Review paper
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ESTIMATIONS ON RISK AND BUREAUCRACY - SENSITIVITY METHOD

ПРОЦЕНЕ РИЗИКА И БИРОКРАТИЈЕ – МЕТОД ОСЕТЉИВОСТИ

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Abstract: *In this paper, risk and bureaucracy are discussed in the tax system. It is indicated that bureaucracy decreases tax revenue, and the same result is shown regarding risk. The methodology applied will be based on S.M. (Sensitivity Method), where, through graphical analysis, the comparison between the risk and the bureaucracy will take place. The mathematical background and the theory of the money cycle specify the behavior of these variables. This work aims to show the interaction of these variables. The scope of this paper is to confirm the behavior of the theory Cycle of Money, considering these variables.*

Keywords: *cycle of money, sensitivity method, programming, risk, bureaucracy.*
JEL Classification: *H21, H26, C63, D73.*

Сажетак: *У овом раду говори се о ризику и бирократији у пореском систему. Резултати показују да бирократија смањује пореске приходе, а исти резултат се показује и у погледу ризика. Примењена методологија заснована је на С.М. (Метода осетљивости) где ће се кроз графичку анализу извршити поређење ризика и бирократије. Математичка позадина и теорија новчаног циклуса одређују понашање ових варијабли. Овај рад има за циљ да покаже интеракцију ових варијабли. Циљ овог рада је да потврди понашање теорије циклуса новца, с обзиром на посматране варијабле.*

Кључне речи: *циклус новца, метод осетљивости, програмирање, ризик, бирократија.*
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INTRODUCTION

The money cycle counteracts the variables of the bureaucracy and the risk. The quantification analysis of the sensitivity of the tax system to the risk and bureaucracy is done by the application of the S.M. (Sensitivity Method). The concept of the money cycle serves as a fundamental mechanism that counteracts the negative influences of bureaucracy and risk within the tax system. The money cycle, which represents the flow and circulation of money within an economy, is inherently sensitive to disruptions caused by bureaucratic inefficiencies and economic risks. These disruptions can impede the smooth functioning of the cycle, leading to reduced tax revenues and economic instability. The theory of the money cycle posits that for an economy to thrive, the flow of money—through production, consumption, savings, and investment—must remain as uninterrupted and efficient as possible. Bureaucracy, characterized by excessive regulation, complex administrative procedures, and inefficiencies, introduces friction into this cycle. It delays transactions, raises compliance costs, and deters economic activities. Much like risk, which shows its face through economic instability, fluctuating legal frameworks, and wild policy changes, engenders uncertainty and compels businesses to deploy more conservative, risk-averse strategies. The plan will often include profit-shifting, tax avoidance, and reduced investment-all which further disrupt the money cycle. The counterbalancing effect is in response to the money cycle's attempt, through the normal process of economic functions, to equilibrate despite such countervailing factors. If the cycle is functioning positively, then the detriments of bureaucracy and risk are buffered to produce a sufficiently stable and predictable environment for higher levels of tax compliance and revenue generation. The quantification analysis will be defining the magnitude to which bureaucracy and risk affect the tax system and how the money cycle can counteract these effects. This is achieved by applying S.M., which is a strong analytical tool measuring the sensitivity of the tax system to variations in these variables.

This implies that, under the Sensitivity Method, the level of bureaucracy and risk is varied systematically in a modeled economic environment to observe the resulting variations in tax revenue. By quantifying these relationships, the S.M. draws a clear picture of how these factors influence the performance of the tax system. Another method emphasizes points where increasing bureaucracy or risk results in significant declines in tax revenues and conditions under which these variables become particularly detrimental to the money cycle. This would therefore imply that even in cases of moderate increases in bureaucratic

complexity, large impacts on tax revenue result. Increased bureaucratic red tape leads to inefficiency in the money cycle, hence the reduction of overall economic activities, which decreases tax collection. S.M. quantifies these effects and identifies threshold levels beyond which bureaucracy would impact revenue generation disproportionately. The Sensitivity Method points out that increased economic risk substantially disturbs the money wheel and causes volatility in tax revenues. Firms respond to increased risk by aggressively planning their taxes and reducing their exposure to unstable environments. The S.M. quantifies these levels of risk and demonstrates the consequence on tax revenues, thereby delivering much-needed information to policy framers for mitigating these risks. Probably most important, the Sensitivity Method underlines how bureaucracy and risk compound in their interaction within a tax system. The analysis shows that the combined impact of both variables, when present, is greater than the sum of their individual impacts. This underlines the need for addressing the problems together in order to optimize the functioning of the money cycle and thereby maximize tax revenue. From the results of this quantification analysis, deep insights can be gained that may have large implications for economic policy and tax administration. It identifies the sensitivity of the taxation system to bureaucracy and risk, based on which intervention by the policymakers may be given more effectively to reinforce the money cycle. Smoothing bureaucratic inefficiencies, the economic environment will allow not only a better flow of money within the economy but also more robust and reliable tax revenues.

The balancing power of the money cycle is fundamental for counterbalancing bureaucracy and risk to have a healthy and fruitful economic system. By applying the Sensitivity Method, the present work gives an accurate quantification of these dynamics, thus offering stimulating insights that could provide useful indications on how to develop policies with a minimal negative impact of these variables and to optimize the tax revenue collection (Bergh, 2009; Bourdin & Nadou, 2018; Challoumis, 2020d, 2020a, 2021c; Corti et al., 2020; Ginsburgh & Weber, 2020; Levi, 2021; Ortun et al., 2017; Paes-Sousa et al., 2019; Rumayya et al., 2020; Tvaronavičienė et al., 2018; Urwannachotima et al., 2020; Woody & Viney, 2017; Παπακωνσταντίνου et al., 2013). The background of this method stands on the behavior analysis of mathematical equations. In-depth, the theoretical background of the Sensitivity Method is well-established within mathematical modeling, sensitivity analysis, and economic theory. Basically, the Sensitivity Method provides a good framework for the analysis of bureaucracy and risk effects on tax systems by capitalizing on established research and methodologies. This approach enriches the understanding of how those variables interact but also informs

strategies aimed at optimizing tax revenue and enhancing economic stability. The sensitivity analysis combined with the theory of a money cycle provides further confirmation that a well-functioning and stable economic environment is a necessary condition for a strong fiscal performance (Challoumis, 2018a, 2018b, 2023g, 2023b, 2023a, 2023i, 2023c, 2023j, 2023k, 2023d, 2023l, 2023e, 2020a, 2023m, 2023n, 2024b, 2024c, 2024a, 2020b, 2021b, 2021a, 2022a, 2022b, 2023h, 2023f). Therefore, the Sensitivity Method is the knowledge of the sensitivity of a variable (Aitken, 2019; Arai et al., 2018; Biernaski & Silva, 2018; Buonomo et al., 2020; Challoumis, 2018c; Diallo et al., 2021; Fernandez & Raine, 2019; Hasselman & Stoker, 2017; Hyeon Sik Seo & YoungJun Kim, 2020; Kananen, 2012; Khadzhyradieva et al., 2019; Kroth et al., 2020; Leckel et al., 2020; Loayza & Pennings, 2020; Montenegro Martínez et al., 2020; Nielsen et al., 2019; Ruiz et al., 2017; Scholvin & Malamud, 2020; Soboleva, 2019; Syukur, 2020; Taub, 2015; Ustinovich & Kulikov, 2020; Watanabe et al., 2018) The Sensitivity Method, in its analysis of the intricacies of an equation, stands independently during inquiry. This method contrasts with its comparative procedure, the Quantification of Errors (Q. E.) method, by choosing not to reject random values but instead searches for one value that conditionally satisfies. By a judicious application of principles of mathematics and programming, the Sensitivity Method quantifies quality data to shed light upon the dynamics of complex systems, as the utility of the method shows in the clarification of the behavior of the global tax revenue impact factor. At its core, it is an equation to be studied, as defined mathematically by the applied theory. Similar to Q. E. in the reasoning that it is based on a principle of one variable present in one case, omitted in the other.

The core, therefore, of the Sensitivity Method and the Q. E. method is differentiated by the condition-based approach. Instead of having a generator that provides random values for each instance, the Sensitivity Method requires that a certain condition be satisfied every single time. Thus, this one is more targeted and controlled when compared with other approaches. Read between the lines: there is fine math-programming interplay within the Sensitivity Method. This synergy allows quality data quantification-that is, the same conceptual framework as the Q.E. method but viewed from another perspective.

Another characteristic of the Mathematics and Programming section is the use of mathematical models and programming languages to analyze and interpret the data. Within the framework of our analysis, this approach has been used to explain the behavior of the impact factor of global tax revenue in detail, thus providing rich input with regard to the complexity of variable relationships. The Sensitivity Method applied in

data analysis allows the researchers to spot the critical variables that affect the outcome. In this case, the quality data is quantified; hence, it would let the researcher know how sensitive the outcome is towards the alteration in these variables. The influence factor of the global tax revenue behavior can be analyzed with the sensitivity method. Quantifying the quality data will enable the researchers to discover which variables most influence tax revenue and changes in those variables' influence on the outcome. Such information can be used to enlighten policy makers and optimize the policy adopted for capturing tax revenues. The Sensitivity Method, in this respect, can be applied in real-life cases when the combination of variables and satisfaction of conditions are adequately thought over by the researcher. The sensitivity method, with an integration of mathematical ideas and programming techniques, can quantify quality data by providing valuable insight into complex systems. Such magic consequences of the sensitivity method are in reality due to a painstaking process of examining the behavior of the impact factor. Isolating one variable by omitting the other, the governing pattern and relationship of the system may come into view. Lurking beneath the superficial level of global tax revenue is a complex web of variables that influences behavior; above it, below it, and sometimes inside it. In fact, pure sensitivity analysis of such observed factors has proved capable of giving rate-determining insight into what happens when these factors interact and hit the revenue.

The Sensitivity Method reaches a point at which it can be seen in action in more detail: examining the quality of the data that quantifies the number of most influential factors responsible for revenue fluctuations, such as economic indicators, policy changes, and shifts in demographics. Such knowledge will enable policymakers to make informed decisions by optimizing tax revenue and achieving economic growth. Policymakers can use the Sensitivity Method to see how global tax revenue is affecting economic growth before getting into the minutiae of economic systems. This will give them an idea of what factors they need to target in their decision-making process for the generation of maximum revenue from taxation policies. Behind the mask of scientific investigation lies a host of interdisciplinary research opportunities. The Sensitivity Method can also be combined with other analytical techniques for intricate investigations into complex phenomena such as climate change, epidemiology, or social network analysis.

But even more exciting, it's how the Sensitivity Method will give a whole new meaning to the translation of theoretical models to real-world applications. Coupled with machine learning algorithms, researchers will be able to build predictive models that capture the subtleties of human behavior, environmental factors, and economic systems. This could reveal

new advancements in areas such as sustainable development, public health, and conservation of natural resources.

1. LITERATURE REVIEW

The impact factor of tax revenues of countries which are tax heaves, s according to the bibliography. It is determined as that:

$$s = \frac{k+l}{r+c+t+i} \tag{1}$$

The symbol of s the impact factor of tax revenue from a global view, and there are some coefficients which are $k, l, r, t,$ and c. Thus, the symbol of k is about the impact factor of capital, l is the impact factor about the liability of the authorities on the tax system. The interpretation of the liability is about how unbalanced it is the tax system. The parameter of r is about the risk, the t is about how much trustworthy is the tax system from the view of cost. The i is about the requirements of the intangibles (different relation from the intangibles which are proportional to capital). The symbols with the "~" are accordingly the same thing but from the view of the uncontrolled transactions. Thus, the numerator is proportional to the income of taxes, as the investments and the stable tax environments, with a lack of cost enhance the tax income. On the other hand, the denominator is inverting proportional to the tax income, as the risk, the cost, and the unbalance of taxation cause less tax income. Moreover, for $\tilde{s}$:

$$\tilde{s} = \frac{\tilde{k}+\tilde{l}}{\tilde{r}+\tilde{c}+\tilde{t}+\tilde{\imath}} \tag{2}$$

It is determined the aggregate impact factor of tax revenues, which is symbolized by $\hat{s}$, and is defined by the next equation:

$$\hat{s} = s + \tilde{s} \tag{3}$$

The extended model now develops the equations of the previous model, which requires further investigation into the dynamics regarding factors of the impact of tax revenues due to the distinction on both tax havens and non-tax havens. Once again, s is that very important parameter that allowed controlled and uncontrolled transactions to be differentiated in comparison. This dichotomization provided a close view of different behaviors peculiar to each type of transaction. Many controlled transactions are typified by regulating and control mechanisms, which tend to regularize

and standardize their patterns. Intrinsic characteristics can thus be examined in depth to highlight, for single sets of transactions, the contribution made to tax receipts. Work undertaken in such a manner assists in understanding how compliance levels, regulatory frameworks, and transparency influence fiscal outcomes. On the other hand, uncontrolled transactions, operating under loose oversight, present another set of issues. Their unpredictable nature, therefore, requires an in-depth investigation of factors such as informal economic activities and tendencies to tax evasion, as well as the role of offshore entities. All these elements shall be understood to devise ways of overcoming prospective losses in state revenue. Moving beyond individual examinations, a synergistic analysis of controlled and uncontrolled transactions offers a holistic perspective. The approach underlines the interaction between regulated and unregulated financial activities and determines the potential points where the lack of certain oversight can be manipulated. Such a comparison of the two types of transactions will, therefore, enable policy makers to spot the loopholes in the tax system and allow them to effect broad reforms. This review, therefore, tries to reveal the mysteries hidden in the tax collection machinery and provides knowledge that may lead to quicker fiscal policies and improved revenue generation.

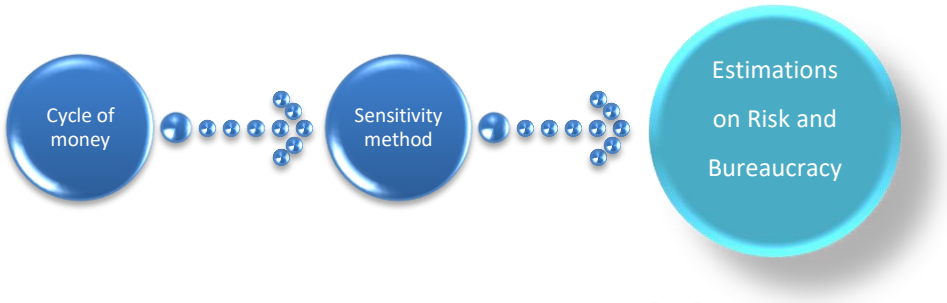

Figure 1. S.M. (Sensitivity Method)

The sensitivity method was the guide for the previous scheme, seeking to identify the behavior of global tax revenue in the case of the existence of risk and in an ideal case when this factor is avoided.

2. RESULTS

The cost interacts with the impact factor of the tax revenues. In this behavioral analysis, the model is determined which explains the behavior of the impact factor of the tax revenues with the existence and with the avoidance of the impact factor of tax sensibility (Challoumis, 2018e, 2018d, 2022e, 2023y, 2023x, 2023w, 2023v, 2023z, 2024h, 2024l, 2024m,

2024j, 2019e, 2024k, 2019a, 2019d, 2019c, 2019b, 2020d, 2020c, 2021k). Then, for the application of the Sensitivity Method:

$$t > l > i > r > k > c \quad (4)$$

The, it is plausible to proceed to a quantity analysis using equations (1), (2), and (4). Therefore, applying the Sensitivity method and choosing the appropriate magnitudes for the coefficient:

Table 1. Compiling coefficients

Factors	Values of s	Values of s'
k	0,4	0,4
i	0.6	0.6
l	0.7	0.7
r	0.5	0.5
c	0.3	-
t	0.8	-
fs	<0.3	<0.3
f_i	<0.3	<0.3

The sensitivity method will then be applied to systematically investigate cost-tax revenue relations, hence giving an appropriate analytical framework for the verification of the hypothesis. The first step involves perusal of the data represented in the table below. The key variables, which are costs and tax revenues and other influencing factors, are carefully examined for their consistency and reliability. This is the data input to the model, where the Sensitivity Method would apply to see how changes in cost impact tax revenue. The sensitivity method will now be used to estimate how responsive tax revenue is to changes in the cost. A selected change in the cost variables may systematically be modified to affect the model and observe changes in tax revenue accordingly. This would help us appreciate to what extent revenue generations are tied or affected by a variation in costs. Graphical analysis represents the relationship of costs and tax revenues and constitutes part of the most important components of the Sensitivity Method. It is instructive to plot the cost against tax revenue to delineate the underlying trend lines and possibly identify an inflection point beyond which small changes in the cost significantly reduce revenue.

This model uses the information given by the table and controls other variables that may affect the outcome. This returns a solid model of how changes in cost will affect tax revenue across different scenarios. Having modeled this, we are in a position to verify our hypothesis that with rising costs, the eventual result is a fall in the heads of tax revenue. It allows the Sensitivity Method to demonstrate empirical proof of showing the rate at which tax revenue falls as costs increase. These are some of the important

confirmations to policymakers in that it brings forth how cost sensitivity is related to optimizing revenue collection.

The results from the Sensitivity Method and the model estimated provide some important issues related to fiscal policy. That means, analytically, the sensitive degree of tax revenue to the costs and policymakers could make the corresponding plans to weaken the shock from the increase of the cost. Further, it can be analyzed by taking other variables into account that might affect this pattern, such as economic growth rate, inflation, and adjustments in the tax policy.

The implications here will be extended to discuss how these results will help policy decisions toward efficiency improvement in tax revenue while controlling for cost-related factors in the next sections.

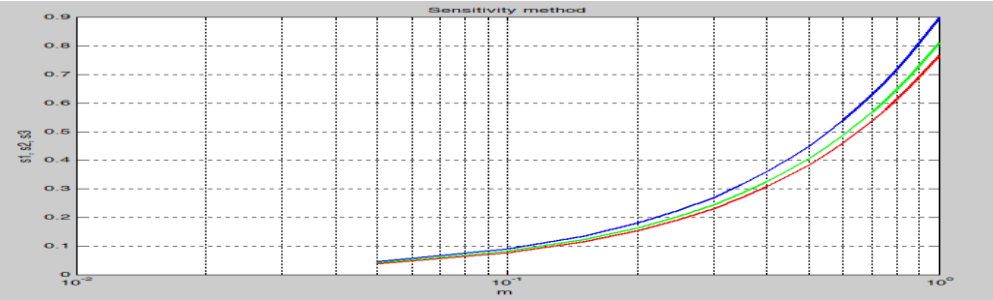

Figure 2. Application of S.M. (in logarithmic form)

In their logarithmic form, the analysis of the different cases through colored lines gives a clear and illustrative presentation of the way the elements of risk, bureaucracy, and interaction of several variables impinge on the tax revenues within the present setup. The red line signifies a situation in which risk is taken away from the system. In logarithmic form, the line characterizes a smooth, predictable pattern of tax revenue. The tax system, therefore, does not have uncertainty because of risk. That would mean more stability in the system and a consistent, perhaps higher, revenue generation. The red line is therefore a kind of benchmark or an ideal case wherein, due to the absence of risk, optimum tax revenue collection can be achieved under controlled conditions. The blue line corresponds to the case when there is bureaucracy. This line, plotted logarithmically, usually takes a different course from the red line in illustrating how bureaucracy 'damps' tax revenue. The process of going through a bureaucracy involves inefficiency, delay, and an increasing cost of compliance, resulting in friction within the system of tax collection. For this reason, the blue line might grow more sluggishly-or even decline in its tax revenues-simply because an increased bureaucratic burden 'squeezes' them. This is an

illustrative case which clearly leads to the understanding that excess regulation, together with administrative intricacy, has a negative effect on efficiency in raising tax revenues.

The green line shows the most complex scenario when all the variables of risk, bureaucracy, and whatever else come into play. This logarithmic line encompasses the effects of the red and blue lines to show how those factors combined affect tax revenue. The green line often shows a more erratic or nonlinear pattern that reflects the complex interactions between risk and bureaucracy. This would give a complete picture of how such variables interact and might lead to far larger fluctuations of tax revenues from the snowballing effects of risk and bureaucratic inefficiency.

Through this theoretical perspective, the red, blue, and green lines validate the theory. The red line represents a risk-free ideal of an unhindered money cycle in which the fruition of tax revenue is as maximal as it can possibly be. The blue line is affected by bureaucracy, and this shows the dampening effect caused by administrative barriers on the money cycle. The green line includes all variables and shows how the combined effects of risk and bureaucracy might cause strong disturbances in the cycle for highly volatile and lower tax revenue outcomes. The realization of these scenarios through logarithmic forms confirms not only the theory of the money cycle but also gives some very practical insights to the policymakers. Understanding the separate and interactive effects of risk and bureaucracy on tax revenue provides great insight into the design of better tax policies. Using a better regulatory framework, for example, will easily reduce bureaucratic inefficiency and manage risks that therefore stabilize and enhance tax revenues.

For instance, future sections can expand this analysis by considering other variables which may influence the money cycle: levels of growth, rates of inflation, and technological developments in the administration of taxes.

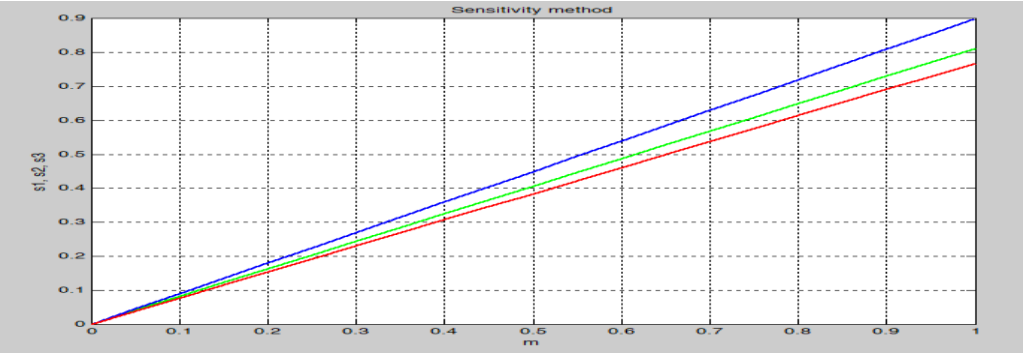

Figure 3. Application of S.M. (in logarithmic form)

In regular form, the red line is about the case that there does not exist risk, and the blue line is the case that there does exist bureaucracy. The green line is the case that there are all the variables.

3. DISCUSSION

This is discussed in the forms of logarithms and graphs, based on the useful insights to be obtained from the complicated dynamics that tax revenue exhibits under conditions of risk, bureaucracy, and other influencing variables. By the isolation and combination of these factors, the study presents an articulate comprehension of how each variable individually and together influences tax revenue efficiency and stability. The red line indicates stability in the tax system as a plus in the no-risk scenario. In a no-risk situation, smoother tax revenue indicates the ideal state of the economy where no disruption in the economy caused by uncertainty exists. However, the above scenario brings out the possibility of the maximization of tax revenue in an economic environment that lacks unpredictable elements. This is even more reason why such policies as solid financial regulations and securities will aid the economy. On the other hand, bureaucracy is represented by the blue line, which shows how administration inefficiencies can be a challenge. Analysis of the log reveals that heavy bureaucracy could delay, or even decrease, tax revenues because added layers of regulation introduce friction into the process of tax collection. This finds its basis in broader economic theory: cumbersome administrative processes tend to be debilitating to economic activity, leading to lower efficiency in the generation of revenue. The negative slope-the flattening-of the blue line underlines the critical need to streamline bureaucratic processes if one is to have any hope of an effective and efficient tax system.

The most complicated, close-to-reality behavior of the tax system is represented by the green line, which incorporates all the variables: risk, bureaucracy, and other factors. The erratic or nonlinear pattern the green line assumes in logarithmic form shows the effects of several variables interacting in a compounded way. These findings strike at the very heart of policymakers. The clear divergence of the red, blue, and green lines shows that a more focused intervention is for an optimal yield from taxation. For instance, a reduction in the rate of bureaucratic inefficiencies and enhanced risk management could reduce the detractions seen in the scenarios represented by the blue and green lines. Similarly, confirmation through these graphical analyses of the money cycle theory shows that it is important to keep the economic environment in balance by keeping risk and bureaucracy low in order to ensure smooth tax revenues.

Instead, one may obtain a more detailed model that provides far greater insight into the underlying dynamics of tax revenues in different economic environments. This will also contribute to better predictability and a sound basis for making policy recommendations concerning the optimization of tax revenue collection in such a complex and multifaceted economic system.

CONCLUSIONS

This work explored the complex dynamics of risk and bureaucracy and their interaction with global tax revenue by providing an in-depth analysis of how these factors shape corporate behavior, and in turn, drive fiscal outcomes. The findings expose important trends in the way in which firms involved in controlled transactions respond to variations in levels of risk and bureaucratic burden across diverse tax environments. The controlled transaction undertaken by the companies reveals a clear preference for those countries that have an unstable legal framework and insecure economies. This will also meet the strategic goals of the companies because it offers more flexibility in allocating profit and loss. Such tax environments with instability and insecurity invite companies to manipulate regulatory loopholes to better optimize their tax liabilities and pursue aggressive tax planning strategies. As a result, participants in controlled transactions will be increased within such tax environments, with further negative implications for the global tax landscape. This preference for unstable and insecure tax environments, while prudent for the bottom line of companies, goes a long way in reducing revenues within the global tax. Most of these cases, in practice, often amount to reduced tax collections in more stable jurisdictions due to profit shifting in areas where tax obligations can be minimized. This contributes to undermining the tax bases of more secure and well-regulated economies, leading to reduced revenues.

However, it indicates that a risk reduction of such tax environments has a substantial implication on global tax revenue. A risk reduction, driven by more stable legal frameworks and consistent and clear enforcement of tax laws, put together with greater security from an economic point of view, would likely reduce the attractiveness of these environments for profit-shifting activities. With fewer opportunities for exploiting instability, more profits would be reported in the higher-tax jurisdictions and thus bring about a significant increase in global tax revenues. This is the good news: international cooperation to stabilize tax environments so that profit-shifting is contained and tax collections improved worldwide. The analysis also uncovers another vital factor in reducing bureaucratic complexity to

increase tax revenues. Inefficient bureaucracies breed lengthy processes, excessive regulation, and administrative burdens that raise a number of barriers to effective tax collection. Not only are these inefficiencies strongly discouraging factors in compliance, but they also offer further avenues through which tax avoidance and evasion could be pursued. It is thus incumbent on governments to make their bureaucracies more efficient, their tax regulations simpler, and their administration more effective to provide an enabling environment for tax compliance-a factor that could increase revenues.

In such an optimum regime, money would flow through the economy with the fewest disturbances due to risk and administrative barriers. A stable and efficient tax environment is one in which businesses report their earnings correctly, comply with tax obligations, and make adequate contributions to public revenues. This not only maximizes tax revenue but also supports broader economic stability and growth. The tax environment should have minimum risk and bureaucracy, as these are variables that directly implicate corporate behavior and the overall effectiveness of tax collection. Most of all, stable and secure tax systems should be promoted for their efficiency by governments to oppose profit-shifting strategies and foster compliance and raise tax revenues. Finally, all these efforts will be complemented at the international level with the need for cooperation to assist globally in these efforts, so that every jurisdiction plays its part in a fair and just global system of taxation.

It may also investigate practical methods for minimizing risk and bureaucracy in a variety of tax environments and explore how technology could enable such objectives. To this end, this paper has tried to delve into how different sectors and types of transactions are affected by such reforms in an effort to shed light on what is needed to better optimize the global tax system.

LITERATURE

1. Aitken, A. (2019). Measuring Welfare Beyond GDP. *National Institute Economic Review*, *249*(1). https://doi.org/10.1177/002795011924900110
2. Arai, R., Naito, K., & Ono, T. (2018). Intergenerational policies, public debt, and economic growth: A politico-economic analysis. *Journal of Public Economics*, *166*. https://doi.org/10.1016/j.jpubeco.2018.08.006
3. Bergh, J. C. J. M. va. den. (2009). The GDP paradox. *Journal of Economic Psychology*, *30*(2). https://doi.org/10.1016/j.joep.2008.12.001
4. Biernaski, I., & Silva, C. L. (2018). Main variables of Brazilian

public policies on biomass use and energy. *Brazilian Archives of Biology and Technology*, *61*(Specialissue). https://doi.org/10.1590/1678-4324-smart-2018000310

5. Bourdin, S., & Nadou, F. (2018). French tech: A new form of territorial mobilization to face up to global competition? *Annales de Geographie*, *2018*(723–724). https://doi.org/10.3917/ag.723.0612
6. Buonomo, I., Benevene, P., Barbieri, B., & Cortini, M. (2020). Intangible Assets and Performance in Nonprofit Organizations:A Systematic Literature Review. *Frontiers in Psychology*, *11*. https://doi.org/https://doi.org/10.3389/fpsyg.2020.00729
7. Challoumis, C. (2018a). Analysis of the velocities of escaped savings with that of financial liquidity. *Ekonomski Signali*, *13*(2), 1–14. https://doi.org/10.5937/ekonsig1802001c
8. Challoumis, C. (2018b). Identification of Significant Economic Risks to the International Controlled Transactions. *Economics and Applied Informatics*, *2018*(3), 149–153. https://doi.org/https://doi.org/10.26397/eai1584040927
9. Challoumis, C. (2018c). Methods of Controlled Transactions and the Behavior of Companies According to the Public and Tax Policy. *Economics*, *6*(1), 33–43. https://doi.org/10.2478/eoik-2018-0003
10. Challoumis, C. (2018d). THE IMPACT FACTOR OF HEALTH ON THE ECONOMY USING THE CYCLE OF MONEY. *Bulletin of the Transilvania University of Braşov*, *11*(60), 125–136. https://webbut.unitbv.ro/index.php/Series_V/article/view/2533/1979
11. Challoumis, C. (2018e). The Keynesian Theory and the Theory of Cycle of Money. *Hyperion Economic Journal*, *6*(3), 3–8. https://hej.hyperion.ro/articles/3(6)_2018/HEJ nr3(6)_2018_A1Challoumis.pdf
12. Challoumis, C. (2019a). The arm's length principle and the fixed length principle economic analysis. *World Scientific News*, *115*(2019), 207–217. https://doi.org/10.2139/ssrn.1986387
13. Challoumis, C. (2019b). The cycle of money with and without the escaped savings. *Ekonomski Signali*, *14*(1), 89–99. https://doi.org/336.76 336.741.236.5
14. Challoumis, C. (2019c). The Impact Factor of Education on the Public Sector and International Controlled Transactions. *Complex System Research Centre*, *2019*, 151–160. https://www.researchgate.net/publication/350453451_The_Impact_Factor_of_Education_on_the_Public_Sector_and_International_Controlled_Transactions
15. Challoumis, C. (2019d). The Issue of Utility of Cycle of Money.

Journal Association SEPIKE, 2019(25), 12–21. https://5b925ea6-3d4e-400b-b5f3-32dc681218ff.filesusr.com/ugd/b199e2_dd29716b8bec48ca8fe7fbcfd47cdd2e.pdf

16. Challoumis, C. (2019e). The R.B.Q. (Rational, Behavioral and Quantified) Model. *Ekonomika*, *98*(1), 6–18. https://doi.org/10.15388/ekon.2019.1.1
17. Challoumis, C. (2020a). Analysis of the Theory of Cycle of Money. *Acta Universitatis Bohemiae Meridionalis*, *23*(2), 13–29. https://doi.org/https://doi.org/10.2478/acta-2020-0004
18. Challoumis, C. (2020b). 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
19. Challoumis, C. (2020c). The Impact Factor of Costs to the Tax System. *Journal of Entrepreneurship, Business and Economics*, *8*(1), 1–14. http://scientificia.com/index.php/JEBE/article/view/126
20. Challoumis, C. (2020d). The Impact Factor of Education on the Public Sector – The Case of the U.S. *International Journal of Business and Economic Sciences Applied Research*, *13*(1), 69–78. https://doi.org/10.25103/ijbesar.131.07
21. Challoumis, C. (2021a). Chain of cycle of money. *Acta Universitatis Bohemiae Meridionalis*, *24*(2), 49–74.
22. Challoumis, C. (2021b). Index of the cycle of money - The case of Belarus. *Economy and Banks*, *2*.
23. 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
24. Challoumis, C. (2021d). The cycle of money with and without the enforcement savings. *Complex System Research Centre*.
25. Challoumis, C. (2022a). Conditions of the CM (Cycle of Money). In *Social and Economic Studies within the Framework of Emerging Global Developments, Volume -1, V. Kaya* (pp. 13–24). https://doi.org/10.3726/b19907
26. Challoumis, C. (2022b). Impact Factor of the Rest Rewarding Taxes. In *Complex System Research Centre*. https://doi.org/10.2139/ssrn.3154753
27. Challoumis, C. (2022c). Structure of the economy. *Actual Problems of Economics*, *247*(1).
28. Challoumis, C. (2023a). A comparison of the velocities of minimum escaped savings and financial liquidity. In *Social and*

Economic Studies within the Framework of Emerging Global Developments, Volume - 4, V. Kaya (pp. 41–56). https://doi.org/10.3726/b21202

29. Challoumis, C. (2023b). Capital and Risk in the Tax System. In *Complex System Research Centre* (pp. 241–244).
30. Challoumis, C. (2023c). Chain of the Cycle of Money with and without Maximum and Minimum Mixed Savings. *European Multidisciplinary Journal of Modern Science*, *23*(2023), 1–16.
31. Challoumis, C. (2023d). Chain of the Cycle of Money with and Without Maximum Mixed Savings (Three-Dimensional Approach). *Academic Journal of Digital Economics and Stability*, *34*(2023), 43–65.
32. Challoumis, C. (2023e). Chain of the Cycle of Money with and without Minimum Mixed Savings (Three-Dimensional Approach). *International Journal of Culture and Modernity*, *33*(2023), 22–33.
33. Challoumis, C. (2023f). Comparisons of the Cycle of Money Based on Enforcement and Escaped Savings. *Pindus Journal of Culture, Literature, and ELT*, *3*(10), 19–28.
34. Challoumis, C. (2023g). Comparisons of the cycle of money with and without the mixed savings. *Economics & Law*. http://el.swu.bg/ikonomika/
35. Challoumis, C. (2023h). Currency rate of the CM (Cycle of Money). *Research Papers in Economics and Finance*, *7*(1).
36. Challoumis, C. (2023i). Elements of the Theory of Cycle of Money without Enforcement Savings. *International Journal of Finance and Business Management (IJFBM)Vol. 2No. 1, 2023*, *2*(1), 15–28. https://journal.multitechpublisher.com/index.php/ijfbm/article/view/1108/1202
37. Challoumis, C. (2023j). FROM SAVINGS TO ESCAPE AND ENFORCEMENT SAVINGS. *Cogito*, *XV*(4), 206–216.
38. Challoumis, C. (2023k). G7 - Global Minimum Corporate Tax Rate of 15%. *International Journal of Multicultural and Multireligious Understanding (IJMMU)*, *10*(7).
39. Challoumis, C. (2023l). Impact factor of bureaucracy to the tax system. *Ekonomski Signali*, *18*(2), 12.
40. Challoumis, C. (2023m). Impact Factor of Liability of Tax System According to the Theory of Cycle of Money. In *Social and Economic Studies within the Framework of Emerging Global Developments Volume 3, V. Kaya* (Vol. 3, pp. 31–42). https://doi.org/10.3726/b20968
41. Challoumis, C. (2023n). 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
42. Challoumis, C. (2023o). The Cycle of Money (C.M.) Considers Financial Liquidity with Minimum Mixed Savings. *Open Journal for Research in Economics*, *6*(1), 1–12.
43. Challoumis, C. (2023p). The Cycle of Money with and Without the Maximum and Minimum Mixed Savings. *Middle European Scientific Bulletin*, *41*(2023), 47–56.
44. Challoumis, C. (2023q). The cycle of money with and without the maximum mixed savings (Two-dimensional approach). *International Journal of Culture and Modernity*, *33*(2023), 34–45.
45. Challoumis, C. (2023r). The Cycle of Money with and Without the Minimum Mixed Savings. *Pindus Journal of Culture, Literature, and ELT*, *3*(10), 29–39.
46. Challoumis, C. (2023s). The cycle of money with mixed savings. *Open Journal for Research in Economics*, *6*(2), 41–50.
47. Challoumis, C. (2024a). Approach on arm's length principle and fix length principle mathematical representations. In *Innovations and Contemporary Trends in Business & Economics*.
48. Challoumis, C. (2024b). Estimations of the cycle of money without escape savings. *International Journal of Multicultural and Multireligious Understanding*, *11*(3).
49. Challoumis, C. (2024c). Impact Factors of Global Tax Revenue - Theory of Cycle of Money. *International Journal of Multicultural and Multireligious Understanding*, *11*(1).
50. Challoumis, C. (2024d). Synopsis of principles for the authorities and controlled transactions. *Pindus*.
51. Challoumis, C. (2024e). Synopsis of principles for the authorities and controlled transactions. *SEPIKE*.
52. Challoumis, C. (2024f). The cycle of money - Escape savings and the minimum financial liquidity. *International Journal of Multicultural and Multireligious Understanding (IJMMU)*, *11*(4).
53. Challoumis, C. (2024g). The cycle of money - Minimum escape savings and financial liquidity. *International Journal of Multicultural and Multireligious Understanding (IJMMU)*, *11*(5).
54. Challoumis, C. (2024h). The impact factor of Tangibles and Intangibles of controlled transactions on economic performance. *Economic Alternatives*.
55. Challoumis, C. (2024i). THE INFLATION ACCORDING TO THE CYCLE OF MONEY (C.M.). *Economic Alternatives*.
56. Corti, I. N., Roldán, C. D., & Benito, S. M. R. (2020). Fiscal pressure and fraud, predisposition to pay taxes and personal

satisfaction in Spain. *Revista Espanola de Investigaciones Sociologicas*, *172*. https://doi.org/10.5477/cis/reis.172.101

57. Diallo, S. Y., Shults, F. L. R., & Wildman, W. J. (2021). Minding morality: ethical artificial societies for public policy modeling. *AI and Society*, *36*(1). https://doi.org/10.1007/s00146-020-01028-5
58. 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
59. Ginsburgh, V., & Weber, S. (2020). The Economics of Language. *Journal of Economic Literature*, *58*(2). https://doi.org/10.1257/JEL.20191316
60. Hasselman, L., & Stoker, G. (2017). Market-based governance and water management: the limits to economic rationalism in public policy. *Policy Studies*, *38*(5). https://doi.org/10.1080/01442872.2017.1360437
61. Hyeon Sik Seo, & YoungJun Kim. (2020). INTANGIBLE ASSETS INVESTMENT AND FIRMS' PERFORMANCE: EVIDENCE FROM SMALL AND MEDIUM-SIZED ENTERPRISES IN KOREA. *Journal of Business Economics and Management*, *21*(2), 421–445.
62. Kananen, J. (2012). International ideas versus national traditions: Nordic economic and public policy as proposed by the OECD. *Journal of Political Power*, *5*(3). https://doi.org/10.1080/2158379X.2012.735118
63. Khadzhyradieva, S., Hrechko, T., & Smalskys, V. (2019). Institutionalisation of behavioural insights in public policy. In *Public Policy and Administration* (Vol. 18, Issue 3). https://doi.org/10.5755/J01.PPAA.18.3.24726
64. Kroth, D. C., Geremia, D. S., & Mussio, B. R. (2020). National school feeding program: A healthy public policy. *Ciencia e Saude Coletiva*, *25*(10). https://doi.org/10.1590/1413-812320202510.31762018
65. Leckel, A., Veilleux, S., & Dana, L. P. (2020). Local Open Innovation: A means for public policy to increase collaboration for innovation in SMEs. *Technological Forecasting and Social Change*, *153*. https://doi.org/10.1016/j.techfore.2019.119891
66. 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
67. Loayza, N., & Pennings, S. M. (2020). Macroeconomic Policy in

the Time of COVID-19 : A Primer for Developing Countries. *World Bank Research and Policy Briefs*, *147291*.

68. Montenegro Martínez, G., Carmona Montoya, A., & Franco Giraldo, Á. (2020). Models for public health policy analysis reported in scientific publications. In *Gaceta Sanitaria*. https://doi.org/10.1016/j.gaceta.2019.11.007
69. Nielsen, T. D., Holmberg, K., & Stripple, J. (2019). Need a bag? A review of public policies on plastic carrier bags – Where, how and to what effect? *Waste Management*, *87*. https://doi.org/10.1016/j.wasman.2019.02.025
70. Ortun, V., Lopez-Valcarcel, B. G., & Pinilla, J. (2017). Tax on Sugar Sweetened Beverages in Spain. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3004464
71. 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
72. Ruiz, J. C., Jurado, E. B., Moral, A. M., Uclés, D. F., & Viruel, M. J. M. (2017). Measuring the social and economic impact of public policies on entrepreneurship in Andalusia. *CIRIEC-Espana Revista de Economia Publica, Social y Cooperativa*, *1*(90).
73. Rumayya, Rammohan, A., Purwono, R., & Harymawan, I. (2020). The local economy and Re-election of incumbent district leaders in Indonesia. *Heliyon*, *6*(5). https://doi.org/10.1016/j.heliyon.2020.e04098
74. Scholvin, S., & Malamud, A. (2020). Is Brazil a Geoeconomic Node? Geography, Public Policy, and the Failure of Economic Integration in South America. *Brazilian Political Science Review*, *14*(2). https://doi.org/10.1590/1981-3821202000020004
75. Soboleva I.V. (2019). Instrumental support for the implementation of the state antimonopoly policy. *Actual Problems of Economics*, *12*(222).
76. 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
77. Taub, R. (2015). New Deal Ruins: Race, Economic Justice, and Public Housing Policy. *Contemporary Sociology: A Journal of Reviews*, *44*(4). https://doi.org/10.1177/0094306115588487x
78. Tvaronavičienė, M., Tarkhanova, E., & Durglishvili, N. (2018). Sustainable economic growth and innovative development of educational systems. *Journal of International Studies*, *11*(1).

https://doi.org/10.14254/2071-8330.2018/11-1/19
79. 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
80. Ustinovich, E., & Kulikov, M. (2020). National projects, socio-economic policy and public equilibrium. *Social'naja Politika i Social'noe Partnerstvo (Social Policy and Social Partnership)*, *6*. https://doi.org/10.33920/pol-01-2006-01
81. Watanabe, C., Naveed, K., Tou, Y., & Neittaanmäki, P. (2018). Measuring GDP in the digital economy: Increasing dependence on uncaptured GDP. *Technological Forecasting and Social Change*, *137*. https://doi.org/10.1016/j.techfore.2018.07.053
82. Woody, W. D., & Viney, W. (2017). A History of Psychology: The Emergence of Science and Applications, Sixth Edition. *A History of Psychology: The Emergence of Science and Applications, Sixth Edition*, 1–599. https://doi.org/10.4324/9781315544403/HISTORY-PSYCHOLOGY-WAYNE-VINEY-WILLIAM-DOUGLAS-WOODY
83. Παπακωνσταντίνου, Α., Κανάββας, Λ., & Ντόκας, Ι. (2013). Οικονομία & μικρές επιχειρήσεις. In *Ινστιτούτο μικρών επιχειρήσεων* (pp. 1–208).

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