

## Empirical evidence on the Ricardian equivalence in Romania

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**Abstract.** *The Ricardian equivalence has become one of the main research concern for many contemporary economists, in the actual context – by stepping into the second phase of a structural economic crisis. This paper is showing through an econometric model what happened in Romania between 2004 and 2012 with the households' consumption, by following the Ricardian equivalence hypothesis.*

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**JEL Classification:** E03, E21, E62.

## 1. Research background

The Ricardian equivalence is an economic theory, which originates from David Ricardo's *On the Principles of Political Economy and Taxation* (1877). He asked in which way is better to finance the war: through new government debts, or through a temporary tax. His conclusion was that there is no difference between the two ways, because "debt is nothing else than postponed taxes". Then, after almost 100 years, Robert Barro, starting from the same dilemma described by Ricardo, asks if *the government bonds are net wealth?*

After two years, Buchanan, asked himself the same thing, but in a different manner: *is the public debt equivalent to taxation?* By observing the similarities between the hypothesis of Barro's paper and Ricardo's descriptive work, he suggests that this model should be called "Ricardian equivalence".

In other words, as Bill Mitchell from Charles Darwin University describes, if every person appreciates that the Government will spend 500\$ per capita and will collect the same amount from the population in order to cover the new debt, then, each person will cut from his consumption the amount of 500\$, generating a negative effect for the economy.

Ricardian equivalence is a different approach from the classical one, regarding the fiscal policies. Therefore, a stimulation of the aggregate demand through a new debt or through a raise in taxes would not be a successful economic policy, being viable only on a short-run, but instead, having huge negative effects over long-run (Bodislav et al., 2015).

## 2. Literature review

In the modern economic literature, the fact that it is not relevant the way in which a government finances its debts, was also stated by other authors, such as Patinkin (1965), Bayley (1971) or Kochin (1974). At microeconomic scale, the most similar theoretical model, which can be compared with the Ricardian equivalence is Modigliani – Miller (1958), which assumes that in a market with perfect competition conditions and without subsidies, the companies are indifferent to how they are financed – own capitals or loans. Bernheim (1987) and Seater (1993) demonstrated the ineffectiveness of the fiscal policies based on a stimulus over AD curve through governmental debts or through raising taxes, but Elmendorf and Mankiw (1999) stated that the result of the above mentioned authors were not relevant.

Ricciuti (2001) highlights that certain conditions underlying econometric models that studied the Barro-Ricardo equivalence are much too restrictive, being for us very difficult to understand if there is, or not, an approximation of the reality. The main regression models which might be considered as being the most influential ones in testing the Ricardian equivalence (RE) are: Feldstein (1982), Kormendi (1983), Seater and Mariano (1985) and Modigliani et al. (1985).

Recent authors who debated this model were Bittante (2013) and Nickel and Vansteenkiste (2008). The debate remains still open while there is no consensus between the two parties:

the ones who have confirmed the existence of the RE and the ones who vehemently contested the model.

The general conditions of RE model, as Barro (1974) describes them, are the following:

- a) Consumers have finite lives and they do care about the welfare of the next generation, having an altruistic attitude regarding their descendants.
- b) Nevertheless, they are acting as having infinite lives and they assume that the government can not postpone forever the repayment of the debt (bonds issued) and the amount that has to be repaid and its interest are equal with the bond's principal and the taxes charged, in order to pay the interest.
- c) The decrease of government savings is compensated by the increase of private savings.

By following the above conditions, according to Barro, government bonds are not net wealth. This, actually, defies Keynes' economy, by violating a classic principle of economics – this science is based on rarity and trade-offs – there is no such thing as a free dinner – in order to gain something, it is always needed to give up another.

### 3. Econometric evidences of the Ricardian equivalence

Main regression models, which were considered the most influential for testing RE hypothesis are the ones of Feldstein (1982), Kormendi (1983), Seater and Mariano (1985) and Modigliani et al. (1985).

The consumption function, estimated through Feldstein's multiple regression (1982) was:

$$C_t = a_0 + a_1 Y_t + a_2 W_t + a_3 SSW_t + a_4 G_t + a_5 T_t + a_6 TR_t + a_7 D_t + e_t$$

Where:

Y = disposable income;

W = net wealth measured at the beginning of the year;

SSW = future value of the social benefits;

G = government spending;

T = taxes income;

TR = transfers towards individuals;

D = net general debt.

Because these coefficients (from the above equation), are not corresponding to Feldstein's expectations, he rejects the idea of Ricardian equivalence for 1930 – 1977 period, for the economy of United States of America. Nevertheless, confidence intervals used by him are not regular, so his results should be reviewed with skepticism (Ricciuti, 2001).

Modigliani et al. (1985) have tested ER for Italy, through the following function:

$$Cp_t = a_0 + a_1 Yd_t + a_2 W_t + a_4 DEF_t + a_4 D_t + e_t$$

Where:

Cp = private consumption;

Yd = disposable income;

W = wealth, including government debt;

DEF = government deficit (inflation adjusted);

D = central bank's net debt and foreign holdings.

The results of Modigliani et al. (1985) have highlighted the fact that an increase of 4 percents of public deficit over GNP, causes a decrease of national saving of 3.4 percents (Ricciuti, 2001).

#### 4. Econometric evidence of the ER – Romania's case

Having in mind the fact that Romania's economy is still young, the available data are not easy to gather; also, since 1990, until this year, the calculation methodology for several indicators had changed a couple of times thus it has been chosen to test the way in which householdings consumption reacts at a change in government spending. We used for this two independent variables and a dummy variable, which has the role of filtering the years with deficit (according to ER, dilemma occurs in the moment in which a deficit do exists).

The data sources were gathered from three different sources, some of them suffering a second-order transformation. These sources were:

- **Eurostat** – primary data used in Eurostat's Household saving rate report ([http://epp.eurostat.ec.europa.eu/cache/ITY\\_PUBLIC/2-29042013-AP/EN/2-29042013-AP-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/2-29042013-AP/EN/2-29042013-AP-EN.PDF)). Used data series were GDI (gross disposable income) and GS (gross savings). Data were expressed in million lei.
- **The World Bank DataBank** – data series available at <http://databank.worldbank.org/data/home.aspx>- were downloaded two time series: G –Romania Consolidated Current Expenditure and Def – Romania Central Government Surplus/Deficit. The same measurement unit was used
- **National Institute of Statistics** – CPI (consumer price index) expressed in percents.

For the data gathered from the first two sources, the frequency was quarterly and for CPI was monthly. In order to have the same frequency, we had to transform this series from quarterly to monthly. Total number of observations is 32, the analyzed period starting with the first quarter of 2006 and ending with the 3rd quarter of 2012 (2004Q4 – 2012Q3).

Secondary data, processed and used in building the optimal regression model, were:

- **HHC** (households consumption), extracted as a difference GDI and GS (gross disposable income and gross savings);
- Data series which were inflation adjusted were **HHC**, **G**, **VD**, having as a starting point the year 2000;
- There were created three new chronological series, in order to stationarize the data, which are the growth rates for the three variable: **VHHC**, **VG**, **VDD** (expressed in percentages)

##### A. Data processing and setting the optimal regression model:

It has been used a linear regression, containing a dummy variable, and the chosen model was, as follows:

$$VHHC_t = a_0 + a_1 * VG_t + a_2 * VDD_t + a_3 * DDum_t + \varepsilon_t, t=2004q4 - 2012q3,$$

Where:

$VHHC_t$  is households consumption growth rate;

$VG_t$  is government spending growth rate;

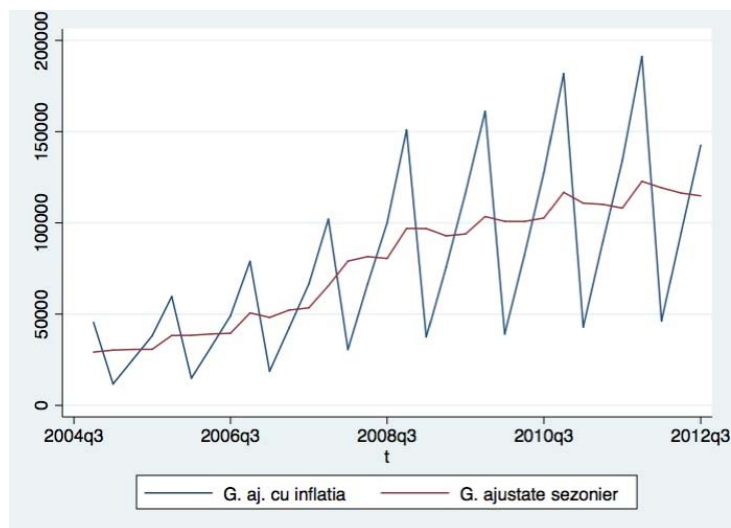
$VDD_t$  is households disposable income growth rate;

$DDum_t$  is a Dummy variable which sets the time windows containing a deficit.

$DDum$  consists in a dummy variable generated in STATA, which equals 1 when it detects a period with deficit and equals 0 when there is no deficit. In order to avoid the multicollinearity phenomena, this variable will be automatically excluded from the regression equation, by STATA software.

In order to have a more clear idea about the evolution of government expenditure (GE) and of what happened in Romania since 2004, until the moment of speaking, the below chart expresses the evolution of GE, seasonally adjusted.

**Figure 1.** The evolution of government expenditure, seasonally adjusted (2004q4 – 2012q3)



**Source:** author (after World Bank Data).

It can be seen that the Romanian authorities are usually spending more in the last quarter of every year (q4). This fact is a normal one, because the public authorities, both central and local, use to spend at the end of the year all the incomes which are left unspent during the year, in order not to return the money to the state treasury.

The following table shows the STATA output of the regression model:

**Table 1.** Regression estimation

```
. regress VHHC VG VVD if DDum==1
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Source	SS	df	MS	Number of obs =	30
Model	.928418916	2	.464209458	F( 2, 27) =	37.48
Residual	.334406005	27	.012385408	Prob > F =	0.0000
				R-squared =	0.7352
				Adj R-squared =	0.7156
Total	1.26282492	29	.043545687	Root MSE =	.11129

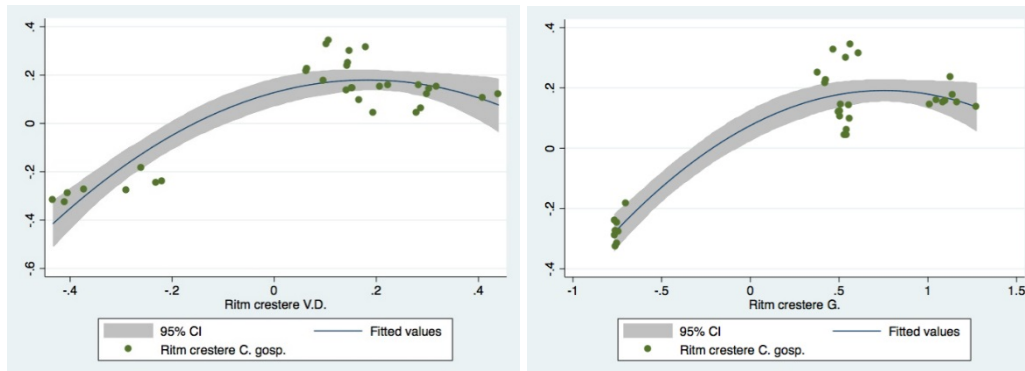
  

VHHC	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
VG	.1715031	.0572899	2.99	0.006	.0539539 .2890523
VVD	.2684648	.155121	1.73	0.095	-.0498172 .5867468
_cons	-.0110564	.0242833	-0.46	0.653	-.0608817 .0387688

**Source:** the author.

According to the statistics tests, we weren't able to detect heteroskedasticity or errors' autocorrelation, so the model respects all the hypothesis of the classical model.

The cloud of points, along with the regression line and the confidence interval (95%) are expressed in the following figure:

**Figure 2.** The relationship between VHHC - VVD and VHHC - VG

**Source:** the author.

## 5. Interpretations and conclusions

According to the estimations found in the table with the regression output, the adjusted value equation is as follows:

$$VHHC = -0.11 + 0,172 * VG + 0,268 * VVD$$

The *t* test value for the constant, shows the fact that it is not relevant for the whole model ( $P > t = 0.6531$ , being outside the 90% confidence interval). As respects the growth rate of government expenditures (VG) and the growth rate of the households disposable income (VVD), the significance of the two variable is relevant for a 90% confidence interval.

Between the two variable there is a positive linear relation. Households consumption change is explained by the variation of the governmental spending and the variation of the disposable income in a proportion of 73.5% ( $R\text{-squared} = 0.735$ ). This result offers a plus of credibility to the predictive capacity of the model. If the growth rate of the governmental spending (VG) is changing with one percent point and the others variables are constant, than the growth rate of households consumption will increase with 1/6 of a percent, meaning 0.172%. The increase with one unit (a percent) of the disposable income will determine a change of 0.268 percent of the growth rate of the households consumption, *caeteris paribus*.

The results of this model are invalidating the existence of the Ricardian equivalence in Romania, for the analyzed period (2004q4 – 2012q3). Thereby, the growth rate of the governmental spendings are able to influence the growth rate of the households consumption. This result is sustaining Keynes' recovery proposal: in order to increase the consumption, it is needed to increase the governmental spending. It seems like an exogenous shock in the Romanian economy, as it was the crisis from the previous years, which did not change the nature of the problem, because the households' consumption, inflation and seasonally adjusted, dropped in the third quarter of 2012, only with 3% compared with the fourth quarter of the year 2008 (being as a start point in the crisis' evolution) A possible explanation for this cause might be the long time during which the households have adapted to this decrease of the disposable income.

Another explanation for which ER does not applies to the Romanian economy can be found in logical flaws of the model:

- the markets are perfect only in theory;
- the destination of the public funds is always changing;
- there are changes in the structure of the patrimony from a generation to another and not all the families are transferring their wealth from a generation to another (donations, conflicts etc.)

Gustave le Bon (1895), in one of his works about mass psychology, explains the way in which taxes are decided by the policy-makers and accepted by the general public. For the ones who are deciding, it is now needed always to choose the fairest tax from the theoretical point of view. It can be chosen an unfair tax, if it is the best masked, or the least burdensome at surface. An example is offered by the same author, using two types of taxes:

Tax collected daily based on consumer products and the proportional tax on revenue, „payable through a single payment”. The population will be much more receptive to the first type of tax, while the second type of tax will generate unanimous protests, even if the last tax is several times lower than the first one. The way the taxes are perceived could be one of the causes for which the test Barro-Ricardo equivalence is not conformed for Romania. Thus, the population will not realize the real increase of the taxes in future and so the predisposition for saving will be affected. The population will not choose to save the necessary amounts which have the role to anticipate a future increase of the taxes. This future increase of the taxes will have the role to finance repayment of government debt tranches.

In interpreting the model various factors should be also taken into consideration, like model imperfection due to the limited access to the data available for Romania, or the limited number of independent variables, which can influence the generation of a better overall picture.

The debate regarding Barro-Ricardo equivalence remains an open one in the scientific communities, while the papers demonstrating that exists are compensated by those disqualifying it as a viable economic theory.

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