

## TAX COMPOSITION AND ECONOMIC GROWTH. A PANEL-MODEL APPROACH FOR EASTERN EUROPE

MURA PETRU-OVIDIU

LECTURER PhD, WEST UNIVERSITY OF TIMIȘOARA

e-mail: [petru.mura@e-uvv.ro](mailto:petru.mura@e-uvv.ro)

### **Abstract**

*In this paper, we investigate the impact of tax composition on economic growth, based on a panel-model approach. The dataset includes six East-European countries and covers the period 1995-2012. Specifically, the study explores the relative impact of different components of tax revenue (direct and indirect tax revenue, as percentage of total tax revenue) on economic growth. The paper adds marginally to the empirical literature, showing how the two types of tax revenue influence economic growth in Eastern Europe, under an extended set of economic and socio-political control variables. The most important empirical output, for the 6 investigated East-European countries during 1995-2012, suggests that direct taxes are significant and negatively correlated with economic growth, while indirect taxes exert a positive influence on the dependent variable, though insignificant. As for the control variables, it seems that only freedom from corruption and political stability have a significant impact on economic growth. The study suggests that the design of tax systems in Eastern European countries is in accordance with the Commission's priorities regarding its growth-friendliness. As for policy implications, governments should continue shifting the tax burden away from labour on to tax bases linked to consumption, property, and combating pollution, with potential positive effects both for growth and for fighting against tax evasion.*

**Key-words:** tax composition, economic growth, effects, panel-model, tax policy.

**JEL classification:** H24, O40.

### **1. Introduction**

Economic growth is generally considered as a precondition for the improvement of living conditions, i.e. increased consumption, improved public services and reduced unemployment and poverty. Taxation serves to collect the necessary funds for public spending, to redistribute income (progressive income taxation), to stabilize the economy, to address externalities (environmental taxes, taxes on alcohol and tobacco), and to influence the allocation of resources (Prammer, 2011) [25]. In examining the effects of tax policy on economic growth, there are two lines of thinking: i) according to the exogenous growth models (Solow, 1956) [30], tax policy has no impact on economic growth in the long run, assuming that key factors of production such as labour and technological progress are determined outside the model; ii) on the contrary, endogenous growth theorists (starting with Barro, 1990; King and Rebelo, 1990; and Lucas, 1990) [8]-[15]-[20], who believe that economic expansion is determined within the system, argue that tax policy does have an impact on economic growth and welfare over time.

The relationship between tax structure (distribution of revenue by type of tax) and economic growth has received both theoretical and empirical attention (see Shinohara, 2014, for a survey of empirical studies) [29]; the findings in the specific literature have shown that taxes affect the allocation of resources and may often generate behavioural distortions of economic agents. When it comes down to economic growth, economic theory states that it is generated by three production factors: labour, capital and technological progress, which are related to each other through a production function. Taxes could alter the economic decisions regarding these factors, and thus adversely/positively affect economic growth (Zipfel and Heinrichs, 2012) [34]:

i) taxation of labour affects the decision of economic agents to participate in the labour market (the number of working hours and the number of staff hired) and the decision to seek higher levels of education and less entrepreneurial activity (due to strongly progressive taxation on income);

ii) taxation of capital impacts on the household decisions on investment and savings (the savings ratio can deviate from its optimum level regarding growth) and also influences companies' decisions regarding location and the volume of investments;

iii) taxation of research and development might curb technological developments, by making these activities less profitable.

iv) taxation of consumption is often considered more conducive to growth, since it distorts inter-temporal decisions (such as decisions on saving, decisions between work and leisure) less strongly than labour taxation.

Given the currently weak economic recovery in many European countries, reforms are necessary to stimulate growth. Since the financial crisis, the EU member states have been faced with the difficult task of consolidating their budgets, while at the same time sustaining economic growth. Redesigning their tax systems could be a possible approach. In this respect, in the last years, Europe has witnessed a slight trend towards more growth-conducive tax systems, which have been redesigned mainly in the northern and East European countries, while central Europe has seen little change.

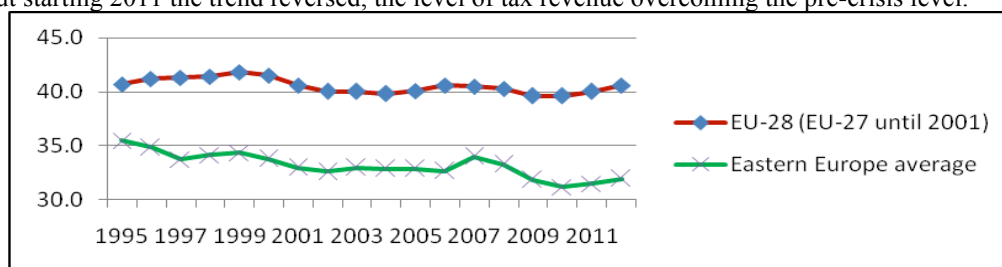
The main objective of this study is to empirically evaluate the impact of tax composition on economic growth for six EU-member states from Eastern Europe, using a panel-model approach, for the period 1995-2012. Specifically, the study explores the relative impact of different components of tax revenue (direct and indirect tax revenue, as percentage of total tax revenue) on economic growth. The paper adds marginally to the empirical literature, showing how the two types of tax revenue influence economic growth in Eastern Europe, under an extended set of economic and socio-political control variables. The main finding suggests that direct taxation is negatively correlated with economic growth, while indirect taxes seem to exert a positive, yet insignificant, effect, confirming some of the recent findings in the literature (Arnold, 2008; Johansson et al., 2008; Arnold et al., 2011; Acosta-Ormaechea and Yoo, 2012) [5]-[14]-[6]-[1].

The rest of the paper is structured as follows: Section 2 presents the tax composition in East-European countries, Section 3 highlights the literature review, Section 4 presents the methodology and data, Section 5 contains the results, while Section 6 concludes.

## 2. Tax composition in East-european countries

Between 1995 and 2012, tax revenue as a percentage of GDP experienced a downward trend in East-European countries. Still, there were several increase episodes during this period, among which the most important was recorded between 2006 and 2007 (as seen in Figure 1), when tax revenue increased by 1.3 percentage points. This was only a short-term evolution and it was due to the high rates of economic growth recorded in these countries at the time (except for Hungary, which recorded a 0.1% real GDP growth rate, the other five countries recorded real GDP growth rates between 5.7% in Czech Republic and 10.5% in Slovakia). However, due to the crisis, the evolution of tax revenue became negative, recording a decrease of 2.8 percentage points between 2008 and 2010. Small recoveries appeared in the last years, but the level of tax revenue remains by more than two percentage points below the pre-crisis level.

With regard to EU-28 countries' average, the statistics clearly show that tax revenue in Eastern countries remain below the EU-28 averages. The differences vary between a minimum of 5.2 percentage points in 1995 and a maximum of 8.7 percentage points in 2012 (the average difference for the period is 7.4 percentage points). As for the evolution of tax revenue in EU-28, one can notice that the crisis generated a decrease (-0.9 percentage points between 2008 and 2010), but starting 2011 the trend reversed, the level of tax revenue overcoming the pre-crisis level.

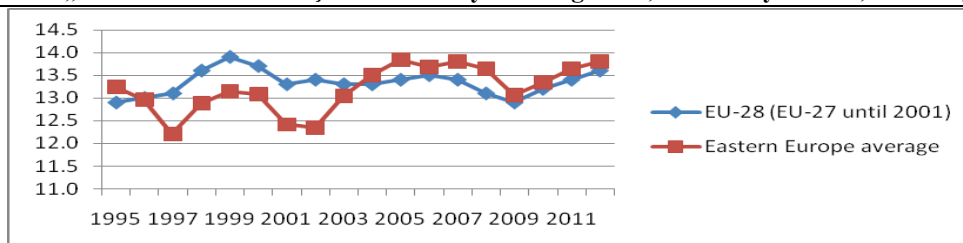


Source: Eurostat, own processing

**Figure 1:** Tax Revenue (including SSC) in Eastern Europe and EU-28 Countries, as a Percentage of GDP (1995-2012)

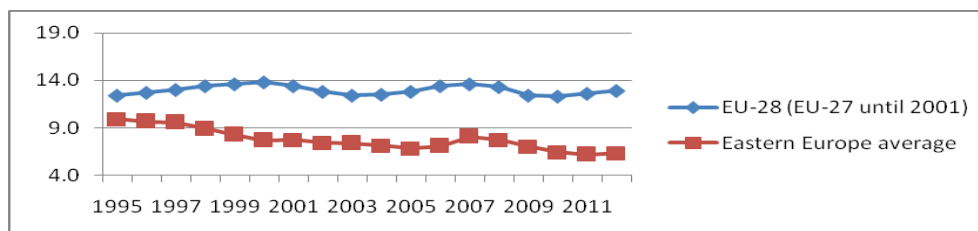
Figures 2 and 3 highlight the indirect and direct tax revenue as a percent of GDP, for the six Eastern European countries and EU-28 during the period 1995-2012. For this period, one can observe that, until 2003, the indirect tax revenue level for the East European countries was below the EU average; starting 2004, this level became higher than the EU average, a trend that continued until the last year of analysis, 2012. The evolution of indirect tax revenue for the Eastern European countries is rather fluctuant, containing rises and falls, but it can be noticed that during the last four years (2009-2012) there is an upward trend.

Regarding direct tax revenue, Figure 3 shows an ever growing gap between the level recorded in Eastern Europe countries and the EU-28 average: at the beginning of the period the difference was of 2.5 percentage points, while in 2012 this difference was recording a maximum level of 6.6 percentage points. While for the EU as a whole, the evolution of direct tax revenue has ups and downs, for the Eastern European countries there is a clear downward trend (the exception refers to the 2005-2007 period, when this level increased by 1.3 percentage points).



Source: Eurostat, own processing

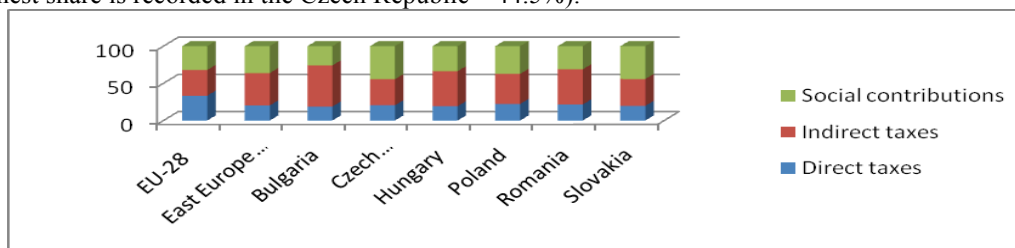
Figure 2: Indirect Tax Revenue in Eastern Europe and EU-28 Countries, as a Percentage of GDP (1995-2012)



Source: Eurostat, own processing

Figure 3: Direct Tax Revenue in Eastern Europe and EU-28 Countries, as a Percentage of GDP (1995-2012)

Figure 4 displays the share of various tax components in total tax revenue, i.e. tax structure, in Eastern Europe and EU-28 countries. Despite the differences among the Eastern countries, there are common features regarding their tax structure: a low share of direct taxes (the lowest share belongs to Bulgaria – 18.8%), a high share of indirect taxes (the highest is recorded also in Bulgaria – 55.3%) and an above EU average share of SSC (the highest share is recorded in the Czech Republic – 44.5%).

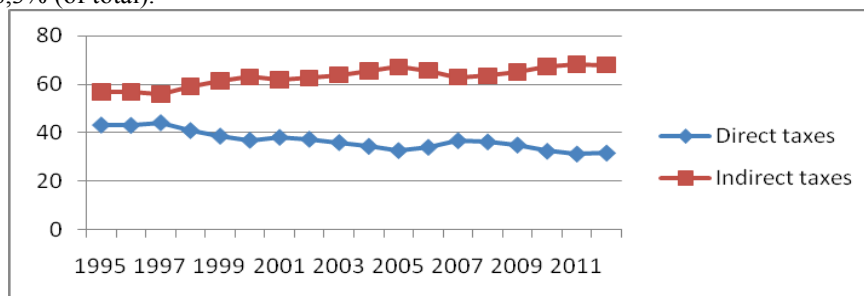


Source: Taxation trends in EU (2014), own processing

Figure 4: Tax Structures in Eastern Europe and EU-28 Countries (% of total tax revenues, including SSC), 1995-2012 average

Considering the direct/indirect tax composition, Taxes on individual or household income, Taxes on the income or profits of corporations, Taxes on holding gains and other taxes on income are included in direct taxes, while Taxes on products (Value added type taxes – VAT, Excise duties, Stamp taxes, Car registration taxes etc.) and Other taxes on production are included in indirect taxes.

Figure 5 depicts the evolution of direct and indirect taxes as a percentage of total tax revenue (excluding SSC) for the six Eastern European countries. As can be noticed, indirect taxes are dominant in these countries' tax systems, accounting currently for almost 70% of the total tax revenue (excluding SSC). The gap between direct and indirect taxation increased over time, the maximum distance between the two categories of taxes being recorded in the last year of analysis, 2012, when direct taxes share was of 31.7% (of total) and indirect taxes share was of 68.3% (of total).



Source: Eurostat, own calculations

Figure 5: The Evolution of Direct and Indirect Tax Revenue in Eastern Europe countries (% of total tax revenues, excluding SSC), 1995-2012

Regarding recent tax measures undertaken in the East-European countries, one can divide them into two broad categories (European Commission, 2013; 2014) [10]-[11]: i) measures aiming direct taxation – such measures were taken by the authorities of all the countries included in the analysis and ii) measures aiming indirect taxation, which were also undertaken recently in the East-European countries (see Table 1 in Appendix for a more detailed picture of these measures).

### **3. Literature review**

During the past decades, there has been a significant work (theoretical and empirical) in public finance regarding the effects of fiscal policy on growth, especially since the development of the endogenous growth models. Previous studies have revealed a wide variety of ways in which the tax structure can affect observed economic growth rates.

Easterly and Rebelo (1993) [9] are among the first who focused on the taxation-growth nexus, their results revealing a weak and non-robust relation between tax policy variables and growth. Another contribution in the field belongs to Mendoza et al. (1997) [22], who performed cross-country panel regressions (time-series panel for 18 OECD countries), based on macroeconomic measures of effective tax rates on income and consumption. Their main conclusion suggests that there is a very mild, yet significant relation between tax policy and long-run growth.

Focusing on 22 OECD countries, for the period 1970-1995, Kneller et al. (1999) [16] study the effects of both taxation and public expenditure on economic growth and they find that distortionary taxation reduces growth, while non-distortionary taxation does not (similar findings apply to productive and non-productive expenditures). In line with these results, empirical evidence found by Arnold (2008) [5] and Johansson et al. (2008) [14] draws attention to a growth-friendly design of tax structures, suggesting that the most harmful for growth are corporate income taxes, continuing with personal income taxes, consumption taxes and finally taxes on wealth. More recently, but still focusing on the OECD countries, Arnold et al. (2011) [6] investigated the impact of the tax structure on long-run GDP, using a panel error correction model for 21 OECD countries over the years 1971-2004. Based on the results of these estimations, the authors suggest a growth-friendliness ranking for tax instruments, which is led by property taxes, in particular by recurrent taxes on immovable property, followed by consumption taxes (and other property taxes). The authors classify personal income taxes as inferior to these two tax instruments, and corporate income taxes as having the most negative effects on GDP per capita.

In the case of South Africa, Koch et al. (2005) [17] analyze the relationship between taxes and economic growth for the period of 1960-2002, and also study the effects of the ratio of indirect taxes to tax revenue on economic growth. Their conclusions suggest that an increase in indirect taxation relative to direct taxation reduces economic growth. During that year, Mamatzakis (2005) [21] employs a VAR model to evaluate the response of economic growth to shocks in tax composition in Greece, for the period 1960-2003; the main result implies a positive impact of the tax mix (the ratio of indirect tax revenue to direct tax revenue) on economic growth. In another empirical study, Lee and Gordon (2005) [19] use both cross-sectional and time series data for 1970-1997 (for a large number of countries), in order to explore the relationship between taxation and economic growth. Their findings suggest a negative effect of corporation income tax on economic growth, while other taxes are not significantly associated with growth.

Different results of tax reforms on growth are displayed by Myles (2009a) [23], within some simulation models surveyed: some argue that there aren't any significant effects from changes in the tax structure, while others refer to the presence of non-negligible effects on GDP growth. In a survey of empirical literature, Myles (2009b) [24] finds evidence that consumption taxes are less damaging for growth than income taxes. Furthermore, Afonso and Furceri (2010) [2] study the effects in terms of size and volatility of government revenue and spending on growth in OECD and EU countries. The results of the paper suggest that both variables are detrimental to growth.

Another important contribution to the relevant literature belongs to Romer and Romer (2010) [27], who suggest that governments can undertake tax measures in order to avoid developments that may cause output to deviate from its normal path. For example, if policy makers consider that demand needs to be stimulated in order to bring the economy out of a recession, a tax cut may be implemented. At the same time, tax measures could be undertaken if the objective is increasing growth above its long-term trend. Another study is performed by Gemmell et al. (2011) [13], who use regression methods that separate short- from long-run effects and they show that estimated long-run growth effects of fiscal policy are typically achieved very quickly, consistent with results from short-run SVAR (Structural VAR) models. Still, the observed impacts on long-run GDP levels are generally small, since fiscal injections are often reversed and may involve growth-retarding tax changes alongside growth-enhancing expenditure policies (and vice versa).

New evidence concerning “tax composition – economic growth” nexus was revealed by Acosta-Ormaechea and Yoo (2012) [1], who performed a study that includes 69 countries, during the period 1970-2009. Their main finding shows that an increase in income taxes, accompanied by the reduction of consumption and

property taxes is associated with slower growth on long term. The authors also claim that social security contributions and personal income taxes have a stronger negative association with economic growth than corporate income taxes. Finally, shifting the burden from income taxes to property taxes has a significant and positive effect on growth, while reducing income taxes and increasing value added and sales taxes at the same time stimulates growth.

Some authors focused their attention towards single-case studies with respect to the relation between tax structure and growth. Thus, Arisoy and Unlukaplan (2010) [4] test the effect of direct-indirect tax composition on economic growth for the Turkish Economy for the period of 1968-2006. In accordance with the predictions of the endogenous growth models, their findings suggest that the real output is positively related to indirect tax revenue, but direct taxation seems to have no significant effect. A similar analysis belongs to Scarlett (2011) [28], who explores the impact of taxation on economic growth in Jamaica, using a general autoregressive distributed-lag model and quarterly data from 1990 to 2010. The findings indicate that increasing revenue from indirect taxes is more conducive to economic growth in the long run; on the other hand, increasing the share of taxes from personal income has the greatest harm on per capita GDP over time.

Furthermore, Angelopoulos et al. (2012) [3] study the quantitative implications of changes in the composition of taxes for long-run growth and expected lifetime utility in the UK economy, for the period 1970-2005, using dynamic stochastic general equilibrium (DSGE) setup. The conclusions of the paper suggest that: i) if the goal of tax policy is to promote long-run growth, then governments should reduce labour taxes, while simultaneously increasing capital or consumption taxes; ii) if the goal is to promote welfare, then capital taxes should be cut, while concurrently increasing labour or consumption taxes. Different results are obtained by Umoru and Anyiwe (2013) [31] when focusing on Nigeria's case: by employing cointegration and error correction as methods of empirical estimation, for the period 1975-2011, the authors find that, while the policy of direct taxation is significantly and positively correlated with economic growth, indirect taxation proved insignificant with its negative impact on economic growth in Nigeria.

Finally, Xing (2011; 2012) [33] conducted an empirical analysis based on the error correction model reaching the following conclusions: i) reducing income taxes and consumption taxes, and increasing property taxes promote economic growth and ii) there is no evidence that, for economic growth, personal income taxes are better than corporate income taxes, and consumption taxes are better than income taxes.

#### **4. Methodology and data**

The effects of tax composition on economic growth are studied with the help of a set of unbalanced data, with 6 cross-sections (6 countries, i.e. Romania, Hungary, Bulgaria, Poland, Czech Republic and Slovakia) for the period 1995-2012, using a panel model approach. We use a panel model since it allows us to control for individual heterogeneity; also, panel data give more informative data, more variability, less collinearity among the variables, and more efficiency (Baltagi, 2008) [7]. The study is focusing on these countries because they belonged to the same political and economic block and shared a similar fate (Kovacs, 2013) [18]. Moreover, according to Farkas (2011) [12], an independent Central and Eastern European model of capitalism is eligible for existence, with the following three main aspects: the lack of capital, weak civil society and the effect of the EU and other international organizations that influence them.

In order to explore the relationship between tax composition and economic growth, we consider economic growth as dependent variable, while as interest variables we select the two main tax categories, direct taxes and indirect taxes, respectively.

The dependent variable is real GDP growth rate ( $\gamma$ ); Gross Domestic Product (GDP) is a measure of the economic activity, defined as the value of all goods and services produced, less the value of any goods or services used in their creation. Using annual growth rate of GDP volume allows us to compare the dynamics of economic development both over time and between economies of different sizes. For measuring the growth rate of GDP in terms of volumes, the GDP at current prices are valued in the prices of the previous year and the thus computed volume changes are imposed on the level of a reference year; consequently, price movements will not inflate the growth rate.

The interest independent variables are: i) direct tax revenue ( $\lambda$ ) as a percentage of total tax revenue (excluding SSC), as defined in Section 2 and ii) indirect tax revenue ( $\chi$ ), as a percentage of total tax revenue (excluding SSC). The analysis focuses on tax structure (and not on tax burden, i.e. direct/indirect tax revenue as a percentage of GDP) since it allows a consideration of revenue-neutral tax policy changes, and thus avoids the difficulty of taking account of how any changes in aggregate revenue might be reflected in changes in public expenditure (Arnold et al., 2011) [6].

Since our main hypothesis considers that tax composition influences the real GDP growth rate, the basic function has the following form:

$$\gamma = f(\lambda, \chi), \quad (1)$$

where  $\gamma$  – real GDP growth rate, and  $\lambda, \chi$  – direct and indirect tax revenue, as percentage of total tax revenue.

The scatter graph of this function (performed separately for direct and indirect tax revenues) is presented in Figure 1 (Appendix). The “Regression Line” Method used to perform the scatter diagram suggests a linear connection between the chosen variables (a negative relation for direct taxes and a positive one for indirect taxes).

The basic OLS naive panel-model is as follows:

$$\gamma_{it} = \alpha + \beta_0 \lambda_{it} + \beta_1 \chi_{it} + \varepsilon_{it} \quad (2)$$

where  $\alpha$  - intercept,  $\beta_{0,1}$  - slopes of interest tax variables,  $i$  - country,  $t$  - time, and  $\varepsilon_{it}$  - the error term, which varies over both country, and time.

The effects of tax composition variables are isolated entering two types of control variables: one derived from the appropriate growth literature, and another one containing robustness variables. In this case, the extended linear model becomes:

$$\gamma_{it} = \alpha + \beta_0 \lambda_{it} + \beta_1 \chi_{it} + \sum_{k=1}^n \beta_k X_{k,it} + \mu_i + \eta_t + \varepsilon_{it} \quad (3)$$

where  $\alpha$  - intercept,  $\beta_{0,1}$  - coefficients of tax composition variables,  $\beta_k$  - coefficient of control independent variable  $k$  by  $n$  type,  $X$  - control independent variables,  $\mu_i$  - stands for country fixed effects,  $\eta_t$  - time-specific effect that controls for unaccounted common time-varying factors,  $i$  - country,  $t$  - time,  $\varepsilon_{it}$  - the error term.

However, according to Arisoy and Unlukaplan (2010) [4], it is notable that collinearity between indirect taxes and direct taxes makes equation (3) difficult to estimate. Having this in mind, we estimate equation (3) for both direct and indirect taxes separately, as follows:

$$\gamma_{it} = \alpha + \beta_0 \lambda_{it} + \sum_{k=1}^n \beta_k X_{k,it} + \mu_i + \eta_t + \varepsilon_{it} \quad (4)$$

$$\gamma_{it} = \alpha + \beta_0 \chi_{it} + \sum_{k=1}^n \beta_k X_{k,it} + \mu_i + \eta_t + \varepsilon_{it} \quad (5)$$

The first set of control variables is originated in the appropriate growth literature and includes: gross fixed capital formation (investments), employment, foreign direct investment, economy openness and inflation. Gross fixed capital formation consists of resident producers’ investments, deducting disposals, in fixed assets during a given period, as a percentage of GDP. The employment rate is calculated by dividing the number of persons aged 20 to 64 in employment by the total population of the same age group. The third control variable, net FDI, illustrates the net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. Economy openness is measured by the exports of goods and services (% of GDP), which represent the value of all goods and other market services provided to the rest of the world, while inflation shows the rate of price change in the economy as a whole.

The variables for robustness refer to: property rights, freedom from corruption, political stability and absence of violence/terrorism, rule of law and tax evasion. The first variable, property rights, explains the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state (the score 100 means secure property rights, while a level of 0 suggests a weak protection of these rights). The second robustness variable, freedom from corruption, shows the intensity of corruption (the score 100 means low corruption, while a level of 0 indicates a very corrupt government). Political stability and rule of law belong to the six dimensions of governance of The Worldwide Governance Indicators (WGI) project: “political stability and absence of violence/terrorism” measure the likelihood that the government will be destabilized by unconstitutional or violent means, including terrorism, while “rule of law” expresses the extent to which agents have confidence in and abide by the rules of society, including the quality of contract enforcement and property rights, the police, and the courts, as well as the likelihood of crime and violence. Finally, tax evasion is based on an index from 0 to 10, assuming that it does not damage public finances (the smaller the value, the greater the damage).

All control variables presented above have consistent impact on economic growth, as Petrakos et al. (2007) [26] argue. The descriptive statistics of variables and their sources are illustrated in Table 2, respectively Table 3 in Appendix.

In our panel-model approach, the model may have heterogeneity in the data. As the investigated sample is unbalanced, we test this property only in the case of cross-section fixed-effects model, because the period fixed-effects model is not appropriate for our sample (we argue that there aren’t omitted variables that are the same for each entity in our sample, but vary over time) and the random effects panel-models are not consistent under unbalanced data-set. In this demarche, F-test allows us to choose between pooled model and fixed-effects model. Furthermore, we suspect the dependent variable and the two interest variables for endogeneity; to deal with this possible endogeneity issue, we perform the Wu-Hausman F test and the Durbin-Wu-Hausman chi-sq test, by using lagged levels of the regressors. Also, in dealing with heteroskedasticity problem, the Pagan-Hall general test statistic will be performed.

The next section highlights the main empirical results of the explored function, performing several econometric scenarios (models 1-4), as Tables 4 and 5, in Appendix, illustrate.

## 5. Results

Regarding direct taxes, the results achieved after the statistical testing of their impact on economic growth, as Table 4 in Appendix reveals, show that the interest variable appears significant in models 3 and 4, and it is negatively correlated with economic growth as dependent variable in every model (1-4). When looking at the control variables, it appears that only freedom from corruption and political stability have statistical significance in models 3 and 4, being negatively, respectively positively related to economic growth. As for inflation, it appears significant and negatively correlated to economic growth in model 2, while employment exerts a positive and significant influence in model 4. The remaining control variables are statistically insignificant.

Further on, we initiate the hypothesis tests to choose between pooled model and fixed-effects model. As the sample is unbalanced and the period fixed-effects are not appropriate, only the cross-section fixed-effects are taken into account. The values of F-test and Chi-square for cross-section fixed-effects reveal that the cross-section fixed-effects model is not preferred to the OLS estimations. Also, we suspect that between economic growth and direct taxation there might be an endogeneity issue, i.e. reverse causality. In order to deal with it, we performed 2SLS method (two-stage least squares), using lags of interest variable (lag=1); in this respect, the Wu-Hausman F test and the Durbin-Wu-Hausman chi-sq test (see Table 4) indicate that the null hypothesis can be accepted, so the regressor is exogenous.

Regarding the disturbance heteroskedasticity, we performed the Pagan-Hall general test statistic and the results clearly suggest that the null hypothesis of homogeneity can be accepted. To conclude, regarding direct taxes, according to the OLS model (3), the interest variable is significant, with negative effect on economic growth. Two control variables are conclusive: freedom from corruption, with a negative impact on economic growth, and political stability, positively correlated with growth. As for the rest of the control variables, they have no statistical significance.

Regarding indirect taxes, the results contained in Table 5 (Appendix) highlight that the interest variable appears significant only in the country fixed-effects model (4), while the connection with economic growth as dependent variable is positive in every model (1-4). As for the control variables, it seems that only freedom from corruption and political stability have statistical significance in models 3 and 4, being negatively, respectively positively related to economic growth. As for inflation, it appears significant and negatively correlated to economic growth in model 2, while the remaining control variables are statistically insignificant.

Similar to the case of direct taxes, we performed the specific tests in order to choose the appropriate model and to test the endogeneity issue and the heteroskedasticity of the residuals. The results from Table 5 in Appendix suggest that OLS estimations (model 3) are preferred to country fixed-effects model (4), while the specific testing for the other two issues display similar results with direct taxation. Consequently, we can assert that indirect taxes have a positive impact over economic growth, but it appears that there is no statistical significance. Again, only two control variables are significant: freedom from corruption, with a negative influence on economic growth, and political stability, positively impacting on growth.

The most important empirical output, for the 6 investigated East-European countries during 1995-2012, suggests that direct taxes are significant and negatively correlated with economic growth, while indirect taxes exert a positive influence on the dependent variable, though insignificant. As for the control variables, it seems that only freedom from corruption and political stability have a significant impact on economic growth.

## 6. Conclusions and further research

The paper investigated over the recent past, i.e. 1995- 2012, the relation between tax composition and economic growth in six East-European countries, with the help of a panel dataset. Since taxes affect the allocation of resources, and, often, distort the underlying behaviour of economic agents, we expect that tax composition has a certain impact on economic growth. The main empirical results indicate that direct taxes exert a negative and significant impact on economic growth, while the effects of indirect taxes are positive, but statistically insignificant. Our results are consistent with several other studies from the specific literature, such as Arisoy and Unlukaplan (2010) [4], Scarlett (2011) [28], Arnold et al. (2011) [6] and Acosta-Ormaechea and Yoo (2012) [1].

When comparing developments in Eastern Europe countries, they seem to be in line with the suggestions from the literature, with decreasing direct tax shares and increasing consumption tax shares. The tax measures undertaken within these countries suggest a positive development, in accordance with the recommendation of the Europe 2020 strategy, i.e. budget consolidation accompanied by a growth-conducive redesign of the tax system. Knowing that Europe is struggling with an increasingly older population and an increasingly smaller workforce, our overall conclusion is that determining the composition of direct and indirect taxes is not only a fundamental tax policy choice, but it can also be a key determinant of growth: a growth-conducive tax system enables the generating of income for the government, while minimizing the distorting effect on the growth factors.

In the context of tax-policy implications, governments from East-European countries should continue shifting the tax burden away from labour on to tax bases linked to consumption, property, and combating pollution, with potential positive effects both for growth and for fighting against tax evasion. Regarding further research, given the high level of tax evasion from the former communist countries, this paper could be a good starting point for an extended investigation over tax composition – tax evasion nexus.

**Acknowledgements:** This study was supported from the European Social Fund through Sectorial Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/142115, project title “Performance and Excellence in Doctoral and Postdoctoral Research in Romanian Economics Science Domain”. The author is indebted to Mihai Mutașcu and Beata Farkas for their valuable suggestions.

## 7. References

- [1]. **Acosta-Ormaechea Santiago, Jae Yoo** (2012). “Tax Composition and Growth: A Broad Cross-Country Perspective”, *IMF Working Paper*, Fiscal Affairs Department, WP/12/257.
- [2]. **Afonso A., Furceri D.** (2010). “Government size, composition, volatility and economic growth”, *European Journal of Political Economy*, 26: 517–532.
- [3]. **Angelopoulos, K., Malley, J. Philippopoulos, A.** (2012). “Tax structure, growth, and welfare in the UK”, *Oxford Economic Papers*. 64(2): 237-258.
- [4]. **Arisoy I., Unlukaplan I.** (2010). “Tax Composition and Growth in Turkey: An Empirical Analysis”, *International Research Journal of Finance and Economics*, 59: 50-61.
- [5]. **Arnold, J.** (2008). “Do Tax Structures Affect Aggregate Economic Growth?: Empirical Evidence from a Panel of OECD countries”, *OECD Economics Department Working Papers*, No. 643, OECD Publishing.
- [6]. **Arnold, J. Brys B., Heady C., Johansson A., Schwellnus C., Vartia L.** (2011). Tax policy for economic recovery and growth”, *The Economic Journal*, 121 (February): 59–80.
- [7]. **Baltagi, B.H.** (2008) *Econometric Analysis of Panel Data*, Third Edition, John Wiley & Sons, Ltd.
- [8]. **Barro, R.** (1990). “Government spending in a simple model of endogenous growth”. *Journal of Political Economy*, 98 (1): 103–117.
- [9]. **Easterly, W., Rebelo, S.**, (1993). “Fiscal Policy and Economic Growth: An Empirical Investigation,” *Journal of Monetary Economics*, 32: 417-458.
- [10]. **European Commission** (2013). *Tax reforms in EU Member States Tax policy challenges for economic growth and fiscal sustainability*, 2013 Report.
- [11]. **European Commission** (2014). *Tax reforms in EU Member States*, 2013 Report.
- [12]. **Farkas, B.** (2011) “The Central and Eastern European model of capitalism”, *Post-Communist Economies*, 23(1): 15-34.
- [13]. **Gemmell N., Kneller R., Sanz I.** (2011). “The Timing and Persistence of Fiscal Policy Impacts on Growth: Evidence from OECD Countries”, *The Economic Journal*, 12: 33-58.
- [14]. **Johansson A, Heady C., Arnold J., Brys B., Vartia L.** (2008). “Tax and Economic Growth”. *OECD Economics Department Working Papers*, No. 620, OECD Publishing.
- [15]. **King, R., Rebelo, S.** (1990). “Public policy and economic growth: Developing neoclassical implications”. *Journal of Political Economy*, 98 (1): 126–151.
- [16]. **Kneller, R., Bleaney, M., Gemmell, N.** (1999). “Fiscal Policy and Growth: Evidence from OECD Countries,” *Journal of Public Economics*, 74: 171-190.
- [17]. **Koch S.F., Schoeman, N.J., Van Tonder, J.J.** (2005). “Economic Growth and the Structure of Taxes in South Africa: 1960 – 2002”, *South African Journal of Economics*, 73(2): 190-210.
- [18]. **Kovacs, A.** (2013) “Crisis Management Similarities and Differences in the Newly Accessed Central and Eastern European Countries”, in *The Aftermath of the Global Crisis in the European Union* (Ed. Beáta Farkas), Cambridge Scholars Publishing.
- [19]. **Lee, Y., Gordon, R. H.** (2005). “Tax Structure and Economic Growth”, *Journal of Public Economics*, 89: 1027-1043.
- [20]. **Lucas, R.**, (1990). “Supply-side economics: an analytical review”. *Oxford Economic Papers* 42 (2): 293–316.
- [21]. **Mamatzakis, E. C.** (2005). “The Dynamic Responses of Growth to Tax Structure for Greece”, *Applied Economic Letters*, 12: 177-180.
- [22]. **Mendoza, E., Milesi-Ferretti, G., Asea, P.** (1997). “On the Ineffectiveness of Tax Policy in Altering Long-Run Growth: Harberger’s Superneutrality Conjecture,” *Journal of Public Economics*, 66: 99-126.
- [23]. **Myles, G. D.** (2009a). “Economic Growth and the Role of Taxation – Theory”, *OECD Economics*



- Department Working Papers*, No. 713, OECD publishing.
- [24]. **Myles, G. D.** (2009b). “Economic Growth and the Role of Taxation – Aggregate Data”, *OECD Economics Department Working Papers*, No. 714, OECD publishing.
- [25]. **Prammer D.** (2011). “Quality of taxation and the crisis: tax shifts from a growth perspective”, *Taxation Papers*, Working Paper 29.
- [26]. **Petrakos, G., Arvanitidis P., Pavleas S.** (2007) “Determinants of Economic Growth: The Experts’ View”, *DYNREG Working Papers*.
- [27]. **Romer, C.D., Romer, D. H.** (2010). “The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks.” *American Economic Review*, 100(3): 763-801.
- [28]. **Scarlett H. G.** (2011). “Tax Policy and Economic Growth in Jamaica”. *Bank of Jamaica working paper*.
- [29]. **Shinohara, M.** (2014). “Tax Structure and Economic Growth – A Survey of Empirical Analyses”, Institute of Economic Research Chuo University, Discussion Paper No.217.
- [30]. **Solow, R.M.** (1956). “A Contribution to the Theory of Economic Growth”, *The Quarterly Journal of Economics*, 70(1): 65-94.
- [31]. **Umoru, D., Anyiwe M.A.** (2013). “Tax Structures and Economic Growth in Nigeria: Disaggregated Empirical Evidence”, *Research Journal of Finance and Accounting*, 4(2): 65-80.
- [32]. **Xing, J.** (2011). “Does tax structure affect economic growth? Empirical evidence from OECD countries”, *Oxford University for Business Taxation Working Paper*, 11/20.
- [33]. **Xing, J.** (2012). “Tax structure and growth: How robust is the empirical evidence?”, *Economic Letters*, 117: 379-382.
- [34]. **Zipfel F., Heinrichs C.** (2012). “The impact of tax systems on economic growth in Europe. An overview”, *Deutsche Bank Research*.

Table 1: Recent tax measures in East-European countries

Direct taxation measures	Indirect taxation measures
<p>In Bulgaria, regarding personal income taxation (PIT), a tax relief measure for minimum wage earners came into force in January 2014. As of 1st of January 2013, interest income from individuals' term deposits in banks, which had been exempt from taxation, was made subject to a 10% withholding tax if received from a resident bank. Still, the tax rate on interest income from deposits was reduced to 8% in 2014, and is to be progressively reduced further, to 6 % in 2015, 4 % in 2016 and 0 % as of 2017.</p> <p>The Czech Republic authorities made changes in social security contributions (SSC); consequently, from the 1st of January 2013, SSC rates vary between 11% (for employees who do not opt for the voluntary pension saving schemes) and 13% (for employees who opt for the voluntary pension saving schemes). Also, employee benefits, which had previously been exempt from social security contributions, will become part of the base used for calculating the level of contributions, with effect from 2015. As for PIT, for self-employed people, a cap was introduced on deductible flat-rate expenses in the categories eligible for a 60 % or a 80% deduction, with effect from 2015, while child tax credits have been restricted to residents from the EU, Norway and Iceland only, with effect from 2014.</p> <p>The most important measure aiming direct taxation was undertaken in Hungary, where in 2011, the progressive PIT system was replaced by a 16% single rate system. A family tax allowance also exists, introduced in 2011, for families with at least three children. As for corporate income tax (CIT) rates, as of January 2013, small businesses were able to choose (in addition to the EVA – simplified enterprise tax) from two more optional tax schemes: 1) the KATA (Small taxpayers' itemized lump sum tax) - The small taxpayer enterprise shall pay a lump sum tax of HUF 50 000 (EUR 179) monthly for each full-time employee registered as a small taxpayer in place of the main taxes on profits and payroll. 2) KIVA (Small business tax) – for businesses with 25 or less employees and annual revenue of below HUF 500 million (EUR 1,79 million). Under this scheme, the business will pay a flat rate of 16% on its cash-flow based profits and payroll.</p> <p>As for Poland, from 2013 the PIT base was broadened and the tax credit for taxpayers with more than two children was increased.</p> <p>In Romania, as of February 2013, the previously optional turnover-type tax of 3% on gross income applicable to microenterprises became mandatory for any SME (Small and medium enterprise) with a gross income lower than EUR 65000. The Romanian authorities expect a positive impact on the revenue collected, but this remains an open question, since highly profitable companies will be favoured, while companies running losses will be disadvantaged.</p> <p>Finally, in Slovakia, in December 2012 the flat rate tax (PIT) was replaced with a progressive income tax, with a top rate of 25%. As of 1st of January 2013, the corporate income tax was increased to 23%, and decreased in 2014 to 22%.</p>	<p>In <b>Bulgaria</b>, there were changes in excise duties: in June 2012, an excise rate was introduced for natural gas used by businesses for heating (while excise duties on electricity used by households is zero), and from December 2012, tax rates for some heavy fuels for heating purposes were raised.</p> <p>VAT changes were made particularly in the <b>Czech Republic</b>, where the VAT rate was increased again in 2013, by one percentage point (until 2015 only); the basic VAT rate is currently 21%, while the reduced rate was increased to 15% in 2013. Also, duties on tobacco were increased in 2014, while a second reduced VAT rate has been introduced for medicines, books and child nutrition, and will take effect in 2015.</p> <p><b>Hungary</b> reveals not only an increase in indirect taxation, but also the introduction of new taxes: between 2009-2013 excise duties on tobacco, alcohol and fuel were increased in several steps, while in the insurance sector, a consumption-type tax of 10% of non-life insurance premiums (for car insurance 15%) was introduced in 2013. Since July 2012, a telecommunications tax of HUF 2 per minute of phone call and per text message (SMS) applies.</p> <p>In <b>Poland</b>, from April 2013 the 23% VAT rate will apply to folk art and crafts (instead of reduced rate) and on certain postal services; excise duty on natural gas for heating was introduced, with effect from November 2013, while duties on tobacco products were increased by 5% and duties on alcohol by 15%.</p> <p>Finally, <b>Romanian</b> authorities increased excise duties on beer, while excise duties on cigarettes will be increased every year until 2018. The VAT rate was reduced to 9 % for bread, flour and related products, and an excise duty was also introduced for luxury products, both with effect from September 2013. An additional increase to the excise duty on fuel was introduced, and excise duties on alcohol were increased by 33 %, both with effect from April 2014.</p>

Source: European Commission (2014), own processing.

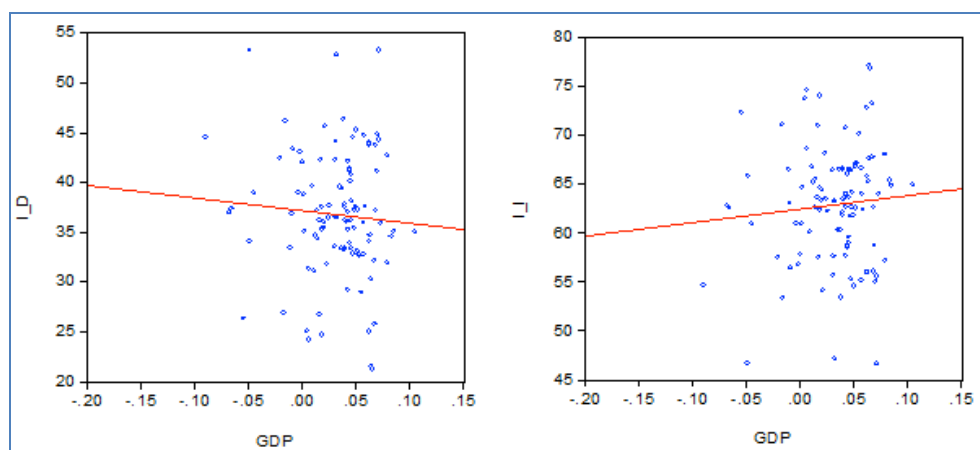


Figure 1: The relationship between tax composition and economic growth

Table 2: Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Real GDP growth rate	0.035741	0.0425	0.105	-0.068	0.037634	54
Direct tax revenue as % of total tax revenue	35.99777	36.14222	46.37076	21.3033	5.228013	54
Indirect tax revenue as % of total tax revenue	63.70721	63.69596	76.88057	53.46719	4.938241	54
Gross fixed capital formation as % of GDP	0.039556	0.039	0.068	0.019	0.011933	54
Employment rate (%)	0.649593	0.644	0.734	0.571	0.042682	54
Net FDI as % of GDP	0.074938	0.049598	0.518958	-0.16418	0.106885	54
Exports of goods and services as % of GDP	0.567223	0.610486	0.873109	0.271244	0.177104	54
Inflation rate (%)	0.04486	0.037194	0.153	-0.01582	0.035486	54
Freedom from corruption	42.03704	41	54	26	7.435161	54
Property rights	54.72222	52.5	70	30	15.79398	54
Political stability and absence of violence/terrorism	1.41E+13	0.74341	1.18E+14	0.036407	3.65E+13	54
Rule of law	0.49034	0.547002	0.96134	-0.22712	0.383466	54
Tax evasion	3.528148	3.525	6	0.95	1.178856	54

Table 3: Source of data

Variable	Source
Real GDP growth rate	Eurostat online database
Direct tax revenue as % of total tax revenue	Eurostat online database
Indirect tax revenue as % of total tax revenue	Eurostat online database
Gross fixed capital formation as % of GDP	Eurostat online database
Employment rate	Eurostat online database
Exports of goods and services as % of GDP	World Bank online database (2014)
Net FDI as % of GDP	World Bank online database (2014)
Inflation rate	World Bank online database (2014) and National Institute for Statistics (for Romania)
Freedom from corruption	The Heritage Foundation online data-base (2014)
Property rights	The Heritage Foundation online data-base (2014)
Political stability and absence of violence/terrorism	The Worldwide Governance Indicators, 2013 Update
Rule of law	The Worldwide Governance Indicators, 2013 Update
Tax evasion	World Competitiveness Online 1995-2010 Edition.

Table 4: Empirical results of panel regressions (direct taxes)

Independent variables	Model			
	(1)	(2)	(3)	(4)
constant	0.046663** (2.246426)	0.073739 (1.441098)	0.192911** (2.149563)	-0.051825 (-0.232559)
direct tax revenue as % of total tax revenue	-0.000406 (-0.728867)	-0.000186 (-0.251249)	-0.003262* (-1.762703)	-0.005582** (-2.156884)
gross fixed capital formation as % of GDP		-0.316127 (-0.872135)	-0.301625 (-0.616197)	0.191680 (0.290461)
employment rate (%)		-0.005947 (-0.063578)	0.145074 (0.904264)	0.602233* (1.745007)
net FDI as % of GDP		0.055655 (1.330021)	-0.060418 (1.372895)	0.083517 (1.634615)
exports of goods and services as % of GDP		-0.033618 (-1.340600)	0.016927 (0.419019)	0.037078 (0.432983)
inflation rate (%)		-0.061956** (-2.573050)	0.154228 (1.052347)	0.194668 (1.027787)
property rights			0.000946 (0.840315)	0.001772 (1.190381)
freedom from corruption			-0.005858*** (-4.420391)	-0.005758*** (-4.028870)
rule of law			0.050652 (0.926574)	-0.056478 (-0.767536)
political stability and absence of violence/terrorism			3.43E-16** (2.538919)	3.97E-16*** (2.884722)
tax evasion			0.006153 (1.259079)	0.005911 (1.102054)
Type of estimation	OLS	OLS	OLS	OLS - FE:CS
Model summary				
R squared	0.005131	0.115903	0.468468	0.534907
F-test for fixed effects				1.057092 (0.3996)
Chi-square				7.210371 (0.2055)
Wu-Hausman F test			2.90934 (0.09545)	
Durbin-Wu-Hausman chi-sq test			3.56304 (0.21774)	
Pagan-Hall general test statistic			13.619 (0.05908)	

a. (...) denotes the t-stat; for F-test for fixed effects, Chi-square, Wu-Hausman F test, Durbin-Wu-Hausman chi-sq test and Pagan-Hall general test statistic, (...) denotes the probability;

b. FE:CS denotes cross-section fixed effects;

c. \*\*\*, \*\* and \* denote significance at 1, 5 and 10% level of significance, respectively.

Table 5: Empirical results of panel regressions (indirect taxes)

Dependent variable: real GDP growth rate (%)				
Independent variables	Model			
	(1)	(2)	(3)	(4)
constant	0.001082 (0.029367)	0.053667 (0.579558)	-0.135425 (-0.640647)	-0.562511 (-1.546737)
indirect tax revenue as % of total tax revenue	0.000487 (0.835374)	0.000203 (0.256054)	0.003192 (1.548861)	0.005028* (1.876918)
gross fixed capital formation as % of GDP		-0.313787 (-0.865820)	-0.243951 (-0.492556)	0.178903 (0.264747)
employment rate (%)		-0.005705 (-0.060931)	0.137084 (0.822968)	0.575590 (1.631389)
net FDI as % of GDP		0.055788 (1.334487)	0.060483 (1.361771)	0.074742 (1.463911)
exports of goods and services as % of GDP		-0.033350 (-1.324736)	0.022632 (0.560066)	0.049182 (0.569307)
inflation rate (%)		-0.061737** (-2.542852)	0.156004 (1.050735)	0.198705 (1.031020)
property rights			0.001005 (0.870687)	0.001718 (1.127847)
freedom from corruption			-0.005682*** (-4.263728)	-0.005626*** (-3.880160)
rule of law			0.04300 (0.792075)	-0.059918 (-0.800767)
political stability and absence of violence/terrorism			3.34E-16** (2.461278)	3.83E-16*** (2.756067)
tax evasion			0.006270 (1.268494)	0.005955 (1.092002)
Type of estimation	OLS	OLS	OLS	OLS - FE:CS
Model summary				
R squared	0.006730	0.115930	0.459991	0.521945
F-test for fixed effects				0.959023 (0.4553)
Chi-square				6.580527 (0.2538)
Wu-Hausman F test			4.42733 (0.04139)	
Durbin-Wu-Hausman chi-sq test			5.24482 (0.02201)	
Pagan-Hall general test statistic			11.34 (0.4152)	

a. (...) denotes the t-stat; for F-test for fixed effects, Chi-square, Wu-Hausman F test, Durbin-Wu-Hausman chi-sq test and Pagan-Hall general test statistic, (...) denotes the probability;

b. FE:CS denotes cross-section fixed effects;

c. \*\*\*, \*\* and \* denote significance at 1, 5 and 10% level of significance, respectively.