Chapter 2

Royal Roads to A Utopian Economy, Wholly under the Endogenous-Equilibrium=the Price-Equilibrium

Foreword to Chapter 2

Aiming at full-employment in reality, this chapter sums up the whole story based on “Earth Endogenous System (hereafter, the EES),” robustly reinforcing the market principles from vertical to wholly as a system and constitutes six nature-aspects as the essence of the EES: Money, consumption, the relative share of capital ($\alpha$), deficit, politics, and spirituality. The whole story realizes the endogenous-equilibrium = the price-equilibrium, managing the speed years by country and by sector. The whole story remains scientific in two-dimensional plane in this chapter, using the author’s topology which is explained in Appendix for supplement. Statistics data cooperate with endogenous data under theory=practice, where growth and returns are controllable and, in reality attains a utopian economy, with full-employment and no more inflation/deflation and assets-bubbles.

This chapter was actually presented to Royal Economic Society Conference, Manchester, but rejected in Dec 2013. The author happily attended the Annual Conference, Manchester, on 7th to 9th April, 2014, to understand current stream of researchers and related literature, practically and by leaning by doing. As a result, the author could keep at hand the whole contents of the manuscript, rather fortunately. Why fortunately? This is because the whole contents include the core of the author’s lifework, in particular geometrically and for future cooperation by country, with individual country’s national taste, preferences, culture, and history, independent of technological progress. Underlying philosophy is one unit of the West and East, Japan civilization, under the same market principles and towards higher level of democracy. The author perceives that markets and democracy are blessed with human target, not only economically but also human history, and beyond space and time. Therefore, this chapter turned to be the first appearance of its whole contents, secretly free from intellectual property problem.

This chapter, wholly and orally with least endogenous equations, summarizes new story composed of new findings/discoveries, with topological solution. Why is it impossible for an economy to realize full-employment as a key target of economic policies? This question must be the severest problem in the world today. Even central banks have currently taken into consideration the rate of unemployment as one priority of their policies in addition to price stability. The literature generally admits a fact that full-employment is in hands under perfect competition. This fact is proved in the Earth Endogenous System (May 2013; hereafter the EES), where both full-employment and
perfect completion are simultaneous results, once ‘seven endogenous parameters’ in the ‘discrete’ Cobb-Douglas production function are measured using the KEWT database series.

In the EES there exist endogenous equations and, with no assumption. It implies that all the parameters and variables are simultaneously measured by endogenous equations. Then, what are obstacles laying between the current economic systems and the EES? We ultimately admit that there is no method to fill the gap between actual statistics data (discrete practice) and purely endogenous data (theory integrating discrete and continuous). Perhaps in the 21st century no purely theoretical data will appear except for the EES. Currently the EES satisfies all the conditions for filling the above gap. And, the EES has produced its database for 86 countries, 1960/90-2011 by sector (total T, government G, and private PRI), whose original data is statistics data, 10 real-assets data and 15 financial/market external data, in International Financial Statistics Yearbook (IFSY), IMF.

Seven endogenous parameters express the qualitative level of the endogenous-equilibrium by country and directly reinforce the market principles prevailing under the price-equilibrium. The above gap was born due to the market principles’ full duty, where producer and consumer goods and services are priced vertically by goods and services. The absolute price holds by good and services and cannot precisely be aggregated as a whole system. The market principles are by nature vertical while the EES is a textile methodology and has an endogenous tool to spin vertical warp and horizontal woof. Further, A System of National Accounts (SNA) is records-oriented while the EES is policy-oriented, where both systems are consistently compatible.

It is impossible for one genius to set up world system-modeling, so as to integrate the supply and demand curves with absolute prices and under the market principles. The EES and the KEWT database are based on a gift that the relative price level \( p \) and the absolute price \( P \) perfectly overlap under \( p=P=1.0000000 \) by country, sector, and year and over years.

Seven endogenous parameters (see Appendix 1 at the end) determine the level of endogenous data in the KEWT database. Once these seven endogenous parameters are measured, thousand variables, independent and dependent, are simultaneously measured accurately. However, there is a fact that policies are all reinforced by strategies and tactics and that these strategies are free from policies whose constraint policies must be completely consistent each other within the whole endogenous system. Strategies and tactics are free from any constraint and restriction and able to easily accept vertical character of the market principles. As a result, households and enterprises just before redistribution of taxes successfully work with animal-spirited and are able to boldly take
action whatever strategies. This chapter, for simplicity, focuses policies to realize full-employment based on the real assets of the SNA.

Full-employment is involved in the structural balance of payments (BOP) and deficit and, in consumption-neutral to growth and technology simultaneously. As a result, endogenously and exogenously, full-employment is connected with stopping macro-inequality in social stratification; with the Phelps coefficient, marginal productivity of capital and marginal productivity of labor (\(MPK=r\) & \(MPL=w\)), the real rate of return= zero (\(RRR=0\)), and no more inflation/deflation and no assets-bubbles. All of these causes are simultaneously equal to those results and are scientifically explained under the two-dimensional Plane Hyperbola (2DPH). For simplicity, a scientific approach to topology under 2DPH is separately summed up in Appendix 2 at the end.

Appendix 2 implies that Pythagoras triangle equals the author’s equilateral triangle; that the Greece golden ratio equals the author’s silver ratio; or that Western culture incidentally overlaps ancient agriculture (‘agri’-culture) succeeded in Japan. This fact backs up the author’s consumption-neutral or, a fact-finding that consumption takes root in each country’s culture. Or, national taste (preferences, culture, and history) produces sustainable consumption independently of technological progress by country and, human civilization is revival by area. Royal roads to a utopian economy is within hands of policy-makers and leaders, from fairytale to yearly execution.

**Signposts to Chapter 2:** the *EES* (Earth Endogenous System); full-employment; money-neutral; the market principles; the endogenous-equilibrium; the price-equilibrium; structural *BOP* and deficit; stop macro-inequality; the relative share of capital-neutral (\(\alpha\)-neutral); the real rate of return= zero (\(RRR=0\)); inflation/deflation; assets-bubbles; consumption-neutral to growth and technology; Lucas, Phelps, Phillips, the two-dimensional (2D), and the 2D plane hyperbola (2DPH). In Appendix: circle; ellipse; the golden ratio; the silver ratio; equilateral triangle; Pythagoras triangle.

**1. Introduction**

This chapter wholly summarizes new story and findings/discoveries we have found hitherto. New fact-findings/discoveries are composed of six nature-neutralities; money-neutral, consumption-neutral, the relative share of capital-neutral (\(\alpha\)-neutral), deficit-neutral, politics-neutral, and spirituality-neutral, with three axioms, whose key core is a constant capital-output ratio. New findings were born incidentally soon after the publication of *Earth Endogenous System: To Answer the Current Unsolved Economic Problems* (lxviii+568, 15 May 2013; hereunder the *EES*). New findings are perfectly consistent with the *EES* and its KEWT (the Kamiryo Endogenous World Table) database. This is because endogenous equations in the *EES* are respectively reduced to topological
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graphs, set under the two-dimensions (2D): New fact-findings are all simplified by corresponding functions measured in the 2D.

Further new fact-findings are numerically consistent by sector (total T, government G, and private PRI). And, concrete expressions such as the real rate of return = zero (RRR=0), nominal growth rate = the rate of inflation/deflation, stop macro-inequality, and full-employment are precisely measured and, by country, by the G sector, and by the PRI sector. As a result, new fact-findings are able to absorb new facts found in the literature such as Phelps E. S. (1961) and Phillips, A. W. (1958) and, further by the G sector and by the PRI sector.

Note: The remaining scientific and topological analysis of this chapter is shown in Appendix 2 for simplicity. Except for Fig. 1 and Introduction, this chapter does not step into five-dimensions (5D) and six-dimensions (6D) proposed by Shizuko Ishida.

Fig. 1 Royal roads connected with a circle of a utopian common universe economy by country
This chapter mostly presents cyclical routes step by step orally, except for some key equations. Appendix 1 shows fundamental equations based on seven endogenous parameters.

Why is the whole version shown by a circle? The title of this chapter is Royal roads to a utopian economy. Look at Fig. 1. How can we enter into Royal roads? This question overlaps round about crossroads peculiar to the UK road system. Leaders and policy-makers are economic drivers for decision-making and its execution and, always want to select a priority among 360 degree direction in round about economic system. A driver or policy-maker cannot directly enter the center of round about system or New-scientific topology of 5 dimensions (5D). He or she stays at scientific world of 6 dimensions (6D). The 6D has social stratification. Concretely, the author’s money-neutral ever prevails anywhere among 360 degree direction. The author empirically proved the money-neutral, by applying the three externals (ten year debt market yield, M2, and the exchange rate; for 86 countries, 1960/90 to 2013) to money-neutral. Money-neutral proves that the real assets and financial/market assets match consistently under perfect competition and with no assumption. We express each endogenous equation by its reduced form of hyperbola and that in the two dimensional plane hyperbola (2DPH).

Each country has maintained its economy backed up by individual utility and macro-utility of national taste, preferences, history, and culture and civilization. Consumption-neutral works in the 2DPH. Consumption is independent of growth and technology theoretically and empirically. Each country has its policy-priority always and the policy-priority changes often in the short-term. In the long-term, the priority becomes stable and, ultimate target falls into full-employment. This chapter sets full-employment the ultimate policy. Why is full-employment not within the hands of policy-makers? This chapter questions and answers full-employment throughout the text and flexibly looks at Royal roads as round about transportation system.

2. Most serious obstacle to full-employment

There must be a lot of excuses and protests to the existence of the current high rate of unemployment. First of all, we indicate a fact that the purpose of a system for national accounts (SNA, 1993, 2010) is not policy-oriented but record-oriented. Endogenously, policy-oriented is not compatible with records-oriented. A typical fact is that the SNA cannot realize three-element equality of production= expenditures= income. This is because the SNA shows final income distribution after redistribution of taxes, using households and enterprises.
The EES (Earth Endogenous System, 15 May 2013) measures all the parameters and variables conceivable just before tax-redistribution. National disposable income \( Y \), instead of \( GDP \), measures \( Y=C+S=W+P \) consistently by country, sector, and year and over years. Why is the above three equality of national income accurately necessitated? Recall Samuelson’s earliest papers (1939, 40, 41, 42; see References). Samuelson theoretically indicates that zero deficit produces stable growth. It means that the balance of payments (\( BOP \)) is connected with deficit (\( \Delta D \)) in the real assets, as shown by Samuelson (1939-42). What is wrong with deficit?

The worst is an assumption that deficit as government saving less government net investment equals government cash flow-in less cash flow-out. This assumption misleads Royal roads and makes many irrevocable wrong paths. Decision-makers and policy-makers under the market principles must be alert in a fact that a unique deficit is measured using the real assets. The market principles may allow us to compare dual measures for deficit. Dual measures, however, dig risky pitfalls here and there in the circle of Fig. 1 above.

One more pitfall is a notion that accountants are able to window-dressing in the balance sheet, the profit and loss (income) statement, and cash flow statement. This notion is true to some extent in accounts by adjusting or taking out some double-bookkeeping accounts. The author’s new fact-finding denies this misleading notion. Why is the EES unable to adjust or take out some endogenous data? This is because the EES has no assumption and is perfectly free from window-dressing. How is this fact-finding proved? The KEWT database proves this discovery as ever true. We proved this fact-finding by analyzing KEWT database. Consistency is proved by the process to connect LONG (1960-2011) data-sets with Short (1990-2011) data-sets (121-169; 171-216, 2013). No one can make window-dressing in the EES and the KEWT database. Why? The EES holds under perfect competition and simultaneously measures the rate of unemployment= zero. Note as an experiment, that KEWT 6.12 used a rate of unemployment as the last means to adjust the endogenous-equilibrium while KEWT 7.13 deleted a rate of unemployment as the last means for attaining the endogenous-equilibrium.

Then does what condition determine qualitative levels of endogenous data under the endogenous-equilibrium? No condition is required at all. The speed years for convergence by year reflect the whole background of qualitative levels of endogenous data. The speed years are inverse number of the speed coefficient, which constitutes seven endogenous parameters (see, Tables 1, 2, and 3). Seven endogenous parameters (see Appendix, 1) wholly determine all the parameters and variables as many as conceivable by using a discrete Cobb-Douglas production function. Data are discrete while empirical analyses are continuous and/or discrete, no matter.
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No one has formed such a revised Cobb-Douglas production function together with no assumption, after Cobb-Douglas invented the simple function taking almost two decades in early the 1990s. Note that some of Keynesian models, new and neo, express a similar model but, in a specific condition and, is not generalized. For example, see the AK model in Hussein Khaled and A. P. Thirwall (2000). Evidence is simple. Evidence is a litmus test for a purely endogenous rate of technological progress: whether or not the rate of technological progress holds generally connecting flows (net capital consumption) with stocks (capital stock). Or in another way, can you measure the capital-output ratio, the relative share of capital, and the rate of return, each endogenously with no assumption? Data change second by second while hypotheses or rules must be fixed. No genius can construct a sketch using the supply and demand curve under the market principles. Vectors, where $AB \neq BA$ holds, correlations, probabilities, differentials and integrals, expectations, and growth accounting look for blue birds in instantly changing data. Mathematics holds partially and matches the whole but, social and economic science does not. Nevertheless, we are optimistic and expects bright future in reality. Why?

3. New discoveries save decision-makers and policy-makers

The EES has found a fact that statistics data are always within a certain range of endogenous data. It implies that full-employment is within the hands of decision-makers and policy-makers, regardless of statistically, endogenously, exogenously, or externally. This must be a gift from the Nature or God.

$$\alpha = \Omega \cdot r$$ is an identity. Under a fixed relative share of capital, $\alpha = \Pi / Y$, in the KEWT database by year, a constant rate of return, $r = r^* = r_0$, prevails, corresponding with a constant capital-output ratio, $\Omega = K / Y$ (or, $\Omega = \Omega^* = \Omega_0$). These relationships hold, endogenously backed up by applying R. Sato’s (1980) conservation laws to the KEWT database. The EES started with Samuelson’s constant capital-output ratio. R. Sato (1980) ultimately proved a constancy of the capital-output ratio but, exogenously. We raise a question: Why does the literature use the capital-labor ratio, $k = K / L$, exclusively instead of $\Omega = K / Y$? We here answers this question. The literature has not expressed total factor productivity ($TFP$; technology stock) using the relationship between the capital-labor ratio and the capital-output ratio. Even Solow (1956, 57) uses the capital-labor ratio, exogenously giving the rate of technological progress (technology flow). There is no connection of $k = K / L$ to $\Omega = K / Y$ in the literature. D. Jorgenson’s (1961) capital flow-approach was revolutionary at that time. Why does connecting-development not appear between capital flow and capital stock after 1961? Again, under the market principles, it is impossible to measure capital stock with no assumption and by sector. We luckily presented an equation of $A = TFP = k^{1-\alpha} / \Omega$, in PhD thesis at the University of Auckland (Note 19, p. 38, Nov 2003).

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$A = TFP = k^{1-\alpha}/\Omega$ is an identity but, without this identity the EES never has been born.

The real rate of return= zero ($RRR=0$) is one concrete expression of six new discoveries after the EES. This expression is simply proved in the 2DPH using the rate of return function to net investment share, $r(i)$. This is because a rate of inflation (here, deflation is a minus inflation) equals the value of the horizontal asymptote (HA), where the vertical asymptote (VA) is zero or overlaps the y axis of the 2DPH. It implies that the rate of inflation equals the growth rate of output. I. Fisher’s (1906, 1930) theory holds under the market principles, where nominal rate= real rate + inflation rate. These rates are all given externally in the markets. The author’s money-neutral holds under the market principles and reinforces the market principles. Market data are each consistent with endogenous data.

The real rate of return= zero ($RRR=0$) is most vital expression in six new discoveries, as proved separately in this chapter. This is because this concrete expression is simultaneously related to the (endogenous) Phelps (1961) coefficient lying between the rate of return and the growth rate of output. Further, this concrete expression produces another concrete expression that the Phillips (1958) curve reduces to the Phillips point at the origin, due to full-employment. This is because the rate of unemployment= zero, under the endogenous-equilibrium, makes the Phillips curve and the NAIRU (non-accelerating-inflation rate of unemployment) of Paul De Grauwe (p. 48, 2005) to match the origin, where a rate of change in population, $n_E$, equals an actual growth rate of population, $n$: $n_E = n$. The real rate of return= zero drives the circle in Fig. 1 safely and presents a short-cut policy-priority to full-employment.

4. Consumption-neutral to growth and technology: macro versus micro

Consumption-neutral is one of six nature-neutrals. This new discovery is a high tree. This tree makes it possible for policy-makers to take an extensive view of obstacle to full-employment. The routes deeply and differently spread between macro and micro. We try to explain plainly as much as possible and avoiding equations (for related equations in detail, see Appendix 1).

The literature has usually been based on micro-oriented. We consent to this stream of progress. Ideally macro is based on micro data and, effects and results. Samuelson (1950) was quite in a loss how to treat individual utility. Up-to-date, for example, Hicks, J. R. (1961), Mackenzie, L. (1983), Graham, L. and Snower, D. J. (2008), and Diamond, Peter. (2011), each connects own aspect with a rate of unemployment cautiously in the circle of Fig. 1.
The EES has invented macro-utility using the relative discount rate of consumers goods to producers goods, $\rho/r$, the propensity to consume, $c = C/Y$, and the relative share of capital, $\alpha = \Pi/Y$. A function of $(\rho/r)(c)$ is empirically quadratic and wholly expresses national taste, preferences, culture, and history, by country. This function is adjusted until its correlation coefficient becomes equal to 1.0000. As a result, KEWT database applies $13.301c^2 - 22.608c + 10.566$ commonly to almost all the countries (even to no financial-market countries such as Iran, Saudi Arabia, Oman, and United Arab Emirates). Exceptionally, $1.8638c^2 - 2.4547c + 1.758$ is used for several saving-oriented countries (e.g., Singapore, Malaysia, and China, occasionally for some periods). Hence, $(1 - \alpha) = \frac{c}{(\rho/r)}$ and, $k = \frac{k}{L} = \frac{(\alpha/(1-\alpha))}{(r/w)}$ or $k = \frac{w\cdot\Omega}{1-r\cdot\Omega}$ are derived endogenously.

Without these equations, policy-makers cannot raise the wage rate to stop macro-inequality. Marginal productivity of capital, $MPK=r$, and marginal productivity of labor, $MPL=w$, are measured simultaneously. $MPK = \Delta Y/\Delta K = r$ and $MPL = \Delta Y/\Delta L = w$ show that perfect competition is measured simultaneously under a constant level of prices, relative and absolute, $P=p=1.000000$. In short, the EES does not use micro-utility but macro-utility. Recall that policies are macro-oriented while strategies are micro-oriented. Micro-oriented strategies reinforce macro-oriented economic policies. In this respect, the EES differs from micro-oriented stream of the literature. This uniqueness accepts and numerically satisfies most severe critic presented by Lucas R. E. (1976).

Consumption-neutral guarantees growth and technology. Consumption is free from the growth rate of output and the Phelps, endogenous and exogenous, coefficient. A fact-finding in the EES shows that the more negative the rate of change in the population, the higher the rate of technological progress is. The Phelps coefficient, $x = (\alpha/i \cdot \beta^*)$, neutralizes an influence of the relative share of capital on macro-inequality. Suppose that net investment equals returns/profits, $\alpha = i$. Then, the Phelps coefficient reduces to $x = 1/\beta^*$. It implies that the relationship between the rate of return and the growth rate of output is controlled by the technology coefficient. Further, under $1/\beta^* = const.$, the following three relationships hold.

i. If $\alpha > i$, $r > g_Y^*$ holds.
ii. If $\alpha = i$, $r = g_Y^*$ holds.
iii. If $\alpha < i$, $r < g_Y^*$ holds.

The relative share of capital is tightly related to $1/\beta^*$ and accordingly, the rate of technological progress. Thus, the relative share of capital cannot determine macro-inequality.

\footnote{New discover here rejected the following view that the lower the $\alpha$ the higher the $w$ is. Using $w \equiv W/L$, $w = (1-\alpha)y$, $\pi_{n/L} \equiv \Pi/L$, $\pi_{n/L} = \alpha \cdot y$, $y = w + \pi_{n/L}$, $Y = S + C = \Pi + W$, and $1 = s_{n/y} + c_{n/y} = \pi_{n/y} + w_{n/y}$, an equation of $g_A =$}
Further, recall new discovery that the real rate of return= zero (RRR=0). Then, the above three equations each loses its meaning, where the rate of inflation equals the nominal growth rate of output. Nevertheless, it follows that if $\alpha = i, r = g^*_e = 0$ holds. A condition of returns= net investment (after capital consumption) is vividly alive. It implies that the relative share of capital, $\alpha = \Pi / Y$, is a key element of new discoveries and that the optimum point of returns/profits maximized is given by at $\alpha = i$ on the $x$ axis, $i = 1/Y$.

Fig. 2 justifies the relationship between hyperbola and parabola. Parabola is able to seek its original address in topology. Hyperbola and parabola are consistently united in geometric topology. The graphical show-up expresses a finding that the endogenous-equilibrium overlaps the price-equilibrium (recall Fig.1 for the whole version and under money-neutral). Hyperbola holds under the endogenous-equilibrium, which reinforces the market principles under the price-equilibrium.

$\alpha \cdot g_r + (1 - \alpha)g_w$ is derived. This equation implies that the lower the $\alpha$ the higher the $w$ is.

Here attention to the expression of $\alpha = \Pi / Y$: $\Pi$ shows profits in microeconomics and, $\Pi$ shows profits even in macroeconomics if the framework follows ‘just after tax redistribution of national disposable income,’ where households and enterprises appear. The $\Pi$ in the EES shows returns, which follows ‘just before tax redistribution of national disposable income.’ For simplicity, the author uses the relative share of capital, $\alpha = \Pi / Y$, for any case.

2 The author visited several university libraries of the US in Oct 2013 and, thankfully confirmed that Fig.2 is the first appearance in the literature, with other topological findings in this chapter. This trip is the third one after National Library, Athens, March 2012. Note hyperbola and parabola are usually shown using cone.
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5. Conclusions

This chapter summed up the whole version of new findings/discoveries in the *EES*, with Figures 1 and 2. New discoveries for decision-makers and policy-makers directly express nature-neutral, money-neutral, consumption-neutral, the relative share of capital-neutral (α-neutral) and deficit-neutral. The *EES* is always policy-oriented by country and by sector. New discoveries are based on macro-oriented specific mechanics. New discoveries have common background yet, micro strategies are welcome to steadily reinforce and realize vital policy-priority. Statistics data are always within a certain range of endogenous data. The market principles are reinforced by the endogenous-equilibrium.

Nature-neutrals in this chapter are further extended to politics-neutral and spirituality-neutral. This is because politics-neutral realizes optimum range of effectiveness and efficiency in statistics data and because spirituality-neutral is able to avoid arbitrary judgments by behavioral decision-making. As a result, nature-aspects are composed of six aspects. Besides, six nature-aspects hold simultaneously under the endogenous-equilibrium=the price-equilibrium directly measurable by seven endogenous parameters. As a result, three axioms appear whose core is a constant capital-output ratio. The constant capital-output ratio solely holds in the *EES* and KEWT database. Two other axioms are: ‘no window-dressing in accounts allowed’ and ‘the negative and positive principle as topological philosophy numerically united with the *EES*.’ In short, six nature-aspects and three axioms are short-cut of the essence of the *EES*, expressed shorter and simpler. The short-cut is only available when the whole system expresses simultaneously theory=practice under no assumption and accordingly, under perfect competition.

Royal roads are everlasting and its results depend on leaders/decision-makers and policy-makers. Full-employment exists in reality. Full-employment is related to the whole version yet, full-employment basically starts with structural balance of payments and deficit. We have many balanced steady signposts flexibly and dynamically by country, sector, and year and over years towards a utopian economy. Fairytale story is in reality, as proved by new discoveries on economic policies.

Democracy has its signposts so as not to have failures in the 21st century. The 21st century is people-oriented; by people, of people, and for people, justified by $RRR=0$. Human experiences, back and forth, have found royal roads towards a utopian economy. Historically there is no waste and no useless. The level of democracy depends on the level of spirituality-neutral. Everything processes with learning by doing. No more inflation/deflation and assets-bubbles are repeated. Anything is right on his/her side, although the other side apparently seems to be adverse. Truth exists under the negative and positive principle simultaneously and always, since balanced dynamics holds second by second. Numerical topology is always bright and relaxed. Democracy will turn from the second best to the best through leaning by doing.

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Table 1 the US, the UK, Sweden, and Japan: The speed years for convergence by country (1)

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Note: The speed years are estimated using the Endogenous-Equilibrium = the Price-Equilibrium method.

Data source: KEWT 9.15LONG, by country and sector, 1960-2012, whose original data are from International Financial Statistics Yearbook, IMF.

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Table 2 France, Germany, Italy, and Spain: The speed years for convergence by country (2)

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<th>Italy</th>
<th>Spain</th>
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<td>20.02</td>
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<td>23.51</td>
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Data source: KEWT 9.15LONG, by country and sector, 1960-2012, whose original data are from International Financial Statistics Yearbook, IMF.

~ 30 ~
Table 3 Greece, Ireland, Russia, and Turkey: The speed years for conformity by country

<table>
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<th>1990 -</th>
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Data source: KEWT 9.15LONG, by country and sector, 1960-2012, whose original data are from International Financial Statistics Yearbook, IMF.
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References


26. KEWT (Kamiryo Endogenous World Table) database series (Versions 1.07 to 9.15) by year. Its original data come from 10 real-assets data and 15 financial/market external data, in *International Financial Statistics Yearbook* (IFSY), IMF (for exclusive donation of the Excel key points to BEA, IMF, the World Bank, and the BEA, see Kamiryo Hideyuki *(PRSEC 54: 121-169; JES 17: 171-216; 2013).*

Information about Kamiryo is available from different sources:

Home Page: http://www.magaegg.ne.jp/~kamiryo

With RePEc: http://ideas.repec.org/s/b.html

Papers of Kamiryo (available after 1980) at National Institute of Informatics: http://ci.nii.ac.jp


Royal Roads to A Utopian Economy, Wholly under the Endogenous-Equilibrium = the Price-Equilibrium

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Appendixes

Appendix 1: Basic endogenous equations in the discrete time

(Source: Notations of the EES (pp. xxxi-xlii)).

A Cobb-Douglas production function works similarly in the discrete and continuous time. This is because statistics data are always within a certain range of endogenous data by year and over years. The discrete Cobb-Douglas production function in the EES solely uses seven endogenous parameters under no assumption and accordingly under perfect competition. The basic endogenous equations are all measured by seven endogenous parameters, \( i=I/Y, \ n_E = n, \ \alpha = \Pi/Y, \ \Omega = K/Y, \ \beta^*, \ \delta_0, \text{and} \ \lambda^* \).

1. The capital-output ratio, \( \Omega = K/Y \) and \( \Omega = \Omega^* = \Omega_0 : \ \Omega^* = \frac{\beta^* \cdot i(1-\alpha)}{(1-\beta^*)^n+1+\alpha \cdot \beta} \).

2. The technology coefficient: \( \beta^* = \frac{\alpha^* \cdot (1-\alpha)+i(1+n)}{i(1-\alpha)+\Omega^* \cdot i(1+n)} \).

3. The DRC coefficient, \( \delta_0 = 1 + \frac{LH(A^*)}{LH(B^*)} \) and \( \beta^* = (1-\beta^*)/\beta^* \).

4. The level of technology (stock): \( A = TFP = k^{1-\alpha} / \Omega \).

5. The relative price level, \( p: p=1 \) always holds using \( p \cdot Y = W \cdot L + r \cdot K \) in the KEWT database. In recursive programming for the transitional path by year, \( W \cdot L = \Pi \cdot K \) holds at convergence of the speed year time, \( t^* = t \).

6. The relative discount rate of consumers goods to producers goods, \( \rho/r \), and \( (\rho/r)(c) \).

7. The elasticity of substitutions, \( \sigma = \frac{-\Delta k/k}{(\sigma/\sigma_{kk})/\sigma} \). At the KEWT database by country, the \( \sigma \) sharply fluctuates by year and over years. In the transitional path by year, however, the \( \sigma \) is exactly equal to 1.000000.

8. The rate of return, \( r = \Pi/K \) and \( r = r^* = r_0: \ r = \alpha/\Omega \). If deficit is zero, this endogenous rate of return corresponds with the rate of profits in the literature.

9. The rate of technological progress and the growth rate of per capita output: \( g_A^* = i(1-\beta^*) \) and \( g_Y^* = g_A^* / (1-\alpha) \).

10. The growth rate of output, \( g_Y^* = (g_A^*(1+n)/(1-\alpha)) + n \). For full-employment, the speed years, \( 1/\lambda^* \), must be adjusted for moderate equilibrium, under \( n_E = n \).

11. The endogenous Phelps coefficient, \( x = r^*/g_Y^* \) and \( x = \alpha/(i \cdot \beta^*) : \ r^* = (\alpha/\beta^*)g_Y^* \). This endogenous coefficient corresponds with the exogenous Phelps coefficient. If this coefficient is 1.00, it shows \( r^* = g_Y^* \) and the cost of capital turns to zero, where \( \text{CofC}_r = g_Y^* = r^* - g_Y^* = 0 \). In other words, a result that returns equals net investment multiplied by the technology coefficient, \( \beta^* \), does not hold at KEWT database, differently from the case of exogenous Phelps coefficient.

12. The endogenous valuation ratio, \( v^* = V^*/K = r^*/r^* - g_Y^* \). When the range of the endogenous-equilibrium is unstable and/or bubble-oriented, the valuation ratio...
fluctuates sharply beyond moderate range, i.e., 1.50 to 3.00. Reversely, if the rate of return become close to zero, deflation spreads and it is difficult to get rid of deflation.

Note that if deficits and debts are huge, the rate of government becomes extremely minus, which results in close-to-zero rate of return at the total economy. As a result, the rate of return at the private sector may rise up, which spreads inequality of the endogenous wage rate among people/workers, as suggested by Paul, Krugman (repeatedly in Column, NY Times, 2012). Huge deficits and debts are results of selfishness against the next generations but, turning back to the current generation definitely. We need fair democracy and openness with a receptacle for policy-making such as the endogenous system and its database. Spiritual awaking and policy-making march together towards moderate democracy.

Appendix 2: Scientific approach to topology under two-dimensions

Appendix 2 shows (1) development of the relationship between circle and ellipse, (2) the corrected bliss point of diagonal and circle and, (3) the author’s own proof for overlapping the Greece Golden ratio with the author’s Japan Silver ratio (as the first appearance in the literature). Civilization may differ by continent yet, various civilizations are historically united as a whole in this world.

Three new findings are explained using Figs. 3, 4, and 5 with related References.

Fig. 3 Development of the relationship between circle and ellipse.
Fig. 4 Corrected bliss point of diagonal and circle.
Fig. 5 First proofs in plane topology: The Golden ratio equal to the Silver ratio.

A2-1 Development of the relationship between circle and ellipse

Fig. 3 is a citation of Burkard Polster’s “Q. E. D.” (2004, p. 26 and 27). The author supplements the relationship between circle and ellipse, based on the first panel of Fig. 3. What is a new development in this relationship? First, we completely accept his two figures on page 26 that compares an ellipse with a circle. Based on this comparison, we examine the curve on the ellipse that has two origins and the curve on the circumference that has one origin.
We here propose a fact that the surface of the cone has numerous origins. Fig. 3 shows two line sentences orally. Yet, Fig. 3 for the ellipse by origin (on the LHS) does not clarify a fact that the two edges of the horizontal line cannot be measured and a fact that the two edges of the vertical line cannot be measured. Similarly, Fig. 3 for the circle having one origin (on the RHS) does not clarify a fact that the two edges of the horizontal line cannot be measured and a fact that the two edges of the vertical line cannot be measured. We stress that these edges each show a logic and are immeasurable. Further, we deny Burkard Polster’s explanation that all the results are sphere trick. We indicate that diagonal forms circle and, other lines crossing the origin form ellipse. The author’s indications here are consistent with immeasurable origins in the structure of the EES and its topology as reduced form of each endogenous equation.

A2-2 Corrected bliss point of diagonal and circle

Fig. 4 clarifies the essence of circle, which is required for the silver ratio’s justification. It is a known fact that relationships between circle, ellipse, parabola, and hyperbola are formed each by slicing a cone with a different angle, as first shown by Germinal Dandelin (1974-1847), according to Burkard Polster (ibid., p.26). The circle and hyperbola are here indispensable twines. We earlier defined a bliss point such that existed at the right
corner of the diagonal. However, we here set this bliss not as a perfect but as a fancy point. This is because on the diagonal numerous circles are drawn countless. Circle, diagonal, and hyperbola are united.

Note: The y axis shows individual or macro utility, while the x axis individual value or macro output. For simplicity, this figure does not show the hyperbola curve. The hyperbola curve each crosses the point of intersection of the circle on the diagonal.

**Fig. 4** Corrected bliss point of diagonal and circle

**A2-3** Proof for overlapping the Greece Golden ratio with the author’s Japan Silver ratio

**Fig. 5** proves the author’s new discovery that the golden ratio area equals the silver ratio area, under the author’s two-dimensional plane. Fig. 5 uses the rate of return function to the ratio of net investment to output, \( r(i) \), as one of hyperbolas reduced from corresponding endogenous equations. The *EES* (p. 506, 2013) has this function, \( r(i) \), with vital related equations such as the vertical asymptote (VA) and the horizontal asymptote (HA) in Appendix at the end of the *EES*.

The VA=0 in \( r(i) \). The VA overlaps the y axis. Fig. 5 shows two sorts of the HA, \( H_{AGOLD} \) and \( H_{AMODEST} \). Suppose that the magnitude of silver ratio is 1.0000. Then, the magnitude of the golden ratio is 0.8586. The silver ratio is originated from the equilateral triangle \((1 \ 1 \ 1.414)\) as the square root of 2; see the RHS of Fig. 4, a right triangle.

\[
3 \quad r^*(i) = \alpha \cdot \beta^*(1+\alpha) + \alpha \cdot n(1-\alpha)
\]

\[
\Omega^* = \left( \frac{i \cdot (1-\beta^*)}{(1-\beta^*)(1+\alpha) + \alpha \cdot n(1-\alpha)} \right)
\]

\[
y = \frac{c + d}{a}, \quad \text{where} \quad a = \beta^*(1-\alpha), \quad b = 0, \quad c = \alpha(1-\beta^*)(1+n), \quad f = d = \alpha \cdot n(1-\alpha), \quad e = \frac{c}{a}, \quad \text{and} \quad \frac{f}{a} = \frac{\alpha n}{\beta^*} = \frac{\alpha n(1-\alpha)}{\beta^*(1-\alpha)}.
\]

\[
r^*(i) = \frac{\alpha(1-\beta^*)(1+n)}{\beta^*(1-\alpha)} + \frac{\alpha n(1-\alpha)}{\beta^*(1-\alpha)}, \quad VA_{r^*(i)} = 0 = -\frac{b}{a}, \quad HA_{r^*(i)} = \frac{\alpha(1-\beta^*)(1+n)}{\beta^*(1-\alpha)}.
\]

\[
\text{Width}_{r^*(i)} = \sqrt{\frac{\alpha n}{\beta^*}} = \sqrt{\frac{f}{a}}, \quad \text{Shape}_{r^*(i)} = \sqrt{2 \left( \frac{\alpha n}{\beta^*} \right)}, \quad \text{Curvature}_{r^*(i)} = 1/\sqrt{2 \left( \frac{\alpha n}{\beta^*} \right)}.
\]

\[
(y - \frac{c}{a})(x + \frac{b}{a}) = \frac{f}{a}.
\]

For \( r^*(i), (y - 0.0516375)(x + 0) = 0.00168776 \).
of S1 S2 and S3). The golden ratio is originated from Pythagoras triangle (3 4 5; see the RHS of Fig.5, a right triangle of P1 P2 and P3). New discovery is a fact that the silver triangle overlaps the golden triangle. For proof, there are two ways: (i) the silver triangle area is equal to the golden triangle area (or each is formed as rectangle, just two times large) and ii) one difference between the two triangle areas is equal to another difference (one shadowed area is equal to another shadowed area in Fig. 5). This new discovery is precisely proved, graphically as well as mathematically.

Then, what is the implication of proof? This was concretely shown in Introduction. First of all, Greece civilization matches ancient agriculture brought up in Japan. Two civilizations by continents are united topologically. Two-dimensions (2D) express six-dimensions (6D) in this world, developing scientific.

Finally, how policy-makers determine an optimum point of \( i = I/Y \) on the x axis of the 2D Plane Hyperbola (2DPH)? Is an optimum point of \( i = I/Y \) selected effectively? Yes, it is. There are three candidates: i) a point of hyperbola that crosses its diagonal, ii) a point of hyperbola that crosses the HA of golden ratio, and iii) a point of hyperbola that crosses the vertical line of \( i = I/Y \) equal to the relative share of capital, \( \alpha = II/Y \), where returns/profits equals net investment. The answer is iii) or a point of \( i = \alpha \).

**Note:** A brief proof of Fig. 5: Start with the silver ratio, whose length is 1.0000. Then length of the golden ratio must be 1.0000−0.1414=0.8586. As a result, each area is the same, and also each increased area. Therefore, Fig. 5 proves the equality between the silver ratio area and the golden ratio area in the two-dimensional plain hyperbola (2DPH).

**Fig. 5** First proofs in plane topology: The Golden ratio equal to the Silver ratio

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4 In a separate chapter, the author introduces Shizuko Ishida’s theory=practice, which is under review. Ishida newly finds Super Universe Integration Theory (SUIT) and proves all the phenomena by using family-like tests and proofs (typically hundreds photos and pictures in her books and chapters published in Japan). The author always looks at Ishida’s experiments and, confirms all of these unique proofs, with family-like tools at home.
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The author presented a manuscript to *Annals of Mathematics* in August 2014. The manuscript included some new facts and related illustrations shown in this chapter, in particular, Appendix 2 ‘Scientific approach to topology under two-dimensions.’ As the author previously pointed out in ‘Foreword to Chapter 2,’ this chapter remains unpublished. Also, the author sent a co-authored paper directly to Clay Mathematics Institute (CMI), Cambridge, when the author carelessly did not know CMI’s rule.5

References to Appendix 2


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5 The title of the co-authored paper to Clay Mathematics Institute was ‘Proofs: Riemann Hypothesis with Yang-Mills,’ by Shizuko Ishida and Hideyuki Kamiryo, dated on 23 Aug 2013, where Fig. 5 above was cited.
Acknowledgements in Appendix 2:

The author’s trip to Philadelphia and Washington, D. C., on 9th to 24th Oct 2013, was endowed with two indispensable targets and records. One is to confirm facts such that the author’s new findings are the first appearance in the literature and, the other is to read through the original and the first appearance books and papers and, to get parts of these originals, focusing on graphs, illustrations, and equations, following the copy-right law in the U.S.. These originals were excitingly found in historical libraries; Univ. of Penn, Georgetown University, CUA University, and Univ. of Hawaii. Historical records in libraries are safely reserved in separated/specified places and sometimes we need magnet for direction in dark large underground rooms.

Sincerely, I am thankful to Founder of International Atlantic Economic Society, late John Virgo and his Katherine, IAE Conference, Philadelphia. The Conference was the last time when we could see and discuss in this world. During this trip, the author’s friend, Kazuhiro Miyamae, and his family took care of Hide, taking Hide to above libraries and whatever places.

Further, the author cannot forget fortunate meetings in rooms of IMF, the World Bank, (whose given names are Nobuya, Carole, Will, Cristina) and shaking hands with Steve Landefeld, Bureau of Economic Activity (BEA), guided by Endo Shigeru’s direct contacts several times before schedules. At that time, US government was during government shutdown but, his secretary, Vicki, helped Hide to see and shake hands at the entrance, next door to Lowes Madison Hotel stay. I cannot forget one day when we enjoyed by Steve’s arrangement and useful discussions of capital stock calculation in accounting, in a room of the BEA in Oct. 2007. This chapter was thankfully rewritten by the above warm friendships towards harmonious cooperation to connect one with the other.