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Original Paper

The Marginal Rate of Substitution, in Relation with the Win-win-win Papakonstantinidis Model—Lessons from Linear B

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Abstract

The Marginal Rate of Substitution-which is analyzed from the view of Political Economy-leads our thoughts into the pure individualism and the need to interpret all the transactions we make and the corresponding decisions through the maximization of our individual satisfaction.

In the opposite, the suggested "win-win-win papakonstantinidis model" (coming from Nash win-win extended approach) tries to find ways for the three-pole bargaining conceptual equilibrium, under conditions, thus maximizing expected utilities for all the involved parties AND the Community in local decision-making by applying a combination of Descriptive Behavior (DB), Rational Choice, Instrumental Rationality and the Applied Behavioral Analysis (ABA) methodologies, then an updating community's behavioral state is expected.

By this definition the win-win-win papakonstantinidis model (Note 1) helps the scientific thought so to understand the "socially acceptable substitution" thus deriving profit from providing the community with the necessary "emotional intelligence" among the people of a self-organizing community, drawing stimuli from distributions made in the Greek area 1450 years BC.

Keywords

Marginal Rate of Substitution (MRS), the bargaining problem, the Linear B, social policy, the number GOLDEN RATIO "φ"

1. Introduction

The paper, based on the T. Schelling's (1960) (Note 2) strategy of conflict deals with the equilibrium conditions and strategy between empathy and conflict: we investigate if the win-win-win papakonstantinidis model 1, as a conflict strategy could co-exist with the empathy as a pure behavioral condition focusing on improving the bargaining power analytical. We investigate the interaction, empathy-global bargain, in a subjective and objective way 1. Objectively as a conflict strategy that is an inherent element of every entity and 2 subjectively, through empathy and sensitivity. We investigate the win-win-win papakonstantinidis from the empathy prism. Especially, we investigate if empathy is included in conflict strategies empathy definitions encompass a broad range of emotional states, including caring for other people and having a desire to help them; experiencing emotions that match another person's emotions? Discerning what another person is thinking or feeling? and making less distinct the differences between the self and the other. It can also be understood as having the separateness of defining oneself and another blur Intuitive Bargaining and Bounded Reality in the Jackpot of Life 2. The combined work of all 4 authors (Nash (Note 3), Harsanyi (Note 4), Selten (Note 5)) has definitely demonstrated the physical and psychological constraints in (cooperative/non-cooperative) bargaining and negotiation processes, with reference to economic gaming behavior, decision making and legal interaction of players. As a result, we can safely assume that the information gap is the "dominant key factor for humans to make a living". The sensitization process of the Papakonstantinidis model of the 3 win can achieve the full angel's point, concerning a bottom up collective bargaining process by propelling meta-capitalist evolution forward, in terms of participatory capital formation. The intuitive 3 win approach calls for (capital-based) bargaining mutualism and has its analogy in the many living examples of biological mutualism (Note 6).

2. Analysis

The essential purpose of negotiation is to develop a cooperative relationship, based on logical arguments, with the opposing side so that the negotiators' differences can be resolved. In order for a negotiation to take place, there must be reasons for competition that need a special agreement and discussion, the parties must each want to achieve the most favorable agreement for the same agreement, which will take the form of a unilateral victory (win/lose) or bilateral (win/win). However, in order to reach an agreement, cooperation and soft negotiation will be required, without which you lead the game to zero sum, i.e., to no result. In the first case of reaching the negotiation through a soft process the parties should avoid personal conflicts based on one-dimensional perception, dealing will require cooperation and soft negotiation, without which the game is zero-sum, i.e., no outcome. Negotiations have largely disappeared in parts of the world where fixed-price retail outlets are most common place to buy goods. However, for expensive goods such as houses, antiques and collectibles, jewelry, and automobiles, negotiation may remain routine Behavioral approaches emphasize the role that negotiators' personalities or individual characteristics play in determining the course and outcome of deals that are negotiating. Behavioral theories may explain negotiations as interactions between personality "types" that often take the form of dichotomies, such as shopkeepers and warriors or "hardliners" and "soft liners" where negotiators are presented as either cutthroat fights for all or diplomatically yielding to another party's demands for the sake of keeping the peace (Nicholson, 1964)

The tension that arises between these two approaches forms a paradox that has been called the "Toughness Dilemma" or "Negotiator's Dilemma" (Zartman, 1978, p. 2; Lax & Sebenius, 1986, p. 3). The dilemma states that although negotiators who are "tough" during a negotiation are more likely to win more of their demands in a negotiated settlement, the trade-off is that by adopting this stance, they are less likely to reach an agreement (Note 7).

In his seminal work on distributive justice and contract law, Anthony Kronman argues that, even for libertarians, contract law should work to promote distributive justice by limiting one party's ability to "take advantage" of others by exploiting "superior information, intellect, or judgment, in the monopoly he enjoys in respect of a particular resource, or in his possession of a powerful instrument of violence or a gift for deception". It offers a "PARETO" restrictive principle, a principle that "forbids us from granting to the possessor of an advantage the exclusive right to exploit it for his own benefit, unless those excluded from its ownership become better off than they would otherwise be that is, a case of being given a greater right to the advantage than anyone else". By focusing on the well-being of all those excluded from advantage, rather than just those involved in a particular transaction, we seek to promote overall social well-being. His formula requires that "the welfare of most people who are benefited in a particular way be increased by the kind of benefit". Contract law promotes distributive justice at a societal level.

Perhaps the best way to determine whether a minimum threshold of distributive justice has been met in a particular case is to ensure that basic standards of procedural justice are enforced.

Most research in the area of procedural justice focuses on processes involving third parties, such as mediation, arbitration, and adjudication. Recently, however, several studies have been conducted on procedural justice in negotiation. They show that many of the same factors that parties in third-party proceedings use to assess procedural justice apply in negotiations. Specifically, the parties to the negotiation judge the process to be fair when they feel that they have been able to express themselves, believe that they can trust the other party, and feel that they have been treated with courtesy and respect.

There is some evidence that market- based solutions are working:

$$y_i = x_i^{\beta} + lne^{x}$$

yi = $win - win - win$ acceptable options
xi = negotiators
β = behavior elasticity (0,1)

Source: Papakonstantinidis, 2023.

Cases

1. If there are 2 negotiators (x =2) with perfectly inelastic behavior (β=0) then the socially acceptable choices are

$$y_i = x_i^{\beta} + lne^{x}$$
$$y = 2^0 + lne^2 = 1 + 2 = 3$$

2. If there are 2 negotiators (x =2) with perfectly elastic behavior (β=1), then the socially acceptable options are

$$y_i = x_i^{\beta} + lne^{x}$$
$$y = 2^1 + lne^2 = 2 + 2 = 4$$

3. If there are three (3) negotiators (x =3) then they will have 4 or 6 socially acceptable options depending on whether they have inelastic or elastic behaviors
4. This means that there is **at least** one additional choice among negotiators that is socially acceptable depending on (a) the number of negotiators and (b) the elasticity of their behaviors
5. Behavior is considered inelastic if at least one negotiator exhibits this inelastic behavior during the negotiation
6. Must $x \geq 2$. Otherwise there is no negotiation
7. The choice is approximate: For this reason the is usedlne

Marginal Rate of Substitution (MRS) (Note 8).

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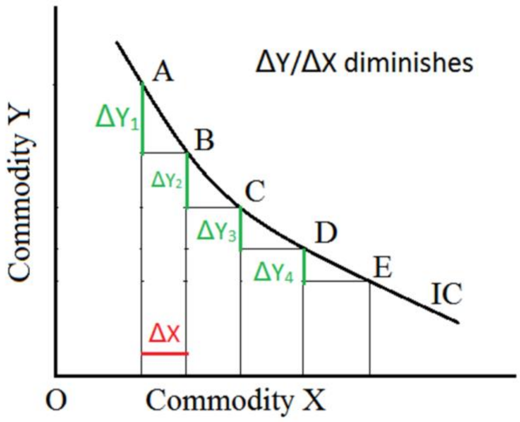
In economics, the Marginal Rate of Substitution (MRS) is the rate at which a consumer can give up some quantity of one good in exchange for another good while maintaining the same level of utility. At equilibrium consumption levels (assuming no externalities), the marginal rates of substitution are identical. Marginal rate of substitution is one of the three factors of marginal productivity, the others being marginal rates of transformation and marginal productivity of a factor.

Under the standard assumption of neoclassical economics that goods and services are continuously divided, the marginal rates of substitution will be the same regardless of the direction of exchange and will correspond to the slope of an indifference curve (more precisely, the slope multiplied by -1) passing from said bundle of consumption, at that point: mathematically, it is the implicit derivative. MRS of X for Y is the amount of Y that a consumer can exchange for one unit of X locally. The MRS is different at each point along the indifference curve and is diminishing Marginal Rate of Substitution. Further under this assumption, or otherwise under the assumption that utility is quantified, the marginal rate of substitution of good or service X for good or service Y (MRSxy) is also equivalent to the marginal utility of X against marginal utility of Y. Is:

$$MRS_{xy} = -m_{\text{indif}} = -(dy/dx)$$

$$MRS_{xy} = MU_x / MU_y$$



SECTION 1

In economics the Marginal Ratio of Substitution (MRL) is the rate at which the consumer is willing to give up up) from one good, in exchange for the acquisition of another good, so as to maintain the same level of utility (Note 9).

Marginal Ratio of Substitution, as “slope of the indifference curve” (negative, with respect to the origin of the axes=-MRS).

According to the usual assumption of neoclassical economics that goods and services can be divided continuously, the marginal ratios of substitution will be the same, regardless of the direction of exchange and will correspond to the slope of the indifference curve, in this point [precisely- ... toward the slope of the indifference curve, multiplied by the factor (-1), due to a negative slope of this indifference curve (Indifferent Curve=I. C) going through the search bundle of consumer choices] Mathematically this is the partial differential derivative of the utility function $U(x, y)$

The marginal rate of substitution of good Y by good X

TOL expresses the maximum quantity (the maximum number of units) of good Y that the consumer is willing to sacrifice in order to obtain an additional unit of good X, without changing the benefit/utility he enjoys, or otherwise.

The maximum quantity of good Y that the consumer is willing to sacrifice to obtain an additional unit of good X, in given utility level, is the consumer's marginal valuation of an additional unit of good X (Note 10).

Analysis with examples

Marginal Ratio of Substitution (MRL) of X over Y is the quantity of Y for which a consumer would be willing, on the spot, to exchange (spend to "compensate") for a given quantity of X that he owns (e.g., money).

I see a car Y for which I would be willing to pay up to 10,000 euros. Nothing more: The car gives me "measurable" (in terms of desired value) as much utility as I would be willing to pay to acquire it.

OLY is different at each point along the indifference curve, so it is important to take this into account when defining it.

In addition, with the assumption of "quantification" of "utility" (utility), the ALL of the product, the service X in order to obtain a good or service of the Y good, or service (MRS_{xy}) is equivalent to the marginal utility-utility of X above in the marginal utility-utility of Y

$$MRS_{xy} = -m_{\mathbf{indif}} = -(dy/dx)$$

$$MRS_{xy} = MU_x/MU_y$$

Note that when comparing "bundles" (2s) of goods X and Y that gives a "constant utility/utility", each time, points along the indifference curve, then the marginal utility of X is measured in terms of units/amounts of Y the possession of which the consumer waives.

Ex I forego buying another packet of sugar (Y) because I would not be willing to pay X (money) to buy that packet. The previous packet of sugar I bought gave me marginal utility/utility. I don't want more.

Another example: If (MRS_{xy})=2, this means that the consumer will give up the desire to exchange 2 units of Y to obtain an additional unit of X.

As one moves down the indifference curve (standard curve) OLY decreases/decreases (as measured by the absolute value of the slope of the indifference curve as it decreases). This is known as "the law of decreasing OLY".

As we have seen, the indifference curve is convex to the origin of the axes we have defined MRS as the negative slope of the indifference curve,

$$MRS_{xy} \geq 0$$

SECTION 2

Introduction to terms-relations of simple mathematics (Note 11).

Simple mathematical analysis.

3. Definition

Partial Differential Equations (PDEs) are equations involving rates of change with respect to continuous variables. The position of a rigid body is defined by six numbers, but the configuration of a fluid is given by continuous distribution of various parameters such as temperature, pressure, and so on. The dynamics for the rigid body takes formulation in a finite-dimensional space. The dynamics for the fluid takes configuration in an infinite-dimensional space. This distinction usually makes MDEs much more difficult to solve than ordinary differential equations (S.D.E.), but here again there will be simple solutions for linear problems. Classic areas where MDEs are used include acoustics, fluid flow, electrodynamics, and heat transfer.

Eg $u(x,y) = x^2 + y^2$, (1,1) A ν generating, with respect to x we have

$u_x(x,y) = 2x$, (1,2) as well

$u_y(x,y) = 2y$ 1, 3)

It is clear that, the combination of (1.1), (1.2) and (1.3), leads to the relation:

$$xu_y(x,y) + yu_x(X,y) = 2u(x,y), \forall (x,y) \in R^2 \quad (1.4)$$

If we omit the parentheses (x, y) that indicate which are the independent variables of the functions entering into the relation (1.4), we can write it in the form of simple equations

Generally,

A Partial Differential Equation (PDE) for the function $u = u(x_1, ...x_n)$ is an equation of the form:

$$F\left(x_1, \ldots, x_n, u, \frac{\partial u}{\partial x_1}, \ldots, \frac{\partial u}{\partial x_n}, \frac{\partial^2 u}{\partial x_1 \partial x_1}, \ldots, \frac{\partial^2 u}{\partial x_1 \partial x_n}, \ldots\right) = 0.$$

If F is one linear function of u and its derivatives, then the MDE is called linear. Common examples of linear MDEs are heat equation, n wave equation, h Laplace’s equation, h Helmholtz equation, n Klein-Gordon equation, and the Poisson’s equation. It is a relatively simple MDE

$$\frac{\partial u}{\partial x}(x,y) = 0.$$

This relation means that the function u (x, y) is independent of x. However, the equation does not give any information about the dependence of the function on the variable y. Therefore, the general solution of this equation is

$$u(x,y) = f(y),$$

where f is an arbitrary function of y. The analog ordinary differential equation is

$$\frac{\mathrm{d}u}{\mathrm{d}x}(x) = 0,$$

which has solution the

$$u(x) = c,$$

where c is any stable price. These two examples show that the general solutions of Ordinary Differential Equations (ODEs) involve arbitrary constants, while the solutions of ODEs involve arbitrary functions.

Calculation of f (U) using Partial Differential Equations (PDEs)

Let the utility/utility function $U(x, y)$ be where U is the consumer's utility and x, y are goods/commodities. Then, the PDE can be calculated through Partial Differential Equations (PDEs) as follows:

$$MU_x = \partial U/\partial x$$

$$MU_y = \partial U/\partial y$$

where MU_x is the marginal utility with respect to good x and MU_y is the marginal utility with respect to good y.

Taking the total differential equation of the utility function we have the following results:

$dU = (\partial U/\partial x)dx + (\partial U/\partial y)dy$, or substituting from the above,

$$dU = MU_x dx + MU_y dy,$$

In other words, without loss of generality-the total derivative of the utility function, with respect to good x, will be

$$\frac{dU}{dx} = MU_x \frac{dx}{dx} + MU_y \frac{dy}{dx},$$

that is

$$\frac{dU}{dx} = MU_x + MU_y \frac{dy}{dx}.$$

At any point on the indifference curve it will be,

dU/dx=0,

because

U=*c*, where c is stable

From the above equation it follows,

$$0 = MU_x + MU_y \frac{dy}{dx}$$

or, rearranging,

$$-\frac{dy}{dx} = \frac{MU_x}{MU_y}$$

OLY is defined by the negative slope of the indifference curve in any bundle (dyad) of 2 basic products, which concern us, in the analysis we do. This turns out to be equal to the ratio of marginal utilities:

$$MRS_{xy} = MU_x/MU_y.$$

When consumers maximize utility with respect to the budget constraint, the indifference curve is tangent to the budget line, hence, with m representing the slope:

$$m_{\text{indif}} = m_{\text{budget}}$$

$$-(MRS_{xy}) = -(P_x/P_y)$$

$$MRS_{xy} = P_x/P_y$$

$$MU_x/MU_y = P_x/P_y$$

$$MU_x/P_x = MU_y/P_y$$

$$-\frac{dy}{dx} = \frac{px}{py}$$

Therefore, when the consumer chooses his "shopping basket" (combination of goods) that maximizes his individual utility, given the income constraint line

$$MU_x/MU_y = P_x/P_y$$

$$MU_x/P_x = MU_y/P_y$$

The important conclusion that emerges from this process tells us that utility is maximized when the consumer's basket is distributed (combination of goods) in such a way that the marginal utility/benefit per monetary unit (e.g., euro) spent is equal for each product. If this equality is not achieved, then this means that the consumer could increase his/her own utility, simply by cutting the expenditure he makes on a product of lesser personal utility, and correspondingly, increase the expenditure on the other product (which possibly gives him/her greater satisfaction/benefit/usefulness which, however, is constantly decreasing). This constitutes both the content and the definition of the so-called "law of of diminishing marginal utility". According to this law: As the consumer increases the consumed quantity of a good per unit of time, the total (psychological) utility he enjoys from this consumption increases, however, after a certain point, the additional (marginal) utility resulting from consuming an additional amount of the good per unit of time tends to zero. Going from positive, to zero, and then to negative values of marginal utility is another way of saying that marginal utility is diminishing. We have seen that the marginal ratio of substitution is given by the slope of the indifference curve at a certain point on it. This behavior of the marginal ratio of substitution to decrease along an indifference curve from its upper to its lower part is called the principle or law of the decreasing marginal ratio of substitution and explains the convexity of indifference curves with respect to the origin of the axes. Or, to put it another way, the convexity of indifference curves captures the validity of the law of diminishing marginal rate of substitution, that is, the decreasing rate of substitution of one good for another (good Y for good X) along an indifference curve and from up down.

Properties of Indifference Curves

Indifference curves are characterized by five basic properties (Note 12):

a. Indifference curves are negatively sloped: This property follows directly from the postulate of non-saturation: The consumer always prefers “more” to “less”. Between 2 bundles A and B that contain the same amount of X but B contains more of Y then B>A.

It is also called “Monotonicity of Preferences”. Since MU is a derivative of the function U, it follows that the integral of MU is the function U. But the integral of MU corresponds to the entire area under the MU curve.

b. The highest (the most distant from the beginning of the axes) indifference curve represents a higher level of utility versus a lower one (which is closer to the origin of the axes-More X than combination A, or more Y than combination B, move the indifference curve further away from the origin of the axes.

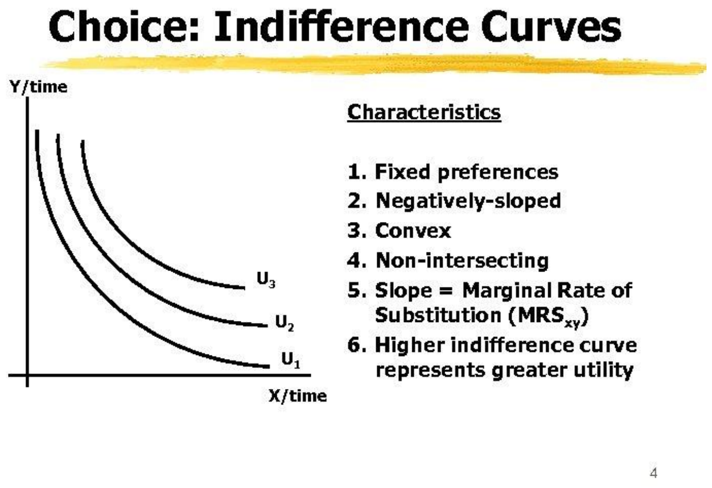
c. Indifference curves are dense everywhere: This property follows from the axiom of comparison and the assumption that goods are perfectly divisible. The consumer is always able to rank, based on his preferences, two bundles of goods at different levels of utility or at the same level of utility (comparison principle). Since each point in the commodity space corresponds to a bundle of goods (assumption of perfect divisibility of goods) it follows that each point in the commodity space must lie on an indifference curve at any given utility level.

d. Indifference curves do not intersect: This property is proved by showing that in the opposite case, i.e., if the indifference curves intersect, we are led to a logical contradiction.

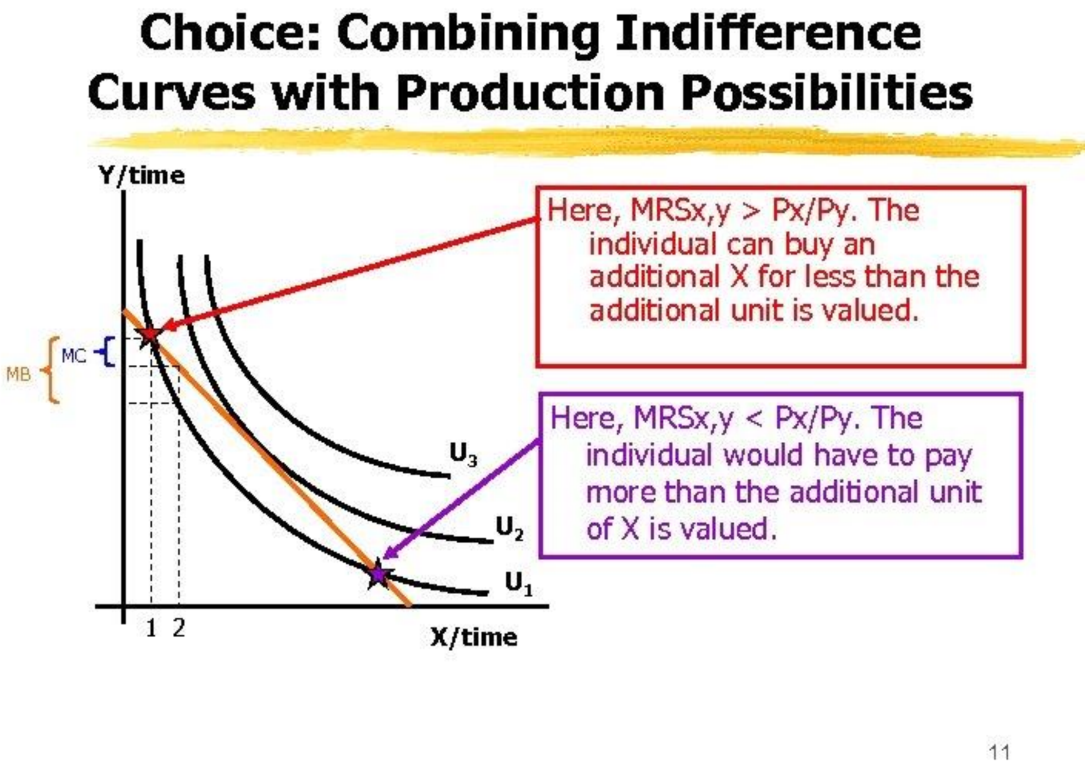
Analysis-proof

We wrote that if the amount of X or Y increases, the beam (A) moves to the same Indifference Curve Curve) but at a different point of it.

We get 2 points (Bundles) A, C’ on the indifference curve K1. However, the points (bundles) B, C’ that express a different level of satisfaction are on a different indifference curve K2. However, C’ seems to satisfy and the 2 levels of utility, which means that the consumer is indifferent between them, which is impossible. On the other hand, the points (bundles) C, C’ satisfy needs/give utility greater than that of A, C’ (of the K1 indifference curve).



CHOICE: Indifferent Curves



Choice: Combining Indifference Curves with Production Possibilities Y/time Here, MRSx, y > Px/Py. The individual can buy an additional X for less than the additional unit is valued. MB MC U 3 U 2 Here, MRSx, y < Px/Py. The individual would have to pay more than the additional unit of X is valued. U 1 1 2 X/time

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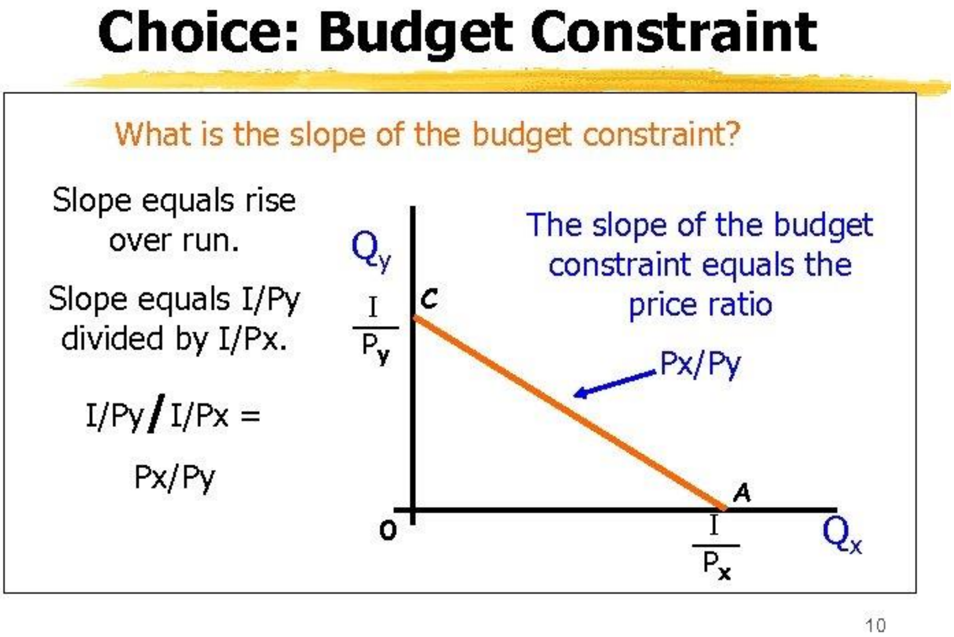
Choice Y/time Y* When MRSx, y = Px/Py, the individual will have reached aChoice Y/time Y* When MRSx, y = Px/Py, the individual will have reached a point where he can make himself no better off by a rearrangement of resources in X and Y consumption. U 3 U 2 U 1 X* He will have maximized his utility!



Choice: Budget Constraint What is the slope of the budget constraint? Slope equals rise over run. Slope equals I/Py divided by I/Px. Qy I Py C The slope of the budget constraint equals the price ratio Px/Py I/Py/I/Px=Px/Py 0 I Px A Qx

good X, and also, Δ y * MUy the change in utility from the change by Δ y of the quantity occupied by good Y and zero the total effect of these utility changes on movement along a given indifference curve. For example, let an indifference curve described by the equation U=f(x, y), where U some fixed number. Taking the total derivative (or total differential) of this equation we will have:

$$0 = (\frac{\partial f}{\partial x}) * dx + (\frac{\partial f}{\partial y}) * dy = MUx * dy + MUy * dy....\delta\eta\lambda...o\lambda\iota\kappa\acute{\eta}..\pi\alpha\rho\acute{\alpha}\gamma\omega\gamma o\varsigma$$

The marginal rate of substitution of good Y by good X expresses the maximum quantity (the maximum number of units) of good Y that the consumer is willing to sacrifice in order to obtain an additional unit of good X, without changing the utility it enjoys.

BALANCE of the consumer

DEFINITION: Equilibrium of the consumer is the situation in which a consumer, given monetary income within a certain period of time and for given prices of goods, maximizes his total utility by disposing of all his income.

Consumer’s first equilibrium condition is:

$$xP_x + yP_y = I..(\sigma\tau\alpha\theta\varepsilon\rho\acute{o}) \quad \text{(i)}$$

where x and y are the quantities possessed by the consumer of two goods X and Y, PX and PY their respective given (fixed) prices per unit of good, I, the given-fixed.
The second equilibrium condition of the consumer is: (ii)

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} \ldots .MU_x = ..οριακήωφέλεια..από..το..X..\&..MU_y = ..Ορ..Ωφ..από...Y$$

(principle of equal marginal changes)
From (i) it follows (by rearrangement)

$$xP_x + yP_y = I..(σταθερό)$$

$yP_y = I - xP_x$……… Divide by: Py (both 2 members of the equation)

$$y\frac{P_y}{P_y} = \frac{I}{P_y} - x\frac{P_x}{P_y}$$

$$y = \frac{I}{P_y} - x\frac{P_x}{P_y}$$

I is the line of income constraint (in our case, "linear" vw prow

$$P_y\ //////...και.....\frac{P_x}{P_y}.....η..κλίση(slope)..της\ /\ ..γραμμής..εισοδηματικού...περιορισμού$$

SECTION VII
PANEL
Alternatively-aggregated,
Let a consumer be willing to sacrifice y units of good Y (Δ y) to obtain x units of good X (Δ x). This consumer is therefore willing to sacrifice Δ y/Δ x units of good Y for an additional unit of good X. So, the marginal rate of substitution of good Y for good X is given by the (negative) quotient Δ y/Δ x.
Generally,
(NDE)

$$F\left(x_1, \ldots, x_n, u, \frac{\partial u}{\partial x_1}, \ldots, \frac{\partial u}{\partial x_n}, \frac{\partial^2 u}{\partial x_1 \partial x_1}, \ldots, \frac{\partial^2 u}{\partial x_1 \partial x_n}, \ldots\right) = 0.$$

$\frac{\partial u}{\partial x}(x, y) = 0.$ (simple MDE)

$u(x,y) = f(y),$ (general solution)

$\frac{\mathrm{d}u}{\mathrm{d}x}(x) = 0,$ usual form with solution, $u(x) = c,$

At least $U(x, y)$

With MDE

$MU_x = \partial U / \partial x$ (1)

$MU_y = \partial U / \partial y$ (2)

$dU = (\partial U / \partial x)dx + (\partial U / \partial y)dy$ (3)

$dU = MU_x dx + MU_y dy$ (4): (1) and (2) over (3)

From (4) the

$\frac{dU}{dx} = MU_x \frac{dx}{dx} + MU_y \frac{dy}{dx}$, (5)

$\frac{dU}{dx} = MU_x + MU_y \frac{dy}{dx}$. (6)

Now, any point on the indifference curve will be,

$\frac{dU}{dx} = 0 \qquad \varepsilon\pi\varepsilon\iota\delta\acute{\eta},,,,,u = c...\kappa\alpha\iota..c = \sigma\,\tau\,\alpha\,\theta\,\acute{\varepsilon}\acute{\eta}$. (7)

$0 = (\frac{\partial f}{\partial x}) * dx + (\frac{\partial f}{\partial y}) * dy = MUx * dy + MUy * dy....\delta\eta\lambda...o\lambda\iota\kappa\acute{\eta}..\pi\alpha\rho\acute{\alpha}\gamma\omega\gamma o\varsigma$ (8)

replacing,

$\Delta x * MUx + \Delta y * MUy = 0$ (9)

or, in infinitesimal differences,

$dx * MUx + dyMUy = 0$ (10)

From the above equation it follows,

$0 = MU_x + MU_y \frac{dy}{dx}$ (11)

or, rearranging,

$-\frac{dy}{dx} = \frac{MU_x}{MU_y}$ (12)

As we have seen, the indifference curve is convex to the origin of the axes we have defined MRS as the negative slope of the indifference curve,

$MRS_{xy} \geq 0$

$MRS_{xy} = MU_x / MU_y$. (13)

Nevertheless,

From (1), (2), (12), and (13)

$$MU_x = \partial U / \partial x \quad (1)$$

$$MU_y = \partial U / \partial y \quad (2)$$

$$-\frac{dy}{dx} = \frac{MU_x}{MU_y} \quad (12)$$

$$MRS_{xy} = MU_x / MU_y . \quad (13)$$

resulting:

$$MRS_{xy} = \frac{MU_x}{MU_y} = -\frac{dy}{dx} \text{.....αρνητικό, πρόσημο,[KA..κυρτή..ως.., προς..την..αρχή..των..αξόνων} \quad (14)$$

Therefore,

$$MRS_{xy} = -\frac{\Delta y}{\Delta x} \text{...για..απειροελάχιστες...διαφορές...} = -\frac{dy}{dx} \quad (15)$$

▲

<u>Nevertheless,</u>

The two equilibrium conditions in the market:

1) $xP_x + yP_y = I..(\text{σταθερό})$ (where x and y are the quantities possessed by the consumer of two goods X and Y, PX and PY their respective given (fixed) prices per unit of good, I, the given-fixed) (16)

2) $$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} \text{....}MU_x = \text{..οριακή ωφέλεια..από..το..X..\&..}MU_y = \text{..Ορ..Ωφ..από...}Y$$

(17)

EQUILIBRIUM

Equilibrium of the consumer it is called the situation in which a consumer, given monetary income within a certain period of time and for given prices of goods, maximizes his total utility by disposing of all his income.

Based on this definition, the equilibrium state will be when:

$$-m_{induff} = -m_{budget} \quad (18)$$

where m=curve slope,

as they both have the same direction (negative slope, with respect to the origin of the axes)

But, negative sign from both sides of the equation implies

$$m_{induff} = m_{budget} \quad (19)$$

Now from the combination of (1), (2), (13) it follows

$MU_x = \partial U / \partial x$(1)

$MU_y = \partial U / \partial y$(2)

$MRS_{xy} = MU_x / MU_y .$(13) results

$$MRS_{xy} = \frac{\frac{\partial U}{\partial x}}{\frac{\partial U}{\partial y}} = \frac{\partial U * \partial y}{\partial U * \partial x} = \frac{\partial y}{\partial x} = \frac{dy}{dx} .....\sigma\varepsilon...\acute{o}\rho o \upsilon \varsigma \sigma \upsilon \nu o \lambda \iota \kappa \acute{\eta} \varsigma.\pi \alpha \rho \alpha \gamma \acute{\omega} \gamma \iota \sigma \eta \varsigma..$$

(20)

Nevertheless, $m_{induff} = m_{budget}$

=slope of the Indifference Curve equal to the slope of the income restriction line, at the specific point (point of contact of KA and Income Restriction Line (budget line).

The consumer chooses (rationality) the "shopping basket" (combination of goods) that maximizes his individual utility, given the income constraint line (I).

$$xP_x + yP_y = I..(\sigma\tau\alpha\theta\varepsilon\rho\acute{o})$$

Ie (*)

$$y = \frac{I}{P_y} - P_x(\frac{P_x}{P_y}).....I..\varepsilon\iota\sigma o \delta \eta,,\pi\varepsilon\rho\iota o\rho\iota\sigma\mu\acute{o}\varsigma..\kappa\alpha\iota..(\frac{P_x}{P_y}) = \eta..\kappa\lambda\acute{\iota}\sigma\eta..\tau\omega\nu..\tau\iota\mu\acute{\omega}\nu,,(\sigma\chi\varepsilon\tau\iota\kappa\acute{\varepsilon}\varsigma..\tau\iota\mu\acute{\varepsilon}\varsigma$$

$MU_x / MU_y = P_x / P_y$ (1)

$MU_x / P_x = MU_y / P_y$ (2)

At equilibrium, we therefore have (combination of (1), (2), (13) and (20)

$MU_x = \partial U / \partial x$ (1)

$MU_y = \partial U / \partial y$ (2)

$MRS_{xy} = MU_x / MU_y .$ (13)

$$MRS_{xy} = \frac{\frac{\partial U}{\partial x}}{\frac{\partial U}{\partial y}} = \frac{\partial U * \partial y}{\partial U * \partial x} = \frac{\partial y}{\partial x} = \frac{dy}{dx} .....\sigma\varepsilon...\acute{o}\rho o \upsilon \varsigma \sigma \upsilon \nu o \lambda \iota \kappa \acute{\eta} \varsigma.\pi \alpha \rho \alpha \gamma \acute{\omega} \gamma \iota \sigma \eta \varsigma.. \quad (20)$$

So,

$$MRS_{xy} = \frac{MU_x}{MU_y} = \frac{P_x}{P_y}(1) = \frac{dy}{dx} = \frac{Px}{Py} \quad (21)$$

More correct mathematical "formulation", (due to negative slope of K.A)

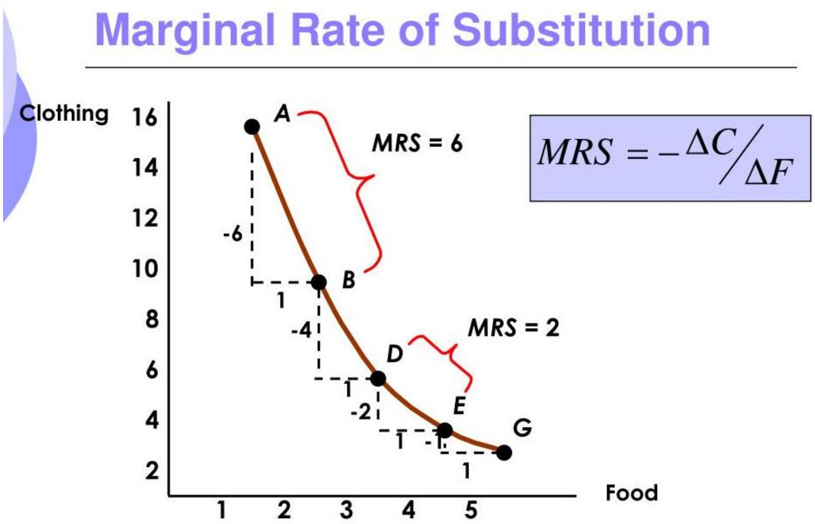
$$-\frac{dy}{dx} = \frac{Px}{Py} ..\text{Ισορροπία..κατ/τή..Σχετικές..τιμές..κοντά...στον...ΟΛΥ}$$

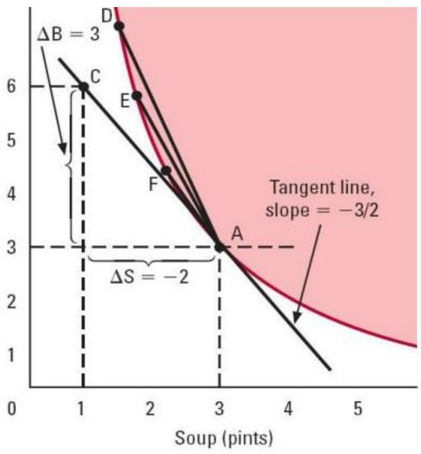
It is at this very point that I achieve my Perfect choice … given a given budget, in the sense that I cannot find a better alternative combination of products, keeping my level of satisfaction of needs unchanged.

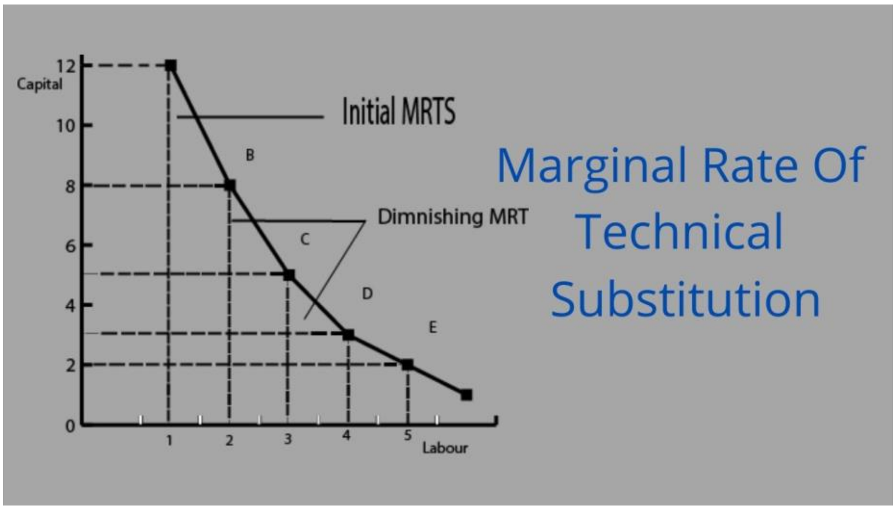
This is how, in a state of equilibrium, this inverse relationship of the slope of the CA is interpreted at the limit point (ALLY) on which it touches the line of income limitation, and consequently the line of relative prices.

$$-\frac{dy}{dx} = \frac{P_x}{P_y}$$

(*) $xP_x + yP_y = I..(\text{σταθερό})$ $yP_y = I - xP_x$ ……… Divide by: Py (both 2 members of the equation) $y\frac{P_y}{P_y} = \frac{I}{P_y} - x\frac{P_x}{P_y}$ $y = \frac{I}{P_y} - x\frac{P_x}{P_y}$







4. The Socially Acceptable Substitution

The beginnings of the following analysis can be found in one of the 60 oldest texts inscribed on clay tablets, in Linear B, in Knossos (1450 and 1100 BC).

Linear B was the writing system used during the Mycenaean Period. Samples of this script have been found in Late Minoan II sites in Crete and in Mycenaean IIIA-B sites in mainland Greece, suggesting that the script was in use between 1450 and 1100 BC. The use of Linear B was limited to important palace sites such as Knossos, Mycenae, Pylos, Thebes and Tiryns. Most Linear B inscriptions are found on clay tablets and largely involve the documentation of the financial transactions of the palace administration, but there are also a few instances related to military activity.

According to G. Lyckouras (Note 14),

LINEAR B IS THE OLDEST PRESERVED FORM OF WRITTEN GREEK THAT WE KNOW.

The Greeks were not the only ones to invent a syllabic writing system: several such writing systems had been used by contemporary neighboring Near Eastern peoples. Linear B includes 90 syllables and an unspecified number of idiograms. Each syllabic symbol represents either a vowel or an open syllable (syllable ending in a vowel), but cannot represent symphonic clusters.

Origin of Linear B

Linear B is the oldest preserved form of written Greek that we know of. At the time when we first encountered this writing system, Greece and various areas of the western coast of Asia Minor were already Greek-speaking. Linear B was used to write an archaic type of Greek known as Mycenaean Greek, which was the language used by the Mycenaeans. The inscriptions found in Crete appear to be older than those found in mainland Greece. The oldest confirmed Linear B tablets are the so-called chariot hall tablets at Knossos and have been dated between 1450 and 1350 BC, while the tablets found at Pylos have been dated to around 1200 BC. This suggests that Linear B was invented in Knossos (Crete), around 1450 BC, when the Mycenaeans took control of Knossos, and from there it spread to mainland Greece. Whether by peaceful annexation or armed invasion, we know that the Minoan civilization was replaced, both in Crete and mainland Greece, by the Mycenaean civilization.

Long before the Mycenaeans took control of Knossos, the Minoan civilization used a writing system known as Linear A, which was used to represent the official Minoan language. Its linguistic affiliation remains a mystery, but the prevailing opinion is that this language was not Greek. It probably wasn't even a language of the Indo-European family. Since Linear B shares many symbols with the earlier Linear A we are led to conclude that Linear B was created when scribes adapted Linear A to a new language: Greek. This view is further supported by the fact that Linear B is not suitable for rendering the Greek language. For example, in Linear B no distinction can be made between long and short vowels and between "λ" and "ρ". As a result, words like "white" had to be spelled "re-u-ka". Another difficulty was the fact that Linear B cannot render symphonic clusters. Thus, names like "Knossos" had to be rendered as "ko-no-so" and words like "axon" or "demnia" (bed, slats) had to be rendered as "a-ko-so-ne" or "de-mi-ni-a" respectively. In a few specific examples such as the word "Egyptian", written as "a-ku-pi-ti-jo" the limitations of the script for the rendering of the Greek are clear.

Decipherment and content of Linear B

Although the first examples of Linear B were discovered in the early 20th century, the texts of these tablets were not published until 1952 AD. The meaning of the Linear B texts remained shrouded in mystery until 1953 AD, when an architect named Michael Ventris managed to decipher it. Ventris interpreted the script as an early form of Greek, which was unexpected, as most scholars at the time believed that Linear B represented a form of Minoan language distinct from Greek. Although most Linear B texts can be read today, some elements of the writing system remain obscure. Not all syllables have been definitively identified.

Linear B texts are mainly administrative in nature, often in the form of inventory lists, receipt declarations, and records of commercial transactions. Tablets found at Pylos, for example, provide details of the manufacture and distribution of goods overseen by palaces, such as woolen and linen cloths and perfumed oils. As Mycenaean palaces had not only economic and political power but also religious power, some of the deciphered Linear B texts include lists of religious offerings. These lists give us an idea of the items they offered to the gods (mainly food and especially oil and wine) and also the names of some of the deities they offered to. Very interestingly, many of the deities of the Mycenaean era were the same as the deities of the classical era: Zeus, Hera, Poseidon, Mercury, Ares, Dionysus and Artemis are some of them. We cannot say with certainty that there was continuity of worship between Mycenaean and Classical times, but at least the names of many gods remained unchanged. Some examples of Linear B texts also mention chariots, armor, weapons, and soldiers preparing for military operations.

Decline of Linear B

After the collapse of Mycenaean rule around 1200 BC. The use of Linear B was gradually reduced until it was finally abandoned around 1100 BC. The use of writing was completely abandoned in the Greek world until its return in the 8th century, e.g., with the appearance of a new writing system: the Greek alphabet. Linear B and the Greek alphabet are two completely different and unrelated writing systems, and this in a way indicates how deeply the Greek space sank into illiteracy and stagnation during the period between the collapse of the Mycenaean civilization and the Greek archaic period, a period known as the Dark Ages.

5. Analysis

Linear B was a syllabic alphabet that was the first writing of the Greek language. It comes from the earlier Linear A and was used during the Mycenaean Period, from the 17th to the 13th century. BC, mainly for keeping accounting records in the palaces. The oldest writing in the Mycenaean language that has been discovered dates to around the 15th century BC.

It was discovered in the early twentieth century at Knossos by Arthur Evans, who named it so because it used linear characters (rather than pictorial ones, like Minoan hieroglyphic writing) inscribed on clay tablets. But it differed from an earlier similar script, Linear A, also found at Knossos and southern Crete. Clay tablets with Linear B writing were later found in the Mycenaean palace of Pylos in Messinia and in other locations in mainland Greece.

In total, about 5,000 texts have been found in Linear B (mainly tablets and, secondarily, vases). Of these, around 3,000 come from Knossos, around 1,400 from Pylos, around 300 from Thebes, 90 from Mycenae while a smaller number comes from Chania, Malia, Tiryns, Eleusis, Orchomenos and elsewhere.

The dating of the texts is disputed. The oldest dates back to around 1450 BC. and is written on a clay tablet discovered in the summer of 2010 in Iklaina, Messinia, by Professor Michalis Kosmopoulos. Others, written a little later, come from Knossos and belong to the Late Minoan II period (around 1400 BC). The remaining texts from Knossos are, according to my opinion, from 1370 BC. before the destruction of the Mycenaean palace. However, the opinion that they are a century younger is also supported. The remaining texts date from the 13th century BC.

Based on the handwriting of the scribes, archaeologists assume that the Knossos tablets were written by at least 60 different scribes, while those of Pylos by at least 30.

Linear B was initially not identified with any language, considered by Evans to represent a separate language he called Minoan, while he was almost entirely convinced that it could not possibly have been Greek.

Much later than the discovery of the signs and after many failed attempts by archaeologists and linguists, it was deciphered in 1952 by the young architect Michael Ventris (M. Ventris). Ventris enlisted the help of the classical philologist John Chadwick (J. Chadwick) and together they published a landmark article in the Journal of Hellenic Studies where they confidently interpreted 65 of its 88 then known symbols, formulated its basic orthographic rules and brought to light a archaic Greek dialect five centuries older than the Greek of Homer.

Linear B includes 89 syllabaries, which represent syllables with phonetic value, and about 260 ideograms (or logograms), which convey meanings such as man, woman, cow, oil, wine, etc. and symbols for rendering numbers. Although its texts are mostly lists of supplies entering, leaving, or stored in palaces and telegraph inscriptions of goods, their value as primary sources for Mycenaean economy, trade, religion, social stratification, and administrative organization of Greece is huge. To date, 87% of the texts have been deciphered. Several attempts have been made to date, to interpret the remaining 17 or so symbols whose syllabic value is not known.

Drawing amazing stimuli from the book "The Pythagorean Hippasus the Metapontine of the musical properties" of the distinguished expert "harmonic" musicologist researcher and engineer Mr. G. Lykouras, who-among other things-cites on page 113, an inscription of Linear B and observes that for the keeping of accounting records in the palaces, it refers to the distribution of rams between Phaistos (pa-i-to) that is, of the Lord and the Subjects according to the proportion

$$\frac{1509}{2440} = 0{,}618$$

or vice versa,

$$\frac{2440}{1506} \approx 1{,}618$$

ΓΡΑΜΜΙΚΗ Β ΔΙΑΝΟΜΗ ΚΡΙΩΝ ΜΕΤΑΞΥ ΑΡΧΟΝΤΑ (ΦΑΙΣΤΟΥ) ΚΑΙ ΥΠΗΚΟΩΝ 1150 π.Χ

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Αναλογία διανομής κριών μεταξύ ΦΑΙΣΤΟΥ[pa-i-to] (ΑΡΧΩΝ) και των ΥΠΗΚΟΩΝ

$$\frac{pa-i-to}{υπηκοοι} = \frac{1509}{2440} = 0{,}618$$

ΛΥΚΟΥΡΑΣ 113

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This observation is surprising at the present stage as it shows that not only does the “bureaucracy” with the ruler receive the smallest amount in relation to what the subjects receive, but even further that the ratio of this division is given by the golden extreme and the mean. ratio, φ or 1/φ.

We say “in the present phase” with 2 meanings.

First of all, we should be concerned about the current bureaucracy which seems to be emerging as a scourge of public life (consultants on call, numerous government schemes, many levels of government which all together reverse the golden ratio and even further exceed it). Let it does not escape the fact that we have very rich rulers and poor citizens.

Second, it gives us an amazing opportunity to move towards self-organization, dominated by sympathy (win) and community contribution (win), along with individualism (win). A win-win-win agreement is therefore acceptable in the process of self-organization.

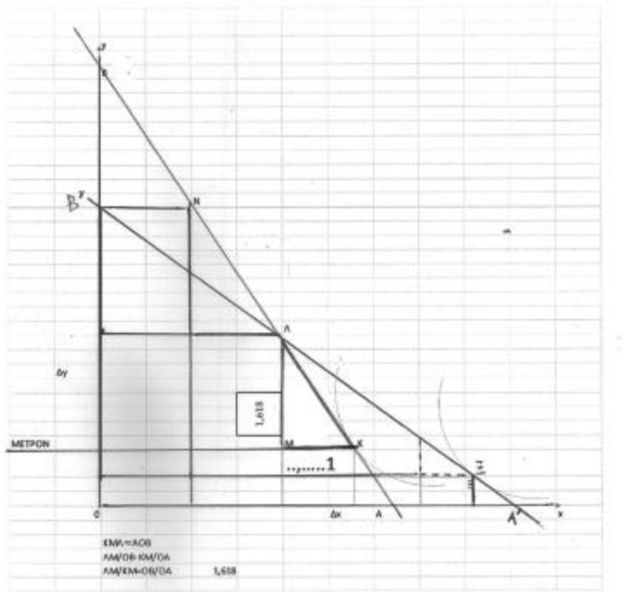
This, however, is not enough if we do not incorporate the “Metro Ariston” of Cleobulus of Lindius (560 BC) into our lives: METRON ARISTON.

Taking into account the above observations we could now “build” self-organization on the foundations of self-awareness and giving.

Drawing stimuli from the distribution of rams in the distant 15th century BC between the ruler (strong) and the subjects (weak) in Phaistos, I can now proceed with the risky proposal, that, at least in self-organization, the powerful through self-knowledge and offering can-and must-sacrifice more than what he expects to gain In fact he aims for any intangible benefits.

Thus the socialized egalitarian principle is “forced” to put a barrier to its claims arising from social contribution and appreciation.

The Equator Principle with the social barrier of MEASURE is shown below.



The (rectangular) triangle KML is similar to the triangle AOB. This means that LM/OB=MK/OA or LM/MK=OB/OA=Px/Py, But, LM/MK=-dy/dx. That is, -dy/dx=Px/Py.

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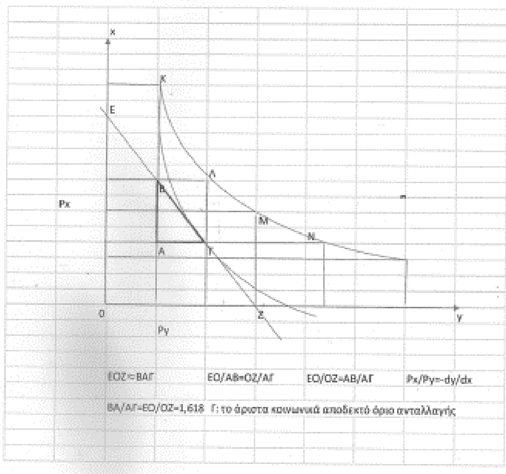

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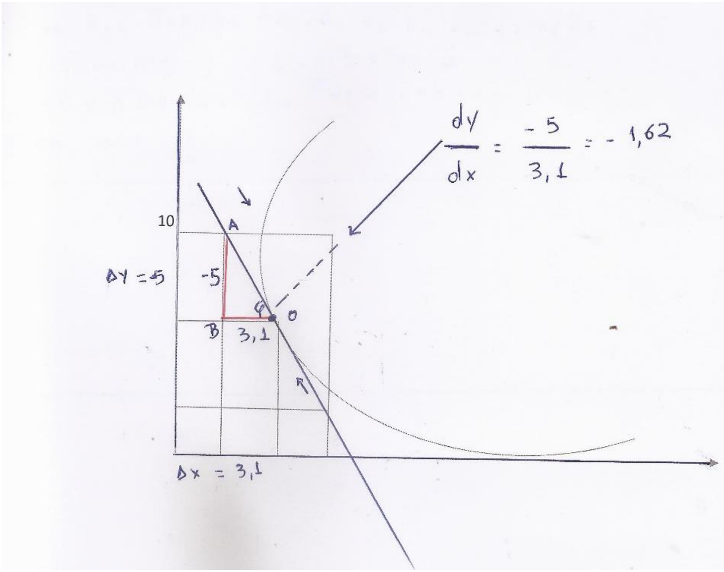


6. Conclusions

Combining the win-win-win concept with the MRS-in the prism of the LINEAR B- a number of views are resulted:

Based on knowledge and attitudes, to achieve self-organization, at the point of choice, for the leaders of a self-organized community

1) consciously sacrificing more to consciously gain less with the overall benefit in mind

2) empathy: I put myself in the place of the other, in the community

3) I am not entirely ignorant of my own self-interest

4) The absolute exchange size of a completely socially acceptable MRS solution is 1.618

5) The Law of Diminishing Marginal Ratio of Substitution dy/dx tells us to sacrifice an ever smaller part for equal (at least) gain

6) The absolute amount of socially acceptable exchange for the leaders determines where we stop this exchange in the case of self-organization

7) The extreme limit of such a socially acceptable exchange is 1,618:1

8) The quantity 1,618 was chosen because it expresses universal harmony

9) The sacrifice-gain difference (1.618-1=0.618) expresses the conscious contribution at the individual level, for the formation of social capital necessary for the case of self-organization

10) As-dy/dx=Px/Py this means that Leaders consciously pay a higher price for some good (e.g., at a Love bazaar, or Christmas) in the case of Self-Organization, as the goal is not to win but to contribute to the general good

11) The win-win-win model representing the benefit for the "opponent" in any interaction (negotiation), the individual benefit (1) and at the same time the benefit for the community, then φ=1.618, 1, and λ=0.618 as are the unique 3 numbers where the product of the edges (1.618*0.618) gives the middle win =1 and it holds φ-λ=1 and φ*λ=1 Numbers that have this property are unique

12) φ is the only number that verifies the three means, as follows

A. NUMERICAL: $\beta = \frac{\alpha+\gamma}{2} = \frac{1{,}618+0618}{2} = \frac{2{,}236}{2} = 1{,}118.$

B. GEOMETRIC: $\beta = \frac{\alpha}{\gamma} = \frac{1{,}618}{0{,}618} => \alpha = \beta\gamma = 1{,}618 * 0{,}618 = 1$

C. HARMONIC: $$H = \frac{N}{\frac{1}{x_1} + \frac{1}{x_2} + \cdots + \frac{1}{x_n}} \quad => \quad \bar{a}_H = \frac{n}{\frac{1}{a_1} + \ldots + \frac{1}{a_n}}.$$

$\beta = \frac{2}{1/\alpha+1/\gamma} = \frac{2\alpha\gamma}{\alpha+\gamma} = \frac{2(1{,}618)(0{,}618)}{1{,}618+0{,}618} = \frac{2}{2{,}236} = 0{,}8944 \ldots$

ARITHMETIC * HARMONIC = GEOMETRIC MEAN

$\beta = \frac{\alpha+\gamma}{2} * \frac{2\alpha\gamma}{\alpha+\gamma} = \frac{2\alpha\gamma}{2}$ =St= 1

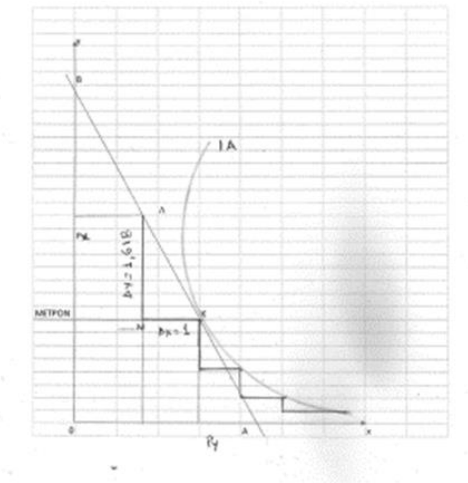
Indeed, 1.118*0.894=1

Finally, the rationally thinking consumer will agree to an exchange of the form (-1) dy/dx<1, i.e., where he derives marginal satisfaction greater than the marginal sacrifice.

Gradually the relationship passes from the point (-1) dy/dx=1 to end up in the self-evident relationship (-1) dy/dx<1, i.e., "I sacrifice as little marginal sacrifice as possible, for as much marginal satisfaction as possible".

Our proposal, for the case of self-organization, focuses on the relationship,

(-1) dy/dx=Px/Py=1.618



References

George, L. (1994). *Alcman of Sparta and the pannychis of the autumnal equinox* (Sponsored by "George Drosini Museum Foundation", 2024).

George, L. (1994). *Dear Director, Mr. Sfyri* (Ilion Music School library, 2016).

George, L. (1994). *Hesiod. 500 years before Archimedes* (Sponsored by "George Drosini Museum Foundation", 2024).

George, L. (1994). *Odysseus of Lisbon* (Self-published, Strilingas archive, 2023).

George, L. (1994). *On the Musical Geography of Delphi* (Archaeology and Arts vol. 86, 2003).

George, L. (1994). *Philolaus and the division of tone* (Syrtos 1994).

George, L. (1994). *Pythagorean Music and the East 1994*. (Syrtos 1994).

George, L. (1994). *Rising Sun and setting Suns* (Presented 2012).

George, L. (1994). *The approach of "π" to Homer* (Archaeology and Arts vol. 96, 2005).

George, L. (1994). *The Bathers of Akrotiri of Thera* (Self-published, Striligas archive, 2022).

George, L. (1994). *The Pythagorean Hippasos, the Metapontine of musical asymmetries* (Self-published, arch. Striligas 2020).

John Harsanyi Bayesian Games: Games with Incomplete Information. (n.d.). *Shmuel Zamir* (pp. 426-441). Retrieved from http://www.ma.huji.ac.il/~zamir/documents/BayesianGames_ShmuelZamir

JOHN SELTEN

John, S. (1988). *A General Theory of Equilibrium Selection in Games* (with John C. Harsanyi). Cambridge, Massachusetts: MIT-Press.

John, S. (1988). *Models of Strategic Rationality, Theory and Decision Library, Series C: Game Theory, Mathematical Programming and Operations Research*. Dordrecht-Boston-London: Kluwer Academic Publishers.

John, S. (1991). *Game Equilibrium Models IV, Berlin, New York*. Springer Verlag.

John, S. (1992). *Rational Interaction—Essays in Honor of John C. Harsanyi, Berlin, New York*. Springer-Verlag.

Lax, D. A., & Sebenius, J. K. (1986). *The Manager as Negotiator*. Free Press, New York, USA.

Mayberry, J. P., Nash, J. F., & Shubik, M. (1953). A comparison of treatments of a duopoly situation. *Econometrica*, *21*(1), 141-154. https://doi.org/10.2307/1906952

Nash, J. (1951). Non-cooperative games. *Annals of Mathematics, Second Series*, *54*(2), 286-295. https://doi.org/10.2307/1969529

Nash, J. (1952a). Algebraic approximations of manifolds. In L. M. Graves, E. Hille, P. A. Smith, & O. Zariski (Eds.), *Proceedings of the International Congress of Mathematicians: Cambridge, Massachusetts, U. S. A., 1950* (Volume I., pp. 516-517). Providence, RI: American Mathematical Society.

Nash, J. (1952b). Real algebraic manifolds. *Annals of Mathematics*, *Second Series*, *56*(3), 405-421. https://doi.org/10.2307/1969649

Nash, J. (1953). Two-person cooperative games. *Econometrica*, *21*(1), 128-140. https://doi.org/10.2307/1906951

Nash, J. (1954). C1 isometric imbeddings. *Annals of Mathematics*, *Second Series*, *60*(3), 383-396. https://doi.org/10.2307/1969840

Nash, J. F. Jr. (1950a). The bargaining problem. *Econometrica*, *18*(2), 155-162. https://doi.org/10.2307/1907266

Nash, J. F. Jr. (1950b). Equilibrium points in n-person games. *Proceedings of the National Academy of Sciences of the United States of America*, *36*(1), 48-49. https://doi.org/10.1073/pnas.36.1.48

Nash, J. F., & Shapley, L. S. (1950). A simple three-person poker game. In H. W. Kuhn, & A. W. Tucker (Eds.), *Contributions to the Theory of Games (Volume I), Annals of Mathematics Studies* (Vol. 24, pp. 105-116). Princeton, NJ: Princeton University Press. https://doi.org/10.1515/9781400881727-011

Nicholson, H. (1964). *Diplomacy*. Oxford University Press, New York, USA.

Papakonstantinidis, L. A. (2002). *The "win-win-win model" Euracademy*. Gotland Campus, Visby, SW.

Papakonstantinidis, L. A. (2002). *The strategy of Economic and Regional Development* (BOOK DARDANOS GUTENBERG Edition).

Papakonstantinidis, L. A. (2007). *Bargaining and Local Development* (BOOK-DARDANOS-GUTENBERG Ed.).

Zartman, W. I. (1978). *The Negotiation Process: Theories and Applications*. Sage Publications Beverly Hills, California, USA.

Notes

Note 1. Papakonstantinidis, L. A. (2002). The "win-win-win model" Euracademy, Gotland Campus, Visby, SW.

Note 2. T. Schelling's. (1960). Strategy of conflict-Harvard University Press.

Note 3. Nash, John F. Jr. (1950a). The bargaining problem. Econometrica, 18(2), 155-162.

Note 4. John Harsanyi Bayesian Games: Games with Incomplete Information, Shmuel Zamir, 426-441, http://www.ma.huji.ac.il/~zamir/documents/BayesianGames_ShmuelZamir

Note 5. SELTEN.

A General Theory of Equilibrium Selection in Games (with John C. Harsanyi), Cambridge, Massachusetts: MIT-Press. (1988)

Models of Strategic Rationality, Theory and Decision Library, Series C: Game Theory, Mathematical Programming and Operations Research, Dordrecht-Boston-London: Kluwer Academic Publishers. (1988)

Game Equilibrium Models IV, Berlin, New York, Springer Verlag, 1991, ISBN 978-3-662-07369-8.

Rational Interaction—Essays in Honor of John C. Harsanyi, Berlin, New York, Springer-Verlag, 1992, ISBN 978-3-642-08136-1.

Note 6. Papakonstantinidis, L. A. (2007). "Bargaining and Local Development"-BOOK-DARDANOS-GUTENBERG Ed. 2007.

Note 7. Nicholson, H., 1964. Diplomacy. Oxford University Press, New York, USA.

Zartman, WI, 1978. The Negotiation Process: Theories and Applications. Sage Publications Beverly Hills, California, USA.

Lax, DA and Sebenius, JK, 1986. The Manager as Negotiator. Free Press, New York, USA.

Note 8. Papakonstantinidis, L. A. (2002). "The strategy of Economic and Regional Development-BOOK DARDANOS GUTENBERG Edition.

Note 9. SOURCE.

Paul Krugman—Nobel Memorial Prize in economics, 2008 Microeconomics-2nd edition.

Note 10. SOURCE: Yiannis Milios Spyros Lapatsioras Giorgos Oikonomakis (1.10.2000) INTRODUCTION TO ECONOMIC ANALYSIS (Greek Letters publications).

Note 11. SOURCE E S :

Dimitris Tsoumbelis (2009 Patras) "Partial Differential Equations" Volume I University of Patras Department of Mathematics.

Svirshchevskii, S. Invariant Linear Space and Exact Solutions of Nonlinear Evolution Equations J. Nonlinear Math. Physics, 1996, Vol. 3, No. 1-2, pp. 164-169.

Note 12. SOURCE: Yiannis Milios Spyros Lapatsioras Giorgos Oikonomakis (1.10.2000) INTRODUCTION TO ECONOMIC ANALYSIS (Greek Letters publications).

Note 13. SOURCE

Drichoutis, AC, Lazaridis, P. and Nayga, RM, Jr. (2004). Determinants of consumers use of nutritional food labels. Global Business & Economics Review-Anthology 2004, 320-332: Didactic «Theory Behavior Consumer » Agricultural University of Athens (Dept Rural Economy and Development) Aua/gr drichoutis/ pp educational.

Note 14. G. Lyckouras. (2020). The Pythagorean Hippasos, the Metapontine of musical asymmetries (Self-published, arch. Striligas 2020).