7A). Furthermore, the Canonical Correlations are found to be very similar for the three landmark years (Tables 3A and 6A), thus implying that the overall discriminant ability of the chosen emission factors has been consistent through the years. Also, the classification analysis indicates that there has been an improvement in the zone of intersection between the two sets of nations over time and this tends to substantiate that the boundaries of the groups are not static.

In 2000, error classifications are exclusively unidirectional and concern solely BRICS countries categorized within the OECD country group (Tables 3 and 4). Among a total of 57 countries, seven countries belonging to BRICS are error-classified, for which an overall error classification of 12.28% materializes, with no OECD country being categorized within the ranks of the BRICS country group. Notably, neither error correlation nor classification randomness underlies said pattern, rather signaling a systematic overlap zone wherein specific countries belonging to the BRICS country group demonstrate an adaptation of their emissions to specified levels of OECD countries' emissions. Egypt, Ethiopia, Indonesia, Iran, Russia, South Africa, and the UAE identified themselves within said overlap zone, adapting to a zone of transitional or hybrid development and emission structure (Table 2A). In turn, the major BRICS countries Brazil, China, and India properly categorized within the BRICS country structure, serve as structural pillars of said grouping.

Fig. 5 portrays the canonical discriminant pattern corresponding to year 2013. In relation to the status-quo defined by 2000, it is possible to notice the continued statistical significance of group separation, with enhanced visualization of observation geometry for a more defi non-overlap region. Countries belonging to the BRICS group move towards the center of the OECD, reflecting their emissions partly converging towards those of the more advanced economies. Meanwhile, OECD members continue to form a nearly identical cluster, confirming their structural emissions homogeneity, defined by their accident scenario.

As shown, in 2013 the pattern of misclassification becomes more selective and focused. Six BRICS members are misclassified out of 57 countries, against an overall misclassification rate of 10.53% (Table 5); no OECD country is assigned to the BRICS group (Table 6). Compared to 2000, fewer BRICS countries are misclassified, indicating a contraction of the overlap area. Noticeably, the Russian Federation, previously situated within the 'overlap' zone, is now accurately and more strongly assigned to the BRICS cluster, based on higher posterior probabilities (Tab. 5A). On the other hand, Egypt, Ethiopia, Indonesia, Iran, South Africa, and the United Arab Emirates remain systematically misclassified into the OECD membership, confirming their status as boundary cases across the two groups. Notably, the set of misclassified countries does not expand, rather it settles around a narrower subset of emerging economies, with higher and less ambiguous posterior assignment probabilities (Tables 5A and 6). Such dynamics reflects a further consolidation of the OECD emission profiles, together with a reduction in structural ambiguity at the group level, reinforcing the originally observed asymmetric nature of discriminant separation already pointed out in the year 2000.

Fig. 6 shows the results of the discriminant analysis for the latest year of the benchmarks, which is 2023. Although there is still a distinction to be made between OECD and BRICS nations, the overlaps start to show more complexity as compared to the preceding years. Not all, however, of the countries included in the BRICS nations show similar or nearly identical configurations of emissions to approach the OECD centroid, and the position of these points along the discriminant axis indicates more emphasis being placed on large-scale data of emissions.

Table 3
Classification summary and model performance, 2000.

Origin	Count	Number of Misclassified	Percentage of Misclassified	R-squared (Entropy)	−2 Log Likelihood
Training	57	7	12,2807	0,28541	37,8318

Source: Author's elaboration

Table 4
Cross-Classification Matrix (Observed vs Expected Group Memberships) 2000.

Observed	Expected Count		Observed	Expected Rate	
Group	BRICS	OCSE	Group	BRICS	OCSE
BRICS	3	7	BRICS	0,300	0,700
OCSE	0	47	OCSE	0,000	1000

Source: Author's elaboration

In 2023, there is a more refined pattern of mismatch, yet with a predominantly asymmetric character. Among 57 countries, there are five countries with mismatches, constituting a total mismatch of 8.77% (Table 7), a further improvement recorded concerning accuracy between benchmarking periods. Among these, four countries of the BRICS group, viz., Egypt, Iran, South Africa, and United Arab Emirates, continue with emission pattern profiles matching those of OECD countries, thus sustaining the existence of a small overlap zone based on endogenous heterogeneity among BRICS countries (Table 8A). Against 2013, Ethiopia and Indonesia are no more mismatched, thus signifying a partial solution to the previous boundary problems.

On the other hand, the discriminant analysis results indicate the appearance of a marginal OECD boundary case. Indeed, one of the OECD countries, the USA, is assigned to the BRICs cluster (Tables 8A–8). Despite its isolation, this fact indicates that the structures of emissions usually typical of emerging economies can sometimes occur within the advanced economies as well.

Nevertheless, this low degree of bidirectionality, rather than affecting the asymmetrical character of misclassification, does not alter the fact that most overlaps continue to cluster around BRICS nations being located near the OECD centroid, whereas OECD nations continue to display a rather cohesive emission structure (Table 8). Considering the dynamics of misclassification overlaps around different benchmark years, it appears that, despite its statistical integrity, the OECD-BRICS divide has turned selectively more porous with passing years. Such overlaps can be best characterized by indicating differing transition phases rather than any kind of homogeneous trend towards a unified emission structure.

5. Discussion

The analysis of the EPCI over the period 2000–2023 provides a robust framework for interpreting long-term differences in environmental pressure pathways across countries. The observed patterns highlight the persistent role of structural and scale-related factors, indicating that size, energy intensity, and production structure remain key drivers beyond institutional classifications. In this perspective, the integration with discriminant analysis allows for a more nuanced understanding of structural differences. The EPCI ranking, in turn, reveals a strong persistence in the relative positions of large-scale economies.

This result reflects the role of productive scale, energy intensity, and demographic size in shaping environmental pressure, as consistently documented in the sustainability and planning literature [21], [32], [40]. Countries such as China, the United States, and India consistently occupy the highest positions throughout the period.

However, differentiated dynamics occur in relation to the differentiation of groups. There are various OECD countries that have experienced stabilization or a gradual decrease in the values of EPCI, especially from the mid-2000s onwards and after 2010.These trajectories are broadly consistent with empirical evidence linking environmental pressure reduction to improvements in energy efficiency, technological innovation, and increasingly stringent environmental policies [25], [28], [42], [45], although they remain characterized by non-linear adjustments linked to economic cycles and external shocks [18], [19].

While the EPCI captures differences in terms of long-term trajectories

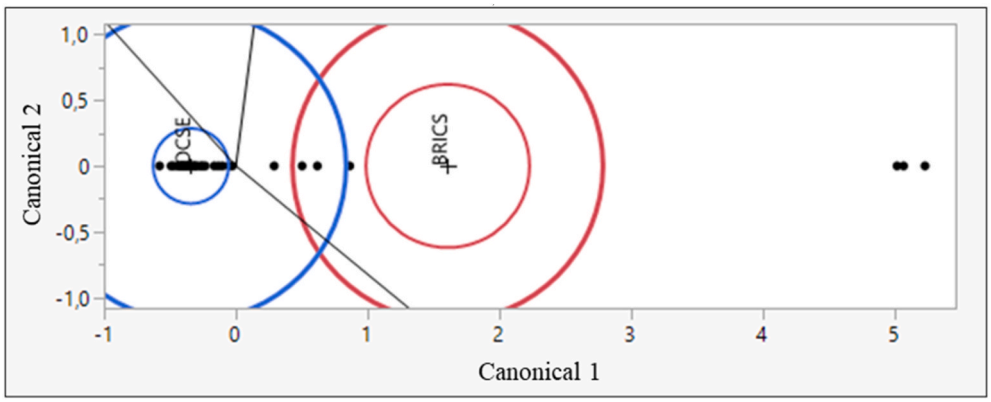

Fig. 5. Canonical Discriminant Function Plot – OECD vs BRICS (Benchmark Year 2013).
Source: Author's elaboration

Table 5
Classification summary and model performance 2013.

Origin	Count	Number of Misclassified	Percentage of Misclassified	R-squared (Entropy)	−2 Log Likelihood
Training	57	6	10,5263	0,36773	33,4737

Source: Author's elaboration

Table 6
Cross-Classification Matrix (Observed vs Expected Group Memberships) 2013.

Observed	Expected Count		Observed	Expected Rate	
Group	BRICS	OCSE	Group	BRICS	OCSE
BRICS	4	6	BRICS	0,400	0,600
OCSE	0	47	OCSE	0,000	1000

Source: Author's elaboration

of environmental pressure, it does not explicitly clarify the compatibility of emission structures with institutional categories. This shortcoming is remedied by discriminant analysis, which concentrates on the multivariate distribution of carbon emissions, methane emissions, and nitrate emissions, thereby facilitating an investigation of structural overlaps and boundary cases of OECD nations and BRICS nations [20], [36], [37].

For the BRICS Countries, the rising EPCI values, particularly for China and India, reflect increasing environmental pressure. This increment is strongly associated with rapid industrialization and urbanization [21], [40], [46]. Nonetheless, some degree of homogeneity is concealed by the data. The discriminant analysis suggests that while some members in the BRICS group still feature clearly different structures for emissions than the structure for the OECD economies, some configurations show partial similarities to the structure for the OECD economies, hence its non-homogeneous character [34], [41], [47].

Across benchmark years, misclassification patterns identified through the discriminant analysis remain predominantly asymmetric. There are overlaps involving BRICS countries classified in the OECD group. Similarly, in conjunction with other classification techniques, asymmetric convergence processes have been observed in literature to

Table 7
Classification summary and model performance 2023.

Origin	Count	Number of Misclassified	Percentage of Misclassified	R-squared (Entropy)	−2 Log Likelihood
Training	57	5	8,77193	0,30793	36,6396

Source: Author's elaboration

Table 8
Cross-classification matrix 2023.

Observed	Expected Count		Observed	Expected Rate	
Group	BRICS	OCSE	Group	BRICS	OCSE
BRICS	6	4	BRICS	0,600	0,400
OCSE	1	46	OCSE	0,021	0,979

Source: Author's elaboration

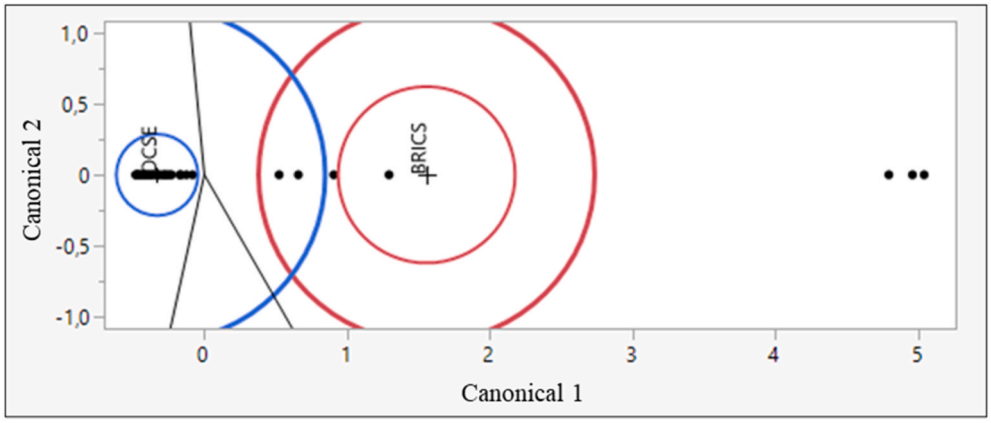

Fig. 6. Canonical Discriminant Function Plot – OECD vs BRICS (Benchmark Year 2023).
Source: Author's elaboration

be inherent in hybrid indicator analysis, with transitions economies being likely to be categorized as "hybrids" in environmental aspects in many cases [32], [35], [50]. Notably, in 2023, findings highlight rather low levels of bidirectional convergence, whereby a marginal boundary case is detected in the OECD category. The finding, rather than disputing the validity of classification distinction between BRICS economies and OECD nations, suggests the presence of transition emission features positioning near the boundary of classification space [41], [49].

These results support an interpretation of the OECD–BRICS distinction as a continuum of environmental pressure and emission profiles rather than a rigid dichotomy [3], [37], [47]. The role of structural heterogeneity, emission pattern dynamics, and group boundary permeability is critical in determining the outcome of the classifications in emissions categories. This means that purely institutional classifications are not sufficient in distinguishing the complexity of the current trajectories in the context of the changing emission dynamics that involve multiple dimensions of the trajectories [30], [31], From a policy perspective, this implies that environmental strategies should not be based solely on institutional classifications, but rather on the actual configuration of emissions and country-specific trajectories [51].

The cases of misclassification could also be viewed as indicators of transition, pointing to structural shifts in the economic and environmental systems of countries. Instead of being considered errors, these instances denote hybrid combinations of the characteristics of both OECD and BRICS emission profiles. The reasons behind such discrepancies can be attributed to the different developmental paths, energy mixes, and environmental regulations, especially in rapidly growing countries that are experiencing industrial and energy transitions.

One such case is the United States, which falls into the category of BRICS emissions in 2023. While counter-intuitive, the outcome demonstrates how advanced nations can still share similarities in their emissions with developing countries owing to their large sizes, high levels of consumption, and reliance on energy.

In this regard, misclassification becomes a methodological strength in detecting structural shifts that might go unnoticed within conventional classification systems.

Overall, these findings reinforce the need to interpret environmental pressure as a dynamic and multidimensional phenomenon, requiring analytical tools capable of capturing both structural heterogeneity and transition processes.

6. Conclusions

Over the period from 2000 to 2023, this study provides evidence that environmental pressure patterns across OECD and BRICS countries are characterized by persistent structural differences, while becoming progressively less rigid over time. By integrating a non-compensatory composite indicator with discriminant analysis, the paper offers a framework that captures both the magnitude and the structure of environmental pressure, allowing for a more nuanced interpretation of convergence and divergence dynamics. [2], [3], [40]. The EPCI analysis highlights strong persistence in the environmental pressure ranking, particularly among economies characterized by large production capacity and demographic scale. However, it also indicates the existence of convergent and divergent pressures. The convergent pressures are related to the fact that many OECD countries show stabilization or reduction in overall levels of environmental pressures, while others in the BRICS countries are observing sharp increments in line with the acceleration of industrialization and urbanization processes [24], [42], [43].

These results give empirical support for the idea that the dynamics of long-term pressures in the environment are strongly driven by structural and scale-related factors and thereby reinforce the idea of interpreting and understanding the significance of cross-country differences in terms other than aggregation and institutional typologies. From a policy perspective, these findings suggest that environmental strategies should move beyond standardized approaches based on institutional classifications and instead be tailored to the specific structural characteristics and transition pathways of individual countries.

The discriminant analysis, conducted for three benchmark years, confirms the existence of statistically significant differentiation between OECD and BRICS countries, while also revealing dynamic changes in misclassification patterns over time. For instance, the outcome identifies the progressive shrinkage and stabilization of the overlap regions, accompanied in the latter period by minimum two-way boundary cases, the graduation of a minimal group of BRICS nations possessing similar emission patterns like developed nations, and most notably in the latter period, the development of marginal overlaps involving large economies in the OECD group as well [37], [39], [50], [53]. In this context, misclassification emerges as a key analytical element, providing insights into transitional and hybrid environmental profiles that cannot be captured through traditional classification schemes.

By jointly considering long-term dynamics and multivariate structural configurations, the proposed framework extends the analytical role of composite indicators beyond descriptive monitoring. It allows for a more nuanced identification of convergence, divergence, and transition patterns, emphasizing that environmental and industrial policies should be grounded in countries' actual emission structures and development trajectories rather than in generic classifications based on aggregate data. In this perspective, multivariate analysis becomes a key tool for identifying transition countries, enabling more targeted and effective policy interventions tailored to their specific structural profiles [24], [25], [37].

Improvement in many OECD countries suggests that a policy approach focused on energy savings, low-carbonization, and regulatory support for the environment can yield results over time. These results are dependent upon constant adjustment in the context of economic disturbances, structural change, and developments in the energy sector [25], [45], [47], [48].

However, certain limitations of the current study are to be kept in mind. These pertain to the narrow scope of the current study in terms of the number of environment indicators examined, the aggregation done at the level of the nation, and the discriminant analysis done in the selected benchmark years but not in a more continuous fashion [30], [37], [49]. Additionally, the focus on emission-based indicators implies that the analysis does not fully capture all dimensions of environmental sustainability, including biodiversity loss and broader ecosystem degradation. Furthermore, the reliance on national-level aggregation may conceal significant internal heterogeneity within larger economies.

Future research might extend the proposed framework along various directions. Firstly, a broader categorization of indicators for consumption-related emissions and resource use as well as biodiversity pressure can enable a complete perspective of environmental stress to be defined. Secondly, a more refined geographical resolution, such as a regional basis or sub-national level, can enable internal diversity to be captured, as well as a clear meaning of structural change. Thirdly, integration of an analytical framework and approach based on scenario and policy indicators can help examine possible alternative routes defined according to distinct regulatory and technological routes.

These results imply that conventional categorizations of countries into groups such as OECD versus BRICS might need to be reexamined in the context of changing environmental dynamics, with the key point being the necessity of adopting an evidence-based approach to identify similarities and differences in structures of countries. However, at the same time, the presented framework can be of practical assistance to policymakers as well as allowing tracking the pressure on the environment and discovering patterns of either convergence or divergence, thus contributing to the effectiveness of policies.

Finally, the generalization of this analysis within a dynamic multivariate model could facilitate an even more rigorous examination of transition processes and, hence, provide further empirical evidence connecting environmental pressure patterns and socio-economic

transitions. From this standpoint, the application of composite indicators and multivariate classification procedures appears to be a productive direction for future research in developing the concept of environmental pressure.

CRediT authorship contribution statement

Tommaso Filì: Writing – original draft, Formal analysis, Data curation, Conceptualization. **Enrico Musso:** Validation, Supervision, Conceptualization. **Martina De Anna:** Software, Methodology, Conceptualization.

Appendix

Tab.1A
Carbon, methane, and nitrate emissions and DP2 composite indicator by country (OECD and BRICS), 2000

Country	Group	Year	Carbon	Methanol	Nitrate	DP2
Albania	OCSE	2000	0,4745	0,56552	0,16718	0,008098
Armenia	OCSE	2000	0,70952	0,294717	0,042117	0,005679
Austria	OCSE	2000	8,592843	1,4818	0,637767	0,062004
Azerbaijan	OCSE	2000	3798	1,215717	0,205033	0,033246
Belarus	OCSE	2000	8,879033	2,073514	1,13165	0,071852
Bosnia and Herzegovina	OCSE	2000	2,036471	0,35855	0,119733	0,013426
Brazil	BRICS	2000	45,79971	59,62789	17,4555	1,008787
Bulgaria	OCSE	2000	6,388929	1,499843	0,481583	0,050616
Canada	OCSE	2000	68,87269	8,099871	4,502467	0,460755
China	BRICS	2000	489,8499	128,8105	54,48672	4,217574
Croatia	OCSE	2000	2,879083	0,404314	0,371917	0,018842
Cyprus	OCSE	2000	1,171317	0,100933	0,041683	0,00564
Czechia	OCSE	2000	18,10051	1,664357	1,529967	0,114824
Denmark	OCSE	2000	7,209614	1,52195	0,9362	0,056057
Egypt, Arab Rep.	BRICS	2000	16,6694	3,997857	2,3361	0,138132
Estonia	OCSE	2000	2,210014	0,4451	0,1029	0,015351
Ethiopia	BRICS	2000	0,553714	9,85526	3,1687	0,130012
Finland	OCSE	2000	10,7252	1,444529	0,914733	0,073045
France	OCSE	2000	52,99516	11,7043	6,660617	0,42875
Georgia	OCSE	2000	1,04242	0,681257	0,216917	0,012545
Germany	OCSE	2000	118,7597	11,85714	7,090533	0,768146
Greece	OCSE	2000	13,27801	1,545086	0,858117	0,087236
Hungary	OCSE	2000	8,070114	1,398371	0,90435	0,058862
Iceland	OCSE	2000	0,475683	0,096617	0,06226	0,00207
India	BRICS	2000	157,674	89,15471	24,85783	1,963029
Indonesia	BRICS	2000	36,78331	20,74116	9,195283	0,463158
Iran, Islamic Rep.	BRICS	2000	51,75155	4,901043	3,674833	0,331725
Ireland	OCSE	2000	6,198857	3,525183	1,3059	0,076495
Italy	OCSE	2000	61,77649	7,885557	3,773667	0,42023
Kazakhstan	OCSE	2000	18,55258	2,256914	1,6256	0,124685
Kyrgyz Republic	OCSE	2000	0,799383	0,8329	0,17355	0,013088
Latvia	OCSE	2000	1,179783	0,297533	0,15365	0,008358
Lithuania	OCSE	2000	1,73745	0,557886	0,4305	0,015027
Luxembourg	OCSE	2000	1,76014	0,108483	0,0427	0,008749
Malta	OCSE	2000	0,42696	0,02784	0,0087	0,000854
Moldova	OCSE	2000	1,1195	0,389917	0,0912	0,009061
Mongolia	OCSE	2000	1,506517	1,949633	0,680767	0,031625
Netherlands	OCSE	2000	27,35197	3,750171	1,91305	0,188838
North Macedonia	OCSE	2000	1,290814	0,231457	0,076983	0,007944
Norway	OCSE	2000	5,1173	0,855486	0,60565	0,036386
Poland	OCSE	2000	42,39059	5,8014	4,0939	0,295864
Portugal	OCSE	2000	8,852843	1,7656	0,596567	0,066764
Romania	OCSE	2000	12,5437	2,4253	1,46355	0,095673
Russian Federation	BRICS	2000	249,7692	22,51274	9,012833	1,574803
Slovak Republic	OCSE	2000	6,28535	0,8521	0,396883	0,041878
Slovenia	OCSE	2000	2,135743	0,376457	0,148183	0,014217
South Africa	BRICS	2000	48,704	6,142029	2849	0,329751
Spain	OCSE	2000	42,41129	6171	3,580217	0,299458
Sweden	OCSE	2000	7,713886	1,554057	0,9276	0,059017
Switzerland	OCSE	2000	6,3043	0,747686	0,348133	0,040578
Tajikistan	OCSE	2000	0,55686	0,89445	0,1954	0,012656
Türkiye	OCSE	2000	31,1399	8,428286	3,783733	0,270177
Turkmenistan	OCSE	2000	5,348667	1,122417	0,398517	0,040438
United Arab Emirates	BRICS	2000	16,7421	0,442914	0,148033	0,089797
United Kingdom	OCSE	2000	72,08377	12,63506	4,432217	0,533244
United States	OCSE	2000	805,3565	65,32133	38,41457	5,011374
Uzbekistan	OCSE	2000	23,84656	2,711743	0,66605	0,155376

Source: Author's elaboration. The table reports values for the benchmark year 2000 only. Full annual data for the period 2000–2023 are available upon request

Tab.2A
Country-level discriminant classification, posterior probabilities, and misclassification flags (OECD vs BRICS) 2000

Country	Group	Dst. Quadr. (observes)	Prob. (observed)	- Log(Prob)		Expeted	Prob. (expected)	Others
Albania	OCSE	0,07977	0,8358	0,179		OCSE	0,8358	BRICS 0,16
Armenia	OCSE	0,08847	0,8386	0,176		OCSE	0,8386	BRICS 0,16
Austria	OCSE	0,05033	0,8307	0,186		OCSE	0,8307	BRICS 0,17
Azerbai-jan	OCSE	0,14987	0,8190	0,200		OCSE	0,8190	BRICS 0,18
Belarus	OCSE	0,06472	0,8337	0,182		OCSE	0,8337	BRICS 0,17
Bosnia and Herze-govina	OCSE	0,07696	0,8402	0,174		OCSE	0,8402	BRICS 0,16
Brazil	BRICS	7,11540	0,9959	0,004		BRICS	0,9959	
Bulgaria	OCSE	0,08673	0,8230	0,195		OCSE	0,8230	BRICS 0,18
Canada	OCSE	0,14031	0,8120	0,208		OCSE	0,8120	BRICS 0,19
China	BRICS	37,01196	0,9997	0,000		BRICS	0,9997	
Croatia	OCSE	0,06010	0,8488	0,164		OCSE	0,8488	BRICS 0,15
Cyprus	OCSE	0,07646	0,8440	0,170		OCSE	0,8440	BRICS 0,16
Czechia	OCSE	0,16979	0,8620	0,149		OCSE	0,8620	BRICS 0,14
Den-mark	OCSE	0,06914	0,8411	0,173		OCSE	0,8411	BRICS 0,16
Egypt, Arab Rep.	BRICS	3,46694	0,1708	1,767	*	OCSE	0,8292	
Estonia	OCSE	0,08786	0,8371	0,178		OCSE	0,8371	BRICS 0,16
Ethiopia	BRICS	1,76431	0,3600	1,022	*	OCSE	0,6400	
Finland	OCSE	0,03873	0,8433	0,170		OCSE	0,8433	BRICS 0,16
France	OCSE	2,34713	0,7882	0,238		OCSE	0,7882	BRICS 0,21
Georgia	OCSE	0,07746	0,8347	0,181		OCSE	0,8347	BRICS 0,17
Ger-many	OCSE	0,69760	0,8230	0,195		OCSE	0,8230	BRICS 0,18
Greece	OCSE	0,02561	0,8390	0,176		OCSE	0,8390	BRICS 0,16

Hungary	OCSE	0,06086	0,8435	0,170			OCSE	0,8435	BRICS 0,16
Iceland	OCSE	0,07312	0,8448	0,169			OCSE	0,8448	BRICS 0,16
India	BRICS	32,35978	0,9999	0,000			BRICS	0,9999	
Indonesia	BRICS	4,62524	0,4635	0,769		*	OCSE	0,5365	
Iran, Islamic Rep.	BRICS	4,20989	0,1356	1,998		*	OCSE	0,8644	
Ireland	OCSE	0,08856	0,7952	0,229			OCSE	0,7952	BRICS 0,20
Italy	OCSE	0,08700	0,7826	0,245			OCSE	0,7826	BRICS 0,22
Kazakhstan	OCSE	0,11352	0,8504	0,162			OCSE	0,8504	BRICS 0,15
Kyrgyz Republic	OCSE	0,09902	0,8284	0,188			OCSE	0,8284	BRICS 0,17
Latvia	OCSE	0,06857	0,8430	0,171			OCSE	0,8430	BRICS 0,16
Lithuania	OCSE	0,07003	0,8466	0,167			OCSE	0,8466	BRICS 0,15
Luxembourg	OCSE	0,07725	0,8440	0,170			OCSE	0,8440	BRICS 0,16
Malta	OCSE	0,07824	0,8446	0,169			OCSE	0,8446	BRICS 0,16
Moldova	OCSE	0,08431	0,8379	0,177			OCSE	0,8379	BRICS 0,16
Mongolia	OCSE	0,08176	0,8164	0,203			OCSE	0,8164	BRICS 0,18
Netherlands	OCSE	0,00324	0,8218	0,196			OCSE	0,8218	BRICS 0,18
North Macedonia	OCSE	0,07719	0,8418	0,172			OCSE	0,8418	BRICS 0,16
Norway	OCSE	0,05744	0,8461	0,167			OCSE	0,8461	BRICS 0,15
Poland	OCSE	1,02333	0,8544	0,157			OCSE	0,8544	BRICS 0,15
Portugal	OCSE	0,08712	0,8205	0,198			OCSE	0,8205	BRICS 0,18
Romania	OCSE	0,10075	0,8380	0,177			OCSE	0,8380	BRICS 0,16
Russian Federation	BRICS	14,43761	0,4644	0,767		*	OCSE	0,5356	
Slovak Republic	OCSE	0,05626	0,8384	0,176			OCSE	0,8384	BRICS 0,16
Slovenia	OCSE	0,07246	0,8408	0,173			OCSE	0,8408	BRICS 0,16
South Africa	BRICS	2,77161	0,2063	1,578		*	OCSE	0,7937	
Spain	OCSE	0,25112	0,8238	0,194			OCSE	0,8238	BRICS 0,18
Sweden	OCSE	0,05990	0,8400	0,174			OCSE	0,8400	BRICS 0,16
Switzerland	OCSE	0,05962	0,8394	0,175			OCSE	0,8394	BRICS 0,16
Tajikistan	OCSE	0,09807	0,8274	0,189			OCSE	0,8274	BRICS 0,17
Türkiye	OCSE	0,23585	0,7524	0,285			OCSE	0,7524	BRICS 0,25
Turkmenistan	OCSE	0,07267	0,8305	0,186			OCSE	0,8305	BRICS 0,17
United Arab Emirates	BRICS	3,57101	0,1572	1,850		*	OCSE	0,8428	
United Kingdom	OCSE	1,21670	0,6242	0,471			OCSE	0,6242	BRICS 0,38
United States	OCSE	44,32619	0,7173	0,332			OCSE	0,7173	BRICS 0,28
Uzbekistan	OCSE	0,49907	0,7979	0,226			OCSE	0,7979	BRICS 0,20

Source: Author's elaboration

Tab.3A
Summary of Discriminant Analysis Statistics 2013

Eigenvalue	Percentage	Cumulative Percentage	Canonical Correlation	Likelihood Ratio	Approx. F	Num DF	Den DF	Prob > F
0,56920726	100,0000	100,0000	0,60227531	0,63726445	10,0560	3	53	<,0001*

Source: Author's elaboration

Tab.4A
Multivariate tests of discriminant significance (OECD vs BRICS): 2013

Test	Value	Exact F	Num DF	Den DF	Prob > F
Wilks' Lambda	0,6372644	10,0560	3	53	<,0001*
Pillai's Trace	0,3627356	10,0560	3	53	<,0001*
Hotelling–Lawley Trace	0,5692073	10,0560	3	53	<,0001*
Roy's Largest Root	0,5692073	10,0560	3	53	<,0001*

Source: Author's elaboration

Tab.5A
Country-level discriminant classification, posterior probabilities, and misclassification flags (OECD vs BRICS) 2013

Country	Group	Dst. Quadr. (observes)	Prob. (observed)	- Log(Prob)		Expeted	Prob. (expected)	Others
Albania	OCSE	0,12481	0,8780	0,130		OCSE	0,8780	BRICS 0,12
Armenia	OCSE	0,15512	0,8786	0,129		OCSE	0,8786	BRICS 0,12
Austria	OCSE	0,11767	0,8723	0,137		OCSE	0,8723	BRICS 0,13
Azerbai-jan	OCSE	0,32443	0,8487	0,164		OCSE	0,8487	BRICS 0,15
Belarus	OCSE	0,14427	0,8858	0,121		OCSE	0,8858	BRICS 0,11
Bosnia and Herze-govina	OCSE	0,15213	0,8789	0,129		OCSE	0,8789	BRICS 0,12
Brazil	BRICS	22,04646	0,9998	0,000		BRICS	0,9998	
Bulgaria	OCSE	0,09276	0,8736	0,135		OCSE	0,8736	BRICS 0,13
Canada	OCSE	1,14323	0,8860	0,121		OCSE	0,8860	BRICS 0,11
China	BRICS	42,48585	0,9998	0,000		BRICS	0,9998	
Croatia	OCSE	0,04373	0,8871	0,120		OCSE	0,8871	BRICS 0,11
Cyprus	OCSE	0,14259	0,8822	0,125		OCSE	0,8822	BRICS 0,12
Czechia	OCSE	0,00821	0,8855	0,122		OCSE	0,8855	BRICS 0,11
Den-mark	OCSE	0,04344	0,8729	0,136		OCSE	0,8729	BRICS 0,13
Egypt, Arab Rep.	BRICS	4,38353	0,1208	2,114	*	OCSE	0,8792	
Estonia	OCSE	0,15238	0,8784	0,130		OCSE	0,8784	BRICS 0,12
Ethiopia	BRICS	2,23870	0,4929	0,707	*	OCSE	0,5071	
Finland	OCSE	0,01336	0,8906	0,116		OCSE	0,8906	BRICS 0,11
France	OCSE	1,52895	0,8252	0,192		OCSE	0,8252	BRICS 0,17
Georgia	OCSE	0,09954	0,8784	0,130		OCSE	0,8784	BRICS 0,12
Ger-many	OCSE	0,54183	0,8797	0,128		OCSE	0,8797	BRICS 0,12
Greece	OCSE	0,10502	0,8717	0,137		OCSE	0,8717	BRICS 0,13

Hungary	OCSE	0,03125	0,8813	0,126		OCSE	0,8813	BRICS 0,12
Iceland	OCSE	0,11571	0,8847	0,122		OCSE	0,8847	BRICS 0,12
India	BRICS	20,00990	0,9999	0,000		BRICS	0,9999	
Indonesia	BRICS	7,80509	0,4369	0,828	*	OCSE	0,5631	
Iran, Islamic Rep.	BRICS	4,73088	0,1004	2,298	*	OCSE	0,8996	
Ireland	OCSE	0,03481	0,8582	0,153		OCSE	0,8582	BRICS 0,14
Italy	OCSE	0,60465	0,7917	0,234		OCSE	0,7917	BRICS 0,21
Kazakhstan	OCSE	0,00320	0,8754	0,133		OCSE	0,8754	BRICS 0,12
Kyrgyz Republic	OCSE	0,17439	0,8657	0,144		OCSE	0,8657	BRICS 0,13
Latvia	OCSE	0,08945	0,8829	0,125		OCSE	0,8829	BRICS 0,12
Lithuania	OCSE	0,03445	0,8962	0,110		OCSE	0,8962	BRICS 0,10
Luxembourg	OCSE	0,14303	0,8838	0,124		OCSE	0,8838	BRICS 0,12
Malta	OCSE	0,13298	0,8844	0,123		OCSE	0,8844	BRICS 0,12
Moldova	OCSE	0,12386	0,8804	0,127		OCSE	0,8804	BRICS 0,12
Mongolia	OCSE	0,04055	0,8653	0,145		OCSE	0,8653	BRICS 0,13
Netherlands	OCSE	0,12624	0,8623	0,148		OCSE	0,8623	BRICS 0,14
North Macedonia	OCSE	0,13945	0,8815	0,126		OCSE	0,8815	BRICS 0,12
Norway	OCSE	0,03271	0,8901	0,116		OCSE	0,8901	BRICS 0,11
Poland	OCSE	1,66439	0,9137	0,090		OCSE	0,9137	
Portugal	OCSE	0,10931	0,8721	0,137		OCSE	0,8721	BRICS 0,13
Romania	OCSE	0,08333	0,8818	0,126		OCSE	0,8818	BRICS 0,12
Russian Federation	BRICS	6,92925	0,6105	0,493		OCSE	0,6105	OCSE 0,39
Slovak Republic	OCSE	0,05245	0,8832	0,124		OCSE	0,8832	BRICS 0,12
Slovenia	OCSE	0,14076	0,8804	0,127		OCSE	0,8804	BRICS 0,12
South Africa	BRICS	3,15080	0,2171	1,527	*	OCSE	0,7829	
Spain	OCSE	0,10107	0,8434	0,170		OCSE	0,8434	BRICS 0,16
Sweden	OCSE	0,01454	0,8853	0,122		OCSE	0,8853	BRICS 0,11
Switzerland	OCSE	0,12958	0,8787	0,129		OCSE	0,8787	BRICS 0,12
Tajikistan	OCSE	0,22103	0,8519	0,160		OCSE	0,8519	BRICS 0,15
Türkiye	OCSE	0,51775	0,6608	0,414		OCSE	0,6608	BRICS 0,34
Turkmenistan	OCSE	0,03119	0,8731	0,136		OCSE	0,8731	BRICS 0,13
United Arab Emirates	BRICS	4,79544	0,1359	1,996	*	OCSE	0,8641	
United Kingdom	OCSE	0,02673	0,8520	0,160		OCSE	0,8520	BRICS 0,15
United States	OCSE	36,38668	0,8069	0,215		OCSE	0,8069	BRICS 0,19
Uzbekistan	OCSE	0,18507	0,8163	0,203		OCSE	0,8163	BRICS 0,18

Source: Author's elaboration

Tab.6A
Summary of Discriminant Analysis Statistics 2023

Eigenvalue	Percentage	Cumulative Percentage	Canonical Correlation	Likelihood Ratio	Approx. F	Num DF	Den DF	Prob > F
0,53430238	100,0000	100,0000	0,59011693	0,65176201	9,4393	3	53	<,0001*

Source: Author's elaboration

Tab.7A
Multivariate tests of discriminant significance (OECD vs BRICS) 2023

Test	Value	Exact F	Num DF	Den DF	Prob > F
Wilks' Lambda	0,651762	9,4393	3	53	<,0001*
Pillai's Trace	0,348238	9,4393	3	53	<,0001*
Hotelling–Lawley Trace	0,5343024	9,4393	3	53	<,0001*
Roy's Largest Root	0,5343024	9,4393	3	53	<,0001*

Source: Author's elaboration

Tab.8A
Country-level discriminant classification, posterior probabilities, and misclassification flags (OECD vs BRICS) 2023

Country	Group	Dst. Quadr. (observes)	Prob. (observed)	- Log(Prob)			Expeted	Prob. (expected)	Others
Albania	OCSE	0,13261	0,8828	0,125			OCSE	0,8828	BRICS 0,12
Armenia	OCSE	0,09909	0,8832	0,124			OCSE	0,8832	BRICS 0,12
Austria	OCSE	0,26411	0,8753	0,133			OCSE	0,8753	BRICS 0,12
Azerbai-jan	OCSE	0,01942	0,8636	0,147			OCSE	0,8636	BRICS 0,14
Belarus	OCSE	0,10909	0,8625	0,148			OCSE	0,8625	BRICS 0,14
Bosnia and Herze-govina	OCSE	29,74350	0,8831	0,124			OCSE	0,8831	BRICS 0,12
Brazil	BRICS	0,04143	0,9998	0,000			BRICS	0,9998	
Bulgaria	OCSE	1,57606	0,8770	0,131			OCSE	0,8770	BRICS 0,12
Canada	OCSE	46,54681	0,8350	0,180			OCSE	0,8350	BRICS 0,16
China	BRICS	0,05126	0,9996	0,000			BRICS	0,9996	
Croatia	OCSE	0,15837	0,8844	0,123			OCSE	0,8844	BRICS 0,12
Cyprus	OCSE	0,01937	0,8813	0,126			OCSE	0,8813	BRICS 0,12
Czechia	OCSE	0,05246	0,8741	0,135			OCSE	0,8741	BRICS 0,13
Den-mark	OCSE	3,81662	0,8687	0,141			OCSE	0,8687	BRICS 0,13
Egypt, Arab Rep.	BRICS	0,09955	0,1427	1,947		*	OCSE	0,8573	
Estonia	OCSE	1,58138	0,8840	0,123			OCSE	0,8840	BRICS 0,12
Ethiopia	BRICS	0,01737	0,6353	0,454			BRICS	0,6353	OCSE 0,36
Finland	OCSE	0,63453	0,8839	0,123			OCSE	0,8839	BRICS 0,12
France	OCSE	0,08845	0,7880	0,238			OCSE	0,7880	BRICS 0,21
Georgia	OCSE	0,71264	0,8815	0,126			OCSE	0,8815	BRICS 0,12
Ger-many	OCSE	0,08865	0,8518	0,160			OCSE	0,8518	BRICS 0,15
Greece	OCSE	0,01511	0,8757	0,133			OCSE	0,8757	BRICS 0,12

Hungary	OCSE	0,10575	0,8790	0,129		OCSE	0,8790	BRICS 0,12
Iceland	OCSE	18,07466	0,8863	0,121		OCSE	0,8863	BRICS 0,11
India	BRICS	6,42406	0,9997	0,000		BRICS	0,9997	
Indonesia	BRICS	5,15046	0,5214	0,651		BRICS	0,5214	OCSE 0,48
Iran, Islamic Rep.	BRICS	0,03540	0,1141	2,170	*	OCSE	0,8859	
Ireland	OCSE	0,07722	0,8549	0,157		OCSE	0,8549	BRICS 0,15
Italy	OCSE	0,00815	0,8395	0,175		OCSE	0,8395	BRICS 0,16
Kazakhstan	OCSE	0,18552	0,8459	0,167		OCSE	0,8459	BRICS 0,15
Kyrgyz Republic	OCSE	0,06411	0,8679	0,142		OCSE	0,8679	BRICS 0,13
Latvia	OCSE	0,02385	0,8843	0,123		OCSE	0,8843	BRICS 0,12
Lithuania	OCSE	0,11877	0,8876	0,119		OCSE	0,8876	BRICS 0,11
Luxembourg	OCSE	0,11843	0,8864	0,121		OCSE	0,8864	BRICS 0,11
Malta	OCSE	0,10275	0,8867	0,120		OCSE	0,8867	BRICS 0,11
Moldova	OCSE	0,04971	0,8832	0,124		OCSE	0,8832	BRICS 0,12
Mongolia	OCSE	0,03805	0,8430	0,171		OCSE	0,8430	BRICS 0,16
Netherlands	OCSE	0,12255	0,8655	0,144		OCSE	0,8655	BRICS 0,13
North Macedonia	OCSE	0,03634	0,8850	0,122		OCSE	0,8850	BRICS 0,12
Norway	OCSE	1,05381	0,8850	0,122		OCSE	0,8850	BRICS 0,11
Poland	OCSE	0,11496	0,8646	0,145		OCSE	0,8646	BRICS 0,14
Portugal	OCSE	0,03463	0,8712	0,138		OCSE	0,8712	BRICS 0,13
Romania	OCSE	2,03323	0,8623	0,148		OCSE	0,8623	BRICS 0,14
Russian Federation	BRICS	0,03875	0,5216	0,651		BRICS	0,5216	OCSE 0,48
Slovak Republic	OCSE	0,11988	0,8821	0,125		OCSE	0,8821	BRICS 0,12
Slovenia	OCSE	3,01365	0,8839	0,123		OCSE	0,8839	BRICS 0,12
South Africa	BRICS	0,04118	0,1851	1,687	*	OCSE	0,8149	
Spain	OCSE	0,01609	0,8126	0,207		OCSE	0,8126	BRICS 0,19
Sweden	OCSE	0,08633	0,8783	0,130		OCSE	0,8783	BRICS 0,12
Switzerland	OCSE	0,24646	0,8817	0,126		OCSE	0,8817	BRICS 0,12
Tajikistan	OCSE	1,68897	0,8550	0,157		OCSE	0,8550	BRICS 0,14
Türkiye	OCSE	0,03348	0,5421	0,612		OCSE	0,5421	BRICS 0,46
Turkmenistan	OCSE	4,57111	0,8674	0,142		OCSE	0,8674	BRICS 0,13
United Arab Emirates	BRICS	0,05862	0,1143	2,169	*	OCSE	0,8857	
United Kingdom	OCSE	34,91211	0,8305	0,186		OCSE	0,8305	BRICS 0,17
United States	OCSE	0,22422	0,2167	1,529	*	BRICS	0,7833	
Uzbekistan	OCSE	0,13261	0,8014	0,221		OCSE	0,8014	BRICS 0,20

Source: Author's elaboration

Data availability

Data will be made available on request.

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