Chapter 3

Structural Improvement in Labor Productivity: Individual Life-Time *versus* Systems

Foreword to Chapter 3

There are two sorts of labor productivity, individuals and systems. Individual productivity is shown by convex parabola to the up-right while system productivity is shown by concave parabola to the up-right. This chapter advocates that individual productivity for life-time is exceptionally has convex parabola and that system productivity, commonly to countries and enterprises, must be concave parabola. Why does textbook parabola express convex parabola in the market principles and the profit maximization principle? One reason is that convex parabola remains illustrative and does not necessarily have equation behind. When parabolas are formulated respectively by corresponding equation, the parabola is accurately measured by equation, as concretely proved in this chapter. This chapter solely clarifies and sums up the character of life-time productivity based on individual life as a human organ. Life-time productivity actually and endogenously connects macro and micro economies with the wage rate and rate of returns and, reinforces consumption to increase steadily. This is because life-time productivity is wholly consistent with productivity systems.

This chapter develops labor productivity commonly at the macro and micro levels. First, as a base of productivity improvement, the author presents life-time by person productivity structure. Second, the author presents how to improve labor productivity as a system, by country and by enterprise/company. Both data equally accept the market principle under complete competition. Additionally, enterprises follow the profits-maximum principle fairly. These conditions are satisfied in the *EES* (i.e., *Earth Endogenous System,* the 1st Ed. 2013; 2nd Ed., 2014) and measured endogenously, free from assumption. However, the market principle and the profits-maximum principle just satisfy sufficient conditions. The author proposes a necessary condition geometrically. What is the necessary condition? The necessary condition is required to strengthen vertical market principles by goods and services lying in demand and supply plane. The necessary condition must satisfy the relationship between amounts and corresponding ratios each based on amounts as the product of the price and quantity. The relationship between amounts and corresponding ratios is satisfied by each calculating and confirming the two weights, W_1 and W_2, between average and incremental. In the case of individual life-time productivity, W_{TIME1} and W_{TIME2} are geometrically calculated and confirmed. What are the effects of the necessary conditions of life-time productivity? An answer expresses a clue of this chapter. Macro inequality is precisely measured by the policy-base for productivity ratio and, is actually stopped by leaders' encouraging decision. Leaders are able to execute the policy-base for productivity ratio, realizing the increase in consumption. The current economic policies are almost *partial* due to vertical market principles and as a result, consumption shrinks adversely.

The base is national disposable net income. Labor productivity is luckily most fitted for solving structural relationship between productivity, wages, and consumption.

1. Life-time productivity analysis

First, life-time productivity analysis is designed using a quadratic equation, similarly to macro and micro productivity analysis using the quadratic equation parabola commonly applicable to economies and enterprises. Nevertheless, there exists a definite difference between life-time productivity and macro and micro productivity analysis. Life-time productivity per person analysis requires convex upwards parabola while macro and micro productivity analysis requires concave downwards parabola. This is because each analysis has its own role.

For working life-time, individuals increase productivity from youth to the prime of life (after schooling to 50-60 years old), with experiences, and then, productivity gradually or rapidly falls depending on different health cares. Macro and micro productivity analysis, on the other hand, is destined to improve productivity as a social system/organization, by country and by company. Particularly, enterprises aim at the profit maximization principle and international competition.

The author perceives that human/individual and government/company are vividly alive with organic spirit. Government, local and central, and companies and non-profit organization control dynamic balances by year and over years and, face the market principle, which shows vertically prices by goods and by services. Any system or organization must reinforce vertical karma by spinning the woof in order to obtain sustainable competiveness.

Further, in the actual world, relationships between government, private organizations, and individuals are closely related. Individuals represent labor and produce consumption and government and companies execute net investment. In this respect, life-time productivity analysis is inherently connected with consumption and economies. Fortunately, the numerator of productivity is national disposable net income or value-added and the denominator is labor. Both the numerator and denominator are tied up with labor and wages. Recall the average and incremental equation, as proved in a chapter. The two weights lying between average and incremental, $W_{T1} = L_0/L_1$ and $W_{T2} = (L_1 - L_0)/L_1$, present key core of economic macro policies and population policy; by person, enterprise, and government.

Therefore, this chapter not only serves individuals and next generations but also contributes to economic development by country. This chapter, at the same time, solves the mechanics of wage-up and sets people at spiritual stability and natural happiness.

Concretely, let us explain the structure of life-time productivity using parabola movements in **Fig. 1;** the top, middle, and bottom sub-graphs.

The top sub-graph compares relation between average and incremental of labor productivity on the *y* axis, taking time on the *x* axis. In the corresponding graphs in the literature, the *y* axis illustratively shows the marginal/incremental labor productivity, setting life-time change over years on the *x* axis.

To our understanding, the incremental curve shown in the illustrative graph remains imaginary, not actually estimated or measured in a model. A reason is this: Relation between average and incremental of individual productivity must start with average and result in incremental based on related amounts. Accordingly, it is wrong for us to count the incremental or the marginal ratio if $\Delta y = y_t - y_{t-1}$ is directly calculated from the corresponding ratio, $y=Y/L$.

The author has investigated related researches and finds that the two weights, e.g., $W_{T1} = L_0/L_1$ and $W_{T2} = (L_1 - L_0)/L_1$, are the first appearance in the literature. Thus, the relationship between the average ratio and the incremental/marginal ratio is numerically confirmed by applying the two weights (see Table 1 for calculation and **Fig. 2** for implication).

The middle sub-graph adds two wage rates, maximum and minimum, to the top graph. The maximum wage rate, $wage\ rate_{MAX}$, shows wages per person shares the improvement in productivity by using $1 - \alpha$. For example, increase in national disposable net income or net value added is factor-shared by 80 % to labor and 20 % to capital. The minimum wage rate, $wage\ rate_{MIN}$, shows wages per person divided by national disposable net income or net value added and, is constant. The relative share of capital or labor is constant to national disposable net income or net value added, by year and over years.

The bottom sub-graph precisely measures the balance between maximum and minimum wage rates, with compares maximum and minimum of the wage rates with each incremental wage rates. Only if the relative share of capital or labor, α or $1-\alpha$, is measured, Figure 1 is presented, after measuring the initial capital is purely endogenously at the initial time.

As a result, the target of how to raise wage rate is actually solved and consumption increases sustainably. The strategy for leaders and policy-makers by country and by company is to execute the wage-share plan between the wage rate between MIN and MAX. For example, a country or a company decides the wage share 40 % in the increase in productivity, where a half of MAX 80 % is activated to net investment. Developed countries and companies naturally have to raise the wage share.

The current problem among economist, researchers, policy-makers, and leaders is an actual fact that the NDI connected with purely endogenous capital stock and a constant capital-output ratio and accordingly, the relative share of capital or labor are not estimated over time consistently. This is not the responsibility of related people but natural results of vertical market principles. The author strengthens this actual fact by uniting actual statistics and endogenous data, in the two-dimension plane and scientifically.

2. Improvement in labor productivity by economy and by enterprise

Second, the author presents how to improve labor productivity as a system, by country and by enterprise/company. For proofs, see **Table 2** for the same calculation as Table 1. This section does not repeat the same explanations. Human and individual die and system and organization is what human produces but sustainable if policies are fitted for and leaders and decision-makers bravely activate what is the truth in the actual world and using statistics data. This is because statistics data are always within a certain range of endogenous data, as proved in the *EES*.

Productivity improves by its numerator or denominator and/or both. The two weights is only related to the denominator. Population is a base for productivity. The target of politicians today is the rate of unemployment.

This target is indispensably connected with population and life-time employment system by person. The target is natural since human created organizations and systems. All of these phenomena are traced back to human and human decision-making. Human decision-making differs from Nature itself. Despite, why scientifically, endogenously, geometrically, and simultaneously? Why, following 'purely endogenously'? Why is it so, geometrically, limiting to the two-dimensions?

This is because causes are simultaneously equal to results. It implies beyond space and time in the two-dimensions. The two-dimensions are united with the universe. Static and dynamics are expressed at the same time everywhere. It implies that 'scientific' is united with other manifold/multiplier dimensions, as already proved by physicians and element-chemists, macro and micro. It implies that organizations must be close to the Nature or God. The market principle is next to God but not the same as God, since the principle was made by human so that it is vertical and not wholly. Wholly must be reinforced by such system as the *EES*.

Now the *EES* declares that technology is measured by the rate of technological progress (FLOW), $g^*_{A(FLOW)}$, and the growth rate of technology (STOCK), $g^*_{A=TFP(STOCK)}$ (see B. 'Equations at the transitional path using recursive programming: towards endogenous turnpike,' in "Notes" of the *EES*, before 'Preface'[1]). Identically, the growth rate of productivity, g^*_y, equals the rate of technology divided by the relative share of labor, $1-\alpha$. Accordingly, the growth rate of national disposable net income or net value-added, g^*_Y, equals $g^*_Y = g^*_y(1+n)+n$. This fact is proved theoretically and empirically by recursive programming using KEWT database. Here again, the relative share of capital or labor, α or $1-\alpha$, is a key for measuring the relation between technological progress, income=output per person (productivity), and income= output.

The relation between KEWT database by year and recursive programming (RP) by corresponding year is consistent. Three differences are: 1) α or $1-\alpha$ changes in KEWT by year and is fixed in RP; 2) $i = I/Y$ changes in KEWT by year and is fixed in RP; and 3) the capital-output ratio, $\Omega = \Omega^* = \Omega_0$, is fixed over years in KEWT and changes in RP by year. As a result, the rate of return, $r = r^* = r_0$, changes adversely; i.e., $r = r^* = r_0$ changes in KEWT by year and over years while $r = r^* = r_0$ changes in KEWT by year and over years adversely. In short, $\alpha = \Omega \cdot r$ must be a key for solving the *EES*. Therefore, the author calls 'a constant/fixed capital-output ratio.'

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[1] $g_{A(FLOW)}(t^*) = g_{TFP(STOCK)}(t^*)$, where A=total factor productivity (TFP) as STOCK. $g_{A(FLOW)}(t^*) = i(t^*) \cdot (1-\beta(t^*))$. $A_{TFP(STOCK)}(t^*) = A_0(1+g_{A(FLOW)}(t^*))^{1/\lambda^*}$. The equality of the two equations after the above statements, here abbreviated.

3. Conclusions

The warp is given by the market principles and the author needs the woof to complete an organic cloth to serve for social and economic society. This chapter focuses on individual life-time productivity for human organ, by applying the two weights between average and incremental to labor productivity and satisfying both sufficient and necessary conditions. Figures 1 and 2 are a bright highlight of this chapter. Data, statistics and endogenous, are closely interrelated and estimated and measured so that sufficient and necessary conditions are satisfied naturally and harmoniously. As a result, the problems of unemployment and macro-inequality are actually solved by the decision-making of leaders and policy-makers. Three sister chapters geometrically proved each aspect.

In short, productivity structures of macro organization and micro individual are united wholly and inevitably. One united productivity structure has first priority of consumption under least net investment. One united productivity structure, definitely by leadership, guarantees full-employment by year and wage rate-up sustainably.

The author developed three aspects as three sister chapters. Three sister chapters are essentially united. Yet, for simplicity, each chapter deepens its own aspect more boldly and freely. A common target is how to cyclically increase the wage rate and consumption, in harmony with macro and micro, and households and enterprises, to solve macro-inequality and unemployment by country and over years.

References

The author's united-measure system (the U-M system) here, from the viewpoint of economics and econometrics, connects the macro-level by country with the micro-level by household and by enterprise. The U-M system, from the viewpoint of management, connects managers with employees, although management is closely related to economics. The author is inclined to write up Ueda's interactive discussions with Peter F. Drucker (1909-2005). It is a lucky fact that readers are able to confirm conversations between Drucker and his student, Ueda. These conversations are historically invaluable to know Drucker's life-time performances. Drucker fortunately had a sincere student, Ueda.

Incidentally, this chapter geometrically proved Drucker's lifetime management fact-findings, by applying endogenous equations and related hyperbola graphs to the essence of Drucker's learning by doing. Handbook written by Atsuo Ueda (2009, the 100th birthday anniversary; Tokyo: Diamond Co., 256p.) is one of the author's invisible treasures and constitutions. Above all, the author lists the following three books authored by Drucker; commonly to 1) U-M system, 2) Life-time productivity, and 3) From the BEP to net sales:

Drucker, Peter, F. (1939). *The End of Economic Man: The Origin of Totalitarianism*. New York: The John Day Co. 271p.

Drucker, Peter, F. (1999). *Management Challenges for the 21st Century*. New York: Harper Collins Publishers Inc. 207p.

Drucker, Peter, F. (2002). *Managing in the Next Society*. New York: St. Martin's Press. 321p.

To the author's understanding, the following bibliographical references are original or, the first appearances (for historical researches, helped by librarians in England and the US, see 'Acknowledgements in Appendix' of "Royal Roads to Utopia Economy" in the previous chapter 1.

Kamiryo, Hideyuki. (1965). *Productivity Analysis*. Tokyo: Japan Management Association (Awarded by Year Prize; Dr. Eiichi Furukawa). 350p (In Japanese).

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Science[2]).

Kamiryo, Hideyuki. (1994). International Hon. PhD. in Environmental Science, May 1994, International Earth Environment University, the US, granted by Linus C. Pauling and Hisatoki Komaki with special courtesy.

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Kneoppel, C. E. (1933). *Profit Engineering: Applied Economics in Making Business Profitable*. New York: McGraw-Hill. xvi, 326p.

Kneoppel, C. E. and E. G. Seybold. (1937). *Managing for Profit: Working Method for Profit Planning*. New York and London: McGraw-Hill. xvi, 343p.

Vatter, W. J. (1947; 1969). *The Fund Theory of Accounting and Its Implications for Financial Reports.* Chicago: The University of Chicago Press. 141p.

2 Just for records, interestingly to readers: Happily, the author agrees with the librarian reply at the current Lincoln University, Canterbury, Christchurch, N.Z. The author wrote his PhD thesis and presented to supervisors, one of whom moved to the Univ. of Auckland, where the author could visit Dept. of Economics, Univ. of Cambridge in 1996 and stayed at Kings College, whose teacher is Harcourt, Geoffrey, now in Sydney vividly alive. Geoffrey celebrated the author's 1st Ed., 2013, at that time, although he was once against the author's idea to integrate Keynesian methods, England and Cambridge, MA.

In Jan 2012, a librarian, Masuda, at HSU Library said, 'your degree (Master of Science in Agricultural Economics) is now PhD, strange to say.' A librarian's reply by email was: "We guarded your degree, with no risk from outsiders." The author, weeping repeatedly, read one of supervisor's summary available in URL. MacArthur wrote this summary just before turning to Heaven, end of 2011. I have not yet received PhD Certificate. The author confesses that the thesis is not complete; empirically applying R. G. D. Allen' (1906-1983) "Index Numbers" to dozen agricultural products by product in Japan, the US, Canada, Australia, and New Zealand. One reason comes from incomplete statistics data for many years after 1945. Purely endogenously and geometrically, cyclical economy and *business cycles* are solved as proved finally in this book.

Conclusively, we live together helped by something, which we know later why and how. This is human, isn't it?

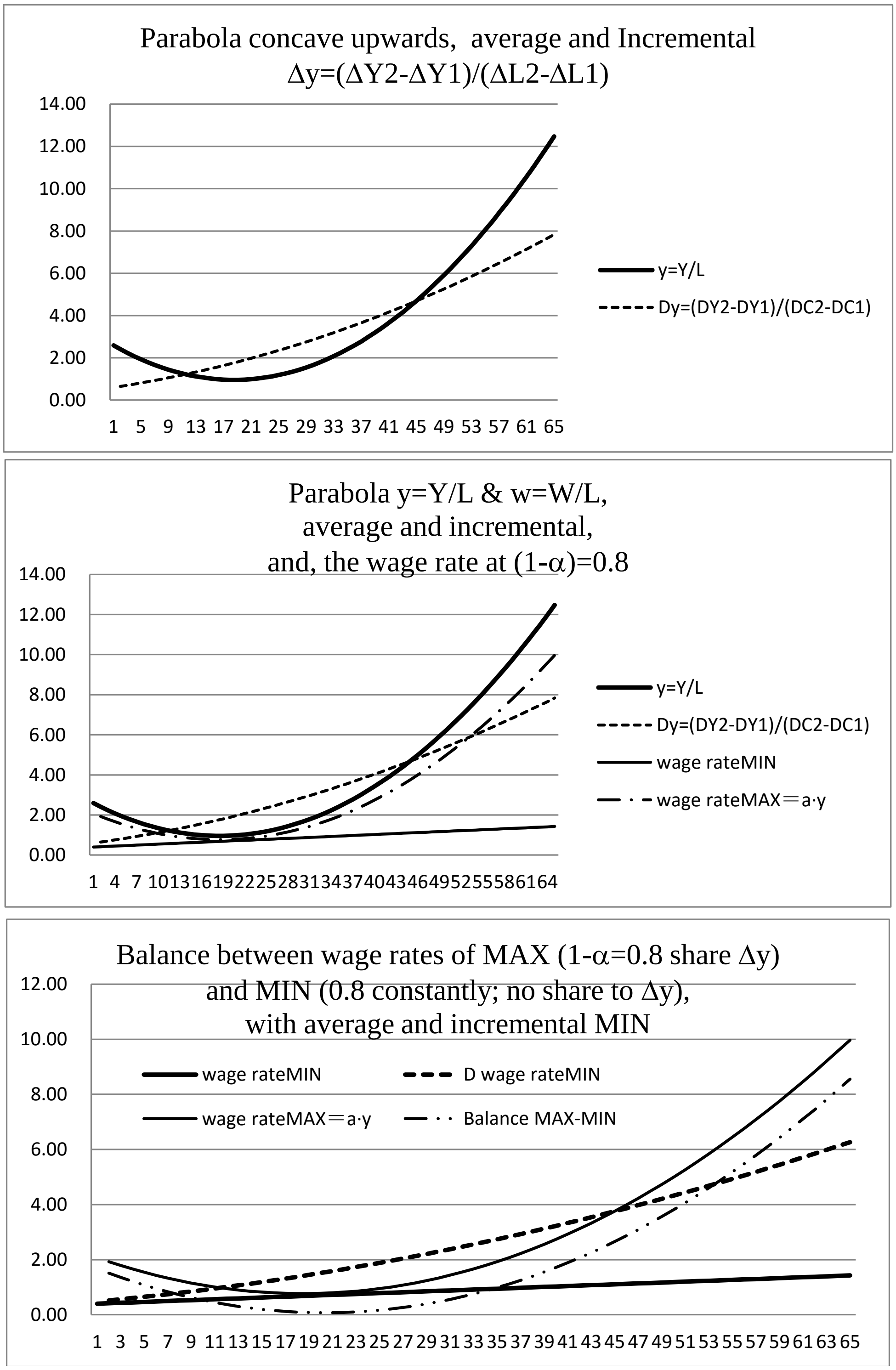
Chapter 3, *HEU*

Table 1 How to raise the wage rate by person in a life-time employment system?

CONVEX	$\Delta y=(\Delta Y_2-\Delta Y_1)/(\Delta C_2-\Delta C_1)$				1-alpha	wage rateMIN		wage rateMAX$=\alpha$ y		$W_{T1}=L_0/L_1$	$W_{T1}=(L_1-L_0)/L_1$		CONVEX
	Δ wage rateMIN				0.8			Balance MAX-MIN					
Y	L	y=Y/L	**y=Y/L**	Δy=(ΔY2-ΔY	W=(1-α)Y	wage rateM	Δ wage rate	wage rateM	Balance MA	W_{T1}	W_{T2}	y=Y/L	$W_{T1}+W_{T2}$
0.2	0.4000	0.5	2.5873		0.1600	0.4000							
0.24	0.4615	**0.52**	2.4064	0.6500	0.1920	0.4160	0.5200	1.9251	1.5091	0.8667	0.13333	**0.52**	1.0000
0.28	0.5185	0.54	2.2363	0.7020	0.2240	0.4320	0.5616	1.7890	1.3570	0.8901	0.10989	0.54	1.0000
0.32	0.5714	0.56	2.0767	0.7560	0.2560	0.4480	0.6048	1.6614	1.2134	0.9074	0.09259	0.56	1.0000
0.36	0.6207	0.58	1.9278	0.8120	0.2880	0.4640	0.6496	1.5423	1.0783	0.9206	0.07937	0.58	1.0000
0.4	0.6667	0.6	1.7896	0.8700	0.3200	0.4800	0.6960	1.4316	0.9516	0.9310	0.06897	0.60	1.0000
0.44	0.7097	0.62	1.6619	0.9300	0.3520	0.4960	0.7440	1.3296	0.8336	0.9394	0.06061	0.62	1.0000
0.48	0.7500	0.64	1.5450	0.9920	0.3840	0.5120	0.7936	1.2360	0.7240	0.9462	0.05376	0.64	1.0000
0.52	0.7879	0.66	1.4386	1.0560	0.4160	0.5280	0.8448	1.1509	0.6229	0.9519	0.04808	0.66	1.0000
0.56	0.8235	0.68	1.3429	1.1220	0.4480	0.5440	0.8976	1.0744	0.5304	0.9567	0.04329	0.68	1.0000
0.6	0.8571	0.7	1.2579	1.1900	0.4800	0.5600	0.9520	1.0063	0.4463	0.9608	0.03922	0.70	1.0000
0.64	0.8889	0.72	1.1835	1.2600	0.5120	0.5760	1.0080	0.9468	0.3708	0.9643	0.03571	0.72	1.0000
0.68	0.9189	0.74	1.1197	1.3320	0.5440	0.5920	1.0656	0.8958	0.3038	0.9673	0.03268	0.74	1.0000
0.72	0.9474	0.76	1.0666	1.4060	0.5760	0.6080	1.1248	0.8533	0.2453	0.9700	0.03003	0.76	1.0000
0.76	0.9744	0.78	1.0241	1.4820	0.6080	0.6240	1.1856	0.8193	0.1953	0.9723	0.02770	0.78	1.0000
0.8	1.0000	0.8	0.9922	1.5600	0.6400	0.6400	1.2480	0.7938	0.1538	0.9744	0.02564	0.80	1.0000
0.84	1.0244	0.82	0.9710	1.6400	0.6720	0.6560	1.3120	0.7768	0.1208	0.9762	0.02381	0.82	1.0000
0.88	1.0476	0.84	0.9605	1.7220	0.7040	0.6720	1.3776	0.7684	0.0964	0.9778	0.02217	0.84	1.0000
0.92	1.0698	0.86	0.9605	1.8060	0.7360	0.6880	1.4448	0.7684	0.0804	0.9793	0.02070	0.86	1.0000
0.96	1.0909	0.88	0.9713	1.8920	0.7680	0.7040	1.5136	0.7770	0.0730	0.9806	0.01938	0.88	1.0000
1	1.1111	0.9	0.9926	1.9800	0.8000	0.7200	1.5840	0.7941	0.0741	0.9818	0.01818	0.90	1.0000
1.04	1.1304	0.92	1.0246	2.0700	0.8320	0.7360	1.6560	0.8197	0.0837	0.9829	0.01709	0.92	1.0000
1.08	1.1489	0.94	1.0672	2.1620	0.8640	0.7520	1.7296	0.8538	0.1018	0.9839	0.01610	0.94	1.0000
1.12	1.1667	0.96	1.1205	2.2560	0.8960	0.7680	1.8048	0.8964	0.1284	0.9848	0.01520	0.96	1.0000
1.16	1.1837	0.98	1.1844	2.3520	0.9280	0.7840	1.8816	0.9476	0.1636	0.9856	0.01437	0.98	1.0000
1.2	1.2000	1	1.2590	2.4500	0.9600	0.8000	1.9600	1.0072	0.2072	0.9864	0.01361	1.00	1.0000
1.24	1.2157	1.02	1.3442	2.5500	0.9920	0.8160	2.0400	1.0754	0.2594	0.9871	0.01290	1.02	1.0000
1.28	1.2308	1.04	1.4400	2.6520	1.0240	0.8320	2.1216	1.1520	0.3200	0.9877	0.01225	1.04	1.0000
1.32	1.2453	1.06	1.5465	2.7560	1.0560	0.8480	2.2048	1.2372	0.3892	0.9883	0.01166	1.06	1.0000
1.36	1.2593	1.08	1.6636	2.8620	1.0880	0.8640	2.2896	1.3309	0.4669	0.9889	0.01110	1.08	1.0000
1.4	1.2727	1.1	1.7914	2.9700	1.1200	0.8800	2.3760	1.4331	0.5531	0.9894	0.01058	1.10	1.0000
1.44	1.2857	1.12	1.9298	3.0800	1.1520	0.8960	2.4640	1.5439	0.6479	0.9899	0.01010	1.12	1.0000
1.48	1.2982	1.14	2.0789	3.1920	1.1840	0.9120	2.5536	1.6631	0.7511	0.9903	0.00965	1.14	1.0000
1.52	1.3103	1.16	2.2385	3.3060	1.2160	0.9280	2.6448	1.7908	0.8628	0.9908	0.00923	1.16	1.0000
1.56	1.3220	1.18	2.4089	3.4220	1.2480	0.9440	2.7376	1.9271	0.9831	0.9912	0.00884	1.18	1.0000
1.6	1.3333	1.2	2.5898	3.5400	1.2800	0.9600	2.8320	2.0719	1.1119	0.9915	0.00847	1.20	1.0000
1.64	1.3443	1.22	2.7814	3.6600	1.3120	0.9760	2.9280	2.2252	1.2492	0.9919	0.00813	1.22	1.0000
1.68	1.3548	1.24	2.9837	3.7820	1.3440	0.9920	3.0256	2.3870	1.3950	0.9922	0.00781	1.24	1.0000
1.72	1.3651	1.26	3.1966	3.9060	1.3760	1.0080	3.1248	2.5573	1.5493	0.9925	0.00750	1.26	1.0000
1.76	1.3750	1.28	3.4201	4.0320	1.4080	1.0240	3.2256	2.7361	1.7121	0.9928	0.00722	1.28	1.0000
1.8	1.3846	1.3	3.6543	4.1600	1.4400	1.0400	3.3280	2.9234	1.8834	0.9931	0.00694	1.30	1.0000
1.84	1.3939	1.32	3.8991	4.2900	1.4720	1.0560	3.4320	3.1193	2.0633	0.9933	0.00669	1.32	1.0000
1.88	1.4030	1.34	4.1546	4.4220	1.5040	1.0720	3.5376	3.3236	2.2516	0.9936	0.00645	1.34	1.0000
1.92	1.4118	1.36	4.4206	4.5560	1.5360	1.0880	3.6448	3.5365	2.4485	0.9938	0.00622	1.36	1.0000
1.96	1.4203	1.38	4.6974	4.6920	1.5680	1.1040	3.7536	3.7579	2.6539	0.9940	0.00600	1.38	1.0000
2	1.4286	1.4	4.9848	4.8300	1.6000	1.1200	3.8640	3.9878	2.8678	0.9942	0.00580	1.40	1.0000
2.04	1.4366	1.42	5.2828	4.9700	1.6320	1.1360	3.9760	4.2262	3.0902	0.9944	0.00560	1.42	1.0000
2.08	1.4444	1.44	5.5914	5.1120	1.6640	1.1520	4.0896	4.4731	3.3211	0.9946	0.00542	1.44	1.0000
2.12	1.4521	1.46	5.9107	5.2560	1.6960	1.1680	4.2048	4.7286	3.5606	0.9948	0.00524	1.46	1.0000
2.16	1.4595	1.48	6.2407	5.4020	1.7280	1.1840	4.3216	4.9925	3.8085	0.9949	0.00507	1.48	1.0000
2.2	1.4667	1.5	6.5813	5.5500	1.7600	1.2000	4.4400	5.2650	4.0650	0.9951	0.00491	1.50	1.0000
2.24	1.4737	1.52	6.9325	5.7000	1.7920	1.2160	4.5600	5.5460	4.3300	0.9952	0.00476	1.52	1.0000
2.28	1.4805	1.54	7.2943	5.8520	1.8240	1.2320	4.6816	5.8355	4.6035	0.9954	0.00462	1.54	1.0000
2.32	1.4872	1.56	7.6668	6.0060	1.8560	1.2480	4.8048	6.1335	4.8855	0.9955	0.00448	1.56	1.0000
2.36	1.4937	1.58	8.0500	6.1620	1.8880	1.2640	4.9296	6.4400	5.1760	0.9957	0.00435	1.58	1.0000
2.4	1.5000	1.6	8.4438	6.3200	1.9200	1.2800	5.0560	6.7550	5.4750	0.9958	0.00422	1.60	1.0000
2.44	1.5062	1.62	8.8482	6.4800	1.9520	1.2960	5.1840	7.0785	5.7825	0.9959	0.00410	1.62	1.0000
2.48	1.5122	1.64	9.2632	6.6420	1.9840	1.3120	5.3136	7.4106	6.0986	0.9960	0.00398	1.64	1.0000
2.52	1.5181	1.66	9.6890	6.8060	2.0160	1.3280	5.4448	7.7512	6.4232	0.9961	0.00387	1.66	1.0000
2.56	1.5238	1.68	10.1253	6.9720	2.0480	1.3440	5.5776	8.1002	6.7562	0.9962	0.00377	1.68	1.0000
2.6	1.5294	1.7	10.5723	7.1400	2.0800	1.3600	5.7120	8.4578	7.0978	0.9963	0.00366	1.70	1.0000
2.64	1.5349	1.72	11.0299	7.3100	2.1120	1.3760	5.8480	8.8239	7.4479	0.9964	0.00357	1.72	1.0000
2.68	1.5402	1.74	11.4982	7.4820	2.1440	1.3920	5.9856	9.1986	7.8066	0.9965	0.00347	1.74	1.0000
2.72	1.5455	1.76	11.9771	7.6560	2.1760	1.4080	6.1248	9.5817	8.1737	0.9966	0.00338	1.76	1.0000
2.76	1.5506	1.78	12.4666	7.8320	2.2080	1.4240	6.2656	9.9733	8.5493	0.9967	0.00329	1.78	1.0000
Y	L	y=Y/L	**y=Y/L**	Δy=(ΔY2-ΔY	W=(1-α)Y	wage rateM	Δ wage rate	wage rateM	Balance MA	W_{T1}	W_{T2}	y=Y/L	$W_{T1}+W_{T2}$

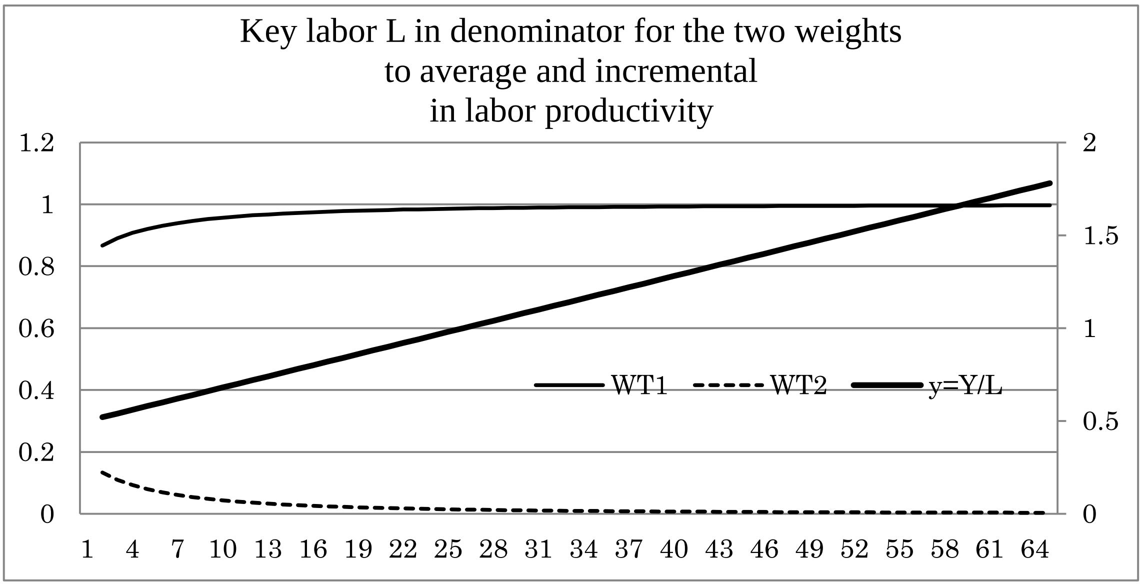
Table 2 How to improve productivity by country and by company in a life-time employment system?

CONCAVE	$\Delta y=(\Delta Y_2-\Delta Y_1)/(\Delta C_2-\Delta C_1)$					1-alpha		wage rateMAX$=\alpha$ y		$W_{T1}=L_0/L_1$	$W_{T1}=(L_1-L_0)/L_1$		CONCAVE
		Δ wage rateMIN				0.8		Balance MAX-MIN					
Y	L	y=Y/L	**y=Y/L**	$\Delta y=(\Delta Y_2-\Delta$	$W=(1-\alpha)Y$	wage rateM	Δ wage rat	wage rateM	Balance M	W_{T1}	W_{T2}	y=Y/L	$W_{T1}+W_{T2}$
0.2	0.4000	0.5	2.5873		0.1600	0.4000							
0.24	0.4615	**0.52**	2.4064	0.6500	0.1920	0.4160	0.5200	1.9251	1.5091	0.8667	0.13333	**0.52**	1.0000
0.28	0.5185	0.54	2.2363	0.7020	0.2240	0.4320	0.5616	1.7890	1.3570	0.8901	0.10989	0.54	1.0000
0.32	0.5714	0.56	2.0767	0.7560	0.2560	0.4480	0.6048	1.6614	1.2134	0.9074	0.09259	0.56	1.0000
0.36	0.6207	0.58	1.9278	0.8120	0.2880	0.4640	0.6496	1.5423	1.0783	0.9206	0.07937	0.58	1.0000
0.4	0.6667	0.6	1.7896	0.8700	0.3200	0.4800	0.6960	1.4316	0.9516	0.9310	0.06897	0.60	1.0000
0.44	0.7097	0.62	1.6619	0.9300	0.3520	0.4960	0.7440	1.3296	0.8336	0.9394	0.06061	0.62	1.0000
0.48	0.7500	0.64	1.5450	0.9920	0.3840	0.5120	0.7936	1.2360	0.7240	0.9462	0.05376	0.64	1.0000
0.52	0.7879	0.66	1.4386	1.0560	0.4160	0.5280	0.8448	1.1509	0.6229	0.9519	0.04808	0.66	1.0000
0.56	0.8235	0.68	1.3429	1.1220	0.4480	0.5440	0.8976	1.0744	0.5304	0.9567	0.04329	0.68	1.0000
0.6	0.8571	0.7	1.2579	1.1900	0.4800	0.5600	0.9520	1.0063	0.4463	0.9608	0.03922	0.70	1.0000
0.64	0.8889	0.72	1.1835	1.2600	0.5120	0.5760	1.0080	0.9468	0.3708	0.9643	0.03571	0.72	1.0000
0.68	0.9189	0.74	1.1197	1.3320	0.5440	0.5920	1.0656	0.8958	0.3038	0.9673	0.03268	0.74	1.0000
0.72	0.9474	0.76	1.0666	1.4060	0.5760	0.6080	1.1248	0.8533	0.2453	0.9700	0.03003	0.76	1.0000
0.76	0.9744	0.78	1.0241	1.4820	0.6080	0.6240	1.1856	0.8193	0.1953	0.9723	0.02770	0.78	1.0000
0.8	1.0000	0.8	0.9922	1.5600	0.6400	0.6400	1.2480	0.7938	0.1538	0.9744	0.02564	0.80	1.0000
0.84	1.0244	0.82	0.9710	1.6400	0.6720	0.6560	1.3120	0.7768	0.1208	0.9762	0.02381	0.82	1.0000
0.88	1.0476	0.84	0.9605	1.7220	0.7040	0.6720	1.3776	0.7684	0.0964	0.9778	0.02217	0.84	1.0000
0.92	1.0698	0.86	0.9605	1.8060	0.7360	0.6880	1.4448	0.7684	0.0804	0.9793	0.02070	0.86	1.0000
0.96	1.0909	0.88	0.9713	1.8920	0.7680	0.7040	1.5136	0.7770	0.0730	0.9806	0.01938	0.88	1.0000
1	1.1111	0.9	0.9926	1.9800	0.8000	0.7200	1.5840	0.7941	0.0741	0.9818	0.01818	0.90	1.0000
1.04	1.1304	0.92	1.0246	2.0700	0.8320	0.7360	1.6560	0.8197	0.0837	0.9829	0.01709	0.92	1.0000
1.08	1.1489	0.94	1.0672	2.1620	0.8640	0.7520	1.7296	0.8538	0.1018	0.9839	0.01610	0.94	1.0000
1.12	1.1667	0.96	1.1205	2.2560	0.8960	0.7680	1.8048	0.8964	0.1284	0.9848	0.01520	0.96	1.0000
1.16	1.1837	0.98	1.1844	2.3520	0.9280	0.7840	1.8816	0.9476	0.1636	0.9856	0.01437	0.98	1.0000
1.2	1.2000	1	1.2590	2.4500	0.9600	0.8000	1.9600	1.0072	0.2072	0.9864	0.01361	1.00	1.0000
1.24	1.2157	1.02	1.3442	2.5500	0.9920	0.8160	2.0400	1.0754	0.2594	0.9871	0.01290	1.02	1.0000
1.28	1.2308	1.04	1.4400	2.6520	1.0240	0.8320	2.1216	1.1520	0.3200	0.9877	0.01225	1.04	1.0000
1.32	1.2453	1.06	1.5465	2.7560	1.0560	0.8480	2.2048	1.2372	0.3892	0.9883	0.01166	1.06	1.0000
1.36	1.2593	1.08	1.6636	2.8620	1.0880	0.8640	2.2896	1.3309	0.4669	0.9889	0.01110	1.08	1.0000
1.4	1.2727	1.1	1.7914	2.9700	1.1200	0.8800	2.3760	1.4331	0.5531	0.9894	0.01058	1.10	1.0000
1.44	1.2857	1.12	1.9298	3.0800	1.1520	0.8960	2.4640	1.5439	0.6479	0.9899	0.01010	1.12	1.0000
1.48	1.2982	1.14	2.0789	3.1920	1.1840	0.9120	2.5536	1.6631	0.7511	0.9903	0.00965	1.14	1.0000
1.52	1.3103	1.16	2.2385	3.3060	1.2160	0.9280	2.6448	1.7908	0.8628	0.9908	0.00923	1.16	1.0000
1.56	1.3220	1.18	2.4089	3.4220	1.2480	0.9440	2.7376	1.9271	0.9831	0.9912	0.00884	1.18	1.0000
1.6	1.3333	1.2	2.5898	3.5400	1.2800	0.9600	2.8320	2.0719	1.1119	0.9915	0.00847	1.20	1.0000
1.64	1.3443	1.22	2.7814	3.6600	1.3120	0.9760	2.9280	2.2252	1.2492	0.9919	0.00813	1.22	1.0000
1.68	1.3548	1.24	2.9837	3.7820	1.3440	0.9920	3.0256	2.3870	1.3950	0.9922	0.00781	1.24	1.0000
1.72	1.3651	1.26	3.1966	3.9060	1.3760	1.0080	3.1248	2.5573	1.5493	0.9925	0.00750	1.26	1.0000
1.76	1.3750	1.28	3.4201	4.0320	1.4080	1.0240	3.2256	2.7361	1.7121	0.9928	0.00722	1.28	1.0000
1.8	1.3846	1.3	3.6543	4.1600	1.4400	1.0400	3.3280	2.9234	1.8834	0.9931	0.00694	1.30	1.0000
1.84	1.3939	1.32	3.8991	4.2900	1.4720	1.0560	3.4320	3.1193	2.0633	0.9933	0.00669	1.32	1.0000
1.88	1.4030	1.34	4.1546	4.4220	1.5040	1.0720	3.5376	3.3236	2.2516	0.9936	0.00645	1.34	1.0000
1.92	1.4118	1.36	4.4206	4.5560	1.5360	1.0880	3.6448	3.5365	2.4485	0.9938	0.00622	1.36	1.0000
1.96	1.4203	1.38	4.6974	4.6920	1.5680	1.1040	3.7536	3.7579	2.6539	0.9940	0.00600	1.38	1.0000
2	1.4286	1.4	4.9848	4.8300	1.6000	1.1200	3.8640	3.9878	2.8678	0.9942	0.00580	1.40	1.0000
2.04	1.4366	1.42	5.2828	4.9700	1.6320	1.1360	3.9760	4.2262	3.0902	0.9944	0.00560	1.42	1.0000
2.08	1.4444	1.44	5.5914	5.1120	1.6640	1.1520	4.0896	4.4731	3.3211	0.9946	0.00542	1.44	1.0000
2.12	1.4521	1.46	5.9107	5.2560	1.6960	1.1680	4.2048	4.7286	3.5606	0.9948	0.00524	1.46	1.0000
2.16	1.4595	1.48	6.2407	5.4020	1.7280	1.1840	4.3216	4.9925	3.8085	0.9949	0.00507	1.48	1.0000
2.2	1.4667	1.5	6.5813	5.5500	1.7600	1.2000	4.4400	5.2650	4.0650	0.9951	0.00491	1.50	1.0000
2.24	1.4737	1.52	6.9325	5.7000	1.7920	1.2160	4.5600	5.5460	4.3300	0.9952	0.00476	1.52	1.0000
2.28	1.4805	1.54	7.2943	5.8520	1.8240	1.2320	4.6816	5.8355	4.6035	0.9954	0.00462	1.54	1.0000
2.32	1.4872	1.56	7.6668	6.0060	1.8560	1.2480	4.8048	6.1335	4.8855	0.9955	0.00448	1.56	1.0000
2.36	1.4937	1.58	8.0500	6.1620	1.8880	1.2640	4.9296	6.4400	5.1760	0.9957	0.00435	1.58	1.0000
2.4	1.5000	1.6	8.4438	6.3200	1.9200	1.2800	5.0560	6.7550	5.4750	0.9958	0.00422	1.60	1.0000
2.44	1.5062	1.62	8.8482	6.4800	1.9520	1.2960	5.1840	7.0785	5.7825	0.9959	0.00410	1.62	1.0000
2.48	1.5122	1.64	9.2632	6.6420	1.9840	1.3120	5.3136	7.4106	6.0986	0.9960	0.00398	1.64	1.0000
2.52	1.5181	1.66	9.6890	6.8060	2.0160	1.3280	5.4448	7.7512	6.4232	0.9961	0.00387	1.66	1.0000
2.56	1.5238	1.68	10.1253	6.9720	2.0480	1.3440	5.5776	8.1002	6.7562	0.9962	0.00377	1.68	1.0000
2.6	1.5294	1.7	10.5723	7.1400	2.0800	1.3600	5.7120	8.4578	7.0978	0.9963	0.00366	1.70	1.0000
2.64	1.5349	1.72	11.0299	7.3100	2.1120	1.3760	5.8480	8.8239	7.4479	0.9964	0.00357	1.72	1.0000
2.68	1.5402	1.74	11.4982	7.4820	2.1440	1.3920	5.9856	9.1986	7.8066	0.9965	0.00347	1.74	1.0000
2.72	1.5455	1.76	11.9771	7.6560	2.1760	1.4080	6.1248	9.5817	8.1737	0.9966	0.00338	1.76	1.0000
2.76	1.5506	1.78	12.4666	7.8320	2.2080	1.4240	6.2656	9.9733	8.5493	0.9967	0.00329	1.78	1.0000
Y	L	y=Y/L	**y=Y/L**	$\Delta y=(\Delta Y_2-\Delta$	$W=(1-\alpha)Y$	wage rateM	Δ wage rat	wage rateM	Balance M	W_{T1}	W_{T2}	y=Y/L	$W_{T1}+W_{T2}$



Note: For calculation, see Tables 1 and 2. It is proved that productivity and wage rates, and the relative share of capital/labor are consistent as a whole.

Figure 1 Individual life-time productivity, with the Wage rate, MAX & MIN



Note: Labor productivity ratio is complete by introducing the two weight parameters, $W_{T1} = \frac{L_0}{L_1}$ for y (average) and $W_{T2} = \frac{(L_1 - L_0)}{L_1}$ for $\Delta y = \frac{Y_1 - Y_0}{L_1 - L_0}$ (incremental) into individual life-time. It suggests that the birth rate should be raised first of all. This is because the two weight parameters present a policy-base for productivity ratio and, the denominator of labor productivity is labor or employees and wholly and consistently determines labor productivity, as empirically proved in one of three sister chapters. In Figure 1, change the difference between the MAX wage rate and MIN wage rate, by changing the relative share of capital or labor from 80% to 50% to 20%. The change of the relative share of capital or labor is determined not from the viewpoint of stop macro-inequality but according to the current dynamic and balanced situation by economy. This decision is most important for an economy.

Figure 2 Two weights to be able to control average and incremental relationship