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Are Taxes Converging in Europe? Trends and Some Insights into the Effect of Economic Crisis

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Abstract

In this note we empirically revise the task of tax convergence in the European Union, paying attention to the possible effects derived from the deep economic crisis. For this purpose, beta and sigma convergence are estimated for the period 1965-2010 from OECD data with the main subdivisions generally used in the tax area. The results reported suggest the existence of overall convergence of the tax structure and the tax burden in the period 1965-2010, but with clear nonlinearities, as the major advances took place up until the end of the 1980s.

Keywords: Convergence; Tax policy; European union; Economic crisis

Introduction

Economic convergence has received much attention in the last three decades, and has generally focused on per capita income, productivity or inflation rates. However, far fewer studies exist to date on fiscal convergence. In the European context, the advancing economic integration process, fiscal harmonization policy and tax competition - harmful or not - could reduce the gap amongst the national tax sets. In this note we study convergence in both the tax level and tax structure in the European Union over the period 1965-2010, paying special attention to more recent years in order to examine the effects of the economic crisis on reducing differences within the European tax system.

One of the consequences of the economic crisis is the necessary revision of the overall public sector and the fiscal policy in particular. Hence this study aims to determine if the packages of measures approved in the European countries have impacted on the convergence path in tax policy or they are rather medium or long-term measures.

Regarding previous studies on this topic for Europe, [1] find evidence of convergence of total fiscal pressure for the period 1967-1994, while [2] conclude that there was a certain convergence of the tax mix for the period 1965-1995. [3] Rejected the convergence hypothesis for fiscal policies among eight EMU countries for the period 1970-2000. [4] Examined the fiscal convergence of the ten eastern members. [5] Reported convergence for the period 1965-2005 and he also presented the results from a cluster analysis from tax variables. [6] using unit roots and stationarity tests with a structural change, found little evidence of tax convergence in the period 1965-2005. [7] Through deterministic and stochastic approaches also reported a lack of convergence. More recently, [8] revise the harmonization process in the EU but without empirical results.

The rest of the paper is organized as follows. Section 2 describes the methodology. Section 3 presents the main results and finally Section 4 concludes.

Measures Of Tax Convergence

The temporal evolution of the tax mix can be quantified with distance measures. Specifically, we follow the studies by [2] and [5] For n countries, the index (D) measures the average fiscal distance of the national structures with respect to the average tax mix:

$$D_t = \frac{1}{n}\sum_{i=1}^{n} D_t^i = \frac{1}{n}\sum_{i=1}^{n}\sum_{j}\left|R_{jt}^i - R_{jt}^{EU}\right| \quad (1)$$

Where i: country, j: taxes, t: year, EU: the average and R: proportion of each tax in the total tax revenue.

Regarding the tax burden convergence, the techniques from the empirics of the growth convergence are applied. Sigma convergence is based on the evolution of the dispersion of tax variables. This dispersion is analysed with several measures including the standard deviation of the logarithms, the coefficient of variation and inequality indexes such as the Gini or Theil indexes, with similar results, so we report the coefficient of variation (CV). Additionally we compute annual rates of sigma convergence.

$$CV_t = \frac{\left(\frac{1}{n}\sum_{i=1}^{n}\left(y_{it} - \overline{y}_t\right)^2\right)^{1/2}}{\overline{y}_t} \quad (2)$$

where y: tax and$y$: the average.

Also interesting is the estimation of beta convergence, where the growth in the variable is regressed on the initial values, i.e., the so-called "Barro regressions". This concept of convergence implies that countries with low-values grow faster than countries with high-values. This approach also permits the estimation of the annual beta convergence rate (v).

$$\ln\left(\frac{y_T}{y_0}\right) = \alpha + \beta \ln(y_0) + \varepsilon \quad (3)$$

where: T is the final year (2010) and β is the relevant parameter, and a significant negative value means beta convergence in taxation.

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Data and Main Results

We employ data from Revenue Statistics (OECD) for the period 1965-2010. The 15 Member States of the European Union as of December 31, 2003 - EU-15 - are analyzed due to the lack of information for the rest of members and the long membership of those countries. The Total Tax Burden (TB) is the relation between the total tax revenue and the Gross Domestic Product (GDP). Its three main sources are income and Profits (IP), Social Security (SS) and Goods And Services (GS). Table 1 contains the summary statistics and Figure 1 plots the deviations of the total tax burden from the average in 1965 and 2010. We observe that the four rescued countries are found in the same quadrant (-,-). Despite this fact, only Italy has positioned on the quadrant (-,+). The study of the tax structure is based on the proportion of the six subdivisions of the OECD tax statistics over the total tax revenue: 1000-Taxes on income, profits and capital gains; 2000-Social security contributions; 3000-Taxes on payroll and workforce; 4000-Taxes on property; 5000-Taxes on goods and services; 6000-Other taxes. Table 2 contains the statistics of the tax mix, again for the three major categories.

The tax mix

Figure 2 shows the evolution of the tax structure heterogeneity.

	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010
Total tax burden (TB)										
Average	27.6	29.7	32.1	34.8	37.5	38.1	38.8	40.3	39.4	38.4
Minimum	14.7	15.9	18.4	21.8	24.5	26.4	29.1	30.9	30.1	27.6
Maximum	34.2	38.4	41.3	46.4	47.4	52.3	48.8	51.4	50.8	47.6
Range	19.5	22.4	22.8	24.6	22.9	25.8	19.7	20.6	20.7	20.0
Income and profits (IP)										
Average	8.8	9.9	11.3	12.2	13.0	13.3	13.3	14.4	13.6	12.9
Minimum	1.6	2.4	2.6	4.2	4.5	5.3	6.5	9.2	7.9	6.8
Maximum	18.3	20.5	22.7	23.8	26.6	28.0	30.1	29.8	31.2	29.1
Range	16.6	18.1	20.0	19.6	22.1	22.7	23.6	20.6	23.3	22.3
Social security (SS)										
Average	6.2	6.8	8.8	9.9	10.7	10.7	11.3	11.0	10.9	11.1
Minimum	1.1	1.2	0.2	0.6	1.4	0.9	1.1	1.8	1.1	1.0
Maximum	11.7	12.5	15.6	17.1	18.8	18.5	18.4	16.0	16.3	16.6
Range	10.5	11.3	15.4	16.6	17.4	17.6	17.4	14.2	15.2	15.6
Goods and services (GS)										
Average	10.4	10.6	9.8	10.6	11.6	11.7	12.0	12.0	11.9	11.5
Minimum	6.0	4.8	4.5	4.7	7.8	9.0	9.2	10.2	10.1	8.6
Maximum	13.1	14.9	13.2	16.1	15.8	15.4	15.7	15.9	16.3	15.2
Range	7.1	10.1	8.8	11.5	8.0	6.4	6.5	5.7	6.1	6.6

Table 1: Summary statistics of the tax burden (%GDP) – EU(15) – 1965-2010.

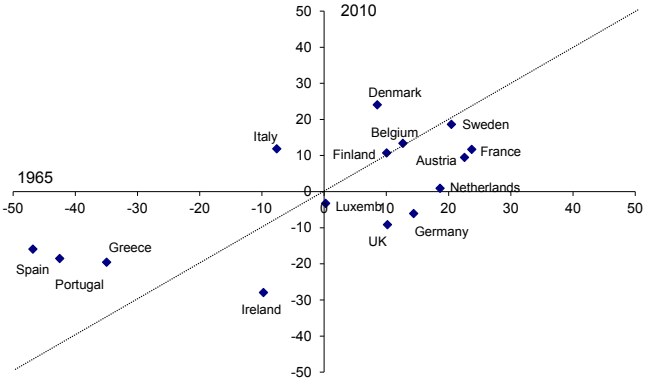

Figure 1: Relative deviation (%) of total tax burden to average (1965-2010).

	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010
Income and profits (IP)										
Average	30.4	31.6	33.0	33.6	33.7	34.2	33.5	35.2	33.7	32.9
Minimum	9.1	11.8	13.3	16.8	16.0	16.1	16.3	24.9	23.5	21.9
Maximum	54.9	54.2	59.0	55.4	57.7	60.1	61.7	60.3	61.3	61.1
Range	45.8	42.4	45.7	38.6	41.7	44.1	45.5	35.4	37.8	39.2
Social security (SS)										
Average	22.7	24.2	28.6	29.1	28.9	28.3	29.2	27.4	28.0	29.3
Minimum	3.8	3.2	0.6	1.3	3.0	2.0	2.2	3.6	2.2	2.1
Maximum	34.2	37.8	47.5	48.6	44.3	44.1	43.0	39.0	39.9	39.0
Range	30.4	34.6	46.9	47.2	41.3	42.1	40.8	35.4	37.8	36.9
Goods and services (GS)										
Average	38.5	36.6	31.5	31.2	31.6	31.6	31.4	30.1	30.6	30.5
Minimum	24.7	20.5	21.3	20.7	24.6	25.0	25.7	24.6	25.3	25.0
Maximum	52.6	52.4	46.8	46.5	44.4	44.5	43.3	39.6	43.1	39.4
Range	27.9	32.0	25.5	25.9	19.9	19.6	17.6	15.0	17.8	14.4

Table 2: Summary statistics of the tax mix (% taxation, three major components) – EU(15) – 1965-2010.

After one decade (1965-75) of divergence, convergence of the tax mix occurs in 1975-80 and again in 1986-91. At the end of the period, namely 2010, fiscal heterogeneity is similar to what it was in 1991, illustrating that the economic crisis had no significant effect on the tax mix.

From a disaggregated perspective, the deviations of each country from the average tax structure (1965, 1990 and 2010) and the variation in the period 1965-2010 (positive implies that the distance has increased) are represented in Table 3. The individual fiscal distance is 0 when the country has the same tax mix as the average and equal to 2 when the tax structure is totally different. The countries appear in descending order, i.e. from more to less disparity in relation to the average, and we observe several changes between the initial and final status. Indeed Finland has passed from the 5th place to the last place in this ranking, while Denmark has now the most different tax mix. Therefore, Denmark has notably increased the gap between 1965 and 2010 (42.91%), with drops in 11 countries.

Sigma-convergence

The evolution of the dispersion of the tax burden, measured through the coefficient of variation, is represented in Figure 3. The existence of sigma-convergence for the overall period is absolutely clear in all cases, with a similar pattern. However, the path is not constant and the convergence can be mainly identified for the following intervals: total tax burden and good and services, 1979-1992; social security, 1965-1977; income and profits, 1973-1983 and 1995-2001. It is clear that this discontinuity will reflect on the estimates of beta convergence. Regarding the last years of the sample (crisis), we appreciate an increase in the tax burden for income and profits. This movement was motivated by the decision of some countries to raise these taxes, but this trend is not general among the members analysed.

Some numerical results of the sigma convergence approach are given in Table 4. The annual rate of σ-convergence is 0.73% for the total tax burden, with smaller rates for income and profits (0.46%) and a similar one for social security contributions (0.73%). Finally, the rate for goods and services is superior to the aggregate (0.82%). As noted above, these rates are higher in the specific time intervals when the process is concentrated. Here the effects of the economic crisis can be noted somewhat as both the total tax burden and taxes on income and profits have their minimum CV in 2007.

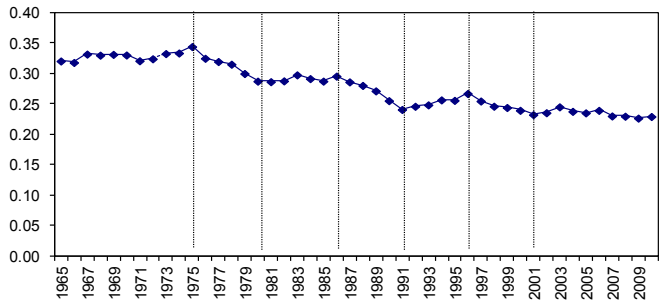

Figure 2: Convergence of the tax mix - EU(15) – 1965-2010.

1965		1990		2010		Var(%)
Sweden	0.5241	Denmark	0.5879	Denmark	0.6331	42.91
Ireland	0.4854	France	0.4557	France	0.3532	-2.81
Greece	0.4770	Greece	0.3239	Greece	0.3108	-34.83
Denmark	0.4430	Ireland	0.3030	UK	0.2565	-17.11
Finland	0.4026	UK	0.2723	Austria	0.2359	26.68
France	0.3634	Portugal	0.2708	**EU-15**	0.2297	-28.41
Luxembourg	0.3220	**EU-15**	0.2557	Ireland	0.2208	-54.52
EU-15	0.3208	Austria	0.2218	Germany	0.2095	31.80
UK	0.3095	Germany	0.1968	Spain	0.2071	21.85
Italy	0.2994	Luxembourg	0.1953	Portugal	0.1932	-1.07
Netherlands	0.2888	Netherlands	0.1949	Sweden	0.1827	-65.13
Portugal	0.1953	Sweden	0.1943	Netherlands	0.1604	-44.47
Belgium	0.1866	Spain	0.1767	Belgium	0.1360	-27.12
Austria	0.1862	Belgium	0.1642	Italy	0.1304	-56.45
Spain	0.1700	Italy	0.1486	Luxembourg	0.1242	-61.45
Germany	0.1590	Finland	0.1297	Finland	0.0914	-77.29

Table 3: Fiscal distance to average.

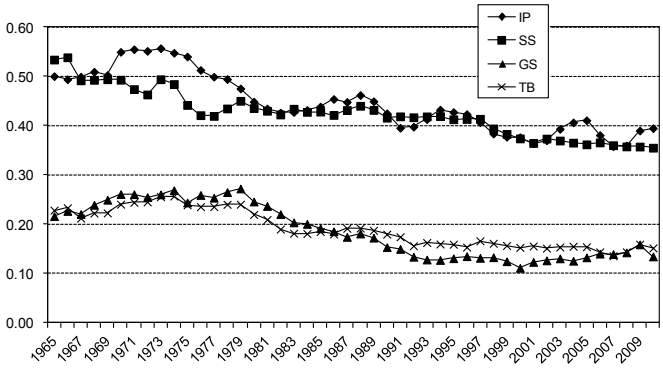

Figure 3: σ-convergence (CV) of the tax burden - EU(15) – 1965-2010.

	Total tax burden	Income and profits	Social Security	Goods and services
CV 1965	0.2257	0.5007	0.5344	0.2168
CV 2010	0.1523	0.3952	0.3556	0.1349
CV Min (year)	0.1363 (2007)	0.3585 (2007)	0.3556 (2010)	0.1118 (2000)
CV Max (year)	0.2575 (1974)	0.5574 (1973)	0.5390 (1966)	0.2728 (1979)
Annual rate of σ-convergence	-0.73%	-0.46%	-0.73%	-0.82%

Table 4: σ-convergence of the fiscal pressure - EU(15) – 1965-2010.

	Total tax burden	Income and profits	Social security	Goods and services
β	-0.6038***	-0.6130***	-0.2682	-0.7336***
t	-5.08	-5.69	-1.56	-5.32
Adj R^2	0.640	0.692	0.093	0.661
v (%)	2.06	2.11	0.69	2.94

*** Significant at 1% level

Table 5: β-convergence of the tax burden - EU(15) – 1965-2010.

Beta-convergence

The estimates of beta convergence are summarized in Table 5. For the overall period, the convergence rate is about 2.06% for the total tax burden, 2.11% for the income and profits and 2.94% for the goods and services. Nevertheless, the results for social security contributions are not significant, so we cannot conclude the existence of β-convergence for that figure (there is beta convergence in the period 1965-1977 only, as can be noted in the sigma results in Figure 2).

Regarding the previous results provided in a similar study for the period 1965-2003, [5] reported bigger annual rates of beta and sigma convergence, so the tax convergence process in the EU has not intensified in recent years despite the efforts of the European authorities to promote greater economic integration.

Concluding Remarks

In this note we study tax convergence in the European Union, paying attention to the possible effects derived from the deep economic crisis and the measures approved in most countries. The results reported suggest the existence of overall convergence of the tax structure and the tax burden in the period 1965-2010, but with clear nonlinearities. Indeed, the reductions in the difference among taxes have not been continuous and the major advances took place up until the end of the 1980s. Since then, fiscal convergence in the EU has hardly progressed, and the recent economic crisis has not yet had a clear impact on the indicators, which reflects a worrying lack of ambitious targets in fiscal integration among the European countries. Additionally, the study of the three main tax sources –income and profits, social security contributions and goods and services- reveals that convergence is based on the taxes on goods and services, due to fiscal harmonization in the EU. Perhaps the economic crisis and the new role of the public sector in Europe have more pronounced effects in the next years and hence further empirical studies will be needed in the future.

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