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The Cycle of Money with and without the Maximum and Minimum Mixed Savings

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ABSTRACT

This paper is about the utility of cycle of money with and without the maximum and/or the minimum mixed savings. This means that it examines the crucial points of tax policy and public policy which are the best for the increase of consumption and investments, subject to the case that there exists the maximum and/or the minimum mixed savings and the case that there is an absence of the maximum and/or the minimum mixed savings. Therefore, made an analysis based on the utility of the public sector and the utility of the uncontrolled enterprises. Thence, it is plausible to extract conclusions about the utility of cycle of money, showing the points and the behaviors of any economy when there are and when there are not the maximum and/or the minimum mixed savings. The Q.E. method approach is applied to the current estimations.

KEYWORDS: *maximum mixed savings, minimum mixed savings, cycle of money.*

Introduction

This paper analyzes the utility of cycle of money with and without the maximum and/or the minimum mixed savings. The examination of the cycle of money with and without the maximum and/or the minimum mixed savings is not plausible through the omission of factories, research centers, development centers, and any kind of transactions that cannot be substituted by the middle/small enterprises and by the citizens (and generally the uncontrolled transactions) (Challoumis, 2018, 2019a, 2020, 2021g, 2021i, 2022a, 2023c). It is obtained that the impact factor of the balanced tax income is decreased in the case that has omitted the factories, the research centers, the development centers, and any other non-substitute transactions by the middle/small enterprises and the citizens. In contradiction the opposite results when these factors are included in the analysis of the cycle of money.

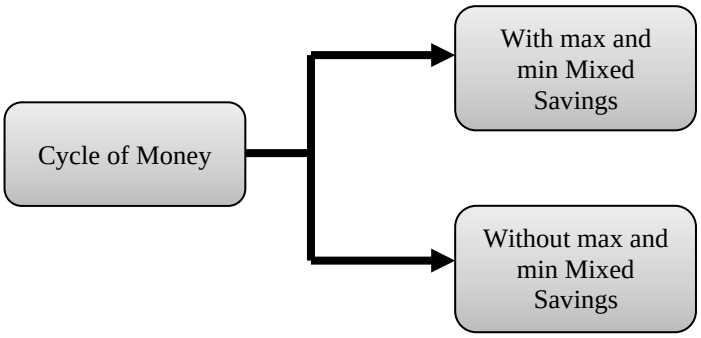

Figure 1: Cycle of Money with and without maximum and minimum mixed savings

The contracts and the agreements between the participants of control transactions are those that determine the allocation of profits and losses. The agreements should mention changes that happen in the contracts. This is the reason why the tax authorities should make periodic inspections (Carattini et al., 2018; Carfora et al., 2021; Cascajo et al., 2018; Castaño et al., 2016; Castro & Scartascini,

2019). The periodic specification of contracts is important for comparability analysis. These periodic inspections of the companies that participate in controlled transactions are crucial for the arm's length principle. Then, the determination of the cost-sharing depends on the periodic check of companies that are tested parties. The scope of the companies of controlled transactions is to face the issues that are connected with the taxation of their activities (Challoumis, 2023d, 2023e). Therefore, the requirements for the companies of controlled transactions with the tax authorities should be in the range of the arm's length principle. Thereupon, the appropriate agreement of the companies of controlled transactions is that which permits them the maximization of their profits in tax environments with low tax rates, and the maximization of costs in economic environments with high tax rates.

Moreover, should be notified that the companies of controlled transactions and the same time the inspections of tax authorities are done under the condition of proportional adjustments (Fernandez & Raine, 2019; Siegmeier et al., 2018; Urwannachotima et al., 2020; Van de Vijver et al., 2020; Παπακωνσταντίνου et al., 2013). The interpretation of the condition of the proportional adjustments is that the companies that participate in controlled transactions many times don't have the appropriate data and uncontrolled transactions of similar circumstances to compare and therefore they proportionally adjust their data (Challoumis, 2021h, 2021f, 2021d, 2021e, 2021c, 2021g, 2021a, 2021b, 2022c, 2022b, 2023a, 2023c, 2023b). This means that if the companies that are tested parties conclude that the profits and losses of companies from uncontrolled transactions are much higher or much fewer, then they make a proportional analogy to compare them with their data.

The production of goods or services creates profits and costs for the companies:

$$u = s(zf + \tilde{z}d) \quad (1)$$

$$z = |\tilde{z} - 1| \quad (2)$$

The symbol u is about the impact factor of the comparability analysis which has any method to the s. The symbol z is a coefficient that takes values between 0 and 1. What value could be received is determined by the influence of the method (using the best method rule) on the s. The symbol of f is about the cost which comes up from the production of goods, and the symbol of d is about the cost which comes from the distribution of the goods. According to prior equations, it is plausible to determine:

$$u_c = zf + \tilde{z}d \quad (3)$$

$$b = (p - u_c) * j_1 \quad (4)$$

The symbol of b in the prior equation is about the amount of taxes that should be paid to the companies of controlled transactions in the application of the arm's length principle. The u_c is the amount of tax obligations that can be avoided through the allocations of profits and losses. Moreover, j_1 is a coefficient for the rate of taxes. Then, the Eq. (4) shows the case of the arm's length principle. In addition, the case of the fixed length principle:

$$v = p * j_2 \quad (5)$$

The symbol of v in the previous equation shows the taxes that should be paid to the enterprises of controlled transactions in the application of the fixed length principle. Then, j_2 is a coefficient for the rate of taxes in the case of the fixed length principle:

$$v \geq b \quad (6)$$

The tax for the companies that participate in controlled transactions of transfer pricing in the case of the fixed length principle is higher or at least equal to that of the case of the arm's length principle.

Thereupon, with the fixed length principle the enterprises of controlled transactions can tackle issues that come from the allocation of the profits and losses. Therefore, the tax authorities can face the transfer pricing effects on the global tax revenue.

The fixed length principle permits to recovery of the tax losses of the global tax revenue from the controlled transactions of the transfer pricing.

The next section presents the theory of the cycle of money. Moreover, the methodology which followed stands on the Q.E. method.

Literature Review

The tax revenues correspond to the savings that the companies could have if the taxes were avoided. The way that these savings are administrated is different from case to case. Then the benefits of the companies could be managed in a completely different way, as could be saved or taxed (De Araujo et al., 2020; Gong et al., 2020; Kominers et al., 2017; Maier, 2012; Olcina et al., 2020; Paes-Sousa et al., 2019). The theory of the cycle of money shows when the savings robust the economy and when the taxes robust the economy/ It is crucial for this determination to be a separation of savings into the non-returned savings (or escaped savings) and the returned savings (or enforcement savings). For the scope of this analysis below are demonstrated the equations which are:

$$\alpha = \alpha_s + \alpha_t, \text{ or } \frac{1}{v} + \alpha_t \quad (7)$$

$$x_m = m - a \quad (8)$$

$$\mathrm{m} = \mu + \alpha_p \quad (9)$$

$$\mu = \sum_{\iota=0}^{n} \mu_\iota \quad (10)$$

$$\alpha_p = \sum_{j=0}^{m} \alpha_{pj} \quad (11)$$

$$c_m = \frac{dx_m}{dm} \quad (12)$$

$$c_\alpha = \frac{dx_m}{da} \quad (13)$$

$$c_y = c_m - c_\alpha \quad (14)$$

The variable of α symbolizes the case of the escaped savings. This means that there are savings that are not returning to the economy or come back after a long-term period. The variable of α_s symbolizes the case that there are escaped savings that come from transfer pricing activities. The variable of α_t symbolizes the case that there are escaped savings not from transfer pricing activities but from any other commercial activity. For instance, α_t could refer to the commercial activities that come from uncontrolled transactions. The variable of m symbolizes the financial liquidity in an economy (Challoumis, 2019b, 2019c). The variable of μ symbolizes the consumption in an economy. The variable of α_p symbolizes the enforcement savings, which come from the citizens and small and medium-sized enterprises. The variable of x_m symbolizes the condition of financial liquidity in an economy. The variable of c_m symbolizes the velocity of financial liquidity increases or decreases. The variable of c_α symbolizes the velocity of escaped savings. Therefore, the variable of c_y symbolizes the term of the cycle of money. Thereupon, the cycle of money shows the level of the dynamic of an economy and its robustness.

As a result, when there is a tax system, such as the fixed length principle, which allows for low taxation of uncontrolled transactions and higher taxation of controlled transactions, the money cycle grows. It should be noted that as uncontrolled transactions are considered, the same applies to cases of financial liquidity of citizens and small and medium-sized businesses. Furthermore, there are three

primary impact factors of rewarding taxes. Rewarding taxes are the only taxes that have an immediate and significant impact on any economy's market. These factors are linked to education, each society's health system, and the remaining relevant structural economic factors of the previous two impact factors. The following scheme depicts this issue:

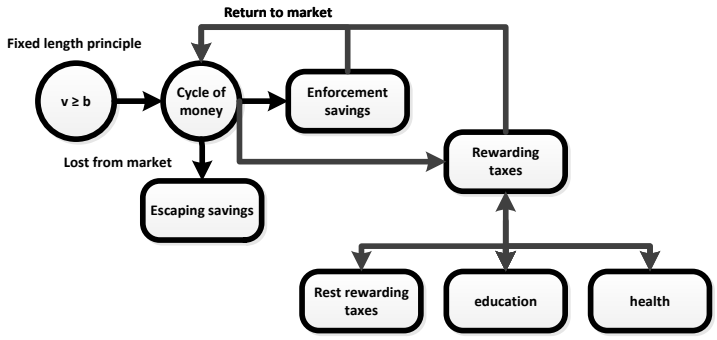

Figure 2: The cycle of money with rewarding taxes

In the previous figure, it is the case that the tax system includes all the tax factors and all the rewarding tax factors:

$$\alpha_p = \alpha_r + \alpha_n * h_n + \alpha_m * h_m \quad (15)$$

$$\alpha_r \geq \alpha_n * h_n \geq \alpha_m * h_m \quad (16)$$

In the prior two equations used some impact factors, which are the a_p which is also demonstrated in Eq. (5), moreover the variables α_r, α_n, h_n, α_m and the h_m. The variable $\alpha_r$symbolizes the impact factor of the rest rewarding taxes. The symbol of α_n is the impact factor of education and any technical knowledge. The symbol of α_m is about the impact factor of health anything relevant and supporting of this issue. The symbol of h_n, and of the h_m, are the coefficients of the health and the health impact factor accordingly.

Definition and mathematical approach of the utility cycle of money with and without the maximum and/or the minimum mixed savings

For the mathematical approach of the utility cycle of money it is used the prior equations subject to the utilities of the next equations, with their conditions, which are:

$$\widetilde{U}'(t) = \sum_{j=1}^{n} [c_m \, \widetilde{U}\,(\mathrm{t}) \, - \, c_\alpha U(t)]_j \quad (17)$$

$$U'(t) = -\sum_{j=1}^{n} [c_\alpha U(t)]_j \quad (18)$$

$$U(0) > 0 \quad (19)$$

$$\widetilde{U}(0) > 0 \quad (20)$$

According to the prior definitions should be mentioned that the symbol of $\widetilde{U}\,(\mathrm{t})$ is about the utility of the authorities and therefore of the public sector. The symbol of $U(t)$ is about the utility of the enterprises that participate in controlled transactions. Moreover, including the mixed savings a_{mi}:

$$\alpha_r = a_{mi} + \sum_{j=1}^{n} (\alpha_r)_j \quad (21)$$

$$\alpha_s = \sum_{k=1}^{m} (\alpha_s)_k \quad (22)$$

$$\alpha_p = \sum_{j=1}^{n} (\alpha_p)_j = \alpha_r + \alpha_n * h_n + \alpha_m * h_m \quad (23)$$

$$\alpha_t = \sum_{v=1}^{d} (\alpha_t)_v \quad (24)$$

$$a = \alpha_s + \alpha_t = \sum_{k=1}^{m}(\alpha_s)_k + \sum_{v=1}^{d}(\alpha_t)_v \quad (25)$$

$$m = \alpha_p + \sum_{z=1}^{q} m_z \quad (26)$$

$$0 \leq a_{mi} \leq 1 \quad (27)$$

From this point, it seems that both elements of recapitalization and reinvestment are important, as it is concluded that industries and large enterprises in general engaged in the primary sector have a mixed character. Of course, there is a basic condition, it is that they do not carry out controlled transactions. If they participate in controlled transactions then their savings are mainly non-supportive and therefore belong to the excess savings (Ruiz et al., 2017; "The East Asian Miracle: Economic Growth and Public Policy," 1994). Thus, in the case of industrial units which do not participate in triangular transactions, it is considered that their savings are partly supportive, and partly deferred savings (generally economic units which are not substituted by medium or medium-dynamic economic data). Also, if it is considered that companies engaged in product research and development have a large volume of transactions, then it is understood that they are substituting medium-dynamic research units that would have boosted savings. For this reason, it is considered that this type of savings belongs to mixed savings. They have characteristics of both boosting savings due to their research nature, but also excessive savings because they concern a large volume of transactions.

Variables	Coefficients	Coefficients' (max. of c_y)	Coefficients''(min. of c_y)
$1 - a_{mi}$	0.6	0.2	0.9
$\sum_{j=1}^{m}(\alpha_r)_j$	0.6	0.6	0.6
α_t	0.7	0.7	0.7

Table: Compiling coefficients

The generator of this procedure used the coefficients which appeared in the previous table. Therefore, the factors have an upper limit of 1, and a lower limit of 0, but s and $\tilde{s}$ are plausible to receive values greater than one as their mathematical structure allows this. After 461 iterations the following diagram:

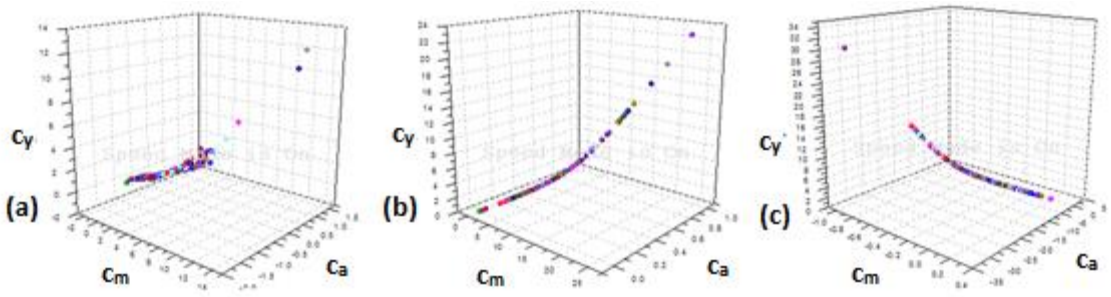

Figure 3: Cycle of money with and without maximum and/or minimum mixed savings in a three-dimensional representation

In the previous scheme of Fig. 3 (a), it is obtained that in the normal case of the cycle of money (the version that included the escaped and the enforcement savings) is at a positive level as it grows. In the scheme of Fig. 3 (b) it is obtained that the maximum and/or the minimum mixed savings increased rapidly the cycle of money (this shows that countries with factories, research, and development centers grow their economies have high growth). Fig clarified the opposite economic situation than of case of Fig. 3(b) because the mixed savings are on their minimum level:

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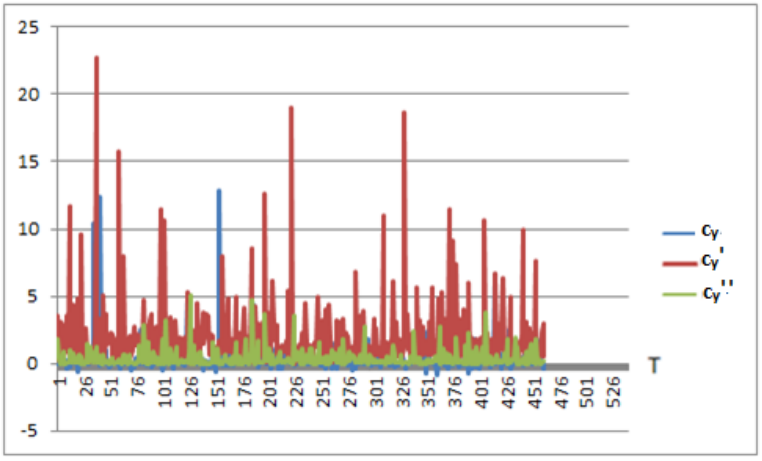

Figure 4: Cycle of money with and without maximum and/or minimum mixed savings in a two-dimensional representation

In the prior figure, it is obtained that the cycle of money is in a negative orientation as the same revealed in Fig. 3. Then, it is concluded as is expected that c_y' is where concluded the highest cycle of money, is because there the mixed savings are at their maximum level. Moreover, it is concluded that the minimum mixed savings decrease the cycle of money, as it is obtained in the case of c_y''.

Conclusion

In this paper, it is concluded that the minimum mixed savings have a negative impact on the economy, as the economic dynamic of this economy is lower when the minimum mixed savings exist. On the other hand, the maximum mixed savings bust the economy to a higher level. Therefore, consumption and investments in this economy are at a lower level when there are minimum mixed savings. Additionally, the consumption and the investments are at their higher level when there are the maximum mixed savings.

Appendix

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%(C)(R)2017 Constantinos Challoumis Q.E. method

as1=0;
at1=0;
xm1=0;
m1=0;
ap1=0;
cm1=0;
ca1=0;
cy1=0;
t=0;
as2=0;
at2=0;
xm2=0;
m2=0;
ap2=0;
cm2=0;
ca2=0;
cy2=0;
t1=0;
```

```
as3=0;
at3=0;
xm3=0;
m3=0;
ap3=0;
cm3=0;
ca3=0;
cy3=0;
t2=0;

while t<10
   t=t+1;

if rand()<9
   am1=0.2*rand();
end

if rand()<9
   ar1=0.6*rand();
end

if rand()<9
   at1=0.7*rand();
end
while t2<10
   t2=t2+1;

if rand()<9
   am1=0.6*rand();
end

if rand()<9
   ar2=0.6*rand();
end

if rand()<9
   at2=0.7*rand();
end
while t3<10
   t3=t3+1;

if rand()<9
   am1=0.9*rand();
end

if rand()<9
   ar3=0.6*rand();
end

if rand()<9
```

```
   at3=0.7*rand();
end
m3=(1-am3)+ar3;
a3=at3;
xm3=m3-a3;
cm3=xm3/m3;
ca3=xm3/a3;
cy3=cm3-ca3;
m1=(1-am1)+ar1;
a1=at1;
xm1=m1-a1;
cm1=xm1/m1;
ca1=xm1/a1;
cy1=cm1-ca1;

m2=(1-am2)+ar2;
a2=at2;
xm2=m2-a2;
cm2=xm2/m2;
ca2=xm2/a2;
cy2=cm2-ca2;



tab1=[a1,xm1,m1,cm1,ca1,cy1;tab1];
tab2=[a2,xm2,m2,cm2,ca2,cy2;tab2];
tab3=[a3,xm3,m3,cm3,ca3,cy3;tab3];

end
```

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