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The Cycle of Money (C.M.) Considers Financial Liquidity with Minimum Mixed Savings

Constantinos Challoumis

National and Kapodistrian University, Athens, GREECE
Faculty of Economics and Political Science

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Abstract

This paper discusses the velocities of escaped savings and financial liquidity, as well as the minimum mixed savings. This means that examined the behavior of the money cycle under normal conditions, due to the velocity of mixed savings at their lower level and the velocity of financial liquidity. As a result, the money cycle determines how the economy operates in this case. Thence, it is plausible to extract conclusions about the consumption and investments in each economy. For this analysis a Q.E. method approach is used.

Keywords: minimum mixed savings, financial liquidity, the cycle of money.

JEL codes: A10, E0, E1.

1. Introduction

This work compares the behavior of the money cycle with the velocity of escaped savings with the velocity of financial liquidity with the minimum mixed savings. It is obtained the attitude of the money cycle and how it works through the Q.E. method and then draws conclusions about consumption and investments in that case. Moreover, it is concluded the behavior of the velocity of escaped savings and the same happens in the case of the velocity of financial liquidity, subject to the minimum mixed savings (Azar, Maldonado, Castillo & Atria, 2018; Liu, Liu, Huang & Chen, 2018; Marques, 2019; Miailhe, 2017; Montmarquette, 2020; Prestianawati, Mulyaningsih, Manzilati & Ashar, 2020; Sánchez, Rodríguez & Espitia, 2020; Schram, 2018; Ustinovich & Kulikov, 2020). Mixed savings are defined as cash reserves that fall somewhere in between the escaped savings and the enforcement savings. When mixed savings reach near to enforcement savings, the economy benefits (Andriansyah, Taufiqurokhman & Wekke, 2019; Cai, 2017; dos Santos Benso Maciel, Bonatto, Arango & Arango, 2020; Driver, 2017; Farah, 2011; Gong, Zhang, Yuan & Chen, 2020; Moreno-Jiménez, Pérez-Espés & Velázquez, 2014; Suslov & Basareva, 2020; Tummers, 2019; Zamudio & Cama, 2020). On the contrary, once the mixed savings approach escaped savings, the economy suffers. Savings that have escaped the country's economic system are referred to as escaped cash reserves. Enforcement savings, on the other hand, are savings that remain in the nation's economy (Berchin et al., 2019; Carfora, Pansini & Scandurra,

Correspondence: Constantinos Challoumis, National and Kapodistrian University, Faculty of Economics and Political Science Athens, GREECE.

2021; Evans, Ringel & Stech, 1999; Korenik & Wegrzyn, 2020; Levi, 2021; Marenco, Strohschoen & Joner, 2017; Tvaronavičienė, Tarkhanova & Durglishvili, 2018).

Contracts and agreements between participants in control transactions determine how profits and losses are allocated. The changes in the contracts should be mentioned in the agreements. This is why tax authorities should conduct regular inspections. The periodic specification of contracts is critical for the comparability analysis. These periodic inspections of companies that participate in controlled transactions are critical for the arm's length principle. The cost-sharing is then determined based on a periodic review of companies that are tested parties. The context of controlled transaction companies is to face issues related to the taxation of their activities. As a result, the requirements for companies conducting controlled transactions with tax authorities should fall within the scope of the arm's length principle (Androniceanu, Gherghina & Ciobănaşu, 2019; Bergquist, Mildenberger & Stokes, 2020; Castro & Scartascini, 2019; Corti, Roldán & Benito, 2020; Farah, 2011; Tummers, 2019). As a result, the appropriate agreement for controlled transaction companies allows them to maximize profits in tax environments with low tax rates while minimizing costs in tax environments with high tax rates.

2. Literature review

Furthermore, the companies of controlled transactions should be notified that tax authorities are inspecting them under the condition of corresponding adjustments. The interpretation of the condition of the proportional adjustment is that companies that participate in controlled transactions frequently lack the appropriate data and uncontrolled transactions of similar circumstances to compare, so they adjust their data in a proportional manner (Challoumis, 2021e, 2021d, 2021b, 2021c, 2021f). This implies that if the tested parties conclude that the profits and losses of companies from uncontrolled transactions are significantly higher or significantly lower, they use a proportional analogy to compare them to their data. Profits and costs are generated by the production of goods or services. It is known from the prior investigation:

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

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

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 receive is determined by the influence of the method (using the best method rule) to 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 equations from (1) to (2) is plausible to determine the following equations:

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

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

The symbol of b in the prior equation is about the amount of taxes that should pay 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 avoid through the allocations of profits and losses. Moreover, j_1 is a coefficient for the rate of taxes. Profits and costs are generated by the production of goods or services by businesses. It is known from the previous investigation:

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

The symbol v in the preceding equation represents the taxes that should be paid by controlled transaction enterprises when the fixed length principle is applied. Thus, j_2 is a coefficient for the rate of taxes in the case of the fixed length principle. As a result of the preceding theory:

$$v \geq b \tag{6}$$

The tax on companies that participate in controlled transactions of transfer pricing under the fixed length principle is higher or at least equal to the tax on companies that participate under the arm's length principle (Challoumis, 2018c, 2018b, 2019, 2020a, 2020b). As a result, using the fixed length principle, controlled transaction enterprises can address issues arising from profit and loss allocation. As a result, tax authorities can confront the transfer pricing effects on global tax revenue (Anderson, Mckee & Mossialos, 2020; Franko, Tolbert & Witko, 2013; John, 2018; Jomo & Wee, 2003; McIsaac & Riley, 2020; Miljand, 2020; OECD, 2020).

The fixed length principle allows for the recovery of global tax revenue losses from transfer pricing controlled transactions (Bestari, Sinaga & Saudi, 2019; Cascajo, Diaz Olvera, Monzon, Plat & Ray, 2018; Cornelsen & Smith, 2018; Cruz-Castro & Sanz-Menéndez, 2016; Ginsburgh & Weber, 2020; Muñoz & Flores, 2020; Ud Din, Mangla & Jamil, 2016). The following scheme depicts the procedure that companies of controlled transactions use for profit and loss allocations, proportional data adjustments, and the fixed length principle:

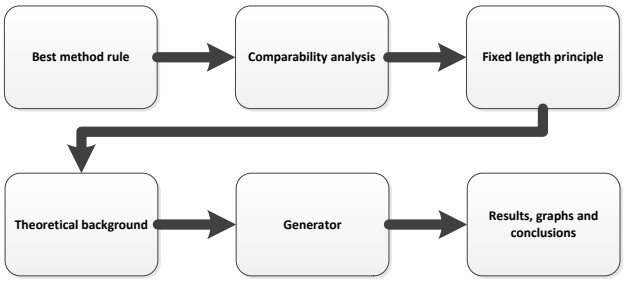

Figure 1. Cost sharing and application of fixed length principle

Fig. 1 depicts the procedure of the fixed length principle and its quantity analysis for determining the model's behavior. The theory of the money cycle is presented in the following section. The Q.E. method and its econometric approach are used as the methodology.

3. The cycle of money

The mathematical background of the theory of the circle of money is listed. Calculations of the money cycle are defined by the following mathematical formulas:

$$c_y = c_m - c_\alpha \tag{7}$$

$$c_y = \frac{dx_m}{dm} - \frac{dx_m}{da} \tag{8}$$

$$i_{cy} = Y * b_d \tag{9}$$

$$g_{cy\ Country} = \frac{c_{y\ coyntry's}}{c_{y\ Average} + c_{y\ coyntry's}} \text{ or } \frac{i_{cy\ coyntry's}}{i_{cy\ Average} + i_{cy\ coyntry's}} \tag{10}$$

$$g_{cy\ Average} = \frac{c_{y\ Average}}{c_{y\ Average} + c_{y\ Average}} \text{ or } \frac{i_{cy\ Average}}{i_{cy\ Average} + i_{cy\ Average}} = 0.5 \tag{11}$$

It is the speed of c_m financial liquidity, it is the speed of emancipatory transactions, and it is the c_α speed of c_y the money cycle. It is the i_{cy} indicator of the money cycle, it is GDP,

and it Y is the bank reserves of each country b_d . In addition, symbolizes the general indicator of the money cycle of each country, is the indicator of the $g_{cy\ Country}$ the economy of each country c_y, and $i_{cy\ coyntry's}$ or $c_{y\ coyntry's}$ c_y is the international indicator of $i_{cy\ Average}$ or $c_{y\ Average}$ i_{cy} . In conclusion, it is the general international $g_{cy\ Average}$ indicator and is perceived as an international constant. The appropriate assumption is $c_y$aimed at establishing the link between the indicator of the international (global) average, $c_y$bank holdings and per capita GDP, taking into account econometric approaches. Subsequently, the initial assumption of the money cycle is verified in the context of real economic scenarios in most countries internationally, divided by the international average of the money cycle index. Eq. (10) and (11) mean that an economy close to 0.5 can directly address an economic crisis. The perfect economy takes a value of 1. Every 0.1 that an economy loses from the unit, means that it takes 3 to 5 years for that economy to recover from an economic crisis (this was identified by the results obtained from this survey). The results approaching the value of 0.5 represent an appropriate indicator of the money cycle, revealing an adequate economic structure for society and the proper distribution of money among citizens – consumers. The ex. (1) the money cycle, used to define it $c_{y\ coyntry's}$ and $c_{y\ Average}$.

The money cycle in quantitative analysis, in the light of GDP, is an expression of$\frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S+I+X})}$, according to$\frac{dx_m}{dm}$ the and $-\frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S'+I'+M})}$ according to the $\frac{dx_m}{da}$. Next, the -, $c_y = d(GDP) = \frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S+I+X})} d(\mathrm{S+I+X})$ rests on $\frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S'+I'+M})}\ d(\mathrm{S'I'+M})$ the, $c_y = \frac{dx_m}{dm} - \frac{dx_m}{da}$ of eq. (2). Where S is savings, I is investments and X is about exports. Then, S', are the savings directed to banks outside the financial system, I', are the investments directed to banks outside the financial system, and M is the imports. Hence, the money cycle expresses GDP under the following relationship:

$Y = S_T + I_T + (X - M), or\ Y = (S - S') + (I - I') + (X - M)$ ή $Y = \Delta S + \Delta I + (X - \mathrm{M})$.

According to the theoretical background of the theory of the cycle of money, money lost from an economy, as a result of economic transactions, can be controlled and under the supervision of an agency that will observe money transfers between the economies of different countries, by comparing economies internationally, through ΔS, ΔI, and (X-M).

Because there is no data from an organization for these activities, the application of the money cycle indicator $c_{ytotal} = \sum_{i=1}^{n}\sum_{t=1}^{m} c_{yi,t} = \sum_{i=1}^{n}\sum_{t=1}^{m}[\frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S+I+X})} d(\mathrm{S+I+X}) - \frac{\partial(\mathrm{GDP})}{\partial(\mathrm{S'+I'+M})}\ d(\mathrm{S'+I'+M})]_{i,t}$is bottled. The money cycle is an expression of the difference between the differential equations of the amount of money used in an economy and the quantity of money lost from the economy. That is why the money cycle theory advocates higher taxation of companies.

As a result, concluded that the money cycle grows when there is a tax system, such as the case of the fixed length principle, which allows for low taxation of uncontrolled transactions and higher taxation of controlled transactions. It should be noted that when uncontrolled transactions are considered, the same thing happens in the cases of citizens and small and medium-sized businesses' financial liquidity. Furthermore, there are three primary impact factors of the rewarding taxes. Only rewarding taxes play an immediate and significant role in any economy's market. These factors are related to education, the health system of each society, and the remaining relevant structural economic factors of the previous two.

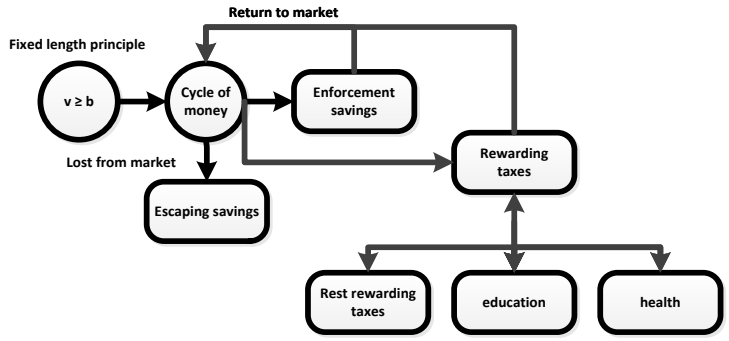

Figure 2. The cycle of money with rewarding taxes

In the previous scheme, the money cycle is represented along with all the rewarding tax factors. Then there are the rewarding taxes:

$$\alpha_p = \alpha_r + \alpha_n{}^* h_n + \alpha_m{}^* h_m \quad (12)$$

$$\alpha_r \geq \alpha_n{}^* h_n \geq \alpha_m{}^* h_m \quad (13)$$

The prior two equations used some impact factors, which are the a_p which also demonstrated, moreover the variables $\alpha_r, \alpha_n, h_n, \alpha_m$ and the h_m. The variable α_r shows the impact factor of the rest rewarding taxes. The case of α_n is the impact factor of education and any technical knowledge. The symbol of α_m is the impact factor of health anything relevant and supportive 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. It is possible to proceed to the mixed savings using equations (1) to (13). Then, considering the mixed savings:

$$\alpha_r = a_{mi} + \sum_{j=1}^{n} (\alpha_r)_j \quad (14)$$

$$\alpha_s = \sum_{k=1}^{m} (\alpha_s)_k \quad (15)$$

$$\alpha_p = \sum_{j=1}^{n} (\alpha_p)_j = \alpha_r + \alpha_n{}^* h_n + \alpha_m{}^* h_m \quad (16)$$

$$\alpha_t = \sum_{v=1}^{d} (\alpha_t)_v \quad (17)$$

$$a = \alpha_s + \alpha_t = \sum_{k=1}^{m} (\alpha_s)_k + \sum_{v=1}^{d} (\alpha_t)_v \quad (18)$$

$$m = \alpha_p + \sum_{z=1}^{q} m_z \quad (19)$$

$$0 \leq a_{mi} \leq 1 \quad (20)$$

Where a_{mi} is mixed savings. After which proceed to general mathematical representations of these forms based on these equations for the velocity of the escaped savings:

$$c_\alpha = c_{a0} * ln(c_m - c_{m0}) \quad (21)$$

$$c_{y\alpha} = b_1[(c_a - c_{a0})^2 + c_{y\alpha 0}] \pm b_2\left(\frac{1}{c_a}\right) \pm b_3\left(\frac{1}{ln\, c_a}\right) \quad (22)$$

$$b_1, b_2, b_3 = 0 \text{ and } x_i \quad (23)$$

$x_i \geq 0$, where i=1,2

In the prior equations the c_{a0} and the c_{m0} are accordingly the initial values of the velocity of escaped savings and the cycle of money (Challoumis, 2018a, 2020c, 2021a, 2022). The equation of $c_{y\alpha}$ represents the general equation of the escaped savings. For the acceptation of the financial liquidity:

$$c_{ym} = b_4[(c_m - c_{m0})^2 + c_{ym0}] \pm b_5(\frac{1}{c_m}) \pm b_6(\frac{1}{ln\ c_m})] \quad (24)$$

$$b_4, b_5, b_6 = 0 \text{ and } x_i \quad (25)$$

$$x_i \geq 0, \text{ where i=1,2} \quad (26)$$

In the eq. (24) we have the general form of the velocity of the cycle of money. The coefficients of b_1, b_2, b_3 took two of them one constant value x_i, and the other one is zero. The same happens with the coefficients of b_4, b_5, b_6 which also two of them takes one constant value x_i and the other one is zero. All the possible combinations of velocities of escaped savings and financial liquidities are to be defined by two concrete equations.

4. Methodology

Using prior formulas for that case is applied:

$$c_{y\alpha} = -b_2(\frac{1}{c_a}) \quad (27)$$

$$c_{ym} = -b_6(\frac{1}{ln\ c_m}) \quad (28)$$

The coefficient table for the money cycle in the case of mixed savings is as follows:

Table 1. compiling coefficients

Variables	Coefficients
1 - a_{mi}	0.8
$\sum_{k=1}^{m}(\alpha_s)_k$	0.6
α_t	0.7

Applying the Q.E. method with the prior coefficients for the behavior of the cycle of money subject to minimum mixed savings the following scheme:

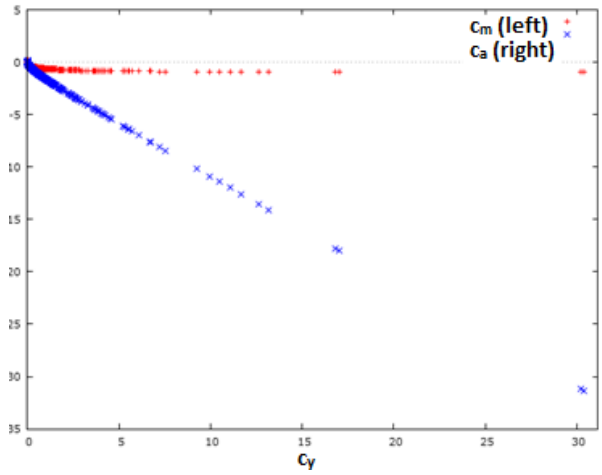

Figure 3. Cycle of money with its velocities

According to the previous figure, the money cycle is linked to the velocity of escaped savings and the velocity of financial liquidity. Low mixed savings benefit the economy. As a result, the velocity of financial liquidity is positive, while the velocity of escaped savings is oriented in the opposite direction. Low mixed savings do not benefit the economy because the absence of savings

from factories with R&D centers costs the economy. This explains why industrial countries have a weaker money cycle and, as a result, a lower economic dynamic.

5. Conclusions

In this article, it is concluded that the money cycle has a positive orientation under economic conditions and that with minimal mixed savings, the economy is not enforced appropriately. This appears to mean that under these conditions, no economy's consumption or investment would increase. When the mixed savings are lesser, the escaped savings increment and the enforcement savings reduce, and the economy is not properly supported.

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Appendix

```
as=0;
at=0;
xm=0;
m=0;
m1=0;
ap=0;
cm=0;
ca=0;
cy=0;
t=0;

while t<10
    t=t+1;

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

if rand()<9
    at=0.7*rand();
end

if rand()<9
    m1=0.9*rand();
end

if rand()<9
    ap=0.8*rand();
end

am=0.2;

a=(1-am)+as+at;%consider am+as as one variable
m=m1+ap+am;
xm=m-a;
cm=xm/a;
ca=xm/m;
cy=cm-ca;


tab=[a,xm,m,cm,ca,cy;tab];
end
```


C O A S