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Research Article

Impact of a BBLR Tax System on Standard of Living in the United States: An OLG Approach

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Abstract: The debate about taxation matters remains relevant in the literature across schools of thoughts and decision-makers. Indeed, these matters carry far-reaching economic effects both domestically and internationally. Taxes can constitute major conduits for distortions and inefficiencies in the economy if not properly set and administered. This study explores the impact of a broad base lower rate (BBLR) tax system on lifetime standard of living in the United States. Toward that end, it considers a partial equilibrium framework in the form of a two-period overlapping generation (2-OLG) model with two groups of people: (i) the young or poor, and (ii) the old or rich. An empirical assessment of the theoretical model using carefully calibrated parameters shows that a BBLR, in the form of a flat effective tax rate, improves the lifetime consumption pattern of a typical economic agent. Considering that consumption averages about two-thirds of the US economy, it naturally suggests that the introduction of such a tax system will usher in a sustained boost to economic activities across all sectors.

Keywords: Tax, BBLR, Overlapping generation, Consumption, Standard of living.

INTRODUCTION

As noted by Benjamin Franklin in 1789, nothing is certain in life "except death and taxes." [1] Fast-forwarding to the 21st century, the conversation about taxes seems to be a recurring theme that has yet to be settled. How high should the tax burden be for economic agents? Or, put differently, how low should it be? In December 2017, the United States Congress passed a major tax legislation. This legislative act revived the decades-old debate regarding the structure and efficiency of the US tax system.

Taxation matters permeate every aspect of the economy, from consumption, investment and savings decisions to job creation and ultimately growth. They determine in every possible way the ability of a government to raise funds and carry out its core regalian functions. Furthermore, taxation is an instrument used by governments across the globe to facilitate the distribution of income among a society's constituents and demographics.

Simply defined, a tax is a levy. There exist three main ways in its application. In a proportional tax system, a flat rate is assessed across all taxable income brackets. In a progressive tax system, higher taxable income brackets are assessed higher rates. At last, in a regressive tax system, higher taxable income brackets are assessed lower rates. In the United States, as in most developed nations, the second way is in force. It was formally instituted in 1862 following the signing of the Revenue Act by President Abraham Lincoln. Today, the US tax code is under the stewardship of the Internal Revenue Service (IRS), which is entrusted with full authority to administer it. In the world largest economy, completing this task proves even more challenging due to two factors. First, the massive size of the US economy cannot be discounted. Second, the complexity of the US tax code, which includes more than 73 thousand pages, is unmistakably a compounding factor of such a challenge. And, it is the major source of inefficiencies in the entire system. According to the IRS, taxpayers spent more than $11 billion in 2018 preparing and complying with the tax code. Such outlays could have served other purposes, namely, consumption, investment and/or savings. These may be just the tip of the iceberg in the big picture of inefficiencies created throughout the economy as a whole.

[1]The full quote reads "Our new Constitution is now established, and has an appearance that promises permanency; but in this world nothing can be said to be certain, except death and taxes."

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Inefficiencies in the tax system can be costly in terms of economic growth and jobs. The rich-poor divide, through the distribution of income, can suffer as well. It therefore becomes a rewarding effort to touch on the overall impact of a reduction in inefficiencies on economic activities. This reduction can be materialized in the form of an implementation of a broad base, and low rate (BBLR) tax system in the US.

This project considers a comparative study between the current US tax system – extensively discussed by Reid (2017) in its various characteristics, or even idiosyncrasies – and a BBLR-based tax structure in its most essential configuration, which consists in the imposition of a flat effective tax. It's noteworthy that two independent commissions set up under previous US administrations, namely, Bush II and Obama, recommended the implementation of a tax system in line with the latter one. On another note, the BBLR tax system matter-of-factly remains a rare common point of convergence among economists over a broad spectrum of schools of thoughts.

An overlapping generation (OLG) model provides a straightforward and comprehensive framework to analyze how various levels of effective flat tax rates affect economic agents' patterns of consumption as well as the standard of living across different generations.

Toward the completion of this empirical analysis, the paper is organized through five sections. In section 2, a literature review is presented. A description of the methodology is given in the following section. Section 4 lays out results and some policy implications. At last, concluding observations are made in section 5.

LITERATURE REVIEW

Taxation remains important in all countries, whether developed or developing. From feudal to contemporary societies, it has been the overarching tool that provides the necessary resources for sustainability and development. In addition, a country's taxation system represents the most potent source for income distribution and redistribution. Hence, there is a myriad of reasons why a country would need to design or pursue a system that is optimal in achieving its set goals. As pointed out by Slemrod (1990) in a seminal research work, tax administrations and financial technology play an integral part in this process. He argues that the optimal taxation theory is incomplete owing to the fact that it overlooks the coercion factor that can beget resistance from entities subject to taxes. Accordingly, he proposes an alternative by introducing what he terms the theory of optimal tax systems. Contrary to the theory of optimal taxation, his new approach is described as more practical because it innovates by incorporating the technological aspect in the collection of taxes along with the constraints exerted upon tax policies by such technology. Other insightful analyses regarding optimal tax systems include, among others, Kaplow (2011) and Jacobs (2018).

Another important issue that emerges in the literature regarding optimality and tax is efficiency. Indeed, reaching the highest level of efficiency is at the center of public policy research on fiscal matters. The more efficient a system becomes, the fewer distortions the economy experiences. In turn, as distortions are reduced, economic activities are boosted across the board benefiting all agents. Jakstonyte and Giriunas (2010) put forward a survey-based approach to assess the efficiency of a tax system. They reckon that this new approach accounts for a key shortcoming of the well-known V. Tanzi diagnostic productivity test, which is weak in capturing the efficiency of the tax administrator. According to authors, their model can be viewed as a universal evaluation tool for tax system efficiency utilizing a set of monographic, logical and statistical methods of analysis.

As a general rule, a tax system is characterized by three keys features, namely, simplicity, transparency, and administrability (Congressional Digest, 2018). Simplicity refers to the time and other resources used by taxpayers to comply with all tax regulations. Transparency essentially includes the ease of taxpayers in understanding the tax code and the extent and reasons of tax liabilities along with penalties for failing to satisfy them. Administrability encompasses all costs pertaining to the collection, processing and enforcement of the tax code. As stated by the same report, one way of improving efficiency of the tax system could be to get rid of the plethora of exemptions or deductions embedded in the tax code. They were originally intended to foster more equity in the system.

Adhikari (2019) enters the debate regarding the efficiency of tax systems by specifically investigating the value-added tax (VAT) system. She points out from the outset that such a system appears in theory to be a booster of economic efficiency. Using the synthetic control method, she assesses efficiency gains when a VAT system is introduced for a pool of both developed and developing countries. The study uncovers that a VAT improves economic efficiency. However, this improvement is chiefly driven by developed nations opening the door to the evidence that a VAT system is not an economic efficiency-booster per se in developing countries. In a nutshell, this investigation alerts us about a general application of predictions from theoretical precepts regarding a VAT system. A note of caution is nonetheless in order as far as reforms in the US tax system are concerned in light of the numerous legislative hurdles that pave the way. Moorehead (2015) is not saying anything less when addressing the complexity of a comprehensive tax reform in the US targeting both business and individual federal taxes. On a more practical and recent note, Lyon and McBride (2018)

weigh up the impact of the 2017 tax reform on US global tax competitiveness. The reform highlights the need for further improvements in the current US tax system for corporations. Indeed, they find out that this reform brought in a significant rise in domestic investment incentives. They underscore also that the partial implementation of some dispositions in a vast and multilayered system of exemptions had the merit of leveling the playing field for US companies with respect to foreign-headquartered companies. However, they suggest that more ambitious reforms should be pondered as they disclose that US corporations still trail foreign counterparts in terms of research incentives.

METHODOLOGY

Economic Environment

This study includes a two-period overlapping generation (2-OLG). A typical agent, or individual, lives over two periods. In the first period of life, the individual is considered young, or poor. At the beginning of that period, she has two types of resources. She is endowed with a given amount of output (y_1), and she additionally receives a fractional income (θy_1). The fractional income may take the form of a tax refund or a welfare allowance received from the government, either directly or indirectly, through various government programs or social nets. It can as well be a combination of both. The resources serve three purposes: (i) consumption (c_1), (ii) savings (s_1), and (iii) tax payments (T_1). The latter is a fraction (τ_1) of endowment. In the second period of life, the individual is considered old, or rich. She owns a valuable estate built over time. Resources are in the form of y_2 and they emanate from activities completed when young, with $y_2 > y_1$. All savings in the first period of life are remunerated at an interest rate (r). These resources are used up through consumption (c_2) and tax payments (T_2). These are final tax payments made in any rich agent's life and may include, among others, an estate tax. These taxes are a share (τ_2) of y_2. Overall, a typical agent in the economy has an objective function based upon a log-utility functional form that introduces a discount factor, β, applied to the second period of life's level of consumption. In view of the afore-discussed environment, the objective function is maximized under two constraints:

$$Max \ln(c_{1t}) + \beta \ln(c_{2t+1})$$
$$\text{subject to: } c_{1t} + s_t + \tau_1 y_1 \leq (1+\theta) y_1 \qquad (1)$$

$$c_{2t+1} + \tau_2 y_2 \leq y_2 + r_{t+1} s_t \qquad (2)$$

The optimization process yields the following steady states levels of consumption[2]:

$$c_1^* = \frac{(1+\theta-\tau_1)}{(1+\beta)} y_1 + \frac{(1-\tau_2)}{r(1+\beta)} y_2 \qquad (3)$$

$$c_2^* = \frac{(1+\theta-\tau_1)\beta r}{(1+\beta)} y_1 + \frac{(1-\tau_2)\beta}{(1+\beta)} y_2 \qquad (4)$$

The sum of c_1^* and c_2^*, say, c^*, which is a function of τ_1 and τ_2, shows the optimal path of an economic agent's lifetime level of consumption. From another perspective, c^* captures the lifetime standard of living of an individual. That is,

$$c^* = c_1^* + c_2^* \qquad (5)$$

From the outset, two extreme cases can be considered to put some context in the upcoming discussion. The first case (Case 1) sets an economy where no taxes are levied, $\tau_1 = \tau_2 = 0$. Findings reveal that c^* reaches the highest possible level for any individual. In the second case (Case 2), a tax levy of 100 percent is applied to all agents, $\tau_1 = \tau_2 = 1$. Such an economy experiences the lowest level of lifetime standard of living for any given individual. In light of these two extreme cases, it comes out that there is an inverse relationship between the level of taxes and the lifetime standard of living: The higher the tax, the lower the lifetime standard of living. This finding leads this research work to the next step, where the model is parameterized with actual metrics of the US economy to observe the paths of lifetime standards of living.

Parameterization

Table 1 reports the values of parameters. The fractional income received by the average person in the first stage of life, or when poor, θ, is proxied using the average tax refund as a share of median income. The discount factor, β, of consumption in the second period of life, or when rich, is approximated subtracting the most recent US Gini Index from 1. The yield on the 30-year US Government bond is used to account for the average interest rate on all forms of savings deposits.

In addition to the two extreme cases reviewed above, this study considers two other sets of cases. On the one hand, there is Case 3, which considers actual tax rates applied in the US economy over time. Using data from the Internal Revenue Service (IRS), τ_1 and τ_2 are proxied by the yearly effective tax rates of bottom 50 percent taxpayers and top 50 percent taxpayers, respectively. They are documented in Table 2. This case provides the baseline results for the study. On the other hand, five separate cases representing a schedule of five combinations of τ_1 and τ_2, as displayed in Table 3, are run. Cases 4, 5, 6, 7, and 8 follow through with a BBLR tax by considering five different combinations of flat tax rates. With a flat rate, the tax differential between

[2] Details pertaining to optimization results are presented in the Appendix.

top and bottom earners is zero. Currently, that differential is 90 percentage points[3].

Table 1. Parameterization

Parameters	Value
θ	0.0317
β	0.6
r_{t+1}	0.0205

RESULTS AND POLICY IMPLICATIONS

Results

Figure 1 shows upward trending standards of living over the past three decades in all eight cases. The baseline model provides a lifetime consumption pattern culminating at about $1.8 trillion. Cases 1 and 2 provide an envelope for all other cases. Case 1, with a flat tax rate of zero percent for all economic agents, represents the top layer, while, case 2, with a flat rate of 100 percent, makes up the bottom layer. Within that envelope, the lifetime consumption pattern using the current tax system, case 3, provides the second lowest standard of living after case 2. Yet, when a BBLR tax is set at the rate currently applied to the bottom 50 percent of income taxpayers, the lifetime standard of living of economic agents is the second highest after case 1, where there is no tax. This salient point corroborates the finding established above regarding the inverse relationship between tax rates and lifetime standards of living.

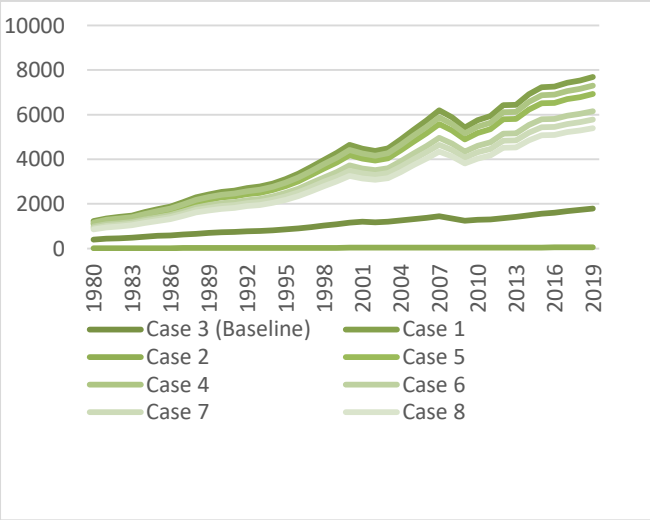

Figure 1. Lifetime Consumption Patterns

Policy Implications

A BBLR tax system is favorably viewed by economists from a broad spectrum of schools of thoughts for a variety of reasons including, among others, its simplicity and the enhanced efficiency it brings in the collection of tax revenues. These two features can boost economic activities across all industries due to the considerable and documented inefficiencies caused by the current tax system. Examples of inefficiencies of US tax code abound. For instance, the Tax Foundation revealed, using data from both the Office of Information and Regulatory Affairs (OIRA) and the Bureau of Labor Statistics (BLS), that tax compliance cost $409 billion to the US economy in 2016[4]. Moreover, the US Office of Management and Budget (OMB) disclosed some alarming figures confirming that the average American (non-business) spent over 8 hours every year to complete her tax returns and comply with tax regulations. Business filers on the other hand averaged at least 24 hours. Speaking of tax regulations, the US tax code has grown almost 6-fold from 409,000 words in 1955 to 2.4 million words long in 2016 (Erb, 2016).

Findings in this analysis spotlight another piece of empirical arguments lending support to a BBLR tax system. At many levels of universal taxes, standards of living markedly improved for all economic agents. According to the Bureau of Economic Analysis (BEA), the share of consumption in the US economy has hovered between 58 and 70 percent since 1947. More recently, in 2019:4, that figure was 68.1 percent. Taking into account these stylized facts, it can be strongly expected that the enactment of a flat tax will sustainably bolster output production in the economy. Another policy implication of this study worth contemplating is the introduction and relevance of a value-added tax (VAT). This could be either an alternative to the flat income tax or a complement to an otherwise low flat tax. The US is the only developed nation that has yet to implement a VAT. The appeal of a VAT system stems from the accuracy and straightforwardness in the reporting process to the government, as this tax is levied at each stage of production. Furthermore, it has the advantage of reducing distortions in the economy.

CONCLUSION

The broad base and low rate (BBLR) tax system has been a topic of conversation in the United States for decades. This tax system has been garnering a great deal of support among economists and decision-makers owing to economywide reductions in inefficiencies and distortions it generates. Using a 2-period overlapping generation model (2-OLG), this study has investigated how the introduction of a BBLR, at various levels of flat rates, affects standards of living across all individuals in the economy. Two striking points are

[3] According to 2018 tax statistics from the IRS, the average tax rate effectively paid was 5 percent for the bottom 50 percent of earners, and 95 percent for the top 50 percent of earners, from 1980 to 2019.

[4] The Office of Information and Regulatory Affairs (OIRA) is part of the Office of Management and Budget (OMB).

highlighted. First, the current tax system yields the second lowest standard of living. The only scenario yielding a worse outcome is the extreme case involving a 100 percent tax levy. Second, a BBLR with a flat tax connotes higher levels of standard of living in a variety of scenarios. A rise in efficiency, reductions in distortions, and increased certainty, all contribute to prop up lifetime consumption. Positive spillovers are expected owing to the fact that consumption makes up the lion's share of US GDP representing well above 60 percent of output. This research endeavor, with a partial equilibrium model, constitutes a basis for further investigations into the impact of a BBLR tax system. For instance, a general equilibrium approach within the framework of a dynamic stochastic equilibrium model (DSGE) could provide more comprehensive results.

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APPENDIX

Optimization solution:

$$\begin{aligned} & \text{Max } \ln(c_{1t}) + \beta\ln(c_{2t+1}) \\ \text{subject to } & c_{1t} + s_t + \tau_1 y_1 \leq (1+\theta)y_1 \\ & c_{2t+1} + \tau_2 y_2 \leq y_2 + r_{t+1}s_t \end{aligned}$$

Lagrangian ($\mathscr{L}$) :

$$\mathscr{L} = \ln(c_{1t}) + \beta\ln(c_{2t+1}) + \lambda_1[(1+\theta)y_1 - c_{1t} - s_t - \tau_1 y_1] + \lambda_2[y_2 + r_{t+1}s_t - c_{2t+1} - \tau_2 y_2] \quad (6)$$

or equivalently,

$$\mathscr{L} = \ln(c_{1t}) + \beta\ln(c_{2t+1}) + \lambda[(1+\theta - \tau_1)y_1 - c_{1t} - (c_{2t+1}/r_{t+1}) - (\tau_2 - 1)/r_{t+1})\, y_2] \quad (6')$$

(5') considers the lifetime budget constraint.

Partial derivatives and rearrangements yield the following condition:

$$\frac{1}{c_{1t}} = \frac{\beta r_{t+1}}{c_{2t+1}} \quad (7)$$

Using (5'), (6) and the derivative of the Lagrangian with respect to λ, equations (3) and (4) are derived.

Table 2. Baseline model values of τ_1 and τ_2 (Case 3)

Period	τ_1	τ_2
1980	7.05	92.95
1981	7.45	92.55
1982	7.35	92.65
1983	7.17	92.83
1984	7.35	92.65
1985	7.17	92.83
1986	7.35	92.65
1987	7.17	92.83
1988	6.46	93.54
1989	6.07	93.93
1990	5.72	94.28
1991	5.83	94.17
1992	5.81	94.19
1993	5.48	94.52
1994	5.06	94.94
1995	4.81	95.19
1996	4.77	95.23
1997	4.61	95.39
1998	4.32	95.68
1999	4.28	95.72
2000	4.21	95.79
2001	4	96
2002	3.91	96.09
2003	4.9	95.1
2004	4.21	95.79
2005	4.07	95.93
2006	3.87	96.13
2007	3.59	96.41
2008	3.41	96.59
2009	3.36	96.64
2010	3.1	96.9
2011	2.46	97.54
2012	2.36	97.64
2013	2.89	97.11
2014	2.78	97.22
2015	2.75	97.25
2016	2.83	97.17
2017	3.04	96.96
2018	3.19701	96.80299
2019	3.398186	96.60181

Table 3. Flat tax rates schedule[5]

	Case 1	Case 2	Case 4	Case 5	Case 6	Case 7	Case 8
$\tau 1$	0	1	0.05	0.1	0.2	0.25	0.3
$\tau 2$	0	1	0.05	0.1	0.2	0.25	0.3

[5] Case 3 is reported in Table 2.