

ORIGINAL SCIENTIFIC PAPER

## Social Protection Convergence in the European Union: Impact of Maastricht Treaty

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**Summary:** The main goal of this paper is to test the convergence of social protection expenditures and, more specifically, to examine the incidence of the Maastricht Treaty on this process. We tested several hypotheses of convergence on 12 EU Member States between 1980 and 2000, by considering two indicators: social protection expenditure as percentage of GDP and social protection expenditure per capita. The cross sectional tests of  $\sigma$  and  $\beta$ -convergence show that, for the two indicators, these two assumptions are checked for the whole of the period. On the other hand, the period division in two sub-periods intended to locate the Maastricht effect indicates a rupture since 1993. Then, panel data estimations of conditional  $\beta$ -convergence confirm the existence of a process of conditional convergence and reveal the significant role of the debt criterion of Maastricht. The coexistence of absolute and conditional  $\beta$ -convergence is not incompatible. It evokes the possible idea of a European "Social Snake" rather than of a single Social Model.

**Key words:** Welfare-state, Social protection, Convergence, European Union, Panel data estimation

**JEL:** H53, O52, I38

### Introduction

The European Construction has been based on the choice of a model of market integration letting the social dimensions lag behind. According to the founding fathers of the EEC, economic integration would promote progress in social protection across participating countries and such social progress would more or less spontaneously follow economic progress. Social protection systems fully remain in the realm of national sovereignty according to the subsidiarity principle.

Beginning in the eighties, the majority of EU countries have been facing similar challenges (weak growth, unemployment, aging population) enhancing the demand for social transfers while at the same time external pressures have

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reduced policy makers' room to maneuver. Globalization has been increasing economic and tax competition. In the same way, the Maastricht Treaty and the Stability and Growth Pact require drastic reduction in government deficits and the public debt. All in all, these challenges raise the question of the viability of heterogeneous social protection systems in such a context grounded on fears of a convergence towards the bottom of welfare provision. However, the design of social protection has witnessed changes in recent years. Rather than being exclusively regarded as production costs, social protection now seems to be considered as a possible lever at the service of European unification. Indeed, since the Summit of Lisbon (2000), the Member States are committed to applying the "Open Method of Coordination" to social policy. However, in contrast to the PSG, this policy instrument does not offer the option of sanctions; besides, the subsidiarity principle is completely preserved. However, if this principle suggests the maintenance of some diversity among European welfare states, the common challenges and constraints that EU countries are facing raise the issue of similar features in the future paths of social protection expenditure. In the context of these policies and trends, the main goal of this paper is to empirically address the impact of European policy integration on social protection expenditures of the 12 EU countries over the period 1980-2000. More precisely, we examine the issue of whether the conditions for single currency settings affect the dynamics and speed of convergence of social protection systems. Although some recent studies give evidence as to the convergence of social protection expenditure among EU countries, to our best knowledge, none of them have included variables relating to Maastricht as conditioning factors in order to tackle the impact of the European integration policy.

The paper is organized as follows. Section 2 exposes briefly the convergence concepts issued from growth empirics (applied to the area of social protection expenditure) and then reviews the empirical evidence on social convergence from recent studies. Section 3 presents evidence on the two concepts of convergence. More specifically, hypotheses of  $\sigma$  and  $\beta$  are first tested using cross-sectional regressions. Then, a more rigorous test is performed by moving to the concept of conditional  $\beta$ -convergence and panel data techniques in order to identify a possible Maastricht effect. Concluding comments are then given in section 4.

## **1. Concepts of $\sigma$ and $\beta$ Convergence and Review of Findings on Social Convergence**

Some recent works adapt the empirical methods of the literature on economic growth to analyze the degree of convergence of social protection expenditures.

### **1.1. Hypotheses of Convergence**

They use the two concepts of convergence resulting from growth empirics.

The first one, known as  $\sigma$ -convergence seeks to study whether the dispersion of per-capita income is reduced over time. Thus, convergence exists if the standard deviation or the coefficient of variation of social protection expenditures across a group of countries tends to decrease significantly over time. Indexing by  $t_0$  the initial date and by  $T$  the final date of reference under the period considered, the Fisher statistics can be used to test the null hypothesis ( $H_0: \sigma^2_{t_0} = \sigma^2_T$ ) against the alternative hypothesis ( $H_1: \sigma^2_{t_0} > \sigma^2_T$ ) at a given level of significance.

The second design corresponds to the concept of  $\beta$ -convergence (Barro and Sala-I-Martin, 1996). It attempts to evaluate whether the standards of living of the various economies tend to approach each other over time in order to highlight the tendency of a poor economy to grow at a faster rate than a rich one. Applied to social protection, this design, often called "regression towards the mean" (Barro and Salt-I-Martin, 1996), is based on the estimation of the following model:

$$\left(\frac{1}{T}\right)\ln\left(\frac{y_{iT}}{y_{i0}}\right) = a + \beta \ln(y_{i0}) + \varepsilon_{iT} \quad (1)$$

Where the left-hand side is the average annual growth rate of social protection expenditure in country  $i$  at time  $T$ ,  $(a)$  is a constant term and  $\varepsilon$  is the error term. The parameter  $\beta$  is a measure of  $\beta$ -convergence. A mechanism of  $\beta$ -convergence is observed when there is a significant and negative relation ( $\beta < 0$ ) between the initial level of the variable and its annual growth rate. If this assumption is checked for welfare expenditures, then it would indicate that countries with initially low levels of SP expenditure would experience faster SP expenditure growth than countries whose levels of expenditures have reached a certain stage of maturity. It follows that, regardless of their economic, social and institutional specificities, all countries in the sample converge to the same steady state<sup>1</sup>.

To supplement these studies, the assumption of conditional  $\beta$ -convergence induced from the endogenous growth literature was tested. This concept analyzes the convergence of each country towards its own steady state;

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<sup>1</sup> The speed of convergence can be estimated by NLLS using the following specification :

$$\left(\frac{1}{T}\right)\ln\left(\frac{y_{iT}}{y_{i0}}\right) = a - [1 - \exp(-bT)/T]\ln(y_{i0})$$

It makes it possible to derive the number of years ( $T$ -half) it would take for one-half of social expenditure differences between member countries to come up to the EU average.

it suggests that convergence depends on the structural characteristics of each economy, and these structural differences imply that different countries will have different steady states relative to per capita income. In this case, the countries will converge all the more quickly as they are distant from their long term steady state.

The convergence equation, in its more general form, can assume the following specification:

$$\ln\left(\frac{y_{it}}{y_{it-1}}\right) = a + \sum_{i=2}^N a_i D_i + \beta \ln(y_{it-1}) + \sum b_k x_{kit} + \varepsilon_{it} \quad (2)$$

Where  $y_{it}$  represents social protection expenditure (as a percentage of GDP or per capita) in country  $i$  at time  $t$  and variables  $x_k$  designate a set of factors affecting the growth rate of social expenditure and controlling (for) the steady-state. Lastly,  $D_i$  is a set of dummy variables, one for each country,  $i=1 \dots N^2$ , which are included as shift parameters. Thus, coefficients ( $a_i$ ) indicate the specific characteristics of each country; they allow for diversity in steady states resulting from the structural differences between countries.

Convergence is thus conditional if the factors introduced in the equation have a significant influence and if there is a positive relation between the growth rate of the welfare expenditures and the distance which separate them from their steady state.

## ***1.2. Empirical Review on Convergence of Social Expenditure***

Alonso et al. (1998) were the first to test the assumptions of  $\sigma$  and  $\beta$ -convergence in the field of social protection. Based on cross-sectional and panel data estimations for 11 countries of the UE over the period 1966-92, the authors show a certain degree of convergence of per capita social protection expenditures for the two sub-periods 1966-74, 1978-86 and 1986-1992 and a process of divergence for the remaining sub-period 1974-1978. In the majority of the studies which followed,  $\beta$ -convergence was primarily estimated using cross-sectional data of social protection expenditures in their totality or by categories (Cornelisse and Goodswaard, 2002; Boeri, 2002). Among these studies, except for that of Wolf (2002), rare are those that tried to clarify the conditions of the catching-up process by testing the influence of other determinants acting on the dynamics of the social protection expenditures. These studies lead as a whole to similar results and give some evidence of the  $\sigma$  and  $\beta$ -convergence processes.

<sup>2</sup> The  $N^{th}$  country stands for the intercept.

The more recent studies aim at supplementing the estimates from cross-sectional data by panel data techniques in order to introduce heterogeneity into the specification of the equations of  $\beta$ -convergence. Thus, Püss et al. (2003) tested the convergence of the social protection expenditure per capita and as a percentage of GDP and by categories of expenditure using panel data of 15 UE-countries over the period 1993-2000. Their results confirm the assumptions of  $\sigma$  and absolute  $\beta$ -convergence and show, at the same time, that the level of convergence is not homogeneous over the period being studied. The contribution of these authors lies in the test of the conditional  $\beta$ -convergence which includes five factors which likely condition convergence. These factors take into account the economic and socio-demographic characteristics of the countries considered but do not include the probable influence of the European integration policy on the dynamics of the welfare expenditures. These concepts are also estimated by Nixon (1999) in panel data to analyze the convergence of the healthcare systems. The author integrates only the level of GDP per capita as a control variable but takes the diversity of healthcare systems into account of.

In the same line, Corrado et al. (2003) use fixed effects and composed coefficients models based on the inclusion of dummy variables to reflect the interaction between country specific factors and welfare policies. They highlight the maintenance of a strong heterogeneity between the social protection systems and thus do not confirm convergence towards a single European social model. These results are deepened in a more recent study of Alsasua et al. (2007) which moderates the results of  $\beta$ -convergence by emphasizing the influence of economic and demographic factors specific to each country in the persistence of variations in the level of per capita social protection expenditures within the European countries. Lastly, these same assumptions are also tested in other works tackling the more general question of the convergence of the structure of public expenditure (Ringe, 2004; Sanz, 2005 and Skidmore and al, 2004).

However, to our knowledge, the majority of these studies primarily take into account only internal factors reflecting the economic and demographic situations of each country without integrating the influence of external factors such as the degree of openness and the nominal convergence criteria related to the European policy integration. In addition, none of these works clearly explain the adequacy between the results obtained from absolute convergence and conditional convergence.

## 2. Results for 12 UE-Members over the Period 1980-2000

Following the same methodology, we propose widening the framework of the analysis, by increasing the degree of complexity of the estimate techniques, in order to integrate various variables likely to influence the speed of convergence of social protection expenditure, particularly those reflecting the degree of openness and the constraints imposed by the construction of the UEM.

The analysis focuses on two indicators of social protection expenditure: the social protection expenditure as a percentage of GDP (SPGDP) and per capita social expenditure (SPCAP), at PPS units and constant price (1985) both expressed in a logarithm, from a sample of 12 EU Member States<sup>3</sup> over the period 1980-2000. The data for this study was obtained from various sources: the data relating to social protection expenditure and the demographic structure come from Eurostat, while the economic indicators are from the statistical appendices of the *European Economy Review*.

These two indicators measure the level of social protection according to two different approaches: the first, (SPGDP), indicates the effort carried out by a country as regards social protection in terms of the share of the national wealth devoted to social protection; the second, (SPCAP), expressed at PPS and constant price can be designated as an indicator of the level of well-being and protection of the inhabitants of a country. From this point of view, SPGDP can be interpreted as an indicator of means whereas SPCAP can be conceived as an indicator of outcomes. These two indicators are obviously linked, but do not coincide inevitably because their divergence can reveal the influence of the GDP per capita<sup>4</sup>.

Before the empirical check of the various hypotheses of convergence, a brief analysis of the evolution of their means is necessary.

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<sup>3</sup> Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and United-Kingdom are the only countries for complete time series over the period 1980-2000 are available.

<sup>4</sup> SPCAP breaks up in the following way: 
$$\frac{SP}{capita} = \frac{SP}{GDP} \cdot \frac{GDP}{capita}$$

**Table 1.** Evolution of the mean of social protection expenditure in EU.

Period Indicators		80 - 89	89 - 93	93 - 00
SPGDP	U 12	22,5 → 23,3 Rise (irregular tendency)	23,3 → 27 Strong rise	27 → 24,9 Decline
SPCAP (index 100 for 1980)	U 12	100 → 123 Rise	123 → 147 Strong rise	147 → 169 Rise

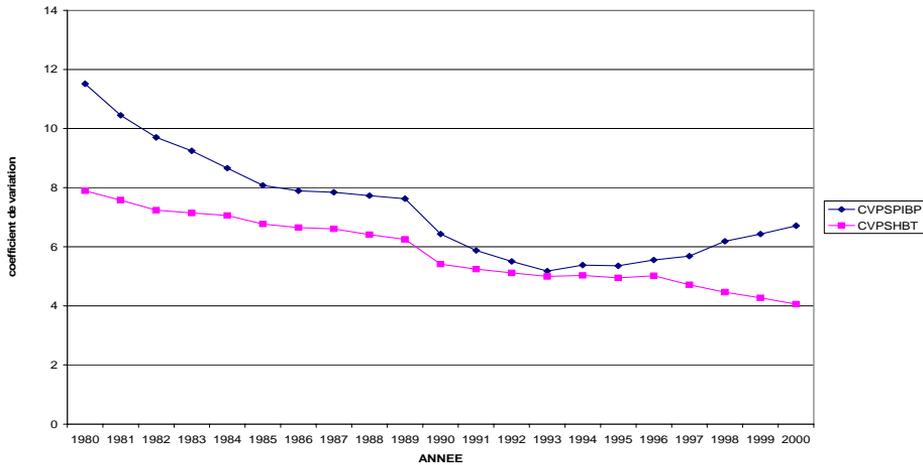
As shown in table 1, it is possible to identify two turning points: one in 1989 and the other in 1993. From 1989 on, the increase in social protection expenditure (SPGDP and SPCAP) accelerates until 1993: from 23.3 % to 27 % for SPGDP, and from 123 to 147 for SPCAP. In 1993 and until 2000, SPGDP decreases to reach 24.9 % thus joining its 1991 level whereas SPCAP continues to increase but more slowly.

This descriptive analysis gives a first indication of a rupture in the evolution of social protection expenditures in the EU. The date corresponds to the implementation of the Maastricht Treaty.

### **2.1. Cross-Sectional Tests of $\sigma$ -Convergence and Absolute $\beta$ -Convergence**

Chart1 displays the trend of the coefficient of variation (CV=standardized standard deviation) over the period for the two indicators (SPGDP and SPCAP) expressed as a logarithm. Although the value of CV for SPGDP declined between 1980 and 2000 from 11.52 to 6.72, its fall was not regular over the whole period. It is characterized by two periods of strong fall: 1980-1985 and 1989-1993 which position the indicator with its minimum value in 1993. As of this date, the indicator started to ascend. The CV for SPCAP decreased slowly between 1980 and 2000 from a value of 7.89 in 1980 to 4.06 in 2000. Nevertheless, it was marked by a stabilization of its value between 1990 and 1996 then it decreased again.

The F-test results (F=2.94 with Pr=0 .04 for SPGDP and F=3.78 with Pr=0.02 for SPCAP) provide evidence to support the hypothesis of  $\sigma$ -convergence for the two indicators over the whole period being examined. On the other hand, this hypothesis is rejected in both cases over the period 1993-2000 (F=1.8 with Pr=0.83 for SPGDP and F=1.5 with Pr=0.25 for SPCAP). Lastly, by comparing the values of CV, one notes that SPGDP presents a greater dispersion than SPCAP. This difference can indicate different choices according to countries' as regards the allocation of GDP to social protection financing.

**Chart 1. Coefficient of variation of SPGDP and SPCAP: 1980-2000**

Having tested  $\sigma$ -convergence, the issue is now to consider whether the evolution of social protection expenditure reveals the existence of a catching-up phenomenon. Also, in order to identify the indirect effect of European integration policy initiated by the implementation of the Maastricht Treaty, model (1) is also estimated over sub-periods: 1980-1992 and 1993-2000 when 1993 corresponds to the implementation of the Maastricht effect. Table 2 gives the OLS cross-sectional estimations of the relation (1) for SPGDP and SPCAP and the 12 EU-countries being considered. With the exception of SPGDP over sub-period 1993-00, the parameter estimates of  $\beta$  are negative and statistically significant. All in all, the results confirm the hypothesis of  $\beta$ -convergence of social protection expenditure (SPGDP and SPCAP) over the whole period with values of -0.041 and -0.0237 respectively for the two indicators being considered. On the other hand, the results obtained over the two sub-periods give evidence that this process is neither continuous nor regular.

Whereas the estimated coefficient ( $\beta$ ) has the expected sign for SPGDP, it admits a very low value and is no longer statistically significant after 1993 suggesting that the very fast convergence which characterized the 1980-1992 period seems to have stopped or slowed down considerably after 1993. All in all, the results corroborate those resulting from the test of the  $\sigma$ -convergence.

**Table 2.** Tests of absolute  $\beta$ -convergence for SPGDP and SPCAP.

	SPGDP			SPCAP at PPS and constant price		
	1980-00	1980-92	1993-00	1980-00	1980-92	1993-00
Intercept	0.131*** (0.027)	0.157*** (0.024)	0.0126 (0.109)	0.210*** (0.028)	0.232*** (0.035)	0.220** (0.068)
$\beta$	-0.041*** (0.009)	-0.047*** (0.008)	-0.007 (0.033)	-0.0237*** (0.004)	-0.026*** (0.0045)	-0.025** (0.008)
R <sup>2</sup>	0.6775	0.782	0.046	0.7865	0.7674	0.4664
speed	0.0925	0.0726	na	0.0327	0.03213	0.0278
T-half	7.5	3.5	na	21.9	21.5	24

*The parameter  $\beta$  and the speed of convergence have been estimated by OLS and NLLS respectively. Standard errors are in brackets. (\*\*\*), (\*\*) and (\*) denote significance at 1%, 5% and 10% respectively.*

The hypotheses of  $\sigma$  and  $\beta$ -convergence are obviously linked, but they are not identical. The  $\beta$ -convergence implies forces tending to push the system back into equilibrium, namely, an adjustment mechanism of the economies towards a long-term equilibrium. As is well-known, existence of  $\beta$ -convergence is a necessary but not a sufficient condition for  $\sigma$ -convergence<sup>5</sup>. The indicator of well-being, SPCAP, exhibits a clear tendency to convergence, probably slowed down by the Maastricht Treaty, but continuous. With the exception of the sub-period 1993-2000 which indicates that  $\beta$ -convergence is not sufficiently significant to guarantee  $\sigma$ -convergence, there is evidence of  $\sigma$  and  $\beta$ -convergence patterns for this indicator.

On the other hand, the effort devoted by countries to social protection does not show the same characteristics: SPGDP tends to converge over the whole period: 1980-2000. However, the second sub-period (1993-2000) does not reveal any reduction in the dispersion of the SP expenditure: the hypothesis of  $\sigma$  and  $\beta$ -convergence cannot be retained.

However, the very low value of R<sup>2</sup> reveals that the estimated model is not significant. In comparison, SPCAP converged significantly over all the periods but at a slower speed after 1993. In all cases, the quality of the adjustment is lower for sub-period 1993-2000 suggesting the need to take into account the influence of other factors on the growth rate of social protection expenditure. This implies that we move to a conditional  $\beta$ -convergence approach.

<sup>5</sup> To note the existence of  $\bar{\sigma}$ -convergence, it is necessary that the tendency expressed by  $\bar{\sigma}$ -convergence is sufficiently strong to dominate the effects of the shocks which occurred during the period.

## **2.2. Panel Data Estimates of Conditional $\beta$ -Convergence: Impact of External Conditioning Factors of Convergence**

Cross-sectional estimates of absolute  $\beta$ -convergence have been criticized because they fail to take into account the heterogeneity of the countries being studied. They could lead to biased estimators of the rate of convergence. Also, Islam (1995) proposes to use panel techniques to analyze convergence. This framework allows the controlling any unobservable time invariant country-specific determinants of growth. Moreover, in comparison with the above results, the small number of observations does not make it possible to include the factors influencing the growth of social protection expenditure other than the initial level of the expenditure. Although the fixed effects and random effects models are the two conventional procedures for panel data estimations, the fixed effects model is, in our study of particular interest because it makes it possible to control the unobservable determinants of the welfare expenditure growth that are specific to the countries and time invariant<sup>6</sup>.

In order to select the variables that could influence the growth rate of SP expenditures and social convergence, we refer to the existing literature dealing with the determinants of public and welfare expenditures.

Following Lindert (1996) and Alsasua et al. (2007), we include three kind of domestic factors. The first one corresponds to the economic growth rate ( $\Delta$  GDP) as it determines the financial capacity of the system. The second is the rate of variation of the unemployment rate ( $\Delta$ UNEM) which depends on the employment picture and conditions the demand for social security benefits. Lastly, the third one takes into account the socio-demographic characteristics represented by the lagged rate of variation of the dependency ratio ( $\Delta$ RD(-1)). According to the literature, this variable should have a positive impact on the growth of the welfare expenditures because a rise in this ratio due to demographic aging increases the proportion of the voters demanding social transfers (Lindert, 1996).

Moreover, among other factors affecting convergence, we consider external factors. We propose including two variables reflecting international and European economic integration: the degree of openness (OPEN) and the Maas-tricht effect (MAAST or MADE).

Concerning the impact of trade openness on welfare expenditures, the literature leads to mitigated results. Trade openness and financial liberalization imply an increasing interdependence of fiscal policies. Particularly, capital mo-

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<sup>6</sup> Moreover, if these individual effects represent proxies of not specified variables, they are likely to be correlated with the other explanatory variables. Lastly, as the countries included in the sample do not correspond to a random sample from a broader set of countries, the fixed effects model represents a suitable choice (Greene 2000).

bility could affect the size and the composition of government spending. According to Tanzi (2000), the mobility of capital and income tax payers would reduce the fiscal autonomy of states. From this point of view, international economic integration would threaten the social protection systems because the maintenance of generous social protection systems would impose a severe liability for both the export and domestic sectors in a more competitive environment<sup>7</sup>.

However, international economic integration can cause an opposite effect. Rodrik (1998) shows that the more economies are open to trade, the more they would be exposed to external shocks and therefore the individuals would require more social protection in order to be able to secure shocks<sup>8</sup>.

With the exception of the study by Ringe (2004), which only studies the determinants of the level of social protection expenditure, the influence of the Maastricht effect was not tested in the studies of social convergence. According to the literature, one should expect a negative effect. Indeed, the criteria of Maastricht constitute a budgetary constraint, a common objective to ensure the suitable functioning of the Monetary Union. They can be used as instruments for fiscal consolidation implying a withdrawal of the Welfare state in Europe. Rotte and Zimmermann (1998) show that the Member States of the EU would have used the popularity of the European idea to reinforce fiscal discipline despite rising unemployment and declining growth rates. The authors use the term of "Europeanization" of tax policy. On the other hand, Von Hagen and Strauch (2001) showed that the probability of implementation of fiscal consolidation would be dependent on the initial economic conditions. In particular, the importance of the initial debt constitutes a significant determinant of both the likelihood of consolidation and the form and quality of the fiscal adjustments<sup>9</sup>.

Thus, in order to measure the Maastricht effect, we introduce a dummy variable which takes a value of 0 in the case of the absence of adhesion to the criteria and 1 starting from the date when the Maastricht criteria were in effect

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<sup>7</sup> Kaufman and Segura-Ubiergo (2001) highlight a negative effect of trade openness on social security expenditure and a positive relation between the liberalization of capital, expenditures for/on health and education in a panel of 14 Latin American countries over the period 1973-1997. In the same way, according to the study by Garrett and Mitchell (2001), trade openness would have reduced the size of the public sector, public consumption and transfers in 18 OECD countries over the period 1961-1983.

<sup>8</sup> Using different arguments and globalization indicators, other studies support the existence of a positive relation between globalization and social protection: Garrett (1998), Hicks and Swank (1992) and Quinn (1997).

<sup>9</sup> The relationship between the initial level of debt and the quality of fiscal adjustment was clarified in a certain number of studies, in particular, in the study by Bertola and Drazen (1993). In the same way, according to Dalagamas (1993), in the countries characterized by very high debt ratio levels, the citizens are more informed on the consequences of expansionary fiscal policies and accept more fiscal conservatism.

(since 1993)<sup>10</sup>. Insofar as one of the criteria of convergence relates to the level of the national debt, we build a multiplicative dummy variable (MADE) which corresponds to the product of the lagged variation of the national debt ( $\Delta\text{DEBT}(-1)$ ) and the dummy variable (MAAST), which will make it possible to appreciate the marginal effect of a variation of the debt before and after the implementation of Maastricht criteria.

Contrary to the majority of studies which organize panel of data into five year sub-periods, our estimates use annual data. In order to highlight the impact of the other factors controlling for steady state, we consider several specifications presented by decreasing degree of restriction. Thus, model A is the most parsimonious specification as it includes only the specific dummy variables for each country and the lagged endogenous variable. Model B adds the internal determinants of the growth of social protection expenditure to model A. Lastly, model C supplements the preceding specification by taking into account the factors related to the international integration of the economies.

After a first round of estimates using Pooled OLS and fixed effects model, the analysis of the error structure by the standard tests reveals the presence of non-spherical errors. Thus, the likelihood test for groupwise heteroscedasticity results in rejecting the null hypothesis of homoscedasticity. In the same way, the test of Breusch-Pagan led to the acceptance of contemporaneous correlation between residuals. Lastly, the test of Wooldridge for the autocorrelation indicates the residuals are first-order correlated. In order to correct the structure of the error terms, two procedures are proposed in the literature. The first is the Feasible Generalized Least Squares (FGLS), a method adjusting for a panel-specific AR(1) process. However, Beck and Katz (1995) showed that the FGLS tended to over-estimate the significance of the coefficients and that their asymptotic properties were not checked for small finite samples in time as well as in cross-sectional dimensions<sup>11</sup>. Also, the second procedure panel-corrected standard errors procedure (PCSE) consists in correcting the standard deviations of the estimated parameters by using Prais-Winsten correction. We apply these two procedures in order to test the robustness of our model. Tables 3 and 4 display the results obtained for our two dependent variables: SPGDP and SPCAP by applying (PCSE)<sup>12</sup>. In the various specifications, the coefficient  $\beta$  is statistically significant and has the expected sign. It confirms that conditional convergence is

<sup>10</sup> Variable MAAST admits a zero value over the overall period considered for Denmark and the United Kingdom.

<sup>11</sup> FGLS requires that the number of observations in time dimension (T) be significantly larger than the number of cross-section units (N). Beck and Katz (1995) propose the PCSE estimator when the data generating process is characterized by heteroscedasticity and correlation (contemporaneous and serial). They claim that PCSE estimator is more efficient than the FGLS one when T is smaller than N.

<sup>12</sup> These results are not very different from the ones resulting from the use of FGLS except for significance levels. Results are available upon request from the authors.

checked for all the 12 countries in the sample. Coefficients of dummy variables by country (tables 3 and 4) reveal that the countries converge towards relatively similar stationary states in term of SPCAP because only some countries deviate from the steady growth path borrowed by the others. On the other hand, SPGDP presents a more significant number of statistically significant dummy variables (in particular in the model C) indicating a greater diversity of the stationary states towards which the social protection systems converge. This result suggests that the countries do not converge in terms of SPGDP towards a single model of social protection but follow trajectories characterized by the same speed of convergence towards their own steady state.

In model B, the simultaneous inclusion of  $\Delta$ GDP and  $\Delta$ UNEM yields non significant results for one of the two variables, a result which can be due to their colinearity. Several preliminary estimates lead us to exclude from model  $\Delta$ UNEM in SPCAP and  $\Delta$ GDP in SPGDP specifications. In all the cases, the rate of variation of the dependency ratio [ $\Delta$ RD(-1)] carry a positive sign and has a strong significant incidence on the welfare expenditure growth.

The result is what one might expect insofar as the increase in this ratio takes into account both the pressure due to demographic aging and that related to the decline of the fertility rate which represents a common challenge which the majority of the European countries must face. The increase in this ratio acts with the rise of the expenditures related to old-age and health which represent the principal component of social protection expenditure. In addition, this result confirms the assumptions of the theory of the median voter. In the same way, the coefficient of the unemployment rate ( $\Delta$ UNEM) is positive and significant, which is justified easily insofar as, by the means of the automatic stabilizers, the needs for social transfers are sensitive to the state of the economic situation.

**Table 3.** Test of conditional  $\beta$ -convergence for per capita social protection expenditure

Dependent variable : $\Delta$ LNSPCAP				
PCSE	A	B	C	
			1	2
Intercept	0.283*** [4.68]	0.420*** [5.91]	0.410*** [5.60]	0.521*** [3.79]
LNSPCAP(-1)	-0.032*** [-4.30]	-0.049*** [-5.61]	-0.042*** [-4.91]	-0.037* [-1.86]
$\Delta$ DR(-1)		1.05*** [3.48]	1.01*** [3.48]	0.544* [1.75]
$\Delta$ UNEM				
$\Delta$ GDP		0.15* [1.88]	0.157* [1.90]	0.193** [2.25]
OPEN			-0.013** [-2.56]	-0.047* [-1.85]
MAAST			-0.005 [-0.86]	
MADE				-0.224* [-1.80]
$\Delta$ DEBT(-1)				-0.082 [-1.18]
DUMMIES COUNTRIES	0.024**L [3.41]	0.013** DK [2.00]	-0.035***L [4.15]	-0.051** E [-2.02]
		0.012**F [2.64]		0.048*** L [3.54]
		0.012*I [1.87]		
		0.026***L [3.69]		
R <sup>2</sup>	0.14	0.17	0.21	0.23
Wald chi2(k)	26.47***	40.95***	64.02***	63.77***
Nber obs.	240	228	228	228

Note: Variables are expressed in log except for MAAST and DEBT. In brackets are the Z-statistics for each coefficient with robust standard deviations to the heteroscedasticity and the correlation of the errors. The Wald test indicates if the specifications carried out are overall significant. (\*\*\*), (\*\*) and (\*) denote significance at 1%, 5% et 10% respectively.

**Table 4.** Test of conditional  $\beta$ -convergence for social protection expenditure as a share of GDP

<b>Dependent variable : <math>\Delta \text{LNSPGDP}</math></b>				
PCSE	A	B	C	
			1	2
Intercept	0.314** [2.87]	0.302** [2.57]	0.616*** [3.46]	0.603*** [4.13]
LNSPGDP(-1)	-0.094** [-2.89]	-0.091** [-2.61]	-0.099** [-2.67]	-0.090** [-2.55]
$\Delta \text{DR}(-1)$		0.711** [2.48]	0.606* [1.88]	0.668** [2.12]
$\Delta \text{UNEM}$		0.136*** [6.34]	0.110*** [4.68]	0.116*** [4.83]
$\Delta \text{GDP}$				-0.073** [-3.34]
OPEN			-0.068** [-2.67]	-0.072*** [-3.28]
MAAST			0.001 [0.22]	
MADE				-0.028* [-1.84]
$\Delta \text{DEBT}(-1)$				0.003 [0.05]
DUMMIES COUNTRIES	-0.049** IRL [-2.79] -0.025** L [-1.99]	-0.014* DK [1.66] -0.028** L [-2.42] -0.037** IRL [-2.40] 0.015* PB [1.79]	NR	NR
R <sup>2</sup>	0.20	0.32	0.337	0.36
Wald chi2(k)	34.61	74.54***	91.26***	99.42***
Nber obs.	240	228	228	228

*Note: NR indicates that the coefficients of dummies are not reported for reasons of space because these variables are mainly significant except for L and P.*

However, the low value of this coefficient compared to that of the dependency ratio indicates that the growth rate of SPGDP is less sensitive to the overall economic situation than the structural one. Lastly, the growth rate of GDP ( $\Delta$ GDP) has a positive incidence on the growth of SPCAP confirming the pursuit of Wagner's Law for social welfare and not the reach of an upper limit of government size. Lastly, in model C, whatever the indicator being studied, conditional convergence is checked, but the inclusion of OPEN and MAAST or MADE reduce the speed of convergence for SPCAP (from -0.049 to -0.042 with MAAST and to -0.035 with MADE) and stabilize it for SPGDP around -0.09. The negative and statistically significant coefficient of OPEN tends to support empirically the hypothesis that market integration puts a downward pressure on the welfare state. In a context of increasing international openness, welfare expenditures are regarded more as production costs than as growth promoters. Although economic globalization can enhance demands for social transfers according to Rodrik (1998), our results show that international competitive pressures seem to outweigh the potential impetus rising from further development of social policies. The impact of MAAST is not significant whatever the indicator selected. On the other hand, the Maastricht effect expressed by the variable MADE indicates, for the two indicators, that if the variation of the debt does not have any impact before 1993, its influence becomes negative and significant after that date. Thus, this result confirms that adherence to Maastricht criteria probably led politician decision makers to implement fiscal consolidation programs causing a slowdown in social expenditure expansion. All in all, the findings are consistent with the existence of effective tensions between globalization and national social policy autonomy.

## **Conclusion**

The main purpose of this paper was to study the dynamics of social protection expenditure in European Union by questioning the existence of social convergence process between EU-countries and the incidence of the Maastricht Treaty on this process.

Several convergence hypotheses were tested on 12 EU-Member States over the period 1980-2000 by focusing on two indicators capturing social expenditure from two different perspectives.

Cross-sectional tests of  $\sigma$  and  $\beta$ -convergence give evidence that a social convergence process, both in SPDGP and SPCAP, occurred over the whole period. On the other hand, the period division into two sub-periods intended to locate the Maastricht effect indicates a rupture since 1993. Convergence in terms of means (SPGDP) still seems a fragile process strongly subjected to various

constraints. In contrast, the catching-up pattern of SPCAP, i.e., in terms of the well-being of the population is characterized by slow but more regular growth.

In order to highlight the impact of the Maastricht Treaty, the hypothesis of conditional convergence was tested using panel data. The results confirm the existence of a process of conditional convergence and exhibit particularly the significant negative influence of the degree of openness and the debt Maastricht criterion on the growth rate of social protection expenditure. In addition, these factors reduce the speed of convergence for SPCAP; the debt criterion becomes significant only after 1993. Whereas countries converge towards relatively similar steady states, SPGDP indicates a greater diversity of the stationary states. Our results give evidence of absolute and conditional convergence patterns over the whole period. This finding is not contradictory but suggests that the countries converge in fact towards parallel stationary states evoking the possible idea of a “European Social Snake” rather than of a single social model.

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