ASSESSING THE OPTIMAL TAXATION OF THE CAPITAL INCOME: A CASE OF CORPORATE BOND MARKET

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Abstract. Often taxation is considered as a restriction to any market development, lessening the willingness to effective actions or raising the opportunity costs. Therefore lots of investigations are dedicated to identification of optimal measures in order to satisfy the fiscal needs still encouraging market performance. The purpose of this paper is to identify the impact of capital income taxation on corporate bond market development by using the Laffer curve and tax burden measurements and methods. While theoretical investigations proposed an application of tax exempt to corporate bond transactions, empirical results stated no significant arguments for corporate bond market stagnation to taxation.

Key words: optimal tax rate, corporate bond, tax burden, Laffer curve.

1. Introduction

The taxation of capital revenues, which include corporate bond interest income, is examined by many theories, whose authors chose the different sections of perception. While ones optimize the state revenue collected by picking different tax rates, others add a measure of time for measuring the taxpayer welfare. There is also a view of capital taxation differences in open and closed economies as well as geographically. However, earliest debates are noticed on labor, capital and consumption taxation allocation.

Deducting the examination of capital income taxation for the context of supply and demand, the formation of it can be interpreted by different tax entities: when capital income is earned and tax paid by natural and legal persons, as in the case of corporate bonds, where the transaction yield (the difference between the acquisition price and the amount received on its maturity date by zero coupon bonds or coupon rate) is taxable.

Often taxation is considered as a restriction to any market development, lessening the willingness to effective actions or raising the opportunity costs. Therefore lots of investigations are dedicated to identification of optimal measures in order to satisfy the fiscal needs still encouraging market performance.

The purpose of this paper is to identify the impact of capital income taxation on corporate bond market development by analyzing natural and legal person optimal tax rates and tax burden. Corporate bond yield and the tax revenues generated by it are defined as the objects of the analysis.

The paper contains of five sections. By the first section getting introduced to the topic and revealing its motivation, one can be acknowledged with the core capital taxation literature analysis in the second section of this paper. Third section contributes to identification of optimal tax rate on corporate bond yield in Lithuania and United States while the fourth section measures the tax burden on natural and legal persons participating in corporate bond transactions in both countries. The paper concludes with the main remarks of the impact of capital income taxation on corporate bond market development.

2. Literature review

The evolution of scientific literature is corresponding to optimal zero rate capital taxation mention, which is supportive in the stable state model (when the balance of population and production development dominates, resources are effectively allocated and rationally used) (Ramsey, 1927; Atkinson ir Stiglitz 1976; Judd, 1985; Chamley, 1986; Mankiw, 2000; Golosov et al, 2003; Fahri, 2010; Piketty and Saez, 2012; Gross, 2014). Fundamental theories of capital taxation are considered to be:

1. Ramsey (1927) who identified that the optimal taxable object must be taxed in inverse proportion to its elasticity. This model was applied to the taxation of goods and raw materials, but now often is used for the capital market interpretation. If the corporate bond instrument store goods in the capital market, then, according to Ramsey, the interest income of this instrument should be taxed inversely proportionally to its demand. As in US and Lithuanian examples, the conclusion of a lower capital tax rate (or total relief) in the US comparing to Lithuania according to market activity data is made[11]. On the other hand, such a differentiation may be contrary to the main taxing principles of social justice and solidarity.

2. Diamond and Mirrlees (1971) examined optimality of the taxation in the context of acquisition, purchase and earning of the tax object. The authors argued that all taxpayers are heterogeneous, which means they have different opportunities to earn taxable income. State tax differentiation in a way that would be more taxing those who can make money, they will lose the desire to work and earn. It was presented in a standardized and uniform taxation concept as an opposition to the Ramsey proposed differentiation. In the relation with this paper object it acquires a double dimension:
   2.1. Uniform taxation of labor and capital;
   2.2. Identical taxation of corporate bond counterparties (natural and legal persons).

3. The theory of Atkinson and Stiglitz (1976) investigated collaboration of labor and capital income taxation, searching the optimal points of contact and the possibility of substitution, when the labor taxation concession gaps are being filled with higher capital income tax rate or vice versa. The authors argued that consumer preferences for current and future consumption in respect with the leisure are quite weak, therefore the capital taxation does not eliminate distortions caused by taxable labor income (evaluating the existing and future period), and determines its own. As a result, the capital income taxation (the differential taxation of consumption) is more expensive and therefore less optimal than progressive taxation of labor income. Atkinson and Stiglitz (1976) theory partly denies Ramsey rule for differential taxation of consumption, but promotes a differentiated tax for the labor income of the population, and thus does not support Diamond and Mirrlees unified taxation insights. Atkinson and Stiglitz (1976) theory propose the interest of corporate bonds and other such transactions to be exempted from tax and thus potentially influencing the greater development of a corporate bond market by reinvestments of unpaid taxes.

4. Chamley (1986) and Judd (1985) have shown that the optimal tax system to cover the cost of government is such a system where the long-term capital is not taxable and the collection of revenues is based on labor income tax. Thus Ramsey (1927) and Atkinson and Stiglitz (1976) theories were maintained for differential taxation of capital and labor, but there were no standardization with Diamond and Mirrlees (1971). According to this theory, the corporate bond transactions are subject to small, probably differentiate taxes which implicit measure (average) in the long-run would be close to zero.

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[11] Since 2010 US corporate bond market is nominally growing every year at 1090-1410 billion USD in new corporate bond issues (SIFMA 2014). Whereas Lithuanian corporate bond market at the same time nominally grows at 190 to 400 million EUR in new corporate bond issues (ECB, 2014).

It should be noted that the scientific literature of the twentieth century was dominated not only by the capital and labor taxation allocations, however, offering several kinds of tax rates-systems: flat (Ramsey, 1927; Diamond and Mirrlees, 1971) and progressive (Atkinson and Stiglitz, 1976) tax rates.

By following twenty-first century investigations of economists as well as their distribution in favor of labor or capital taxation was closely related to the primer theories (See Fig. 1).
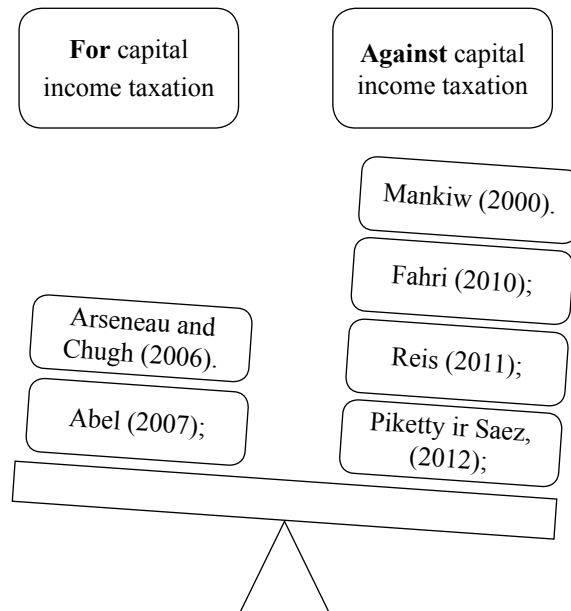

Figure 1. The allocation of capital taxation theories in the 21st century

Source: compiled by authors

Capital taxation was opposed by Reis (2011). Using Ramsey theory, author called for a different labor and capital taxation and only not being able to distinguish between capital and labor entrepreneurs return (stating that even the company's profit is determined by the CEO labor and capital return), both quantities are subject to corporate tax, and brings the income to the state budget. On the other hand, more efficient in the meaning of greater benefits to the state budget, taxes are from labor income. Therefore, equal labor and capital income taxation will stimulate the economy deviations (Reis, 2011). Such an argument would be contrary to the Diamond and Mirrlees approach. The author's opinion is close to many countries (e.g. United States, the Netherlands, Poland, the Czech Republic, the United Kingdom, Latvia, Sweden and others) applicable tax systems in practice.

As seen in the spending saving theory for the taxation of capital and labor from the expenditure side, Mankiw (2000) also adjusts the Ramsey model. In order to net income maximization, most spenders will ignore the minority of savers (such an assumption is made in the model), and the optimal capital tax rate will be equal to zero. It is a case of the capital supply being very elastic and when taxing capital income encourages race to the bottom, triggering lower the actual labor remuneration. This effect is so great that the capital tax is not desired even by those who do not have any capital income (Mankiw, 2000).

Besides the relation with the labor taxation and the tax rate itself, capital tax collection was examined as a part of the state budget revenues. Capital income tax cyclicality was monitored by Fahri (2010), who argued that after a negative increment in revenues from capital taxes, the growth trend begins. In this way, the long-run capital tax rate is close to zero, this being supported by Gross (2014). These authors developed the theory of Atkinson and Stiglitz, adapting it to the closed and open economy models, thereby acknowledging the findings of predecessors.

On the other hand, the optimal capital taxation was not always equal to zero. This was also the conclusion of the labor market theorists, looking for the balance of the labor market (employed and unemployed employees and their welfare maximization in the equilibrium of labor supply and demand). They seek capital taxation (assuming the tax rate to be not equal to zero) (Arseneau and Chugh, 2006) or exempt labor income from taxation (tax rate equal to zero), looking for other sources of state budget revenues (e.g. income from capital taxation), allowing certain deductions (reducing tax rates) and to say so do not distort the market (Abel, 2007). It is the fundamental contradiction between those and Atkinson and Stiglitz theory which argues that capital taxation does not result the prevention of labor market distortions.

The vast majority of authors standing against capital taxation, rare market economy countries do not apply the tax to capital (alike labor) (e.g.: United Arab Emirates, Qatar, Oman, the Cayman Islands, etc.). Practice gap is interpreted by several arguments:

- First of all, people do not live in stable states (Mankiw, 2000), that are mentioned in the theories of Ramsey (1927), Atkinson ir Stiglitz (1976), Judd (1985), Chamley (1986).
- Another reason becomes a period and individual preferences (Mankiw, 2000; Golosov et al, 2003; Piketty and Saez, 2012). In the short run residents consume more, therefore tolerate capital taxation despite its serious consequences in the long run (Mankiw, 2000). Selecting present and future consumption by the given random information, individuals are faced with consumption anomalies, and these distortions are caused by positive capital taxes (Golosov et al, 2003). And being able to distribute taxable objects, consumers rather choose lower taxation in the long-run than higher taxation in the short-run, examining inheritance and capital taxation samples (Piketty and Saez, 2012).

One of the theory and practice gap consequences is the international competition for the capital raising and attraction of foreign investments. Devereux and Griffith (2002) proved that the capital tax rates determine the location of businesses as well as investment decisions. Therefore, the supply of tax havens (or countries applying smaller or not applying the capital or labor taxes at all) exists, being generated by the demand created.

According to all theories analyzed, despite their contact to corporate bond market and its development mentioned, an exceptional tax impact on corporate capital structure is a further subject of the investigation. Groppa (2002) and Alworth and Arachi (2001) argue that corporate debt-equity ratios are determined by the tax, giving a higher preference to loan than the equity. Greater tax rates on assets and the income it generates than those on the leveraged capital increases the debentures, as a source of funds for investment activities (Groppa, 2002). Increased property taxation is interpreted by double taxation on companies' profits: corporate income tax for profits and corporate income tax for dividends. Meanwhile, the debentures paid interest (the coupon or redemption spread only) is a subject to the so-called single once applicable rate. On the other hand, Alworth and Arachi (2001) measured the economic effects of tax to debt obligations and provided with more specific findings that significant tax effects were seen on bank loans, slightly lower - on corporate bonds, other companies' obligations were not affected by taxes. Thus, the tax effect on capital or asset class related financial instruments and their balance sheet exposures are primarily determined by the tax diversification, and then by the instrument sensitivity to tax rate. If the instruments are taxed differently, investors choose lower tax position of what was justified by Diamond and Mirrlees theory, but in order to optimize the state revenue collected, a measurement of sensitivity to tax rate (elasticity) applicable to Ramsey theory is introduced.

Liu et al (2007) identified another tax mediated corporate bond market imperfection (distortion) that is yield differences. The authors argued that of the same investment credit rating corporate bond issues may have different yields in order of different taxation depending on issuers' residency or country of emission circulation. It is empirically proven that taxes explains 60% of the AA rated corporate bond yield, 50% - A rated corporate bond yield and 37% - BBB rated corporate bond yield (Liu et al, 2007). It follows that the higher the rating, less risky corporate bonds are and their yields are more explainable by tax differences between different countries or transaction sides. We can also relate corporate bond risk and taxation: less risky corporate bonds being more influenced by the taxation than more risky ones.

Even though the standard optimal taxation theory describes the main purpose of the tax system as the magnification of social welfare function with certain set of restrictions (Mankiw et al, 2009), the optimal capital taxation could be summarized by several different character traits and some theories and assumptions they have been determined by (See Table 5).

Table 1. Optimal capital taxation features in the economy

No.	Feature	Complying with the theory	Assumption or motivation
1.	Efficient capital tax rate is close to zero	Chamley (1986) ir Judd (1985) Fahri (2010), Gross (2014).	Effective tax rate is a ratio of nominal rate and state budget revenues caused by it or a ratio of a tax burden.
2.	Differential taxation of labor and capital, in favor of capital	Atkinson ir Stiglitz (1976)	In case of divergence between labor and capital taxation, lower tax rates, narrower base or more exceptions (exemptions, tax credits or other forms) should be applicable to capital.
3.	The taxation of financial instruments of asset and capital class should be differentiated according to their elasticity for demand	Ramsey (1927), Mankiw (2000), Alworth and Arachi (2001), Gropp (2002), Reis (2011).	Market competition condition with partial insight into corporate capital structure adjustment (adjusting the debt-equity ratio, according to the debt indicators and potential risks).
4.	Unified taxation of corporate bond counterparties (if the owner of the instrument is a natural or legal person)	Diamond and Mirrlees (1971)	Standardization of taxation, without distorting the market for the establishment of new institutes.

Source: compiled by authors

To sum up the given features, it should be noted that there are no conclusions about determining the optimum size of the nominal tax rate (provided by law), and the effective rate analysis is performed in the long run. Hence, all investigated theories do not contradict to the short-run capital taxation. Capital which generates investment opportunities by possibilities to reinvest should be encouraged more than labor force by the differentiation of fiscal policy. The same differentiation is proposed to taxation of several market instruments in the levels of administrative costs of the tax system. However, tax burden for different counterparties regardless their legal status should be equalized. This practice is not widespread - dominated by different businesses and individuals of the same transaction tax experience, in contrast to e.g.: Lithuania or Estonia, where both businesses and individuals are taxed at the same 15 and 21 percent income tax rates, respectively (European, 2014).

In the analysis of taxation of corporate bonds, theoretical considerations to tax exempt or to differentiation by the holder or the risk are concluded by an exhaustive tax administration and market distortions arguments. Corporate bonds varying by accrued interest amounts (zero coupon bonds, coupon bonds and etc.), price (discounted, denominated or at a premium), the date of acquisition and retention by the deadline, differentiated taxation administration of the instrument is complicated. If the cost of tax collection is notable for its revenues being generated, the application of this tax is inexpedient. It is also not intended to distort the behavior of the investor when acquiring, selling or at the redemption of the instrument.

Taking into account the theoretical ideas of capital gains exemption from taxation (as promoting development) and with the assumption that the corporate bond transactions are taking not the highest part of the state budget income, and the behavior of the participants in the transactions is sensitive to taxation (elastic demand), the authors of this paper supports the idea of the interest of corporate bond transactions (and similar capital gains) exemption from any taxation as is defaulted by the state fiscal target, however, preventing stagnation of market instrument development.

In order to assess the validity of the assumptions and a theoretical application, the analysis of the United States and Lithuania cases is introduced. There are given brief overviews of relevant taxation of corporate bond yields in these countries and assessment of its optimality (in terms of effectiveness, See Table 5) is made as well as tax burden is measured.

While the interest gained on US sovereign bonds is tax-free, municipal bonds are taxed at the local level corporate bonds are the subject to federal and state tax rates. Their taxation is differentiated by:

- Taxpayers: a natural or legal;
- The tax payer's country of residence: a resident or non-resident.

In the USA, there are corporate bond interest (the coupon rate or yield at maturity) and capital gains (sale of an instrument on the secondary market) earned by individuals taxed. A progressive personal income tax rates are applicable which vary from 10 percent up to 39.6 percent depending on the marital status. Meanwhile, income from corporate financial transactions is represented in the income (loss) statements and is a subject to corporate income tax rate (applicable to the overall operating profit), which is ranging from 0 to 12 per cent depending on the state, and up to 40 percent of federal tax rate which is applicable to more than 18 million USD profits. Non-resident corporations are taxed at 30 percent rate on interest earned from US corporate bonds (IRS, 2014).

From year 2014 Lithuania has expanded the personal income tax base by adding interest of financial transactions. This expansion includes the interest of corporate bonds. For individuals, the tax rate of 15 percent is applicable with several exceptions of tax exempts in the case of bonds redemption starting no earlier than 366 days from the date of issuance (the longer term - over the years) as well as the sum of € 3,000 of interest earned is not the subject to the taxation. Meanwhile the legal institutes are taxed at 15 percent tax rate on the interest or yields gained in financial activities with other companies bonds (VMI, 2014).

Tax environment in the US and Lithuania differs not only by tariff, but the tax base and the scope or application of tax exemptions. It should be noted that in both the US and Lithuania there exist double taxation evasion cross-border contracts, which are reducing the tax burden on non-residents and attracting foreign investments to the country.

In order to assess if the yield of corporate bond transactions is a subject to the optimal tax rate, the Laffer curve and the tax burden index calculation methods were chosen.

3. The optimal taxation of corporate bonds

While examining the fiscal environment in the context of the state regulation, state budget tax revenues collected from corporate bond and these revenue maximization opportunities is being assessed (Laffer curve). Laffer curve, named after the American economist Arthur Betz Laffer, describes the relationship between tax rates and state budget tax revenue collected. Curve evaluates the two-way effect on taxation: arithmetic and economic. Arithmetic effect occurs by increasing the rate and getting higher tax revenues. Meanwhile, the economic effect notes reluctance to pay higher taxes, alternative costs, due to the decreasing tax revenues at excessively high rates (Laffer, 2004). Although the Laffer curve author notes that the curve does not indicate the exact tax rates and their relations to tax revenues collected, it is widely used in personal income (Heijman and Ophem, 2005; Laroque, 2005; Trabandt and Uhlig, 2009; Laužikas et. al. 20215), corporate income (Brill and Hassett, 2007; Edwards, 2007; Loretz, 2008; Girūnas, Mackevičius 2014;), consumption (Mattews, 2003; Emran and Stiglitz, 2005; Carbonnier, 2005; Ginevičius and Tvaronavičienė, 2001) taxation characteristics. The inherent purpose of the Laffer curve is to measure the fiscal effect of personal income tax. However, Loretz (2008) lists the arguments of application of the method to capital taxation: the corporate income tax rate creates an international competitiveness, when the rate is an incentive for the legal person to migrate between countries, as well as lower capital than labor income taxation encouraging persons to start up the business at lower taxes than working as individuals. Different kind of migration initiated by suboptimal tax rate was described by Heijman and Ophem (2005), who motivated Laffer curve calculation by legal and illegal activity (otherwise the shadow economy) proportions difference: depending on the size of tax rate the business migrate between legal activities and tax return or tax evasion.

According to Matthews (2003), the prevalence of the use of Laffer curve was formed by the formation of fiscal policy guidelines. It was also noted by Edwards (2007), who argued that the tax rate reduction is compensated by broadening the tax base in order to meet the state budget plan targets of tax revenue collected. Trabandt and

Uhlig (2009) explained the implementation of the budget tax revenue goals by reducing the tax rate and the each other tax revenue compensations, which affects one in tax revenue decreasing as incentive effects of the other growth. In this way, the reduction of personal or corporate income tax rate decreases direct tax revenues of the state budget, however, increases the consumption tax revenues collected. On the other hand, such refinancing of the state budget that has arisen due to one of the tax rate reduction was explained only by increase of another tax rate by Emran and Stiglitz (2005).

Brill and Hassett (2007) by observing the changes in optimal corporate income tax rate state that the Laffer curve is not a static data measurement, adapting to changes in the national economies.

It is noted that most of the authors (Mattews, 2003; Heijman and Ophem, 2005; Emran and Stiglitz, 2005; Edwards, 2007; Loretz, 2008) were using the Laffer curve calculations in order to identify the tax rate reduction opportunities. Proponents of higher tax rates, as Laroque (2005) and Carbonnier (2005), argued that maximization of budget tax revenues will ensure the social welfare due to the increase in social benefits (Laroque, 2005) or explained the tax rate increase in the asymmetry effect of the supply that considers fixed costs to be more responsive to increased than reduced tax rate (Carbonnier, 2005).

According to the instrument motivation being listed by the other authors and objective of the paper of the optimal tax rate to assess, the existing available data was used in order to model the Laffer curve for the US and Lithuania cases. As the corporate bond yields are subject either to personal or corporate income tax base, the model does not confine itself to including just the personal income tax rate by adding the corporate income tax rate as well.

Simulated tax revenues of the corporate bond yield as a part of the countries' GDP were selected as the dependent variable of the model. Laffer curve is mapping a period of 2000-2013.

In the absence of reliable statistics that brings a classification which differentiates tax revenues generated by corporate bond transactions, Laffer curve calculation was carried out with the assumption that in one case all the tax revenues are generated by natural persons only (See Figure 2 for the US case or Figure 3 for case of Lithuania), otherwise - legal (See Figure 4 for the US case or Figure 5 for the case of Lithuanian). Due to the assumptions made curves would be named as hypothetical. The analysis was simplified by excluding the evaluation of non-taxable income amounts. It was performed by using the second degree polynomial regression equations. Reliability of conclusions was checked by Student and Fisher (t, F) statistics as well as p-value (applicable for the linear transformation of variables and parameters of the linear relationship (Quinn and Keough 2002; Gujarati and Porter, 2009)).
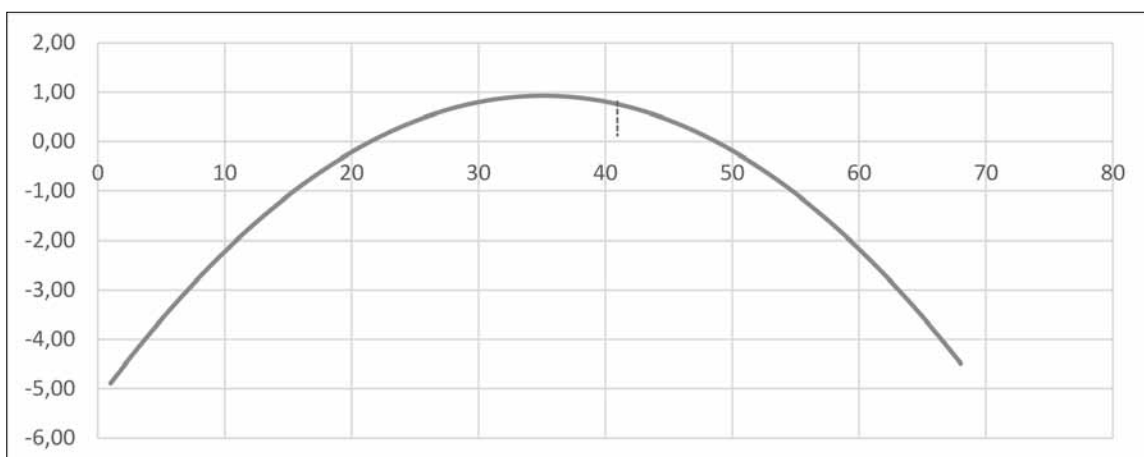

Figure 2. **Hypothetical Laffer curve for corporate bond tax revenue collected and personal income tax rate in the USA, in percent**

Source: compiled by authors, based on authors' calculations

As can be seen from Fig. 2, the formed Laffer curve offers an optimal 35 percent personal income tax rate which should be applicable to US natural persons who receive interest from corporate bonds. Currently there is a progressive tax rate in force which is estimated as less efficient and equal to 26.5 percent. Almost 9 percentage point increase in the rate applicable to the instrument should not adversely affect the tax revenue collected by the state. Notably lower than 21 percent rate and higher than 49 percent rate causes negative state budget revenues in GDP. This impact could be interpreted as the possible economic effect of the rate when a higher rate reduces the corporate bond market capitalization, and the lower rate is of loss-making for state by administrative costs. The elastic dependency of the Laffer curve and the economic cycle should be noted. It was one of the factors of corporate bond transactions interest - taxable base – to form. Optimal tax rate estimate is not confirmed by F and t statistics ($F_{computed} < F_{k, n-k-1}$, $2.29 < 3.98$; $|t_{computed}| < t_{n-k-1}$, i.e., $|0.38| < 2.20$ and $|-0.31| < 2.20$; $p > 0.05$, i.e., $0.71 > 0.05$ and $0.76 > 0.05$), and the coefficient of determination (R^2) explains just 30 per cent of tax revenue to GDP ratio average diffusion caused by changes in the tax rate.
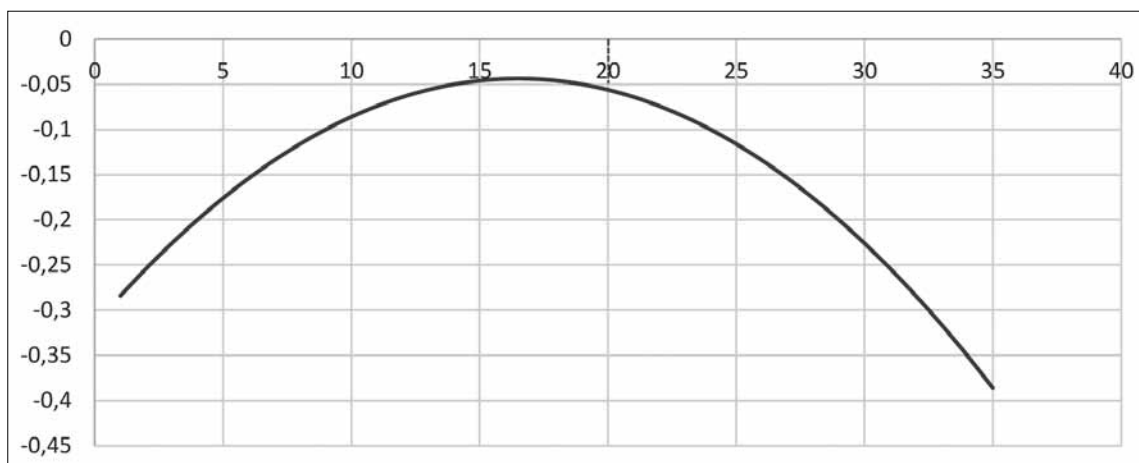

Figure 3. **Hypothetical Laffer curve for corporate bond tax revenue collected and personal income tax rate in Lithuania, in percent**

Source: compiled by authors, based on authors' calculations

Figure 3 shows the Lithuanian case, where the Laffer curve proposes an optimal tax rate of 16-17 percent, which generates a uniform maximum of state tax revenue of corporate bond interest from individual counterparties collected. Personal income tax rate is currently 15 percent in the country. Presumably 1-2 percentage points increase in tax rate would increase the state tax revenue collected without reducing the current market activity (at ceteris paribus). On the other hand, the Lithuanian case Laffer curve shows the negative relationship between corporate bond interest rate and the tax revenue collected that could be caused by administration of tax expenses extension to the contribution to the budget made or mismatches in interest income, generated by economic transactions, payouts and fiscal policy upturn and downturn periods, or by other latent factors. Unlike the case of the USA, this model is reliable, conclusions being confirmed by F and t statistics ($F_{computed} > F_{k, n-k-1}$, $7.01 > 3.98$; $|t_{computed}| > t_{n-k-1}$, i.e., $|3.65| > 2.20$ and $|-3.70| > 2.20$, $p < 0.05$, i.e., $0.004 < 0.05$). The coefficient of determination (R^2) is acknowledged around 50 percent of tax revenue to GDP ratio average diffusion.

While examining the state budget tax revenues from business interest of the corporate bond transactions, the optimization of the tax rate in modified curve does not evoke the inherent Laffer curve shape.
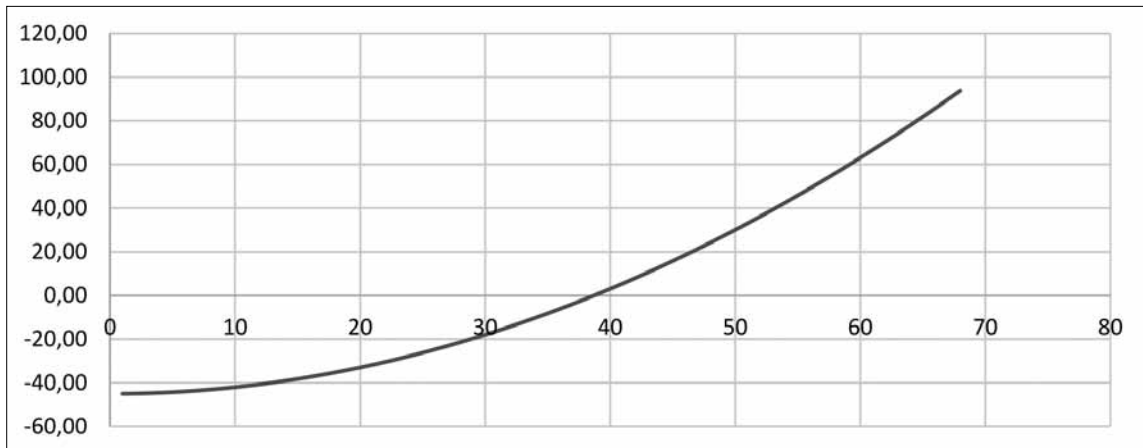
Figure 4. **Hypothetical Laffer curve for corporate bond tax revenue
collected and corporate income tax rate in the USA, in percent**

Source: compiled by authors, based on authors' calculations

As can be seen from Fig. 4, the US corporate income tax from interest earned from the corporate bond transactions acquires a partial positive slope parabolic form, i.e., when increasing rate, revenue is growing. On the other hand, the positive part of the tax revenue to GDP ratio is only beyond the 39 percent of the rate. Such pattern of cases deviations could be interpreted by the dynamic model of the dependent variable and understated tax-exempt basis, when the tax base is determined by the corresponding period of the economic conditions or by the mismatches of transactions maturity within the state fiscal policy (by changing tax rates).

Variable dependency model is statistically significant that being confirmed by the conclusions of the F and t statistics ($F_{computed} > F_{k, n-k-1}$, $14.99 > 4.74$; $|t_{computed}| > t_{n-k-1}$, i.e., $|3.87| > 2.18$, $p < 0.05$, i.e., $0.002 < 0.05$). The coefficient of determination (R^2) is acknowledged for 56 percent of average diffusion of tax revenue to GDP ratio. Therefore the coefficient of independent variable could be interpreted like 1 percentage point increase in the tax rate of 0.03 percent increases corporate bond transactions generated tax revenue share of GDP.
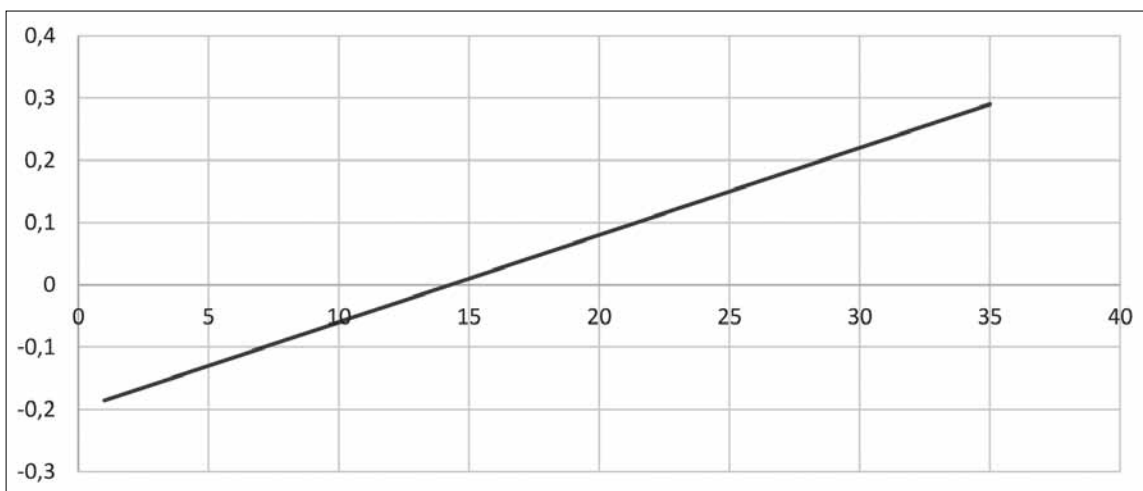

Figure 5. **Hypothetical Laffer curve for corporate bond tax revenue collected
and corporate income tax rate in Lithuania, in percent**

Source: compiled by authors, based on authors' calculations

Figure 5 shows the Lithuanian case, where the interest generated by the corporate bond transactions, the tax rate for legal persons and the budget revenue collected in the GDP gain linear dependence. When tax rate increases, the revenue is growing. On the other hand, the positive part of the revenue to GDP ratio is only 14 percent of

the rate beyond. A similar explanation of latent variables and their values as in the model of the United States is searchable.

The variables of this linear dependence model are statistically significant, being confirmed by the conclusions of the F and t statistics ($F_{computed} > F_{k, n-k-1}$, 20.15 > 4.74; $|t_{computed}| > t_{n-k-1}$, i.e., $|4.49| > 2.18$, p < 0.05, i.e., 0.001 < 0.05). The coefficient of determination is acknowledged as 60 percent of average diffusion of tax revenue to GDP ratio. Therefore the coefficient of independent variable could be interpreted like 1 percentage point increase in the rate of 0.014 percent increases corporate bond transactions generated tax revenue share of GDP.

To sum up the Laffer curves presupposed conclusions to be found in the differences of scales when the changes of PIT rate which is applicable to corporate bond transactions do not exceed any of the state budget income per cent, while a similar corporate tax revenue to the budget creates a much higher share of GDP (e.g. the US case). Explanation is found in the tax rate, being higher for the corporate than individual income in the USA. Comparing different counterparties of the corporate bond transactions, individuals are assessable to be more sensitive to tax rate changes than legal persons (as one can see from the slopes of the curves), concluding to the fare current corporate bond transaction tax base differentiation.

Another distinction in the analyzed cases became evident when the Laffer curve proposed a lower optimal tax rate for corporate bond yield in Lithuania than in the USA. Compared to existing legally enshrined tax rates and those proposed by Laffer curve, Lithuania is considered to be closer to the optimal rate (current 15 per cent, proposed 16-17 per cent rate), while the USA has a rate enhancement potential (~ 9 per cent above) without the fiscal side effects. Comparing the different parameters of the model independent variables and their economic interpretations, conclusions are made, that the lower rate changes result in smaller changes in the collection of the tax revenue. It should be noted that the Laffer curve is more appropriate to describe the corporate bond market in Lithuania than in the US (according to R^2 measure).

However, the weaknesses of the Laffer curve method applicability for separate transactions, type of budget income are the absence of equations and models (there is only one statistically significant equation of PIT rate in Lithuania) and the complexity of interpretations of the model for non-full explanation of dependent variable (negative scale deviations, latent factors).

4. Measuring the tax burden on corporate bond transactions

In evaluation of low budget tax revenues generated by corporate bond market, the optimal tax rates had been set. Further investigations for examination of the tax burden indicators, often regarded as a measure of growth (Reed and Rogers, 2005), are being introduced to the adoption of the market development measurements. The tax burden is also analyzed as a measure of effective tax rate. The motivation of the analysis of tax burden to be relevant to corporate bond market development starts and is described by the competition and allocation (Lammersen and Schwager, 2005; Ginevičius and Tvaronavičienė, 2004). A small tax burden attracts new investment into the country or the country increases the competitiveness of the sector in other countries or sectors, that influences the development of the market. In support of the market competitiveness and economic growth as well as placing an emphasis on adaptation to taxation changes and optimization of the tax burden options, Clausing (2007) identified four of the tax burden on capital income indicator assessment dimensions:
● The direct effect of increased tax rate on the tax revenue collected;
● Activity related changes due to the taxable and non-taxable income distribution or the optimization of the tax burden (e.g.: opportunity to change the legal status);
● Corporate activity changes associated with the relocation of activities to tax havens (or country close to them);
● Reduction in business or economic activity with a lower turnover, profit and value-added created (GDP).

The tax burden indicator is based on a small criticism of indicator' covering information which excludes countries specificity (Reed and Rogers, 2005), as well as does not explain the decrease of tax rate and tax revenue

to GDP ratio growth trends (Mooij and Nicodemus, 2008), which is refused by Devereux et al (2004) and Auerbach (2007) stating that the main reason for tax revenue from capital income to GDP to grow is given by the development of financial markets, generating higher tax revenue at a lower tax rate.

In the context of the corporate bond market development the tax burden is examined as proportion of tax revenues generated by corporate bond transactions in the country's GDP. As in the Laffer curve calculation case, calculations carried out with the assumptions that in one case all the tax revenue is being generated only by natural persons, otherwise - legal. The dynamics of the indicators of Lithuanian and the US tax burden for corporate bond transactions for the period of 2000-2013 is presented in Figure 6.
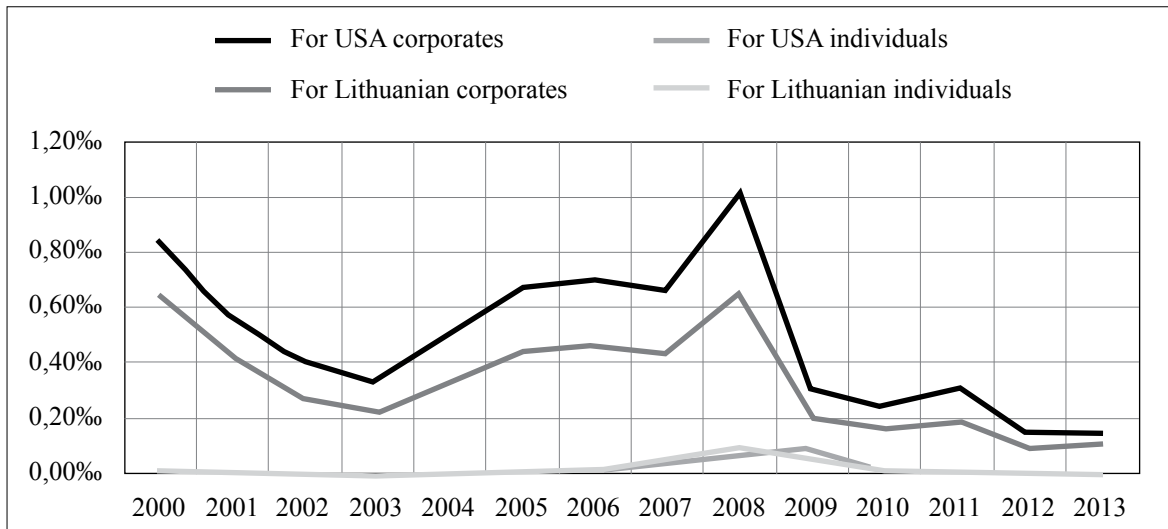

Figure 6. **The tax burden on yield of corporate bond transactions in the USA and Lithuania, in percent, 2000-2013**

Source: compiled by authors, based on authors' calculations

Although only in 2008 in the USA the tax burden on corporate bond transactions exceeded 1 percent of GDP, in other cases examined by both the USA and Lithuania, it was not mean (less than 1 per cent of GDP). It should be noted that a higher tax burden is faced by the US corporate bond holders than Lithuanian ones because of different market size and activity data, as well as by business entities than the US population. Meanwhile in Lithuania, the taxation of transaction interest income is equivalent to both corporate and individual counterparties of the transaction.

Notably the higher tax burden amounts are interpreted not only by growing GDP, but also by the volume of interest generated by transactions. Moreover, there is some uniform state policy on taxing business and population (at constant difference between the US taxation curves, almost not differing in Lithuania). As one can see in Fig. 6 the curves of the dynamics equate the periods of the increase of the tax burden in the US and Lithuania (e.g.: the year 2008) except a one-year Lithuanian business tax burden retardation. Meanwhile, the tax burden decrease (e.g.: 2003, 2010, 2012) is the same in both countries of both legal forms of counterparties. As there were no rates or tax base overlap in both countries observed, it must be concluded on taxable interest income (yield) increase.

Uneven dynamics of the tax burden by fluctuations could be explained by different corporate bond periods (when interest is paid and taxed). Variation can also be influenced by the economic cycle (the largest fluctuations coincide with the periods of economic fluctuations: e.g.: on 2008 in USA). As the interest of corporate bonds is fixed (being stable till the maturity of the transaction under any economic fluctuations, but these fluctuations affect the newly issued corporate bonds and their realization in the market opportunities), this variation is to be construed in quantity of transactions while approving the

conclusion of the tax burden being affected by corporate bond redemption periods.

The assessment of the tax burden on the dimensions proposed by Clausing (2007) shows that both countries' (the USA and Lithuania) tax revenue collected from corporate bonds yields is not at the maximum (what could be and had no adverse effects). In Lithuanian case, when the tax burden arising from transactions is at close to 0 percent to GDP, there is no clear presumption of transfer of company activities or taxable income distribution arising from taxation. In the US case the relocation assumption is more favorable. However, the borrowing in the capital market or capital taxation is not to be considered as the cause. It should be noted that the corporate bond interest or yield is charged on the investor side, and application of it depends on the investor and the issuer of corporate bonds acquired residency and existing tax agreements between countries (bilateral agreements).

Conclusions

To conclude the literature review, optimal capital taxation features are characterized as efficient capital tax rate being close to zero, the differentiated taxation of labor and capital, in favor of capital. Furthermore, the taxation of financial instruments of asset and capital classes should be differentiated according to their elasticity for demand and a unified taxation of corporate bond counterparties (natural or legal person) should dominate.

Taking into account the theoretical ideas of capital gains exemption from taxation (as promoting development) and with the assumption that the corporate bond transactions are taking not the highest part of the state budget income, and the behavior of the participants in the transactions is sensitive to taxation (elastic demand), the authors of this paper supports the idea of the interest of corporate bond transactions (and similar capital gains) exemption from any taxation as is defaulted by the state fiscal target, however, preventing stagnation of market instrument development.

Summing up the results of the assessment of the corporate bond taxation, it should be noted that the existing tax rates are lower than the proposed optimal ones. Although significant fluctuations of the tax burden in the long run, they are not large in size. Consequently, there is no corporate bond market stagnation to taxation (jamming market development) arguments. On the other hand, by assessing the incentive of the tax burden or the optimal tax rate on corporate bond transactions it was noticed that the US tax rates remained unchanged throughout all the period of the analysis while Lithuania (in the case of the individuals) applied it only at the beginning of the year 2014, therefore there is not enough data to sustainable conclusions. All the analysis of corporate bond market inertia apparently was looked for the reasons in other factors (economic cycle, administrative costs, etc.) than in the high tax rate high tax burden created.

References

Abel A.B. (2007). OPTIMAL CAPITAL INCOME TAXATION. *NBER Working Paper*, No. 13354. p. 1-38.

Alworth J. and Arachi G. (2001). The Effect of Taxes on Corporate Financing Decisions: Evidence from a Panel of Italian Firms. *International Tax and Public Finance*, Vol. 8, p. 353–376.

Arseneau D. M. and Chugh S. K. (2006). Ramsey Meets Hosios: The Optimal Capital Tax and Labor Market Efficiency. International Finance Discussion Papers No. 870. p. 1-36.

Atkinson, A.B., Stiglitz, J.E. (1976). The design of tax structure: Direct versus indirect taxation. *Journal of Public Economics*, 6, p. 55-75.

Auerbach A. (2007). Why have corporate tax revenues declined? Another look. *CESifo Economic Studies*, Vol. 53(2), p. 153–171.
Brill A. and Hassett K.A. (2007). Revenue-Maximizing Corporate Income Taxes: The Laffer Curve in OECD Countries. Available at:

http://www.aei.org/wp-content/uploads/2011/10/20070731_Corplaffer7_31_07.pdf

Carbonnier C. (2005). Is Tax Shifting Asymmetric? Evidence from French VAT reforms, 1995-2000. Available at: https://hal.archives-ouvertes.fr/halshs-00590719/document

Chamley C. (1986). Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives. *Econometrica*, 54(3), p. 607-622.

Clausing K. (2007). Corporate tax revenues in OECD countries. *Int Tax Public Finance*, No. 14. p. 115–133

Devereux M.P. and Griffith R. (2002). The impact of corporate taxation on the location of capital: A review. *SWEDISH ECONOMIC POLICY REVIEW* No. 9, p. 79-102.

Devereux, M. P., Griffith, R., Klemm, A. (2004). Why has the UK corporate tax raised so much revenue. *IFS working paper WP04/04*, p. 1-27.

Diamond P.A. and Mirrlees J.A. (1971). Optimal Taxation and Public Production I: Production Efficiency. The american Economic Review., Vol 61(1). p. 8-27.

ECB (2014). Available at: http://www.ecb.europa.eu/home/html/index.en.html

Edwards C. (2007). Corporate Tax Laffer Curve. Available at: http://www.cato.org/sites/cato.org/files/pubs/pdf/tbb_1107_49.pdf?q=laffer-curve

Emran M. S. and Stiglitz J.S. (2005). On selective indirect tax reform in developing countries. Journal of Public Economics, Vol. 89, No. 4. p. 599-623.

European Commission (2014). Taxation and Customs Union. Available at: http://ec.europa.eu/taxation_customs/tedb/taxSearch.html
Farhi E. (2010). Capital Taxation and Ownership when Markets are Incomplete. Journal of Political Economy, Vol.118, no. 5. p. 908-948.

Ginevičius R. and Tvaronavičienė M. (2004). Tax evasion through offshore companies: how important the phenomenon is? Journal of Business Economics and Management. Stralsund: North-German Academy of Informatology (Stralsund). ISSN 1611-1699. 2004, Vol. 5, no. 1, p. 25-30.

Ginevičius R. and Tvaronavičienė M. (2001). Comparative Analysis of Tax Systems in Lithuania, Latvia and Estonia. Studies in Industrial Engineering and Management. No 16. Ten yers of economic transformation. Vol. 3. Societies and institutions in transition Comparative Analysis of Tax Systems in Lithuania, Latvia and Estonia. Lappeenranta. 2001, p. 127-145.

Girūnas, L.; Mackevičius, J. (2014). Evaluation of frauds in public sector, *Entrepreneurship and Sustainability Issues* 1(3): 143-150. DOI: http://dx.doi.org/10.9770/jesi.2014.1.3(3)

Golosov M., Kocherlakota N. and Tsyvinski A. (2003). Optimal Indirect and Capital Taxation. *Review of Economic studies*, no. 70. p. 569-587.

Gropp R.E. (2002). Local Taxes and Capital Structure Choice. *International Tax and Public Finance*, Vol. 9, p. 51-71.

Gross T. (2014). Equilibrium capital taxation in open economies under commitment. *European Economic Review*, Vol. 70. p. 75-87.

Gujarati D.N. and Porter D.C. (2009). Basic Econometrics. Fifth edition. McGeaw-Hill. 210-213 p.

Heijman W. J. M. and Ophem J.A. C. (2005). Willingness to pay tax: The Laffer curve revisited for 12 OECD countries. *Journal of Socio-Economics*, Vol. 34, No. 5. p. 714-723.

IRS (2014). Available at: http://www.irs.gov/

Judd K.L. (1985). Redistributive taxation in a simple perfect foresight model. *Journal of Public Economics*, 28(1), p. 59-83.

Laffer R.A. (2004). The Laffer Curve: Past, Present, and Future. Available at: http://news.heartland.org/sites/all/modules/custom/heartland_migration/files/pdfs/15245.pdf

Lammersen L. and Schwager R. (2005). *The Effective Tax Burden of Companies in European Regions*. Heidelberg: Physica Verlag. 13-18 p.

Laroque G. (2005). Income Maintenance and Labor Force Participation. Econometrica, Vol. 73, No. 2. p. 341-376.

Laužikas, M.; Tindale, H.; Bilota, A.; Bielousovaitė, D. (2015). Contributions of sustainable start-up ecosystem to dynamics of start-up companies: the case of Lithuania, *Entrepreneurship and Sustainability Issues* 3(1): 8-24. DOI: http://dx.doi.org/10.9770/jesi.2015.3.1(1)

Liu S., Shi J., Wang J. and Wu C. (2007). How much of the corporate bond spread is due to personal taxes? *Journal of Financial Economics*, Vol. 85(3), p. 599-636.

Loretz S. (2008). Corporate taxation in the OECD in a wider context. Oxford Review of Economic Policy, Vol. 24 No. 4. p. 639-660.

Mankiw G. (2000). The Savers-Spenders Theory Of Fiscal Policy. American Economic Review, Vol. 90, p. 120-125.

Mankiw G., Weinzierl M. and Yagan D. (2009). Optimal Taxation in Theory and Practice. *Journal of Economic Perspectives* 23(4): p. 147-174.

Matthews K. (2003). VAT Evasion and VAT Avoidance: Is there a European Laffer curve for VAT? International Review of Applied Economics, Vol. 17, No. 1. p. 105-114.

Mooij R.A. and Nicodème G. (2008). Corporate tax policy and incorporation in the EU. Int Tax Public Finance No. 15, p. 478–498

Piketty T. and Saez E. (2012). A Theory of Optimal Capital Taxation. NBER Working paper No. 17989, p. 1-106.

Quinn G.P. and Keough M. J. (2002). *Experimental Design and Data Analysis for Biologists*. New York: Cambridge University Press. 111-154 p.

Ramsey F.P. (1927). A Contribution to the Theory of Taxation. *The Economic Journal*, Vol. 37 (145). p. 47-61.

Reed W.R. and Rogers C.L. (2005). TAX BURDEN AND THE MISMEASUREMENT OF STATE TAX POLICY. Available at: http://www.econ.canterbury.ac.nz/personal_pages/bob_reed/papers/Tax_Variable_Paper.pdf

Reis C. (2011). ENTREPRENEURIAL LABOR AND CAPITAL TAXATION. *Macroeconomic Dynamics*, Vol. 15(03). p. 326-335.

SIFMA (2014). Available at: http://www.sifma.org/

Trabandt M. and Uhlig H. (2009). How Far Are We From The Slippery Slope? The Laffer Curve Revisited. Available at: http://www.nber.org/papers/w15343.pdf

VMI (2014). Available at: http://www.vmi.lt/

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