Center for Open Access in Science ▪ https://www.centerprode.com/ojre.html
Open Journal for Research in Economics, 2024, *7*(1), 33-40.
ISSN (Online) 2620-102X ▪ https://doi.org/10.32591/coas.ojre.0701.04033c

Velocity of the Escaped Savings and Financial Liquidity on Mixed Savings

Constantinos Challoumis

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

Received: 3 October 2023 ▪ Revised: 2 July 2024 ▪ Accepted: 14 August 2024

Abstract

This paper is about the velocities of the escaped savings and of the financial liquidity, using and the mixed savings. This means that it scrutinizes the behavior of the cycle of money in normal circumstances subject to the velocity of escaped savings and the velocity of financial liquidity in combination with mixed savings. Therefore, it is determined how the economy works based on its cycle of money. Thence, it is plausible to extract conclusions about the consumption and the investments in each economy. For this analysis, the Q.E. method approach has been applied.

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

1. Introduction

The case of mixed savings includes in its model both the escaped savings and the enforcement savings. This current work analyzes the behavior of the cycle of money in combination with the velocity of escaped savings with the velocity of financial liquidity in combination with mixed savings. It is obtained through the Q.E. method the attitude of the cycle of money and how it works and then extracted conclusions about the consumption and the 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 mixed savings.

The allocation of profits and losses are determined with agreements between the participants of controlled transactions (Challoumis, 2020, 2021c; De Araujo et al., 2020; Engström et al., 2020; Fernandez & Raine, 2019; Gangl & Torgler, 2020; Maier, 2012; Syukur, 2020; Van de Vijver et al., 2020)(Baker et al., 2020; Berg et al., 2020; Gangl & Torgler, 2020; Hagenaars et al., 2017; Levi, 2021). 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 (Burstein, 2020; Cruz-Castro & Sanz-Menéndez, 2016; Haigh, 2020; Jeon et al., 2020; Peres et al., 2020; Rasmussen & Callan, 2016; Torres Salcido et al., 2015). 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

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

requirements for the companies to control transactions with the tax authorities should be in the range of the arm's length principle (Challoumis, 2019a, 2019b). 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.

Furthermore, the companies of controlled transactions should be estimated tax authorities' inspections are conducted 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 proportional adjustments condition is that companies that participate in controlled transactions frequently lack the appropriate data and uncontrolled transactions of similar circumstances to compare, so they proportionally adjust their data. (Challoumis, 2021a, 2021h, 2023b, 2023c, 2023a, 2021g, 2021f, 2021b, 2021c, 2021e, 2021d, 2022b, 2022a). This means 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 with their data.

2. Literature review

The theory of the cycle of money defines when the savings robust the economy and when the taxes robust the economy. This determination must be a separation of savings into the non-returned savings (or escaped savings) and the returned savings (or enforcement savings) (De Araujo et al., 2020; Gong et al., 2020; Kominers et al., 2017; Maier, 2012; Olcina et al., 2020; Paes-Sousa et al., 2019). For the scope of this analysis below are demonstrated the equations which are:

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

$$x_m = m - a \quad (2)$$

$$\mathrm{m} = \mu + \alpha_p \quad (3)$$

$$\mu = \sum_{\iota=0}^{n} \mu_\iota \quad (4)$$

$$\alpha_p = \sum_{j=0}^{m} \alpha_{pj} \quad (5)$$

$$c_m = \frac{dx_m}{dm} \quad (6)$$

$$c_\alpha = \frac{dx_m}{da} \quad (7)$$

$$c_y = c_m - c_\alpha \quad (8)$$

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. 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.

$$\alpha_p = \alpha_r + \alpha_n{}^* h_n + \alpha_m{}^* h_m \quad (9)$$

$$\alpha_r \geq \alpha_n{}^* h_n \geq \alpha_m{}^* h_m \quad (10)$$

In the prior two equations used some impact factors, which are the a_p which was also presented previously, 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.

The mathematical approach of the utility cycle of money has been used for the prior equations subject to the utilities of the next equations, with their conditions:

$$\widetilde{U}'(t) = \sum_{j=1}^{n} [c_m \, \widetilde{U}\,(\mathrm{t}) \; - \; c_\alpha U(t)]_j \quad (11)$$

$$U'(t) = -\sum_{j=1}^{n} [c_\alpha U(t)]_j \quad (12)$$

$$U(0) > 0 \quad (13)$$

$$\widetilde{U}(0) > 0 \quad (14)$$

According to the prior definitions should be mentioned that the symbol of $\widetilde{U}$ (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 that participate in controlled transactions. In addition, including the mixed savings a_{mi}:

$$\alpha_r = a_{mi} + \sum_{j=1}^{n} (\alpha_r)_j \quad (15)$$

$$\alpha_s = \sum_{k=1}^{m} (\alpha_s)_k \quad (16)$$

$$\alpha_p = \sum_{j=1}^{n} (\alpha_p)_j = \alpha_r + \alpha_n{}^* h_n + \alpha_m{}^* h_m \quad (17)$$

$$\alpha_t = \sum_{v=1}^{d} (\alpha_t)_v \quad (18)$$

$$a = \alpha_s + \alpha_t = \sum_{k=1}^{m} (\alpha_s)_k + \sum_{v=1}^{d} (\alpha_t)_v \quad (19)$$

$$m = \alpha_p + \sum_{z=1}^{q} m_z \quad (20)$$

$$0 \leq a_{mi} \leq 1 \quad (21)$$

The $\boldsymbol{a_{mi}}$ represents the mixed savings.

General equilibriums of velocities of the cycle of money:

It follows the general mathematical representations of these forms, which stand on these equations about the case of the velocity of the escaped savings:

$$c_\alpha = c_{a0} * ln(c_m - c_{m0}) \quad (22)$$

$$c_{y\alpha} = b_1[(c_a - c_{a0})^2 + c_{y\alpha 0}] \pm b_2\left(\frac{1}{c_a}\right) \pm b_3\left(\frac{1}{ln\, c_a}\right) \quad (23)$$

$$b_1, b_2, b_3 = 0 \text{ and } x_i \quad (24)$$

$x_i \geq 0$, 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. Moreover, the equation of $c_{y\alpha}$ represents the general equation of the escaped savings:

$$c_{ym} = b_4[(c_m - c_{m0})^2 + c_{ym0}] \pm b_5(\frac{1}{c_m}) \pm b_6(\frac{1}{ln\ c_m}) \quad (25)$$

$$b_4, b_5, b_6 = 0 \text{ and } x_i \quad (26)$$

$$x_i \geq 0, \text{ where i=1,2} \quad (27)$$

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 take one constant value x_i and the other one is zero. In that way, there are all the possible combinations of velocities of escaped savings and financial liquidities be defined by two concrete equations.

Mathematical approach and analysis of the cycle of money with the velocities of the escaped savings and financial liquidity subject to mixed savings:

Using equations (22) to (27):

$$c_{y\alpha} = b_1[(c_a - c_{a0})^2 + c_{y\alpha 0}] \quad (28)$$

$$c_{ym} = b_4[(c_m - c_{m0})^2 + c_{ym0}] \quad (29)$$

The table of coefficients for the cycle of money in the case of mixed savings is this:

Table 1. compiling coefficients

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

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

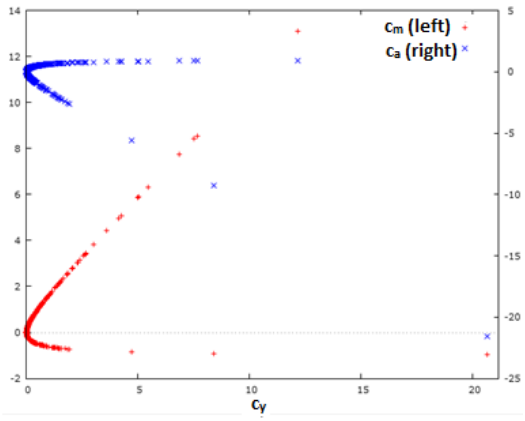

Figure 1. Cycle of money with its velocities

The previous figure has determined that the cycle of money is connected with the velocity of escaped savings, and with the velocity of financial liquidity. The mixed savings enhance the economy. Thence has clarified that the velocity of financial liquidity is positive and the velocity of escaped savings has an opposite orientation. It is concluded that initially, the velocity of the escaped savings has a stronger impact on the cycle of money, but finally, the velocity of financial

liquidity has a higher impact than the velocity of escaped savings. Then in general the cycle of money in normal economic circumstances has a positive orientation. The mixed savings helped the economy to overcome these initial disturbances more rapidly.

3. Conclusion

In this paper, it is concluded that the cycle of money under normal economic circumstances has a positive orientation, and with mixed savings, the economy is enforced more. This means that consumption and investments would be increased in any economy with normal conditions. mixed savings have a positive role in consumption and investments.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public commercial, or not-for-profit sectors.

The author declares no competing interests.

References

Baker, S. D., Hollifield, B., & Osambela, E. (2020). Preventing controversial catastrophes. *Review of Asset Pricing Studies*, *10*(1). https://doi.org/10.1093/RAPSTU/RAZ001

Berg, A., Markey-Towler, B., & Novak, M. (2020). Blockchains: Less government, more market. *Journal of Private Enterprise*, *35*(2). https://doi.org/10.2139/ssrn.3301714

Burstein, P. (2020). The Determinants of Public Policy: What Matters and How Much. *Policy Studies Journal*, *48*(1). https://doi.org/10.1111/psj.12243

Carattini, S., Carvalho, M., & Fankhauser, S. (2018). Overcoming public resistance to carbon taxes. In *Wiley Interdisciplinary Reviews: Climate Change* (Vol. 9, Issue 5). https://doi.org/10.1002/wcc.531

Carfora, A., Pansini, R. V., & Scandurra, G. (2021). The role of environmental taxes and public policies in supporting RES investments in EU countries: Barriers and mimicking effects. *Energy Policy*, *149*. https://doi.org/10.1016/j.enpol.2020.112044

Cascajo, R., Diaz Olvera, L., Monzon, A., Plat, D., & Ray, J. B. (2018). Impacts of the economic crisis on household transport expenditure and public transport policy: Evidence from the Spanish case. *Transport Policy*, *65*. https://doi.org/10.1016/j.tranpol.2017.06.001

Castaño, M. S., Méndez, M. T., & Galindo, M. Á. (2016). The effect of public policies on entrepreneurial activity and economic growth. *Journal of Business Research*, *69*(11). https://doi.org/10.1016/j.jbusres.2016.04.125

Castro, E., & Scartascini, C. (2019). Imperfect attention in public policy: A field experiment during a tax amnesty in Argentina. *IDB Discussion Paper*, *April*.

Challoumis, C. (2019a). The R.B.Q. (Rational, Behavioral and Quantified) Model. *Ekonomika*, *98*(1). https://doi.org/10.15388/ekon.2019.1.1

Challoumis, C. (2019b). Transfer pricing methods for services and the policy of fixed length principle. *Economics and Business*, *33*(1), 222-232. https://doi.org/https://doi.org/10.2478/eb-2019-0016

Challoumis, C. (2020). Impact factor of capital to the economy and tax system. *Complex System Research Centre*, *2020*, 195-200. https://www.researchgate.net/publication/350385990_Impact_Factor_of_Capital_to_the_Economy_and_Tax_System.

Challoumis, C. (2021a). Index of the cycle of money – The case of Belarus. *Economy and Banks*, *2*.

Challoumis, C. (2021b). Index of the cycle of money – The case of Greece. *IJBESAR (International Journal of Business and Economic Sciences Applied Research)*, *14*(2), 58-67.

Challoumis, C. (2021c). Index of the cycle of money – The Case of Latvia. *Economics and Culture*, *17*(2), 5-12. https://doi.org/10.2478/jec-2020-0015

Challoumis, C. (2021d). Index of the cycle of money – The case of Montenegro. *Montenegrin Journal for Social Sciences*, *5*(1-2), 41-57.

Challoumis, C. (2021e). Index of the cycle of money – The case of Serbia. *Open Journal for Research in Economics (OJRE)*, *4*(1). https://doi.org/10.32591/coas.ojre.0401.01001c

Challoumis, C. (2021f). Index of the cycle of money – The case of Slovakia. *S T U D I A C O M M E R C I A L I A B R A T I S L A V E N S I A Ekonomická Univerzita v Bratislave*, *14*(49), 176-188.

Challoumis, C. (2021g). Index of the cycle of money – The case of Thailand. *Chiang Mai University Journal of Economics*, *25*(2), 1-14. https://so01.tci-thaijo.org/index.php/CMJE/article/view/247774/169340.

Challoumis, C. (2021h). Index of the cycle of money – The case of Ukraine. *Actual Problems of Economics*, *243*(9), 102-111. https://doi.org/10.32752/1993-6788-2021-1-243-244-102-111

Challoumis, C. (2022a). Index of the cycle of money – The case of Moldova. *Eastern European Journal of Regional Economics*, *8*(1), 77-89.

Challoumis, C. (2022b). Index of the cycle of money – the case of Poland. *Research Papers in Economics and Finance*, *6*(1), 72-86. https://journals.ue.poznan.pl/REF/article/view/126/83

Challoumis, C. (2023a). Index of the cycle of money: The case of Costa Rica. *Sapienza*, *4*(3), 1-11. https://journals.sapienzaeditorial.com/index.php/SIJIS.

Challoumis, C. (2023b). Index of the cycle of money – The case of Canada. *Journal of Entrepreneurship, Business and Economics*, *11*(1), 102-133. http://scientificia.com/index.php/JEBE/article/view/203.

Challoumis, C. (2023c). Index of the cycle of money – The case of England. *British Journal of Humanities and Social Sciences*, *26*(1), 68-77.

Challoumis, C. (2023d). The velocities of maximum escaped savings with than of financial liquidity to the case of mixed savings. *International Journal on Economics, Finance and Sustainable Development*, *5*(6), 124-133.

Challoumis, C. (2023e). Utility of cycle of money with and without the escaping savings. *International Journal of Business Diplomacy and Economy*, *2*(6), 92-101.

Cruz-Castro, L., & Sanz-Menéndez, L. (2016). The effects of the economic crisis on public research: Spanish budgetary policies and research organizations. *Technological Forecasting and Social Change*, *113*. https://doi.org/10.1016/j.techfore.2015.08.001

De Araujo, V. A., Vasconcelos, J. S., Morales, E. A. M., Savi, A. F., Hindman, D. P., O'Brien, M. J., Negrão, J. H. J. O., Christoforo, A. L., Lahr, F. A. R., Cortez-Barbosa, J., Gava, M., & Garcia, J. N. (2020). Difficulties of wooden housing production sector in Brazil. *Wood Material Science and Engineering*, *15*(2). https://doi.org/10.1080/17480272.2018.1484513

Engström, G., Gars, J., Jaakkola, N., Lindahl, T., Spiro, D., & van Benthem, A. A. (2020). What policies address both the coronavirus crisis and the climate crisis? *Environmental and Resource Economics*, *76*(4). https://doi.org/10.1007/s10640-020-00451-y

Fernandez, M. A., & Raine, K. D. (2019). Insights on the influence of sugar taxes on obesity prevention efforts. In *Current Nutrition Reports* (Vol. 8, Issue 4). https://doi.org/10.1007/s13668-019-00282-4

Gangl, K., & Torgler, B. (2020). How to achieve tax compliance by the wealthy: A review of the literature and agenda for policy. *Social Issues and Policy Review*, *14*(1). https://doi.org/10.1111/sipr.12065

Gong, B., Zhang, S., Yuan, L., & Chen, K. Z. (2020). A balance act: Minimizing economic loss while controlling novel coronavirus pneumonia. *Journal of Chinese Governance*, *5*(2). https://doi.org/10.1080/23812346.2020.1741940

Hagenaars, L. L., Jeurissen, P. P. T., & Klazinga, N. S. (2017). The taxation of unhealthy energy-dense foods (EDFs) and sugar-sweetened beverages (SSBs): An overview of patterns observed in the policy content and policy context of 13 case studies. In *Health Policy* (Vol. 121, Issue 8). https://doi.org/10.1016/j.healthpol.2017.06.011

Haigh, Y. (2020). Increasing complexities: Teaching public policy in the age of discontent. *Teaching Public Administration*, *38*(1). https://doi.org/10.1177/0144739419879483

Jeon, J., Kim, S., & Kwon, S. M. (2020). The effects of urban containment policies on public health. *International Journal of Environmental Research and Public Health*, *17*(9). https://doi.org/10.3390/ijerph17093275

Kominers, S. D., Teytelboym, A., & Crawford, V. P. (2017). An invitation to market design. *Oxford Review of Economic Policy*, *33*(4). https://doi.org/10.1093/oxrep/grx063

Levi, S. (2021). Why hate carbon taxes? Machine learning evidence on the roles of personal responsibility, trust, revenue recycling, and other factors across 23 European countries. *Energy Research and Social Science*, *73*. https://doi.org/10.1016/j.erss.2020.101883

Maier, E. (2012). Smart Mobility – Encouraging sustainable mobility behaviour by designing and implementing policies with citizen involvement. *JeDEM - EJournal of EDemocracy and Open Government*, *4*(1). https://doi.org/10.29379/jedem.v4i1.110

Olcina, G., Tur, E. M., & Escriche, L. (2020). Cultural transmission and persistence of entrepreneurship. *Small Business Economics*, *54*(1). https://doi.org/10.1007/s11187-018-0089-2

Paes-Sousa, R., De Andrade Schramm, J. M., & Pereira Mendes, L. V. (2019). Fiscal austerity and the health sector: The cost of adjustments. *Ciencia e Saude Coletiva*, *24*(12). https://doi.org/10.1590/1413-812320182412.23232019

Peres, M. F. P., Oliveira, A. B., Sarmento, E. M., Rocha-Filho, P. S., Peixoto, P. M., Kowacs, F., Goulart, A. C., & Benseñor, I. M. (2020). Public policies in headache disorders: Needs and possibilities. *Arquivos de Neuro-Psiquiatria*, *78*(1). https://doi.org/10.1590/0004-282X20190144

Rasmussen, K., & Callan, D. (2016). Schools of public policy and executive education: An opportunity missed? *Policy and Society*, *35*(4). https://doi.org/10.1016/j.polsoc.2016.12.002

Siegmeier, J., Mattauch, L., Franks, M., Klenert, D., Schultes, A., & Edenhofer, O. (2018). The fiscal benefits of stringent climate change mitigation: an overview. *Climate Policy*, *18*(3). https://doi.org/10.1080/14693062.2017.1400943

Syukur, M. (2020). Insentif Pajak terhadap Sumbangan Covid-19 dari Perspektif Relasi Hukum Pajak Indonesia dengan Hak Asasi Manusia. *Jurnal Suara Hukum*, *2*(2). https://doi.org/10.26740/jsh.v2n2.p184-214

Torres Salcido, G., del Roble Pensado Leglise, M., & Smolski, A. (2015). Food distribution's socio-economic relationships and public policy: Mexico City's municipal public markets. *Development in Practice*, *25*(3). https://doi.org/10.1080/09614524.2015.1016481

Urwannachotima, N., Hanvoravongchai, P., Ansah, J. P., Prasertsom, P., & Koh, V. R. Y. (2020). Impact of sugar-sweetened beverage tax on dental caries: A simulation analysis. *BMC Oral Health*, *20*(1). https://doi.org/10.1186/s12903-020-1061-5

Van de Vijver, A., Cassimon, D., & Engelen, P. J. (2020). A real option approach to sustainable corporate tax behavior. *Sustainability (Switzerland)*, *12*(13). https://doi.org/10.3390/su12135406

Παπακωνσταντίνου, Α., Καναββάς, Λ., & Ντόκας, Ι. (2013). Οικονομία & μικρές επιχειρήσεις [Economy & small business]. In *Ινστιτούτο μικρών επιχειρήσεων*.

Appendix

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

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
    am=0.6*rand();
end

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

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

m=(1-am)+ar;
a=at;
xm=m-a;
cm=xm/m;
ca=xm/a;
cy=cm-ca;


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