

Chapter 16

Essence of Purely Endogenous System & Essence of the Break-Even-Point (BEP)

1. Essence of Purely Endogenous System: Under the Market Principles

A. Two Limitations of the Market Principles

The Market Principles have been inherited since the birth of human with money as unique base for bartering. The Market Principles work always and anywhere in the world beyond human ability, just like ‘next to God/Nature.’ However, the Market Principles indicate each price, vertically by goods, services, and software. As a result, the Market Principles cannot concretely step into the macro level, although the Market Principles penetrate perfectly both in the macro and micro levels. Thus, the Market Principles have the following two limitations or characters.

(1) No cause is pertinently clarified in terms of the real assets of A System of National Accounts (SNA, 1993, 2008). E.g., leaders, policy-makers, researchers, and economists could explain their views but with a number of assumptions which justify equations in their model and system. The truth is that no assumption makes ‘theory’ equal to ‘practice,’ where causes and results are simultaneously expressed under consistency beyond space and time. In another word, ‘learning by doing’ produce true theory universally.

(2) Gap between instant-price formation and one-month/year production duration is inevitable. The Market Principles consistently and wholly show each price level, in a momentarily and beyond human understanding. No way exists for how to conquer this fate. If human find a solution, human equals God/Nature.

Nevertheless, the human system could approach God/Nature under the Market Principles. This is ‘Purely Endogenous System.’ One example is the author’s “*Earth Endogenous System*” (1st 2013 and 2nd 2014, hereunder the *EES*). Theory is instantly connected with practice as shown by Kamiryo Endogenous

Chapter 16, *HEU*

World Table (KEWT) database series.¹ The KEWT database shows ‘endogenous data.’ Original data are ‘statistics data’: “*International Financial Statistics*” (*IFS*) in Yearbooks printed and also IMF DATA in the e-Library. Why endogenous and statistics data ever consistent?

B. Mechanics of the *EES* and its KEWT database

Mechanics of the *EES* and its KEWT database is algebraic but immediately turns to geometric. Mechanics clarifies the essentials behind purely endogenous as follows:

- (1) Money=1.0000=quality=quantity in the real assets. Financial and market assets in the SNA is a mirror of the real assets. The mirror is more whole as an organic system than the double bookkeeping in accounting in the micro level.
- (2) Statistics data hold within a certain range of endogenous data, by country, sector, year, and over years and in the macro level. Why are endogenous and statistics data ever consistent? Because: The same data of the SNA are divided into two; Just before and, just after redistribution of all the taxes. One constitutes endogenous data and, the other constitutes statistics data.
- (3) The macro level and also the micro level are persistently consistent, between endogenous and statistics data. Difference is the definition of the two sectors: the government and private sectors (the G and PRI sectors) in the macro level versus households and enterprises in the micro level. Aggregated amount of the G and PRI sectors equals that of households and enterprises.
- (4) For policy-makers: Endogenous data are sustainable by themselves. Statistics data must pursue sustainability by year and over years endlessly. This fact is expressed by green business cycles versus traditional business cycles. In another word, endogenous mechanism makes primary business cycles by itself.
- (5) Typical difference of the two data is whether or not the rate of technological progress is ‘purely endogenously’ measured. The market principles and Mechanics of the *EES* and the *HEU* commonly know this fact.

¹ Database series in the KEWT are: 1.07, 2.08, 3.09,, 8. 14, 9.15, 10.16, and so on, starting in 2007 and up-dating by year.

Essence of Purely Endogenous System & Essence of the Break-Even-Point (BEP)

- (6) As a result, the *EES* and its KEWT database are endowed with six aspects: 1) The real rate of profits/returns is zero, $RRR=zero$; 2) Technology is independent of national taste (preferences, culture by country, civilization by area, and history); 3) Macro-inequality is free from the relative share of capital; 4) Most effective and efficient under deficit= $zero$; 5) Politics-neutral, and 6) Spirituality-neutral.
- (7) Six aspects are primarily algebraic but instantly turn to those geometric, measured wholly by hyperbola functions: Hyperbola functions are obtained solely by reformulating algebraic mechanics pertaining to the *EES* and KEWT. The unity is most easy in macroeconomics, since Money= 1.0000 =quality=quantity in the real assets and historically under the market principles.

C. Another example using the exchange rate as by Kanda Yoshihiro

The author here introduces another example using the exchange rate and GDP per capita. This example is the idea of Kanda Yoshihiro. To the author's understanding (accordingly, the author's responsibility for statements herein), Kanda looks for a true exchange rate in the micro level yet resultantly covers the whole level, micro and macro. Kanda proposes a true base for daily instant changes in the exchange rate, by replacing the daily exchange rate by 'the exchange rate= 1.0000 ': With 0.7000 to 0.9999 and similarly 1.0001 to 1.3000 in the exchange rate markets.²

Kanda's true base for daily instant changes in the exchange rate markets stay at actual statistics data and remains in the financial and market assets of the SNA. Nevertheless, 'the exchange rate = 1.0000 ' realizes no inflation or deflation. Kanda's 'the exchange rate= 1.0000 ' corresponds with the author's 'Money = 1.0000 = quality = quantity in the real assets.' Only problem is a fact that 'the exchange rate = 1.0000 ' does not clarify true case of the actual situation

² Kanda Yoshihiro is the author's colleague and best friend in the author's university, Hiroshima Shudo University. Kanda has actually long trade experiences as Representative of Australia JETRO (The Japan External Trade Organization), before joining the author's university. Contrarily, the author has thirty year experiences as a member of the Tokai Bank, Ltd. (today's Bank-of-Tokyo Mitsubishi UFJ Bank, after merger) and also, Nagoya Small and Medium Investment Half-Public Company, Ltd., (whose company target is unique enterprises in middle-Japan area and before listing shares), and thirty years' researcher and consultant experiences, immediately after retiring the Tokai Bank, March 1981 (see Home page yearly, though a little bit old, dated on 5 Oct 2013, <http://www.megaegg.ne.jp/~kamiryo/>).

Chapter 16, *HEU*

of '0.7000 to 0.9999 and similarly 1.0001 to 1.3000 in the exchange rate markets.' Instead, Kanda proposes a new scale as an alternative estimation. This scale or yardstick is 'GDP per capita.' The GDP per capita is estimated soon after ex post facts, similarly and generally to economic literature hitherto.

Kanda incidentally sets no assumption on the GDP per capita. Yet, Kanda cannot clarify true causes hidden behind the exchange markets. This is not the responsibility of human and researches but comes from the character of the market principles. The exchange rate conquers a limitation of vertical price level by itself, which may be a new fact. Yet, is it possible for ex ante? Kanda asserts that it is for the GDP per capita to forecast future exchange rates. Kanda is confident in a fact, throughout empirical researches by country for many years, that the difference between '0.7000 to 0.9999' or '1.0001 to 1.3000' does not last long, since 'the exchange rate=1.0000' is most stable and modest.

2. Essence of the Break-Even-Point (BEP)

Why don't we overcome a fact that the Break-Even-Point (hereunder, BEP) equals 1.0000? BEP was originally invented by Kneoppel (1933) and, Vatter (1947), differently funding from cash-in and -out. What we need is important perception to non-value added or external expenses, regardless of fixed and variable and of macro and micro. Non-value added or external expenses are not obstacle but friend of accounting and the 93SNA. Policy-makers cry how to rise productivity loudly.

Productivity or value added per capita does not rise in the macro level as well as in the micro level. Causes, recipe, and prescription are found only in the real assets and solved as in the KEWT database ex-ante verifies. Nevertheless, why do we not study function of the balance sheet and profit and loss statement more pertinently? Simply, net sales, total revenues, and the 93SNA must be a base for understanding.

Section 2 sums up by presenting essence of related ranges in the above understanding: A. Notations for amounts/absolute values; B. Key parameters between life-time and part-time employment systems; C. Five parameters supporting the model/system; D. The BEP equation, Eq. 1 or Eq. 2 reversed; E. Hidden parameters behind the BEP equation; F. Conclusions; G. Q&A to a new idea of the Break-Even-Point (BEP); and References by point of view.

Essence of Purely Endogenous System & Essence of the Break-Even-Point (BEP)

As a result, readers will realize the following five connections between the macro and micro practice and execution:

1. Individual life-time and accordingly family oneness is a base for human activities in the world.
2. Households enjoy consumption and country become happy and wealthy in any aspect.
3. Method for calculating better life and social activities, public and private, is required, as shown in this chapter rather technically.
4. Nevertheless, method is alive when decision-makers' philosophy level is deepen. Human's body and mind never be separated.
5. Essence of BEP verifies foundation of human life and social activities by human, from money-oriented to social contribution in the world in reality.

A. Notations for amounts/absolute values

Y=NDI: National disposable net income, macro.

VA: Value added, micro.

GDP: macro but *statistics* data to be compared with Y=NDI.

Non-VA: External expenses, macro or, non-value added, micro.

$n_E = n = (L_t - L_{t-1})/L_{t-1}$: The rate of change in population or labor.

$y = Y/L$: Labor productivity: Deeply involved in the BEP equation below.

X: total net sales, macro and, micro as well.

$Z = X - Y$: External expenses, $Z = \text{Non-VA}$.

$Y = C + S = W + \Pi$: Y in the endogenous-equilibrium. C: Consumption; S: Saving; W: wages; Π or P: Returns, macro or, Profits, micro.

E: Total expenses. $E = Z + W$ and $E = X - \Pi$, macro or, $E = X - P$, micro.

B. Key parameters between life-time and part-time employment systems

L_{TIME} : Life-time employment numbers \div total employment numbers.

e.g., $L_{\text{TIME}} = 0.9$, $L_{\text{TIME}} = 0.5$, or $L_{\text{TIME}} = 0.1$, etc.

Independent variable in model/system:

The goal of the BEP equation is to maximize profits and realize the profit maximum principle. $\pi = \frac{\Pi}{X}$ or $\frac{P}{X}$: The ratio of returns/profits to net sales, commonly to macro and micro.

The above returns/profits equation reinforces the BEP equation below.

Chapter 16, *HEU*

C. Five parameters supporting the model/system

- 1) The level of BEP sales to total net sales, $bep_X = BEP_X/X$, which must be less than 1.0; e.g., $bep_X = 0.9$, $bep_X = 0.7$, or $bep_X = 0.5$.
- 2) The level of non-value added to total net sales, $z = Z/X$, which must be less than 1.0; e.g., $z = 0.8$, $z = 0.45$, or $z = 0.1$.
- 3) Wages divided by net sales, $w_X = W/X$.
- 4) The average-incremental equation that is composed of two weight parameters connecting average with incremental, $W_{T1} = L_0/L_1$ and $W_{T2} = (L_1 - L_0)/L_1$, where denominator values of $y = Y/L$ only determine two weights existing between average and incremental.
- 5) Relative share of capital, $\alpha = P/Y$, or relative share of labor, $(1 - \alpha) = W/Y$.

D. The BEP equation, Eq. 1 or Eq. 2 reversed

$$bep_X = \frac{BEP_X}{X} = \frac{1-(z+(1-L_{TIME} \cdot w_X))}{L_{TIME} \cdot w_X} = \frac{1-v}{f} \quad (\text{Eq. 1})$$

$$bep_X = 1 - \frac{z/(1-z)}{L_{TIME}(1-\alpha)} \quad (\text{Eq. 2})$$

What are implications in the **Eq. 1** and **Eq. 2**? Eq. 1 and Eq. 2 constitute cores of an integrated structure of the BEP. Is there any difference between Eq. 1 and Eq. 2?

$w_X = W/X$ is stressed in Eq. 1 while the relative share of capital or labor, $\alpha = P/Y$ or $(1 - \alpha) = W/Y$, in Eq. 2. It means: $(1 - \alpha) = W/Y$ and $(1 - \alpha) = W/Y$ are not shown at the same time in an equation; an alternative holds between the two equations. Therefore, Eq. 1 and Eq. 2 have each significant implication. Eq. 1 and Eq. 2 are able to answer any questions from citizens, people, enterprises, households, leaders, decision-makers, policy-makers, countries, and societies. For example, what level is better between life-employment system or, part-time system? This is a unique question raised by Peter Drucker (19Nov 1909-Nov 2005) in his life-time work.

Essence of Purely Endogenous System & Essence of the Break-Even-Point (BEP)

E. Hidden parameters behind the BEP equation

Connected with six aspects in the EES and its KEWT database and also, unique Axiom of the capital-output ratio, $\Omega = \Omega^* = \Omega_0$. These are delicate and separately discussed.

An identity that the relative share of capital equals the product of the capital-output ratio and the rate of return: $\alpha = \Omega \cdot r$.

F. Conclusions

- (1) Relation between fixed and variable expenses is severely clarified in the returns/profits equation. The BEP equation cannot wholly express the structure of net sales.
- (2) The returns/profits equation is naturally connected with wages and its role. Macro starts with national disposable net income but needs the returns equation.
- (3) Macro develops from national disposable net income to the returns equation, while micro develops from net sales to the profits equation. The returns/profits equation unites macro with micro and; policies are well connected with strategies.
- (4) This chapter presents an original solution to Drucker's life-time question, macro and micro and effectively, efficiently, and socially.

G. Q&A to a new idea of the Break-Even-Point (BEP)

Q1: Why is the break-even point (BEP) formulated as an identity of the $BEP = 1.0000$ in corporate accounting?

A1: The ratio BEP holds when fixed assets to net sales, $f = F/X$, equals $1 - V/X$, where profits are zero and $f = 1 - v$ holds. It is impossible for us to formulate the level of BEP, in the micro level.

Q2: Why is the SNA not connected with the BEP equation hitherto?

A2: The SNA as statistics cannot measure the sum of wages and returns, since *NDI* differs from *GDP*. *GDP* may estimate the sum of saving and consumption but, this actual amount differs from the sum of wages and returns. Also, for the BEP level requires a necessary condition of the sum of saving and consumption = the sum of wages and returns. This condition cannot be measured in the SNA.

Chapter 16, *HEU*

Q3: Why do statistics data have time lag between causes and effects/results?

A3: This is natural as long as we use statistics data. This is not the responsibility of statistics and systems. Purely endogenous data simultaneously have causes = results and are free from assumptions to justify equation formulation.

Q4: Why is the wage rate a key for the level of BEP?

A4: Wages is able to raise the level of the wage rate and directly, no others. Even net investment cannot directly raise the wage rate under the profit maximization principle.

Q5: Why is the level of BEP consistent with the market principles that have vertical limitation by goods, services, and market?

A5: This is because the BEP level measures the amount of wages first of all, not directly the wage ratio. The amount is the product of price and quantity so that it is free from price by goods and by services shown in the textbooks.

Q6: Why is the level of BEP consistent with endogenous wages that reduce returns or profits?

A6: This is because returns and profits increase under minimized net investment.

Q7: What is philosophy behind the level of BEP?

A7: The origin of Philosophy is moderation and corresponds with the origin of two-dimensions in the plain. Moderation is not measured but amounts and ratios approach close to moderation. Moderation leads us to mind happiness with sustainable robustness of economies. And, this is controlled by combining three specified parameters designed in an integrated structure of the BEP and returns or profits.

In short, the BEP, returns, and profits are newly connected with wages and, net sales and Non-Value Added are absorbed into a whole system. Problems hidden in the wage rate are mechanically clarified and tested. Drucker's advice to Japan or, 'life-time employee system' to match Japanese culture and civilization are now empirically proved in this chapter, using the KEWT database.

Essence of Purely Endogenous System & Essence of the Break-Even-Point (BEP)

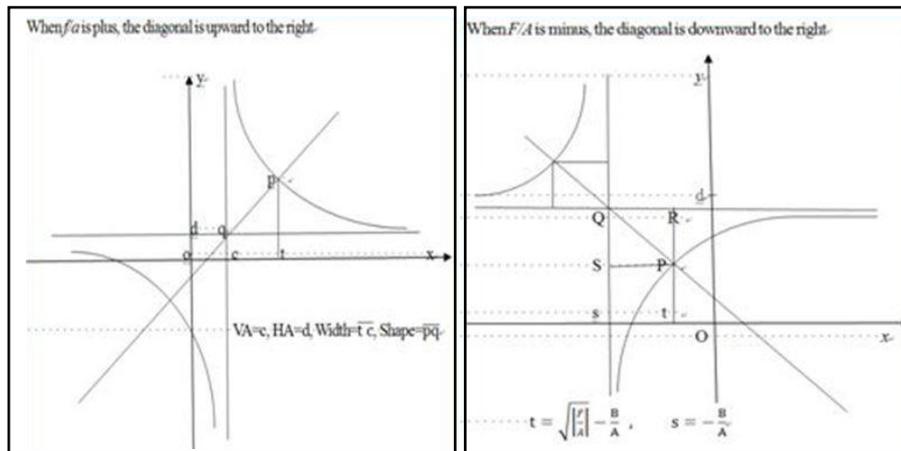


Fig. 1 Geometrical mechanics in two dimensional planes

References penetrating this chapter:

- Drucker, Peter, F. (1939). *The End of Economic Man: The Origin of Totalitarianism*. New York: 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.

Original list of the first appearances of the BEP and its extended equations:

The following three books have been my research bible of the BEP up-to-date, with my research-father of Dr. Kaichiro Nishino in eternity.

- 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.

BEP of algebra and geometry:

- Kamiryō, Hideyuki (15 Oct 2014). Equations connecting the break-even point with net sales and returns/profits: Common to macro/micro. Room 302, Chaired by Beate Sauer, Munich. *International Atlantic Economic Conference*, Savannah, 13 -15 Oct 2014. 46p.