The Impact of Single Taxes on the Convergence of Taxation in the European Union[1]

*Monika ŠVEC BUŠOVSKÁ – Ladislav BUŠOVSKÝ**

Abstract

The European Union, as a result of original purely economic-oriented cooperation, cooperates in a number of areas including tax policy area. This paper results from works pointing out a tax convergence in the EU. The aim is to quantify the impact of single taxes and tax competition on the convergence of taxation in the EU. Panel regression with fixed-effects for the EU-28 countries between the years 1965 – 2011 is used. Two models report a statistically significant positive impact of all components but the most important determinants are tax competition and property taxes. All models meet diagnostic tests and are econometrically robust.

Keywords: *taxes, convergence, European Union, tax burden, tax mix, tax competition*

JEL Classification: H20

Introduction

The first step in the European integration consisted in strengthening economic cooperation between the Member States whose goal was to establish a single market. That means free movement of goods, persons, services, and capital (EC, 2010). As a result, the original purely economic-oriented cooperation gave birth to a community that is now cooperating in a number of areas and tax policy is not excluded.

* Monika ŠVEC BUŠOVSKÁ – Ladislav BUŠOVSKÝ, University of Economics Prague, Faculty of Finance and Accounting, Department of Public Finance, Winston Churchill square 4, 130 67 Prague 3, Czech Republic, e-mail: xbusm04@vse.cz; xbusl01@vse.cz

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The homogeneity in terms of the tax burden of individual Member States may be questionable (Emerson, Gross and Italianer, 1992). However, the European Union has been trying to converge taxation, which should lead to the removal of all obstacles to the creation of the single market.

Tax-coordination and tax-harmonization have been subjects of much debate since the beginning of the European integration. The issues of the coordination, approximation, and harmonization of tax systems in the EU are discussed, for instance, in Musgrave (2002), Serna (2008), who make readers familiar with various directives and regulations that affect the tax systems of the Member States.

However, tax convergence has its supporters as well as opponents. Cultural dissimilarities and freedom of adopting tax legislation, which are based on different basis, are the main arguments to reject the convergence of taxes. Another negative aspect is a loss of tax competitiveness of individual Member States (Mach, 2004). Reuven (2010) believes that convergence is a positive phenomenon because it reduces the scope of "unfair" tax arbitrage for the price of higher transaction costs. All Member States would be able to benefit from the single tax system and no distortions would emerge. He prefers full harmonization and integration. Thus it is evident that there have been continuous different views during the EU facing the question whether to maintain tax competition or rather press for tax harmonization since its establishment.

Kubátová (2004) pursued the controversy between tax harmonization and competition as well and she came to the conclusion that it was impossible to tell which is more favourable – tax competition or harmonization. Nevertheless, tax competition itself should lead to the convergence of taxation as well because of reduction of the tax burden in one state will cause the growth of tax incomes by the relocation of tax bases and the outflow of tax revenues of other states. In order to prevent this phenomenon they will reduce their tax burden too and according to economic theory the whole process leads to the convergence of tax burden in one area (Theather, 2005). In her work on the impact of tax competition on economic growth Szarowská (2011, p. 40) defined tax competition as: "*A process of lowering effective tax burden to make investors and factors of production owners allocate their tax bases in a given country, provided that identical conditions are respected for all subjects.*"

In spite of these problems there is lot of authors who have been trying to find out whether the effect of taxation convergence is present in the EU. Foltysová (2007) and Kubátová, Vančurová and Foltysová (2008) deal with a cluster analysis of 22 OECD countries in several time periods between 1965 and 2003. They conclude that the tax structure in the EU has become closer. Drawing on the β-convergence and σ-convergence methodology, Sosvilla and Tamarit (1999; 2000)

and Sosvilla, Simón and Ángel (2001) infers that tax burden converges between 1967 and 1995 during an annual data analysis of 15 EU countries. The same methodology including unit root tests is used by Delgado and Presno (2007; 2009), and Rivero and Casquero (2010),whose key contribution is attached to the evidence that tax convergence in the EU occurs during the whole 1965 – 2005 period.

As mentioned papers Bušovská (2012; 2014) and Bušovská and Petrovická (2013) address tax burden convergence by means of β-convergence and σ-convergence from several points of view. According to their analyses the effective tax burden itself converges in the EU between 1965 and 2011. These conclusions are used for subsequent research included in this work as well as the definition of tax competition taken from the work by Szarowská (2011).

As mention above taxation converged in the EU countries between 1965 and 2011 and the aim of this work is to determine the impact ratio of individual tax burden components (in other words tax mixes – expresses share of individual taxes of the total tax revenues) convergence on tax systems convergence of the EU Member States and quantify the given issues. The article will answer:

- To what degree tax burden components influence the convergence of tax systems in the EU countries.
- To what degree tax competition influences the convergence of tax systems in the EU countries.

1. Methodology

Firstly, it is necessary to identify individual terms and their definition content. The easiest way to determine the tax burden is the use of *statutory rates of taxes* (Bušovská, 2014). However, Blechová (2008) emphasizes in her research that statutory tax rates do not state as the main role of an objective indicator for the international comparison because *implicit tax rates* are considered as more objective indicators.[2] This methodology is used e.g. by the European Commission (2012) and Bušovská (2014). The total *tax burden (also called tax quota)* can be also applied for the international comparison of tax burden (Szarowská, 2011).[3] *Tax mix* represents the proportion of individual taxes on the total tax revenue (total tax burden). This indicator informs whether a country prefers direct or indirect taxes (Bušovská, 2014) – see Table 1.

[2] They measure the average effective tax burden of various kinds of economic incomes and activities. In other words, implicit rates inform about the percentage from the given economic activity that is paid to the state on respect of taxes, including social allowances concerning labour (Blechová, 2008).

T a b l e 1

Example of the Tax Mix of the Czech Republic in 2011 (in %)

Taxes on income (IT)	20.34	Tax on payroll (Payroll)	1.75
Social security contribution (SC)	44.06	Tax on goods and services (Indir)	33.84
Other taxes (Other)	0.01	Tax on property (Property)	<0.00

Source: OECD (2012); own processing.

For the above stated reasons, the total tax burden and its individual components classified according to the OECD classification will be used to achieve the objective. In this work, *gross domestic product* (hereinafter referred to as "GDP") is considered as common prices in the purchasing power parity. The term of "*European Union*" denotes a community of 28 EU Member States. The panel regression analysis is based on the annual data of the EU countries since 1965 and the end of the individual time series is stipulated by 2011. The data source comprises secondary information provided by OECD (2012). Tax shares are classified in accordance with OECD classes (Kubátová, 2012) and missing data are excluded.

According to Slavík (2007, p. 5), *convergence* means reducing the difference between two quantities during some time. The aforesaid holds true for the convergence exploration between two countries. The standard deviation or σ-convergence used by Bušovská (2014) are methods that can be used for the convergence determination. The econometric analysis and the related estimations are done in programs Gretl 1.9. and Eviews 7.2. For individual residues, the work uses the following abbreviations presented by the Table 2.

T a b l e 2

Variable Definition

Shortcut	Name	Shortcut	Name
TTB	Total tax burden	SC	Social contribution (tax revenues)
dTTB	1st difference of time period of total tax burden	Payroll	Taxes on wages and salaries (tax revenues)
IT	Income taxes (tax revenues)	Indir	Indirect taxes (tax revenues)
PIT	Personal income taxes (tax revenues)	Property	Taxes on property (tax revenues)
dPIT	1st difference of time period of personal income taxes (tax revenues)	dProperty	1st difference of time period of taxes on property (tax revenues)
CIT	Corporate income taxes (tax revenues)	Other	Other taxes (tax revenues)
dCIT	1st difference of time period of corporate income taxes (tax revenues)	dOther	1st difference of time period of other taxes (tax revenues)

Source: Own processing.

[3] It represents a macroeconomic indicator which is set as the ratio of tax and customs revenues to GDP in going prices. Thus the total tax burden represents a certain proportion of GDP which is redistributed by means of public budgets. This indicator uses information on tax incomes actually collected for GDP by means of which it can inform about the value of the overall effective taxation figure in a given country. *Total tax burden* is more relevant because it expresses the share of all taxes (including social contributions) on GDP (also *TTB*) (Kubátová, 2010).

In view of the fact that it is a time series analysis between 1965 and 2011, it is necessary to check whether time series are stationary when working with them or they are not. The works by contemporary authors suggest unit roots tests of panel data which have greater power than unit roots tests used for checking the stationarity of one-dimensional time series (Novák, 2007, p. 75). We can mention: Levin, Lin and Chu (2002) – test LLC; Im, Pesaran and Shin (2003) – test IPS; Maddala and Wu (1999); Choi (2001) – Fisher-ADF test and Fisher-PP test. These tests are used in the work as well.[5] Consequently, the work uses the panel regression analysis or panel data analysis.[6] A general estimating equation is considered as follows:

$$y_{it} = \alpha + \beta' x_{it} + \delta_i + \varepsilon_{it} \tag{2}$$

where

y_{it} – the explained variable,
x_{it} – k-vector of explanatory variables,
ε_{it} – residual component of the model,
$i = 1 \ldots N$ – cross-section units,
$t = 1 \ldots T$ – time (data flow in time),
α – overall constant of the model,
β' – parameters (coefficients) representing the slope of variables,
δi – cross-section effects
γt – time (periodic) effect.

According to Dougherty (2006) we cannot suppose that in the case of the panel of the EU countries these countries are a random sample of all sovereign states in the world and thus it is necessary to make use of the regression analysis with fixed effects. To confirm this hypothesis the outcomes of the Durbin-Wu-Hausman test were also used of which value confirmed that it is really more adequate to use a panel regression model with fixed effects (Davidson and MacKinnon,

[4] Because this representation eliminates the differences in price levels among countries and allows us to compare even economies which markedly differ in the absolute magnitude. *Purchasing power parity* as an artificially created monetary unit used in international comparisons to express the volume of economic overall indicators.

[5] Their explanatory power according to the null hypothesis (H0: $\rho = 1$) confirms that the monitored time series includes the unit root (it is not stationary). Thus if this is possible, we can reject the null hypothesis, the time series is stationary and it is possible to work with it for panel regression purposes.

[6] A panel stands for a set of units which are similar or related by some characteristic qualities and which are continuously monitored (Novák, 2007, p. 75). A necessary precondition for the possibility of defining a panel and subsequent panel data analysis is that the set of units does not change in time and the missing units are not replaced by new ones.

1989). A properly constructed model also should not show autocorrelation which is why the Durbin-Watson test (Durbin and Watson, 1951) is used in the work.

The work does not handle the issue of tax construction or the choice of optimal tax system; it also does not deal with the question of tax justice or processes and instruments of the EU tax policy. Models results from papers of Kubátová, Vančurová and Foltysová (2008), Foltysová (2007), Delgado and Presno (2007; 2009) and Rivero and Casquero (2010) and Bušovská (2014) and do not reflect the impact of other variables that have got an effect on tax convergence in the EU.

2. Results and Discussion

2.1. Panel Tests of Data

Panel unit root tests have shown that most of time series are already stationary at a 1% significance level which makes it possible to use these data on the purpose of the panel regression analysis. It was necessary to use the first differences of some variables to achieve the stationary data. For further information see the Table 3.

T a b l e 3

Panel Unit Root Tests

Unit Root Test	**TTB**	**Prob**	**Obs**	**TTB 1. difer**	**Prob**	**Obs**	**IT**	**Pro.**	**Obs**	**IT 1. difer**	**Prob**	**Obs**
LLC	–0.827	0.204	769	–11.796	0.000	748	–0.935	0.175	770	–10.60	0.000	749
IPS	–1.067	0.143	769	–14.571	0.000	748	–0.535	0.296	770	–13.93	0.000	749
Fisher ADF	49.493	0.199	769	303.091	0.000	748	41.24	0.504	770	292.28	0.000	749
Fisher PP	51.398	0.152	790	489.211	0.000	769	57.35	0.057	791	521.96	0.000	770
	CIT	**Pro.**	**Obs**	**CIT 1. difer**	**Prob**	**Obs**	**PIT**	**Prob**	**Obs**	**PIT 1. difer**	**Prob**	**Obs**
LLC	–0.069	0.474	747	–10.467	0.000	726	0.083	0.533	945	–7.751	0.000	924
IPS	–4.389	0.000	747	–15.766	0.000	726	0.504	0.693	945	–12.838	0.000	924
Fisher ADF	88.540	0.000	747	328.133	0.000	726	38.223	0.633	945	256.156	0.000	924
Fisher PP	182.859	0.021	768	615.734	0.021	747	39.343	0.588	966	534.493	0.000	925
	SC	**Prob**	**Obs**	**Indir**	**Prob**	**Obs**	**Pro-perty**	**Prob**	**Obs**	**Property 1. difer**	**Prob**	**Obs**
LLC	–3.641	0.000	772	–2.538	0.005	772	–1.506	0.066	771	–12.077	0.000	750
IPS	–3.137	0.000	772	–3.442	0.000	772	–0.156	0.437	771	–16.793	0.000	750
Fisher ADF	76.998	0.000	772	82.600	0.000	772	43.746	0.397	771	345.523	0.000	750
Fisher PP	62.733	0.021	793	87.779	0.000	793	73.125	0.002	792	562.009	0.000	771
	Payroll	**Prob**	**Obs**	**Payroll 1. difer**	**Prob**	**Obs**	**Other**	**Prob**	**Obs**			
LLC	2.769	0.997	772	–4.054	0.000	751	–3.389	0.000	772			
IPS	–4.156	0.000	772	–14.899	0.000	751	–3.721	0.000	772			
Fisher ADF	84.243	0.000	772	315.904	0.000	751	83.006	0.000	772			
Fisher PP	372.130	0.000	793	798.852	0.000	772	66.267	0.009	793			

Source: OECD (2012); own processing.

2.2. Panel Regression Model 1

The convergence of the EU tax systems is represented as the difference between the total tax burden (y_{ttb}) of an individual Member State *s* (*s* = 1… 28) in different years *t* (*t* = 1… 46) and average values in the EU countries (y_{ttbav}) in the given year *t (t* = 1… 46*)* at the left side of the model equation.

The right side of the equation represents the impact of the convergence of individual tax mix components on the total tax burden convergence as a whole (once again, the constants are specific for country *s* and time *t*). δi represents fixed effects in the *s*-th observation (*s*-th country), εit represents a residual component in time *t* and country *s*. The influence of the individual components is calculated for:

1. Income taxes $IT_{s,t}$ as 1st difference $\left(y_{it,s,t} - y_{itav,t}\right)$
2. Social allowances $SC_{s,t}$ as $\left(y_{sc,s,t} - y_{scav,t}\right)$
3. Indirect taxes $Indir_{s,t}$ as $\left(y_{indir,s,t} - y_{indirav,t}\right)$
4. Property taxes $Property_{s,t}$ as 1st difference $\left(y_{property,s,t} - y_{propertyav,t}\right)$
5. Payroll taxes $Payrol_{s,t}$ as 1st difference $\left(y_{payroll,s,t} - y_{payrollav,t}\right)$
6. Other taxes $Other_{s,t}$ as 1st difference $\left(y_{other,s,t} - y_{otherav,t}\right)$.

In which the first value in brackets represents the difference of the value of a given part of the tax mix within an individual Member State *s* (*s* = 1… 28) in different years *t (t* = 1… 46*)* and the average value of the given part of the tax mix in the EU countries in the given year *t (t* = 1… 46*).* The estimating equation is as follows:

$$d(y_{ttb,s,t} - y_{ttbav,s,t}) = \alpha + \beta * dIT_{s,t} + \beta * SC_{s,t} + \beta * Indir_{s,t} + \\ + \beta * d\,\mathrm{Pr}operty_{s,t} + \beta * dPayroll_{s,t} + \beta * Other_{s,t}\delta_i + \varepsilon_{it} \quad (3)$$

The Table 4 presents the outcomes. To gain the results, 774 observations were used and residues of other taxes (*Other*) were excluded because they did not show any significant dependence in the model specified. Model results are presented in the Table 4.

The calculated values show a positive dependence among variables. The increase of e.g. income taxes by 1 percentage point in Member States increases the tax burden convergence in the EU by 0.97% in the same year. The given relations are statistically important already at a 1% significance level. The Durbin-Watson test confirms that residues do not suffer from autocorrelation. As for the panel regression, it is more appropriate to use an adjusted determination coefficient R^2 (Wooldridge, 2006) which indicates that the given model clarifies about a 59.6% convergence value of the total tax burden in the EU.

T a b l e 4

Model 1 Estimation

Variable	Coefficient	Standard deviation	t-test	P-value	
Constant α	–0.0715776	0.0409081	–2.3940	0.01723	***
dIT	0.97608	0.0364901	26.7492	<0.00001	***
SC	0.0725883	0.022536	3.2210	0.00133	***
Indir	0.114497	0.0262755	4.3576	0.00002	***
dProperty	1.03675	0.0725328	14.2935	<0.00001	***
dPayroll	0.535058	0.130096	4.1128	0.00004	***
R^2	0.609131				
Adjusted R^2	0.596084				
Durbin-Watson test	1.978998				
Number of observations	774				

*, **, *** represent significant coefficient of 1% significance level.

Source: OECD (2012); own processing.

The harmonization of indirect taxes is on a high level in the EU, both in the field of selective indirect taxes imposed on selected commodities (called consumption taxes or excise duty) and the general indirect tax, which takes the form of the value added tax. The importance of this type of taxes should grow in the upcoming years as stated by the European Commission (2012).There is also apparent trend to increase indirect taxes in many European Union countries, especially in the recent years after the outbreak of the financial crisis.

This measure (very popular with Member governments) is up to a certain extent induced by the fact that the increase of indirect taxes does not have to have such a negative impact on the domestic economy as the increase of direct taxes (Szarowská, 2011).[7]

In this point, the harmonization is at a higher level than with other taxes and practically has been in progress since the beginnings of the European economic integration. Thus the relatively low level of the impact of the indirect tax convergence (*Indir* with the value of 0.114) on the tax burden convergence of the EU countries is not surprising. This happens because a similar(if not the same) legislative adjustment in the field of indirect taxes does not offer the Member States a greater choice for various types of adaption and thus not even the possibility to reach the average values of the EU countries to a larger extent.

Unlike indirect taxes, the direct taxation field is affected by the European harmonisation trend only marginally. The cooperation of Member States comes through especially when providing information on taxes, avoiding double taxation, taxation of interest or licence fees or when fighting against offshore centres. There have been fruitless discussions for several years concerning the adoption

[7] Indirect taxes also represent a relatively stable and well-predictable source of income.

of the directive adjustment of the common consolidated tax base of corporations at the European level, which was strongly rejected by a number of states. Some Member States perceive the field of income taxation as a part of their national sovereignty which has been developing for centuries on political, geographical, social as well as humanitarian bases and this is why the efforts in this field are in most cases accepted with a negative initial attitude in the Member States.

High rates in the model (*dIT* with the value of 0.976 and *dPayroll* with the value of 0.535) suggest that they have a greater influence on the tax burden convergence than harmonised indirect taxes. To justify the degree of this impact it is also necessary to look at the other side and point out that in the field of income taxes there is still tax competition in the EU Szarowská (2011).

Moreover, it is the tax competition, which is supported especially by the efforts of less developed or new joined Member States to do well on the European market. The result is outflow of tax bases from their residual homelands which results in defensive measures of these residual homelands in the form of reducing taxes as well to beguile tax bases back. There is a clearly visible decrease of the tax level of income taxes in the EU countries, especially in the 1980s up to 2011 Bušovská (2014). The decrease in rates occurs during the whole period, starting in the very half of 1980s further to the new idea approach of supply side economists.[8]

The degree of income and labour force taxes influence confirms the conclusion of Kubátová (2004) who writes that it is not necessary to harmonize taxes artificially since tax competition could lead to the "spontaneous harmonization effect" and theoretically it could also lead to a greater effectiveness of tax systems. In this case, the presumption that the tax competition impacts the tax burden convergence in the European area was confirmed.

The degree of social security contributions (*SC*) influence on convergence is positively dependant (0.072) at a lower than 1% importance level. There is only coordination or rather the same application of several basic rules.[9] In general, it is not the same application of rules but only a certain general frame of the international

[8] The fundamental idea of supply side economics is the hypothesis that the offer of production factors of production is much more flexible than it was assumed by Keynesian economics, which either ignored it completely or considered it negligible. The change of tax rates will evoke arouse various changes in the behaviour of an individual.

The first change is the retirement effect reflecting the fact that to maintain their living standards, an individual increases their working efforts when tax rates increase and vice versa. The second change is the substitution effect that expresses the willingness to reconcile with lower wages accompanied by more free time. As the most important key point could be mentioned is the statement that the changes of marginal tax rates cause changes in prorated labour costs and savings and thus they also cause changes in their offering.

[9] E.g. equal treatment, the only insurance in the EU area, the addition of insurance periods, the payment of benefits, the assimilation of facts and good administrative cooperation.

process of social insurance in the EU. So, there is no application of harmonisation rules in this field since every country uses its own procedures which are based on historical, sociological as well as on political roots. This is also why the degree of the influence on the tax burden convergence is not noticeable.

The last analysed variable that showed a positive influence on the effective tax burden convergence in the EU is property tax revenues (*dProperty* with the value of 1.037). Bušovska´s work (2014) points out the tax mix convergence in the EU between 1965 and 2011 and mentions that the convergence was confirmed in the tax zone of property taxes. However, in the model above, the property tax convergence has the highest value (1.037) and to find out the reason of this value we have to look at its development.

The number of property taxes and rates of these taxes have always differed the most in Europe. Such taxes were very high in some countries. On the other hand, in some other countries there were almost none. The attitude of domestic governments to individual taxes was and probably still is different. Although, in some countries an opinion prevailed that there should be almost no property taxes because double income taxation occurs, other states praised their indisputable influence and the function of solidarity in society. Despite of these great differences, the development took its place in the field of property taxes from 1965 to 2011 and although property taxes differ within the EU and there are still many types of them, we are currently able to note that several main types of property taxes have been embraced by the legislatives of most European countries. Thus the most frequent property taxes in the EU include land tax, building tax, inheritance tax, gift tax, real estate transfer tax and wealth tax. In result, numerous above mentioned different property taxes have been grouped into several main groups in which the rules are applied at a similar level during 46 analysed years.

2.3. Panel Regression Model 2

From the structure of the total tax burden indicator point of view and in respect with the above mentioned model it is not possible to identify all influences that tax mix could causes on its convergence in more details. This is why Model 2 presents a detailed appreciation of the topic and counts in the division of income (*IT*) into personal income taxes (*PIT*) and corporate income taxes (*CIT*). This will bring a closer ascertainment of tax competition influence which will also allow it to be reflected from the position of investors´ taxation and work owner, land and capital. The designation of the individual components of the model is the same as in the above mentioned model, the quantification of the compounds has to be specified as follow:

1. Personal income taxes $PIT_{1,t}$, as the difference $\left(y_{pit,s,t} - y_{pitav,t}\right)$
2. Corporate taxes $CIT_{1,t,}$ as the difference $\left(y_{cit,s,t} - y_{citav,t}\right)$.

In which the first value in brackets represents the difference in a value of a give part of tax mix (personal income taxes y_{pit}) in an individual member state s (s = 1… 28) in different years t (t = 1… 46) and average values of a given part of tax mix (personal income taxes y_{pitav}) in the EU countries in a given year t (t = 1… 46). The estimating equation is as follows:

$$d\left(y_{ttb,s,t} - y_{ttbav,t}\right) = \alpha + \beta * dPIT_{s,t} + \beta * dCIT_{s,t} + \beta * sc_{s,t} + \beta * Indir_{s,t} + \\ + \beta * dProperty_{s,t} + \beta * dPayroll_{s,t} + \beta * Other_{s,t} + \delta_i + \varepsilon_{it} \quad (4)$$

The Table 5 presents results. To reach the outcomes, 719 observations were used and residues of other taxes (Other) were excluded as statistically insignificant variable on 1% significance rate.

T a b l e 5

Model 2 Estimation

Variable	Coefficient	Standard deviation	t-test	P-value	
Constant α	–0.0777575	0.0297032	–2.6178	0.00904	***
dIT	0.984777	0.0706347	13.9418	<0.00001	***
SC	0.972814	0.0461551	21.0771	<0.00001	***
Indir	0.0606861	0.0233824	2.5954	0.00965	***
dProperty	0.126901	0.0285767	4.4407	0.00001	***
dPayroll	0.551633	0.139432	3.9563	0.00008	***
Variable	1.0251	0.0751446	13.6417	<0.00001	***
R^2	0.593507				
Adjusted R^2	0.578843				
Durbin-Watson test	1.932426				
Number of observations	719				

*, **, *** represent significant coefficient of 1% significance level.

Source: OECD (2012); own processing.

As result, the outcomes of Model 2 present a positive impact of all components on tax burden convergence in the specified area. In general, it means that all tax mix components – apart from other taxes (*Other*), where this fact was not proved on significant level of importance so they were excluded from the model – contribute to tax burden convergence in the EU.

Tax burden convergence shows the highest dependence in the area of property taxes convergence (*Property*). The areas of corporate taxes (*CIT*), personal income taxes (*PIT*) as well as payroll taxes (*Payroll*) show high dependence on lower than 1% significance level. Thus the influence of tax competition in the EU could be considered as confirmed and the conclusion as verified: tax competition leads to tax burden convergence in the EU, both in the field of investors and work owners, land and capital. Nevertheless, the influence of corporate taxes

(*CIT*) gains higher values than the influence of personal income taxes (*PIT*) or payroll taxes (*Payroll*) of which the reason can be especially the mobility of labour which is lower with labour than with the mobility of capital, above all during the last years of economic crisis (Wyplosz and Baldwin, 2013).

Since new variables were included, the accuracy of this model went down to approximately 0.579. The Durbin-Watson test confirms the absence of residual autocorrelation. The graphical residual test is sustained.

Conclusion

The work draws on the conclusions of works by Foltysová (2007) and Kubátová, Vančurová and Foltysová (2008), Sosvilla and Tamarit (1999; 2000) and Sosvilla, Simón and Ángel (2001), Delgado and Presno (2007; 2009), Rivero and Casquero (2010), Bušovská and Petrovická (2013), and Bušovská (2014) in which statistical methods proved the tax burden convergence in the EU countries between 1965 and 2011.

The aim of the work was to find out to what degree the components of the effective tax burden (total tax burden) influence the tax system convergence and to what degree the tax system convergence is influenced by tax competition in the EU. The subject of research was a panel of 28 European countries between 1965 and 2011 and missing data were left out of account. To meet the objectives, an analysis of available literature was made in the contribution thanks to which tax competition was defined.

Secondary data from the OECD database for period of 1965 – 2011 were used and subsequently applied to a panel regression analysis with fixed effects. Two models were designed, both of which showed significant dependence on significance level lower than 1%. Moreover, according to the Durbin-Watson test, the models do not suffer from residual autocorrelation and work with stationary time series.

Both models provide a proof of positive dependence of fixed residues when 774 observations were made in the first case and 719 in the second one. The outcomes confirm that all parts of a tax mix and their changes affect tax burden convergence in the EU. Surprisingly, the greatest influences are shown in the area of property taxes in which, in the period under consideration, six main groups were generated from the originally enormous number of taxes and which are currently used in all Member States.

The degree of the influence of income taxes and labour taxes confirms the conclusion of Kubátová (2004) that taxes do not need to be harmonised artificially as tax competition can lead to the “spontaneous harmonisation effect” and

theoretically also to greater effectiveness of tax systems when the competition of taxation systems leads to the increase of economic stimuli of individual taxes and public budgets savings, which was also proved in the work by Szarowská (2011). In this case, the presumption that tax competition has a really great impact on the growth of gross domestic product in Europe was confirmed.

The conclusions above follow the hypothesis that the tax burden convergence is influenced by all applied taxes. Moreover, the greatest share of the tax burden convergence was borne by tax competition and property taxes between 1965 and 2011. Although, one would think that the impact of indirect harmonized taxes should be the greatest, it is not the case.

Though the tax burden convergence is actually influenced by more factors than only by its structure, the values of the adjusted determination of the coefficient of the estimated models ranged from 58% to 60%. All models also satisfy diagnostic tests and thus they are robust enough from the econometrical point of view. Hence the estimated results could be considered relevant with satisfactory significance power.

The whole work is based on the methodology of new Keynesian economics according to which the econometric model used can only help to reveal the relations among variables but its conclusions do not confirm nor disprove the validity of the economic theory. This is why recommendations for the economic policy cannot be drawn from the outcomes of the model. The work provides a basis for further possible research in the same direction when it is possible to include additional variables in the model, e.g. the mobility of labour or the influence of the harmonisation legislative of the tax policy within the European Union.

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