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Analysis of the Theory of Cycle of Money

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Abstract: This study investigates the Theory of Cycle of Money. The concept of this theory is based on the distribution of money in an economy and shows that it is plausible to have a positive effect on an economy by the appropriate public and tax policy (when is applied the cycle of money). The dynamic of each economy is represented by the concept of the cycle of money. The multiple times that money is used and reused to a country's economy, without getting out to external economies and banking systems, clarifies the robustness of this economy. Therefore, to this analysis are determined the appropriate tax policies in connection with the savings of the companies of controlled (the companies of transfer pricing administrate their taxation with the allocation of profits and losses to maximize their benefits) and uncontrolled transactions (the companies are not participating in allocations to administrate their profits and losses). This theory is based on the approach that small and medium enterprises must have lower taxes than larger and international companies that substitute the activities of these companies. Moreover, the only large economic units that should have low taxes are the factories and know-how technological companies. In that way, a society could achieve its best well-being standards, as this is a theory that completely sought social welfare. This article aims to clarify the Theory of Cycle of Money and its importance for the robustness of the economy, and the prosperity of the society and citizens. The current study applies the Q.E. method and its econometric approach.

JEL classification: B41, F6, F40, F43, F62, F63

Keywords: the cycle of money, the velocity of liquidity, the velocity of savings, tax and public policy, society

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1. Introduction

This theory reveals that to an economy the taxes return to the society, basically to the case of the education and the health system. But, the main rule is that the authorities should keep the taxes as low as is plausible, for the medium or small economic units (meaning any kind of economic unit e.g. freelancers), and companies (OECD, 2019). The government should protect those applying low taxes and at the same time applying higher taxes on the bigger companies. But, there is an exception for the big companies to the case that their activities are not covered by small companies, where the tax authorities should apply low taxes. Also, factories and high technology companies should have low taxes. Thus, the mainstream is to have an economy, with the best allocation of production (Feinschreiber, 2004). In that way, an economy achieves its higher level. Additionally, this theory demonstrates that with the best allocation of production units and of taxes the money is cycled in the economy and is not lost from the economy, as it achieves the maximum use of the same amount of money in an economy (Challoumis, 2018). The cycle of money stands on the way that money reused in the economy and the structural form of an economy (Ossa, 2014). As an allegorical paradigm, the economy should be imagined as a balloon and the money as the air. The big companies substitute the activities of the smaller companies and decline the prosperity and economic growth because they save a huge amount of money to tax havens and external banking systems (IMF, et al., 2017). The consumption is reduced by this mechanism (because the air of the balloon is less and the balloon, becomes smaller).

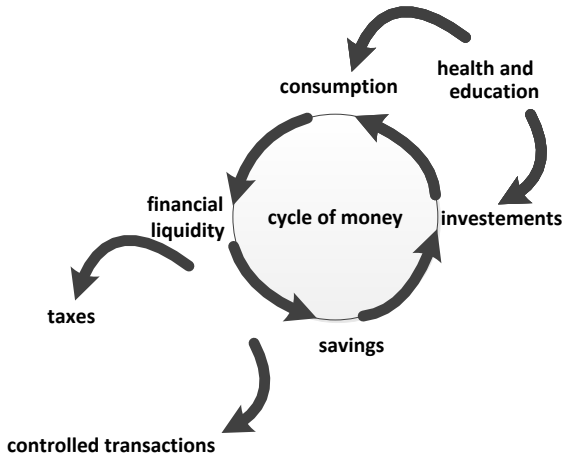

Figure 1: Chain of the cycle of money

The Theory of the Cycle of Money represents the dynamic of any economy. It scrutinizes the structural characteristics of the economy and the appropriate behavior of authorities who are responsible for the public and tax policy (Bank de France, 2018). The dynamic of the economy is analyzed also with the terms of savings. This work makes a distinction between escaped savings and enforcement savings (OECD, 2010). The way that money of savings recycles or escapes from the economy affects the robustness of the economy. The structural form of the economy and the decisions of the authorities on the companies determine the dynamic of the economy. In the next sections is analyzed the cycle of money and the forms that affect the velocity of financial liquidity and the velocity of escaped savings (Challoumis, 2018). These two economic velocities clarify the rate of the cycle of money. To engage in a most comprehensive analysis of the cycle of money is applied to the Q.E. method for the appropriate exegesis of the model (Challoumis, 2017). Then, this work is clarified the concept of the Theory of Cycle of Money, by the confirmation of the initial hypothesis, meaning the money that is lost from countries economy decline the cycle of money, and on the other hand, the reuse of money in an economy increases the cycle of money (see Figure 4 (a) and (b), the values c_y, c_m and c_a).

2. Methods

In this paper as a method is used the axiomatics and Q.E. method. The axiomatics is the indicator of the reliability of a study. The axiomatics stands on the assumption that the results are not known on a hypothesis. The hypothesis is used for the determination of the results. The criterion about the reliability of the model stands on that approach. The results in combination with the initial hypothesis are the compass of the adequate adjustment of the model which is under consideration. This is the key to the scrutiny of an economic theory that is under examination. The hypothesis of economic theory is the basis for the further study of each economic model (Challoumis, 2020). Therefore, the axiomatics is trying to answer the background of economic analysis and to confirm that the initial hypothesis of the model is satisfied. If the hypothesis complies, then the theory is consistent with the principles of the model that is under examination (Research, 2019). The main concept of axiomatics stands on the correspondence of the initial hypothesis to the mathematical and economic scrutiny. Consequently, it is plausible for the scientist to confirm the theory about the chosen model (IMF, 2018).

The concept of the Q.E. theory is based on a methodology described by mathematical equations subject to their conditions. Moreover, the research determines the upper and lower limit of the

independent variables. The dependent variable represents the behavior of the selected model, pending on a generator that produces random values to all the independent variables to figure the interaction between them and their behavior under different conditions. At least the basic study includes two facets:

- The analysis of the behavior of the model allows the extraction of general conclusions about the model which is under examination. It is plausible the analysis of data into two and three-dimensional axes of the graph, pending on the case.

- The frequency analysis behavior scrutinizes the behavior of the dependent variables, from the view of the number of appearances of a variable than another, estimating the impact that one independent variable has with one or more other independent variables.

The dependent variables are modified for the generator. The generator produces values for the dependent variables. The extracted values of the generator allow the creation of magnitudes, which are the base for comparisons between the variables, and the investigation of the mathematical equations. It is plausible to quantify the quality data and theoretical terms, of the model. According to the Q.E. method, the created magnitudes allow proceeding furthermore to econometrical analyses. In general, it is a methodology for the quantification of quality data (Camerer, 2003). Thus, using the Quantification of Everything (Q.E.) methodology is plausible to clarify the behavior of any model and to determine its standalone behavior, or its comparative behavior, between different models. The Q.E. methodology follows an index of four basic steps. These steps are described below:

- The first step is about the hypothesis. It is determined the scope of the analysis of each study. Thus, the mathematical determination is the main point of this step.

- The second step is about the generator, which produces the values for the independent variable. This procedure takes into consideration the upper and the lower limit for the production of values through the randomization procedure. This technique allows the formation of the quality data into a quantified form. After a crucial number of irritations is plausible to sketch the appropriate mathematical equation. Then, it is obtained the behavior of the equation, which is under examination. The procedure needs at least two mathematical equations, with an addition of some variables, or the omission of some variables to the existing equation, to understand how the equation reacts in different forms.

- The third step gives the conclusions, and through the hypothesis is plausible to confirm an existing theory, or to submit a new scientific view.

- The fourth step is about the feedback, the repetitions of the whole procedure, and the appropriate modifications of the model if the third step didn't achieve to extract the appropriate conclusions.

The prior analysis shows the plausible ways to administrate the data which comes from the Q.E. generator. Then, the basic two ways to tackle the data in a way that allows their further analysis is by shifting or by conversion of them into absolute values. Thereupon:

- The case of shifting indicates the movement of data from negative values to positive values. This means that the constant of the econometric analysis here has a double role. First to administrate the econometric approach and secondly to adjust the data.

- The absolute values of the data reveal the intensity of the model. Then, in that case, some information is not included in the final model. Therefore, the method of absolute values is an effective and simple way to administrate the data but having some pros and cons.

- One more technique applied in the data, is the linearity of them, meaning the transformation of them into a linear form, with logarithms.

- This technique accepts any transformation of data does not affect two basic things, the form of the model, and the form of the data in their substance. One effective way to obtain when the data are not affected by the transformations is when the comparability analysis is not affected. This means that the information which comes from the comparisons between the models and the data remains the same in their main key characteristics. The same should happen and to the structural characteristics of the model which must still be the same.

Based on these principles, it is plausible to proceed to an application of them to the model, using the case of absolute values.

The contracts and the agreements between the participants of control transactions are these which determine the allocation of profits and losses. The agreements should mention the changes in the contracts (Linde & Pescatori, 2017). This is the reason why the tax authorities should make periodic inspections (Challoumis, 2019). The periodic specification of contracts

is important for the comparability analysis. These periodic inspections of the companies which participate in controlled transactions are crucial for the arm's length principle. The determination of the cost-sharing depends on the periodic inspections of companies that are tested parties (the companies which participate in control transactions). The scope of the companies of controlled transactions is to face the issues that are connected with the taxation of their activities. Then the requirements for the companies of controlled transactions should be in the range of the arm's length principle (Feinschreiber, 2004). Thus, the appropriate agreement of the companies of controlled transactions is that which permits them the maximization of their profits in tax environments with a low tax rate, and the maximization of costs in economic environments with a high tax rate.

The companies of controlled transactions and at the same time tax authorities proceed according to proportional adjustments of their transactions (data that companies present to tax authorities). The issue of proportional adjustments is that the companies which participate in controlled transactions many times don't have the appropriate data and knowledge of uncontrolled transactions under similar circumstances, to make a comparison and therefore are not able to adjust their data proportionally. This means that if the companies which are tested parties obtain that their profits and losses comparing with the uncontrolled transactions are much higher or much fewer, then they adjust their profits and losses.

The production of goods or services creates profits and costs for 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 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) and (2) is plausible to determine the following equations:

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

And

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

The symbol of b is about the amount of taxes that should pay the companies of controlled transactions according to the arm's length principle. The u_c is the amount of tax obligations that can avoid the allocation of profits and losses. Moreover, j_1 is a coefficient for the rate of taxes. Then, equation (4) shows the case of the arm's length principle. Besides, to the case of the fixed length principle obtained the next equation:

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

The symbol of v represents the taxes that should pay the companies of controlled transactions according to the fixed-length principle. Then, j_2 is a coefficient for the rate of taxes in the case of the fixed length principle. Therefore, the relation between b and v is represented by the next relation:

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

The tax for the companies which 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. Then, with the fixed-length principle, the enterprises of controlled transactions can tackle issues that come from the allocation of profits and losses. Consequently, the tax authorities can face the transfer pricing effects of global tax revenue.

The fix length principle permits the recovery of the tax losses of the global tax revenue from the controlled transactions of the transfer pricing. The next scheme illustrates the procedure that companies of controlled transactions follow for their allocation of profits and losses, the proportional adjustments of data, and the application of the fix length principle:

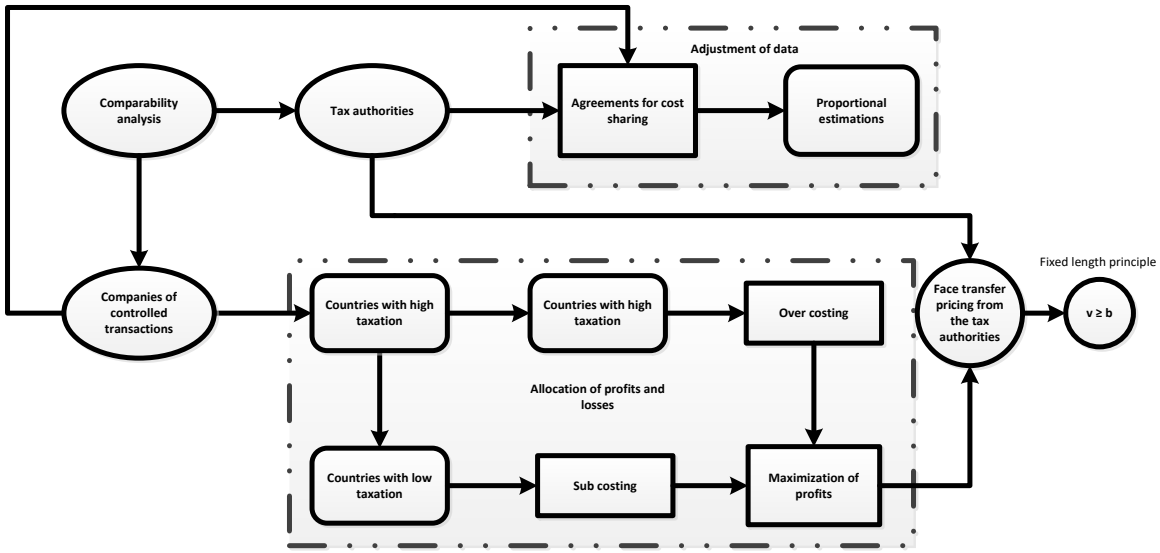

Figure 2: Cost sharing and application of fixed - length principle

Figure 2 determines the procedure of the allocation of profits and losses. It illustrates the case that the companies of controlled transactions make a proportional adjustment of data. The tax authorities can face the allocation of profits and losses of the companies which participate in controlled transactions, by the fixed-length principle. The fixed-length principle and the arm's length principle are tax policies for the savings of the companies which participate in controlled transactions and the companies which participate in uncontrolled transactions.

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. The theory of the cycle of money reveals when the savings and taxes robust the economy. This definition separates savings into non-returned savings (or escaped savings) and returned savings (or enforcement savings). The scope of this analysis is demonstrated in the following equations:

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

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

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

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

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

$$c_m = \frac{dx_m}{dm} \tag{12}$$

$$c_\alpha = \frac{dx_m}{da} \tag{13}$$

$$c_y = c_m - c_\alpha \tag{14}$$

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 escaped savings that come from transfer pricing activities. The variable of α_t symbolizes the escaped savings, not from transfer pricing activities, but any other commercial activities. For instance, α_t could refer to the commercial activities which come from uncontrolled transactions. The variable of m symbolizes the financial liquidity in an economy. 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 companies. 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. The variable of c_α symbolizes the velocity of escaped savings (United Nations, 2013). 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.

The rate of the cycle of money grows when there is a tax system like the case of the fix length principle which permits low taxation of uncontrolled transactions and higher taxation of controlled transactions. It should be considered as uncontrolled transactions, the financial liquidity of citizens, and small and middle-size companies. The prior analysis is illustrated in the next scheme:

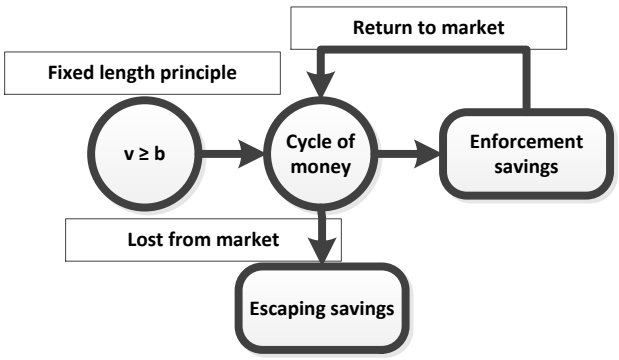

Figure 3: Cycle of money

Figure 3 shows the cases of escaping savings and enforcement savings. It represents the connection of the higher tax policy for the controlled transactions and the lower tax policy for the uncontrolled transactions which corresponds to the fixed-length principle.

3. Results

For the mathematical approach of the cycle of money are used the prior equations subject to the next condition:

$$\mu > \alpha_p > \alpha_t > \alpha_s \quad (15)$$

For the scope of this work are used the prior equations to receive the next table about the coefficients of the values of the cycle of money:

Factors	Values
α_s	0.6
α_t	0.7
M	0.9
α_p	0.8

Table 1: Compiling coefficients

The generator of this procedure uses the coefficients which appeared in the previous table. Factors have as an upper limit the 1, and a lower limit the 0, but s and $\tilde{s}$ are plausible to receive values greater than 1 according to the compilation of the model. After 461 iterations extracted the following diagrams:

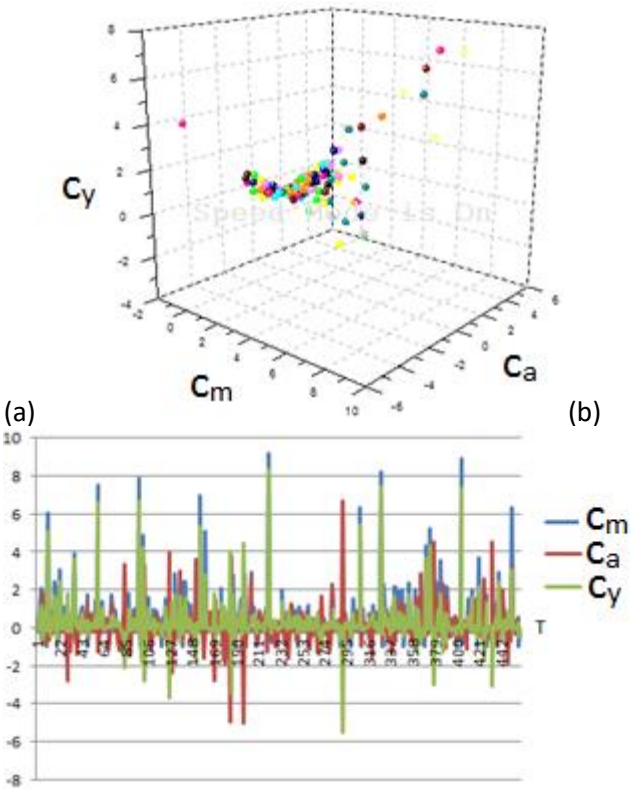

Figure 4: (a) Three-dimensional representation of the cycle of money (see Appendix) (b) Cycle of money

Figure 4 (a) illustrates the case of the three-dimensional representation of the cycle of money. The c_y and c_m have positive values, and c_α has negative values. Consequently, the controlled transactions of transfer pricing decline the cycle of money (it is in the same line with the initial expectation). The velocity of escaped savings diminishes the cycle of money and comes up with a weak positive cycle of money. The ideal economy is not a closed economy but an economy with fragments. The economy with fragments protects its financial liquidity by the increase of the escaped savings. According to that mechanism, the cycle of money is enforced, with the investments and consumption at a higher level. In Figure 4 (b) the velocity of financial liquidity maintains the cycle of money at a positive level, as the velocity of escaped savings is pooling to the opposite orientation. Afterward, is applied an econometrical examination for the stability of the model:

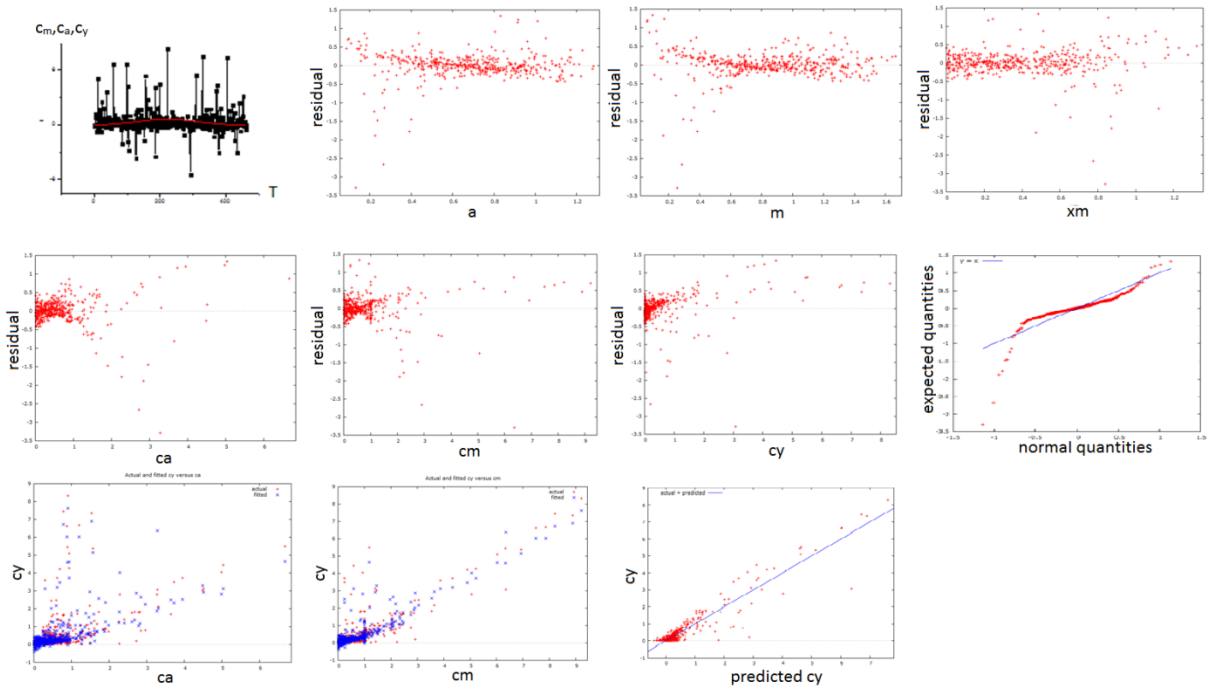

Figure 5: Econometric analysis of the cycle of money

According to the prior figure, all the variables of the model are stable, as the residuals do not have any important deviation from the expected values. Then the results of the Q.E. method are fine with the residuals of the model, showing that the model is consistent.

Discussion

The current study analyzed themes about the fragment of the economy; complying not with the sense of a closed economy, but an open economy with certain rules. An economy that has no real limits to the transactions of the international companies' losses taxes and financial bank savings **(Feinschreiber, 2004)**. The application of the fixed length principle to an economy is crucial for the robustness of the economy. The arm's length principle allows the big companies to manipulate their tax obligations and to save their money to international tax heavens making weaker the cycle of money of the economy. To the question, if the arm's length principle serves the dynamic of the economies, the answer is negative. The application of the fix length principle shows that an additional tax should be applied to big companies that substitute the activities of the smaller one companies **(Erceg, et al., 2018)**. Fix length principle permits the authorities to reduce the lost money from the economy. The Theory of Cycle of Money suggests even to the case that no tax is implied: if the money is circulated and reused in the economy without external losses to other economies, the economy will work perfectly. Then, to an economy should be applied a constant additional tax to international companies that substitute local companies. The

reason for the application of the additional tax is that the international companies reduce the money in the economy (making smaller - weaker the cycle of money), as the international companies can't lead to the same consumption of products as smaller companies and citizens, can do. The smaller companies don't save their money to international banking systems, but local banks, making the economy stronger. Therefore, the arm's length principle doesn't serve the nations' economies. Moreover, an application of the Theory of Cycle of Money could be found in the work "Index of the Cycle of Money - The case of Latvia", where the dynamic of the country's economy according to the cycle of money, reveals the strength of Latvia's economy to a financial crisis **(Challoumis, 2020)**.

4. Conclusions

Insights of the current analysis, suggest that tax policy and structural formation of the public policy according to the private investments robust the economy. The taxation in combination with consumption, investments, and savings reveal to tax authorities the appropriate economic policy. Therefore, increased consumption and investments in combination with the low escaped savings from the economy, the low taxation of economic units of the uncontrolled transaction, and the high taxation of control transactions, lead the dynamic of the economy to its higher level. The mainstream concept of the Theory of Cycle of Money is that the small and medium companies should be taxed as lower as plausible, to increase with that way the reuse of money to an economy avoiding its loss to other external banking systems and economies. Then, as many times an amount of money is used to an economy, the wealth for the society and the country's economy will be robust. Simultaneously, the companies that proceed to controlled transactions (and in general the international companies) are saving their money out of the economy's system, so they should be taxed higher than the small and medium enterprises (as they substitute their activities). In that way, a country's economy could have a higher cycle of money. Finally, it should be mentioned that the only taxes that have a real positive effect on an economy are education and health taxes, as both of them are returning to the economy, making the quality of the economy higher. Therefore, the only case that big companies can have low taxes is for the case of factories, and companies with high technology services, because they cannot be substituted by smaller companies, as they don't have the appropriate know-how or capital. Since these principles are applied to an economy, a society could achieve its best well-being standards.

Appendix

This code is used the compilation of the model. The results of Matlab are modified with Origin (462 compilations for 2772 results for the variables of the model).

```
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

a=as+at;
m=m1+ap;
xm=m-a;
cm=xm/a;
ca=xm/m;
cy=cm-ca;

%initially in the first compile; tab is not used

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

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