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UTILITY OF CYCLE OF MONEY WITH AND WITHOUT THE ENFORCEMENT SAVINGS

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A R T I C L E I N F O.

Keywords: utility of cycle of money, enforcement savings.

Abstract

This paper is about the utility of the cycle of money with and without enforcement savings. This means that were examined the critical points of tax policy and public policy which are the best for the increase of consumption and investments, subject to the case that there exist the enforcement savings and the case that we have an absence of enforcement savings. Therefore, made an analysis based on the utility of the public sector and the utility of the uncontrolled enterprises. It is plausible to extract conclusions about the utility of the cycle of money, showing the points and the behaviors of any economy when there are and when there are no enforcement savings. For this analysis is used a simple system of first-order derivatives under conditions, and the Karush-Kuhn-Tucker method.

1. Introduction

This paper analyzes the utility of the cycle of money with and without enforcement savings. The examination of the utility of the cycle of money with and without enforcement savings is plausible through the utility of companies and the utility of the authorities (Bourdin & Nadou, 2018; Gilens & Page, 2014; Herrington, 2015; Kominers et al., 2017; Maier, 2012; Mancuso & Moreira, 2013; Siegmeier et al., 2018). Then, in this scrutiny is used a simple system of derivatives about the utilities of the companies and the authorities. Thence, after estimations were extracted the utility graphs, which used to obtain the behavior of the cycle of money with and without the enforcement savings (Challoumis, 2019, 2020c, 2020a, 2021c, 2021e, 2021a, 2022). In addition, should be mentioned that used the velocity of financial liquidity (or, impact factor of financial liquidity), and the case of the velocity of enforcement savings (or, impact factor of enforcement savings) should be mentioned that is considered approximately equal to zero and in the other case wasn't equal with. These are the key elements of the cycle of money. The next section is given the basic principle of the cycle of money without enforcement savings.

2. Literature review

Contracts and agreements between the participants of control transactions are these which determine the allocation of profits and losses. This is the reason why the tax authorities should make periodic inspections. The periodic specification of contracts is important for the comparability analysis (Challoumis, 2020b, 2020a; Feinschreiber, 2004; OECD, 2017). These periodic inspections of the companies which 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. Therefrom, the requirements for the companies of controlled transactions with the tax authorities should be in the range of the arm's length principle (Cruz-Castro & Sanz-Menéndez, 2016; Herzog, 2021; Hussain et al., 2022; Ladvocat & Lucas, 2019; Lucchese & Pianta, 2020; Peres et al., 2020; Rumayya et al., 2020). 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 (Aakre & Rübbelke, 2010; Adhikari et al., 2006; Baldwin et al., 2011; Gangl & Torgler, 2020; Holcombe, 1998; Miailhe, 2017; Suslov & Basareva, 2020). The interpretation of the condition of the proportional adjustments is that the companies which 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. This means that 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 a proportional analogy to compare them with their data.

The production of goods or services creates profits and costs for the companies. Based on the prior scrutiny:

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

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

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 eq. (1) - (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. Then, eq. (5) 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 pay 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 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.

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

The fixed length principle permits to cover the tax losses of the global tax revenue from the controlled transactions of the transfer pricing. The next scheme has 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:

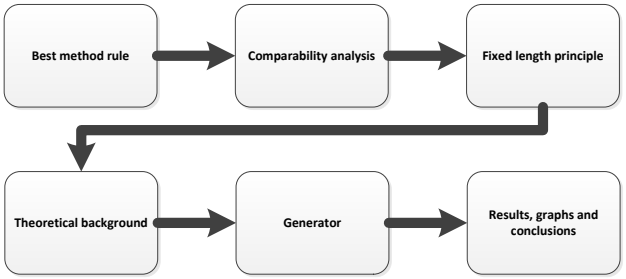

Figure 1: Cost sharing and application of fixed length principle

Fig. 1 is determined the procedure of the fixed length principle and its quantity analysis for the determination of the behavior of the model. The next section is presented the theory of the cycle of money.

3. Methodology

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 could be taxed. 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 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:

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

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

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

$$\mu = \sum_{i=0}^{n} \mu_i \quad (10)$$

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

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

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

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

The variable of α has symbolized 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 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 which come from uncontrolled transactions. The variable of m symbolizes the financial liquidity in an economy (Challoumis, 2021d, 2021b). 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.

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. Should be mentioned that as uncontrolled transactions are considered the same happens with the cases of the financial liquidity of citizens and small and middle-size companies.

There are three basic impact factors of rewarding taxes. The rewarding taxes are the only taxes that have an immediate and important role in the market of any economy. These factors are affiliated with education, with the health system of each society according to Fig. 2, and with the rest relevant structural economic factors of the prior two impact factors:

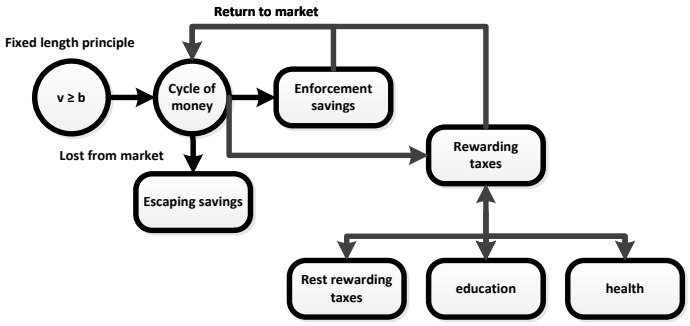

Figure 2: The cycle of money with rewarding taxes

The issue without the enforcement savings is illustrated in the next scheme:

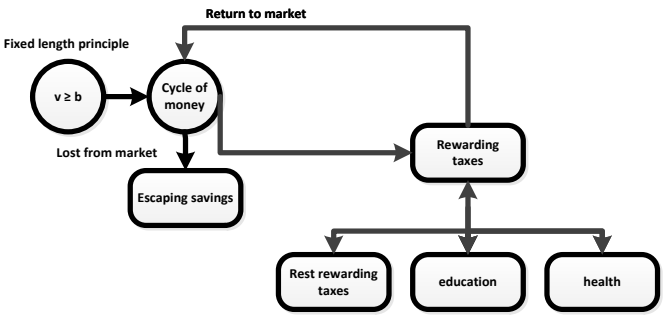

Figure 3: The cycle of money without enforcement savings

Fig. 3 shows the cycle of money additionally with all the rewarding tax factors. Then, for the rewarding taxes:

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

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

The prior two equations used some impact factors, which are the α_p which is also demonstrated in the eq. (11), moreover the variables $\alpha_r, \alpha_n, h_n, \alpha_m$ and the h_m. The variable α_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. In the next section are determined the utilities of the companies and the authorities. Then, $\alpha_m * h_m$, is approximately equal to zero, because there are no enforcement savings. In the other case is used the factor of the $\alpha_m * h_m$.

4. Results

For the mathematical approach to the utility of the cycle of money:

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

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

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

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

According to the prior definitions should be mentioned that the symbol of $\tilde{U}(t)$ 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 which participate in controlled transactions. Using equations (1) to (20) it is plausible to define the behavior of the utility of the cycle of money.

Then, using all the factors, meaning that there are both, the escaping savings and the enforcement savings, thence there are all the magnitudes in the one case. In the other case, the velocity of enforcement savings is approximately equal to zero ($c_m = 0.125$, and $c_a = 0.86$):

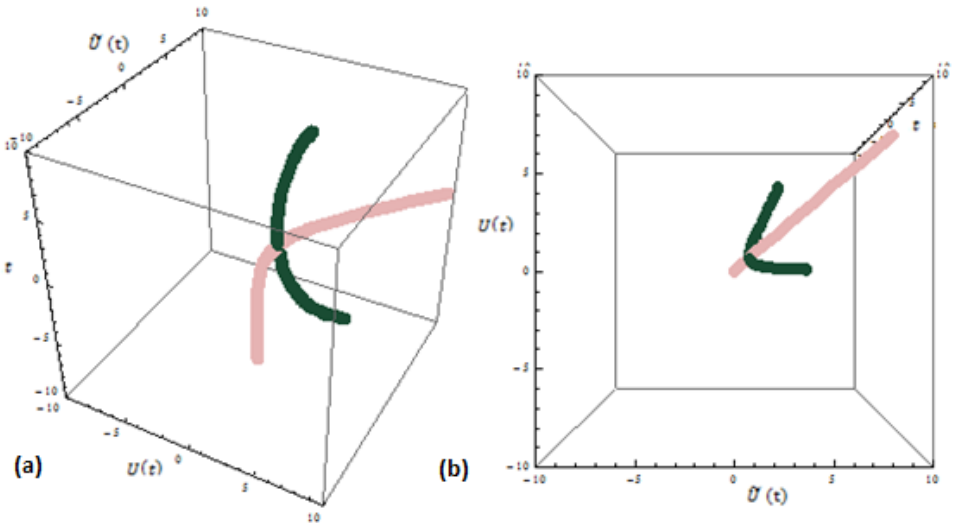

Figure 4: (a) Utility of cycle of money with and without enforcement savings in three dimension approach (b) Utility of cycle of money with and without enforcement savings in three dimensions approach from a different view

In both diagrams of Fig.4, it is concluded that there is only one critical point which is the point where the utility curve is changing (the symbol of t is about the number of iterations, which are 20). This happens in one case, in the case that there exist enforcement savings (green line), and it doesn't exist in the case that there are no enforcement savings (pink line). Then, it is obtained that the utility is higher in the case that there are enforcement savings than in the case that there don't exist escaping savings:

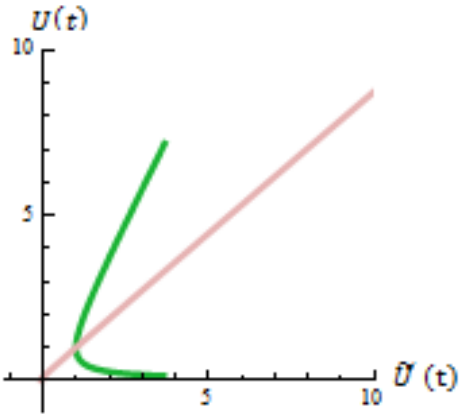

Figure 5: Utility of cycle of money with and without the enforcement savings

Fig. 5 shows that the utility is higher for the public and the private sector in the case that there are enforcement savings (green line), than in the case that there don't exist enforcement savings (pink line). Thence, the utility of the economy and the economic dynamic in the version that there exist enforcement savings are higher than in the case that there are no enforcement savings.

5. Conclusions

This paper concluded from prior comparisons that the utility of the public sector and private sector is very high when there are enforcement savings. Then, the consumption and inventions in this economy would be at their maximum level. Additionally, it is obtained that there is a critical point between the tax policies only in the case that there are enforcement savings (and more precisely between the arm's length principle and the fixed length principle). In the case that there are no enforcement savings any tax policy could have effect.

Appendix

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cmB=0.125;
caB=-0.86;
eksisosiB:=xB'[t]ŠcmB*xB[t]-caB*yB[t];
eksB:=yB'[t]Š-caB*yB[t];
con1B:=xB[0]Š1
con2B:=yB[0]Š1
phaseB=DSolve[{eksisosiB,eksB,con1B,con2B},{xB[t],yB[t]},t];
xxB=xB[t]/.phaseB[[1]];
```

```
yyB=yB[t]/.phaseB[[1]];

five=ParametricPlot3D[{xxB,yyB,t},{t,-10,10},PlotRange®{-10,10},AxesLabel®{"cm-axis","ca-axis","t-axis"},PlotStyle® {Thickness[0.03],RGBColor[0.9,0.7,0.7]}]

six=ParametricPlot[{xxB,yyB},{t,-10,10},PlotRange®{-10,10},AxesLabel®{"cm-axis","ca-axis","t-axis"},PlotStyle® {Thickness[0.01],RGBColor[0.9,0.7,0.7]}]

Show[one,five]

Show[two,six]

Show[one,three,five]

Show[two,four,six]


cm=0.197;

ca=0.198;

eksisosi:=x'[t]Šcm*x[t]-ca*y[t];

eks:=y'[t]Š-cm*y[t];

con1:=x[0]Š1

con2:=y[0]Š1

phase=DSolve[{eksisosi,eks,con1,con2},{x[t],y[t]},t];

xx=x[t]/.phase[[1]];

yy=y[t]/.phase[[1]];

one=ParametricPlot3D[{xx,yy,t},{t,-10,10},PlotRange®{-10,10},AxesLabel®{"cm-axis","ca-axis","t-axis"},PlotStyle® {Thickness[0.03],RGBColor[0.1,0.3,0.2]}]

two=ParametricPlot[{xx,yy},{t,-10,10},PlotRange®{-10,10},AxesLabel®{"cm-axis","ca-axis","t-axis"},PlotStyle® {Thickness[0.01],RGBColor[0.1,0.7,0.2]}]

xx

yy
```

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