

JEL: H2, H26, E22, E23**THE ISSUE OF UTILITY OF CYCLE OF MONEY****Constantinos Challoumis**, PhD candidate in Economics,*Department of Economics,**National Kapodistrian University of Athens, Greece*

Abstract: *The paper considers the utility of cycle of money. We have examined the critical points of tax policy and public policy which are macroeconomics tools for the increase of consumption and investments. Therefore, we have analyzed the utility of the public sector and the uncontrolled enterprises. Thence, it is plausible to extract conclusions about the utility of cycle of money showing the points and the general behavior of any economy to determine the dynamics of any economic process. Both a simple system of first order derivatives under conditions, and the Karush-Kuhn-Tucker method have been used for the purposes of this analysis.*

Keywords: *cycle of money, utility, enforcement savings, controlled transactions, uncontrolled transactions*

INTRODUCTION

The cycle of money is a theory based on the idea that the public and tax authorities should boost the small or medium enterprises with lower taxes and from the bigger companies to retain low taxes only for production units, e.g. factories etc. The bigger companies, which overlap smaller companies make weaker the economy as the money they receive is out of the cycle. The sense of savings escape is about the money in the leakages not returning back with consumption and investments (reinvestments). This paper is about the ideal case of the cycle of money and its normal form based on the analysis the utility of cycle of money. The examination of utility of cycle of money is plausible through the companies' utility and an authorities' utility. Then, a simple system of derivatives about utilities of the companies and the authorities is used in our scrutiny. It should be notified that estimations are subject of two conditions. Thence, after estimations extracted the utility graphs used to obtain the behavior of cycle of money. In addition, it is considered both impact factors of escaping savings and financial liquidity, which are key elements of cycle of money.

MATERIALS AND METHODS

Our current paper is based on the previous researches of the theory of cycle of money and author's findings.

Both a simple system of first order derivatives under conditions, and the Karush-Kuhn-Tucker method have been used for the purposes of this analysis.

RESULTS

Theoretical background and the applied methodology

The contracts and agreements between the participants of control transactions are these which determine the profits and loss allocation. We should mention the changes in the contracts to the agreements. It is the reason why tax authorities should make periodic inspections. The periodic contracts' specification is important for the comparative analysis. Periodic inspections of the companies which participate in controlled transactions are crucial for the arm's length principle. Then, the cost sharing determination depends on the periodic companies' audit, i.e. tested parties¹. The scope of the companies with controlled transactions face the issues that are connected with the taxation of their activities. Therefrom, the requirements for the companies with controlled transactions with the tax authorities should be in the range of the arm's length principle. Thereupon, the appropriate agreement of the companies with controlled transactions permits them their profit maximization in the tax environment with low tax rate, and the cost maximization into the economic environment with high tax rate.

It should be notified that the companies with controlled transactions and inspections of tax authorities are done under the condition of the proportional adjustments². The interpretation of the condition for the proportional adjustments is that the companies which participate in controlled transactions many times do not have the appropriate data and uncontrolled transactions of similar circumstances to compare; therefore, they adjust their data in proportional way. This means if the companies (which are tested parties) conclude that the profits and losses of companies from uncontrolled transactions are much higher or much fewer then they make proportional analogy to compare them

¹ As tested parties, companies are considered that participated in control transactions

² Challoumis, C. (2018). Chain of Cycle of Money with Mixed Savings, *SSRN*. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3158422.

with their data. The production of goods or services creates profits and costs to the companies³. Based on the prior scrutiny we have⁴:

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

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

The symbol u indicates the impact factor of the comparability analysis which has any method to the s ⁵. The symbol z is a coefficient which takes value between 0 and 1. The value is determined by the influence of the method to the s . The symbol f reflects the cost which comes up from the production of goods, and the symbol d reflects the cost which comes from the distribution of the goods.

Let us consider the following equations:

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

and

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

The symbol b in the prior equation is an 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; j_1 is a coefficient for the tax rate.

In addition, the case of fixed length principle we have the next equation:

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

The symbol v in the previous equation shows the taxes that should pay the enterprises of controlled transactions in the application of the fixed length principle. Then, j_2 is a coefficient for the tax rate in the case of fixed length principle. Thereupon, we conclude according the prior theory that:

³ Challoumis, C. (2018). Arm's Length Principle and Fix Length Principle Mathematical Approach. *SSRN*. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3148276

⁴ Challoumis, C. (2018). Analysis of Tangibles and Intangibles Transactions Subject to the Fixed Length Principle. *SSRN*. Available at: <https://ssrn.com/abstract=3142960>

⁵ Ibid

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

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

Thereupon, with the fixed length principle the enterprises of controlled transactions are able to tackle issues which come from the allocation of the profits and losses. Thus, the tax authorities are able to face the transfer pricing effects to the global tax revenue.

The fixed length principle permits to recover the tax losses of the global tax revenue from the controlled transactions of the transfer pricing. In the next scheme is illustrated the procedure that companies of controlled transactions follow for their allocations of profits and losses, the proportional adjustments of data, and the fixed length principle. Thence, we have possibility to create *Figure 1*, where the procedure of the fixed length principle is determined.

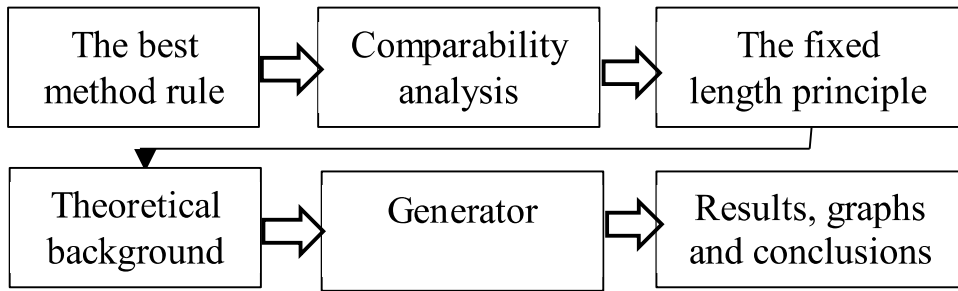


Figure 1: Cost sharing and application of the fixed length principle

Source: developed by author

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. Then the benefits of the companies could be managed in a completely different way, as could be saved or could be taxed. The theory of cycle of money shows when the savings robust the economy. It is crucial for this determination to be a separation of savings into the non-returned savings (or escaped savings) and into the returned savings (or enforcement savings). For the scope of this analysis, the equations are demonstrated below:

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

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

$$m = \mu + \alpha_p \quad (9)$$

$$\mu = \sum_{t=0}^n \mu_t \quad (10)$$

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

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

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

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

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

The basic principles for the cycle of money are:

(1) Both citizens and small and middle sized enterprises substitute the services and the property of the companies which save their money and not invest them or consume it proportionally in the economy. Thus, the companies of the controlled transactions are the main cause for the escape savings.

(2) The escaped savings are responsible for the economic decline in the society. The key point of escape savings is that the companies of controlled transactions of transfer pricing are responsible for the not reenter of these amount of money in the market. This situation causes the lack of financial liquidity in an economy.

(3) The substitution of controlled transactions is not substituted from citizens and from small and medium sized companies when there is not plausible to offer the same added value to the products. It happens especially in the instance of factories, in the research centers etc. Therefrom, these cases in the appropriate tax policy should be taxed as uncontrolled transactions independently, if they participate in the controlled transactions (using the fixed length principle).

(4) The enforcement savings are responsible for the high economic dynamic of the economy. Thus, the investments and the consumption are these elements which come from the savings of citizens and small and medium sized companies.

(5) The velocity of financial liquidity shows how rapidly the economy robustness grows or declines. There is an index for how well structured any economy.

(6) The velocity of escaped savings shows how rapidly the non-return savings are lost from the market, or by the lack of investments, or by the lack of consumption.

(7) The cycle of money represents the condition of the economy. The level of well-structured tax system, and in general the dynamic of the economy. If this indicator is high, then the economy has high robustness otherwise has low financial liquidity.

(8) The controlled transactions in the theory of cycle of money are considered not only transfer pricing cases, but any kind of profits administration to avoid taxation.

(9) As uncontrolled transactions in the theory of cycle of money are the case of commercial activity of citizens, small and medium sized enterprises, factories, research centers, and any kind of commercial activity, it cannot substitute by the companies of controlled transactions.

(10) The fixed length principle tackles issues subjects like the case cycle of money. But, it does not mean that restrictive must apply the fixed length principle as the cycle of money is more widely theory which exceeds the transfer pricing scope.

Therefrom, we obtain that the cycle of money grows when there is a tax system like the case of the fixed length principle which permits the low taxation of uncontrolled transactions and the higher taxation of controlled transactions.

There are three basic impact factors of the rewarding taxes (taxes which have immediate and important role in the market economy). These factors are affiliated with the education, health system of each society, and with the rest relevant structural economic factors of the prior two impact factors. This issue is illustrated in *Figure 2*.

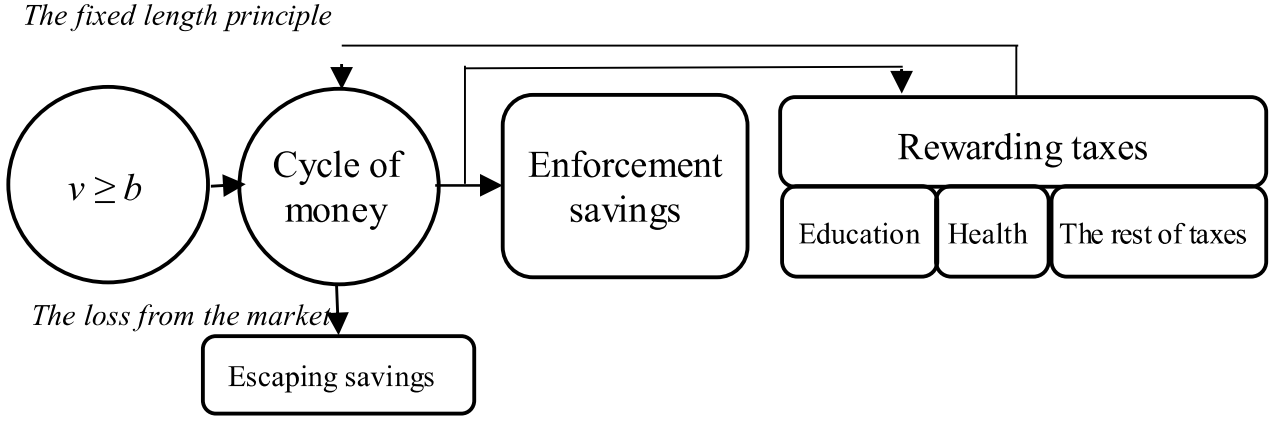


Figure 2: The cycle of money with rewarding taxes

Source: created by author

The scheme represents the cycle of money with all rewarding tax factors. Then, for the rewarding taxes we have equations:

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

and

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

The variable α_r symbolizes the impact factor of the rest rewarding taxes. The α_n is the impact of the education factor. The α_m is the impact factor of health. The h_n and h_m are coefficients of the education and the health impact factors respectively.

Mathematical approach of the utility cycle of money

For the purposes of the mathematical approach of the utility cycle of money we use the prior equations subject to the utilities of the next equations with their conditions:

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

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

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

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

According to the prior definitions, $\hat{U}(t)$ is the authorities' utility and thus, the public sector. The $U(t)$ is the enterprises' utility that take part in controlled transactions. Using equations, it is plausible to define the behavior of the cycle of money utility. Then, using all factors, meaning that we have both, the escaping savings and the enforcement savings, the magnitudes of them should have not a high divergence ($c_m = 0.197$ and $c_a = 0.198$). A utility of cycle of money in 3D is shown in *Figure 3*.

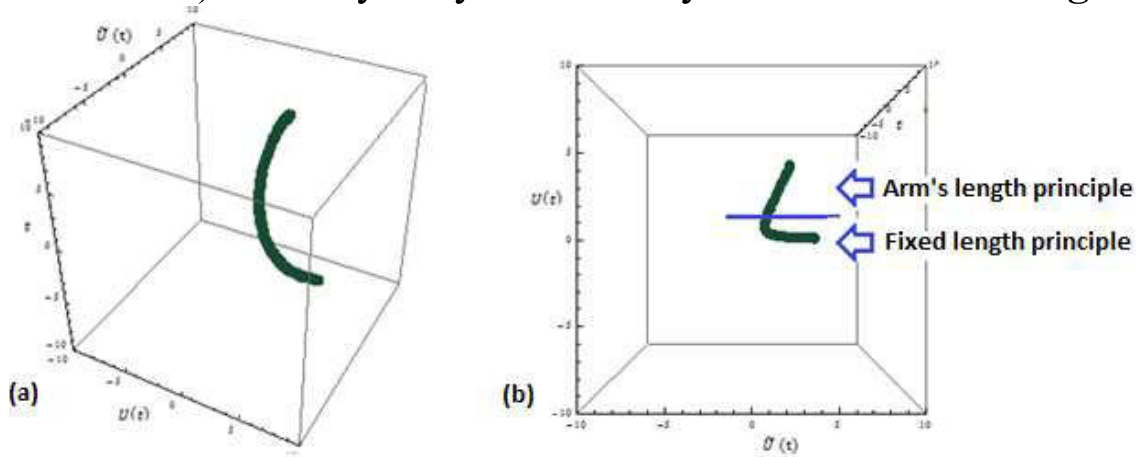


Figure 3: Utility of cycle of money in 3D from a different view

Source: created by author

In both diagrams (*Figure 3*) we have one critical point which is the point where the utility curve is changing (the symbol of t is the number of iterations equal 20). In the part of the fixed length principle we obtain that the authorities' utility (public sector) is increased. The same happens for the companies which participate in uncontrolled transactions (as belong from the view that both win in case of the lower taxation of uncontrolled transactions⁶). In the part of the arm's length principle, the enterprises of controlled transactions have more utility (*Figure 4*).

As the companies have higher utility than the authorities, this is the reason and the risk that enterprises take to proceed to business plans.

CONCLUSIONS

In this paper, we found out that the utility of public sector is a bit lower than the utility of private sector. This is the reason for the private sector why take risks for business plans.

⁶ Challoumis, C. (2018). Methods of Controlled Transactions and Identification of Tax Avoidance. *SSRN*. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3134109

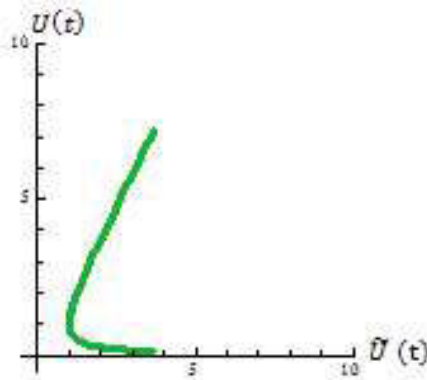


Figure 4: Utility of cycle of money

Source: created by author

Additionally, we obtained that there is a critical point between the tax policies, and more precisely between the arm's length principle and the fixed length principle.

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