Chapter 1[1]

The Real Rate of Profits/Returns Equals Zero, Actually and Endogenously

Foreword to Chapter 1

This chapter illustrates a new fact that the real rate of return is zero or *RRR*=0 with its implication, in "*Earth Endogenous System*," 15 May 2013. Another article presented to Conference, Madrid, proves other new facts towards stop macro-inequality under full-employment and with no inflation, so that the whole version will be integrated by two sister items. These new facts solely hold scientifically, using two-dimensional plane and simply reducing endogenous equations each by hyperbola function. Also these new facts commonly and robustly reinforce the market principles under the price-equilibrium. *RRR*=0 is tightly connected with the author's money-neutrality (*Int. Adv Econ Res*, 16, 2010) and, in this chapter, money-neutral is externally tested by (1) directly using 10 year debt yield, M2, and the exchange rate, each in *International Financial Statistics Yearbook*, IMF; and also tested by (2) indirectly using the speed years and the valuation ratio each in equilibrium, after endogenously proving the Phelps' (1961, 1965, 1966) golden rule. *RRR*=0 implies that the nominal growth rate of output matches the rate of inflation/deflation. Also, *RRR*=0 leads to no more inflation/deflation and no more assets-bubbles, where statistics data are always within a certain range of endogenous data, in KEWT database, simultaneously under theory=practice.

Signposts to Chapter 1: the real assets; the financial/market assets; the (real) rate of profits/returns; the relative share of capital; the capital-output ratio; nominal and real; the rate of inflation/deflation; money-neutral; the technology coefficient; the Phelps coefficient; the speed coefficient; the endogenous-equilibrium; the price-equilibrium; the market principles; perfect competition with no assumption; the relative price level; the absolute price level; endogenous, external, and exogenous; the valuation ratio; assets-bubbles; geometrical topology; seven endogenous parameters

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[1] The author dedicates the 'new discovery of *RRR*=0' in this chapter to Dr. John M. Virgo, Founder of IAES since 1974. The author is much thankful to his successor, Dr. Katharine Virgo. The author is delighted to have this opportunity to convey their spirit to next generations at the Madrid Conference on 10-13 Oct., 2013.

Chapter 1, *HEU*

1. Introduction

This chapter develops the author's purely endogenous system under no assumption, from the standpoint of "*Earth Endogenous System*," lxviii+568, 15 May 2013, published by Better Advances Press, Toronto (the *EES*, hereunder). Processes and conclusions before and after the *EES* remain the same. This chapter intends to express the same contents more precisely and measure and proves the author's one new discovery/finding, the rate of return=zero or *RRR*=0, with its implications. First of all, this chapter stays scientific, as Samuelson pursued (see, Kamiryo, 2013a p.11). Human perceives differences between natural science, mathematics, physics, and chemistry, and social science. Today, social sciences and accordingly, economics are much closer to natural science in the 21st century, with human decision-making.

The author' two-dimensional plane hyperbola (simply, 2DPH) is a reduced form of endogenous equation in the *EES*. This chapter geometrically develops the topology of 2DPH and simplifies the points of the new finding, *RRR*=0. *RRR*=0 makes the *EES* more robust and to the point. The author proves that Pythagorean triangle area equals right equilateral triangle area in the 2DPH. The author repeatedly has confirmed that the proof is the first appearance in the literature, investigating topology at math and physics libraries. 2DPH is fitted for developing right equilateral triangle so as to express author's silver ratio (1, 1, and 1.4142 as the square root of 2).

The proof implies that old Greece western civilization and Japan old agriculture (agricultures based on Japan Oriental civilization) are united peacefully. The proof is numerically proved by using corresponding endogenous equation and, immediately by a cross point of the hyperbolic curve, as a reduced form of the endogenous equation, and its horizontal asymptote (HA).[2]

2. Consumption-neutral to growth and technology, with stop macro-equality

Characteristics of the endogenous system are represented by one finding that the real rate of profits/returns is zero, $r_{(REAL)} = 0$. This finding spreads over the system with other new findings and concrete expressions. Consistently and compatibly, $r_{(REAL)} = 0$ prevails and reinforces the market principles and statistics data, by country, sector, and year

[2] See the *EES*, Appendix, p. 481, 2-1 and p. 506, $r^*(i) = \frac{\alpha \cdot i\,(1-\beta^*)(1+n)+\alpha \cdot n(1-\alpha)}{\beta^*(1-\alpha)i}$, where the vertical asymptote (VA)=0 and the horizontal asymptote $HA_{r^*(i)} = \frac{\alpha(1-\beta^*)(1+n)}{\beta^*(1-\alpha)}$. Related equations are: $y = \frac{c}{a} + \frac{d}{ax} = \frac{cx+d}{ax}$, where $a = \beta^*(1-\alpha)$, $b = 0$, $\mathrm{c} = \alpha(1-\beta^*)(1+n)$, $\mathrm{f} = \mathrm{d} = \alpha \cdot n(1-\alpha)$, $\mathrm{e} = \frac{\mathrm{c}}{\mathrm{a}}$, and $\frac{\mathrm{f}}{\mathrm{a}} = \frac{\alpha \cdot n}{\beta^*} = \frac{\alpha \cdot n(1-\alpha)}{\beta^*(1-\alpha)}$. Or, $r^*(i) = \frac{\alpha(1-\beta^*)(1+n)}{\beta^*(1-\alpha)} + \frac{\alpha \cdot n(1-\alpha)}{\beta^*(1-\alpha) \cdot i}$, and $\left(y - \frac{c}{a}\right)\left(x + \right.$ *ba=fa*.

and over years.

Preliminarily the author refers to 'consumption-neutral' to growth and technology, as discussed in a separate chapter. Consumption-neutral expresses one of essentials in the *EES* so that readers may easily enter into the mechanics of the rate of return and further the Phelps coefficient that follows soon below. Consumption and technological progress march together but independently. It implies that consumers' goods and producer's goods are produced independently but integrated into one sector and the whole system by country. Note here the whole system like the *EES* differs from two-sector models in the literature. What is the difference?

First of all, there exist some differences between technological progress and E. S. Phelps (1961, 1965) golden rule. All the models in the literature estimate partially endogenous rates of technological progress under the market principles. The *EES* measures a unique endogenous rate of technological progress by converting Solow's (1956) exogenous to endogenous, based on a discrete Cobb-Douglas production function. Endogenous results reflect differences between the demand and supply in the macro-economy. The market principles cannot disclose causes wholly, while the *EES* clarifies causes=results simultaneously. Fundamental cause is the accumulation of deficit over years. The rate of technological progress, g_A^*, is the product of the net investment to disposable national income, $i = I/Y$, and the technology coefficient, $1-\beta^*$; $g_A^* = i(1-\beta^*)$. And, two elements of i and β^* are measured by sector, just before tax redistribution.

As a result, Phelps golden rule is converted to endogenous from exogenous under the market principles. Under the exogenous golden rule, the actual/estimated growth rate of *GDP* and the market rate of interest as a resultant rate of profits to capital are compared. Nominal=real +inflation/deflation prevails in the Fisher's (1906, 1930) equations. Contrarily under the endogenous golden rule, the growth rate of output is accurately measured using the rate of technological progress. The rate of return is measured using the capital-output ratio and the relative share of capital. These parameters and variables are always consistent by country, sector, and years, and over years, as the whole system. However, the rate of return=0 surprisingly unites exogenous and endogenous Phelps coefficients (see next section).

In short, four statements outline the contents of the new finding in this chapter:

(1) New finding is, r_{REAL}=0 or *RRR*=0. This is supreme foundation of an economy and implies that nominal growth is equal to the rate of inflation.

(2) The author's money-neutral prevails by country, sector, and years and over years. The first appearance is *IAER* (16), 2010.

(3) r_{REAL}=0 is connected with a new finding of the relative share of capital-neutral

(α-neutral) to macro-inequality.

(4) Three neutralities, money-neutral, consumption-neutral to growth and technology, and α-neutral to macro-inequality, are interrelated inherently.

3. Rate of return after deducting inflation/deflation is zero

This section proves one finding that the real rate of return is zero or *RRR*=0 and constitutes a highlight of this chapter. *RRR*=0 is wholly supported by money-neutral existing regardless of qualitative level of the market principles. Further, this new fact is inherently related to two concrete expressions in new findings; stop macro-inequality and enjoy full-employment. **Fig. 1** expresses that the *RRR*=0 is a unique core of new findings. *RRR*=0 is justified by its proof, theoretical and empirical. The author shows two ways of proofs, simple indication and precise measure in the same 2DPH:

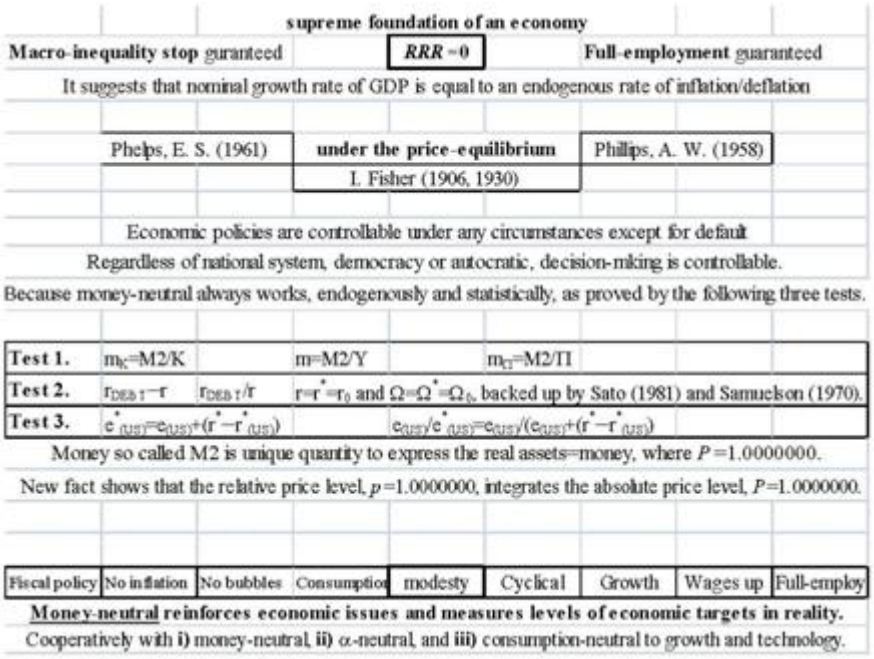

Fig. 1 Structural design of *RRR*=0 wholly supported by money-neutral

Simple indication: One cross point of the hyperbolic curve and the diagonal in 2DPH. Character of 2D apparently makes four quadrants static.

Precise measure: The *x* axis shows the ratio of net investment to national disposable income after depreciation (capital consumption) and, the *y* axis shows the rate of return. The horizontal asymptote (HA) expresses the rate of endogenous inflation/deflation and, the hyperbolic curve expresses the rate of return function to the net investment to national disposable income. These two ratios lead to a proof that returns are maximized at minimum net investment: The closer the vertical asymptote (VA) to the hyperbolic curve, the higher the rate of return to net investment is.

New finding of the *RRR*=0 corresponds with maximum profits historically accepted in the literature and under the market principles. Enterprises after tax redistribution solely aim at maximum profits. Maximum profits are geometrically shown by parabola. A parabola, however, does not need an origin of four quadrants and is free from quadrants. Simply the literature pays attention to parabola, much easier than hyperbola that requires four quadrants.

Next, let the author explain and prove new concrete expressions extracted from *RRR*=0, step by step using endogenous equations. This work presents a highlight of this chapter and proves that any equation in the *EES* is always consistent with thousand equations conceivable. First of all, prove that the rate of return reduces to zero. Preliminarily, let start with the speed coefficient, $\lambda^* = (1-\alpha)n + (1-\delta_0)g_A^*$. At the convergence point of time, the relative share of capital, α, equals the diminishing returns to capital (DRC) coefficient, δ_0. Then, $\lambda^* = (1-\alpha)n + (1-\delta_0)g_A^*$ reduces to $\lambda^* = (1-\alpha)(n+g_A^*)$. This equation matches Robert Barro and Sala-i-Martin's (1995), except for the difference between endogenous and exogenous in the rate of technological progress.

The *EES* proves $r^* = (\alpha/(i\cdot\beta^*))g_Y^*$, where the endogenous Phelps coefficient *x* is $\frac{\alpha}{i\cdot\beta^*}$. The Phelps coefficient, $x \equiv \frac{r^*}{g_Y^*}$, is obtained by using $\alpha = \Omega\cdot r^*$ or $r^* = \frac{\alpha}{\Omega}$ and accordingly, $\mathrm{x} = \alpha/(\mathrm{i}\cdot\beta^*)$ holds. The growth rate of disposable national income per capita is shown by $g_y^* = i(1-\beta^*)/(1-\alpha)$. Accordingly, the growth rate of output is shown by $g_Y^* = g_y^*(1+n)+n$. Back to $g_A^* = i(1-\beta^*)$, if $1-\beta^* = 0$, there appears no growth.

Now let search and prove the condition that $1-\beta^*$ turns to 0.0000 or no growth appears. As an extension of Chapter 8 in the *EES*, the following E1 to E4 hold each as reduced form under the rate of change in population, $n_E = n = 0$.

E1. $\beta^* = \frac{\Omega(1-\beta^*)}{(1-\alpha)}$ or $\Omega = \frac{\beta^*(1-\alpha)}{(1-\beta^*)}$. Or, $\beta^*(1-\alpha) = \Omega(1-\beta^*)$.

E2. $\beta^* = \frac{\Omega\cdot i}{i(1-\alpha)+\Omega\cdot i}$ holds under population *L*=const. and accordingly, *n*=0 in $\beta^* = \frac{\Omega^*(n(1-\alpha)+i(1+n))}{i(1-\alpha)+\Omega^*\cdot i(1+n)}$. Thus E2 becomes reduced form.

E3. Inserting the capital-output ratio of E1 into E2, $\beta^* = \frac{\frac{\beta^*(1-\alpha)}{(1-\beta^*)}\cdot i}{i(1-\alpha)+\frac{\beta^*(1-\alpha)}{(1-\beta^*)}\cdot i}$.

E4. The LHS of E3 is β^* while the RHS of E3 is $\frac{\beta^*}{(1-\beta^*)+\beta^*} = 1.0000$.
As a result, $\beta^* = 1.0000$ or $(1-\beta^*) = 0$.

In short, the above four equations imply no growth due to $(1-\beta^*) = 0$ and

$g_A^* = i(1-\beta^*) = 0$, when population *L*=const. and accordingly, *n*=0. The *EES* shows the above results as a conclusion, yet without the above processes, step by step. Besides, the above four equations imply that discrete endogenous results equal corresponding results of partial derivative using the continuous case.[3] The same results exist between discrete and continuous.

4. From exogenous to endogenous 'Phelps' golden rule, cooperating and reinforcing the market principles

This section briefly sums up new finding and new concrete expressions so as to prove inherent interrelationships consistently. Phelps (ibid.) golden rule determines the relationship between the rate of return and the growth rate, based on the market principles and accordingly, under the price-equilibrium. In the case of exogenous, the rate of technological progress is given and the rate of return is determined in the financial market. In the case of endogenous, the rate of technological progress is first of all measured by $g_A^* = i(1-\beta^*)$. Accordingly, followed by the rate of return, and the growth rate of national disposable net income, g_Y^*. The rate of return is zero, as proved in two-ways in topology above. Also the rate of return is zero as the extension of the *EES* (see E1 to E4 above). Then, the nominal rate of inflation corresponds with the nominal rate of growth. The relative share of capital is measured by $\alpha = \Pi/Y$ and also alternatively by $\alpha = \Omega_0 \cdot r_0$, where the capital-output ratio is $\Omega = \Omega^* = \Omega_0$ and accordingly the rate of return is $r = r^* = r_0$ under a fixed relative share of capital, $\alpha = \Pi/Y$.

As a result, the Phelps coefficient *x* reduces to $x = i \cdot \beta^*/\Omega$. The author proves the Phelps coefficient, $x = i \cdot \beta^*/\Omega$, here using four steps:

E5. $r^* = \frac{\alpha}{\Omega}$.

E6. $g_Y^* = \frac{i(1-\beta^*)}{1-\alpha}(1+n) + n$.

E7. Since population *L* is constant and *n*=0, $g_Y^* = \frac{i(1-\beta^*)}{1-\alpha}$ and $\Omega = \frac{\beta^*(1-\alpha)}{(1-\beta^*)}$.

E8. As a result, $\frac{r^*}{g_Y^*}$ reduces to $\frac{\alpha}{i\cdot\beta^*}$ (in detail, see E1 to E4 above).

Supplement to $\alpha = \delta_0$: The diminishing returns to capital (DRC) coefficient δ_0 becomes the relative share of capital, α, at the convergence point of time in the transitional path. The DRC coefficient δ_0, is finally determined by $B^* = (1-\beta^*)/\beta^*$ and $\Omega = \Omega^* = \Omega_0$; $\delta_0 = 1 + \frac{LN(\Omega^*)}{LN(B^*)}$. Thus, g_Y^* is determined by the ratio of net investment to net national disposable income, $i = I/Y$, and the DRC coefficient δ_0;

[3] Tinny differences between discrete and continuous: The continuous case has one answer while the discrete case several answers at least. Purely endogenous equation is able to extend as many equations as possible so that tinny difference such as 1.0000000000 versus 1.0000000500 is calculated.

independently of $r = r^* = r_0 = 0$. It implies that the endogenous Phelps coefficient holds wholly. New finding of $r = r^* = r_0 = 0$ at the *EES* perfectly matches other new findings and concrete expressions. Note that $i = I/Y$ is related to the balance of payments to *Y*, $bop = BOP/Y = s - i$,[4] where saving rate is shown by $s = S/Y$. In short, g_Y^* is determined by net investment and the rate of technological progress.

Supplement to the market principles: Under the market principles, the rate of return is replaced by the rate of interest externally in the financial market. The rate of inflation is similarly by Consumers Price Index (*CPI*) externally. Irving Fisher's (ibid.) equation, 'nominal = real + inflation/deflation' holds anywhere beyond space and time. Data obtained in the markets are always external and its causes are not given. As a result, any model in the literature is composed of endogenous and exogenous or external and with assumptions as surrogate for equations.

Then, what is the condition for the exogenous Phelps coefficient to holds in the literature? The condition is simple. The above general form, $x = i \cdot \beta^*/\Omega$, answers at once. Set $x = 1.0$ in order to maintain $r = g_Y^*$. The answer is $\Omega = i \cdot \beta^*$. Phelps (ibid.) golden rule in the literature holds under $\Omega = i \cdot \beta^*$, even if the rate of technological progress is given externally.

5. The first money-neutral tests: using externals of ten-year debt yield, money supply, and the exchange rate by country

First, this section sums up the stream of the author's money-neutral. Second, the author presents money tests for money-neutral. The author already addressed his own money-neutrality in *Int. Adv. Econ. Res.* 2010 16: 282-296. This stream has never changed before and after publication of the *EES* (15 May 2013). This chapter focuses on money-neutral tests for the sake of whole new findings and concrete expressions. [5]

And, this section extends the stream of the author's money-neutral: The real assets of the *EES* stay at the Scientific world (for its strictness, see BOX 1-3 in Chapter 1). The real assets use money as numerical numbers, i.e., money by country with the exchange rate.

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[4] The above national disposable net income *Y* is composed of the real assets. Therefore *Y* is endogenously related to the balance of payments $BOP = S - I$ and deficit $\Delta D = S_G - I_G$ by country, where the PRI sector is expressed by $(S_{PRI} - I_{PRI}) = (S - I) - (S_G - I_G)$. Suppose that the G sector is zero. In this case $(S_{PRI} - I_{PRI}) = (S - I)$ holds. Suppose that deficit is based on cash flows. Real-assets deficit exceptionally equals estimated deficit that uses cash flow-in and -out only when deficit is zero. Why is it so? This question is tied up with several fundamental defects macroeconomics has not conquered.

[5] The author's endogenous I-S and external L-M diagram (2010) was involved in 'money-neutrality.' The 'money-neutrality' is now expressed as 'money-neutral,' as a core among six nature-neutrals developed after the *EES*.

It implies that money is a unique unit to be able to examine hypotheses among all the units used in natural and social sciences.

The current stream of money-neutral: Historically, David Hume (*Of Money*, 1752; see N. Gregory Mankiw) affirmatively steps into money-neutral. Technically, short-sighted (negative) money is distinguished with long-sighted (positive) money. Money is just like close to God and perfectly neutral to the real assets. David Hume (ibid.) immediately overlaps the *EES*. Positive and negative always coexist in reality yet at once are united in reality. This is the money world.

Mankiw, Gregory, N. (*Journal of Economic Perspectives*, May 2006) publishes 'The Macroeconomist as Scientist and Engineer,' on behalf of David Hume and compares Keynes Revolution with the Neoclassicists. N. Gregory Mankiw (ibid.) integrated two ways, engineer and scientist. The author is thankful to his invaluable tolerance and two-way stay at the real world.

Back to the first money-neutral tests: Let the author test money-neutral, by using ten-year debt yield, money supply, and the exchange rate. Related data are available in the KEWT databases for 65 countries and three area averages, 1960-1990 to 2010/2011.

For the financial/market assets, the *EES* has analyzed (1) money-neutral indicators or three sorts of money supply to capital and output, where each inverse is the multiplier, (2) the difference between ten-year debt yield and related endogenous rates/ratios, and (3) a unique exchange rate-neutral indicator that clarifies that the exchange rate is completely neutral to the real assets.

Tables 1 to **6** at the end of this chapter each shows two tests, $r_{M(10yrs)}/r^*$ and $e_{(US)}/e^*_{(US)}$, where $e^*_{(US)} = e_{(US)} + (r^* - r^*_{(US)})$, [6] for 65 countries and three area-averages. The exchange rate is surprisingly neutral to the real assets at almost all the countries. Anyone cannot control the exchange rate by country. The market principles are alive forever. Ten-year debt yield changes, wholly depending on the level of debt. The Phelps coefficient or its golden rule prevails by country. Yet, the Phelps coefficient reflects the qualitative level of the endogenous-equilibrium. As a result, the rate of return suddenly fluctuates and (often soon) recovers balances.

[6] The exchange rate-neutral indicators are composed of the following five, as shown in Notations of the *EES*:

E9. the exchange rate to the US (item 'ae', in *IFSY*, IMF) divided by the relative growth rate of per capita output, $e_{(US)}/g^{**}_y$, where $g^{**}_y = g^*_y/g^*_{y\,(US)}$.

E10. $r_{DEBT} - r^*$.

E11. $e^*_{(US)} = e_{(US)} + (r^* - r^*_{(US)})$.

E12. $e_{(US)}/e^*_{(US)} = e_{(US)}/\left(e_{(US)} + (r^* - r^*_{(US)})\right)$.

E13. $e_{(US)}/y^{**}$, where $y^{**} = y^*/y^*_{(US)}$.

6. The second money-neutral tests endogenously using the speed years and the valuation ratio

This section endogenously presents the second money-neutral tests, where money-neutral is wholly involved in the real assets and the *EES* (see Tables 1 to 6, once again).

The *EES* has endogenous consistency among values and ratios in its whole system. This consistency spreads over all the values and ratios of statistics data. The first money-neutral tests above are indispensably extended to the endogenous equilibrium tests that use two ratios, the speed years for convergence, $\mathrm{speed} = 1/\lambda^*$, and the valuation ratio, $v^* = r^*/(r^* - g_Y^*)$. These two ratios express endogenous equilibrium inherently.

Character of the valuation ratio is similar to that of the exchange rate by country. It implies that the valuation ratio is tightly related to the exchange rate and the markets. No one controls the exchange continuously. The valuation ratio reflects the real assets severely. Readers will understand the circumstances as an extension of the Phelps coefficient. When the three parameters of $\alpha, i = I/Y, and\ \beta^*$ of the Phelps coefficient are modest, the markets express its judge more favorably.

Character of the speed year for convergence differs, similarly to ten-year debt yield to the *RRR*, $r_{M(10yrs)}/r^*$. It implies that the rate of return, exogenously and endogenously, is deeply involved in the essentials of the real assets. The speed years are not only a direct measure of the endogenous equilibrium but also a whole typical indicator of the real assets. Suppose: The speed years fluctuate sharply. This shock is required for the recovery of unstable equilibrium. After the shock, the speed years usually become stable and modest. If it is not, some fundamental causes exist such as huge debt and extreme unbalances between the real assets.

7. Conclusions

This chapter is one of two sister chapters and focuses on *RRR*=0. It implies that the nominal growth rate of national disposable net income *Y* remains non sense, due to the equal relationship between the growth rate and the rate of inflation or deflation. Suppose deficit=0. Then, there is no inflation and no deflation. This is deficit-neutral, which is closely related to *RRR*=0. Inevitably, *RRR*=0 is tied up with the Phelps (1961) coefficient between profits and output growth under the market principles. As a result, this chapter presents the first and second money-neutral tests for the whole versions of new discoveries/findings and the two-dimensional (2D) plane hyperbola, which is most fitted

for the proof of *RRR*=0.

Let the author conclude the implication of the *RRR*=0 in statistics analysis and under money-neutral. International competition for higher *GDP* and accordingly, endless inequality at macro level (except for social policies) will lose color. *GDP* growth rate equals the rate of inflation. People by country become friendly and stable under the *RRR*=0. Policy-makers relaxed deepen country's own culture and history and, people are happy free from meaningless competitions. Human will come back, nearer to the Nature. No assets-bubbles are expected when three parameters of the Phelps coefficient, $x = i \cdot \beta^* / \Omega$, are balanced and controlled in the Scientific world. It is not required for economists to establish new qualitative indicators over *GDP*.

Most important is technological competition in the global world. One country develops technology independently of national taste and consumption. And, the less the population, the higher the rate of technological progress is, as proved in the *EES* (pp. 405-432).

Lastly, endogenous equations use two independent variables, the ratio of national disposable net income, $i = I/Y$, and the rate of change in population, $n_E = n$. The *RRR*=0 as a dependent variable uses $i = I/Y$, as its independent variable. $i = I/Y$ and $n_E = n$, however, completely symmetric as proved in the *EES* (see, Appendix C, page 494). The rate of unemployment as a dependent variable uses $n_E = n$, as its independent variable. Thus the *RRR*=0 is at once connected with the rate of unemployment, in the two dimension plane. There is no tradeoff between the *RRR*=0 and the rate of unemployment, endogenously and as a result, in actual statistics data since actual statistics data are always within a certain range of endogenous data.

The level of optimum depends on a level of endogenous equilibrium and is determined directly by the speed years. A level of endogenous equilibrium is expressed by corresponding level of moderation, whose immeasurable point is the origin of two dimension plane. Therefore, the situation of the *RRR*=0 and the rate of unemployment=0 ultimately indicates the level of optimum, where the origin is much close to the origin.

Let us together dream towards diversified culture and civilization with people's spiritual happiness and towards give-first and back-last; by country. Dream reflects natural science. Dream realizes peacefully in the 21st century at once when social and economic science becomes much closer to natural sciences by year.

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Table 1 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	17 Asian counti	E0. Euro Area	15 Europe excl	1. Argentina		17 Asian counti	E0. Euro Area	15 Europe excl	1. Argentina
σ(DEBT)/σ*					σ(US)/σ*(US)			σ*(US)=σ(US)+(σ*-σ*(US))	
1990	0.160		4.8066	0.7382	1990	0.5612		1.0001	0.5978
1991	0.269		2.2625	0.1039	1991	0.7038		1.0000	0.2630
1992	0.398		2.1598	0.0172	1992	0.7924		1.0000	0.0598
1993	0.514		1.7682	0.3444	1993	0.8478		1.0000	0.6322
1994	0.667		4.9246	0.5099	1994	0.9050		1.0000	0.7641
1995	0.768		3.4725	0.7028	1995	0.9305		0.9995	0.8542
1996	0.812		3.3204	0.5520	1996	0.9443		0.9989	0.8997
1997	0.711		1.3624	0.3870	1997	0.9309		0.9962	0.9213
1998	1.095		0.9546	0.8257	1998	0.9692		0.9951	0.9428
1999	1.263	1.6463	0.7257	0.8869	1999	0.9867	1.0394	0.9945	0.9447
2000	1.191	1.8941	0.6270	1.0661	2000	0.9869	1.0355	0.9949	0.9629
2001	1.434	1.5002	0.5162	3.0794	2001	1.0174	1.0387	0.9953	0.9860
2002	1.537	0.7970	0.4353	3.7543	2002	1.0430	1.0361	0.9949	0.9873
2003	1.392	1.3330	0.3301	1.3854	2003	1.0419	1.0995	0.9936	0.9880
2004	1.303	1.2785	0.3268	0.4533	2004	1.0365	1.1075	0.9943	0.9847
2005	1.393	1.0796	0.2838	0.3745	2005	1.0543	1.1047	0.9957	0.9829
2006	1.442	1.1454	0.3588	0.4148	2006	1.0357	1.0925	0.9965	0.9639
2007	1.348	1.1269	0.4395	0.5294	2007	1.0304	1.1012	0.9962	0.9592
2008	1.682	1.3521	0.5595	0.8554	2008	1.0501	1.1298	0.9984	0.9599
2009	2.553	1.5084	0.5780	0.9143	2009	1.0688	1.1727	1.0002	1.3183
2010	1.560	1.4072	0.5528	0.3825	2010	1.0710	1.1605	1.0001	26.7274
2011	1.719	1.5826	0.5799	0.4730	2011	1.0779	1.1539	1.0005	8.6051
2012	0.168	1.0256	1.4149	0.5655	2012	0.8466	1.1531	1.0027	4.6095
	1. US	E1. Austria	1. Denmark	2. Bolivia		1. US	E1. Austria	1. Denmark	2. Bolivia
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	1.024	0.5587	1.5418	1.3266	1990	1.0110	0.9946	1.0050	0.9783
1991	1.034	0.2660	0.0372	1.0877	1991	1.0099	0.9785	0.7040	0.9718
1992	0.848	0.3467	0.1317	0.9216	1992	1.0116	0.9877	0.9095	0.9736
1993	0.829	0.3806	0.1630	0.8885	1993	1.0151	0.9928	0.9512	0.9737
1994	1.046	0.4127	0.2317	0.7676	1994	1.0129	0.9930	0.9626	0.9729
1995	1.136	0.6240	0.2516	0.7509	1995	1.0197	0.9980	0.9622	0.9722
1996	1.141	0.6026	0.2421	0.7629	1996	1.0183	0.9992	0.9721	0.9715
1997	1.170	0.5498	0.2367	0.7661	1997	1.0164	0.9988	0.9795	0.9740
1998	0.975	0.4662	0.2825	0.8119	1998	1.0124	0.9980	0.9855	0.9784
1999	1.014	0.3628	0.2596	0.9026	1999	1.0104	0.9552	0.9867	0.9817
2000	1.035	0.0019	0.2826	0.9225	2000	1.0079	0.0417	0.9840	0.9839
2001	0.785	0.0657	0.3094	0.8681	2001	1.0135	0.6200	0.9888	0.9869
2002	0.664	0.1035	0.4327	0.7550	2002	1.0250	0.7123	0.9934	0.9913
2003	0.553	0.1364	0.4119	0.6180	2003	1.0245	0.7972	0.9963	0.9919
2004	0.604	0.1379	0.4532	0.5662	2004	1.0248	0.7881	0.9987	0.9910
2005	0.609	0.1420	0.4035	0.6048	2005	1.0367	0.8702	0.9998	0.9907
2006	0.699	0.1649	0.4145	0.5029	2006	1.0229	0.8515	0.9969	0.9831
2007	0.660	0.1797	0.5185	0.4431	2007	1.0213	0.8307	0.9955	0.9792
2008	0.462	0.2178	0.6855	0.4497	2008	1.0261	0.8938	1.0004	0.9762
2009	0.379	0.3313	0.8777	0.6620	2009	1.0308	1.0147	1.0138	0.9879
2010	0.382	0.2764	0.6513	0.4360	2010	1.0359	1.0183	1.0090	0.9847
2011	0.320	0.2728	0.6185	0.3883	2011	1.0346	1.0117	1.0086	0.9821
2012	0.329	0.1512	0.4709	0.3539	2012	1.0366	0.9664	1.0086	0.9804
	2. Canada	E2. Belgium	2. Iceland	3. Brazil		2. Canada	E2. Belgium	2. Iceland	3. Brazil
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	3.148	1.3292	1.2490	15.304	1990	1.0583	1.0007	1.0005	1.0005
1991	2.836	1.3192	1.3177	3.987	1991	1.0498	1.0006	1.0002	0.9996
1992	2.452	1.2252	1.0813	4.345	1992	1.0503	1.0008	1.0004	1.0000
1993	2.272	1.0539	1.0721	18.819	1993	1.0411	1.0005	1.0003	1.0004
1994	2.667	1.1150	0.8060	8.096	1994	1.0380	1.0004	1.0003	1.0000
1995	2.428	0.8456	1.2055	45.254	1995	1.0374	0.9998	1.0004	1.0724
1996	2.185	0.8285	0.9529	38.279	1996	1.0337	1.0000	1.0003	1.0592
1997	1.798	0.6578	0.9232	34.690	1997	1.0261	0.9996	1.0002	1.0465
1998	1.578	0.5767	0.8087	36.961	1998	1.0225	0.9996	1.0001	1.0386
1999	1.345	0.5780	0.6783	32.800	1999	1.0167	0.9830	1.0000	1.0237
2000	1.014	0.8014	0.7921	19.650	2000	1.0050	0.9962	1.0000	1.0191
2001	1.224	1.4318	0.9456	18.851	2001	1.0182	1.0365	1.0002	1.0199
2002	1.317	1.3830	0.9324	19.873	2002	1.0340	1.0660	1.0005	1.0182
2003	1.228	1.2680	0.7176	19.647	2003	1.0486	1.0969	1.0006	1.0244
2004	1.090	1.0078	0.6942	14.592	2004	1.0498	1.0930	1.0008	1.0255
2005	0.900	0.8228	0.6092	14.055	2005	1.0576	1.0907	1.0008	1.0321
2006	0.939	0.8603	0.8385	12.114	2006	1.0469	1.0759	1.0006	1.0250
2007	0.930	0.8998	1.0487	9.730	2007	1.0380	1.0841	1.0005	1.0177
2008	0.869	1.1747	0.9525	9.661	2008	1.0591	1.1203	1.0003	1.0153
2009	13.128	1.3812	1.0430	8.542	2009	1.1048	1.1697	1.0007	2.4560
2010	1.220	1.1773	0.8536	6.359	2010	1.1114	1.1559	1.0006	(0.7219)
2011	1.028	1.4096	0.7314	7.146	2011	1.1075	1.1492	1.0006	(0.8590)
2012	0.582	0.3798	0.3116	4.899	2012	1.0818	1.0727	1.0003	(1.0389)

Data source: KEWT database 9.15, 1990-2012, for 65 (=17+14+15+19) countries by area, with three area-averages.

Original data are from *International Financial Statistics Yearbook*, IMF, by year (hereunder abbreviated).

Table 2 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	3. Australia	3. Finland	3. Norway	4. Chile		3. Australia	3. Finland	3. Norway	4. Chile
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	2.318	1.5462	0.6069	4.9064	1990	1.0331	1.0064	0.9869	1.0000
1991	2.990	2.9820	0.6184	2.9181	1991	1.0423	1.0122	0.9883	1.0000
1992	2.661	3.1730	0.8220	2.0692	1992	1.0445	1.0112	0.9968	0.9999
1993	2.077	2.4236	0.5386	1.7165	1993	1.0363	1.0088	0.9955	0.9999
1994	2.482	2.2425	0.5805	0.9970	1994	1.0381	1.0093	0.9942	0.9997
1995	2.422	1.4717	0.5749	0.7343	1995	1.0351	1.0054	0.9944	0.9999
1996	2.003	1.1793	0.4193	1.0284	1996	1.0313	1.0058	0.9904	1.0000
1997	1.682	0.7415	0.3122	1.1101	1997	1.0207	1.0001	0.9876	1.0000
1998	1.179	0.5830	0.4074	1.3783	1998	1.0134	0.9954	0.9949	1.0000
1999	1.413	0.6104	0.4089	1.3036	1999	1.0152	0.9889	0.9919	1.0000
2000	1.405	0.6206	0.4078	1.3040	2000	1.0118	0.9774	0.9898	1.0000
2001	1.280	0.5490	0.4372	0.6611	2001	1.0165	0.9861	0.9924	1.0000
2002	1.294	0.6535	0.5335	0.4452	2002	1.0291	1.0200	0.9966	1.0000
2003	1.184	0.7588	0.3987	0.3938	2003	1.0452	1.0652	0.9985	1.0000
2004	1.193	0.7614	0.2836	0.2054	2004	1.0463	1.0726	0.9962	0.9999
2005	0.943	0.6767	0.2112	0.2696	2005	1.0425	1.0799	0.9937	0.9999
2006	1.000	0.7351	0.2251	0.2413	2006	1.0344	1.0653	0.9873	0.9997
2007	0.993	0.6345	0.3042	0.2655	2007	1.0371	1.0514	0.9852	0.9997
2008	0.760	0.8158	0.2400	0.3484	2008	1.0272	1.0948	0.9863	0.9999
2009	0.834	1.2890	0.2772	0.4265	2009	1.0655	1.1682	1.0015	1.0022
2010	0.754	1.0279	0.2264	0.1828	2010	1.0639	1.1561	0.9987	1.0019
2011	0.589	1.0048	0.2682	0.2127	2011	1.0506	1.1493	1.0032	1.0027
2012	0.395	0.4367	0.0769	0.2934	2012	1.0489	1.1302	0.9841	1.0020
	4. N. Z.	4. France	4. Sweden	5. Colombia		4. N. Z.	4. France	4. Sweden	5. Colombia
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	4.707	2.3719	1.6043	3.1265	1990	1.0448	1.0111	1.0030	0.9999
1991	0.393	2.2810	1.4435	3.0814	1991	1.0383	1.0097	1.0027	0.9999
1992	3.126	2.3008	1.4235	2.6344	1992	1.0400	1.0109	1.0037	0.9999
1993	2.170	1.9328	1.1768	2.3677	1993	1.0312	1.0087	1.0017	0.9999
1994	2.304	2.0489	1.4317	2.6079	1994	1.0314	1.0090	1.0024	0.9999
1995	2.297	2.0827	1.2145	2.5164	1995	1.0329	1.0097	0.9999	0.9999
1996	2.551	1.7348	1.0834	2.8069	1996	1.0347	1.0082	1.0007	0.9999
1997	2.578	1.5489	0.8359	2.0503	1997	1.0263	1.0060	0.9991	0.9999
1998	2.601	1.2496	0.6322	2.3298	1998	1.0234	1.0055	0.9987	0.9999
1999	2.368	1.3097	0.5984	1.3551	1999	1.0213	1.0313	0.9980	0.9999
2000	2.309	1.5147	0.6004	1.2046	2000	1.0161	1.0283	0.9975	1.0000
2001	1.414	1.3811	0.5938	1.1325	2001	1.0137	1.0365	0.9990	1.0000
2002	1.734	1.3894	0.6828	0.9519	2002	1.0319	1.0671	1.0020	1.0000
2003	1.508	1.2023	0.6128	1.2148	2003	1.0451	1.0948	1.0038	1.0000
2004	1.697	1.1859	0.5123	0.9645	2004	1.0517	1.1039	1.0026	1.0000
2005	1.985	0.9825	0.3772	0.9601	2005	1.0593	1.1006	1.0028	1.0000
2006	2.125	1.0929	0.3519	0.9378	2006	1.0517	1.0908	0.9984	1.0000
2007	2.045	1.2237	0.3514	1.1573	2007	1.0552	1.1071	0.9934	1.0000
2008	2.406	1.2365	0.3698	1.3285	2008	1.0544	1.1263	0.9973	1.0000
2009	1.879	1.0117	0.5195	1.1160	2009	1.0812	1.1544	1.0094	1.0005
2010	1.871	0.8620	0.3657	0.9188	2010	1.0875	1.1439	1.0053	1.0020
2011	1.579	0.9428	0.2838	0.9555	2011	1.0880	1.1404	1.0033	1.0020
2012	1.225	0.6312	0.1436	1.1966	2012	1.0942	1.1349	1.0006	1.0023
	5. Mexico	5. Germany	5. Switzerland	6. Paraguay		5. Mexico	5. Germany	5. Switzerland	6. Paraguay
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	9.491	1.2309	0.4441	1.0774	1990	1.0048	1.0179	0.9614	1.0000
1991	7.282	1.7624	0.5744	0.9426	1991	0.9977	1.0274	0.9845	0.9999
1992	4.407	1.6932	0.6215	0.9091	1992	0.9875	1.0317	1.0058	1.0000
1993	6.798	1.4959	0.4749	0.8085	1993	1.0019	1.0266	1.0010	1.0000
1994	6.571	1.4318	0.6447	0.7113	1994	1.0007	1.0245	1.0019	1.0000
1995	5.784	1.4363	0.3357	0.8290	1995	0.9992	1.0273	0.9764	1.0000
1996	2.474	1.3655	0.3883	0.8923	1996	0.9932	1.0249	0.9893	1.0000
1997	1.505	1.2410	0.3485	0.9255	1997	0.9914	1.0177	0.9889	1.0000
1998	2.121	1.0492	0.2890	1.0070	1998	0.9971	1.0161	0.9818	1.0000
1999	2.143	1.4477	0.4176	0.9860	1999	0.9971	1.0381	0.9872	1.0000
2000	1.704	1.7982	0.3736	0.9339	2000	0.9972	1.0351	0.9823	1.0000
2001	1.251	1.6907	0.4419	0.8973	2001	0.9993	1.0436	0.9971	1.0000
2002	1.299	1.6744	0.3170	0.7370	2002	1.0016	1.0748	1.0140	1.0000
2003	1.078	1.5470	0.4073	0.7235	2003	1.0017	1.1071	1.0288	1.0000
2004	1.033	1.4624	0.3284	0.5361	2004	1.0010	1.1155	1.0283	1.0000
2005	1.127	1.2263	0.2673	0.6253	2005	1.0027	1.1113	1.0305	1.0000
2006	0.864	1.1837	0.2654	0.6229	2006	1.0001	1.0955	1.0002	1.0000
2007	0.844	0.9579	0.2724	0.5628	2007	1.0008	1.0912	0.9670	1.0000
2008	0.994	1.0070	0.1844	0.6135	2008	1.0023	1.1168	0.9703	1.0000
2009	1.367	1.2746	0.2219	0.6252	2009	1.0054	1.1756	1.0402	1.0002
2010	1.193	0.9421	0.1835	0.7779	2010	1.0058	1.1565	1.0256	1.0009
2011	1.016	0.8521	0.0773	0.6435	2011	1.0047	1.1481	1.0204	1.0009
2012	0.840	0.3453	0.0377	0.3257	2012	1.0049	1.1295	0.9202	1.0009

Data source: KEWT database 9.15, 1990-2012, for 65 countries by area.

Table 3 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	6. Bangladesh	6. Greece	6. the UK	7. Peru		6. Bangladesh	6. Greece	6. the UK	7. Peru
σ(DEBT)/σ*					σ(US)/σ*(US)			c*(US)=c(US)+(r*-r*(US))	
1990	1.103	2.1460	1.0176	73.4542	1990	0.9987	1.0000	0.9946	0.9989
1991	1.299	2.3237	0.8172	74.0012	1991	0.9991	1.0000	0.9831	1.0000
1992	1.125	2.0649	0.6579	10.8985	1992	0.9991	1.0000	0.9729	1.0000
1993	0.959	1.8714	0.5359	5.5258	1993	0.9983	0.9999	0.9643	1.0000
1994	0.984	1.7566	0.6477	3.5843	1994	0.9984	0.9999	0.9747	1.0000
1995	0.913	1.3958	0.7987	2.0163	1995	0.9983	0.9999	0.9872	0.9782
1996	1.124	1.2745	0.7930	2.0404	1996	0.9989	0.9999	0.9865	0.9815
1997	1.259	1.5318	0.7454	2.7024	1997	0.9991	1.0001	0.9863	0.9859
1998	1.425	0.9442	0.5808	1.6701	1998	0.9994	1.0001	0.9849	0.9898
1999	1.491	0.7338	0.4840	1.6398	1999	0.9994	1.0001	0.9811	0.9932
2000	1.427	0.3852	0.4641	1.4484	2000	0.9992	0.9999	0.9769	0.9940
2001	0.842	4.3639	0.4760	1.1763	2001	0.9980	1.1163	0.9801	0.9969
2002	0.953	4.2105	0.4406	1.2809	2002	0.9987	1.1396	0.9897	1.0045
2003	1.637	2.7309	0.4076	1.2569	2003	1.0001	1.1694	0.9947	1.0083
2004	1.560	1.9006	0.4355	1.1498	2004	1.0002	1.1723	0.9951	1.0073
2005	1.522	1.4835	0.3692	1.0645	2005	1.0003	1.1410	0.9950	1.0042
2006	1.665	1.8068	0.3973	0.5930	2006	1.0001	1.1655	0.9920	0.9732
2007	1.714	1.7268	0.5012	0.5464	2007	1.0001	1.1814	0.9878	0.9629
2008	1.714	1.3846	0.4235	0.7504	2008	1.0003	1.1510	0.9837	0.9823
2009	1.503	1.2630	0.2924	0.9571	2009	1.0005	1.1478	1.0024	1.5243
2010	1.300	2.5845	0.3032	0.5631	2010	1.0004	1.1457	0.9971	(2.4989)
2011	1.293	4.7302	0.2661	0.4342	2011	1.0003	1.1412	0.9982	(2.2294)
2012	1.495	1.3277	0.1088	0.4988	2012	1.0005	0.9509	0.9628	(1.8604)
	7. China	7. Ireland	1. Bulgaria	8. Iran		7. China	7. Ireland	1. Bulgaria	8. Iran
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	0.852	1.3383	0.0000	0.0000	1990	0.9978	1.0426	0.0000	0.9999
1991	0.749	1.5977	0.0000	0.0000	1991	0.9952	1.0589	0.0000	0.9992
1992	0.677	1.7395	0.0000	0.0000	1992	0.9946	1.0776	0.0000	0.9983
1993	0.738	1.2064	0.0000	0.0000	1993	0.9894	1.0332	0.0000	1.0000
1994	0.626	1.3254	0.0000	0.0000	1994	0.9892	1.0350	0.0000	0.9999
1995	0.815	0.8087	0.9648	0.0000	1995	0.9923	0.9700	0.1405	0.9999
1996	0.714	0.6461	1.1225	0.0000	1996	0.9926	0.9417	0.3627	0.9999
1997	0.610	0.4088	0.2378	0.0000	1997	0.9917	0.8897	0.4202	0.9999
1998	0.490	0.5014	0.1397	0.0000	1998	0.9926	0.8696	0.7190	0.9999
1999	0.492	1.3305	0.1430	0.0000	1999	0.9936	1.0191	0.7535	0.9999
2000	0.502	0.8952	0.1590	0.0000	2000	0.9939	0.9976	0.8406	0.9999
2001	0.502	0.7583	0.1957	0.0000	2001	0.9951	1.0052	0.8928	0.9999
2002	0.442	0.6791	0.1709	0.0000	2002	0.9970	1.0209	0.8627	1.0000
2003	0.404	0.5583	0.1884	0.0000	2003	0.9966	1.0345	0.8661	1.0000
2004	0.383	0.5393	0.2080	0.0000	2004	0.9949	1.0348	0.9031	1.0000
2005	0.370	0.4120	0.1468	0.0000	2005	0.9953	1.0305	0.9163	1.0000
2006	0.391	0.4301	0.1799	0.0000	2006	0.9925	1.0177	0.9148	1.0000
2007	0.430	0.6117	0.1820	0.0000	2007	0.9901	1.0418	0.8846	1.0000
2008	0.304	1.0951	0.4157	0.0000	2008	0.9913	1.1096	0.9683	1.0000
2009	0.294	1.4201	1.0650	0.0000	2009	0.9925	1.1538	1.0467	1.0000
2010	0.330	1.6917	0.9658	0.0000	2010	0.9932	1.1479	1.0369	1.0000
2011	0.393	2.2059	1.0756	0.0000	2011	0.9943	1.1266	1.0415	1.0000
2012	0.380	0.5234	0.1674	0.0000	2012	0.9956	0.9346	0.8579	1.0000
	8. India	8. Italy	2. Czech Rep.	9. Kazakhstan		8. India	8. Italy	2. Czech Rep.	9. Kazakhstan
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	3.611	1.4930	0.0000		1990	1.0029	1.0000	0.0000	
1991	3.661	1.7792	0.0000		1991	1.0016	1.0000	0.0000	
1992	3.473	1.8412	0.0000		1992	1.0016	1.0000	0.0000	
1993	2.856	1.6250	0.0000		1993	1.0010	1.0000	0.0000	
1994	2.077	1.5287	0.0000		1994	1.0004	1.0000	0.0000	
1995	1.886	1.4287	0.2354	0.0000	1995	1.0000	1.0000	0.9830	1.0005
1996	2.211	1.2457	0.3944	0.0000	1996	1.0002	1.0000	0.9913	1.0001
1997	1.768	0.9270	0.7592	0.0000	1997	0.9998	1.0000	0.9971	0.9996
1998	2.045	0.7024	0.6839	0.0000	1998	1.0000	1.0000	0.9960	0.9993
1999	1.844	0.5932	0.6514	0.0000	1999	1.0000	0.9979	0.9981	0.9999
2000	1.757	0.7461	0.5306	0.0000	2000	0.9999	0.9951	0.9985	0.9995
2001	1.784	0.6926	0.4672	0.3541	2001	1.0002	1.0078	0.9989	0.9995
2002	1.486	0.6796	0.4299	0.3284	2002	1.0003	1.0314	0.9999	0.9996
2003	1.227	0.4878	0.6657	0.3239	2003	1.0002	1.0449	1.0012	0.9995
2004	0.809	0.5015	0.4252	0.1599	2004	0.9993	1.0532	1.0004	0.9992
2005	0.842	0.4170	0.3452	0.1403	2005	0.9997	1.0530	1.0003	0.9991
2006	0.860	0.5552	0.3157	0.1236	2006	0.9993	1.0428	0.9989	0.9987
2007	1.000	0.6724	0.3452	0.3199	2007	0.9993	1.0582	0.9967	0.9988
2008	1.126	0.6354	0.4199	0.2756	2008	0.9999	1.0704	0.9991	0.9986
2009	1.076	0.3818	0.5768	0.5467	2009	1.0003	1.0708	1.0033	1.0065
2010	0.701	0.3625	0.5997	0.3811	2010	1.0003	1.0721	1.0027	1.0272
2011	0.855	0.5453	0.6459	0.3127	2011	1.0002	1.0611	1.0029	1.0267
2012	0.894	0.5970	0.0796	0.3302	2012	1.0002	1.0779	0.9804	1.0264

Data source: KEWT database 9.15, 1990-2012, for 65 countries by area.

Table 4 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	9. Indonesia	9. Luxemburg	3. Hungary	10. Kuwait		9. Indonesia	9. Luxemburg	3. Hungary	10. Kuwait
σ(DEBT)/e*					σ(US)/e*(US)				
1990	0.798		1.8352	0.9549	1990	0.9999		0.9990	0.9955
1991	1.074		1.8341	1.4890	1991	0.9999		1.0001	1.0082
1992	0.942		2.7200	1.4028	1992	0.9999		0.9997	1.0121
1993	1.226		1.3295	1.3569	1993	1.0000		0.9990	1.0085
1994	1.089		1.9989	0.8402	1994	1.0000		0.9995	0.9979
1995	1.341	0.7554	2.6335	0.7397	1995	1.0000	1.0001	0.9997	0.9912
1996	1.436	0.6368	1.5503	0.4042	1996	1.0000	0.9999	0.9994	0.9603
1997	1.407	0.7541	1.0356	0.3883	1997	1.0000	0.9999	0.9993	0.9550
1998	2.663	0.6243	1.0173	3.9967	1998	1.0000	0.9998	0.9994	1.0140
1999	3.781	0.4033	1.1281	3.8112	1999	1.0000	0.9526	0.9997	1.0134
2000	0.755	0.4199	0.8356	1.8841	2000	1.0000	0.9422	0.9997	1.0057
2001	0.766	0.5123	0.6545	2.1675	2001	1.0000	0.9834	0.9998	1.0123
2002	1.380	0.5378	0.7603	1.9321	2002	1.0000	1.0080	1.0000	1.0187
2003	1.637	0.3324	0.9056	0.9533	2003	1.0000	1.0038	1.0001	1.0138
2004	1.291	0.3055	1.0105	0.5804	2004	1.0000	1.0148	1.0001	1.0019
2005	0.928	0.2199	0.9146	0.4008	2005	1.0000	1.0031	1.0002	0.9786
2006	0.910	0.2596	0.9725	0.3253	2006	1.0000	0.9630	1.0001	0.9532
2007	0.859	0.3163	0.8001	0.2978	2007	1.0000	0.9442	1.0000	0.9455
2008	0.622	0.3993	1.0677	0.2019	2008	1.0000	0.9990	1.0000	0.9252
2009	0.667	0.5076	1.2149	0.2939	2009	1.0000	1.0703	1.0003	1.3347
2010	0.615	0.3303	0.8741	0.1727	2010	1.0000	1.0481	1.0001	1.2893
2011	0.589	0.3021	0.9203	0.1215	2011	1.0000	1.0456	1.0002	1.2239
2012	0.591	0.0964	0.6085	0.1124	2012	1.0000	0.9367	1.0000	1.2200
	10. Japan	10. Netherlands	4. Latvia	11. Pakistan		10. Japan	10. Netherlands	4. Latvia	11. Pakistan
σ(DEBT)/e*					σ(US)/e*(US)				
1990	1.980	1.2126	0.0000	0.3662	1990	1.0005	1.0149	0.0000	0.9945
1991	1.754	1.2783	0.0000	0.4894	1991	1.0004	1.0123	0.0000	0.9971
1992	1.018	1.3471	0.0000	0.4686	1992	1.0004	1.0205	0.0000	0.9974
1993	0.888	1.1288	0.0000	0.3938	1993	1.0004	1.0152	0.0000	0.9966
1994	1.043	1.0937	0.0000	0.4577	1994	1.0005	1.0104	0.0000	0.9977
1995	0.731	1.0160	6.4211	0.7486	1995	1.0005	1.0078	1.0582	0.9974
1996	0.679	0.9552	3.6448	0.6795	1996	1.0004	1.0064	1.0150	0.9972
1997	0.462	0.8121	2.4859	0.6081	1997	1.0003	1.0003	1.0185	0.9968
1998	0.413	0.5237	2.1999	0.3266	1998	1.0004	0.9871	1.0059	0.9983
1999	0.848	0.8103	2.2213	0.2206	1999	1.0004	1.0053	1.0036	0.9976
2000	0.812	0.8193	2.4120	0.2474	2000	1.0004	0.9934	1.0274	0.9982
2001	0.772	0.7485	1.5987	0.2923	2001	1.0004	1.0084	1.0466	0.9985
2002	0.850	0.8381	1.1187	5.2860	2002	1.0007	1.0399	1.0851	0.9991
2003	0.679	0.7711	0.9508	0.2354	2003	1.0008	1.0666	1.1049	0.9993
2004	0.967	0.6935	1.0428	0.3037	2004	1.0008	1.0648	1.1243	0.9992
2005	0.948	0.4906	0.8542	0.3277	2005	1.0008	1.0541	1.1269	0.9987
2006	1.207	0.5265	0.8662	0.4142	2006	1.0007	1.0357	1.0948	0.9982
2007	1.074	0.5236	1.0787	0.5564	2007	1.0008	1.0286	1.0586	0.9985
2008	1.133	0.5212	1.3341	0.4402	2008	1.0011	1.0401	1.0781	0.9977
2009	1.342	0.7238	3.3288	0.4138	2009	1.0013	1.1265	1.2304	1.0093
2010	1.106	0.5745	3.0145	0.3450	2010	1.0015	1.1168	1.1763	1.0083
2011	0.814	0.4798	3.1211	0.3046	2011	1.0015	1.0965	1.1793	1.0072
2012	0.570	0.3676	3.2886	0.1693	2012	1.0013	1.1145	1.1837	1.0040
	11. Korea	11. Portugal	5. Poland	12. Saudi Arabia		11. Korea	11. Portugal	5. Poland	12. Saudi Arabia
σ(DEBT)/e*					σ(US)/e*(US)				
1990	1.499	3.3766	4.5643	0.0000	1990	1.0000	1.0003	0.8872	0.9852
1991	1.570	2.4351	6.3129	0.0000	1991	1.0000	1.0001	1.0025	1.0008
1992	1.405	2.2124	3.2668	0.0000	1992	1.0000	1.0002	0.9857	0.9936
1993	1.209	1.6315	2.2688	0.0000	1993	1.0000	1.0001	0.9688	0.9961
1994	1.226	1.3441	1.8127	0.0000	1994	1.0000	1.0000	0.9616	0.9809
1995	1.245	1.5385	1.6252	0.0000	1995	1.0000	1.0001	0.9526	0.9867
1996	1.146	1.0942	1.3694	0.0000	1996	1.0000	1.0001	0.9626	0.9752
1997	1.259	0.8894	1.4791	0.0000	1997	1.0000	1.0001	0.9732	0.9743
1998	1.375	0.6113	1.6831	0.0000	1998	1.0000	1.0000	0.9784	0.9990
1999	0.623	2.2010	1.3574	0.0000	1999	0.9999	1.0455	0.9861	0.9867
2000	0.708	1.5504	1.7466	0.0000	2000	0.9587	1.0320	0.9883	0.9766
2001	0.671	1.5962	0.9484	0.0000	2001	0.9819	1.0398	0.9908	0.9860
2002	0.684	1.5529	0.5884	0.0000	2002	0.9999	1.0703	0.9922	0.9885
2003	0.451	1.2286	0.5324	0.0000	2003	0.9952	1.0953	0.9985	0.9804
2004	0.353	1.0717	0.7371	0.0000	2004	0.9777	1.0972	1.0034	0.9652
2005	0.444	0.9802	0.6027	0.0000	2005	1.0062	1.1001	1.0079	0.9441
2006	0.562	1.1371	0.6410	0.0000	2006	1.0077	1.0912	1.0043	0.9377
2007	0.606	1.3639	0.6675	0.0000	2007	1.0122	1.1120	0.9974	0.9370
2008	0.732	1.1892	0.8182	0.0000	2008	1.0292	1.1196	1.0033	0.9226
2009	0.663	1.1289	0.8604	0.0000	2009	1.0468	1.1521	1.0206	1.3190
2010	0.462	1.4045	0.8480	0.0000	2010	1.0281	1.1400	1.0159	1.2899
2011	0.448	3.0185	0.9213	0.0000	2011	1.0347	1.1425	1.0178	1.2513
2012	0.351	1.3542	0.9151	0.0000	2012	1.0315	1.0743	1.0176	1.2555

Data source: KEWT database 9.15, 1990-2012, for 65 countries by area.

Table 5 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	12. Malaysia	12. Slovak	6. Romania	13. Algeria		12. Malaysia	12. Slovak	6. Romania	13. Algeria
σ(DEBT)/σ*					σ(US)/σ*(US)			c*(US)=c(US)+(r*-r*(US))	
1990	0.813			1.7929	1990	1.0038			1.0012
1991	0.946			0.9498	1991	1.0012			0.9968
1992	1.000			1.0660	1992	1.0013			0.9981
1993	0.894			1.3133	1993	0.9947			0.9989
1994	0.753			1.3681	1994	0.9933			0.9992
1995	0.658	4.1607	28.6133	1.3940	1995	0.9939	1.0004	1.3428	0.9990
1996	0.579	5.1479	17.1256	0.5011	1996	0.9878	1.0010	1.1499	0.9982
1997	0.625	3.5807	5.0371	0.7341	1997	0.9904	1.0005	0.9909	0.9983
1998	0.632	3.3554	2.3570	0.9073	1998	0.9862	1.0006	0.9317	0.9990
1999	0.487	1.7600	1.8890	0.7240	1999	0.9871	1.0002	0.9516	0.9988
2000	0.427	1.4393	1.0144	0.3614	2000	0.9860	1.0002	0.9348	0.9972
2001	0.377	1.6813	0.8305	0.4352	2001	0.9953	1.0006	0.9504	0.9982
2002	0.363	1.4533	0.6658	0.4461	2002	0.9998	1.0012	0.9625	0.9988
2003	0.362	0.9601	0.6137	0.3630	2003	1.0009	1.0015	0.9677	0.9983
2004	0.375	0.8309	0.5807	0.3272	2004	0.9985	1.0016	0.9713	0.9981
2005	0.321	0.5855	0.5270	0.2510	2005	1.0002	1.0016	0.9815	0.9972
2006	0.342	0.7508	0.4848	0.2427	2006	0.9946	1.0015	0.9790	0.9967
2007	0.297	0.5428	0.5485	0.2648	2007	0.9942	1.0008	0.9783	0.9966
2008	0.279	0.6549	0.6416	0.2706	2008	0.9946	1.0020	0.9875	0.9970
2009	0.385	4.3398	0.9712	0.5060	2009	1.0105	1.2074	1.0099	1.0129
2010	0.336	3.8629	0.9534	0.2647	2010	1.0083	1.1916	1.0118	1.0105
2011	0.292	3.2524	1.0949	0.4773	2011	1.0038	1.1810	1.0150	1.0122
2012	0.328	0.6264	1.3973		2012	1.0103	1.0995	1.0197	
	13. Philippines	13. Slovenia	7. Russia	14. Egypt		13. Philippines	13. Slovenia	7. Russia	14. Egypt
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	1.747			1.5832	1990	0.9986			0.9893
1991	1.404			1.5581	1991	0.9976			0.9884
1992	1.135			1.6473	1992	0.9970			0.9921
1993	0.809			1.5220	1993	0.9966			0.9902
1994	0.922			1.2363	1994	0.9967			0.9855
1995	0.868	4.7956	30.2491	1.2086	1995	0.9969	1.0003	1.0073	0.9846
1996	0.864	4.1244	27.5597	0.8943	1996	0.9969	1.0002	1.0046	0.9726
1997	0.802	2.9226	9.8179	1.0918	1997	0.9978	1.0000	1.0067	0.9842
1998	0.885	2.2301	13.0955	0.7420	1998	0.9966	1.0000	1.0018	0.9694
1999	0.650	1.8512	2.8387	0.9122	1999	0.9969	1.0000	0.9973	0.9780
2000	0.672	2.3450	0.4109	0.3927	2000	0.9978	1.0000	0.9816	0.9782
2001	0.781	2.0818	0.4195	0.9795	2001	0.9981	1.0000	0.9885	0.9868
2002	0.544	1.6347	0.4688	1.0721	2002	0.9988	1.0001	0.9925	0.9925
2003	0.593	0.8118	0.3860	1.0965	2003	0.9992	1.0001	0.9921	0.9967
2004	0.684	0.5381	0.3271	1.1522	2004	0.9992	1.0001	0.9913	0.9979
2005	0.593	0.4446	0.2171	1.1283	2005	0.9994	1.0001	0.9914	0.9993
2006	0.420	0.4150	0.1909	1.1846	2006	0.9984	1.0000	0.9903	0.9979
2007	0.284	0.2267	0.2120	1.0500	2007	0.9979	0.8728	0.9906	0.9922
2008	0.488	0.2937	0.2468	1.0580	2008	0.9986	0.9446	0.9925	0.9941
2009	0.352	0.5948	0.5856	0.6596	2009	0.9975	1.0866	0.9986	1.1973
2010	0.325	0.6836	0.2508	0.7132	2010	0.9976	1.1103	0.9939	3.1094
2011	0.222	0.7904	0.3780		2011	0.9961	1.1185	0.9972	
2012	0.327	0.7883	0.1822		2012	0.9990	1.1209	0.9939	
	14. Singapore	14. Spain	8. Turkey	15. Kenya		14. Singapore	14. Spain	8. Turkey	15. Kenya
σ(DEBT)/σ*					σ(US)/σ*(US)				
1990	0.555	0.7546	3.0357	2.7226	1990	0.9807	1.0004	1.0000	1.0012
1991	0.541	0.6917	3.0480	2.8446	1991	0.9696	1.0003	1.0000	1.0008
1992	0.429	0.7360	2.4192	2.6027	1992	0.9749	1.0004	1.0000	1.0004
1993	0.375	0.6876	2.4046	3.4551	1993	0.9658	1.0003	1.0000	1.0000
1994	0.367	0.6410	2.1808	4.0515	1994	0.9501	1.0003	1.0000	0.9999
1995	0.386	0.5107	1.7736	2.9646	1995	0.9455	1.0002	0.2312	0.9998
1996	0.389	0.4599	1.9325	1.2433	1996	0.9446	1.0002	0.3749	0.9965
1997	0.391	0.3951	2.6180	0.9486	1997	0.9492	1.0001	0.5279	0.9961
1998	0.504	0.3480	1.7036	0.8029	1998	0.9544	1.0001	0.4918	0.9952
1999	0.352	0.3637	1.4656	0.5879	1999	0.9642	1.0165	0.6119	0.9957
2000	0.360	0.3122	1.8450	0.6325	2000	0.9688	1.0154	0.7217	0.9963
2001	0.403	0.2388	1.7203	0.5017	2001	0.9933	1.0206	0.8416	0.9960
2002	0.428	0.1773	1.4532	0.4639	2002	1.0072	1.0429	0.8668	0.9961
2003	0.324	0.1229	1.0187	0.4075	2003	1.0066	1.0601	0.8395	0.9960
2004	0.276	0.0841	0.7822	0.3386	2004	0.9920	1.0756	0.8664	0.9966
2005	0.226	0.0321	0.7644	0.3661	2005	0.9885	1.0779	0.8969	0.9967
2006	0.229	(0.0216)	1.0135	0.3810	2006	0.9694	1.0650	0.9218	0.9962
2007	0.169	(0.0781)	1.1010	0.9872	2007	0.9542	1.0817	0.9006	0.9991
2008	0.206	(0.1572)	1.4121	1.2559	2008	0.9863	1.1125	0.9512	0.9996
2009	0.176	(0.2708)	0.8537	1.4651	2009	0.9962	1.1573	0.9502	1.0131
2010	0.152	(0.3968)	0.7675	1.5755	2010	0.9806	1.1539	0.9430	1.0520
2011	0.139	(0.4993)	0.8836	1.8239	2011	0.9856	1.1496	0.9761	1.0494
2012	0.090	(0.3198)	1.2246	2.5952	2012	0.9751	1.1102	0.9894	1.0489

Data source: KEWT database 9.15, 1990-2012, for 65 countries by area.

Table 6 Money-neutral tests using 10yrs debt yield and the exchange rate by country

	15. Sri Lanka	17. Vietnam	9. Ukraine	16. Morocco		15. Sri Lanka	17. Vietnam	9. Ukraine	16. Morocco
r(DEBT)r*					e(US)e*(US)			e*(US)=e(US)+r*-r*(US)	
1990	1.473	3.198		1.5317	1990	1.0002	1.0000		1.0049
1991	1.817	2.890		1.4579	1991	0.9997	1.0000		1.0034
1992	2.324	2.852		1.4923	1992	1.0002	1.0000		1.0040
1993	2.569	3.186	0.2605	1.6543	1993	1.0001	1.0000	0.1094	1.0027
1994	2.152	2.649	0.4250	1.5071	1994	1.0000	1.0000	0.6444	1.0019
1995	2.148	2.416	0.2921	1.5247	1995	1.0000	1.0000	0.6990	1.0021
1996	2.162	2.181	0.4058	1.3629	1996	0.9999	1.0000	0.8031	1.0006
1997	2.162	1.845	0.5316	1.3961	1997	1.0000	1.0000	0.8475	1.0000
1998	2.363	1.847	2.1340	0.8692	1998	1.0000	1.0000	0.9927	0.9977
1999	2.520	1.005	1.7389	0.7795	1999	1.0001	1.0000	0.9900	0.9983
2000	2.596	0.833	1.1172	0.8054	2000	1.0000	1.0000	0.9836	0.9990
2001	2.685	0.765	1.0162	0.7289	2001	1.0000	1.0000	0.9893	0.9992
2002	1.786	0.796	0.8386	0.6654	2002	1.0002	1.0000	0.9911	1.0011
2003	1.988	0.914	0.8431	0.5550	2003	1.0003	1.0000	0.9928	1.0019
2004	1.310	0.930	0.4785	0.5064	2004	1.0003	1.0000	0.9719	1.0024
2005	1.631	1.002	0.8237	0.4934	2005	1.0005	1.0000	0.9944	1.0034
2006	1.795	1.029	0.9483	0.4264	2006	1.0002	1.0000	0.9951	1.0012
2007	2.405	1.162	0.9145	0.4708	2007	1.0003	1.0000	0.9906	0.9992
2008	1.843	1.725	1.0701	0.4161	2008	1.0001	1.0000	0.9968	0.9999
2009	2.274	1.147	0.8425	0.4693	2009	1.0005	1.0000	1.0009	1.1463
2010	1.573	1.228	0.8317	0.6377	2010	1.0006	1.0000	0.9984	1.1395
2011	1.150	1.461	0.7506	0.5685	2011	1.0004	1.0000	0.9988	1.1827
2012	1.925	1.399	0.3764	0.5033	2012	1.0005	1.0000	0.9866	1.1345
	16. Thailand	19. Tanzania	18. South Africa	17. Nigeria		16. Thailand	19. Tanzania	18. South Africa	17. Nigeria
r(DEBT)r*					e(US)e*(US)				
1990	1.600	3.198	1.654		1990	1.0013	1.0000	1.0003	
1991	1.507	2.890	1.468		1991	1.0007	1.0000	0.9920	
1992	1.499	2.852	1.221		1992	1.0009	1.0000	0.9903	
1993	1.477	3.186	1.186		1993	1.0005	1.0000	0.9909	
1994	1.407	2.649	1.250		1994	1.0003	1.0000	0.9902	
1995	1.337	2.416	1.454	0.8704	1995	1.0001	1.0000	0.9925	0.9932
1996	1.431	2.181	1.378	0.4133	1996	1.0001	1.0000	0.9929	0.9820
1997	1.551	1.845	1.253	0.4176	1997	1.0001	1.0000	0.9908	0.9841
1998	1.599	1.847	1.382	0.1852	1998	1.0001	1.0000	0.9930	0.9599
1999	1.177	1.005	1.414	0.2639	1999	1.0002	1.0000	0.9936	0.9929
2000	1.143	0.833	1.312	0.1022	2000	1.0002	1.0000	0.9948	0.9819
2001	0.995	0.765	1.095	0.8403	2001	1.0005	1.0000	0.9977	0.9982
2002	0.856	0.796	1.090	0.6000	2002	1.0009	1.0000	0.9988	0.9975
2003	0.586	0.914	0.919	0.4419	2003	1.0011	1.0000	0.9997	0.9973
2004	0.798	0.930	0.940	0.4722	2004	1.0011	1.0000	1.0004	0.9977
2005	0.845	1.002	0.763	0.3116	2005	1.0013	1.0000	1.0010	0.9964
2006	0.851	1.029	0.751	0.0855	2006	1.0010	1.0000	0.9983	0.9855
2007	0.661	1.162	0.849	0.1075	2007	1.0009	1.0000	0.9973	0.9874
2008	0.716	1.725	1.057	(5.6326)	2008	1.0015	1.0000	0.9998	1.0008
2009	0.674	1.147	1.022	0.3017	2009	1.0021	1.0000	1.1567	1.0032
2010	0.551	1.228	1.087	0.4505	2010	1.0022	1.0000	2.5238	1.0054
2011	0.602	1.461	0.934	0.1307	2011	1.0022	1.0000	1.9621	0.9991
2012	0.595	1.399	0.776	0.2013	2012	1.0023	1.0000	1.8812	1.0016

Data source: KEWT database 9.15, 1990-2012, for 65 countries by area.