

# From Usefulness to Declining Significance of Deferred Tax Credits: A Critical Consideration of the Post-COVID Period: Empirical and Methodological Limits

Eleni Imprixi, Georgia Karakousis, Dimitrios Dimitriou, Dimitra Kouloubou, Nicos Sykianakis

Department of Accounting and Finance, University of West Attica, Aigaleo, Greece

Email: [eimpriksi@uniwa.gr](mailto:eimpriksi@uniwa.gr)

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## Abstract

This study examines the transformation of the role of Deferred Tax Credits (DTCs) in the balance sheets of Greek systemic banks during the period 2022 to 2024. The analysis of the four systemic banks (i.e., Alpha Bank, Eurobank, the National Bank of Greece, and Piraeus Bank) shows a consistent downward trend in the level of Deferred Tax Credits (DTCs), marking a fundamental shift in their significance as an accounting and supervisory variable. As far as the authors are aware, this is the first study to examine this relationship in the post-COVID period. The limited time series and the resulting methodological instability render any attempt at statistical correlation or regression scientifically unreliable. This paper argues that the role of Deferred Tax Credits (DTCs) has shifted from a mechanism of capital support to a residual element of past accounting practices, which makes quantitative analysis both unnecessary and potentially misleading. As a result, this period between 2022 and 2024 should be approached through qualitative and institutional interpretation, supported by descriptive statistical analysis, rather than through empirical econometric modeling. The findings underline a wider transition in the Greek banking system toward genuine capital adequacy, reduced reliance on fiscal instruments, and closer alignment with the evolving European supervisory framework.

## Keywords

Deferred Tax Credits, Banks in Greece, DTCs, Supervisory Framework, Statistical Methodology

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## 1. Introduction

The concept of Deferred Tax Credits (DTCs) has historically held a central posi-

tion in the balance sheets of the four Greek banks, particularly in the aftermath of the banking and fiscal crisis of the decade 2010 to 2020. The institutionalization of Deferred Tax Credits (DTCs) through Law 4172/2013 and their subsequent amendments constituted a crucial instrument of capital support, as they linked tax losses from previous fiscal years with the possibility of strengthening equity capital. This law 4172 (2013) allowed banks to convert past tax losses into definitive claims against the State, which were directly recognized as regulatory capital, thereby functioning as an instrument of immediate CET1 strengthening.

The period from 2022 to 2024 is treated as a distinct analytical unit because it represents the first post-COVID phase in which Greek banks operate without the extraordinary distortions of the previous decade. Unlike the crisis-heavy periods from 2011 to 2015 and from 2016 to 2021, this three-year window is characterized by stable profitability and reduced risk levels, conditions that structurally alter the role and significance of DTCs.

However, during the three-year period 2022-2024, a new reality emerges: DTCs cease to operate as a strategic mechanism for the absorption of losses and gradually recede to levels of limited significance. This development raises methodological questions regarding both the feasibility and the necessity of statistical analysis.

## 2. Institutional and Theoretical Framework

The European Central Bank (ECB) and the Single Supervisory Mechanism (SSM) have, in recent years, emphasized the need to reduce banks' reliance on supervisory-oriented tax instruments (SSM, 2021; ECB, 2022). The supervisory framework has shifted toward criteria of genuine profitability and the generation of taxable income, thereby gradually weakening the role of Deferred Tax Credits (DTCs) as capital enhancers.

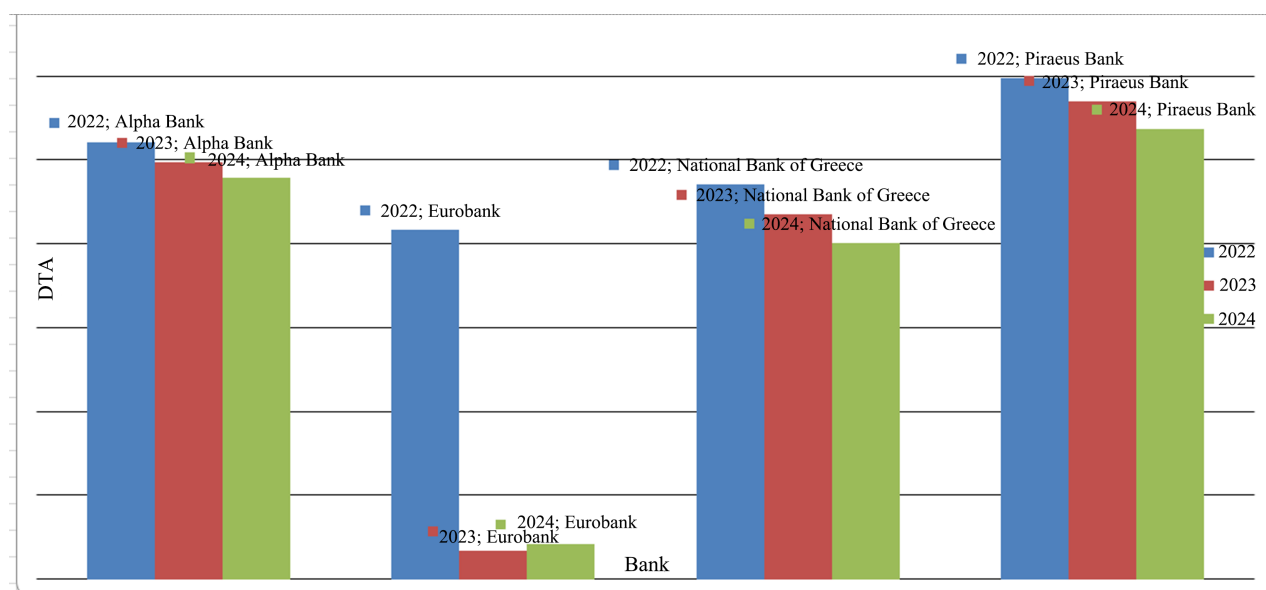
The pandemic acted as a turning point, as the support measures, the rapid rebound of economic activity, and the return of banks to strong profitability accelerated the absorption of deferred tax assets, resulting in a faster decline in DTC levels after 2022.

The shift is explicitly reflected in the SSM Supervisory Priorities from 2021 to 2023 and from 2023 to 2025, as well as in the ECB's guidance on the quality of supervisory capital, all of which emphasize the gradual reduction of reliance on tax-based instruments and the strengthening of organic capital drivers, such as profitability and asset quality.

The relevant literature records the Greek peculiarity of DTCs as the "accounting footprint of the crisis" (Avgouleas & Goodhart, 2020). While in the periods 2011-2015 and 2016-2021, the analysis of DTCs provided research value (correlations with NPEs, CET1 ratios, assets), after 2022 their statistical dynamics have weakened due to the uniform downward trend that has been observed (Figure 1).

## 3. Empirical Data 2022-2024

By examining the Balance Sheet figures of the four systemic banks for the years 2022-2024, as presented in the following Table 1.



**Figure 1.** Evolution of Deferred Tax Assets (DTA) 2022-2024.

**Table 1.** Balance sheets of the four Greek systemic banks.

| ALPHA BANK                      |                         |                         |                         |
|---------------------------------|-------------------------|-------------------------|-------------------------|
| In € '000                       |                         |                         |                         |
|                                 | YEAR 2022               | YEAR 2023               | YEAR 2024               |
|                                 | ALPHA                   | ALPHA                   | ALPHA                   |
| ASSETS (A)                      | 77200.633               | 71453.000               | 70954.000               |
| TOTAL EQUITY (TE)               | 6199.643                | 7288.694                | 8155.000                |
| DEFERRED TAX ASSETS (DTA)       | 5210.746                | 4967.124                | 4789.000                |
| NON-PERFORMING EXPOSURES (NPEs) | 3116.000                | 2240.000                | 1700.000                |
| EUROBANK                        |                         |                         |                         |
| In € '000                       |                         |                         |                         |
|                                 | YEAR 2022               | YEAR 2023               | YEAR 2024               |
|                                 | EUROBANK                | EUROBANK                | EUROBANK                |
| ASSETS (A)                      | 81457.000               | 79781.000               | 101150.000              |
| TOTAL EQUITY (TE)               | 6667.000                | 7899.000                | 8899.000                |
| DEFERRED TAX ASSETS (DTA)       | 4161.000                | 334.000                 | 415.000                 |
| NON-PERFORMING EXPOSURES (NPEs) | 2257.000                | 1512.000                | 1300.000                |
| NATIONAL BANK OF GREECE         |                         |                         |                         |
| In € '000                       |                         |                         |                         |
|                                 | YEAR 2022               | YEAR 2023               | YEAR 2024               |
|                                 | NATIONAL BANK OF GREECE | NATIONAL BANK OF GREECE | NATIONAL BANK OF GREECE |
| ASSETS (A)                      | 78113.000               | 74584.000               | 74957.000               |

Continued

|  | 6475.000            | 7652.000            | 8452.000            |
|--|---------------------|---------------------|---------------------|
| <b>TOTAL EQUITY (TE)</b>               |                     |                     |                     |
| <b>DEFERRED TAX ASSETS (DTA)</b>       | 4705.000            | 4346.000            | 4006.000            |
| <b>NON-PERFORMING EXPOSURES (NPEs)</b> | 1800.000            | 1250.000            | 980.000             |
| <b>PIRAEUS BANK</b>                    |                     |                     |                     |
| <b>In € '000</b>                       |                     |                     |                     |
|  | <b>YEAR 2022</b>    | <b>YEAR 2023</b>    | <b>YEAR 2024</b>    |
|  | <b>PIRAEUS BANK</b> | <b>PIRAEUS BANK</b> | <b>PIRAEUS BANK</b> |
| <b>ASSETS (A)</b>                      | 74645.000           | 76450.000           | 80044.000           |
| <b>TOTAL EQUITY (TE)</b>               | 6581.000            | 7353.000            | 8273.000            |
| <b>DEFERRED TAX ASSETS (DTA)</b>       | 5974.000            | 5703.000            | 5363.000            |
| <b>NON-PERFORMING EXPOSURES (NPEs)</b> | 2400.000            | 2110.000            | 920.000             |

We observe the following. Eurobank exhibits a dramatic reduction in DTCs from € 4.16 billion (2022) to € 334 million (2023), with a marginal recovery in 2024 (€ 415 million). Alpha Bank shows a steady decline from € 5.21 billion (2022) to € 4.79 billion (2024), while the National Bank follows a downward trajectory from € 4.70 billion to € 4.00 billion. Finally, Piraeus demonstrates relative stability, with a decrease from € 5.97 billion to € 5.36 billion. This trend is accompanied by a large reduction of NPEs across all four banks, indicating a broader balance sheet cleanup. The data suggest convergence in both the size and significance of DTCs, rendering interbank differences of little research value.

Based on the 2022 to 2024 data of Alpha Bank, and through a concise descriptive depiction using four ratios.

$$DTA/ASSET \rightarrow \frac{DTA}{ASSET}, DTA/EQUITY \rightarrow \frac{DTA}{EQUITY}, EQUITY/ASSET \rightarrow \frac{EQUITY}{ASSET}, NPEs/ASSET \rightarrow \frac{NPEs}{ASSET},$$

we observe the following ratio results:

$$2022: DTCs/Assets = 0.0675 \cdot DTCs/Equity = 0.8405 \cdot Equity/Assets = 0.0803 \cdot NPEs/Assets = 0.0404$$

$$2023: DTCs/Assets = 0.0695 \cdot DTCs/Equity = 0.6815 \cdot Equity/Assets = 0.1020 \cdot NPEs/Assets = 0.0313$$

$$2024: DTCs/Assets = 0.0675 \cdot DTCs/Equity = 0.5872 \cdot Equity/Assets = 0.1149 \cdot NPEs/Assets = 0.0240$$

Examining all the above financial ratios, we can see that the DTCs-to-Assets ratio remains stable at approximately 6.8% - 7.0% throughout the three (3) year period, without any structural variation. The DTCs-to-Equity ratio shows a continuous downward trajectory (0.84 to 0.59), which indicates a declining dependence of equity capital on DTCs. Likewise, the Equity-to-Assets ratio records a clear strengthening (8.0% to 11.5%), reflecting an improvement of the capital “buffer.” Finally, the NPEs-to-Assets ratio decreases from 4.0% to 2.4%, highlighting the further clean-up of the loan portfolio.

On the basis of these findings, it becomes evident that no further statistical analysis is required, since we have only three annual observations (sample size). Regression or correlation exercises lack statistical validity (insufficient degrees of freedom, impossible significance tests, and a high risk of pseudo-causality). Furthermore, the trends are unidirectional and obvious without the use of a statistical model: stability in the DTCs/Assets ratio, decline in the DTCs/Equity ratio, increase in the Equity/Assets ratio, and decrease in the NPEs/Assets ratio. Therefore, the conclusions would not be altered through the use of any statistical package. Moreover, there is no indication of a “structural break” or reversal of trends within the three-year period that would necessitate further econometric testing. The essence of the policy reading (reduction of dependence on DTCs alongside the strengthening of organic capital position with the continued decline in NPEs) is fully documented.

Thus, for the three-year period 2022-2024, the empirical depiction is deliberately limited to four financial ratios (DTCs/Assets, DTCs/Equity, Equity/Assets, NPEs/Assets), since the small number of observations does not permit reliable inferential statistics. The findings are unequivocal: the DTCs/Assets ratio remains stable (~6.8% - 7.0%), the DTCs/Equity ratio declines (0.84 to 0.59), the Equity/Assets ratio is reinforced (8.0% to 11.5%), and the NPEs/Assets ratio decreases (4.0% to 2.4%). Consequently, further statistical modeling does not add information, while descriptive ratio analysis is sufficient to document the decreasing reliance on DTCs and the simultaneous improvement of the capital and credit profile of the banks.

In the diagram (Figure 2) for Alpha Bank (2022-2024), the downward trajectory of the DTCs-to-Equity ratio and the simultaneous strengthening of the Equity-to-Assets ratio are clearly visible, providing visual evidence that the bank is reducing its reliance on DTCs while organically reinforcing its capital base.

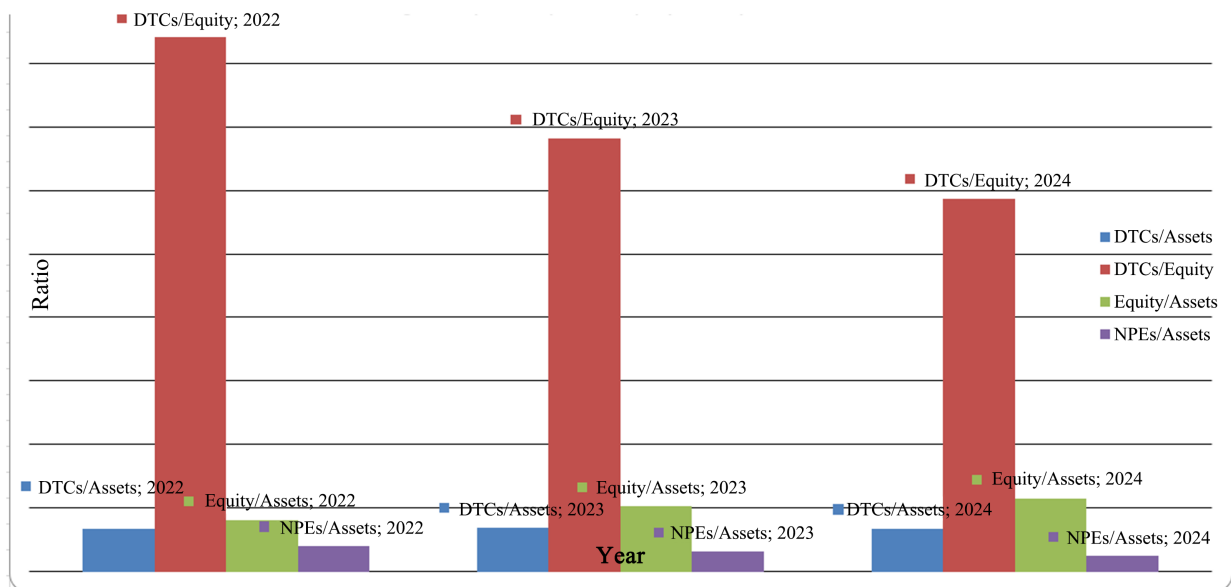


Figure 2. Alpha bank (2022-2024): Capital composition ratios.

Similarly, for Eurobank (2022-2024), the ratios demonstrate that no further analysis using statistical tools is required, as the trends are clear and unidirectional. Specifically, the bank's ratios are as follows:

2022:  $DTCs/Assets = 0.0511$  ·  $DTCs/Equity = 0.6241$  ·  $Equity/Assets = 0.0818$  ·  $NPEs/Assets = 0.0277$

2023:  $DTCs/Assets = 0.0042$  ·  $DTCs/Equity = 0.0423$  ·  $Equity/Assets = 0.0990$  ·  $NPEs/Assets = 0.0190$

2024:  $DTCs/Assets = 0.0041$  ·  $DTCs/Equity = 0.0466$  ·  $Equity/Assets = 0.0880$  ·  $NPEs/Assets = 0.0129$

The DTCs to Assets ratio declines from 5.1% in the year 2022 to only 0.4% in 2023-2024, indicating the disappearance of DTCs' significance in the balance sheet. The DTCs to equity ratio falls dramatically from 62% to just 4%, demonstrating that Eurobank's base equity has become almost independent from the DTCs. The Equity to Assets ratio remains consistently healthy (8.2% - 9.9%) without major fluctuations, reflecting stable capital adequacy. Finally, the NPEs-to-Assets ratio decreases further from 2.8% to 1.3%, confirming the continuing clean-up of the portfolio loan.

The period from 2022 to 2024 for Eurobank essentially marks the "end of an era" for DTCs as a critical variable. Their weight in the balance sheet is nearly negligible, making any further statistical investigation or regression analysis unnecessary.

In the diagram (Figure 3) for Eurobank (2022-2024), the collapse of the DTCs-to-Equity ratio (from approximately 62% to just about 4%) and the stability of the Equity-to-Assets ratio at around 9% are clearly visible. This provides visual evidence that DTCs have ceased to constitute a critical element of the capital base and that the bank now relies primarily on organic equity capital.

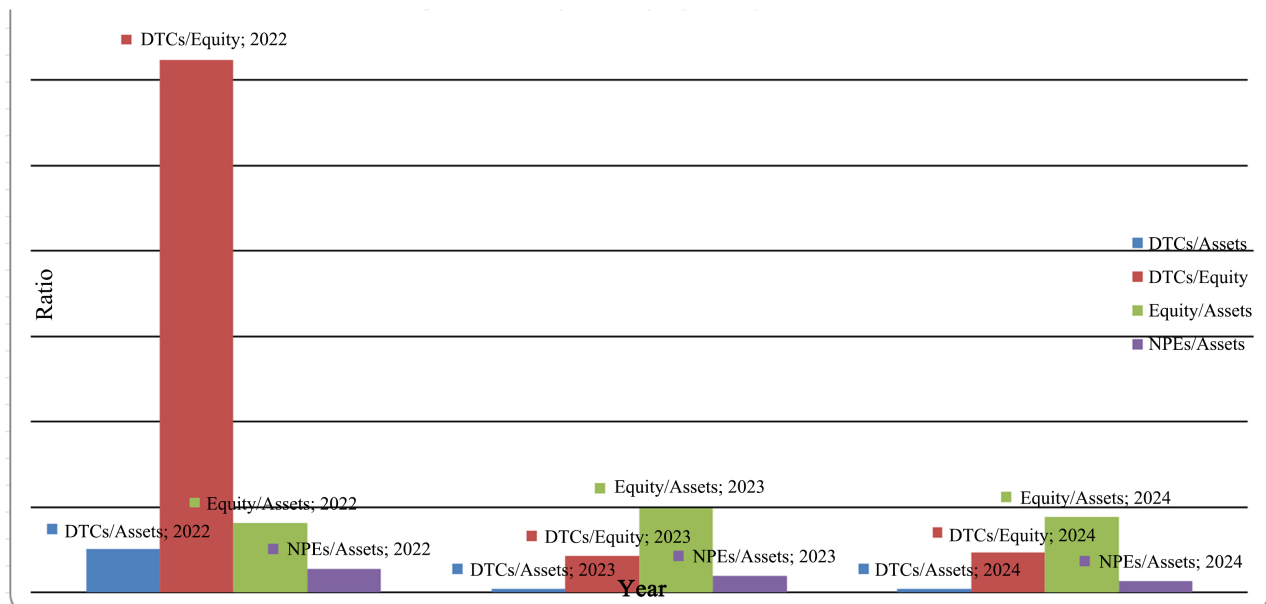
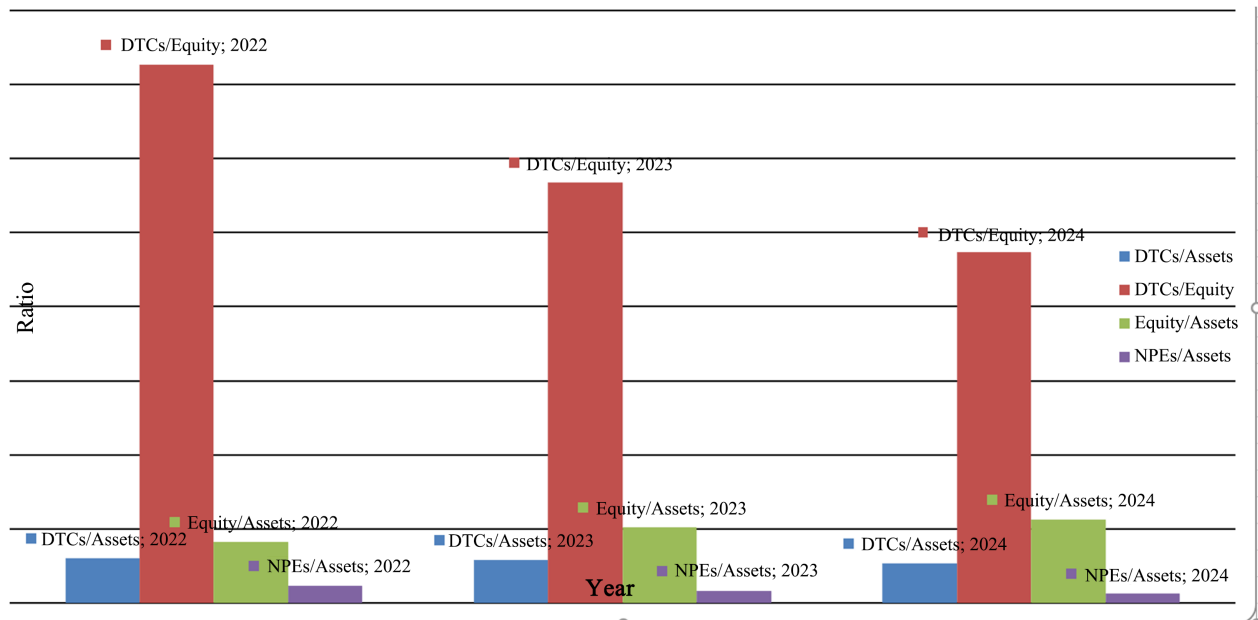


Figure 3. Eurobank (2022-2024): Capital composition ratios.

For the National Bank (**Figure 4**) of Greece (NBG) between 2022 and 2024, the ratios present a clear and consistent picture.



**Figure 4.** National bank (2022-2024): Capital composition ratios.

2022: DTCs/Assets = 0.0602 · DTCs/Equity = 0.7265 · Equity/Assets = 0.0829 · NPEs/Assets = 0.0230

2023: DTCs/Assets = 0.0583 · DTCs/Equity = 0.5680 · Equity/Assets = 0.1026 · NPEs/Assets = 0.0168

2024: DTCs/Assets = 0.0534 · DTCs/Equity = 0.4740 · Equity/Assets = 0.1128 · NPEs/Assets = 0.0131

The DTCs to assets ratio decreases gradually, from 6% to 5.3%, reflecting a marginal yet steady decline in the significance of DTCs. The DTCs to equity ratio drops from 73% in the year 2022 to 47% in 2024, demonstrating that the bank's equity capital is becoming progressively less dependent on the DTCs. The Equity to Assets ratio strengthens from 8.3% to 11.3%, an indicator of improved capital adequacy. Finally, the NPEs to Assets ratio declines unambiguously (2.3% to 1.3%), confirming the further cleanup of the loan portfolio.

The three-year period 2022-2024 for the National Bank of Greece records a gradual and orderly disengagement from DTCs, accompanied by a parallel strengthening of the organic capital base and a continued decline in NPEs. The picture is unambiguous, given the very limited number of observations (N = 3).

For Piraeus Bank (2022-2024), the ratios present the following picture:

2022: DTCs/Assets = 0.0800 · DTCs/Equity = 0.9078 · Equity/Assets = 0.0882 · NPEs/Assets = 0.0321

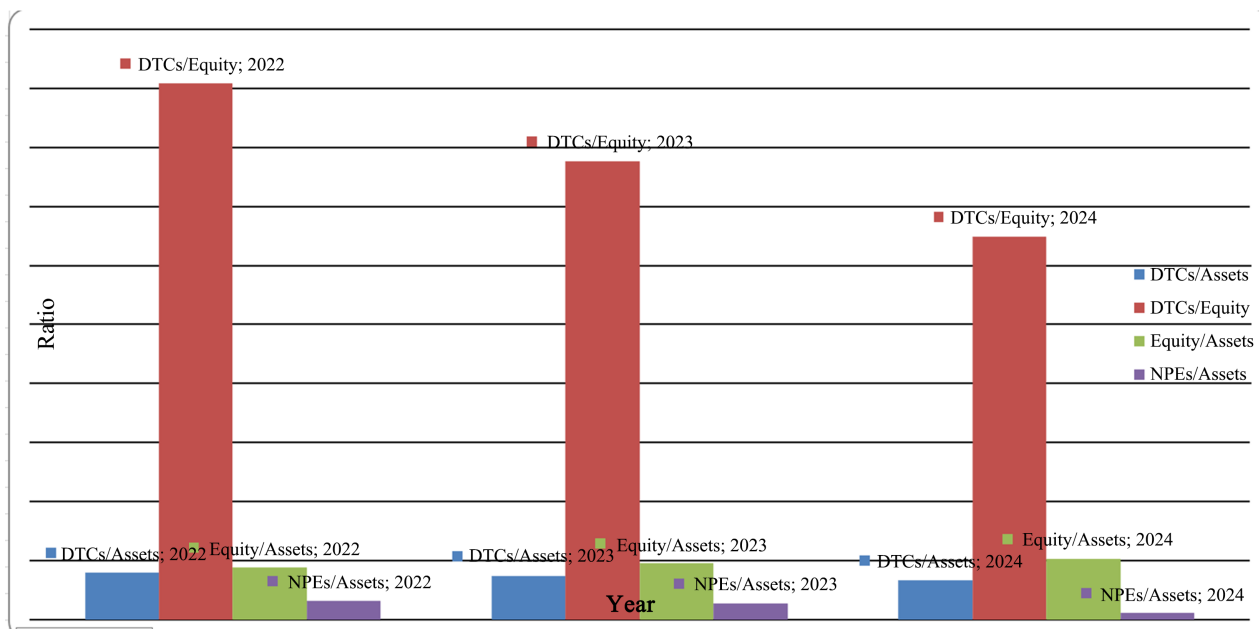
2023: DTCs/Assets = 0.0746 · DTCs/Equity = 0.7757 · Equity/Assets = 0.0962 · NPEs/Assets = 0.0276

2024: DTCs/Assets = 0.0670 · DTCs/Equity = 0.6482 · Equity/Assets = 0.1034 ·

$NPEs/Assets = 0.0115$

The DTCs to Assets ratio declines steadily (8.0% to 6.7%), indicating a reduction in the relative weight of DTCs in the balance sheet. The DTCs to Equity ratio decreases from 91% in 2022 to 65% in 2024, a sign of the bank's gradual disengagement from the DTC mechanism. The Equity-to-Assets ratio strengthens (8.8% to 10.3%), reflecting an improvement in capital adequacy. Finally, the NPEs-to-Assets ratio drops dramatically, from 3.2% to just 1.1%, recording clear progress in the clean-up of the loan portfolio.

During the three (3) year period from 2022 to 2024, Piraeus Bank (Figure 5) still maintains a significant DTCs to Equity ratio, yet the trend is steadily downward. Combined with the rapid decline in NPEs and the strengthening of the Equity-to-Assets ratio, it is evident that its capital base is becoming more organic and less dependent on the fiscal framework. Given the small sample size ( $N = 3$ ) and the unidirectional trajectory of the ratios, further statistical analysis is unnecessary, as the conclusions emerge directly from descriptive observation.



**Figure 5.** Piraeus Bank (2022-2024): Capital composition ratios.

Below, we present a comparative assessment of the four systemic banks for the year 2024, based on the calculated ratios.

Alpha:  $DTCs/Assets = 6.8\%$  ·  $DTCs/Equity = 59\%$  ·  $Equity/Assets = 11.5\%$  ·  $NPEs/Assets = 2.4\%$

Eurobank:  $DTCs/Assets = 0.4\%$  ·  $DTCs/Equity = 5\%$  ·  $Equity/Assets = 8.8\%$  ·  $NPEs/Assets = 1.3\%$

National Bank of Greece:  $DTCs/Assets = 5.3\%$  ·  $DTCs/Equity = 47\%$  ·  $Equity/Assets = 11.3\%$  ·  $NPEs/Assets = 1.3\%$

Piraeus Bank:  $DTCs/Assets = 6.7\%$  ·  $DTCs/Equity = 65\%$  ·  $Equity/Assets = 10.3\%$  ·  $NPEs/Assets = 1.2\%$

The comparative assessment is based exclusively on the year 2024, which is taken indicatively as the most recent reference point. This choice is justified, on the one hand, by the small time series ( $N = 3$ ), which does not permit statistically reliable time series analyses, and, on the other hand, by the unidirectional trend focused during the period between 2022 and 2024, characterized by the continuous decline of the DTCs and NPEs and the gradual strengthening of capital adequacy. Consequently, the depiction of the 2024 functions serves as a representative snapshot of each bank's final position at the end of the period, enabling a comparative evaluation of their status with respect to dependence on DTCs, the composition of equity capital, and the quality of assets. In this way, the analysis focuses on the most recent and substantive phase of the Greek banking system, where restructuring strategies have been completed and the divergences among credit institutions become clear and visible.

With regard to the first ratio, for the year 2024 (DTCs/Assets), Eurobank displays an almost negligible dependence (0.4%), which renders it fully disengaged from Deferred Tax Credits. By contrast, Alpha and Piraeus Bank maintain levels around 6.7% to 6.8%, while the National Bank follows with 5.3%. This indicates that, although all banks have drastically reduced the proportion of DTCs, differences remain in the degree of dependency.

As for the DTCs-to-Equity ratio in 2024, the picture is even more telling: Eurobank records only 5%, demonstrating that its equity capital is no longer affected by DTCs. In contrast, Piraeus Bank (65%) and Alpha Bank (59%) still exhibit relatively high dependence, while the National Bank (NBG) is positioned at an intermediate level (47%). This shows that, despite the overall improvement, two of the four (4) banks continue to hold a significant portion of their capital "accounting bound" to DTCs.

All four (4) banks operate at acceptable levels of capital adequacy. According to the Equity to Assets ratio, Alpha (11.5%) and the National Bank (NBG) (11.3%) record the highest values, which indicates a more resilient capital base. Piraeus (10.3%) also maintains a satisfactory level, while Eurobank appears somewhat lower (8.8%) but still remains within supervisory requirements.

The most notable progress is observed in the ratio of non-performing exposures. According to this measure (NPEs-Assets), all four banks have declined to levels between 1% and 2%. Piraeus (1.2%), Eurobank (1.3%), and the National Bank (NBG) (1.3%) are positioned at almost the same low level, while Alpha maintains a slightly higher ratio (2.4%). This reflects the successful strategy of balance sheet clean-up, with the near-complete elimination of NPEs as a systemic risk.

The comparative analysis shows that Eurobank was the frontrunner in disengaging from DTCs, with their contribution to equity capital being almost negligible. Alpha and Piraeus continue to exhibit a high DTCs to Equity ratio, which renders them more exposed to institutional changes in the DTC framework. The National Bank (NBG) occupies an intermediate position, showing clear improvement but still maintaining a relatively high DTC ratio. All four banks display very

low levels of NPEs and enhanced capital adequacy, a fact that demonstrates the transition to a more “normalized” banking environment after a decade of crisis.

#### **4. Methodological Limits of the Statistical Analysis**

Statistical processing (Pearson correlations, regressions) requires an adequate sample size (N: number of observations) in order to yield reliable conclusions. With only three observations per bank (N = 3), the estimation of any relationship is unstable and scientifically invalid. Moreover, the converging trajectory of DTCs toward low levels reduces their endogenous variability and consequently, their statistical informational value. Therefore, even the technically rigorous application of SPSS or any other statistical tool would result in outcomes that cannot be generalized.

The three (3) year period 2022 to 2024 should be interpreted as a transitional phase from the use of DTCs as an accounting strategy toward their gradual absorption through profitability and the improvement of asset quality. This shift reflects a structural transformation of the Greek banking systems, which cease to rely on the “tax cushion” of DTCs and revert to more conventional accounting practices. The fact that supervisory authorities themselves are promoting the gradual phasing out of DTCs (ECB, 2023a) confirms the qualitative significance of this transformation.

#### **5. Conclusions**

The present article demonstrates that the statistical analysis of DTCs during the period 2022-2024 is methodologically insufficient and scientifically unnecessary. Research interest shifts from quantitative processing to institutional and qualitative interpretation. Greek banks are abandoning the strategy of dependence on DTCs and are transitioning to conditions of genuine capital self-sufficiency, a development that constitutes a pivotal point in the path out of this crisis.

Another critical factor that limits the necessity of statistical analysis of DTCs in the period 2022-2024 is the evolving macroeconomic and institutional environment. The stabilization of the Greek economy after the pandemic, the gradual decline of risks associated with non-performing exposures, and the increased confidence of markets in Greek banks have all contributed to the reduction of the relative weight of DTCs. Within this framework, DTCs have ceased to function as a central mechanism of capital adequacy reinforcement and instead have become a secondary accounting residual, reflecting primarily the historical use of the deferred tax credit framework.

At the same time, the guidelines of the SSM and the ECB reinforce the need to reduce dependence on tax-based techniques, such as profitability and risk management. As noted above by the European Central Bank (ECB, 2023b), the improvement in asset quality and the reduction of NPEs create scope for genuine capital reinforcement without the need for substitution through deferred tax credits.

Moreover, the trend of DTC reduction across the four (4) systemic banks indicates that the phenomenon is not characterized by individual features but rather constitutes a systemic outcome of the transition toward more normalized operating conditions. This removes from DTCs their previous status as an “observable variable” with significant volatility, which in the past had justified the use of complex statistical tools. By contrast, the analysis now becomes confined to the institutional and policy dimension, with emphasis on the sustainability of the DTC framework and its compatibility with European directives.

On a comparative basis, the two preceding periods (2011 to 2015 and 2016 to 2021) highlight the substantial differentiation of the role of DTCs. During the first period, 2011 to 2015, marked by the restructuring of Greek sovereign debt (PSI) and the extensive losses incurred by banks, DTCs functioned as the primary instrument of the accounting adjustment. The institutionalization of Deferred Tax Credits (Law 4172/2013) enabled the conversion of tax losses into capital, artificially boosting capital adequacy ratios (Louri & Migiakis, 2019). Similarly, in the period 2016 to 2021, DTCs remained a critical instrument, as banks were called upon to address high levels of non-performing exposures (NPEs) and heightened capital requirements under the SSM. Statistical analysis during that period was meaningful, since DTCs displayed significant variability and were directly correlated with key indicators (capital, assets, NPEs), thereby highlighting measurable relationships (ECB, 2020).

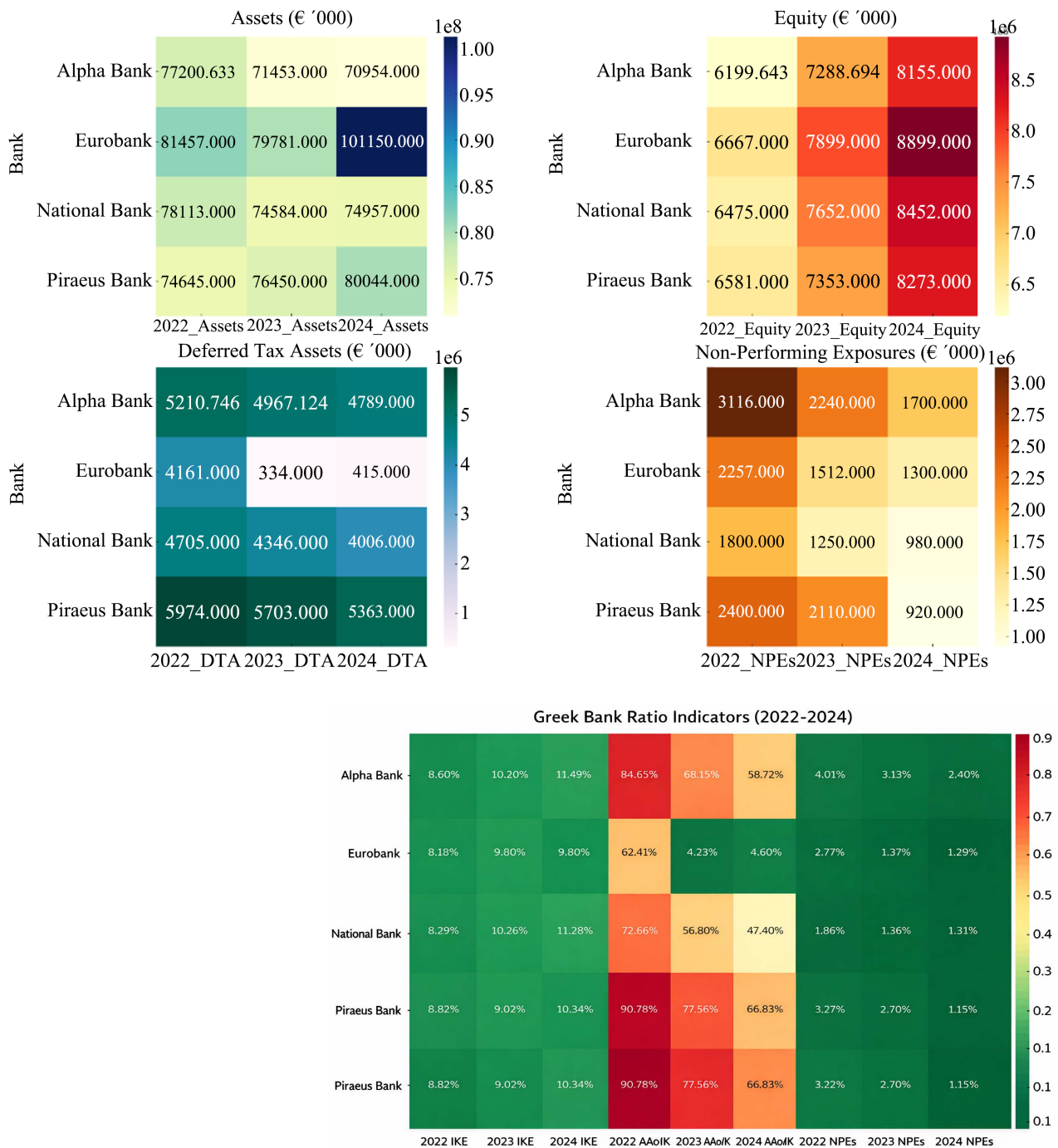
During the period 2022 to 2024, the function of DTCs departs from this earlier dynamic. They no longer operate as a capital reinforcement tool under crisis conditions, but rather as a residual of previous accounting choices, which tends to be gradually amortized. Eurobank, for instance, almost eliminated its DTCs in 2023, a development indicating the completion of the cycle of tax utilization. Within the same framework, Alpha Bank and the National Bank of Greece display a steady downward trend, while Piraeus, although maintaining higher balances, follows the same path of reduction. Consequently, unlike in previous periods where the statistical correlation of DTCs with capital adequacy indicators had scientific value, in the current period such analysis leads to weak or inactive research outcomes, rendering qualitative and institutional interpretation more appropriate.

The outlook beyond 2025 further reinforces the argument concerning the non-necessity of statistical analysis of DTCs. As systemic banks continue the process of balance sheet clean-up and achieve stable profitability, DTCs tend to be relegated to secondary importance. The strategic shift of the ECB and the SSM toward the strengthening of the quality of supervisory capital (Common Equity Tier 1) delineates an environment in which reliance on accounting “devices” will be incompatible with the objectives of financial stability (ECB, 2023b). The gradual elimination of DTCs will signify that banks will henceforth rely on organic earnings and capital markets for strengthening their capital base, thereby enhancing the transparency and reliability of financial statements.

Furthermore, this shift will also redirect research interest from the quantitative analysis of the DTC dynamics toward the evaluation of issues such as banks’ re-

silience under conditions of elevated interest rates, market risk management, and the transition to more sustainable financing models (OECD, 2024). Within this framework, DTCs may serve as a subject of historical or comparative analysis, but not of current statistical investigation, since their role as a supervisory tool is essentially coming to an end. Thus, the period 2022 to 2024 constitutes not only an accounting but also a research turning point, marking the end of an era in which DTCs represented a central axis of the balance sheets of Greek banks.

Below, we present heatmaps that visually summarize our analysis:



According to the heatmaps, we can see that the Equity to Assets ratio (E/A) for all four (4) systemic banks has strengthened, with their capital “buffers” increasing between 2022 and 2024. In 2024, Alpha Bank (11.49%) and National Bank of Greece (NBG) (11.28%) exhibit the highest capital adequacy levels, followed by Piraeus Bank with (10.34%), while Eurobank remains at a lower yet still robust level (8.80%). Analyzing the Deferred Tax Assets to Equity ratio (DTA/E), a strong “red” concentration is observed in 2022, indicating a high dependency on deferred tax assets, which gradually declines by 2024. Eurobank shows a near-complete decoupling (62.41% to 4.66%), National Bank demonstrates a substantial reduction (72.66% to 47.40%), and Alpha Bank also moderates its exposure (84.05% to 58.72%), although it remains relatively elevated. Piraeus Bank continues to be the most exposed institution in this respect (90.78% to 64.83%).

Finally, the ratio of Non-Performing Exposures to Assets (NPEs/A) reveals a uniform and pronounced improvement across all banks, converging around 1% to 2% in 2024. Piraeus Bank records the lowest figure (1.15%), followed by Eurobank and National Bank (approximately 1.3%), while Alpha Bank remains slightly higher but on a declining path (2.40%). In summary, the comparative heatmap analysis from 2022 to 2024 demonstrates a clear visual transition; the “hot zones” corresponding to DTA/E gradually cool down, reflecting reduced reliance on deferred tax assets, while the NPEs segments increasingly “green”, signaling the ongoing cleansing of loan portfolios. Simultaneously, the E/A indicators become progressively brighter, denoting enhanced capital strength. Distinct patterns are observed among individual institutions: Eurobank appears to be entering a post-DTA phase, with minimal tax asset dependence and stable capitalization. National Bank (NBG) presents consistent improvement across all three indicators with moderate residual DTA exposure. Alpha Bank exhibits solid capital adequacy but maintains relatively high DTA/E and slightly elevated NPEs. Piraeus Bank achieves significant progress in asset quality and capital levels but remains the most dependent on deferred tax assets. At the bottom line, the “fewer DTAs-stronger organic capital-lower NPEs” is clearly reflected across the system. The key outstanding issue concerns the further reduction of DTA/E for Alpha Bank and, most notably, for Piraeus Bank.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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