INSTITUTIONAL QUALITY IN THE EU: CONVERGENCE AND DIFFERENCES

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Abstract

The paper examines institutional quality in the EU27 countries over the period 2004–2023. It focuses on convergence and differences among countries. Institutional quality is analysed at the level of the individual dimensions of the Worldwide Governance Indicators, as well as through an aggregate index. The empirical analysis combines hierarchical cluster analysis with sigma-convergence and beta-convergence approaches. The cluster analysis identified two distinct institutional profiles, indicating heterogeneity among EU27 countries. The convergence analysis showed that the overall Institutional Quality Index exhibited sigma-convergence, while the development of the individual dimensions was not uniform. Convergence was confirmed for Political Stability and Rule of Law, while Regulatory Quality exhibited divergence. The beta-convergence results also suggest that countries with a lower initial level of institutional quality experienced, on average, more favourable development, although this pattern was not confirmed across all dimensions. The average level of institutional quality declined over the observed period. The results therefore suggest that institutional convergence in the EU does not proceed uniformly.

Key words: institutional quality, EU27, cluster analysis, beta-convergence, sigma-convergence

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Introduction

EU Member States operate within a common legal, regulatory, and economic environment that influences their functioning and development. Nevertheless, heterogeneity among countries is evident – differences can be observed in political stability, levels of corruption, government effectiveness, and regulatory measures. This naturally raises the question of whether the process of European integration has also been accompanied by genuine institutional convergence.

A change in institutional quality itself does not indicate whether the differences between EU Member States are decreasing. At the same time, convergence does not necessarily imply

overall improvement, as it may result from lower-rated countries catching up, deterioration in countries that were initially rated more highly, or a combination of both processes. Therefore, it is necessary to monitor not only the development of differences between countries, but also their initial level and subsequent development.

Examining the development of institutional quality in EU27 is relevant because countries entered the integration area gradually and with different initial levels of institutional quality. Institutional quality encompasses several distinct areas, such as control of corruption, government effectiveness, regulatory quality, rule of law, voice and accountability, and political stability. Convergence of the overall institutional quality index, constructed as the average of all six dimensions, may conceal different developments in its individual dimensions. Despite extensive research on institutional convergence, less attention has been paid to how changes in differences between Member States are linked to their long-term institutional heterogeneity.

The aim of this study is to assess the development and convergence of institutional quality among EU Member States over the period 2004–2023. The analysis focuses not only on the overall institutional quality index, but also on its individual dimensions. We also focus on whether differences in institutional quality between countries are decreasing and whether countries with a lower initial level are catching up with the others. At the same time, cluster analysis is used to identify groups of countries with similar long-term institutional profiles.

1 Literature Review

The Member States of the European Union operate within a common integration, legal, and regulatory framework; however, institutional quality differs across countries. Examining its development is relevant in view of the gradual enlargement of the integration area, which countries entered from different starting positions. The European Union therefore cannot be perceived as a homogeneous area, but rather as a group of countries with different institutional environments. These differences are also influenced by the broader economic, political, and social context of individual countries, which shapes the functioning of their institutional environments (Rodríguez-Pose, 2015).

Institutional quality does not develop in the same way across all EU countries or across all of its dimensions. A decline in the overall index does not necessarily mean that all dimensions have worsened, as they may develop differently. These differing developments and different initial levels create scope for examining the convergence of the institutional environments of EU Member States. Convergence can be understood as a process of gradually

reducing differences between countries. Countries may become more similar as a result of lower-performing countries catching up, a decline in countries that were initially rated more highly, or a combination of both processes (Eurofound, 2023). The literature identifies two forms of convergence: beta-convergence and sigma-convergence. Beta-convergence examines whether countries with a lower initial level gradually catch up with other countries, while sigma-convergence examines whether differences between countries decrease over time (Savoia & Sen, 2016; Schönfelder & Wagner, 2019).

Previous empirical studies do not provide an entirely consistent picture of the development of institutional convergence. Savoia and Sen (2016) point out that countries with initially weaker institutional quality tended to gradually catch up with better-performing countries, while also noting that this convergence effect appears to be temporary. Schönfelder and Wagner (2019) found convergence in Regulatory Quality and even identified beta-divergence in Rule of Law, indicating differing developments across WGI dimensions. Vučković et al. (2019) identified differences among groups of EU countries, with Nordic countries achieving more favourable results than countries in Central and Eastern Europe. Kollias & Messis (2022) state that institutional convergence is a long-term process that may be influenced by major economic events and structural changes.

In its analysis of the six WGI dimensions, Eurofound (2022) confirms that EU27 countries maintain a high level of institutional quality despite a decline in values following the 2008 crisis. At the same time, substantial differences between groups of countries were confirmed: the highest values were recorded by Nordic and Western European countries, while the Baltic countries experienced significant improvement and gradually surpassed Mediterranean countries. The development of the individual dimensions was not uniform either – Eurofound identified downward convergence in Voice and Accountability, Political Stability, and Government Effectiveness, while Regulatory Quality, Rule of Law, and Control of Corruption exhibited upward convergence.

The research therefore suggests that the process of institutional convergence in Europe is not uniform and may vary. However, less attention has been paid to the joint assessment of convergence dynamics and long-term institutional heterogeneity within the EU27. This study therefore combines convergence analysis with cluster analysis in order to capture not only the development of differences between countries, but also the structure of their long-term institutional profiles.

2 Methodology

The empirical analysis is based on data from the Worldwide Governance Indicators (WGI) published by the World Bank and covers 27 EU Member States over the period 2004–2023. Six dimensions of institutional quality were analysed: Control of Corruption (CC), Government Effectiveness (GE), Rule of Law (RL), Regulatory Quality (RQ), Voice and Accountability (VA), and Political Stability (PS). Based on their values, a composite IQ Index was also constructed as an aggregated measure of institutional quality.

Based on the objective of the study, three research questions were formulated:

- **RQ1:** Do EU Member States naturally form distinct groups of countries in terms of institutional quality?
- **RQ2:** Did differences in institutional quality among EU Member States decrease over the period 2004–2023?
- **RQ3:** Do countries with a lower initial level of institutional quality tend to converge toward countries with a higher initial level?

Cluster analysis was used to identify groups of countries with similar long-term institutional profiles. In general, cluster analysis aims to classify objects into relatively homogeneous groups so that objects within the same cluster are as similar as possible, while differences between clusters are maximized (Danko & Löster, 2019). For each country, the average values of the six dimensions over the period 2004–2023 were used, so the resulting clusters capture long-term differences among countries. Given the high correlation among the CC, GE, RL, RQ, and VA indicators, principal component analysis (PCA) was applied to the standardized data. The first two components explained 96.6% of the total variability, and their scores were subsequently used in hierarchical agglomerative cluster analysis employing Ward's method and Euclidean distance. The number of clusters was determined based on the dendrogram and supplementary indicators, and the stability of the resulting classification was verified using the k-means method. (Řezanková et al., 2007)

Tab. 1 Correlation Matrix

	CC	GE	RL	RQ	VA	PS
CC	1.000	0.968	0.966	0.935	0.954	0.649
GE	0.968	1.000	0.973	0.919	0.949	0.689
RL	0.066	0.973	1.000	0.941	0.959	0.704
RQ	0.035	0.919	0.941	1.000	0.919	0.685
VA	0.954	0.949	0.959	0.910	1.000	0.668

PS	0.649	0.689	0.704	0.685	0.668	1.000

Source: own elaboration based on results from R Studio

Institutional convergence was examined using beta-convergence and sigma-convergence approaches (Savoia & Sen, 2016; Schönfelder & Wagner, 2019; Vučković et al., 2019; Eurofound, 2023). Beta-convergence was used to assess whether countries with a lower initial level of institutional quality experienced more favourable subsequent development. For each country, the average annual absolute change in institutional quality over the period 2004–2023 was calculated as $(IQ_{i,2023} - IQ_{i,2004})/19$ and regressed on the initial level of institutional quality in 2004. A negative and statistically significant coefficient on the initial level indicates beta-convergence, i.e. a catching-up tendency of initially lower-performing countries. As WGI values may also take negative values, the indicators were analysed in levels rather than logarithms. HC3 heteroskedasticity-robust standard errors were used for statistical inference.

Sigma-convergence was assessed through the annual cross-sectional standard deviation of institutional quality across the EU27 countries. A declining standard deviation indicates a reduction in cross-country disparities and thus sigma-convergence, while an increasing standard deviation indicates sigma-divergence. The direction and statistical significance of the development were evaluated using a linear time trend estimated over the period 2004–2023, with Newey–West HAC standard errors used to account for possible heteroskedasticity and serial correlation in the annual series. In addition, the annual cross-country mean of institutional quality was monitored to distinguish whether convergence occurred alongside an improvement or a deterioration in the average institutional quality level (Barro & Martin, 1992).

3 Results

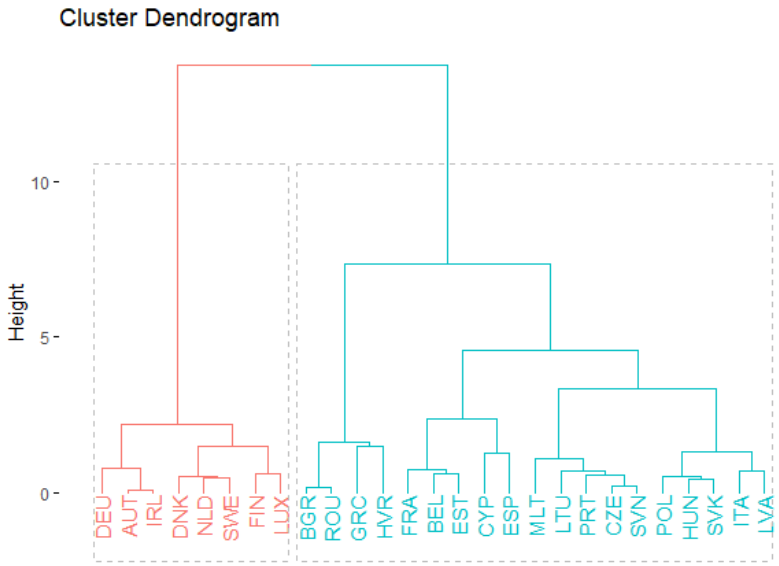
The empirical analysis focused on two interconnected questions. The first was whether distinct long-term institutional profiles could be identified among EU Member States, and the second was whether differences in institutional quality across countries decreased over the period 2004–2023.

In the first part of the analysis, hierarchical cluster analysis was used to identify two main clusters of EU27 Member States with different long-term levels of institutional quality. The first cluster consists of a smaller group of countries with higher values across all six WGI dimensions. The most pronounced differences compared with the second cluster were observed in Control of Corruption, Political Stability, Regulatory Quality, and Government Effectiveness, while the differences in Rule of Law and Voice and Accountability were smaller

but still evident. The results also show that this cluster is not formed by extreme values, but by consistently strong institutional profiles.

The second cluster is larger and more internally heterogeneous, with average values of all dimensions of institutional quality below 1. France and Belgium can be considered borderline cases, as they achieve relatively favourable values for some indicators, while their overall multidimensional profiles are closer to the second cluster. This confirms that cluster membership is not determined by a single indicator, but by the overall similarity of a country's institutional profile.

Fig. 1 Cluster Dendrogram



Source: R Studio

The results were also stable under alternative procedures. Hierarchical analysis based on PCA scores produced the same classification of countries as the analysis without PCA, while the k-means method classified 24 out of 27 countries identically (88.9%). Belgium, Estonia, and France were classified differently, confirming their more borderline position. The cluster analysis therefore points to the existence of distinct long-term institutional profiles within the EU; however, it does not show whether differences between countries decrease or increase over time. This question is therefore complemented by convergence analysis. More specifically, it is addressed by sigma-convergence analysis, which examines the development of differences among Member States over time.

Tab. 2 Sigma-convergence

Indicator	Trend coefficient	Newey–West SE	p-value	Result
Control of Corruption	-0.0022	0.0021	0.291	No significant trend
Government Effectiveness	-0.0060	0.0033	0.084	No significant trend*
Political Stability	-0.0032	0.0005	<0.001	Sigma-convergence
Regulatory Quality	0.0072	0.0009	<0.001	Sigma-divergence
Voice and Accountability	0.0020	0.0015	0.191	No significant trend
Rule of Law	-0.0075	0.0026	0.011	Sigma-convergence
Institutional Quality Index	-0.0016	0.0004	0.002	Sigma-convergence

Source: own elaboration based on results from R Studio

Note: Government Effectiveness shows weak evidence of convergence at the 10% significance level.

Table 2 presents the results of sigma-convergence for the Institutional Quality Index and its individual dimensions. Statistical significance was found for the Political Stability and Rule of Law dimensions, indicating that differences between countries decreased over time. Regulatory Quality showed the opposite trend, i.e. divergence, meaning that differences between countries increased. In the case of Government Effectiveness, convergence was confirmed at the 10% significance level. No statistically significant trend was found for Control of Corruption or Voice and Accountability.

For the overall IQ Index, the trend was negative and statistically significant, indicating an overall reduction in differences in institutional quality among EU27. This result also shows that convergence at the aggregate level may occur despite differing developments across individual institutional dimensions. However, the reduction in differences does not necessarily mean that institutional quality in the EU27 improved at the same time. The average value of the index declined from 1.059 to 0.984, and the time trend was negative and statistically significant. At the aggregate level, this can therefore be described as downward convergence: Member States became more similar to one another, but this process occurred simultaneously with a decline in the average level of institutional quality.

Tab. 3 Beta-convergence

Indicator	Beta coefficient	HC3 robust SE	p-value	Result
Control of Corruption	-0.0094	0.0045	0.047	Beta-convergence
Government Effectiveness	-0.0136	0.0036	<0.001	Beta-convergence

Political Stability	-0.0129	0.0041	0.005	Beta-convergence
Regulatory Quality	0.0014	0.0068	0.844	No significant beta-convergence
Voice and Accountability	-0.0089	0.0043	0.050	No significant beta-convergence*
Rule of Law	-0.0286	0.0070	<0.001	Beta-convergence
Institutional Quality Index	-0.0092	0.0034	0.011	Beta-convergence

Source: own elaboration based on results from R Studio

Note: The coefficient for Voice and Accountability is negative but narrowly misses statistical significance at the 5% level (p = 0.050).

Table 3 complements the previous findings on sigma-convergence and addresses the question of whether the reduction in differences was also driven by the catching-up of countries with initially lower levels of institutional quality. Beta-convergence was confirmed for Control of Corruption, Government Effectiveness, Political Stability, and Rule of Law. In the case of Regulatory Quality and Voice and Accountability, beta-convergence was not confirmed. For Regulatory Quality, this result is also consistent with the finding of sigma-divergence in this dimension.

The differences between the results of sigma-convergence and beta-convergence also indicate that the two approaches capture different aspects of the same process. For example, in the case of Control of Corruption, the results confirm that countries with a lower initial level were catching up, while the overall differences among Member States did not decrease to a statistically significant extent. By contrast, for Political Stability and Rule of Law, both types of convergence were confirmed.

The results of this study are partially consistent with previous research. The identified beta-convergence supports the findings of Savoia and Sen (2016), who point to a tendency for weaker-performing countries to catch up with stronger-performing ones. The differing development of the individual dimensions of institutional quality is also consistent with Schönfelder and Wagner (2019), who found that the dimensions evolved differently. Compared with Eurofound (2022), which identified an overall reduction in differences across all six WGI dimensions over the period 1996–2020, the results for 2004–2023 indicate a less uniform pattern, particularly in the case of Regulatory Quality.

Overall, the results show that institutional quality among EU27 converged, but this process was not uniform. Convergence differed across individual dimensions, occurred

alongside a decline in the average value of the IQ Index, and distinct long-term institutional profiles among countries remained identifiable.

Conclusion

The article examined the development of institutional quality in the EU27 over the period 2004–2023, with an emphasis on convergence and persistent differences among Member States. The aim was to capture not only whether countries gradually converged in terms of institutional quality, but also whether distinct long-term institutional profiles continued to persist among them.

The cluster analysis confirmed substantial heterogeneity in institutional quality across the EU27 and identified two main groups of countries with different long-term institutional profiles. The first cluster consisted of countries with higher average values across all six WGI dimensions over the observed period – these were not countries with extreme values, but countries with strong, stable, and effective institutional environments. Cluster 2 was larger and, at the same time, more internally heterogeneous. Differences between countries therefore persisted despite the fact that convergence was identified at the aggregate level.

The convergence analysis showed that the aggregate Institutional Quality Index exhibited sigma-convergence, although developments varied across individual dimensions. Sigma-convergence was confirmed for Political Stability and Rule of Law, while Regulatory Quality exhibited divergence; the remaining dimensions showed weaker or statistically insignificant trends. The baseline beta-convergence results further indicate that countries with lower initial institutional quality tended to experience more favourable subsequent development, although this evidence weakened in the robustness specification. Since the mean IQ Index declined significantly over the period, the aggregate pattern can be characterised as downward rather than upward convergence. This suggests that the narrowing of differences was associated not only with catching-up by initially weaker countries, but also with weaker development among some initially stronger performers.

The results therefore suggest that the EU cannot be regarded as a homogeneous area in terms of institutional quality. Despite the common integration framework, differences remain visible both across the individual dimensions of institutional quality and in the overall perception of institutional quality. Further research could focus on the factors influencing institutional quality and potentially explaining the different trajectories of its development across EU27.

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