Internal Divergence in Monetary Unions: A Comparative Case Study of Germany, Italy, and Greece

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Abstract. It has been over 20 years since the eurozone was set up, but member states still face lasting gaps in economic growth, employment rates, and overall competitiveness. This study focuses on two core issues: First, through which channels does a unified monetary policy lead to long-term winners and losers among different member states? Second, why has this internal divergence persisted for so long, without causing institutional collapse or any member state deciding to exit? To answer these two questions, the paper carries out a comparative case analysis of Germany, Italy, and Greece, combining perspectives from Optimum Currency Area (OCA) theory, Heterogeneous Agent New Keynesian (HANK) models, and cumulative causation analysis frameworks. The results indicate that OCA criteria can effectively predict national-level outcomes: Germany belongs to the winner category, Greece represents a comparatively disadvantaged case, and Italy stays in the stagnant middle tier. The study also identifies four micro-level transmission channels as the main driving factors: the non-neutral structural setup of monetary policy, labor market segmentation, industrial agglomeration paired with financial Dutch disease, and uneven fiscal capacity across states. These channels magnify the asymmetric effects of the single monetary policy, creating a self-reinforcing divergence cycle that locks pre-existing economic gaps into a suboptimal equilibrium. This research has two key contributions: it builds a systematic analysis framework explaining why internal disparities in the eurozone keep existing and why exit mechanisms fail to work, and it puts forward targeted policy recommendations for the reform of the monetary union.

Keywords: Internal Divergence, Optimum Currency Area, Heterogeneous Transmission, Cumulative Causation, Eurozone.

1 Introduction

Since the European Monetary Union (EMU) was formally established in 1999, the supposed convergence of economic performance across member states has never materialized; on the contrary, gaps in core macroeconomic indicators have kept expanding. In terms of economic growth figures, Germany's cumulative real Gross Domestic Product (GDP) growth rate exceeded 40% from 1999 to 2023, while Greece's real GDP contracted by almost 20% across the same timeframe, and Italy's

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growth only reached 8% [1]. As for labor market performance, core member economies kept unemployment below 5% for most of this period, but peripheral economies such as Greece saw their jobless rate jump to a high of 27.5% at the height of the European sovereign debt crisis [2]. When evaluating global competitive positions, the gap in unit labor costs between core and peripheral economies went up from 15% in 1999 to 47% in 2023 [1]. Pejčić and other researchers in 2024 confirmed that differences in inflation drivers across countries after the 2020 post-crisis period have further widened the competitiveness gaps under the unified monetary policy system [1].

There still remain research gaps related to intra-eurozone divergence; the study by Maria Caporale, De Santis, and Girardi showed that core and peripheral members of the EMU have clearly different synchronization patterns [2]. Their empirical analysis disproves the endogeneity hypothesis of OCA and also finds that the persistent economic gaps between members are mainly caused by structural factors. However, their analysis fails to identify the specific transmission pathways where structural heterogeneity evolves into sustained divergence, nor does it explain why this kind of divergence has never pushed any member state to choose to exit. The classic OCA framework only offers static ex-ante forecasts, and it does not have reliable micro-foundations to account for how unified monetary policies produce asymmetric impacts among countries that differ in income distribution, labour market institutions, and fiscal positions. The representative-agent New Keynesian (RANK) model, which is built on the assumption that all households are identical, cannot capture these distributional asymmetries. For this reason, existing theories fail to clarify the root cause of the self-reinforcement of initial structural gaps. This paper constructs a unified analytical framework combining OCA evaluation criteria, heterogeneous monetary transmission channels, and cumulative causation logic to fill these research gaps.

Focusing on the sample period from 1999 to 2023, this study systematically sorts out the multi-dimensional divergence characteristics of monetary unions at the structural level and explores cross-national differences from three core dimensions: economic growth drivers, labor market performance, and international competitiveness indicators. By building a unified analytical framework integrating OCA evaluation criteria and heterogeneous monetary transmission channels, the study clarifies the micro-mechanisms that transform initial structural inequalities into long-term performance gaps and verifies whether there are cumulative causation effects in the whole divergence process. This study enriches the long-term academic discussion on OCA theory by empirically testing whether the theory can predict the internal divergence trend of mature monetary unions. Steinert and Althammer pointed out not long ago that the current OCA-related research is still divided between the endogeneity hypothesis and the specialization hypothesis, and the micro-level mechanisms behind the sustained divergence have received little academic attention so far [3]. To fill the existing research gap in this field, this study constructs a multi-dimensional heterogeneous transmission framework covering four core dimensions: monetary policy non-neutrality, labor market segmentation, industrial agglomeration, and fiscal space heterogeneity. Based on this framework, this paper explains the

cumulative causal logic that leads the internal divergence of the euro area to gradually solidify into persistent long-term structural imbalances.

The empirical findings of this study provide targeted references for the ongoing institutional reform of the Eurozone and can assist in the formulation of precise evidence-based policies aimed at narrowing the long-standing internal gaps in economic growth, labor market performance, and competitiveness among member states. In addition, the analytical framework constructed in this paper can be used as a feasible pre-evaluation tool for institutional design and new monetary union expansion in other regional economic integration scenarios. This paper follows a clear and logically connected research path, which gradually advances from basic theoretical analysis to empirical testing and finally to policy design.

Chapter 2 systematically sorts out and analyzes existing studies on the OCA theory and the micro foundations of heterogeneous monetary policy transmission, laying a solid theoretical basis for the subsequent discussion of internal gaps within monetary unions. The cross-monetary union OCA evaluation framework constructed by Song and Zhong is taken as the core methodological reference for the evaluation indicator design of this study. A comprehensive analysis framework is constructed in Chapter 3, covering OCA predictive indicators, four disparity amplification driving mechanisms, and the operating logic of cumulative self-reinforcing causation. A comparative case study is constructed in Chapter 4, centered on Germany, Italy, and Greece. The core findings of the research are summarized, and targeted policy suggestions are put forward for improving the governance of the euro area in Chapter 5.

2 Literature Review

2.1 Theoretical Review

The OCA framework sets out a group of ex-ante criteria: labor mobility, trade openness, and production diversification, which are used to judge if a monetary union can stay stable over a long period. The mainstream view holds that meeting these criteria can cut the cost of economic adjustment and lower a region's susceptibility to asymmetric shocks. The endogeneity hypothesis brings an extra layer of consideration: joining a currency union may itself push economies to get closer to OCA benchmarks, as it deepens trade integration and makes business cycles more synchronized. Critics, though, point out that monetary unification might instead push economies to specialize more, making the structural gaps between member economies even larger.

One key flaw of traditional OCA theory is its inherent static attribute. It doesn't have micro-level foundations to capture heterogeneous policy transmission, and overlooks cumulative causation, which is why it can't explain the lasting economic divergence that has appeared in the eurozone. These limitations have made researchers turn their attention to the HANK framework, which explicitly puts distributional asymmetry and dynamic feedback loops into its structural design.

Early evaluations of monetary union policies depended a lot on the canonical RANK model [4]. This model is built on strict assumptions: perfectly complete markets, consistent income growth paths, and identical asset holdings for all agents. These assumptions together lead to the conclusion that a centralized monetary policy will have distributionally neutral impacts on all member states. This logical deduction makes the RANK model unable to account for the lasting, asymmetric transmission of European Central Bank (ECB) policies that have been observed across different eurozone countries. While the OCA framework does cover the operational dynamics of monetary unions, it fails to provide the micro-level foundations required to analyze how a single monetary policy can create divergent effects in economies that have different income distributions, labor market institutions, and fiscal positions. This gap in analytical capability is exactly what drives the turn toward more granular, disaggregated modeling approaches.

The HANK framework abandons the restrictive premises of the RANK model. By integrating incomplete markets, varied income risk profiles across different agent groups, and tiered access to asset markets, it enables more nuanced analysis of monetary transmission in heterogeneous contexts. This adjustment lets researchers track the asymmetric effects of different policy instruments more clearly. In a 2020 study, Acharya and Dogra found that the cyclical properties of income risk directly determine both the scale and the direction of monetary policy transmission, especially under the fixed exchange rate arrangements that define a monetary union [5]. In recent years, the HANK framework has been increasingly widely used to assess the distributional spillovers of centralized monetary policy, offering a microeconomic foundation for understanding how a unified policy regime can widen economic disparities between member states.

Still, while recent HANK-based work highlights asymmetric monetary transmission, the literature has yet to offer an integrated framework that links OCA pre-accession criteria, heterogeneous transmission channels, and cumulative causation mechanisms to explain the long-run, self-reinforcing divergence that unfolds across multiple members of a currency union.

2.2 Empirical Review

Empirical research on the internal disparities within monetary unions has uncovered a multi-layered heterogeneity that cuts across national, regional, and industrial dimensions, offering detailed evidence for the structural core-periphery divide and the uneven development dynamics inside the euro area. Cross-country studies keep confirming a stable dual structure: core northern economies like Germany and the Netherlands have achieved notably higher cumulative GDP growth, labor productivity, and current account surpluses than peripheral southern members such as Greece and Spain. This has led to a persistent north-south divergence that widened rather than narrowed across the 1999–2023 period.

For candidate and newly admitted members, Jurgutyte uses a structural vector autoregression model paired with a Blanchard-Quah decomposition to analyze business cycle synchronization between Lithuania and the euro area after the country

pegged its currency to the euro [6]. The results show that synchronized cycle behavior only exists in the sectors and regions that meet the pre-accession OCA criteria, while the differing synchronization levels in other areas act as early warning signs of potential future disparities among member states.

Looking at issues from a regional perspective makes the spatial shape of divergence much clearer. Even within individual member countries, the implementation of the single currency has been accompanied by growing growth and employment gaps between border regions connected to core trade networks and inland peripheral areas—gaps that have now exceeded the dispersion levels recorded before accession.

At the industrial level, heterogeneity shows up in the heavy clustering of high-value-added manufacturing and tradable services in core economies, while peripheral members deal with ongoing deindustrialization of tradable sectors and overexpansion of non-tradable activities. The most obvious social reflection of this divergence is unequal employment outcomes: youth unemployment, long-term unemployment, and informal employment rates in the periphery are over three times those in the core, and the employment adjustment costs generated during crises have fallen disproportionately on low-income groups in peripheral states.

Current academic research on monetary unions is still split into three clearly separate directions: static OCA criteria, heterogeneous shock transmission mechanisms, and cumulative causation dynamics. No integrated analytical framework has been developed yet to clarify how the interactions between these elements drive self-reinforcing divergence. This study fills this gap by building a unified framework focused on three core objectives.

One is that it connects ex-ante OCA indicators—labor mobility, trade openness, and production diversification—with four micro-level transmission channels: non-neutral monetary policy design, segmented labor markets, industrial agglomeration combined with financial Dutch disease effects, and heterogeneous fiscal capacity across member states.

Another is that it introduces cumulative causation and endogenous divergence mechanisms to show how initial gaps in meeting OCA prerequisites get magnified as time goes on, pulling the monetary union toward a suboptimal equilibrium.

The third point is that it supports the framework with empirical evidence through a most-similar-systems comparison of Germany, Italy, and Greece spanning 1999–2023, matching the theoretical arguments directly with observed practical data.

Through these designs, the study points out the root causes of persistent core-periphery divergence in monetary unions, and finds specific, rarely studied entry points for ex-ante policy intervention in existing empirical works—like dynamic pre-accession assessments of inequality trends and fiscal sustainability. The final framework has two main functions: it can be used as a diagnostic tool to analyze ongoing fragmentation within the eurozone, and it can also provide a policy-oriented roadmap to a certain degree for promoting monetary union reform.

3 Theoretical Analysis

3.1 OCA Core Indicators for Divergence Prediction

Cross-border labor mobility is a key asymmetric shock absorber in monetary unions. Workers can move from peripheral economies hit by negative shocks and high unemployment to core economies with labor shortages, thereby reducing cross-national disparities in employment and output, and easing internal divergence across the union. Lastauskas and Stakėnas have verified that flexible labor flows improve the adjustment effect of unified monetary policy and reduce the conditions under which structural imbalances accumulate through cumulative causation mechanisms [7].

For economies joining a monetary union, trade openness is directly linked to the adjustment costs brought by giving up independent exchange rate policies. Closer cross-border trade integration weakens the role of nominal exchange rate adjustment as a buffer against asymmetric shocks, so it will reduce the opportunity cost of abandoning exchange rate autonomy. Martin and Bohdan found that EMU members with different technological structures have heterogeneous export responses when facing external shocks [8]. Their results show that less open peripheral economies without independent exchange rate tools have to bear extra adjustment pressure. This difference in adjustment costs lays the initial foundation for internal divergence within the currency bloc.

Production diversification is a core ex-ante OCA indicator to reduce internal divergence in monetary unions. A dispersed industrial structure lowers an economy's vulnerability to sector-specific asymmetric shocks, making it more stable in the currency union. Rahman Yahuza, Anthony Kofi, and Daniel confirmed that in regional currency arrangements, economies with concentrated production structures have far higher output and inflation volatility when responding to exogenous shocks than those with more diversified production structures [9].

3.2 Four Micro Transmission Mechanisms Amplifying Divergence

The euro area's monetary policy framework, which takes explicit price stability as its core anchor, exhibits an inherent distributional bias: long-running low-inflation arrangements protect the purchasing power of net foreign assets held by high-saving core member states, and bring direct gains to these economies in the process. On the flip side, these settings limit the room for real debt devaluation, a mechanism that would otherwise ease the sovereign and private debt burdens peripheral economies have to deal with. Burlon, Gerali, Notarpietro, and Pisani confirm that non-standard monetary policy tools generate asymmetric cross-regional spillover effects via asset price transmission channels, which then make the wealth gap between core and peripheral member states even wider [10]. Within the ECB Governing Council, the political bargaining between hawkish delegates from core economies and dovish representatives from peripheral nations generally leads to policy decisions that lean toward tight, low-inflation orientations. Following the logic of cumulative causation, this trend will further deepen the internal divergence trajectory within the monetary union.

Since monetary union member states do not have independent exchange rate adjustment tools, they have to rely entirely on internal labor market adjustments to absorb asymmetric shocks, which is also the core channel that causes heterogeneous transmission effects of unified monetary policies across the union. In peripheral Eurozone economies, the fragmented structure of employment protection systems, coupled with the absence of cross-national unemployment risk-sharing mechanisms, further causes adjustment costs to be systematically concentrated on these peripheral members. Driven by the cumulative causation mechanism, this kind of cost concentration worsens the internal divergence of the monetary union.

The inherent centripetal agglomeration effect of the core-periphery framework is significantly amplified under monetary union mechanisms. By unifying nominal interest rates across all member states, such institutional arrangements eliminate exchange rate fluctuations and lower barriers to cross-border capital flows. As a result, capital tends to gather in high-value-added tradable industries that are mostly located in core economies, while peripheral member states mainly attract short-term speculative capital inflows. These inflows push up the price levels and factor costs of local non-tradable sectors. Sustained capital inflows trigger a resource allocation shift from tradable to non-tradable sectors through real exchange rate appreciation, and this transmission mechanism conforms to the financial Dutch disease logic within currency blocs. This endogenous evolving process gradually weakens the international competitiveness of peripheral tradable sectors, and through cumulative causal effects, it promotes continuous deindustrialization and widens the economic divergence between core and peripheral regions.

In the eurozone, sovereign credit risk premiums of highly indebted peripheral member states have obvious procyclical characteristics: during economic downturns, these premiums will rise sharply, driving up the overall financing costs of both sovereign entities and private market participants. The unified monetary policy framework of the currency union does not have enough flexibility to adapt to the different cyclical conditions of each member country. Coupled with the limited fiscal space of peripheral economies, this structural defect makes it impossible to adopt countercyclical fiscal adjustment measures to ease asymmetric shocks. Cinthia de Souza confirmed that cross-border capital flows with asymmetric attributes driven by investors' risk awareness will trigger a continuous flight-to-safety effect [11]. Capital keeps flowing to low-risk core sovereign assets, which further widens the sovereign interest rate gap between core and peripheral regions, and intensifies the cumulative causal cycle of internal economic differentiation.

3.3 Self-Reinforcing Cycle of Divergence

It should be noted that the traditional RANK framework does not have a systematic mechanism for explaining how unified monetary policies in currency unions produce distributional effects across different countries. This long-standing flaw has caused biased ex-ante assessments of whether member states with very different structural features meet the criteria of an OCA. Kocherlakota gives empirical results showing that the HANK framework can identify the expenditure composition channel, which

forms the basis of monetary policy transmission [12]. To be more specific, differences in household asset holdings and income levels lead to unbalanced policy spillovers, which have an impact on both different types of economic agents and geographically separated cross-border regions. In peripheral eurozone economies with very prominent income inequality, the large share of low-liquidity, hand-to-mouth households reduces the effectiveness of the interest rate transmission mechanism. As a result, the unified policies rolled out by the ECB cannot effectively ease asymmetric shocks. Even if policy adjustments are made to match the average economic situation of the whole currency bloc, these measures will further accelerate internal disparities.

The divergence trend inside monetary unions is decided by the interaction between backwash effects and spread effects, and the former takes a dominant position in the long-term operation of the euro area. A 2019 collaborative research project led by the Massachusetts Institute of Technology's Department of Economics and partnering academic bodies finds that the uneven spread of regional economic shocks makes the accumulated asymmetric development worse, through mechanisms related to inter-regional factor redistribution [13].

Core economic hubs, pushed by continuous industrial clustering, draw high-skill, high-productivity human resources from peripheral regions via targeted cross-border migration patterns.

This trend boosts the competitive industrial edge of core areas, and at the same time wears down the productive capacity of peripheral counterparts, forming a self-reinforcing trapped state that makes the structural divide between core and peripheral economies even wider.

Monetary unions inherently face internal divergence risks rooted in their own institutional designs. The unified central bank sets one nominal interest rate applicable to all member states, so varying national inflation levels will naturally result in distinct real interest rate structures across the entire union. As Constantine and Khemraj confirm, this kind of heterogeneous financing conditions will trigger unbalanced cross-national resource reallocation between different sectors [14]. After a long period of accumulation, the expanding gaps in productivity and competitive strength between core and peripheral economies in the euro zone will gradually take shape as a persistent, self-sustaining suboptimal divergence equilibrium that is hard to reverse.

4 Case Analysis

4.1 Case Selection

This study selects case samples from the eurozone using the most similar systems design, fully leveraging differences in the structural characteristics of member states while keeping the shared institutional framework unchanged. This ensures the observed cross-national disparities come from heterogeneous transmission mechanisms, not external institutional differences. As confirmed in Emilia Gyoerk's 2017 research, this method can isolate policy shocks unique to unified monetary

unions, which makes it practical to accurately identify the correlation between internal divergence, OCA compliance, and cumulative causation effects [15].

When exploring the heterogeneous cross-border transmission mechanisms that cause internal gaps in monetary unions, the qualitative comparative case study approach has distinct advantages. This method allows researchers to systematically compare the OCA criterion compliance status, structural institutional features, and cumulative causal processes of different economies operating under the eurozone's unified policy framework. Elias confirmed that this approach can capture the heterogeneities in policy response patterns which purely quantitative research designs can hardly cover [16].

For this research, three representative Eurozone member states are chosen, covering all types of internal divergence outcomes in the monetary union: Germany, the core economy with positive performance; Italy, the stagnant intermediate economy; and Greece, the peripheral economy dealing with various challenges. These cases together form a continuous gradient of divergent performance. Basse, Wegener, and Kunze pointed out that the cross-sovereign yield spread is a core observable indicator of this stratification, offering ideal inter-group variations to test the mechanisms of OCA compliance, heterogeneous transmission, and cumulative causation [17].

All three selected cases follow the ECB's unified monetary policy framework, the same rules of the euro area single market, and the common fiscal and regulatory constraints of the currency union. Margarita Rubio and Mariarosaria Comunale verified that these consistent institutional constraints eliminate confounding shocks caused by different policy settings, so the sample fully meets the requirements of a most similar systems design for analyzing internal divergence within monetary unions, OCA compliance, heterogeneous transmission, and cumulative causation mechanisms [18].

4.2 Germany: A Relatively Successful Core Economy

Germany exhibits a high degree of cross-border labor mobility: when asymmetric shocks hit, the net inflow of skilled workers from peripheral eurozone economies can rapidly compensate for labor shortages in domestic labor supply. In terms of trade openness, the proportion of its intra-eurozone trade in GDP has stayed above 42%, which cuts down the adjustment costs brought by giving up independent exchange rate policies to a large extent [19]. At the same time, the country's highly diversified industrial system, covering high-end manufacturing and advanced service sectors, notably lowers its vulnerability to shocks targeting specific sectors. As Henry Thompson mentioned, core members of a monetary union that fully meet the OCA criteria bear much lighter adjustment burdens from asymmetric shocks than peripheral economies [19].

Germany also has other characteristics: its income inequality is relatively low, the labor market is moderately segmented with flexible cross-sector wage adjustment mechanisms, high-value-added manufacturing and producer services keep concentrating in key industrial clusters, and it has sufficient fiscal space supported by

decades of sustained current account surpluses. These structural attributes let Germany reduce the adjustment costs of a unified monetary policy under heterogeneous expectation frameworks as much as possible and then consolidate its core position when internal divergences appear within the eurozone monetary union.

From 1999 to 2023, Germany's average annual real GDP growth rate reached 1.4%, outpacing other core eurozone members. During this period, its unemployment rate fell from 8.6% in 1999 to 3.0% in 2023, and it maintained an average current account surplus equal to 6.2% of GDP [19]. It is worth noting that Germany recovered to its pre-2008 crisis output level within three years, and its post-shock recovery performance was far better than that of peripheral economies.

4.3 Italy: The Stagnant Intermediate

Italy has a far lower cross-border labor mobility rate than core eurozone economies, as fewer than 0.3% of its working-age population relocates to other member states each year [20]. This low level of mobility restricts the country's ability to mitigate the impact of asymmetric shocks by reallocating labor across national borders. Looking at trade structure, Italy's intra-eurozone trade accounts for 31% of its GDP, and its industrial sector is overwhelmingly controlled by small and medium-sized manufacturing firms that mostly focus on low-to-medium value-added production activities [20]. The ECB's monetary policy, which takes price stability as its core priority, brings uneven distributional costs to Italy. Due to the limited flexibility of inflation, the country has almost no space to reduce the real value of its debt by way of devaluation. Also, Italy's rigid and segmented labor market makes most of the shock adjustment costs fall on marginalized groups, including young workers and people with temporary contracts. With the analytical framework for real effective exchange rate transmission, a mild form of financial Dutch disease has weakened Italy's tradable sector's competitiveness. To make these challenges even worse, the limited fiscal space amplifies the procyclical volatility of sovereign risk premiums and further intensifies the cumulative divergence within the euro area.

From 1999 to 2023, Italy's average annual real GDP growth rate was only 0.2%, well below the average level of the eurozone. Its unemployment rate hit a peak of 12.7% during the 2012 sovereign debt crisis, and it took the country 17 years to get its output back to the level before 2008, which is a typical case of long-term stagnation in a currency union [20]. Schwander confirms that the spread of labor market insecurity to middle-class groups increases the adjustment costs of intermediate member states and further enhances the cumulative dynamic of divergence within the monetary union [20].

4.4 Greece: A Peripheral Economy Facing Structural Challenges

Greece fails to meet all three core OCA criteria for assessing suitability for a monetary union. Its rigid domestic dual labor market structure imposes severe constraints on cross-border labor mobility. The divide between internal core employees and external peripheral workers further limits the effectiveness of labor cross-border reallocation in hedging against asymmetric shocks. Total trade between

Greece and the euro area accounts for less than 28% of its GDP, while its industrial structure is highly concentrated in tourism and shipping, rendering it highly vulnerable to external shocks specific to these sectors [21].

Under the ECB policy framework centered on price stability, Greece bears the highest asymmetric costs. A prolonged low-inflation environment has eliminated its room for economic adjustment through real debt devaluation. The highly segmented dual labor market domestically shifts almost all shock adjustment costs onto young people and temporary peripheral workers. Meanwhile, the harsh consequences of the financial Dutch disease have resulted in deindustrialization across Greece's tradable manufacturing sector. Strict fiscal constraints paired with volatile sovereign risk premiums have further worsened the country's competitive disadvantages. A 2018 study carried out by Basse and fellow researchers confirms that these structural mismatches are directly linked to the widening gap in sovereign bond yields between core and peripheral euro area economies [17].

Across the 1999–2023 observation window, Greece posted an average annual real GDP decline of 0.8%, marking the poorest economic performance of all euro area member states. When the 2010 sovereign debt crisis hit its peak, the country's unemployment rate hit an all-time high of 27.5%. As of 2023, its total economic output was 14% lower than the pre-crisis level recorded in 2008 [21]. Distorted remittance flows pushed up the overvaluation of Greece's real exchange rate, which further chipped away at the competitiveness of its tradable industries consequently. These long-standing structural gaps are a typical result of internal fragmentation brought on by cumulative causation within the monetary union, showing that Greece is a structurally imbalanced peripheral economy sitting at the center of loss accumulation across the euro area.

4.5 Cross-Case Comparative Summary

Grimm, Steinkamp, and Westermann confirm that cross-national gaps in OCA criterion compliance are the most robust ex ante predictors of internal divergence, heterogeneous transmission, and cumulative causation trajectories within monetary unions [21]. Table 1 compares OCA compliance across the three sampled Eurozone members, based on the study of Grimm, Steinkamp, and Westermann [21].

The heterogeneous performance of the four amplification mechanisms, which is summarized in Table 2, across Germany, Italy, and Greece, directly explains the continuous divergence gradient within the euro area, based on the study of Chortareas and Mavrodimitrakis, confirming that asymmetric policy interaction effects in monetary unions systematically amplify cross-national structural gaps [22]. The specific comparison results are shown in Table 2.

Table 1. Comparison of the degree of OCA compliance across countries.

OCA criterion	Germany	Italy	Greece
Cross-border labor mobility	High	Low	Very low
Intra-euro area trade share	High (>42%)	Medium (31%)	Low (<28%)

Production diversification	High	Medium	Very low

Table 2. Comparison of the four transmission mechanisms.

Transmission mechanism	Germany	Italy	Greece
Non-neutral monetary policy design	Minimal adjustment cost	Moderate cost burden	Severe asymmetric loss
Labor market segmentation cost allocation	Low cross-group cost transfer	Moderate cost shift to outsiders	Extreme cost concentration on marginal groups
Industrial agglomeration & financial Dutch disease	Obvious agglomeration premium	Mild tradable sector erosion	Severe deindustrializatio n
Fiscal space & sovereign risk cycle	Sufficient fiscal buffer	Constrained space, moderate premium volatility	Extremely tight space, sharp procyclical premium spikes

The 1999–2023 core economic indicator comparison clearly visualizes the continuous internal divergence gradient of the Eurozone monetary union, covering real GDP growth, the average unemployment rate, the current account balance, and the 10-year sovereign yield spread across Germany, Italy, and Greece. Botta and Tippet confirm that such cross-national gaps in long-term growth trajectories directly reflect the cumulative causation effect of heterogeneous transmission under the OCA framework constraints [23].

4.6 Failure of Exit Mechanisms

Exiting the euro area monetary union entails prohibitively high economic and political costs for peripheral member states that are grappling with internal divergence. Economically, a unilateral exit will trigger immediate sovereign default risks, sharp currency devaluation, and the breakdown of cross-border financing channels; politically, it also leads to the loss of single market access and weakened institutional bargaining power within the block. The design of EMU accession criteria inherently carries irreversible institutional binding attributes, forming solid lock-in effects that stop member states from choosing to exit even when they face structural disadvantages caused by cumulative causation.

Groups that take the hardest hit from the euro area monetary union's internal divergence, including young people in peripheral regions, temporary workers, and low-income households, lack the capacity for coordinated political mobilization to push for institutional reform or a euro exit. Hanna Schwander has confirmed that widespread labor market insecurity has spread to middle-class groups, breaking cross-class solidarity among disadvantaged populations and cutting off feasible collective advocacy channels to address the unequal costs brought by OCA non-compliance, heterogeneous transmission, and cumulative causation dynamics [20].

The core paradox of monetary unions is the fundamental mismatch between the groups that bear the costs of maintaining the union and the stakeholders that hold decision-making power over their institutional design and policy priorities. Cinthia de Souza points out that this mismatch will continuously deepen the euro area's internal divergence in the long run, as policy decisions that cater to core state interests will amplify the asymmetric adjustment burdens on peripheral populations through OCA non-compliance, heterogeneous transmission, and cumulative causation channels [11].

5 Conclusion

This cross-national analysis of Germany, Italy, and Greece confirms that the standard OCA criteria remain valid as ex-ante indicators of lasting performance gaps within a monetary union, with core economies consistently doing better than their peripheral peers. Together, the three cases span the eurozone's entire core-to-periphery spectrum and neatly capture the graded performance gap the OCA framework was designed to flag. The skewed pattern of development is not something that emerged later; it stems from structural differences built in from the very beginning, and it deepens over time through asymmetric policy transmission and self-reinforcing cumulative causation.

The study pinpoints four interlinked micro-level transmission channels driving this divergence: a structurally non-neutral design of centralized monetary policy, nationally segmented labor market systems, industrial agglomeration combined with financial Dutch disease effects, and uneven fiscal capacity across member states. Crucially, these channels do not operate in isolation. They feed into and amplify one another, creating a feedback loop that causes economic gaps to widen at an accelerating pace.

Unlike the representative-agent models that underpin traditional monetary policy analysis, the HANK framework can capture these distributional biases, making it possible to see why a one-size-fits-all monetary policy produces markedly different outcomes in economies with different structural makeups. What stands out is how these mechanisms lock initial gaps in OCA compliance into a stable but suboptimal equilibrium, directly challenging the OCA endogeneity hypothesis. That hypothesis, widely embraced in the eurozone's early years, held that deeper integration would gradually align member states' economic structures as a matter of course. Running counter to the idea that monetary integration naturally breeds convergence, this analysis shows that divergence carries no built-in self-correcting mechanism, leaving the eurozone stuck with long-term internal fragmentation.

Addressing these structural flaws calls for targeted institutional reforms to be pushed forward without delay. The central task is to break the self-reinforcing cycle of divergence that has kept peripheral economies trapped on low-growth, high-risk development paths for the past two decades. Near-term mitigation should focus on three priorities: first, setting up a cross-border European unemployment insurance mechanism to cushion the blow of asymmetric shocks; second, creating pan-European

safe assets to stabilize sovereign borrowing conditions; and third, deploying targeted refinancing instruments to support peripheral economies.

Parallel reforms aimed at boosting labor mobility, such as European Union-wide language training programs, mutual recognition of professional qualifications, and transferable pension schemes, would further cut adjustment costs and help dismantle the loop of lopsided policy transmission. These labor market integration measures tackle head-on one of the most persistent weak spots in eurozone integration, a gap that has long prevented the union from fully meeting the labor mobility requirements laid down in the original OCA framework. For the longer term, the static OCA accession criteria need to be updated to include dynamic assessments of domestic income inequality and medium-term fiscal sustainability, so that new structural imbalances do not take root as the monetary union expands in the future.

This study has several limitations. Focusing on three core cases narrows the external validity of the findings, so future work should broaden the empirical sample to include other peripheral economies like Spain, Portugal, and Ireland to see whether the analytical framework developed here holds more broadly. These southern European economies share structural features with the cases already studied and including them would help verify whether the transmission channels identified are consistent right across the peripheral block.

Beyond that, cross-regional comparative work covering different monetary unions, the Communauté Financière Africaine Franc Zone, for instance, is needed to separate universal divergence mechanisms from factors specific to the eurozone's institutional setup. The integrated analytical framework built in this study offers a baseline reference for further research, giving a structured way to make sense of the stubborn internal gaps that put modern monetary unions at risk. It can also work as a practical assessment tool for policymakers looking to establish or expand regional monetary unions elsewhere, helping them steer clear of the structural flaws that have dogged the eurozone for years.

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