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Reservations on the classical Laffer curve

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Abstract
Throughout the last two decades, some economists have objected to the conventional shape of one peak point on the Laffer curve. This paper examines the reservations presented in the literature and demonstrates the possibility of a Laffer curve with three peak points. Such a shape may be due to the three heterogeneous population groups of younger workers, adult males, and adult females. These groups respond differently to net wage rate changes, thus reducing the applicability of the changing of tax rates by policymakers.

Keywords Laffer curve · Heterogeneous population groups · Multi-peak points · Tax rates · Tax revenue

1 Introduction

The well-known Laffer curve is considered a very important tool for policymakers. The curve was first developed in 1974 by Arthur Laffer who drew a nicely shaped symmetric curve on a napkin. The famous economist, Wanniski, named it the "Laffer

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curve." Four years later, Wanniski (1978) presented what has become the classic depiction of the curve. The curve represents the relationship between the tax rate, t, which is imposed by government and the total tax revenue that is collected. At some point the revenue value approaches its maximum. The relationship between the tax burden and the amount of tax revenue collected by the government is shown by the Laffer curve. It is typically represented with an inverted U-shaped curve that crosses the horizontal axis at 0% and 100%.

Economists have no doubt that at the tax rate of zero as well as at a high tax rate (not necessarily of one) the tax revenue would be zero. The reason for no revenue at a high tax rate is that the high rate motivates workers to avoid working and earning income. They might also prefer evading taxes. Even if workers avoid illegal activity, instead of working as independent contractors or employees, they may become self-employed to allow for tax exempt income from self-production. In their research, most economists follow the original Laffer paper and agree that although the exact shape is ambiguous, the curve still exhibits one and only one peak point at which tax revenue is at its maximum. If the tax rate that the government actually imposes is higher than the rate of maximum revenue, it is recommended to reduce the tax rate in order to increase tax revenues and to decrease both the tax burden on the citizen and the deadweight loss due to tax inefficiency. Laffer himself asserted this claim during the Reagan administration period in the 1980's. More recently the Trump administration also presented it as an argument for reducing individual tax rates as well as corporation tax.

Several economists during the last two decades have objected to the convention of the shape of one peak point on the Laffer curve. Some suggest that although they agree that at the two extreme scenarios of $t = 0$ and $t \rightarrow 1$ tax revenues are zero, at the intermediate tax rate of $0 < t < 1$ the values may still present a non-monotonic shape of positive or negative slopes of the curve with only one peak point. Instead they suggest a different shape of curves, possibly with multiple peaks. In the present paper the example of a triple-peaked Laffer curve may exist due to very realistic assumptions that are suggested regarding the shape of the labor market supply curve.

The labor market is assumed to be nonhomogeneous in terms of how various types of workers differently respond to their net wages per unit of labor supply. The different types of workers can be identified as responding differently towards net wage according to gender. Males and females may have differently shaped labor supply curves. Another possibility is that different relations between labor service and the net wage rate are due to age. For example, younger and older workers respond differently to net wage compared to middle-aged workers. Differences are also due to marital status such as single as compared to married workers, etc. The same segmentation between types of workers can be identified between domestic and foreign workers, or between workers who are citizens and those who are noncitizens. In most cases the different groups have the following different responses of labor supply to the net wage rates, (i.e., to the actual tax rate). The different types of workers may lead to different shapes of the labor supply curve as follows.

a. The minimum net wage rate at which workers stop or avoid working is lower for women in comparison to men. It is also lower for younger or older adults in comparison to middle-aged workers; and for foreigners or noncitizens compared to domestic workers with citizenship, etc.

b. The limitation on the maximum number of daily working hours varies for different groups of people who are willing to work at their places of employment. For example, in many countries with different religions or cultures, the maximum supply of labor for women and especially for mothers of young children is limited and less than that for men or for fathers of families. Due to traditional paternalistic family structure, many mothers limit their labor supply to part-time jobs so that they can fulfill the obligations of motherhood, while the men in families are hired for full-time jobs allowing for many more work hours (Spiegel et al., 2014). The model developed below follows the assumptions described above with three different groups of workers. It may lead to several peak points on the Laffer curve, in contrast to the conventional curve which has only one peak point.

2 Literature Review

2.1 Historical literature review of the traditional Laffer curve

The Laffer curve is considered a major contribution of the supply-side economists, showing the nonlinear effect of tax rates on total tax revenues.

Changes in tax rates have two effects on tax revenues. The first effect is that due to reduction of the tax rate there is reduction in the revenues from a given tax base. The second and possibly opposite effect should also be considered, since the reduction in the tax rate may encourage people to work and invest more. Thus, tax revenues may increase since a larger tax base is created due to the tax rate reduction. The overall effect of the tax rate on tax revenue is ambiguous. This may lead the supply-side economists to the traditional view of Laffer and his followers that at two different tax rates the same tax revenue is collected (Laffer, 1979).

The question that should be raised is why just two points necessarily guarantee the same tax revenue that leads to only one peak point of the Laffer curve.

Other graphic interpretations of the Laffer curve originate from a premise that it can have more than one inflection point. Henderson (1981) was the first to observe that the amount of tax revenues could vary depending on individual preferences in the case of lower taxes on labor income. Individual reactions are not identical and are not necessarily predictable. Some will work harder and find an additional job, while others will give priority to leisure. People react differently due to factors such as job complexity, family status, gender, age, educational background, wealth, and income level. Since the income effect and the substitution effect of the tax imposed differ in absolute values, signs and the values of elasticity of taxable income in relation to labor income tax rates, their total effect might change from negative to positive several times in line with the reduction of the tax rate. Scholars studying the Laffer curve obtained different estimates for the elasticity.

Due to the variability of the elasticity estimates obtained, Gardner (1981) suggested that the Laffer curve should be drawn with multiple peaks.

Spiegel and Templeman (2004) also criticize the original Laffer curve with one peak point. They are cited by Jayasooriya (2019), who finds a strong correlation of the tax revenue and GDP with respect to the tax rate for the Laffer curves.

Kakaulina (2017) also suggests a Laffer curve that has two rather than one inflection point by considering foreign economic factors that were not originally addressed by other authors.

Canto et al. (1981) develop a model using two factors, capital and labor, to analyze the ambiguity effect of tax revenues based on the supply and output elasticities of the factors of production. This ambiguity may affect the various shapes of the Laffer curve.

Blinder (1981) similarly confirms the basic original shape of the Laffer curve, although he offers the possibility that several tax rates may lead to the same maximum tax revenues.

The literature review presented above includes academic disputes among scholars regarding the real shape of the Laffer curve, and thus encourages its reconsideration.

2.2 Literature review of the Laffer curve with segmentation according to gender and age

The wage gap between genders has shifted in recent years towards a new dimension of the motherhood wage penalty and the fatherhood wage premium. In a very recent paper, Glauber (2018) discusses this issue. Following Budig and Hodges (2010, 2014), she investigates the different intensities of these gender-related penalties versus premiums for different groups within the bottom, middle and top of the wage distribution. This gender effect exists along the entire wage distribution. Her finding is consistent with the studies of Buchmann and McDaniel (2016); Pal and Waldfogel (2016); Weeden et al. (2016); Budig and Hodges (2010); England et al. (2016); and Killewald and Bearak (2014).

The above referenced authors reveal factors that influence the gap between genders such as education, background, marital status, professional experience, age and number of children. During parenthood the gap between spouses of different genders is very remarkable. (See also Azmat and Ferrer (2017).)

Kleven and Landis (2017) introduce and very extensively discuss gender inequality that is shown in the labor market research outcomes in terms of gaps in wages, participation rates, and hours of work.

Using a large data set, their research shows that the substantial gender convergence is due to demographic factors such as fertility rates, education levels, and views concerning basic gender roles that influence the gaps between genders in the labor supply market.

Despite substantial gender convergence during the last century, there is still considerable gender inequality in the labor market research outcomes for all developed countries. Evidence from different high-income countries suggests that most of the remaining gender inequality can be explained by the unequal impacts of parenthood on men and women (e.g. Waldfogel (1998); Paull (2008); Bertrand et al. (2010); Goldin (2014); Angelov et al. (2016); Kleven et al. (2016)). For example, Kleven et al. (2016) show that 80% of the remaining earnings inequality between men and women in Denmark results from “child penalties” that mothers face, but not fathers. Indeed, theories of economic growth and fertility highlight the demographic transition as a key transmission mechanism for gender convergence (e.g. Galor and Weil 1996; Galor 2012). In these theories, technological progress and capital accumulation complement mentally intensive tasks more than physically intensive tasks in production, thus favoring the skill in which women have a comparative advantage.

Goldin (2014) introduces the concept of grand gender convergence between men and women as fact, using evidence from the United States and the themes and ideas that are developed in her study to close the wage gaps in other societies or countries. The discussion is not with regard to the question of whether the gap between genders exists, but as to the kind of involvement that is or should be required to eliminate or reduce this gap.

However, with labor supply from population groups that differ in gender, age, and other socioeconomic terms, the Laffer curve with different local maxima points becomes a more comprehensive issue, that should be considered by the policymaker. The policymaker has to choose amongst several tax rates that guarantee the same or similar value of tax revenues.

Another very important segmentation between labor supply groups is based on age, i.e., differentiation between younger and unexperienced workers as compared to those who are older and experienced.

This gap is first expressed by a simple fact regarding the last decade of the twentieth century. A decline in the entry wages began at that time and continued during the following decade (See Rosolia and Torrini 2007, 2017). Moreover, in addition to the decrease in the wage rate, the employment rate for young workers has also significantly decreased. Beaudry and Green (2000) discuss a different wage gap. The pattern of change in the age earning profile demonstrated in Canada for the years 1971–1993 shows a broadening of the wage gap between younger workers whose salary continues to decrease in comparison to older workers. Whether or not this gap is due to experience skill premia, the evidence demonstrates a significant dispersion due to age among males.

Different research studies discuss the relationship among wage rate, age, and productivity. The fundamental work of Lazear (1979) explains the positive effect of age on the wage rate.

Van Ours and Stoeldraijer (2011) examine the Dutch industry and show the gap between wage rates and productivity for older workers. In comparison to other groups, older workers may have a wage that is higher than their productivity. This can be explained by the fact that the older workers are protected due to either their seniority or to employment legislation. However, the basic fact remains that wage gaps exist between older and younger workers.

Cataldi et al. (2011) show that younger workers are paid below their productivity level while older workers are paid above it. The results support the deferred payment model developed by Lazear (1979).

"The Italian labor market (Ballarino et al., 2014) displays major differences across gender and age groups…There are also major differences between women with and without children." (Please see page 6.)

In the following section, different Laffer curves are introduced in accordance with the school that asserts the multi-peaked shape of the Laffer curve.

3 The model

The model developed in this paper uses very basic presumptions regarding the labor market with different and heterogeneous population groups. The model concludes that

the traditional one peak Laffer curve of 1974 most likely does not exist and therefore remains an incorrect and most likely ineffective tool.

In the current model the aggregate labor supply of the whole market includes three different groups of workers. In reality, we may also identify three segmented groups of workers, each group with its own supply of labor as a function of the net wage rate, $w(1-t)$. The first group of workers has a labor supply provided by male adults, L_M, and the supply is:

$$L_M = \begin{cases} -M + w(1-t) & for \quad 0 < L < \widehat{L_M} \\ \widehat{L_M} & for \quad L = \widehat{L_M} \end{cases} \tag{1}$$

The second group of workers has a labor supply provided by female adults, L_F, and the supply is:

$$L_F = \begin{cases} -F + w(1-t) & for \quad 0 < L < \widehat{L_F} \\ \widehat{L_F} & for \quad L = \widehat{L_F} \end{cases} \tag{2}$$

The third group of workers includes younger workers and their labor supply, L_Y, is:

$$L_Y = \begin{cases} -Y + w(1-t) & for \quad 0 < L < \widehat{L_Y} \\ \widehat{L_Y} & for \quad L = \widehat{L_Y} \end{cases} \tag{3}$$

Each of the three curves of supply has a different intercept such that $Y < F < M$, and for simplicity we assume for all three groups an identical slope which is one.

This indicates that an increase of \$1 in the net wage rate increases the labor supply by an additional unit of labor. The presumption that $Y < F < M$ indicates that the reservation wage rates of the population groups due to age, gender, family structure, etc. exists. Younger workers are willing to supply labor service at a lower net wage rate than are females. The male workers demand an even higher net wage than female workers in order to be willing to work. This is due to their monopoly (monopsony power) that enables them to demand higher wages than females and younger workers. The third characteristic of the supply of labor by the three groups of workers is $\hat{L}_i$, that indicates a different limit on the maximum hours of labor supply. At the maximum, the labor supplies become totally inelastic with respect to changes in the net wage rate due to legal requirements or social constraints. In reality we can identify these values for younger workers, females, and males as $\widehat{L_Y} < \widehat{L_F} < \widehat{L_M}$.

Based on the three characteristics, above, we can construct the aggregate labor supply curve for the entire market using simulations of specific numbers of net wage rates.

It leads to a Laffer curve with several local maxima of revenues. In accordance with the preceding literature review, there are broader implications that will be discussed below.

The labor supply curves of the three groups are necessarily as follows:

1. The wage discrimination between genders exists since males receive a higher wage rate and have a higher elasticity of labor supply with respect to wage rate.
2. Age positively affects the wage rate. According to this clear evidence, the aggregate labor supply of the three groups maintains a monotonic increase of labor supply with respect to wage changes, although the shape of the upwards increases in labor supply fluctuates.

Based on the above discussion regarding gender and wage differences, the aggregate supply curve is given below:

The aggregate supply of labor is generated by using a horizontal summation of L_M, L_F, and L_Y for specific values of Y = 5, F = 13, M = 24, and $\widehat{L_M} = 12, \widehat{L_F} = 7, \widehat{L_Y} = 5$, while the slope of each labor supply curve is still one. The aggregate supply includes in this case six zones A, B, C, D, E and G as shown at Fig. 1. For zones A, B, C, D, E and G the supply can be defined as:

$$\begin{array}{ll} \mathrm{L_A at\ zone\ A} : L_A = -5 + w(1-t) & for\ 5 < w(1-t) < 10 \\ \mathrm{L_B at\ zone\ B} : L_B = 5 & for\ 10 < w(1-t) < 13 \\ \mathrm{L_C at\ zone\ C} : L_C = 5 L_C = -8 + w(1-t) & for\ 13 < w(1-t) < 20 \\ \mathrm{L_D at\ zone\ D} : L_D = 12 & for\ 20 < w(1-t) < 24 \\ \mathrm{L_E at\ zone\ E} : L_E = -12 + w(1-t) & for\ 24 < w(1-t) < 36 \\ \mathrm{L_G at\ zone\ G} : L_G = 24 & for\ 36 < w(1-t) \end{array} \quad (4)$$

Based on the six zones and assuming an initial gross wage rate, w, of 50 ($\overline{w}$ =50), we derive the Laffer curve equation of $T = t \cdot \overline{w} \cdot L$ as follows.

For $\overline{w} = 50$ we can find how changes in the tax rate, t, affect the net wage rate per hour as well as the total quantity of labor supply, L. From the above six zones of aggregate labor supply L_A, L_B, L_C, L_D, L_E, and L_G, we get the Laffer curve T as a function of each tax rate, t, according to the total labor supply.

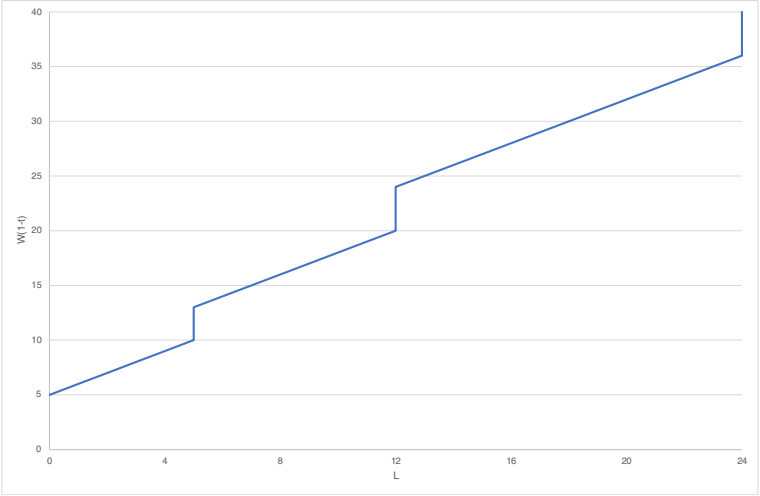

Fig. 1 The Aggregate Supply of Labor.

The Laffer curve T as a function of the tax rate, t, for given $\overline{w} = 50$ is written as follows for the six zones described above:

$$T = \begin{cases} t \cdot 50 \cdot L_A = \mathrm{t} \cdot 50[-5 + 50(1-t)] = 2250t - 2500t^2 & for\ 0.8 < t < 0.9 \\ t \cdot 50 \cdot L_B = \mathrm{t} \cdot 50 \cdot 5 = 250t & for\ 0.74 < t < 0.8 \\ t \cdot 50 \cdot L_C = t \cdot 50 \cdot [-8 + 50(1-t)] = 2100t - 2500t^2 & for\ 0.6 < t < 0.74 \\ t \cdot 50 \cdot L_D = \mathrm{t} \cdot 50 \cdot 12 = 600t & for\ 0.52 < t < 0.6 \\ t \cdot 50 \cdot L_E = t \cdot 50 \cdot [-12 + 50(1-t)] = 1900t - 2500t^2 & for\ 0.28 < t < 0.52 \\ t \cdot 50 \cdot L_G = \mathrm{t} \cdot 50 \cdot 24 = 1200t & for\ 0 < t < 0.28 \end{cases} \quad (5)$$

This Laffer function can be introduced in Figs. 2, 3, 4 and 5 below for different values of the gross wage rate, for the parameters that are introduced in table 1.

All Figures illustrate triple peak points on the Laffer curves. At Figs. 2, 3 and 5, we find two local maxima points and one global maximum point, while at Fig. 3 we find two global maxima points and only one local maximum point. Furthermore, additional possibilities can be shown under different values of the parameters, with different shapes of the Laffer curve, and with different values of several peak points of the Laffer curve. For example, a case can be considered in which there are different values of the gross wage rate, *w*, for the three different groups. In reality the gross wage rate of younger workers is lower than that of females, which is also lower than the gross wage rate of males. In such a case, more fluctuations and peak points may be revealed. In addition, a case can be considered with degrees of freedom in the values of F, Y, and M as well as in $\widehat{L_Y}, \widehat{L_F}, \widehat{L_M}$ that may lead to further fluctuations and shapes of the Laffer curve.

The above results illustrate in a very simple way that the fundamental shape introduced by Laffer in 1974 is incorrect and unrealistic. Laffer's well-behaved curve starts with a tax revenue of zero at a tax rate of zero, and later has only one peak point. The current paper demonstrates that in a very basic and microeconomic supply of labor

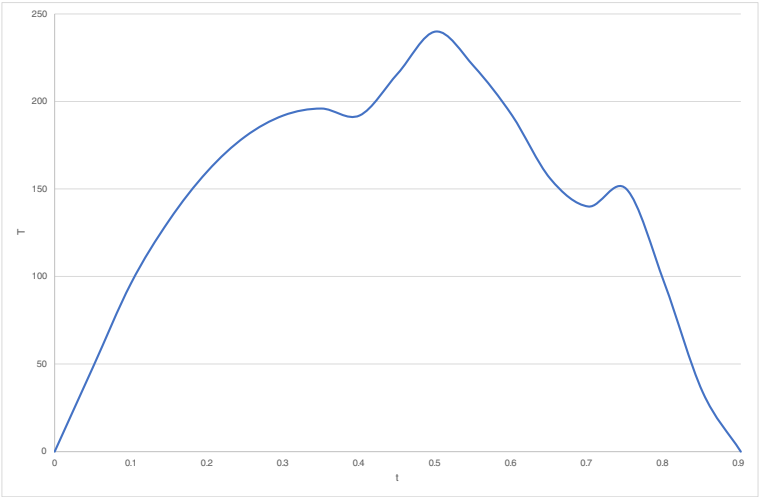

Fig. 2 For w = 40 with Three Peak Values of the of the Laffer Curve.

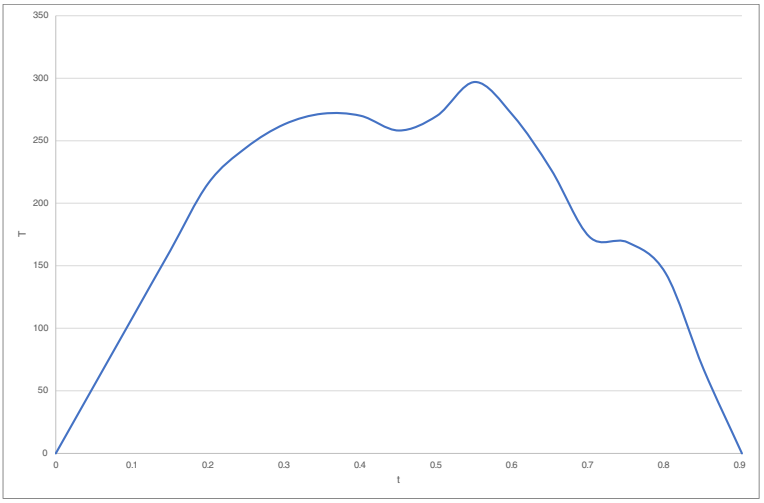

Fig. 3 For w = 45 with Three Peak Values Laffer Curve.

by population groups differing in gender, age, scholastic abilities, attitudes towards leisure and work, and other factors, various shapes of Laffer curves with several peak points are more likely to exist.

4 The tax burden among groups

An important result is derived from the above findings. The Laffer curve cannot have one and only one peak point of local maximum revenues, but the actual Laffer curve includes several tax rates with the same maximum tax revenues.

If several tax rates collect the same tax revenue, then the issue regarding the tax burden becomes important. In previous discussions concerning the Laffer curve, nothing was

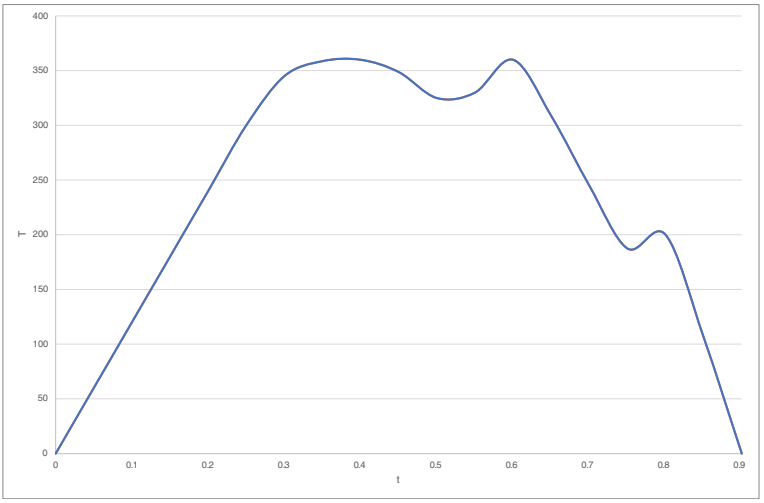

Fig. 4 For w = 50 with Three Peak Values of the of the Laffer Curve.

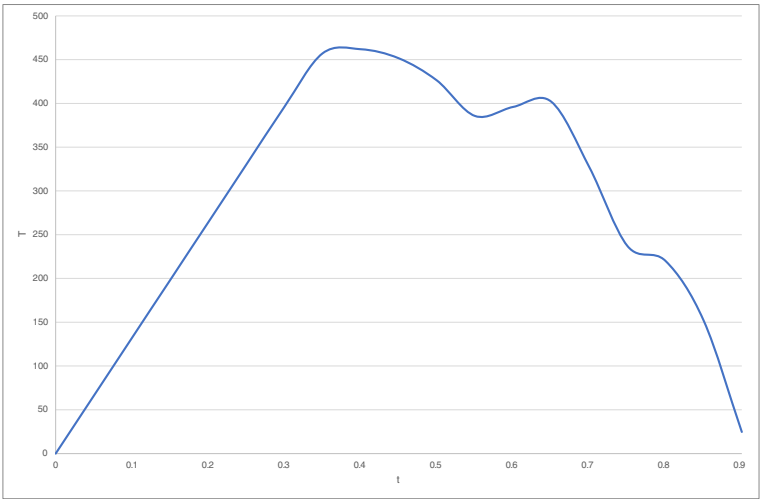

Fig. 5 For w = 55 with Three Peak Values Laffer Curve.

stated regarding the tax burden and whether the tax revenue is paid by males or females, old or young, rich or poor. This may be referred to as a characteristic of tax neutrality, in which the only issue the policymaker considers is effectiveness and efficiency of tax collection. However, according to the present approach it is indeed possible to have a modified Laffer curve containing several tax rates with the same maximum tax revenues and reflecting additional relevant issues. The tax burden distribution among all taxpayers is such that the tax revenues may affect poor or rich, younger or older individuals, males or females, etc. The tax imposition may also affect the attitude of workers towards work, so that they might switch from a full-time job to a part-time job, etc. These and other issues should be considered by policymakers in determining which one of the local maximum tax revenues should be chosen. The present discussion extends the example of three local maxima and shows the tax burden distribution among male, female and younger workers at different tax rates that lead to the same total tax revenues collection. However, the tax burden differs among the groups. These issues may affect the decision as to which of the tax rates that lead to the same or similar tax revenues should be chosen.

5 The tax incidence of neoclassical public finance theory, the Austrian school, and the Buchanan approach

This section discusses the source of ambiguity of the tax rates effect and relates to different schools of economics. First is the background shown by the economists that follow Arthur Laffer.

Table 1 Parameters of the Numerical Example for W = 40,45,50,60

F	Y	M	LF max	LY max	LM max
13	5	24	7	5	12

The basic inverse U-shaped Laffer curve is derived by the neoclassical public finance theory that uses the approach of a representative, rational and homogeneous agent that defines the labor supply curve. Two dimensions are included on this curve.

a. There is an entire range of tax rates in which an increase in the value leads the worker to supply less labor service.
b. There is a high tax rate at which the representative worker avoids working.

The current paper departs from the neoclassical approach and applies that of the Austrian school and Hayek, its most prominent representative.

The Austrian school objects very firmly to the idea of homogeneity of workers and strongly supports the idea of heterogeneity.

Due to heterogeneous individual values and dispersed knowledge, as raised by Hayek of the Austrian school, he suggests developing elements of the discovery capacity of human beings. Through "implicit economics" Hayek develops the idea of the important role of market institutions as "repositories of social learning" (Vaughn, 1999). "... Hayek's alternative embeds the Austrian appreciation of entrepreneurship within a larger institutional context of the market order" (Vaughn, 1999).

He investigates the ability of legal and political institutions to take action and improve their own wellbeing within the market order (Vaughn, 1999). This can be done by enhancing an individual's basic knowledge that improves assessment ability with respect to one's own actions.

This approach of Hayek is also applicable to the issue of optimal tax policy that is developed and discussed in later years by Nobel Prize winner James Buchanan. DiLorenzo (1990) raises an important question regarding optimal tax policy. The conventional neoclassical public finance approach presumes a well-known and simple labor supply curve including a backward-bending zone. The neoclassical conclusions lead to a simple Laffer curve that includes one peak point of maximum tax revenues. The results derived in the current paper depart from the neoclassical approach towards the existence of several peak points. Thus, the target of achieving tax revenue maximization is more complicated and requires some modifications. The basic background of the present new Laffer curve with several peak points is based on the presumption that in real life policymakers suffer from a Hayekian knowledge problem with respect to maximizing tax revenues. They do not have exante robust information about the relationship between the tax rate and actual tax revenues. The above claims concerning the deficiencies of the public finance approach are based on the Austrian school as briefly described.

Buchanan, who initiated the public choice theory, objected to the neoclassical public finance theory. Yet he also deviated to some extent from the Austrian school.

The tax incidence issue is developed not only by the neoclassical public finance theory, but also by Buchanan and his followers who use aspects of public choice theory. The former approach focuses on the cost of taxation in terms of "who pays," while the "'access burden' or welfare cost" is assumed to be objective and measurable (DiLorenzo, 1990, p. 183). The latter approach of Buchanan integrates subjectivist insights into his thinking. Buchanan objected to the Keynesian theory and to the approach of his followers such as Barro. He believed in the Ricardian approach of the "equivalence theorem," stating that financing public expenses by

debt is similar to financing them by imposing more tax. Buchanan himself developed the principles of public choice in his new public finance theory, based on a subjectivist Austrian approach. It should be emphasized that the subjective cost theory of the Austrian school is given little attention in Buchanan's work that usually uses a strictly positivist approach. However, several of his works "may be properly labeled 'Austrian'…Moreover... the work of Buchanan and other public choice scholars is weakest when it neglects fundamental Austrian-school insights" (DiLorenzo, 1990, p. 195).

6 Numerical Example

Based on the numerical example that assumes a gross wage rate of $50 per hour of labor, the Laffer curve contains two local maxima points, each of which is $360 in total tax revenue. One point is approximately at a tax rate of 0.4 and the other point is approximately at a tax rate of 0.6.

In a case such as that in which two points end with the same tax revenues, other elements should be considered in determining which of the two is preferable.

At the tax rate of 0.4 the tax burden imposed on young workers at 100 out of 360 is 28%; on females at 140 out of 360 is 39%; and on males at 120 out of 360 is 33%.This seems to be a very acceptably distributed tax burden among the three groups. In contrast, at the tax rate of 0.6 the total tax burden is the same as at the tax rate of 0.4. However, in the former case the burden on males is totally eliminated while the

Table 2 Tax Burden Among Groups

t	TY	TF	TM	Total T
0	0	0	0	0
0.05	12.5	17.5	30	60
0.1	25	35	60	120
0.15	37.5	52.5	90	180
0.2	50	70	120	240
0.25	62.5	87.5	150	300
0.3	75	105	165	345
0.35	87.5	122.5	148.75	358.75
0.4	100	140	120	360
0.45	112.5	157.5	78.75	348.75
0.5	125	175	25	325
0.55	137.5	192.5	0	330
0.6	150	210	0	360
0.65	162.5	146.25	0	308.75
0.7	175	70	0	245
0.75	187.5	0	0	187.5
0.8	200	0	0	200
0.85	106.25	0	0	106.25

Table 3 Tax Burden Shares Among Groups

t	TY/T	TF/T	TM/T
0			
0.05	21%	29%	50%
0.1	21%	29%	50%
0.15	21%	29%	50%
0.2	21%	29%	50%
0.25	21%	29%	50%
0.3	22%	30%	48%
0.35	24%	34%	41%
0.4	28%	39%	33%
0.45	32%	45%	23%
0.5	38%	54%	8%
0.55	42%	58%	0%
0.6	42%	58%	0%
0.65	53%	47%	0%
0.7	71%	29%	0%
0.75	100%	0%	0%
0.8	100%	0%	0%
0.85	100%	0%	0%

burden on young workers at 150 out of 360 is 42%, and on females at 210 out of 360 is 58%. This information is presented in Tables 2, 3 and Fig. 6.

The solution of t = 0.6 is definitely unacceptable either to society or to its representatives, the policymakers. This issue is totally ignored by Laffer and his followers in earlier research of the 1970's, but it is presently emphasized in this paper due to the more recent empirical evidence that more than one local maximum point exists.

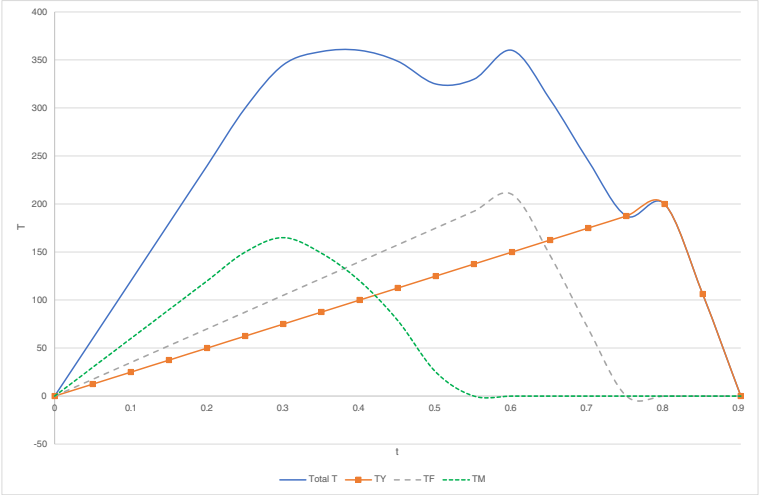

Fig. 6 Tax Burden Among Groups for Different Tax Rates.

7 Conclusions

The very basic presumption used by many economists as well as politicians and policymakers regarding the shape of the Laffer curve is that it contains one and only one peak point. This presumption just indicates that at a tax rate of zero as well as at a very high tax rate, no tax revenues exist. However only at a certain and very specific tax rate does the tax revenue approach maximum. If only one peak point curve exists, the use of the curve may be an important tool for policymakers in evaluating whether at a certain actual tax rate an increase or decrease in the tax rate should be considered in order to gain more tax revenue.

The only concern that is relevant to Laffer and his followers regards the effectiveness of tax imposition, i.e., the actual tax collection, while not addressing other issues that may be important to the policymakers. An example is the tax burden that is raised by an increase in the tax rate. Other relevant issues consider whether the tax revenues collected from different income groups are paid by poor or rich, male or female, young or old, etc. These issues are very important for policymakers who are looking for the optimal tax rate. They were not considered at all by Laffer himself when in 1974 he introduced the well-behaved Laffer curve on a napkin.

As shown in the current paper, the possibility that different tax rate values may lead to more than one peak point and that even several peak points exist for the same or different tax revenues reveals two results. First, it has an implication for policymakers in determining whether and in which direction to change tax rates. In addition, the evaluation of whether to increase or decrease the tax rates depends upon other essential issues. Tax effectiveness requires further considerations beyond actual tax revenues per se.

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