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THEORETICAL ASSESSMENT OF EFFECTS ON TAXATION AND TAX SYSTEM ON PROPERTY MARKET

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Abstract: *Designing and implementing a system of taxation must determine reducing losses to producers and buyers. Lowering tax rates and reducing income tax help to stimulate supply. The intensity of the effects of the tax system on goods market is determined by elasticity of demand and offer. Assessment of the effects generated by a system of taxes on goods market balance is necessary for the partial equilibrium.*

Keywords*: governmental income, tax base, tax rate, tax burden.*

JEL Classification: *D01, D31, C02*

1. Modeling the mechanism of duty and tax system

Duty and tax system should be designed so as to reduce losses to both the manufacturer and the buyer. It is possible that by increasing duty (taxation) total revenue would decline and therefore the governmental revenue would decrease.

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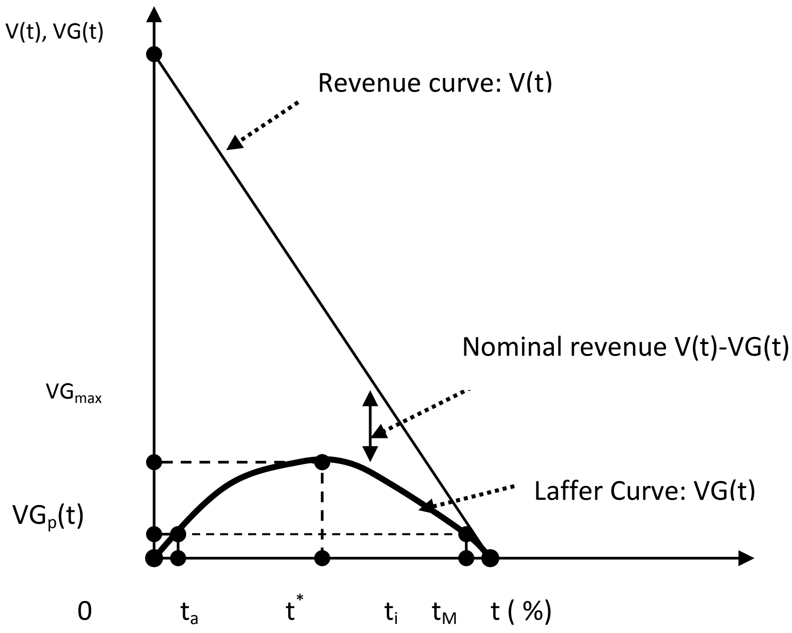

Fig.1. L**affer curve and income/revenue line**

Graphical representation of the relationship between government revenues (VG) and the tax rate (t) is known as the Laffer curve.

Laffer curve equation can be deduced from the idea that income (V), which is the tax base, is a decreasing function relative to the marginal rate of taxation (t). (Badea, 2016**)**:

$$V = V(t) = V_0 - b \cdot t$$

Giving t zero value, we obtain the expression of calculating the amount of untaxed income symbolized by $V_{0:}$

$$V_0 = V(0)$$

The maximum rate of taxes (t_M) is determined provided that the income V(t) become void:

$$V(t) = 0 \rightarrow V_0 - b \cdot t = 0 \rightarrow t_M = \frac{V_0}{b}$$

The coefficient b is the decrease of income when t increases by one. The size of coefficient b is marginal and is obtained by differentiating the revenue equation:

$$V(t) = V_0 - b \cdot t$$

$$dV = 0 - b \cdot dt$$

$$b = -\frac{dV}{dt} \rangle\ 0,\ iar\ \frac{dV}{dt} \langle\ 0$$

Governmental income is determined by the relationship:

$$VG = V(t) \cdot t$$

By definition, the size t expresses the increase of governmental income when income increases by one :

$$t = \frac{dVG}{dV}$$

Detailing the income expression V(t) as a decreasing function relative to variable t and performing calculations we obtain a second degree function which has a maximum point, because size $(-b)\langle 0$ **:**

$$VG = V(t) \cdot t = (V_0 - b \cdot t) \cdot t = V_0 \cdot t - b \cdot t^2$$

Determining the optimal value (t*) of the tax rate, in order to obtain maximum governmental income, is achieved on the condition that first-order derivative of the function of governmental revenue relative to t is equal to zero **:**

$$\frac{dVG}{dt} = 0$$

$$\frac{d(V_0 \cdot t - b \cdot t^2)}{dt} = V_0 - 2 \cdot b \cdot t = 0$$

$$t^* = \frac{V_0}{2 \cdot b} = \frac{t_M}{2}$$

Governmental income is canceled for two values of the tax rate (t):

$$VG = V(t) \cdot t = (V_0 - b \cdot t) \cdot t = 0 \rightarrow t_1 = 0 \quad si \quad pentru V_0 - b \cdot t = 0 \rightarrow t_2 = \frac{V_0}{b} = t_M$$

The level of VG(t) is always inferior to the level of income V(t) because the level of fiscal rate (t) is positive and subunitary:

$$VG = t \cdot V(t), \quad 0 \le t \le 0$$

The difference between income V(t) and governmental income VG(t) represents the net income. In the graph of FIG. 1 the level of net income is the distance between the Laffer curve and income line V(t). As seen in the graphical representation (see fig.1) the net income drops dramatically if the tax rate increases above the optimum level (t*). The total amount of taxes paid by the citizens of a country in the form of income tax, corporation tax , VAT etc , as a proportion of GDP is *fiscal pressure*. (Băcescu-Cărbunaru, Băcescu, 2008).

Laffer curve has two parts on either side of the rate t* that provide the maximum level of government revenue **(**$VG_{\max}$**) (**Manolescu, 1997)**:**

- allowable zone (placed on the left of t*), which improves governmental revenue by increasing the fiscal pressure;
- unacceptable zone (placed on the right of level t*), which causes decrease in governmental revenue by increasing the fiscal pressure.

The Laffer curve analysis shows that for any governmental income less than the maximum governmental income **(**$VG(t) \langle VG_{\max}$**)** there are two values of fiscal pressure rate: one located in the allowable zone **(t_a)** and one located in the unacceptable zone **(t_i).**

The existence of two values for taxation rate under an income planned by the government $VG_p(t)$ highlights the absurdity of adopting a higher tax rate, because increasing the tax rate cannot offset the decrease in the tax base represented by income line $V(t)$.

According to Arthur Laffer 's opinion (theorist of economy of offer) a lowering of tax rates and a gradual reduction of income tax are needed to stimulate demand and boost production . (Dornbusch**,** Fischer, 1997)

Laffer curve is a purely theoretical representation which cannot allow the establishment of governmental revenue in relation to the size of fiscal pressure. *Since there is no practical procedure for determining the peak of the Laffer curve, Laffer curve cannot be used to determine the optimal fiscal policy.*

Laffer curve can be used by the government as a justification for tax cuts provided in governmental programs.

2. Modeling the effects of the tax system on goods market

Assessment of the effects of the tax system on partial equilibrium (on goods market) or on general equilibrium can be achieved by means of economic calculation models. **[**CHIRIȚĂ N., SCARLAT E, 1998]**.**

We consider the goods market with a single product (partial equilibrium) . The original equilibrium price is p and can write the equation:

CA(p) = OA(p)

If the marginal rate of taxation is *t*, and the fee is collected from the buyer, the equilibrium price is p' and the balance equation is:

$CA\ (p^{'}+t) = OA(p^{'})$

Price p' is *price excluding taxes*

If the tax is collected from the seller, the equilibrium price is p"

$CA(p^{''}) = OA(p^{''}-t)$

Price p" is *price including taxes*.

In the case of collecting taxes from the buyer, the price paid exceeds the actual price for which reason, demand for the product will be less than the actual demand.

In the case of collecting taxes from the seller, the seller receives less than the price paid by the buyer, so the offer will be lower than possible offer.

Comparing the conditions presented the t level is obtained:

$CA\ (p'+t) = CA\ (p'') \quad \rightarrow \quad p'+ t = p'' \quad \rightarrow \quad t = p''- p'$, for demand

$OA\ (p') = OA\ (p''-t) \quad \rightarrow \quad p' = p''-t\ , \quad \rightarrow \quad t = p''- p'$, for offer

It is noted that fees are dependent on the prices formed on the market, and income from the tax system is independent of government decisions.

The more the elasticity of offer or demand is smaller, the more the supplementary loss is greater for the manufacturer or the buyer respectively.

We continue with the analysis of the tax paid by the buyer.

If offer and demand are dependent on the price we can write:

$$CA(p+t)=OA(p) \qquad (1)$$

It is assumed that the price depends on the "t" and the procedure is to differentiate the equation**:**

$$\frac{dCA(p+t)}{d(p+t)}\cdot\frac{d(p+t)}{dt}=\frac{dOA(p)}{dp}\cdot\frac{dp}{dt}$$

W note $\frac{dCA(p+t)}{d(p+t)}=CA'$ derived of aggregate demand and $\frac{dOA(p)}{dp}$ =OA' derived of aggregate offer.

Result the relation:

$$CA'\cdot\frac{d(p+t)}{dt}=OA'\cdot\frac{dp}{dt}$$

Performing calculations we get:

$$\frac{dp+dt}{dt}\cdot CA'=\frac{dp}{dt}\cdot OA'\rightarrow\left(1+\frac{dp}{dt}\right)\cdot CA'=\frac{dp}{dt}\cdot OA'$$

$$CA'\cdot\frac{dp}{dt}-OA'\cdot\frac{dp}{dt}=-CA'$$

$$\frac{dp}{dt}\cdot(CA'-OA')=-CA'$$

$$\frac{dp}{dt}=\frac{CA'}{OA'-CA'} \qquad (2)$$

Elasticity of demand is given by the relation:

$$E_{CA} = \frac{\frac{dCA}{CA}}{\frac{dp}{p}} = \frac{dCA}{dp} : \frac{CA}{p} = \frac{dCA}{dp} \cdot \frac{p}{CA}$$

Elasticity of supply is given by the relation:

$$E_{OA} = \frac{\frac{dOA}{OA}}{\frac{dp}{p}} = \frac{dOA}{dp} : \frac{OA}{p} = \frac{dOA}{dp} \cdot \frac{p}{OA}$$

We replace the elasticity's in equation (2) and obtain:

$$\frac{dp}{dt} = \frac{E_{CA}}{E_{OA} - E_{CA}}$$

If $E_{CA}=0$, prices and taxes remain unchanged because $\frac{dp}{dt} = 0$, and consumers bear the whole loss from tax.

If $E_{OA}=0$ results $\frac{dp}{dt} = -1$, respectively $\frac{dp}{dt} \langle 0$, so the loss is transferred to the producer and prices and taxes are reduced.

Conclusion

Effects caused by the tax system on goods market are dependent on elasticity of demand and offer of goods. If the elasticity coefficients of demand or offer are smaller, the loss suffered by the consumer and producer are higher.

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