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Corporate Tax in Europe: Towards convergence?

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Abstract:

In this paper, we analyse whether there has been any convergence in statutory corporate tax rates within a pool of European countries. We find that there has been some degree of convergence; specifically we find four main convergence clubs.

JEL classification: C22, E62

Key words: convergence clubs, tax policy, Europe.

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1. Introduction

Europe, and in particular EU member states[1], have applied a series of harmonisation measures in order to move towards a more integrated economic area. However, tax systems and, fiscal policy more generally, have been left to the discretion of each of the countries. In this paper we analyse to what extent these countries have converged in their corporate tax rates.

Past studies have found a declining trend in corporate income tax rates around the world (and certainly including Europe), including Slemond (2004) and Devereux et al. (2008) for developed countries and Abbas and Klemm (2013) for transitional and developing countries. This paper is one of a small number of recent contributions that examine the related but separate research question: is there also a negative trend in the dispersion of corporate tax rates? Rather than a single measure of central tendency, we look at the evolution of the whole distribution. The heterogeneity in tax setting in Europe is analysed by applying the new methodology of cluster analysis and panel convergence proposed by Phillips and Sul (2007; 2009).

Studies of tax convergence usually focus on the tax burden and fiscal pressure (e.g. Delgado and Presno, 2010; Apergis and Cooray, 2013). In this study, by contrast, the variable of interest is the statutory tax rate, rather than revenue, using data from the OECD tax database supplemented with the World Tax Database and the KPMG Corporate and Indirect Tax Rate Survey (2009-2014). The rest of this note is organised as follows: Section 2 presents the tax convergence issue and Section 3 the results. The last section concludes.

2. Tax convergence

Phillips and Sul (2007) have developed the *logt* test which focuses on the evolution over time of the individual transition path compared to the common growth component. The relative transition coefficient $h_{it} = y_{it}/\bar{y}_t$ is defined where the original variable is compared to the cross-section average $\bar{y}_t$, eliminating the

[1] We use two data sets. The first one for 19 European countries, for 1980-2014, and the second one with the original 19 + 6 Central and Eastern European countries, for 1993-2014. We gratefully acknowledge an anonymous referee for pointing this clarification.

common growth path. The *logt* test is a time series regression where a transformation of the cross-section variance of h_{it} ($\sigma^2_{h\,t}$) is regressed against $\log(t)$, whose coefficient is the one of interest.

$$\log(\sigma^2_{h\,1}/\sigma^2_{h\,t}) - 2\log[log(t)] = c + b\log(t) + u_t \quad (1)$$

This particular form of the regression is obtained by modelling the dynamic behaviour of h_{it} in a semiparametric form. If $h_{it} \to 1$ as time evolves for all economies, then $\sigma^2_{h\,t} \to 0$ and there is convergence. In equation (1), this is captured by a positive coefficient of $\log(t)$. The null hypothesis of convergence is a one-sided test based on the t-statistic of $\hat{b}$ ($H_0: b \geq 0$). Since the *logt* test is based on the variance of a transformation of the variable of interest, this test is more closely related to sigma than other concepts of convergence.

In addition, Phillips and Sul (2007) develop a four-step clustering algorithm where convergence clubs are identified by endogenised groupings. The algorithm applies the *logt* test iteratively based on the country ordering towards the end of the period. However, Phillips and Sul (2009) state that the algorithm in Phillips and Sul (2007) tends to over-estimate the number of convergence clubs. Hence, they propose to merge the cluster using the same test.

The idea behind the Phillips and Sul (2007, 2009) method is to test whether idiosyncratic components within a group of individuals convergence to a common factor. If that is the case, then we can say that there is evidence of convergence.

3. Results

Applying the cluster algorithm, five convergence clubs are found. They have been ordered in Table 1 in descending order according to the last five year average corporate tax rate. The *logt* test in column [3] fails to reject the null of convergence (i.e. convergence within each cluster), while columns [4] and [5] perform the *logt* test to check whether the clusters can be merged. Since clusters 2 and 3, as well as 3 and 4, can be merged in column [4], column [5] tests whether clusters 2, 3 and 4 can all be merged together: the three central clusters are merged into one. Hence, there are three

convergence clubs: a large cluster with 13 countries in the centre of the distribution and two small clusters (three countries each) at the two tails (see column 6 for their composition). Additionally, the *logt* test in column [8] rejects the null of overall convergence.

Figure 1 shows that the general downward trend in corporate tax rates emphasised in previous studies can be observed within each of the three clusters, but at different speeds. In Club A average tax rates were consistently reduced over this period from over 30 per cent to an average rate of 10 per cent from 2003. Clubs B and C averaged over 40 per cent at the start of the period; however, while club C countries only reduced their rates to around 34 per cent, countries in club B reduced their rates, on average, 10 percentage points further. Figure 2 computes the relative transition coefficients (h_{it}) using the average tax rates from Figure 1. Although all clubs reduced their tax rates over this period, they have not converged towards the same rate. On the contrary, Figure 3 shows that dispersion within clubs is falling over time.

Cyprus, Ireland and Switzerland, the members of Club A with the lowest tax rates of the sample, are usually considered to be tax havens. Cluster C is composed of the countries that had high rates in 1980 and become the highest at the end of the period. Cluster B consists of the remainder countries which are EU member states plus Norway.

In Table 2, we repeat the cluster analysis adding six Central and Eastern European countries (CEECs) for the period 1993-2014[2]. The *logt* test in column [5] suggests there is no overall convergence. Instead, there are now four convergence clubs. The *logt* tests in column [3] confirm that there is convergence within each cluster. The results in column [4] suggest none of the clusters can be merged. The composition of the clubs is very similar to Table 1, with the addition of a new cluster (convergence club D), which includes most of the CEECs. The negative trends of the average tax rate across clubs and the increase in dispersion in Figures 4 and 5, respectively, have not changed much from Figure 1 and 2[3]. Cluster D is located between clusters A and B. Countries in the new cluster D have engaged in strong tax cuts.

[2] Due to data availability.

[3] The Figures with new transition curves are omitted due to sample limitation but they are available upon request from the authors. Results are not quantitatively different from Figure 3.

The tax competition literature has proposed that convergence may be explained by strategic behaviour of governments competing for the location of corporations (e.g. Slemrod, 2004). The convergence result would reinforce the general wisdom that tax competition amongst regions produces a Nash equilibrium and, at the same time, would help to identify which countries are competing with each other.

Tax convergence may be part of globalisation and economic integration in Europe. Bretschger and Hettich (2002) find a negative and significant impact of globalisation on corporate taxes for fourteen OECD countries. Tax convergence may be explained as part of a cooperative game where governments recognise the importance of transnational enterprises in an integrated world, which would push towards a more homogenous tax setting where countries with relatively high corporate taxes cut down their rates.

4. Conclusions

In Europe, tax convergence has taken the form of club convergence. Overall, the dispersion of corporate tax rates has fallen over 1980-2014, mainly through cuts in rates. The results show heterogeneous tax setting behaviour across the 25 European countries, with four clubs: the tax havens (Club A), a core of Eastern European countries plus Luxembourg (Club D), the high tax countries (Club C) and a large club with 12 Central-Western European countries (Club B).

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Table 1. Club convergence – 19 European countries, 1980-2014

Convergence clubs [1]	Tax rate Mean [2]	logt test Cluster conv. [3]	Cluster merging 1 [4]	Cluster merging 2 [5]	Final convergence clubs [6]	Tax rate mean [7]	Overall Conv [8]
Cluster 5: Belgium, France and Malta	34.1	0.389 (1.093)			**Cluster C:** Belgium, France and Malta	34.1	
			-1.065** (-1.829)				
Cluster 4: Finland, Netherlands, Portugal and Spain	26.0	0.344 (0.745)			**Cluster B:** Finland, Netherlands, Portugal, Spain, Austria, Denmark, Greece, Italy, Norway, Sweden, Germany, Luxembourg and United Kingdom	24.4	-1.244*** (-8.836)
			1.141 (4.258)	0.336 (0.932)			
Cluster 3: Austria, Denmark, Greece, Italy, Norway and Sweden	25.5	-0.001 (-0.003)					
			0.091 (0.241)				
Cluster 2: Germany, Luxembourg and United Kingdom	20.1	-0.649 (-1.060)					
			-0.743*** (-4.419)				
Cluster 1: Cyprus, Ireland and Switzerland	10.7	0.177 (0.408)			**Cluster A:** Cyprus, Ireland and Switzerland	10.7	

Notes: Columns have been numbered. The last five year club average tax rate can be found in column [2]. Columns [3], [4], [5] and [8] contain the logt convergence test. Column [3] tests the (within) cluster convergence while cluster merging is performed in columns [4] and [5]. Overall convergence is tested in column [8]. The logt test is one-sided, with critical values of -2.33, -1.65 and -1.28 (at 1%, 5% and 10% significance levels, respectively), and the null hypothesis implies convergence. All t-statistics are HAC consistent, Newey-West type. ***, **, * stands for 1%, 5%, 10% significance level.

Figure 1: Average tax rate across clusters

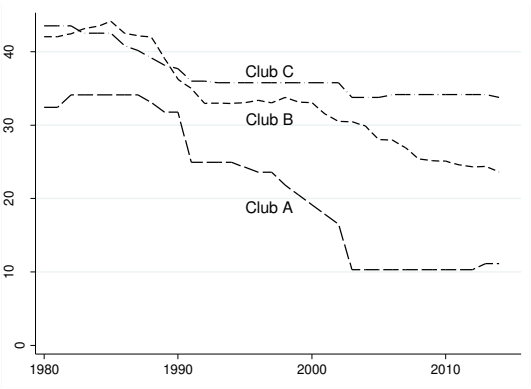


Figure 2: Transition curves among clusters

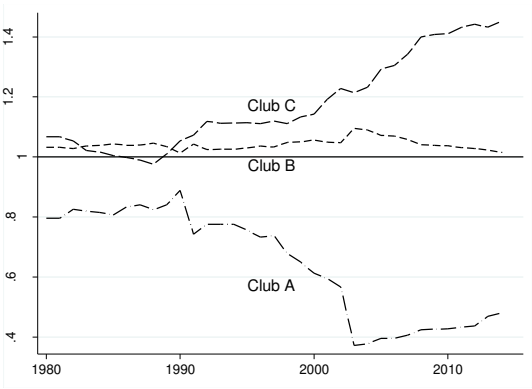
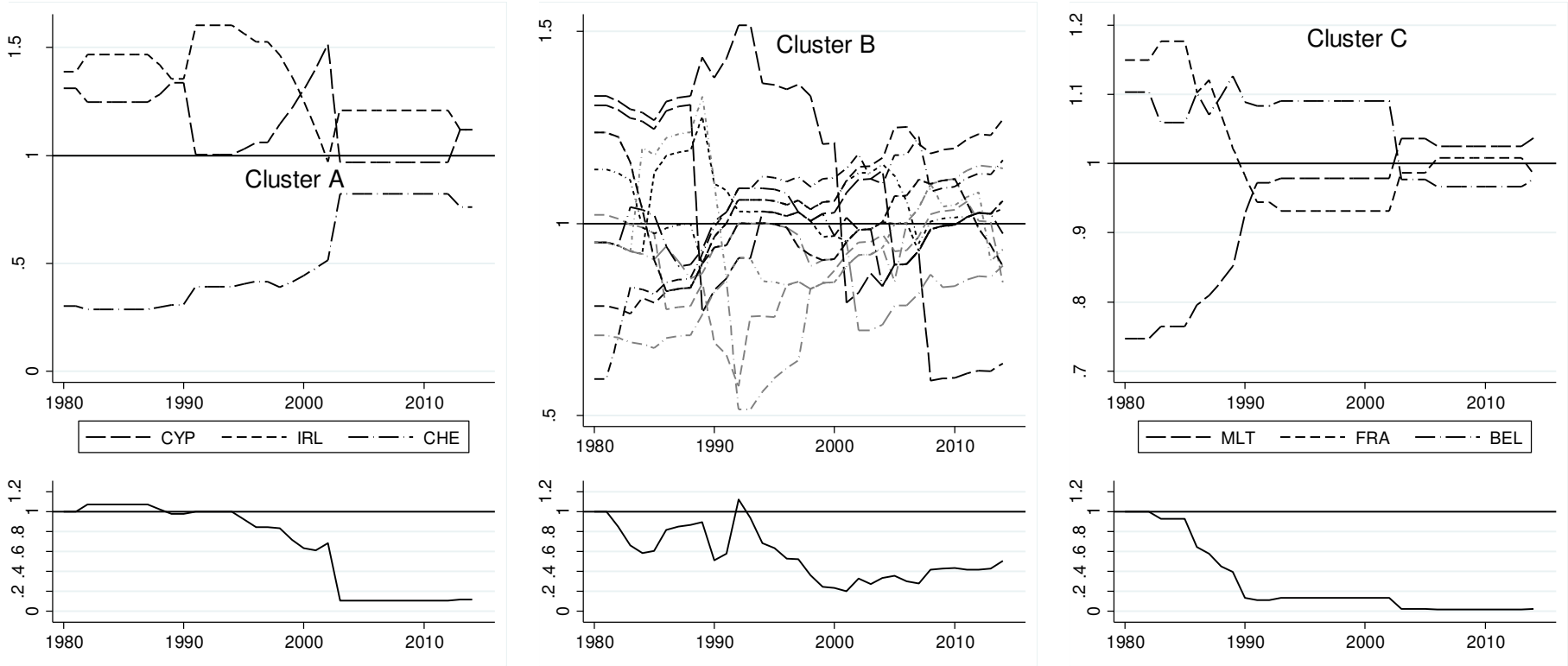


Figure 3: transition curves across clusters



Notes: The three plots on top show the transition curves of the members of each cluster. In all cases, dispersion is diminishing. The bottom three plots show the variance of the transition curves, normalized by its value in 1980. The dashed line added in the dispersion plot for cluster B shows the variance of the transition curves without Germany.

Table 2. Club convergence – 25 European countries, 1993-2014

Convergence clubs [1]	Tax rate mean [2]	logt test Cluster conv. [3]	logt test Cluster merging [4]	logt test Overall conv. [5]
Cluster C: Belgium, France and Malta	34.1	0.678 (1.733)		
			-0.976*** (-9.119)	
Cluster B: Austria, Denmark, Finland, Greece, Hungary Italy, Netherlands, Norway, Portugal, Spain, Sweden and UK	25.6	-0.209 (-0.856)		
			-0.577*** (-2.404)	-1.285*** (-10.91)
Cluster D: Luxembourg, Czech Rep., Estonia, Poland, Slovakia and Slovenia	19.7	-0.040 (-0.071)		
			-0.573*** (-2.938)	
Cluster A: Cyprus, Germany, Ireland and Switzerland	11.8	0.565 (1.220)		

Notes: Columns have been numbered. Overall convergence is in column [5] now. See notes in Table 1 for the other columns.

Figure 4: Average tax rates across clusters

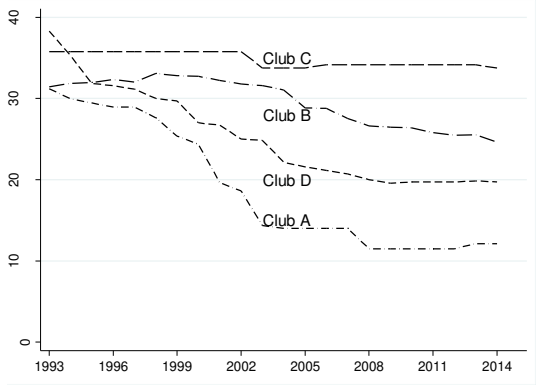


Figure 5: Transition curves among clusters