	0.467	1.139
2001	0.335	0.828	0.759	0.317	0.415	5.07	9.79	0.742	0.742	0.348
2002	0.113	0.830	0.812	0.231	0.422	4.46	3.40	0.825	0.825	0.212
2003	(0.079)	0.851	0.853	0.173	0.405	4.19	1.39	0.833	0.833	0.200
2004	0.110	0.894	0.879	0.137	0.370	4.10	2.21	(0.465)	(0.465)	(3.151)
(2) India										
1995										
1996	#NUM!	(2.327)	0.166	5.024	1.734	17.73	#NUM!	0.651	0.651	0.537
1997	#NUM!	12.526	0.162	5.175	2.142	16.75	#NUM!	0.550	0.550	0.818
1998	#NUM!	7.552	0.143	5.988	2.646	17.98	#NUM!	0.733	0.733	0.364
1999	#NUM!	3.459	0.131	6.632	3.088	19.09	#NUM!	0.366	0.366	1.732
2000	#NUM!	(0.335)	0.127	6.874	3.259	20.25	#NUM!	0.429	0.429	1.330
2001	0.172	0.105	0.118	7.442	3.871	20.27	46.30	0.614	0.614	0.630
2002	#NUM!	(0.138)	0.118	7.446	3.896	21.65	#NUM!	0.432	0.432	1.316
2003	(1.252)	0.301	0.104	8.585	4.450	23.22	12.89	0.508	0.508	0.970
2004	#NUM!	(5.842)	0.100	9.016	5.067	25.39	#NUM!	0.573	0.573	0.746
(6) Japan										
1995										
1996	0.186	0.807	0.739	0.353	0.213	4566.36	43822.56	(2.507)	(2.507)	(1.399)
1997	(0.033)	0.773	0.782	0.279	0.211	3803.13	3658	(0.694)	(0.694)	(2.441)
1998	0.175	0.654	0.000	2992	0.102	########	########	1.527	1.527	(0.345)
1999	0.613	0.961	0.145	5.886	0.150	82050.59	########	9.268	9.268	(0.892)
2000	#NUM!	1.155	0.183	4.476	0.155	62111.29	#NUM!	(2.043)	(2.043)	(1.489)
2001	#NUM!	7.359	0.040	24.221	0.139	########	#NUM!	12.975	12.975	(0.923)
2002	#NUM!	42.357	0.003	343.34	0.118	########	#NUM!	0.021	0.021	46.192
2003	4.021	(2.764)	0.003	293.49	0.120	########	########	0.109	0.109	8.203
2004	(1.416)	(0.612)	0.003	385.73	0.121	########	24554.02	0.307	0.307	2.258

Table E-2 Structure of *ALP, TFP*, *ACP* and B_{TFP}: the PRI sector, the US, Russia, China, India, and Japan

PRI sector	$delta_{PRI}$	$beta_{PRI}$	$beta_{TFP(PRI)}$	$B_{TFP(PRI)}$	ACP_{PRI}	TFP_{PRI}	$TFP_{RESI(PRI)}$	$beta^*_{PRI}$	$beta^*_{TFP(PRI)}$	$B^*_{TFP(PRI)}$
(0) U S	At the current situation			TFP_{PRI}/k_{PRI}	At the current situation			At convergence		
1995								assuming that $beta^*=beta^*_{TFP}$		
1996	0.459	0.905	0.825	0.212	0.412	13.83	48.58	0.838	0.838	0.194
1997	0.421	0.892	0.818	0.222	0.409	14.96	47.87	0.824	0.709	0.409
1998	0.423	0.885	0.809	0.237	0.418	16.07	54.14	0.819	0.705	0.418
1999	0.336	0.856	0.798	0.253	0.423	17.58	43.65	0.785	0.703	0.423
2000	0.323	0.864	0.804	0.244	0.380	19.49	51.34	0.806	0.724	0.380
2001	0.249	0.857	0.816	0.225	0.391	18.50	31.90	0.777	0.719	0.391
2002	0.093	0.855	0.842	0.188	0.399	16.14	11.50	0.734	0.715	0.399
2003	0.281	0.891	0.853	0.172	0.398	15.73	24.18	0.783	0.715	0.398
2004	0.379	0.902	0.848	0.179	0.411	16.65	40.43	0.807	0.709	0.411
(8) Russia										
1995										
1996	(0.930)	0.580	0.533	0.878	1.447	8.16	0.62	0.822	0.822	0.217
1997	0.183	0.552	0.553	0.808	1.315	9.59	9.27	0.796	0.709	0.409
1998	1.104	0.813	0.597	0.676	1.119	10.58	133.10	0.722	0.705	0.418
1999	1.003	0.998	0.611	0.636	1.018	19.20	365.69	0.752	0.703	0.423
2000	8.265	0.605	0.660	0.515	0.769	29.16	########	0.755	0.724	0.380
2001	2.779	0.538	0.659	0.518	0.687	38.50	########	0.716	0.719	0.391
2002	4.848	0.523	0.630	0.587	0.684	53.20	########	0.714	0.715	0.399
2003	(0.269)	0.647	0.668	0.497	0.613	61.89	13.73	0.722	0.715	0.398
2004	0.263	0.744	0.705	0.419	0.560	71.07	204.61	0.711	0.709	0.411
(6) China										
1995										
1996	(0.279)	0.362	0.322	2.101	2.286	4.36	3.27	0.572	0.572	0.749
1997	(0.347)	0.408	0.369	1.712	1.932	4.60	2.89	0.512	0.709	0.409
1998	(0.456)	0.442	0.400	1.499	1.744	4.77	2.42	0.539	0.705	0.418
1999	(0.491)	0.459	0.420	1.381	1.633	4.97	2.24	0.550	0.703	0.423
2000	(1.728)	0.530	0.490	1.042	1.290	5.19	0.26	0.590	0.724	0.380
2001	1.002	0.619	0.576	0.736	1.000	5.23	27.39	0.583	0.719	0.391
2002	0.582	0.668	0.617	0.621	0.847	5.53	14.50	0.592	0.715	0.399
2003	0.430	0.724	0.669	0.496	0.698	5.94	12.26	0.605	0.715	0.398
2004	0.302	0.766	0.721	0.387	0.568	6.19	9.74	0.669	0.709	0.411
(2) India										
1995										
1996	(0.953)	0.466	0.379	1.642	2.223	10.01	1.32	0.490	0.490	1.040
1997	(0.533)	0.470	0.415	1.411	1.957	10.46	2.59	0.529	0.709	0.409
1998	(0.848)	0.524	0.465	1.152	1.706	11.30	1.10	0.505	0.705	0.418
1999	(3.316)	0.585	0.517	0.935	1.464	11.87	0.00	0.560	0.703	0.423
2000	2.134	0.658	0.563	0.777	1.263	12.13	2629	0.608	0.724	0.380
2001	1.041	0.716	0.626	0.597	1.018	12.39	170.84	0.598	0.719	0.391
2002	0.782	0.756	0.667	0.498	0.876	12.55	89.03	0.649	0.715	0.399
2003	0.667	0.796	0.711	0.407	0.775	12.91	68.10	0.626	0.715	0.398
2004	0.595	0.820	0.738	0.356	0.695	13.91	63.04	0.630	0.709	0.411
(6) Japan										
1995										
1996	0.131	0.938	0.928	0.078	0.362	750.07	535.07	0.444	0.444	1.252
1997	0.232	0.948	0.930	0.075	0.340	781.96	1473	0.433	0.709	0.409
1998	0.001	0.970	0.968	0.033	0.331	389.81	39.47	0.394	0.705	0.418
1999	(0.264)	0.950	0.957	0.045	0.311	529.47	6.45	0.365	0.703	0.423
2000	(0.179)	0.952	0.956	0.046	0.309	539.02	14.84	0.407	0.724	0.380
2001	(0.338)	0.960	0.966	0.035	0.311	413.92	1.94	0.419	0.719	0.391
2002	(0.144)	0.967	0.968	0.033	0.356	350.32	8.55	3.154	0.715	0.399
2003	0.134	0.976	0.971	0.030	0.353	316.11	91.89	0.566	0.715	0.398
2004	0.249	0.980	0.973	0.028	0.362	297.53	232.11	0.508	0.709	0.411

Table E-3 Structure of *ALP, TFP*, *ACP* and B_{TFP}: the Total economy, the US, Russia, China, India, and Japan

Total	delta	beta	$beta_{TFP}$	B_{TFP}	ACP	TFP	TFP_{RESI}	beta*	$beta^*_{TFP}$	B^*_{TFP}
(0) U S	At the current situation			=TFP/k	At the current situation			At convergence		
1995								assuming that $beta^*=beta^*_{TFP}$		
1996	0.372	0.853	0.789	0.268	0.447	15.48	42.04	0.783	0.783	0.277
1997	0.390	0.857	0.789	0.268	0.452	16.01	46.83	0.787	0.787	0.271
1998	0.381	0.850	0.784	0.275	0.463	16.73	47.64	0.777	0.777	0.288
1999	0.374	0.843	0.780	0.283	0.474	17.60	49.15	0.767	0.767	0.304
2000	0.349	0.852	0.792	0.263	0.436	18.68	49.73	0.781	0.781	0.280
2001	0.362	0.856	0.793	0.261	0.439	19.00	53.36	0.784	0.784	0.275
2002	0.382	0.866	0.800	0.251	0.433	18.85	56.81	0.795	0.795	0.258
2003	0.377	0.868	0.803	0.245	0.427	19.47	58.09	0.797	0.797	0.255
2004	0.361	0.859	0.798	0.253	0.441	20.53	57.56	0.783	0.783	0.278
(8) Russia										
1995										
1996	0.471	0.749	0.459	1.179	1.520	9.23	18.88	0.424	0.424	1.359
1997	0.407	0.744	0.472	1.119	1.424	11.01	21.91	0.433	0.433	1.307
1998	0.417	0.733	0.530	0.885	1.206	11.93	25.88	0.475	0.475	1.105
1999	0.419	0.730	0.566	0.766	1.127	20.42	54.84	0.485	0.485	1.062
2000	0.392	0.777	0.640	0.562	0.923	27.38	76.50	0.537	0.537	0.861
2001	0.411	0.766	0.667	0.500	0.854	32.08	103.85	0.556	0.556	0.797
2002	0.418	0.759	0.652	0.535	0.832	42.85	172.08	0.550	0.550	0.819
2003	0.412	0.772	0.693	0.442	0.740	48.97	203.47	0.578	0.578	0.729
2004	0.393	0.780	0.727	0.375	0.680	56.14	221.27	0.600	0.600	0.667
(6) China										
1995										
1996	3.555	0.599	0.396	1.526	1.741	4.22	137.94	0.411	0.411	1.434
1997	4.105	0.598	0.443	1.256	1.494	4.44	665.08	0.451	0.451	1.217
1998	2.846	0.612	0.481	1.079	1.331	4.58	226.65	0.482	0.482	1.076
1999	1.518	0.646	0.508	0.969	1.209	4.76	42.63	0.504	0.504	0.985
2000	1.124	0.662	0.563	0.777	1.005	4.99	31.28	0.550	0.550	0.820
2001	1.160	0.663	0.627	0.595	0.816	5.12	45.33	0.602	0.602	0.660
2002	0.983	0.676	0.666	0.501	0.719	5.33	37.91	0.633	0.633	0.579
2003	0.917	0.686	0.712	0.404	0.617	5.62	41.08	0.670	0.670	0.493
2004	0.841	0.691	0.757	0.321	0.518	5.80	41.00	0.708	0.708	0.412
(2) India										
1995										
1996	6.030	0.540	0.353	1.830	2.182	10.52	335865	0.380	0.380	1.634
1997	2.416	0.567	0.378	1.644	1.970	11.19	958.98	0.406	0.406	1.464
1998	2.067	0.570	0.413	1.421	1.756	12.42	887.87	0.436	0.436	1.293
1999	1.065	0.624	0.453	1.205	1.533	13.38	136.61	0.471	0.471	1.125
2000	1.199	0.611	0.496	1.017	1.332	13.82	241.03	0.508	0.508	0.968
2001	1.019	0.641	0.556	0.800	1.085	14.35	200.27	0.564	0.564	0.772
2002	0.997	0.649	0.599	0.670	0.937	14.61	225.72	0.601	0.601	0.665
2003	1.002	0.638	0.643	0.555	0.828	15.24	282.18	0.631	0.631	0.584
2004	0.917	0.663	0.676	0.480	0.746	16.33	266.47	0.657	0.657	0.523
(6) Japan										
1995										
1996	(0.693)	0.420	0.911	0.097	0.324	1004.98	0.50	0.796	0.796	0.324
1997	(0.613)	0.422	0.916	0.092	0.307	1017.08	1.00	0.804	0.804	0.307
1998	(0.560)	0.419	0.923	0.083	0.276	1011.27	1.56	0.825	0.825	0.276
1999	(0.636)	0.420	0.922	0.084	0.271	1031.01	0.81	0.827	0.827	0.271
2000	(0.774)	0.424	0.921	0.086	0.270	1051.05	0.23	0.825	0.825	0.270
2001	(1.628)	0.461	0.927	0.079	0.267	970.08	0.00	0.831	0.831	0.267
2002	4.079	0.564	0.920	0.087	0.288	973.07	########	0.822	0.822	0.288
2003	(2.088)	0.487	0.927	0.079	0.287	882.96	0.00	0.825	0.825	0.287
2004	(2.454)	0.515	0.929	0.076	0.294	840.82	0.00	0.817	0.817	0.294

Table E-4 Comparisons of *beta* & *beta** and the years for convergence: US, Russia, China, India, and Japan

G/PRI	β_G	β_{PRI}	$\beta_{(G/PRI)}$	β^*_G	β^*_{PRI}	$\beta^*_{(G/PRI)}$	β_G/β^*_G	$\beta_{PRI}/\beta^*_{PRI}$	$1/\lambda_{PRI}$	$1/\lambda$
(0) U S	**c-cc**	Score of (S-I)/Y=$(S\text{-}I)_G$/Y+$(S\text{-}I)_{PRI}$/Y: **0**							years for converg.	
1995										
1996	0.324	0.905	**0.358**	0.374	0.838	**0.446**	0.867	1.080	45.3	46.9
1997	0.531	0.892	**0.596**	0.492	0.824	**0.597**	1.081	1.082	42.7	44.9
1998	0.519	0.885	**0.586**	0.432	0.819	**0.527**	1.202	1.080	39.0	41.8
1999	0.731	0.856	**0.854**	0.641	0.785	**0.816**	1.141	1.090	36.4	39.5
2000	0.715	0.864	**0.828**	0.575	0.806	**0.713**	1.243	1.071	36.2	39.7
2001	0.856	0.857	**0.999**	0.822	0.777	**1.057**	1.041	1.102	41.1	43.2
2002	1.249	0.855	**1.460**	1.209	0.734	**1.647**	1.033	1.166	46.2	49.4
2003	0.847	0.891	**0.951**	0.890	0.783	**1.138**	0.951	1.138	53.1	49.8
2004	0.447	0.902	**0.495**	0.597	0.807	**0.740**	0.748	1.118	46.3	44.6
(8) Russia	**ss-sss**	Score of (S-I)/Y=$(S\text{-}I)_G$/Y+$(S\text{-}I)_{PRI}$/Y: **8**								
1995										
1996	0.214	0.580	**0.368**	0.296	0.452	**0.653**	0.722	1.283	6.9	9.4
1997	0.379	0.552	**0.687**	0.437	0.417	**1.048**	0.868	1.324	23.9	11.7
1998	(0.232)	0.813	**(0.285)**	(0.131)	0.748	**(0.175)**	1.769	1.087	30.2	11.6
1999	(0.533)	0.998	**(0.534)**	(0.541)	0.998	**(0.543)**	0.985	1.001	17.4	14.6
2000	0.533	0.605	**0.881**	0.413	0.491	**0.841**	1.291	1.232	(2.7)	46.3
2001	0.697	0.538	**1.295**	0.505	0.447	**1.129**	1.379	1.203	(7.9)	29.2
2002	0.704	0.523	**1.347**	0.474	0.475	**0.998**	1.485	1.100	(6.1)	24.0
2003	0.728	0.647	**1.125**	0.449	0.595	**0.754**	1.622	1.087	25.4	24.2
2004	0.649	0.744	**0.872**	0.253	0.687	**0.368**	2.566	1.083	28.5	25.7
(6) China	**ss-sss**	Score of (S-I)/Y=$(S\text{-}I)_G$/Y+$(S\text{-}I)_{PRI}$/Y: **6**								
1995										
1996	0.703	0.362	**1.939**	0.618	0.344	**1.797**	1.138	1.054	3.8	3.6
1997	0.770	0.408	**1.884**	0.686	0.380	**1.805**	1.121	1.074	4.0	3.0
1998	0.805	0.442	**1.821**	0.721	0.406	**1.778**	1.116	1.090	3.8	1.6
1999	0.829	0.459	**1.804**	0.761	0.419	**1.817**	1.090	1.098	3.8	(0.5)
2000	0.837	0.530	**1.580**	0.773	0.477	**1.621**	1.083	1.111	2.3	306.6
2001	0.828	0.619	**1.337**	0.789	0.545	**1.447**	1.049	1.136	764.2	14.6
2002	0.830	0.668	**1.242**	0.726	0.598	**1.214**	1.144	1.118	15.6	12.5
2003	0.851	0.724	**1.176**	0.698	0.653	**1.069**	1.219	1.108	11.6	11.2
2004	0.894	0.766	**1.168**	0.753	0.692	**1.089**	1.187	1.107	10.6	10.9
(2) India	**s**	Score of (S-I)/Y=$(S\text{-}I)_G$/Y+$(S\text{-}I)_{PRI}$/Y: **2**								
1995										
1996	(2.327)	0.466	**(4.988)**	(1.812)	0.399	**(4.540)**	1.284	1.169	4.9	6.2
1997	12.526	0.470	**26.638**	10.996	0.392	**28.039**	1.139	1.199	7.0	6.2
1998	7.552	0.524	**14.426**	6.853	0.428	**16.001**	1.102	1.222	6.2	5.4
1999	3.459	0.585	**5.912**	3.241	0.478	**6.781**	1.067	1.224	2.8	3.5
2000	(0.335)	0.658	**(0.510)**	(0.228)	0.551	**(0.414)**	1.470	1.193	(16.5)	(1.7)
2001	0.105	0.716	**0.147**	0.163	0.606	**0.269**	0.645	1.181	71.4	(213.6)
2002	(0.138)	0.756	**(0.182)**	(0.064)	0.648	**(0.098)**	2.160	1.167	33.5	42.2
2003	0.301	0.796	**0.378**	0.340	0.683	**0.498**	0.885	1.166	26.7	28.8
2004	(5.842)	0.820	**(7.120)**	(5.515)	0.710	**(7.764)**	1.059	1.155	24.7	25.5
(6) Japan	**c-cc**	Score of (but extreme) (S-I)/Y=$(S\text{-}I)_G$/Y+$(S\text{-}I)_{PRI}$/Y: **6 but extreme**								
1995										
1996	0.807	0.938	**0.861**	0.870	0.763	**1.140**	0.928	1.229	53.3	42.0
1997	0.773	0.948	**0.816**	0.818	0.803	**1.019**	0.945	1.180	57.1	45.5
1998	0.654	0.970	**0.675**	0.941	0.752	**1.252**	0.695	1.290	84.5	59.8
1999	0.961	0.950	**1.011**	0.993	0.716	**1.387**	0.968	1.328	66.0	66.0
2000	1.155	0.952	**1.214**	1.031	0.730	**1.411**	1.121	1.304	63.2	67.8
2001	7.359	0.960	**7.664**	2.105	0.705	**2.985**	3.496	1.362	46.4	80.9
2002	42.357	0.967	**43.810**	8.210	0.712	**11.539**	5.159	1.359	69.5	104.1
2003	*(2.764)*	0.976	**(2.831)**	0.331	0.769	**0.431**	(8.341)	1.269	91.0	113.4
2004	(0.612)	0.980	**(0.625)**	0.706	0.794	**0.889**	(0.868)	1.234	92.0	108.4