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"Crises Around the World Have Been More Frequent and Deeper"—But How Do They Impact EU Convergence?

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Abstract

This paper analyzes how two major economic downturns—a recession and a stagflation—affected convergence in the European Union (EU). Absolute and conditional convergence rates are estimated using ordinary least squares (OLS) semilog regressions based on cross-sectional data from 2004 to 2022. The study tests two hypotheses: there was no absolute convergence in the EU during either the recession or the stagflation period, and conditional convergence occurred during the recession but not during stagflation. The regression results indicate that neither hypothesis can be rejected. External variables—economic openness, inflation, and investment—were more influential during stable periods, whereas internal variables—debt, unemployment, and the control of corruption—had a greater impact during crises. These findings suggest that the EU was more institutionally prepared for the stagflation due to mechanisms developed after the financial crisis, but these tools proved less effective in addressing supply-side shocks.

Keywords: convergence; European Union; economic downturns; COVID-19 pandemic

Academic Editor: Gabriela Dobrota

Received: 21 June 2025
Revised: 18 July 2025
Accepted: 22 July 2025
Published: 24 July 2025

Citation: Šiljak, D. (2025). "Crises Around the World Have Been More Frequent and Deeper"—But How Do They Impact EU Convergence? *Economies*, *13*(8), 214. https://doi.org/10.3390/economies13080214

1. Introduction

In his book *Globalization and Its Discontents* (2002), Joseph Stiglitz wrote that "crises around the world have been more frequent and deeper" (Stiglitz, 2002). While his critique was directed at the International Monetary Fund (IMF) and its failure to fulfill the founding mission of preventing financial instability, this insight is equally relevant to the European Union (EU). In its nearly 70-year-long history, the EU has faced several economic challenges, with the most severe occurring in the past two decades: the 2009 financial crisis and the euro area crisis (collectively referred to in this paper as the "recession"), and, most recently, the combined shocks of the COVID-19 pandemic and the war in Ukraine (in this paper, the "stagflation"). Each of these challenges required constant change and institutional adaptation, as they affected the EU as a whole and individual member states as well. A key characteristic of EU studies over the past decade has been attention to crises (Rhinard, 2019).

During the recession, the EU responded with several major policy innovations, including the establishment of the European Stability Mechanism (ESM), the introduction of the Macroeconomic Imbalance Procedure (MIP), a range of monetary measures by the European Central Bank (ECB), and the controversial use of fiscal austerity in crisis-hit countries, so, theoretically, it was better prepared for the stagflation. Therefore, this paper analyzes how the two crises affected the convergence process within the EU by estimating absolute and conditional β-convergence models in the period 2004–2022.

Convergence, defined as a tendency of poor countries to grow faster than rich countries (Barro & Sala-i-Martin, 1992), has long been a focus of the EU. From the creation

of the European Regional Development Fund to provide financial assistance in the pre- and post-accession periods, the EU has helped less developed member states catch up. The aim of this research is to analyze the effects of two different economic downturns—a demand-side recession and a supply-side stagflation—on absolute and conditional economic convergence in the EU. Analyzing the two types of convergence in tandem is well established in the literature (Ibid), as it helps explain how structural differences among countries affect their growth trajectories and, consequently, the convergence process. The main research question of this paper is the following: Was the EU genuinely better prepared for the stagflation, having faced another crisis twelve years earlier, or were the crises so fundamentally different that preparation made little difference? To answer the question, two research hypotheses are tested:

H1: *Absolute convergence within the EU ceased during the recession and stagflation periods, relative to periods of economic stability.*

H2: *Conditional convergence within the EU was more likely to occur during the recession than the stagflation period due to the different natures of the two crises.*

Although recent studies have examined the impact of the COVID-19 pandemic on EU convergence, this research builds on that work by offering a direct comparison between two structurally different crises and their respective effects on both absolute and conditional convergence, which is the novelty of the research. This approach allows for a deeper understanding of how the nature of economic shocks shapes convergence dynamics in the EU.

The paper is structured as follows: After the introduction, Section 2 provides a literature review. Section 3 presents the methodology, followed by the discussion of the policy responses implemented during the two crises in Section 4. Section 5 outlines the regression estimation results. Section 6 concludes the paper.

2. Literature Review

The EU has focused on achieving convergence among its member states since the Treaty of Rome. Although it has been called a "convergence machine", as its member states achieved high growth rates with the lowest levels of income inequality (Ridao-Cano & Bodewig, 2018), the process has not been homogeneous (Csaba, 2025).

Since the late 1990s, research has focused on analyzing the convergence process of CEECs towards the old member states, focusing on the core–periphery division. Indeed, the EU member states have converged (Forgó & Jevcák, 2015; Cieślik & Wciślik, 2020; Bernardelli et al., 2021; Şanlı & Arslan, 2025). Significant disparities remain, which led to the creation of multiple "convergence clubs", highlighting the EU's vulnerability to external economic shocks (Borović et al., 2024). Despite the European integration process, the divergence between northwestern and southeastern European countries has become more pronounced (Casagrande & Dallago, 2024), while there is no convergence among the core countries (Šiljak, 2015).

The negative effects of the recession on the convergence process in the EU have been confirmed by several studies (Marelli & Signorelli, 2015; Stoica et al., 2019; Bisciari et al., 2020), especially in the euro area. Inadequate enforcement of fiscal rules and weak policy coordination within the euro area contributed to insufficient real convergence, as structural differences among member states deepened, particularly during and after the recession (Schuknecht et al., 2011; Dallago, 2017). Convergence remains limited, with persistent divergence patterns shaped by complex systemic interactions and external shocks, such as

the global financial crisis and the COVID-19 pandemic (Haynes & Alemna, 2023; Licchetta & Mattozzi, 2023).

Real convergence in the EU further deteriorated during the COVID-19 pandemic, highlighting the EU's vulnerability to external shocks and the need for differentiated policy responses (Fedajev et al., 2021) beyond monetary policy alone (Demary & Hüther, 2022). Its effects are also confirmed in the case of EU candidate countries, where the stagflation significantly disrupted convergence dynamics (Šiljak & Nielsen, 2025).

3. Methodology

Based on the Solow growth model (Solow, 1956), convergence analysis was popularized by Barro and Sala-i-Martin (1992). In their research, they analyzed the process in the U.S. and found a convergence speed of 2% per year, regardless of the time period. This rate is used as a benchmark in empirical studies.

There are two types of convergence, sigma and beta (β):

- Sigma convergence measures a reduction in the dispersion of per capita GDP over time.
- β-convergence, the focus of this study, tests whether poorer countries grow faster than richer ones, capturing the speed of convergence.
- β-convergence is further divided into the following:
- Absolute (unconditional) convergence assumes countries have the same structures and converge toward the same steady state. As the EU member states differ in their economic and institutional structures and levels of development, this diversity provides a key motivation to test for conditional convergence.
- Conditional convergence acknowledges structural differences across countries, meaning convergence still occurs but toward different steady states.

To test β-convergence, an OLS regression is estimated. In the absolute convergence model, the dependent variable is the average per capita GDP growth rate, and the independent (explanatory) variable is per capita GDP (PPP-adjusted) in the initial year of the analyzed period, computed in a natural logarithm (Equation (1)). A negative and significant β-coefficient indicates convergence:

$$\Upsilon_{i.0,T} = \alpha_i + \beta \log(Y_{i,0}) + \varepsilon_i \quad (1)$$

Conditional convergence is analyzed by estimating an augmented absolute convergence model. While the two core variables remain the same (initial per capita GDP and per capita GDP growth), the model is extended by including additional independent variables. In this research, two sets of variables are incorporated:

- Internal variables—influenced by government policy: control of corruption, general government debt, and unemployment (Equation (2)).
- External variables—largely outside domestic control: economic openness, inflation, and gross fixed capital formation (Equation (3)).

$$\Upsilon_{i.0,T} = \alpha_i + \beta_1 \log(Y_{i,0}) + \beta_2 CC_{i.0,T} + \beta_4 Debt_{i,0.\,T} + \beta_5 Unemp_{i,0.T} + \varepsilon_i \quad (2)$$

$$\Upsilon_{i.0,T} = \alpha_i + \beta_1 \log(Y_{i,0}) + \beta_2 EO_{i.0,T} + \beta_3 Inf_{i,0.\,T} + \beta 4 GFCFi_{,0.T} + \varepsilon_i \quad (3)$$

The independent variables included were chosen for two reasons. First, they reflect key areas affected by the crises. Second, they are well-established in the literature on economic convergence (see Section 5). This ensures that the models are both theoretically grounded and relevant to the context of the analysis.

The analyzed period is 2004–2022. As this research aims to analyze the effects of the two economic downturns on the process, the regressions were also estimated for the

following sub-periods: the pre-recession period (2004–2008), the recession period (2009–2013), the post-recession period (2014–2019), and the stagflation period (2020–2022).

Model diagnostics were performed to ensure the robustness of the regression results. Heteroskedasticity was tested using the Breusch-Pagan test, and multicollinearity was determined using the Variance Inflation Factor (VIF). Where heteroskedasticity was detected, models were re-estimated with robust standard errors.

This research follows the classical approach to the convergence analysis used by Sala-i-Martin (1996) and is based on cross-sectional data, i.e., the regressions are estimated using average values of annual data. While panel data analysis is more common, the use of cross-sectional data is justified by the focus on economic downturns. Islam (1995) suggests using panel data for periods no shorter than five years, and the stagflation period in this research lasted for three years. Also, "the cross-sectional data are free of the distortions caused by business cycles, as well as various demand- and supply-side random shocks that deviate the economy from the path toward a steady state" (Vojinović et al., 2009, p. 127).

Table 1 presents the descriptive statistics for the variables used in the estimation of the convergence models across twenty-eight countries, EU-27, and the UK, as it was an EU member state during almost all of the analyzed period 2004–2022.

Table 1. Descriptive statistics (2004–2022).

Variable	Description	Mean	Standard Deviation	Min	Max
Per capita GDP growth	Annual percentage growth rate of GDP per capita	2.024123	1.448656	−0.0752	4.474886
Log (initial per capita GDP)	Natural logarithm of per capita GDP	10.03407	0.470701	9.103929	11.07743
Economic openness	A sum of exports and imports as a percentage of GDP	123.6808	65.3275	55.80998	328.348
Inflation rate	By the Harmonized Index of Consumer Prices	2.532431	1.023868	1.493692	5.00654
Gross fixed capital formation	Percentage of GDP	21.93394	2.931246	15.67464	28.12339
Control of corruption	On a scale from 0 to 100; the lower value indicates a more corrupt government	69.96429	15.63936	45.57895	96.31579
General government debt	Percentage of GDP	62.7903	33.39201	9.090226	158.78
Unemployment rate	Percentage of labor force	8.231482	2.977089	4.978947	16.53158

Source: Author's calculations.

The data on per capita GDP growth, initial per capita GDP, economic openness, gross fixed capital formation, unemployment, government debt, and control of corruption were obtained from the World Bank (2025). The data on inflation rates were sourced from the IMF's World Economic Outlook database (International Monetary Fund, 2024).

4. Understanding Recession and Stagflation: A Macroeconomic View

Economic fluctuations differ in their nature. A recession—a decline in economic activity lasting several months (Hall & Geldard, 2024)—is a demand-side shock characterized by rising unemployment and lower inflation, or, most commonly, deflation. As aggregate demand needs to be stimulated to end a recession and initiate an economic boom, central

banks typically lower interest rates to encourage spending and investment, which aligns with Keynesian economic recommendations. Recessions are not uncommon and occur more frequently than stagflation, which is a more severe type of economic fluctuation.

Stagflation is a combination of rising inflation and economic stagnation caused by an adverse supply shock, such as a decrease in the supply of a commodity, which raises its price. According to Mankiw (2021), policymakers face two painful options when dealing with stagflation:

1. As adverse supply shocks cause prices to increase, the first option is to hold aggregate demand constant, which leads to a decline in output, or a recession.
2. The second option is to expand aggregate demand to prevent a reduction in output. However, this results in a permanently higher price level (Mankiw, 2021). Therefore, there is no win-win scenario when it comes to stagflation.

The world has experienced two major supply shocks since 2020. The first was caused by the COVID-19 pandemic, which disrupted production and global supply chains. The second was the war in Ukraine, which triggered an energy crisis. As this inflation was largely imported, traditional monetary policy tools had limited effect. Central banks raised interest rates, a traditional tool for lowering inflation through a reduction in demand, to little effect as several EU member states continue to struggle with high inflation.

4.1. Institutional Learning from the 2009 Financial Crisis

In response to the 2008–2009 global financial crisis and the subsequent euro area debt crisis, the EU implemented a series of reforms designed to strengthen its economic governance framework and reduce systemic vulnerabilities.

- **European Stability Mechanism (ESM):** Established in 2012 as the successor to the European Financial Stability Facility (EFSF), the ESM became the EU's permanent crisis resolution body. Its stated mission is to "enable the countries of the euro area to avoid and overcome financial crises and to maintain long-term financial stability and prosperity by providing loans and other types of financial assistance" (European Stability Mechanism, n.d.-c). In 2020, its mandate was extended to mitigate the consequences of the COVID-19 pandemic. Under the revised conditions, "the only requirement to access the credit line was that euro area Member States requesting support would commit to use that credit line to support domestic financing of direct and indirect costs regarding healthcare, cure and prevention related to the COVID-19 crisis" (European Commission, 2020). In 2025, the total amount of loans distributed by ESM/EFSF was EUR 295 billion, with a remaining lending capacity of EUR 427 billion (European Stability Mechanism, n.d.-b).
- **Macroeconomic Imbalance Procedure (MIP):** Established in 2011, the MIP is a surveillance mechanism designed to identify and monitor the most relevant dimensions of macroeconomic imbalances and competitiveness losses. These include external imbalances and competitiveness, internal imbalances, and employment (Eurostat, n.d.). The mechanism applies to both individual member states and the EU as a whole. When significant imbalances are identified, affected countries may receive country-specific recommendations aimed at addressing structural weaknesses. Their policy commitments are subsequently tracked through enhanced monitoring and regular reporting procedures (European Commission, n.d.-a).
- **Banking Union:** Established in 2014 as a response to the 2008 financial crisis and the subsequent euro area debt crisis, the EU Banking Union aims "to provide for a new and better integrated European architecture for banking supervision and resolution. . . through strengthening the safety and soundness of Europe's banks to make them more resilient and enhance confidence in the financial system. . . built on pre-existing

banking regulatory framework". The recession showed the deep interconnections within the euro area banking sector and the impact of the spill-over effects on the financial stability of the entire region. The Union currently comprises 21 states (20 members of the euro area and Bulgaria) (European Council, n.d.).

4.2. Monetary and Fiscal Policy in the Euro Area Crisis

Monetary and fiscal policies are classical tools used to mitigate the negative consequences of economic downturns. However, the situation in the EU is complicated, as most member states (currently 20) are part of the euro area and share a common monetary policy managed by the ECB. On the other hand, the EU is not a political union, and fiscal policy remains decentralized, managed by individual member states. During the recession, member states that were part of bailout programs had to implement austerity measures, while the ECB pursued an expansionary monetary policy. Therefore, the two policies were mismatched.

By 2025, the ECB had cut interest rates seven times (Canepa & Koranyi, 2025). This is a typical pro-Keynesian response during a crisis, i.e., lowering interest rates to stimulate demand. The ECB also provided liquidity through Targeted Long-Term Refinancing Operations (TLTROs). First launched in 2014, these operations offer financing to credit institutions on favorable conditions to stimulate lending to the real economy (European Central Bank, n.d.-b). Another program, the Securities Markets Programme (SMP), announced in May 2010, involved the purchase of debt securities by the Eurosystem from its counterparts to restore the proper functioning of the monetary policy transmission mechanism, but it did not alter the money supply (European Central Bank, 2010, p. 24). The program was replaced by Outright Monetary Transactions (OMTs) in 2012. Designed to maintain the integrity of the euro area, OMTs involve potentially unlimited purchases of sovereign bonds on the secondary market by the ECB (European Central Bank, 2012). Both the SMP and OMT announcements significantly reduced bond yields in crisis-hit countries and lifted aggregate European stock indices, whereas the announcement of TLTROs had weaker effects (Mody & Nedeljkovic, 2024).

In contrast to the ECB's expansionary monetary stance, fiscal policy in the EU during the recession was dominated by austerity, particularly in member states such as Greece, Ireland, Portugal, and Spain, which were subject to bailout programs financed by the "Troika" (the IMF, the European Commission (EC), and the ECB). These programs required countries to surrender substantial elements of economic sovereignty in exchange for financial aid (Stiglitz, 2016, p. 17). While these states already faced rising government debt and deficits, the fear of contagion within the euro area further justified intervention. The programs imposed austerity measures, which included spending cuts and tax increases, despite the fact that, in line with Keynesian economics, such an approach is counterproductive during a recession. Keynes advocated for increased government spending and higher public debt during recessions to stimulate aggregate demand, financed through borrowing. Once the economy had stabilized, the debt would be repaid. As the central architect of the Bretton Woods system, he later became the subject of Stiglitz's remark: "Keynes would be rolling over in his grave were he to see what has happened to his child" (Stiglitz, 2002, p. 13) (referring to the IMF). Ultimately, austerity measures worsened the recession and delayed the region's economic recovery (Guajardo et al., 2014). Therefore, the mismatch between the ECB's expansionary monetary policy and the restrictive fiscal policies adopted by many member states contributed to the prolonged duration of the eurozone crisis. Fiscally constrained countries were hit hardest by the crisis and were unable to fully benefit from the growth-supporting monetary conditions. As a result, these states experienced significant delays in their economic recovery.

4.3. Institutional Responses to the COVID-19 and Stagflation Crisis

The crisis triggered by the COVID-19 pandemic and the war in Ukraine exhibited "stagflationary" characteristics. Driven by supply-side shocks, it was characterized by high inflation and stagnation. Consequently, the policy measures effective during the recession proved less applicable, requiring a different set of tools and institutional responses. The EU responded swiftly at the supranational level, together with individual policies of member states, and it launched several packages to mitigate monetary and fiscal consequences.

- **Pandemic Emergency Purchase Programme (PEPP):** Initiated in March 2020 and discontinued in December 2024, PEPP was an ECB monetary measure to "counter the serious risks to the monetary policy transmission mechanism and the outlook for the euro area posed by the coronavirus (COVID-19) outbreak". It was a temporary asset purchase program covering private and public sector securities, initially worth EUR 750 billion and totaling EUR 1850 billion by December 2020 (European Central Bank, n.d.-a).
- **NextGenerationEU (NGEU):** In response to the COVID-19 pandemic, the EC created NGEU, a temporary recovery instrument. Through a combination of loans and grants to member states, as well as centrally managed EU programs, the EC was authorized to borrow up to EUR 806.9 billion by 2026 (European Commission, 2022). Of this total, 90% (or EUR 723.9 billion) will fund the Recovery and Resilience Facility (RRF). Established in 2021, the RRF is a temporary instrument that offers both grants and loans to support reforms and investments in member states, particularly in the areas of green and digital transitions (Ibid). The RRF is also crucial to the implementation of the REPowerEU plan, the EC's response to mitigate the energy and socio-economic consequences of Russia's invasion of Ukraine (European Commission, n.d.-b).
- **Support to mitigate Unemployment Risks in an Emergency (SURE):** Introduced in 2020 and active until December 2022, SURE was designed to provide financial assistance to member states in support of short-time work schemes. The instrument enabled governments to maintain employment by keeping workers formally attached to their employers as full-time workers, even when only part-time work was available (Yueh, 2023, p. 146). SURE offered up to EUR 100 billion in loans on favorable terms, helping to preserve employment during the COVID-19 pandemic (European Commission, n.d.-c).
- **ESM Pandemic Crisis Support Credit Line:** The ESM created a safety net for sovereigns in the form of the Pandemic Crisis Support instrument, amounting to EUR 240 billion (Revoltella et al., 2020), which became operational in May 2020. Pandemic Crisis Support was a credit line designed to support financing of healthcare costs related to the COVID-19 crisis. The ESM could provide loans amounting to 2% of a country's GDP at very low interest rates. No EU members applied for the facility (European Stability Mechanism, n.d.-a).
- **Pan-European Guarantee Fund (EGF):** The third safety net was established by the European Investment Bank and offered up to EUR 200 billion in support for EU-based companies. Its aim was to help the COVID-19 pandemic-affected businesses by ensuring they would have sufficient short-term liquidity available to weather the crisis and that they were able to continue their growth and development in the medium to long term (European Investment Fund, n.d.). The three safety nets totaled EUR 540 billion (European Central Bank, n.d.-a).

Next to the safety nets, German Chancellor Angela Merkel and French President Emmanuel Macron initially proposed a EUR 500 billion European Fiscal Response, which was increased to EUR 750 billion by the EC. It consisted of EUR 390 billion in grants and EUR 360 billion in loans (Janse & Tsanova, 2020).

To contain inflation following the COVID-19 pandemic and the war in Ukraine, the EU implemented a combined approach of restrictive monetary policy by the ECB and fiscal interventions at the national level. In July 2022, the ECB discontinued net asset purchases under the Asset Purchase Programme and began raising interest rates (Blot et al., 2023). In September 2022, the Governing Council decided to raise the three key ECB interest rates by 75 basis points, which increased to 400 basis points by September 2023 (European Central Bank, n.d.-a). The interest rate increase is a classic tool a central bank applies to lower inflation and decrease demand. However, in this case, it was ineffective in slowing inflation, as the inflation was imported, not demand-driven (Blot et al., 2023, p. 8).

In parallel, a wide range of fiscal measures were adopted at the national level to mitigate the economic and social impact of the pandemic. These included cuts in tax bases and rates, tax reliefs, exemptions, deferrals, and other supportive mechanisms aimed at providing immediate relief, supporting economic recovery, and ensuring stability for businesses and individuals during challenging times (European Parliament, 2023, p. 42). The tax-benefit systems absorbed a significant share of the COVID-19 shock and were able to offset—in most countries—the regressive nature of the shock on market incomes (Christl et al., 2021, p. 17).

The EU's fiscal response to the COVID-19 pandemic amounted to approximately EUR 1.29 trillion, while the combined monetary and fiscal response totaled EUR 2.64 trillion. These tools reflected stronger institutional coordination, showing that the EU did learn from past experiences. The EU's COVID-19 response demonstrated improved crisis management capacity but limited early political recognition and public engagement, highlighting institutional constraints rather than progress toward deeper integration (Boin & Rhinard, 2022, p. 15). However, the two crises differed in their structures: while the EU was institutionally better prepared in 2020–2022, the nature of the crisis ultimately constrained the effectiveness of its response. Table 2 summarizes the key features and policy responses of the two crises discussed above, highlighting the institutional evolution in the EU's approach to economic shocks.

Table 2. Summary of crisis periods and policy tools.

Period	Crisis Type	Key Features	Main Policy Tools (Monetary and Fiscal)	EU Institutional Response
2009–2013	Recession	Demand-side shock, deflation	ECB interest rate cuts, austerity	ESM, MIP, Banking Union
2020–2022	Stagflation	Supply-side shock, inflation	ECB PEPP, national subsidies	NGEU, SURE, REPowerEU

The following section analyzes how the two crises impacted the absolute and conditional convergence processes within the EU.

5. Results

This section analyzes the EU convergence between 2004 and 2022, emphasizing the effects of the two economic downturns on the process. Table 3 presents the results of the regression analysis for the full period and four sub-periods: pre-crisis (2004–2008), crisis (2009–2013), recovery (2014–2019), and stagflation (2020–2022).

The regression results show that absolute convergence occurred in the EU over the entire analyzed period, as well as during periods of economic stability, but not during the two major economic downturns. Between 2004 and 2022, the β-coefficient was negative at −2.27 and statistically significant (p-value = 0.000), indicating a convergence speed of 2.27% per year, consistent with the Barro and Sala-i-Martin benchmark. During this period, the

average annual growth rate across EU countries was 2%, while the average EU per capita GDP in 2004 was only 42% of the 2022 average.

Table 3. Absolute convergence analysis [1].

Denomination	Model 1 2004–2022	Model 1′	Model 2 2004–2008	Model 3 2009–2013	Model 4 2014–2019	Model 4′	Model 5 2020–2022	Model 5′
				β (t)				
Log of initial per capita GDP	−2.27 *** (−5.58)	−2.27 *** (−5.52)	−4.45 *** (−7.25)	−1.22 (−1.48)	−2.13 ** (−2.46)	−2.13 ** (−2.51)	−0.55 (−0.48)	−0.55 (−0.28)
Half-life (years)	30	30	16	-	32	32	-	-
Number of observations/countries	28	28	28	28	28	28	28	28
F statistics (*p*-value)	31.09 (0.0000)	30.43 (0.0000)	52.50 (0.0000)	2.18 (0.1520)	6.03 (0.0211)	6.30 (0.0186)	0.24 (0.6264)	0.08 (0.7795)
R^2	0.5445	0.5445	0.6688	0.0773	0.1883	0.1883	0.0092	0.0092
Breusch–Pagan test	0.0332		0.6797	0.8533	0.0226	-	0.0014	-
Interpretation	Moderate convergence	Moderate convergence	Strong convergence	No convergence	Moderate convergence	Moderate convergence	No convergence	No convergence

Significance: *** $p < 0.01$, ** $p < 0.05$. Source: Author's calculations based on World Bank data. [1] Heteroskedasticity was detected in Models 1, 4, and 5. When models with robust standard errors are estimated (Models 1′, 4′, and 5′), the models are corrected, but the results remain unchanged.

Convergence was fastest in the pre-crisis period, with a rate of 4.45%. This outcome is expected, as the post-2004 enlargement period was characterized by increased trade and investment, institutional improvements, access to EU cohesion funds, and the implementation of structural reforms. These factors accelerated per capita growth in the CEECs (Rapacki & Próchniak, 2019). The average growth rate across the entire EU during this period was 3.6%, while in the CEECs, it was 6.3%.

As noted, the global financial crisis had a negative effect on the EU convergence process. Although the regression results for the period 2009–2013 showed that the β-coefficient was negative, it was not statistically significant, indicating neither convergence nor divergence. The average growth rate during this period was −0.53%. Poland was the only EU country that avoided recession, maintaining a positive growth rate throughout.

In 2009, the average per capita GDP was 85% of the 2014 average. In the post-crisis period, EU countries converged again, at a rate of 2.13% per year. While lower than the pre-crisis rate, this reflects a recovery phase during which member states grew at an average rate of 2.8%.

The "stagflationary" episode also hindered the convergence process. Although the β-coefficient remained negative, it was not statistically significant. The COVID-19 pandemic, an exogenous shock that effectively shut down national economies for nearly a year, was followed by a recovery period. However, the combined effects of the pandemic and the spillover from the war in Ukraine led to stagnation across most EU countries during this period (see Figure 1). Therefore, based on the regression results, the first research hypothesis cannot be rejected. However, these findings should be considered preliminary, as the full impact of stagnation on the EU convergence process will become clearer once full data for the post-stagflation period become available.

Tables 4 and 5 present the conditional β-convergence results for models incorporating external and internal variables, highlighting their impact across different periods.

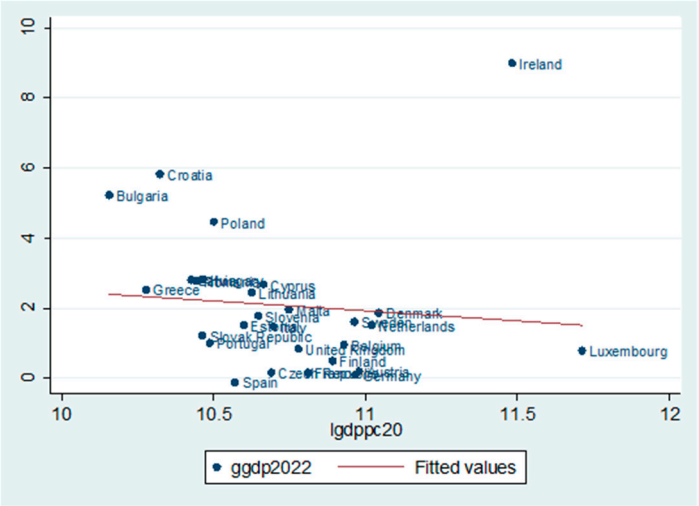

Figure 1. Absolute convergence between 2020 and 2022.

Table 4. Conditional convergence with external variables [1].

Denomination	Model 6 2004–2022	Model 7 2004–2008	Model 8 2009–2013	Model 8′	Model 9 2014–2019	Model 10 2020–2022
			β (t)			
Log of initial per capita GDP	−2.41 *** (−4.15)	−3.23 *** (−3.38)	−1.18 (1.21)	−1.18 * (−1.88)	−3.40 *** (−5.97)	−1.25 (−0.71)
Half-life (years)	29	21	-	58	20	-
Economic openness	0.01 *** (3.43)	0.01 * (1.76)	0.01 ** (2.17)	0.01 ** (2.67)	0.01 *** (3.90)	0.01 (0.36)
Inflation rate	−0.06 (−0.24)	0.37 (1.44)	0.08 (0.2)	0.08 (0.32)	−0.99 ** (−2.60)	0.1 (0.36)
Gross fixed capital formation	0.13 ** (2.30)	0.05 (0.56)	0.14 (1.28)	0.14 (0.96)	0.28 *** (5.28)	0.04 (0.33)
Number of observations/countries	28	28	28	28	28	28
F statistics (*p*-value)	18.37 (0.0000)	19.59 (0.0000)	2.30 (0.0898)	2.59 (0.0636)	16.46 (0.0000)	0.58 (0.6775)
R^2	0.7616	0.7731	0.2854	0.2854	0.7411	0.0922
Breusch–Pagan test	0.4044	0.2327	0.0377	-	0.1555	0.6736
Mean VIF	2.35	2.56	1.31	-	1.20	1.69
Interpretation	Moderate convergence	Strong convergence	No convergence	Weak convergence	Strong convergence	No convergence

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: Author's calculations based on World Bank and IMF World Economic Outlook data. [1] Heteroskedasticity was detected in Model 8. When a model with robust standard errors is estimated (Model 8′), the models are corrected. The β-coefficient was not statistically significant in the original model, but in the corrected model, it becomes significant.

The regression results show that EU member states converged conditionally when external variables are included in the model in all analyzed periods except during the stagflation, where the β-coefficient was not statistically significant. This is consistent with the absolute convergence results. The recession period recorded the slowest convergence rate at 1.18%[1], while the post-crisis period saw the highest convergence rate of 3.4%.

Table 5. Conditional convergence with internal variables [1].

Denomination	Model 11 2004–2022	Model 12 2004–2008	Model 13 2009–2013	Model 14 2014–2019	Model 14′	Model 15 2020–2022	Model 15′
				β(t)			
Log of initial per capita GDP	−1.43 * (−1.57)	−2.65 *** (−2.82)	−3.17 ** (−2.51)	−1.25 (−0.81)	−1.25 (−0.88)	1.87 (1.05)	1.87 (0.55)
Half-life (years)	0.48	0.26	22	-	-	-	-
Unemployment	−0.03 (−0.47)	0.02 (0.23)	−0.14 * (−1.89)	−0.05 (−0.43)	−0.05 (−0.99)	0.05 (0.29)	0.05 (0.32)
General government debt	−0.02 *** (−2.86)	−0.04 *** (−4.77)	−0.01 (−1.39)	−0.01 (−1.05)	−0.01 * (−2.01)	−0.01 (−1.27)	−0.01 ** (−2.19)
Control of corruption	−0.02 (−0.82)	−0.03 (−1.33)	0.05 * (1.71)	−0.03 (−0.83)	−0.03 (−1.41)	−0.08 * (−2.06)	−0.08 * (−1.77)
Number of observations/countries	28	28	28	28	28	28	28
F statistics (*p*-value)	14.59 (0.0000)	29.61 (0.0000)	4.98 (0.0048)	2.48 (0.0722)	4.10 (0.0119)	1.49 (0.2372)	3.09 (0.0357)
R^2	0.7174	0.8374	0.4643	0.3014	0.3014	0.2061	0.2061
Breusch–Pagan test	0.1103	0.8465	0.9571	0.0103	-	0.0176	-
Mean VIF	3.12	2.66	2.39	2.76	-	2.13	-
Interpretation	Weak convergence	Moderate convergence	Strong convergence	No convergence	No convergence	No convergence	No convergence

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: Author's calculations based on World Bank data. [1] Heteroskedasticity was detected in Models 14 and 15. When a model with robust standard errors is estimated (Models 14′ and 15′), the models are corrected. General government debt was not a statistically significant variable in the Model 15, but in the corrected model, it becomes significant. No changes are detected in Model 14.

During the stagflation period, none of the explanatory variables affected the convergence process. In contrast, all were statistically significant in the post-crisis period. Economic openness had a small but positive effect on convergence, confirming previous findings (Szeles & Marinescu, 2010; Popovic et al., 2020). The EU's average openness rate rose from 110% in the pre-crisis period to 140% during the stagflation, which is not a surprise as the EU is a customs union with free trade among members. Initial fears of trade diversion following the 2004 enlargement, given that the new member states were former socialist countries whose economies had been closed and were not competitive, were not realized. Instead, the accession process led to trade creation as a result of opening economies to new markets and increased access to investment (European Commission, 2009).

Investment, measured by gross fixed capital formation, positively affected convergence only over the 2004–2022 period, a finding consistent with previous research (Vojinović et al., 2009; Rapacki & Próchniak, 2019). The average investment rate declined from 24.5% of GDP (2004–2008) to 21.9% (2020–2022).

The theoretically negative impact of inflation on convergence (Vojinović et al., 2009) was confirmed only during the post-crisis period. Historically, CEECs have experienced higher inflation than old member states. The root of this lies in their socialist past, when prices were state-controlled. A characteristic of the transition was price liberalization, implemented across all formerly socialist countries (European Bank for Reconstruction and Development, n.d.). Six of the eleven CEECs that joined the EU have since adopted the euro, requiring compliance with the Maastricht price stability criterion. However, without a binding post-accession mechanism, inflation control is guided primarily by the ECB's 2%

target. The average inflation rate fell from 4.5% pre-crisis to 1.6% post-crisis but rose again to 3% during the stagflation period, in line with the nature of this downturn.

Since the EU is a single market with free trade, it is unsurprising that economic openness had a positive effect, even during the recession. However, the external variables included in the model were beyond the control of individual countries, and as such, their limited influence on the convergence process during an exogenous shock is to be expected.

When internally controlled variables are included in the model, the regression results show that EU member states exhibited conditional convergence over the entire period—albeit at the lowest rate of 1.43%—as well as during two sub-periods: the pre-crisis and the crisis period. The fastest convergence occurred during the recession period, with a rate of 3.17%. Therefore, the second research hypothesis cannot be rejected.

All explanatory variables are statistically significant in at least one analyzed sub-period. Historically, the unemployment rate has been higher in CEECs compared to old member states, another socialist legacy. Under the previous system, state-owned enterprises (SOEs) employed most of the labor force. However, with the collapse of socialism, SOEs either went bankrupt or were privatized, leading to a sharp rise in unemployment during the transition.

As previously noted, EU accession led to an increase in FDI inflow, which contributed to job creation and a decline in unemployment. In the pre-crisis period, the average unemployment rate in the EU was 7.5%, rising to 10.2% during the recession, the highest average rate across the analyzed periods. This rise in unemployment was in line with the typical effects of a recession.

The unemployment rate began to decline during the recovery period, reaching 6% during the stagflation. The results indicate that during the recession, unemployment was structural, negatively affecting growth, which supports previous findings (Fagerberg & Verspagen, 1996; Siljak & Nagy, 2019). During the stagflation, unemployment was cyclical, caused by the temporary shock of economic closures. With reopening, employment was restored.

General government debt was statistically significant in all estimated models, except during the recovery period. As theoretically expected, it had a negative impact on per capita growth, consistent with the findings by Yin et al. (2003) and Szeles and Marinescu (2010). The average EU debt-to-GDP ratio steadily increased from 46.3% in the pre-crisis period to 73.6% during the stagflation.

On average, CEECs have maintained lower debt levels than the old member states, as they did not inherit high debt burdens from the socialist times. Additionally, as part of their preparations to join the euro area, they were required to meet the Maastricht fiscal criterion, which stipulates that general government debt should not exceed 60% of GDP. Among the six CEECs that have adopted the euro, only Croatia failed to meet this criterion at the time of accession (Šiljak, 2022).

The debt ratio began to rise during the recession, as governments borrowed to implement stimulus measures, consistent with Keynesian economic theory. During stagflation, most CEECs remained below the 60% threshold, with the exception of Croatia, Hungary, and Slovenia.

Control of corruption should have a positive impact on growth, which was evident during the crisis period; however, its impact turned negative during the stagflation, as some governments intentionally used the pandemic as "an excuse" to further weaken democratic institutions (Adkins, 2021). In the remaining periods, it was not a statistically significant variable. On average, CEECs have a lower control of corruption score compared to core countries. This can be traced back to the socialist era, when all decisions were made by the central government. The transition process is fundamentally one of institution-building

(Redek & Sušjan, 2005), which includes reducing corruption. CEECs have made progress; however, several countries have experienced increased institutional inefficiency, partly due to rising support for Eurosceptic and populist parties (Benczes, 2023). This trend may explain the limited influence of the control of corruption on the convergence process.

The stagflation also exposed structural limitations within the EU. While the EU functions as a customs and economic union, it is not a political union. Member states maintain independent legal systems, fiscal policies, and emergency response mechanisms, which led to asymmetric outcomes during the crisis. For instance, laws on public procurement could be suspended during states of emergency. This flexibility was exploited to award contracts for vaccine and ventilator procurement to politically connected actors across several member states (Ibid), revealing institutional inefficiencies.

The conditional convergence models suggest that drivers of growth vary depending on the macroeconomic context: external variables contribute more to convergence during stable periods, both in terms of significance and higher convergence rates, whereas internal variables are more impactful during crises.

As noted in Section 4, the EU entered the stagflation crisis of 2020–2022 with significantly more policy tools than it had during the 2009 recession, when the mechanisms were established with a delay due to institutional unpreparedness. However, these tools still proved insufficient to achieve the absolute convergence of member states, indicating that they differ in their structures. The EU learned from the experience and responded faster when the COVID-19 pandemic started. The empirical findings in this paper show that while conditional convergence occurred during the recession, there was no convergence during the stagflation period. This contrast answers the research question: in theory, the EU was more prepared in institutional terms, as it learned from the past, but in reality, it could not have been fully prepared, as this was a fundamentally different type of crisis. The recession was a financial demand-side shock that could be constrained by stimulus and liquidity measures. The crisis caused by the COVID-19 pandemic and the war in Ukraine was a supply-side shock, where monetary and fiscal tools have limited effects. The results emphasize that convergence is more likely in stable periods, but it can also occur during times of economic instability. The EU's policy mechanisms were effective in mitigating the negative effects of the recession, and they were less effective in addressing the unique challenges posed by stagflation, as these are two different types of economic downturns.

6. Conclusions

This research analyzes the effects of two economic downturns—a recession and a stagflation—on the convergence process in the EU. The study employs both absolute and conditional convergence analysis.

The results show that there was no absolute convergence in the EU during recession or stagflation, indicating their negative effect on the process. The countries conditionally converged during the recession but not during the stagflation. Therefore, neither of the two research hypotheses can be rejected.

As the EU countries converged at the highest rate in absolute terms during the pre-crisis period (4.5%), but conditional convergence rates increased in the subsequent periods, the results suggest structural differences within the EU. The highest conditional convergence rate when internal variables were included in the model was during the recession period (3.2%), indicating that domestic policies had a stabilizing effect. When external variables were included, the highest convergence rate occurred during the post-crisis period (3.4%), highlighting the importance of further integration in supporting economic recovery. The analysis reveals that the explanatory variables had different effects depending on the

macroeconomic context: the external variables were more dominant during stable periods, while the internal variable had a greater impact during periods of crisis.

Based on this research, it can be concluded that the EU's preparedness for a crisis depends on the nature of the shock. The EU developed mechanisms for dealing with a crisis during the recession and was more institutionally prepared for the crisis caused by the COVID-19 pandemic and the war in Ukraine. However, these mechanisms required updates and were sometimes insufficient for addressing stagflation. Therefore, while the EU was better prepared for the recent crisis, convergence did not occur during the stagflation period, which reflects the EU economy's vulnerability to external shocks.

This empirical research offers important recommendations for policymakers. It suggests that the EU needs tools that can effectively address both demand- and supply-side shocks, through institutional reforms and proactive crisis planning. Moreover, adopting and enforcing transparent public procurement standards is essential to reduce corruption during emergencies.

A key limitation of this study is data availability. Although data for 2023 and 2024 are available, these years represent the recovery period following stagflation rather than its continuation. Including them would distort the results. Also, a two-year period is insufficient to estimate convergence trends accurately. Methodologically, this study is based on cross-sectional data, which was the most appropriate given the short duration of the stagflation period. However, future studies could incorporate panel data analysis to capture dynamic effects more precisely. Further examination of institutional factors, especially how institutional degradation during the COVID-19 pandemic affected convergence and cohesion policy functioning, is also needed. Additionally, the post-crisis recovery trajectory remains uncertain and could be further shaped by external factors, such as the potential imposition of U.S. tariffs.

The future of EU convergence depends not only on institutional preparedness shaped by past crises but also on how swiftly and effectively the EU can adapt to present challenges and sustain cohesion among the member states. Convergence is not guaranteed, but with the right tools and policies, it remains achievable.

Funding: This research received no external funding.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available in the public domain. These data were derived from the following resources: IMF World Economic Outlook Database (https://www.imf.org/en/Publications/WEO/weo-database/2024/April, accessed on 22 July 2025) and World Bank Open Data (https://data.worldbank.org/).

Conflicts of Interest: The author declares no conflict of interest.

Note

[1] This is the only convergence model with external variables where the problem of heteroskedasticity was detected. In the original model, the β-coefficient was not statistically significant. After estimating a model with the robust standard error, the β-coefficient became significant, indicating convergence.

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