FISCAL DRAG IN GREECE

Maria Flevotomou
Bank of Greece, Economic Analysis and Research Directorate

Nikos Ventouris
Bank of Greece, Economic Analysis and Research Directorate

ABSTRACT

This paper uses a microsimulation approach to analyse the phenomenon of "fiscal drag" in Greece, i.e. the increase in tax revenues that arises when nominal tax bases grow, while the parameters of the personal income tax (PIT) system remain unchanged in nominal terms. First, we estimate the phenomenon in terms of the tax-to-base elasticity, which captures the responsiveness of PIT revenue to changes in the tax base under an unchanged legislation. The results suggest an elasticity of almost 1.8 in 2019, implying a built-in progressivity in the PIT system and, therefore, potential for fiscal drag. We further decompose this elasticity to identify its main drivers across income sources (labour, capital, self-employment, pensions and benefits) and tax parameters (tax brackets, tax deductions/credits) as well as across the income distribution. Second, we assess fiscal drag in practice between 2019 and 2023 by comparing actual PIT revenues (incorporating *observed* income growth and legislative changes) against counterfactual 2023 scenarios simulating alternative indexation practices. We quantify the actual impact of fiscal drag, defined as a share of GDP, and the extent to which government policies have managed to offset it. The findings indicate that, although Greece has no formal indexation of tax parameters, the tax policy reforms implemented between 2019 and 2023 more than offset the potential effects of fiscal drag, keeping PIT revenues broadly stable as a share of GDP, while slightly reducing the average effective tax rate. Overall, the results highlight that, during a period of rapid nominal income growth, Greece's PIT reforms improved both the progressivity and the redistributive capacity of the tax system, while safeguarding PIT revenue. These insights are relevant for the design of future tax policy interventions.

Keywords: personal income tax; inflation; indexation; bracket creep

JEL classification: D31; H24; E62

DOI link: https://doi.org/10.52903/econbull20256201

Η ΦΟΡΟΛΟΓΙΚΗ ΔΙΑΒΡΩΣΗ ΣΤΗΝ ΕΛΛΑΔΑ

Μαρία Φλεβοτόμου
Τράπεζα της Ελλάδος, Διεύθυνση Οικονομικής Ανάλυσης και Μελετών

Νίκος Βεντούρης
Τράπεζα της Ελλάδος, Διεύθυνση Οικονομικής Ανάλυσης και Μελετών

ΠΕΡΙΛΗΨΗ

Η παρούσα μελέτη χρησιμοποιεί ένα υπόδειγμα μικροπροσομοίωσης για να εξετάσει το φαινόμενο της "φορολογικής διάβρωσης" (fiscal drag) στην Ελλάδα, δηλαδή την αύξηση των φορολογικών εσόδων που προκύπτει όταν οι φορολογικές βάσεις αυξάνονται σε ονομαστικούς όρους, αλλά οι παράμετροι του συστήματος Φόρου Εισοδήματος Φυσικών Προσώπων (ΦΕΦΠ) παραμένουν αμετάβλητες. Στο πρώτο στάδιο, εκτιμούμε το φαινόμενο σε όρους ελαστικότητας φόρου ως προς τη φορολογητέα βάση (tax-to-base elasticity), η οποία αποτυπώνει τη μεταβολή των εσόδων από τον ΦΕΦΠ σε σχέση με μεταβολές της φορολογητέας βάσης, υπό συνθήκες αμετάβλητης νομοθεσίας. Τα αποτελέσματα υποδηλώνουν ελαστικότητα ύψους 1,8 το 2019, η οποία αντανακλά την προοδευτικότητα που απορρέει από τον ίδιο το σχεδιασμό του συστήματος ΦΕΦΠ και, συνεπώς, υποδηλώνει δυνητικό περιθώριο για φορολογική διάβρωση. Στη συνέχεια, αναλύουμε την ελαστικότητα στα επιμέρους συστατικά της, προκειμένου να εντοπίσουμε τους βασικούς της προσδιοριστικούς παράγοντες ανά πηγή εισοδήματος (μισθωτή εργασία, κεφάλαιο, αυτοαπασχόληση, συντάξεις και επιδόματα), ανά φορολογική παράμετρο (φορολογική κλίμακα, φορολογική έκπτωση/πίστωση) και σε όλο το εύρος της εισοδηματικής κατανομής. Στο δεύτερο στάδιο, εξετάζουμε το φαινόμενο της φορολογικής διάβρωσης στην πράξη την περίοδο μεταξύ 2019 και 2023, συγκρίνοντας τα πραγματικά έσοδα από τον ΦΕΦΠ (τα οποία ενσωματώνουν την *παρατηρούμενη* αύξηση των εισοδημάτων και τις νομοθετικές παρεμβάσεις που υλοποιήθηκαν) με εναλλακτικά σενάρια για το 2023, τα οποία προσομοιώνουν διαφορετικές πρακτικές τιμαριθμικής αναπροσαρμογής. Ποσοτικοποιούμε την πραγματική επίδραση της φορολογικής διάβρωσης, ως ποσοστό του ΑΕΠ, καθώς και το βαθμό στον οποίο οι κυβερνητικές πολιτικές την αντιστάθμισαν. Τα ευρήματα δείχνουν ότι, παρότι η Ελλάδα δεν εφαρμόζει τυπική τιμαριθμική αναπροσαρμογή των φορολογικών παραμέτρων, εφάρμοσε φορολογικές μεταρρυθμίσεις την περίοδο 2019-23 οι οποίες υπεραντιστάθμισαν τις δυνητικές επιδράσεις της φορολογικής διάβρωσης, διατηρώντας τα έσοδα από τον ΦΕΦΠ σχεδόν σταθερά ως ποσοστό του ΑΕΠ και μειώνοντας ελαφρά τον μέσο αποτελεσματικό φορολογικό συντελεστή. Συνολικά, τα αποτελέσματα δείχνουν ότι, σε μια περίοδο ταχείας ανόδου των ονομαστικών εισοδημάτων, οι μεταρρυθμίσεις στον ΦΕΦΠ ενίσχυσαν τόσο την προοδευτικότητα όσο και την αναδιανεμητική ικανότητα του φορολογικού συστήματος, διασφαλίζοντας παράλληλα τη σταθερότητα των εσόδων από τον ΦΕΦΠ. Τα συμπεράσματα αυτά είναι ιδιαίτερα χρήσιμα για το σχεδιασμό μελλοντικών παρεμβάσεων στη φορολογική πολιτική.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Η φορολογική διάβρωση (fiscal drag) αναφέρεται στην αύξηση των φορολογικών εσόδων που προκύπτει όταν η φορολογητέα βάση (κυρίως το εισόδημα) αυξάνεται σε ονομαστικούς όρους, αλλά οι παράμετροι της φορολογικής νομοθεσίας (π.χ. φορολογικά κλιμάκια, εκπτώσεις/απαλλαγές) δεν αναπροσαρμόζονται αναλόγως. Αυτό οδηγεί σε αύξηση του μέσου αποτελεσματικού φορολογικού συντελεστή. Το φαινόμενο αφορά κυρίως το φόρο εισοδήματος φυσικών προσώπων (ΦΕΦΠ) και έχει ιδιαίτερη σημασία για τη δημοσιονομική πολιτική, καθώς επηρεάζει: (1) τις προβλέψεις των φορολογικών εσόδων, (2) τα μακροοικονομικά υποδείγματα των δημόσιων οικονομικών, (3) την εκτίμηση του διαθέσιμου δημοσιονομικού χώρου στο πλαίσιο των νέων δημοσιονομικών κανόνων, (4) την κατανομή του εισοδήματος και, κατά συνέπεια, (5) το βέλτιστο σχεδιασμό της φορολογίας.

Η φορολογική διάβρωση αποτελεί κρίσιμο ζήτημα για τη δικαιοσύνη και τη βιωσιμότητα της φορολογικής πολιτικής, καθώς οδηγεί σε αύξηση της φορολογικής επιβάρυνσης χωρίς αντίστοιχη ενίσχυση της πραγματικής φοροδοτικής ικανότητας των φορολογουμένων. Ως εκ τούτου, έχει σημαντικές επιπτώσεις στη δίκαιη κατανομή του φορολογικού βάρους, ιδιαίτερα σε περιόδους υψηλού πληθωρισμού και ταχείας ανόδου των ονομαστικών εισοδημάτων.

Η παρούσα μελέτη αναλύει τη φορολογική διάβρωση στο σύστημα του ΦΕΦΠ στην Ελλάδα την περίοδο 2019-23, προκειμένου να αναδειχθεί η σημασία της για το σχεδιασμό δίκαιων και αποτελεσματικών φορολογικών παρεμβάσεων. Ειδικότερα, εξετάζεται σε πρώτο στάδιο η επίδραση της διάβρωσης από θεωρητική σκοπιά, δηλαδή υπό την υπόθεση αύξησης των εισοδημάτων χωρίς αλλαγές στη φορολογική πολιτική ή στην τιμαριθμική αναπροσαρμογή. Στη συνέχεια, γίνεται εκτίμηση της πραγματικής φορολογικής διάβρωσης την περίοδο 2019-23, εξετάζοντας παράλληλα εναλλακτικά σενάρια υπολογισμού των φορολογικών εσόδων. Η ανάλυση εστιάζει στις επιπτώσεις στο διαθέσιμο εισόδημα των φορολογουμένων, στα δημόσια έσοδα, καθώς και στη φορολογική δικαιοσύνη (με έμφαση στην προοδευτικότητα του φορολογικού συστήματος και την ανισότητα). Με αυτό τον τρόπο γίνεται μια αξιολόγηση των εναλλακτικών πολιτικών για την αντιμετώπιση του φαινομένου.

Η ανάλυση χρησιμοποιεί το υπόδειγμα μικροπροσομοίωσης φόρων-παροχών της ΕΕ (EUROMOD), το οποίο για τη συγκεκριμένη μελέτη βασίζεται στα μικροδεδομένα της ΄Ερευνας Εισοδήματος και Συνθηκών Διαβίωσης της Ευρωπαϊκής ΄Ενωσης (EU-SILC 2020), που αφορούν εισοδήματα του 2019.

Η θεωρητική ανάλυση δείχνει ότι το 2019 το ελληνικό σύστημα ΦΕΦΠ εμφάνιζε υψηλό βαθμό προοδευτικότητας, η οποία δημιουργεί δυνητικό περιθώριο για φορολογική διάβρωση όταν οι παράμετροι του συστήματος παραμένουν αμετάβλητες. Η εκτιμώμενη ελαστικότητα φόρου ως προς τη φορολογητέα βάση —περίπου 1,8— υποδηλώνει ότι τα έσοδα από τον ΦΕΦΠ αυξάνονται δυσανάλογα σε σχέση με την άνοδο των ονομαστικών εισοδημάτων. Η εξέταση των επιμέρους προσδιοριστικών παραγόντων της ελαστικότητας δείχνει ότι η σταδιακή συρρίκνωση των εκπτώσεων φόρου εξηγεί το μεγαλύτερο μέρος της φορολογικής διάβρωσης, ενώ η προοδευτικότητα της φορολογικής κλίμακας διαδραματίζει δευτερεύοντα ρόλο. Η ανάλυση αναδεικνύει επίσης σημαντικές διαφοροποιήσεις μεταξύ των πηγών εισοδήματος, με τα εισοδήματα από αυτοαπασχόληση και μισθωτή εργασία να εμφανίζουν τις υψηλότερες ελαστικότητες, ενώ τα εισοδήματα από συντάξεις και επιδόματα να επηρεάζουν σε πολύ μικρότερο βαθμό. Η κατανομή της ελαστικότητας ανά εισοδηματικό κλιμάκιο δείχνει ότι οι ελαστικότητες είναι συστηματικά υψηλότερες στα μεσαία εισοδήματα, γεγονός που υποδηλώνει ότι, ελλείψει μέτρων πολιτικής, η αυτόματη μετάβαση σε ανώτερα φορολογικά κλιμάκια (bracket

creep) θα επιβάρυνε δυσανάλογα αυτούς τους φορολογουμένους. Σε συνάφεια με τα παραπάνω ευρήματα, μια οριζόντια αύξηση των εισοδημάτων μειώνει την προοδευτικότητα του συστήματος ΦΕΦΠ, αλλά οδηγεί σε μικρή μείωση της ανισότητας, κυρίως επειδή πολλοί χαμηλόμισθοι συνεχίζουν να καταβάλλουν μηδενικό φόρο ακόμη και μετά την άνοδο των εισοδημάτων τους. Συνολικά, το σύστημα ΦΕΦΠ του 2019 —δεδομένης της προοδευτικής του δομής και της κατανομής των φορολογητέων εισοδημάτων— ήταν διαρθρωτικά ευάλωτο στη φορολογική διάβρωση, ελλείψει μηχανισμών τιμαριθμικής αναπροσαρμογής ή άλλων παρεμβάσεων πολιτικής.

Η *εμπειρική* ανάλυση δείχνει ότι οι μεταρρυθμίσεις που υλοποιήθηκαν στην Ελλάδα την περίοδο 2019-23 κατόρθωσαν να αντισταθμίσουν πλήρως τις επιδράσεις της φορολογικής διάβρωσης, μειώνοντας τον μέσο αποτελεσματικό φορολογικό συντελεστή, διατηρώντας παράλληλα τη σταθερότητα των εσόδων και περιορίζοντας την εισοδηματική ανισότητα. Τα μέτρα πολιτικής της περιόδου 2019-23 —όπως η αναμόρφωση της φορολογικής κλίμακας, η μείωση των οριακών συντελεστών στα χαμηλά εισοδήματα, η εισαγωγή νέου κλιμακίου με χαμηλότερο συντελεστή και οι εκτεταμένες παρεμβάσεις στις εισφορές κοινωνικής ασφάλισης— διαδραμάτισαν καθοριστικό ρόλο στην εξουδετέρωση μεγάλου μέρους των δυνητικών αυξήσεων εσόδων που υποδηλώνει η δομή του συστήματος ΦΕΦΠ. Μάλιστα, τα αποτελέσματα του βασικού σεναρίου —το οποίο ενσωματώνει τις μεταρρυθμίσεις της εξεταζόμενης περιόδου— καταδεικνύουν χαμηλότερη φορολογική επιβάρυνση σε σύγκριση με τις επιδόσεις των περισσότερων εναλλακτικών σεναρίων, που υποθέτουν τιμαριθμική αναπροσαρμογή των φορολογικών παραμέτρων και οδηγούν σε συγκριτικά υψηλότερη φορολογική επιβάρυνση.

Η εμπειρία της περιόδου 2019-23 δείχνει ότι η πραγματική επίδραση της φορολογικής διάβρωσης εξαρτάται σε μεγάλο βαθμό από τις επιλογές πολιτικής: στην Ελλάδα οι μεταρρυθμιστικές πολιτικές που εφαρμόστηκαν την περίοδο 2019-23 —εν απουσία τιμαριθμικής αναπροσαρμογής— ήταν εκείνες που αντιστάθμισαν την αύξηση των εσόδων που θα μπορούσε να προκύψει από τη δομή του συστήματος ΦΕΦΠ του 2019, συμβάλλοντας έτσι στη μείωση του μέσου φορολογικού βάρους.

Συνολικά, η φορολογική διάβρωση μπορεί να έχει σημαντικές επιπτώσεις στην είσπραξη φορολογικών εσόδων, στους μέσους φορολογικούς συντελεστές και στην εισοδηματική κατανομή, με κρίσιμες συνέπειες για την εισοδηματική ανισότητα και το βέλτιστο σχεδιασμό της φορολογικής πολιτικής. Με δεδομένο τον περιορισμένο δημοσιονομικό χώρο, οι φορείς χάραξης πολιτικής καλούνται να επιτύχουν τη σωστή ισορροπία μεταξύ της ανάγκης για μείωση του φορολογικού βάρους και του στόχου διασφάλισης των δημόσιων εσόδων. Η ποσοτικοποίηση της φορολογικής διάβρωσης και η ενσωμάτωσή της στο σχεδιασμό μεσοπρόθεσμων δημοσιονομικών στρατηγικών μπορούν να βελτιώσουν την ακρίβεια των προβλέψεων εσόδων και να στηρίξουν την κατάρτιση πιο στοχευμένων παρεμβάσεων πολιτικής. Παράλληλα, οι μηχανισμοί μέσω των οποίων η φορολογική διάβρωση επηρεάζει διαφορετικά τμήματα της εισοδηματικής κατανομής απαιτούν την υιοθέτηση στοχευμένων μέτρων πολιτικής. Η διάσταση αυτή είναι καθοριστική για την αξιολόγηση του κατά πόσο είναι σκόπιμη η τιμαριθμική αναπροσαρμογή των φορολογικών παραμέτρων. Η πρόσφατη εμπειρία της Ελλάδος δείχνει ότι η ενίσχυση της προοδευτικότητας του φορολογικού συστήματος μπορεί να αντισταθμίσει τις επιπτώσεις της φορολογικής διάβρωσης, συμβάλλοντας παράλληλα σε δικαιότερη κατανομή του φορολογικού βάρους και σε βελτίωση της φορολογικής συμμόρφωσης.

FISCAL DRAG IN GREECE*

Maria Flevotomou
Bank of Greece, Economic Analysis and Research Directorate

Nikos Ventouris
Bank of Greece, Economic Analysis and Research Directorate

I INTRODUCTION

Fiscal drag (or "bracket creep") refers to an increase in tax revenues that arises when the tax base (e.g. income) increases in nominal terms, while the parameters of tax legislation (e.g. tax brackets, deductions/exemptions) are not adjusted accordingly. Periods of high inflation and rapid nominal income growth can give rise to fiscal drag, a mechanism through which tax revenues increase automatically as taxpayers move into higher tax brackets or lose access to deductions and credits, whose nominal thresholds remain fixed. This leads to an increase in the average effective tax rate,[1] thereby raising the overall tax burden, even though real incomes —reflecting taxpayers' capacity to pay— remain unchanged.

Fiscal drag mainly concerns personal income tax (PIT), which often displays a high degree of progressivity, and has important implications for fiscal policy. In particular, it affects: (a) tax revenue forecasts;[2] (b) the macroeconomic modelling of public finances;[3] (c) the estimation of the available fiscal space under the new European fiscal rules;[4] (d) income distribution and, consequently, (e) optimal tax design.[5] The global inflation surge that began in 2021, together with the subsequent growth in household incomes, has rekindled analytical and policy interest in fiscal drag as a key factor influencing both revenue developments and income distribution.[6]

This paper provides a comprehensive analysis of fiscal drag in Greece in the recent period. Using harmonised household survey data and detailed information on tax legislation, it offers new evidence on both the potential for fiscal drag embedded in the design of the PIT system and the extent to which it materialised in practice over 2019-23, a period marked by exceptionally high inflation.

The first part of the analysis examines the sensitivity of PIT revenues to income growth, assuming an unchanged tax legislation and homogeneous income growth. This approach captures the degree of progressivity built into the tax system and allows the estimation of the potential fiscal drag through the tax-to-base elasticity.[7] The analysis further explores the underlying drivers of fiscal drag and highlights variations across income sources and income deciles.

The second part of the analysis examines how fiscal drag evolved in practice during the recent period of high inflation.[8] This assessment incorporates not only the progressivity of the PIT system but also the policy measures imple-

* This paper is part of a study covering 21 European countries, including all euro area Member States and Hungary. For more details, see García-Miralles, E., M. Freier, S. Riscado et al. (2025), "Fiscal drag in theory and in practice: A European perspective", ECB, Working Paper No. 3136. Warm thanks are extended to Esteban García-Miralles (Banco de España) for his insightful comments and constructive feedback. The views expressed in this article are of the authors and do not necessarily reflect those of the Bank of Greece. The authors are responsible for any errors or omissions.

1 The average effective tax rate is the share of the tax base paid in taxes (i.e. the ratio of total tax liability to the tax base).

2 See Creedy and Gemmell (2004) as well as Belinga et al. (2014).

3 See Hack (2025).

4 Under the new EU economic governance framework, additional revenues resulting from taxpayers moving into higher tax brackets (bracket creep) are considered as *discretionary revenue measures*. An increase in such revenues raises the upper limit on the growth rate of *net nationally financed primary expenditure*, thereby creating additional fiscal space. For the role of fiscal drag as an automatic stabiliser, see Auerbach and Feenberg (2000); Immervoll (2006); Dolls et al. (2012); and Paulus and Tasseva (2020). For an example of explicit use of fiscal drag as a discretionary measure in the UK, see Waters and Wernham (2022).

5 See Saez (2003); Immervoll (2005); Sutherland et al. (2008) as well as Heer and Süssmuth (2013).

6 See OECD (2023); Balasundharam et al. (2023); Leventi et al. (2024); Waters and Wernham (2022); and Balladares and García-Miralles (2025).

7 A first line of research on fiscal drag has focused on estimating tax-to-base (TTB) elasticities that capture the responsiveness of tax revenues to tax base growth. For more details, see Immervoll (2005); Price et al. (2015) and Boschi and d'Addona (2019).

8 A second line of research concentrates on analysing how fiscal drag operates in practice. For more details, see Paulus et al. (2020); Waters and Wernham (2022) and Moriana-Armendariz (2023).

mented over the period. To do so, actual tax revenues in 2023 are compared against counterfactual scenarios in which tax brackets were either fully indexed or remained unchanged since 2019.

Overall, our analysis aims to contribute to a more comprehensive understanding of the PIT system in Greece, providing relevant information on issues such as its progressivity, the distributional impacts of inflation through its interaction with the tax system, the potential stabilisation properties of the PIT system and its effect on public finances. Our results underline the quantitative importance of fiscal drag, especially in periods of high inflation, and the role of policy design in addressing it.

The paper provides a coherent and comprehensive assessment of fiscal drag in Greece and is structured as follows: Section 2 presents the data and methodology, including the use of the EUROMOD microsimulation model. Section 3 outlines the institutional features of the Greek PIT system that are relevant for the analysis. Section 4 analyses fiscal drag in theory, examining the responsiveness of the PIT revenues to tax base growth under unchanged legislation and exploring the underlying mechanisms across income sources and income groups. Section 5 assesses fiscal drag in practice, comparing actual PIT outcomes for 2023 with counterfactual scenarios that simulate alternative indexation policies. Finally, Section 6 summarises the main findings and discusses their policy implications for the design of optimal tax reforms in Greece.

2 DATA – METHODOLOGY

Our analysis draws on a microsimulation approach, enabling us to study the effects of public policy not only at the aggregate level, but also along the income distribution and across various population segments. This is because microsimulation models operate at the individual level, i.e. they take into account diverse circumstances and characteristics of the population of interest (National Research Council 1991) contained in micro datasets providing information on different sources of income (gross earnings, pensions and social transfers), household composition and individual socioeconomic characteristics.

For our analysis, we employ EUROMOD,[9] the tax-benefit microsimulation model of the European Union, currently developed and maintained by the Joint Research Centre of the European Commission. The model embeds the legislation on direct taxes and benefits of all 27 EU Member States, allowing for the simulation of tax liabilities and benefit entitlements at both the individual and household level. Effectively, EUROMOD enables the analysis, in a comparable manner, of the effects of taxes and benefits on household incomes for individual countries and the EU as a whole. EUROMOD may, nonetheless, generate small biases due to features of the tax code that cannot be modelled given the available information or that are simplified in the calculations.

EUROMOD not only allows us to simulate baseline scenarios under actual legislation and given the income observed in the microdata, but, equally importantly, it can accommodate the simulation of counterfactual scenarios under changes in the tax-benefit legislation or in the underlying data. This is highly relevant for the purposes of our analysis. Our theoretical (or potential) fiscal drag measure, drawing on estimated tax-to-base elasticities, is obtained following a simulation of a 1% increase in all sources of income that enter the tax base of all individuals and then calculating the resulting tax liability (see Section 4.1). Fiscal drag in practice, over the period 2019-23, is analysed in the light of full and no indexation scenarios allowing to quantify how much of the potential revenue associated with fiscal drag is effectively offset by policy measures (see Section 5.1).

9 Version I.6.0+. For more information on the EUROMOD model, see https://euromod-web.jrc.ec.europa.eu/ as well as Sutherland and Figari (2013).

EUROMOD by default uses the EU statistics on income and living conditions (EU-SILC)[10] survey as input data. EU-SILC provides a yearly cross-sectional survey of households with regard to income, poverty, social exclusion and living conditions that is standardised across all EU Member States. Yet, as is the case for all survey data, it most likely fails to capture the very top earners who have a large impact on revenue collection. Our analysis employs the EU-SILC 2020 wave, with 2019 as the income reference period. For Greece, this is effectively a representative sample of the population containing information on 32,832 individuals in 15,086 households.

Since the income reference period of EU-SILC 2020 is the year 2019, all monetary variables had to be adjusted to reflect their nominal levels in 2023 in order to conduct the corresponding simulations. This so-called "uprating exercise" is implemented by income source per simulated year within EUROMOD, based on information obtained from other data sources. The data are typically taken from Eurostat or provided by the statistical offices of the Member States, government authorities or National Central Banks. Table A.1 in the Appendix sets out the assumptions underlying the uprating mechanism from 2019 to 2023 in the case of Greece,[11] breaking down household disposable income into its basic sub-components. As a result of this process, individual income growth differs as long as there are individual differences in income composition. It should be noted that the uprating of the 2019 microdata described above is based only on the nominal growth of individuals' tax base and, therefore, fails to incorporate the observed growth (e.g. through a change in the number of taxpayers), which may induce a growing divergence with respect to official statistics.

Finally, it should be made explicit that EUROMOD is a static microsimulation model. Static microsimulation models typically impute income tax or other liabilities and the receipt of social security and other benefits by applying the rules for eligibility or liability to individuals and households (Harding 1996). In replicating current or hypothetical institutional frameworks, static models assume away behavioural responses on the part of micro agents. Therefore, their key purpose has traditionally been to show the "morning after" impact of a policy change.

3 THE PERSONAL INCOME TAX SYSTEM IN GREECE

A clear understanding of the institutional framework of the Greek personal income tax (PIT) system is essential for interpreting the mechanisms through which fiscal drag operates. This section provides an overview of the main features of the PIT system and the composition of the tax base. It describes how taxable income is defined, outlines key tax parameters, such as deductions and credits, and summarises the major policy changes introduced during the period 2019-23. It also examines the distributional characteristics of the PIT base and the tax liabilities across income groups, which are central to understanding both the system's progressivity and its sensitivity to changes in nominal incomes.

3.1 DESCRIPTION OF THE PIT

The Greek PIT system features a relatively broad tax base that encompasses most sources of earned and replacement income, subject to limited deductions. The tax base includes reported earnings from employment and self-employment, other market income, income from rent, private transfers received, education allowances, family benefits for civil servants, sickness benefits, disability pensions, main and supplementary old-age pensions, minor old-age pensions, as well as widows' and orphans' pensions. Unemployment benefits are also part of the tax base for individuals whose

10 For more details on EU-SILC, see Eurostat's EU statistics on income and living conditions.

11 The Joint Research Centre (JRC) publishes annual country reports that describe in more detail the uprating exercise, policy changes and the institutional set-up of each EU country (EUROMOD Country Reports).

(other) total taxable income exceeds €10,000. Taxable income is defined as gross taxable income minus tax allowances,[12] which in Greece are very limited. Throughout the period 2019-23, the only allowance concerned social security contributions, which were fully deductible from the tax base. Income from interest and dividends is excluded from the PIT base and taxed separately at flat rates.

The PIT system in Greece combines individual-based taxation with a progressive rate structure and a limited set of exemptions and credits. More specifically, tax liability is assessed at the individual level, although spouses have the option to file a joint income tax return; in such cases, incomes are entered separately and taxed individually.[13] Income taxation is graduated, with progressively higher marginal tax rates applying to higher income brackets. Some forms of income are exempted from taxation, including unemployment benefits, social assistance and some family benefits, while employment and pension income received by persons with a disability above 80% is also tax-exempt.[14] Tax credits, which directly reduce the amount of tax payable, include the following:

(i) *employment and pension income tax credit,* which applies to the sum of employment, pensions and farming income (EPF income) and is capped to the amount of people's actual tax liability. In 2019 it was equal to €1,900/€1,950/€2,000/€2,100 for taxpayers with zero/one/two/three or more dependent children and EPF income up to €20,000 per year; it declined by €10 for each additional €1,000 of EPF incomes over €20,000. In 2020-23 the tax credit was equal to €777/€810/€900/€1,120/€1,340 for taxpayers with zero/one/two/three/four dependent children and EPF income up to €12,000 per year, while for each additional dependent child after the fourth it increased by €220. The tax credit declined by €20 for each additional €1,000 of EFP income over €12,000.

(ii) *disability tax credit*, amounting to €200 annually per eligible taxpayer (i.e. a person with disability of at least 67%).

(iii) *tax credit for charitable donations*, calculated at 10% of donations greater than €100 per annum but less than 5% of taxable income.

Greece does not apply an automatic indexation of PIT brackets or income thresholds; instead, tax parameters are adjusted on a discretionary basis through legislative changes.

3.2 PIT REFORMS 2019-23

During the 2019-23 period, significant reforms in the PIT system were implemented in Greece aiming at reducing the tax burden on labour and improving progressivity.[15] The reform package included a revision of the PIT schedule, adjustments to tax credits and successive reductions in social security contribution rates. These measures were introduced against a backdrop of strong nominal income growth and high inflation, yet without the application of automatic indexation to tax parameters. In parallel, the government implemented broader labour-market measures —such as increases in the statutory minimum wage— that indirectly influenced the tax and contribution base. In more detail:

– *PIT tax schedule:* In 2020, the PIT tax schedule was reformed with the introduction of an additional tax band featuring a lower tax rate (for incomes up to €10,000) and with marginal reductions in tax rates for higher income brackets. The tax schedules applicable from 2019 to 2023 are presented in Table 1 (for employment, pension and farming income) and Table 2 (for property income).

– *Social security contributions:* On a cumulative basis over the 2019-23 period, social security contribution rates for the private sector were reduced for both employees and employers,

12 Note that tax allowances are usually shared between the main taxpayer and his/her spouse.
13 However, there is a partial exception to this rule: some tax allowances and/or tax credits are jointly assessed.
14 Unemployment benefits, large family benefits and disability benefits are taxed for individuals with (other) taxable income over €10,000.
15 For more details, see Bank of Greece, *Annual Reports 2019* (pp. 158-159 and 186-187) and *2020* (pp. 202-203), as well as Ministerial Decisions No. 107675/29.12.2021, 38866/21.4.2022 and 31986/24.3.2023 (in Greek).

Table 1 Tax schedule: Employment, pension, self-employment and farming income

Income bracket (EUR)	Tax Rate 2019	Tax Rate 2020-23*
0 - 10,000	22%	9%
10,001 - 20,000		22%
20,001 - 30,000	29%	28%
30,001 - 40,000	37%	36%
40,000 -	45%	44%

Source: EUROMOD Country Reports Greece 2019-2022, 2020-2023.
* Applied separately to farming income.

Table 2 Tax schedule: Property income (2019-23)

	Income bracket (EUR per year)		
Tax band	Lower limit	Upper limit	Tax rate (%)
1	0	12,000	15
2	12,001	35,000	35
3	35,001	...	45

Source: EUROMOD Country Reports Greece 2019-2022, 2020-2023.

by 1.88 and 2.52 percentage points (pps), respectively (see Table 3). Moreover, in 2020, the self-employed and farmers' social security contributions changed into a schedule of social security classes (i.e. lump sum amounts irrespective of self-employment/ farming income, as opposed to a rate-based schedule in 2019; see Tables 4-6). In 2023, the self-employed social security contributions were increased in line with inflation.

Table 3 Private sector social security contributions

(%)

	Employees	Employers
2019	15.75	24.81
2020	15.33	24.33
2021	14.12	22.54
2022-23	13.87	22.29
change (cum.)	-1.88	-2.52

Source: EUROMOD Country Reports Greece 2019-2022, 2020-2023.

Table 4 Own account workers' social security contributions (2019)

Primary pension	13.33%
Sickness insurance	6.95%
Unemployment insurance	EUR 10/month

Source: EUROMOD Country Report Greece 2019-2022.

Table 5 Self-employed liberal professions' social security contributions (2019)

Primary pension	13.33%
Supplementary pension	7.00%
Lump sum pension	4.00%
Sickness insurance	6.95%
Unemployment insurance	EUR 10/month

Source: EUROMOD Country Report Greece 2019-2022.

Table 6 Own account workers' and self-employed liberal professions' social security contributions 2020-23

(EUR per month)

Insurance class	2020-22	2023
up to 5 years of history	126	138
1	210	230
2	252	276
3	302	331
4	363	398
5	435	477
6	566	621

Source: EUROMOD Country Report Greece 2020-2023.

– *Minimum wage:* In January 2019, the minimum wage —payable 14 times a year— stood at €586. In February 2019, it was raised to €650. In 2022 and 2023, the minimum wage was further increased, thereby affecting the level of the unemployment insurance benefit, which is connected to it[16], as well as the upper and lower earnings lim-

16 For the period of analysis, the unemployment benefit was calculated as 55% of the minimum daily wage paid for 25 days.

Table 7 Employment, pension and farming income tax credit

(EUR per year)

	No children		One child		Two children		Three children		Four children	
Income	2019	2020-23	2019	2020-23	2019	2020-23	2019	2020-23	2019	2020-23*
0 - 12,000	1,900	777	1,950	810	2,000	900	2,100	1,120	2,100	1,340
20,000		617		650		740		960		1,180
30,000	1,800	417	1,850	450	1,900	540	2,000	760	2,000	980
40,000	1,700	217	1,750	250	1,800	340	1,900	560	1,900	780
50,850	1,592	0	1,173	33	1,223	123	1,323	343	1,323	563
52,500	1,575	0	1,140	0	1,190	90	1,290	310	1,290	530
57,000	1,530	0	1,050	0	1,100	0	1,200	220	1,200	440
68,000	1,420	0	830	0	880	0	980	0	980	220
79,000	1,310	0	610	0	660	0	760	0	760	0
210,000	0	0	50	0	100	0	200	0	200	0
215,000	0	0	0	0	50	0	150	0	150	0
220,000	0	0	0	0	0	0	100	0	100	0
230,000	0	0	0	0	0	0	0	0	0	0

Source: Bank of Greece calculations.
* From 2020 onwards, the tax credit for each child after the third is increased by EUR 220.

its for the social security contribution base.[17] More specifically, the minimum wage was increased by 2% in January 2022 and by another 7.7% in May 2022, reaching €713 per month. In April 2023 it was raised by 9.4%, reaching €780 per month.

– *Employment and pension tax credit:* In 2020, this tax credit became less generous, as described in Section 3.1 and illustrated in Table 7.

3.3 SPECIAL FEATURES OF THE GREEK PIT SYSTEM

The composition of the PIT base in Greece is distinctive compared to other euro area countries, reflecting the structure of household income and labour market characteristics.[18] In all other euro area countries, labour income constitutes the dominant component of the PIT base, but Greece stands out for having the lowest share of labour income (45%) and the highest shares of self-employment income (19%) and pensions and social-benefit income (33%) within the euro area. This structure reflects the country's labour market and demographic composition, characterised by a large number of self-employed workers and a relatively high share of retirees receiving taxable pensions.

From a distributional perspective, the composition of income sources varies markedly across the income distribution (Chart 1).[19] In Greece, self-employment income is most prevalent in the lowest income deciles, whereas labour income dominates the upper half of the distribution. This asymmetry supports the stylised observation that "wage earners are rich and the self-employed are poor".[20] In other words, employees contribute disproportionately to the higher segments of the tax base, whereas a substantial part of the reported self-employment income is concentrated among lower-income taxpayers. Pension income is heavily concentrated in the middle of the income distribution, reflecting the fact that

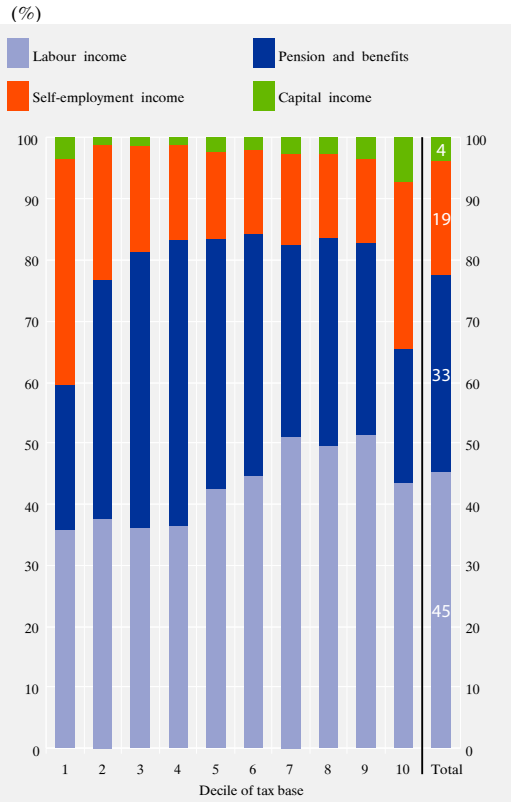
17 In 2019-22, the lower limit for the contribution base was equal to the 2019 minimum wage (i.e. €650), while the upper earnings threshold was 10 times the 2019 minimum wage (i.e. €6,500). Since 2022, these thresholds are uprated by the rate of inflation.
18 For comparison with other EU countries, see Figure 2(b) in García-Miralles et al. (2025).
19 For detailed data, see Tables A.2.1 and A.2.2 in the Appendix.
20 However, it could also be interpreted as highlighting the substantial extent of income under-reporting among the self-employed.

pensions are generally lower than earnings from employment but more stable and widespread. This composition has important implications for both the progressivity of the PIT system and the incidence of fiscal drag across income groups.

The PIT burden in Greece is highly concentrated among high-income taxpayers, reflecting not only the progressivity of the tax system but also the structure of the tax base, which is effectively very narrow (Chart 2).[21] This pattern has remained broadly unchanged between 2019 and 2023. In particular, the richest 10% of taxpayers accounts for over 50% of total PIT revenues, while the bottom half of the income distribution contributes less than 10%. This concentration largely reflects the underlying distribution of the tax base, as the top decile represents roughly 28% of the total tax base, whereas the bottom half of taxpayers earns only about 24%. At the same time, a large share of individuals either pay no tax or contribute relatively little to total revenues. The share of zero taxpayers —i.e. individuals with no PIT liability due to low income or available credits— declined slightly from 32% in 2019 to 30% in 2023, mainly due to a reduction among middle-income households. This structure underlines both the strong progressivity of the Greek PIT system and its narrow effective tax base, with a relatively small segment of high-income taxpayers bearing the bulk of the tax burden.

By focusing on the top of the income distribution, it becomes evident that the Greek PIT system exhibits one of the highest concentrations of both the tax base and tax liabilities in the euro area[22] and that this concentration has increased in recent years, reflecting both structural and policy factors. In 2023, the top 20% of taxpayers accounted for about 44% of the total tax base, a share that has remained broadly unchanged since 2019. However, their share of total PIT revenues rose from 67% in 2019 to 73% in 2023, indicating a growing contribution of high-income earners to overall tax collection (Chart 3). The widening gap between the share of income earned and the share of tax paid, points to a rise in the progressivity of the PIT system. This is consistent with the increase in the Kakwani index[23] (from 0.274 in 2019 (Table 8, Baseline Scenario) to 0.321 in 2023 (Table 10, Baseline Scenario)), which quantifies the progressivity of the tax system and confirms that personal income taxation in Greece became more redistributive

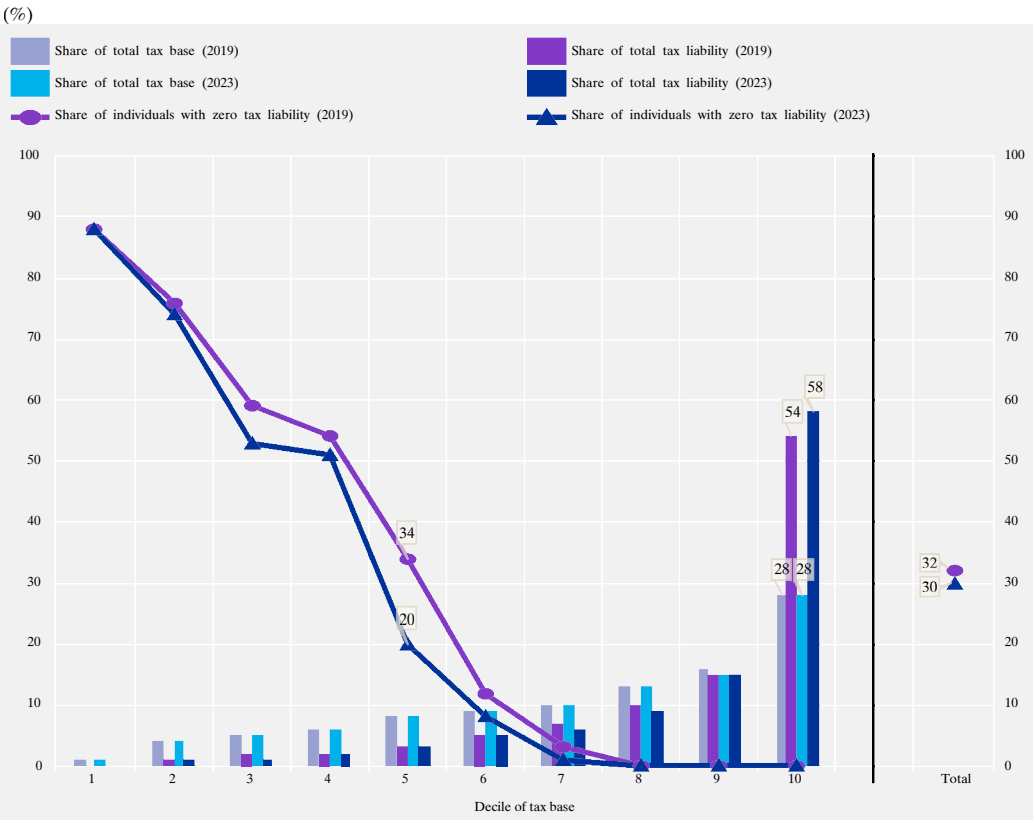
Chart 1 Share of tax base by income source – Distributional analysis



Sources: EUROMOD and Bank of Greece calculations.
Note: The chart is based on 2019 data; however, the composition of the tax base and the corresponding distributional patterns remain broadly unchanged in 2023.

21 For detailed data, see Table A.3 in the Appendix.
22 For a comparison with other EU countries, see Figure A.2(a) and (b) in García-Miralles et al. (2025).
23 The Kakwani index (Kakwani 1977) is a standard measure of the progressivity of a tax system, defined as the difference between the concentration coefficient of taxes and the Gini coefficient of pre-tax income: $K = C_T - G_Y$, where C_T denotes the concentration of tax payments (ranking individuals by pre-tax income) and G_Y represents the Gini coefficient of the pre-tax income distribution. The index takes values between -1 and 1. $K>0$ indicates a progressive tax (the average tax rate increases with income). $K=0$ denotes a proportional tax. $K<0$ corresponds to a regressive tax (the average tax rate decreases with income). The larger the Kakwani index, the greater the redistributive potential of the tax system.

Chart 2 Distribution of tax base and PIT liabilities across income deciles (2019 and 2023)



Sources: EUROMOD and Bank of Greece calculations.

over time. This development reflects both the impact of the 2019-23 PIT and other structural reforms —which reduced rates primarily for lower and middle incomes— as well as the stronger nominal income growth experienced by higher earners.

4 FISCAL DRAG IN "THEORY"

The descriptive analysis above provides the necessary context for quantifying fiscal drag within the Greek PIT system. This section turns to the estimation of tax-to-base elasticities, which measure the responsiveness of PIT revenues to income growth under unchanged legislation. This "theoretical" assessment allows us to isolate the mechanical progressivity and estimate the potential fiscal drag inherent in a given tax system.

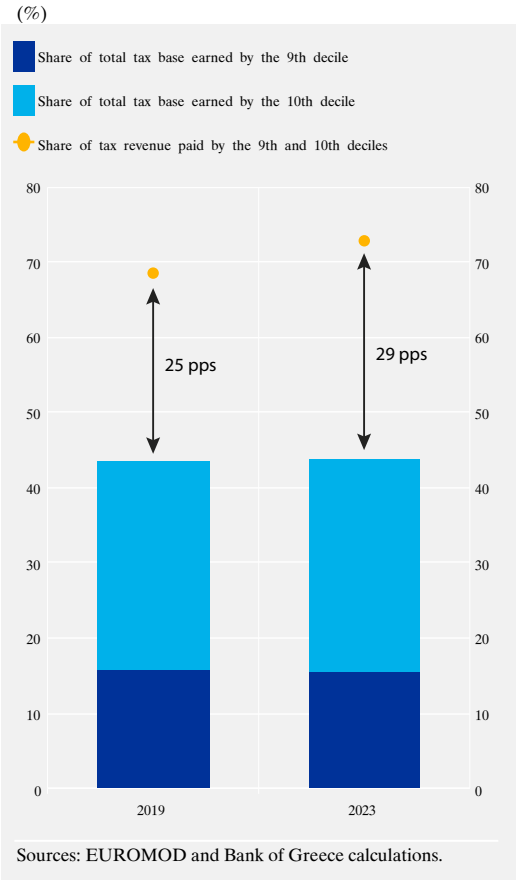
4.1 METHODOLOGY: ESTIMATING TAX-TO-BASE ELASTICITIES

Tax-to-base elasticity (TTB) is defined as the percentage change in PIT revenues resulting from a homogeneous 1% increase in taxpayers' income. Formally, we define the TTB elasticity for each taxpayer as:

$$\frac{\partial t/_t}{\partial y/_y} = \frac{y}{t} \times \frac{\partial t}{\partial y} = \frac{\partial t/_{\partial y}}{t/_y} = \frac{MTR}{ATR}$$

where y denotes the tax base and t represents PIT revenue. Note that TTB elasticity is equivalent to the ratio of the average Marginal Tax Rate (MTR) and the Average Tax Rate (ATR). In a progressive system, marginal rates are generally higher than the average tax rates across the income distribution, resulting in TTB elasticities greater than one. *Fiscal drag*

Chart 3 Share of tax base earned and tax revenue paid by the top 20% of the tax base distribution (2019, 2023)



Sources: EUROMOD and Bank of Greece calculations.

is defined as the disproportionate (i.e. greater than 1%) increase in tax revenues resulting from a 1% nominal increase in income. Note also that these elasticities are a *static* measure because they are calculated under a *ceteris paribus* assumption at a given point in time under the prevailing tax regime, where all tax parameters remain fixed and there are no behavioural responses. Therefore, the size of the elasticity depends both on the design of the PIT legislation (such as tax brackets, deductions and credits) and on the income distribution and demographic characteristics of taxpayers, which affect their final tax liability.

We estimate the TTB elasticity by simulating a 1% increase in all income sources included in the tax base for all individuals and then calculating the resulting tax liability, keeping the PIT legislation constant (including the value of nominal tax parameters). The TTB elasticity is then computed as the percentage change in PIT revenue divided by the 1% increase in the tax base.

The progressive nature of PIT implies a relatively high tax-to-base elasticity, indicating significant potential for fiscal drag when tax parameters are not adjusted.

Estimating TTB elasticities requires methodological choices on how the PIT system interacts with other elements of the tax-benefit framework, particularly social security contributions and income-linked parameters. Our approach focuses on isolating the effect of keeping PIT parameters fixed, while allowing other features of the tax-benefit system to adjust freely in response to the simulated income growth. For example, when labour income increases, social security contributions (SSCs) paid by employees also rise – and since these are tax-deductible in the PIT, this effect is allowed in the simulation. Likewise, where SSC schemes include nominal minimum or maximum contribution thresholds, these are also increased by 1%, to reflect the usual practice of their update in line with income growth. Finally, since the PIT legislation includes references to nominal values of the statutory minimum wage, this parameter is also indexed to income growth, which tends to moderate TTB elasticities.

4.1.1 DECOMPOSING TAX-TO-BASE ELASTICITIES

The microsimulation framework allows us to disentangle the mechanisms that drive the responsiveness of PIT revenues to tax base growth. We decompose the TTB elasticity by isolating the contribution of key tax parameters, distinguishing between tax brackets and the most important tax credits and deductions. The exercise proceeds in two steps. First, we simulate a 1% increase in all components of the tax base, while proportionally adjusting all PIT parameters – representing a scenario close

to full indexation to income growth. Second, we sequentially remove this adjustment for each parameter to identify how much each component (bracket thresholds, credits or deductions) contributes to the overall elasticity. This approach reveals the specific design features that amplify or dampen the mechanical effect of income growth on PIT revenues.

We further examine how elasticities vary across different sources of income, capturing the heterogeneity of fiscal drag within the PIT base. Separate simulations are conducted for labour income, self-employment income, capital income and pensions and benefits, by increasing each source individually by 1% and observing the resulting change in tax revenues. The corresponding elasticity is then calculated as the percentage change in PIT revenue relative to the 1% change in the tax base driven by that specific income source. This breakdown highlights how differences in tax treatment and exemptions across income categories shape the overall responsiveness of the PIT system.

4.1.2 DISTRIBUTIONAL ANALYSIS – IMPACT ON PROGRESSIVITY AND INEQUALITY

We further calculate separate TTB elasticities for each decile group across the individual tax base distribution. Estimating TTB elasticities across income deciles provides a detailed picture of how fiscal drag operates along the income distribution. This non-parametric approach captures how the built-in progressivity of the PIT system affects individuals at different income levels, revealing the impact of potential fiscal drag on redistribution and inequality. We further document, for each decile group, the mechanisms driving the elasticities.

Elasticities are computed separately for each decile as the ratio of the change in total taxes paid by individuals in that group to the change in their tax base. The resulting decile-specific elasticities represent a weighted average of individual elasticities within each group, using tax liabilities as weights. As a result, zero-taxpayers, whose elasticity is undefined (because a 1% income increase does not usually alter their tax liability), receive a zero weight and do not affect the estimated elasticity. This weighting approach ensures internal consistency with the aggregate TTB elasticity, as taxpayers with higher liabilities exert a proportionally greater influence on the overall measure.

4.2 RESULTS: TTB ELASTICITIES IN GREECE

The 2019 results show that Greece exhibited a tax-to-base (TTB) elasticity broadly in line with the euro area average, indicating potential for large fiscal drag effects embedded in its PIT system. More specifically, the aggregate TTB elasticity is estimated at around 1.8, placing it within the euro area range of 1.7-2.[24] An elasticity of this magnitude implies that, even under uniform nominal income growth and unchanged legislation, PIT revenues in Greece increase more than proportionally relative to the tax base, reflecting the built-in progressivity of the system.

The results of the analysis show that the key determinant of fiscal drag (i.e. the portion of the TTB elasticity that is above 1) was the effect of tax credits,[25] which accounted for approximately 80% of fiscal drag, while the progressivity of the tax schedule contributed the remaining 20% (Chart 4).[26] This pattern differs from many other euro area countries where bracket creep plays a more prominent role. These findings highlight the fact that Greece's theoretical fiscal drag stems primarily from the structure and phase-out of key tax credits, making their design central to understanding the responsiveness of PIT revenues.

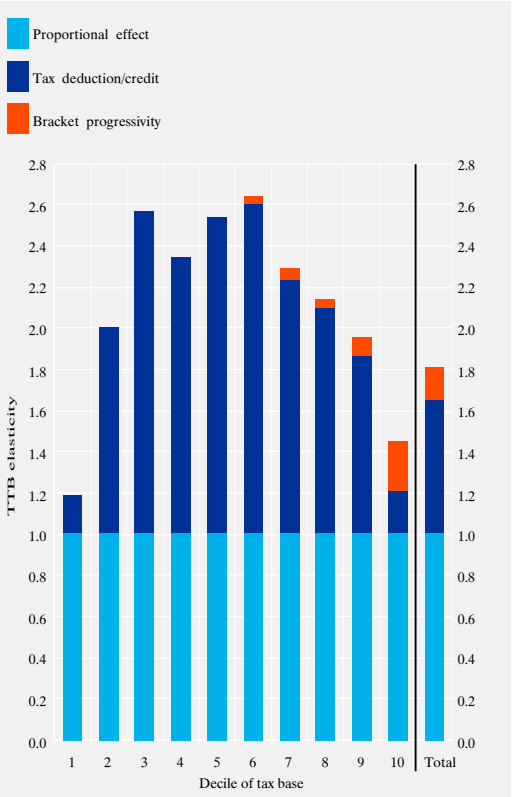
In Chart 4 we also report the estimates of TTB elasticities by decile groups of the tax base distribution, as well as their underlying mecha-

24 For more details, see García-Miralles, E., M. Freier, S. Riscado et al. (2025), "Fiscal drag in theory and in practice: a European perspective", ECB, Working Paper No. 3136.
25 Among these, the tax credit for income from employment and pensions has the greatest impact on elasticity, as it is dependent on income.
26 For detailed data, see Table A.4 in the Appendix.

nisms. This decile-based, non-parametric analysis provides a detailed view of how fiscal drag varies across the income distribution. Unlike aggregate indicators of volatility or dispersion, examining elasticities by decile helps detect sharp differences or "kinks" in the distribution, which are crucial for evaluating the progressivity and design of the tax system with greater precision. The results show that elasticities can be particularly high in certain parts of the income distribution, indicating very steep marginal tax rates for those taxpayers. In the absence of policy measures, such features imply that fiscal drag could have a significant impact on these groups. This, in turn, raises concerns about potential inefficiencies, as excessively high marginal rates may distort work incentives and undermine the fairness of the tax system. By decomposing elasticities by decile, we can identify the specific tax parameters that generate these concentration points and inefficiencies.

The decomposition shows that the drivers of TTB elasticities vary significantly across the income distribution, with tax credits dominating in the lower deciles and bracket progressivity becoming increasingly important for higher-income taxpayers (Chart 5).[27] In particular, in the bottom half of the distribution (deciles 1-5), almost the entire elasticity above one is driven by the employment-pension tax credit, which accounts for close to 100% of the fiscal drag mechanism in these groups. As income rises, the relative contribution of bracket progressivity gradually increases: in deciles 6-8, bracket effects explain 2-4% of the fiscal drag, while in the top deciles they become more substantial – around 10.5% in decile 9 and over 50% in decile 10. This pattern reflects the interaction between the credit's phase-out —most relevant at low and middle incomes— and the PIT schedule's increasing marginal tax rates at the top. Overall, the 2019 results indicate that fiscal drag for most taxpayers is primarily driven by the erosion of tax credits, while bracket creep becomes the dominant mechanism only in the upper end of the income distribution.

Chart 4 Decomposition of tax-to-base (TTB) elasticities across the income distribution (2019)

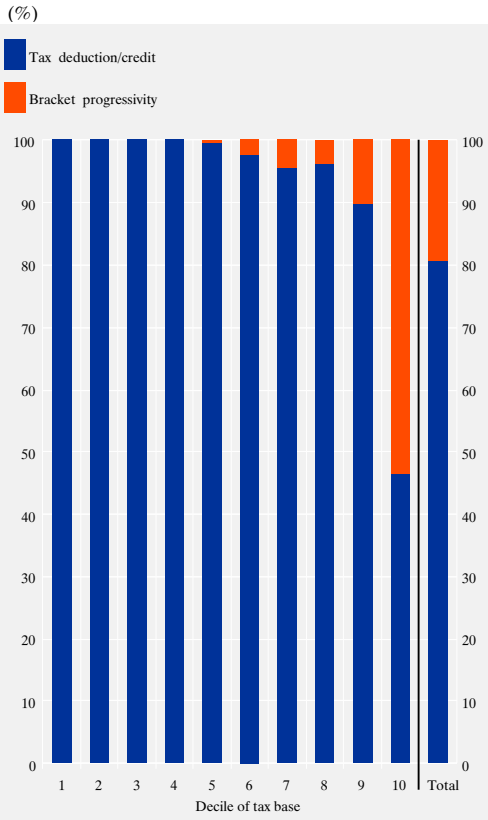


Sources: EUROMOD and Bank of Greece calculations.

Moreover, our simulation results indicate that the level of TTB elasticity varies across income deciles (Chart 4). More specifically, at the bottom of the distribution, the elasticity is relatively low reflecting the limited tax liability of low-income taxpayers. Beginning in decile 2, elasticities increase sharply, driven largely by the erosion of the employment-pension tax credit. Elasticities remain elevated in the middle of the distribution, with values around 2.55-2.64 in deciles 5 and 6, before gradually declining toward the top. This profile shows that the theoretical fiscal drag in 2019 was most pronounced among low to middle-income tax-

27 Chart 5 shows the decomposition of the portion of the elasticity that is above one, normalising its size to 100. This allows comparing the relative contribution of each mechanism across income deciles, irrespective of the size of the elasticity. For detailed data, see Table A.5 in the Appendix.

Chart 5 Composition of theoretical fiscal drag by income decile (2019)



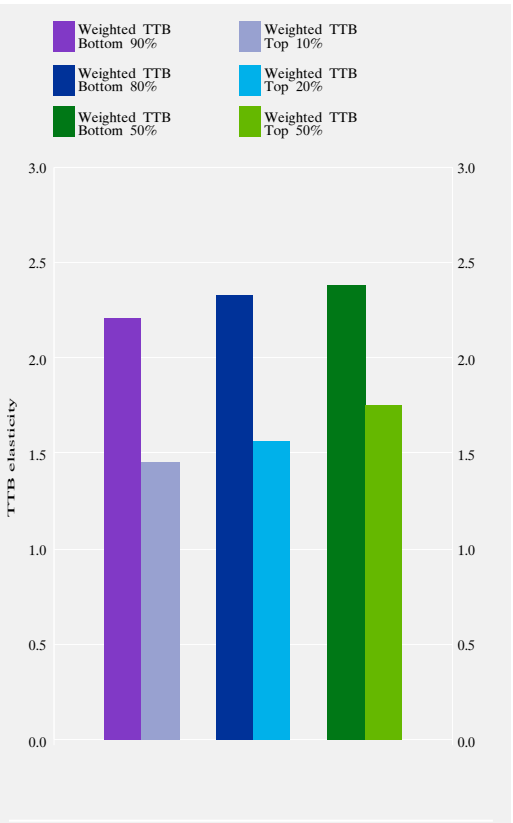
Sources: EUROMOD and Bank of Greece calculations.

payers, where credit erosion is strongest, while remaining more moderate at the very bottom (due to many zero-liability taxpayers) and at the very top, where bracket effects dominate but credits play a limited role.

The distribution of TTB elasticities across income groups reveals a systematic asymmetry, with lower segments of the income distribution exhibiting higher elasticities than higher ones (Chart 6). The bottom 90% of taxpayers display significantly higher weighted elasticities than the top 10%, while a similar pattern holds when comparing the bottom 80% with the top 20% and the bottom half with the top half of the distribution. This indicates that, in theory, fiscal drag is stronger among lower to middle-income groups, as these taxpayers are more likely to lose access to tax credits or shift into higher brackets when nominal incomes rise. From a macroeconomic perspective, these distributional differences matter because lower-income households tend to have higher marginal propensities to consume, while higher-income households save a larger share of their income. As a result, when fiscal drag falls more heavily on lower to middle-income taxpayers, it can dampen aggregate consumption and reduce the strength of the PIT system as an automatic stabiliser during periods of rising nominal incomes.

The distribution of TTB elasticities suggests that, *in theory*, fiscal drag reduces the progressivity of the PIT system when incomes rise and tax parameters remain unchanged. A progressive tax implies that effective tax rates increase with income. However, under unchanged legislation, our results show that PIT progressiv-

Chart 6 Distribution of TTB elasticities (2019)



Sources: EUROMOD and Bank of Greece calculations.

Table 8 Distribution of TTB elasticities (2019): Impact on progressivity and inequality

	2019	
	Baseline scenario	1% increase simulation scenario
Progressivity:		
Kakwani index	0.274	0.272
Difference in Kakwani index after 1% income increase	*-0.001*	
Inequality:		
Gini: tax base (post-tax) (%)	0.351	0.351
Δ (Gini: tax base (post-tax)) (in basis points)	*-0.009*	
Inequality reduction capacity:		
Gini: tax base (pre-tax) (%)	0.378	0.378
Gini: tax base (post-tax) (%)	0.351	0.351
Δ (Gini) (in percentage points)	-0.026	-0.026
Δ (Δ (Gini)) (in basis points)	*-0.010*	

Source: EUROMOD.
Note: The simulation scenario assumes a homogenous 1% increase in the tax base.

ity decreases following a 1% increase in nominal income. In other words, effective tax rates grow more for low- and middle-income taxpayers than for top-income earners, while they remain unchanged for individuals with no tax liability. To quantify this effect, we compute the Kakwani index,[28] which quantifies the degree of progressivity of the tax system, before and after a uniform 1% income increase. As shown in Table 8, the index declines following the income increase, confirming that progressivity weakens when tax parameters are fixed. This outcome is consistent with the distribution of TTB elasticities presented in Charts 4 and 6, where elasticities are systematically higher among lower-income groups. The main driver is the phase-out of tax credits as incomes rise (for low income groups) and the transition into higher tax brackets (for higher income taxpayers). Together, these mechanisms imply that, in the absence of policy measures, fiscal drag erodes the progressivity of the PIT system and shifts the tax burden disproportionately toward the lower and middle segments of the income distribution.

The analysis of TTB elasticities across income groups indicates that fiscal drag tends to reduce income inequality when tax parameters remain unchanged. To assess this effect, we calculate the Gini coefficient —which places more weight on disparities in the middle of the income distribution— for net-of-tax income before and after a uniform 1% increase in income, keeping legislation constant. The negative value reported in Table 8 indicates that, when incomes rise homogeneously, inequality declines slightly (by 0.009 basis points). This reflects the fact that low-income individuals, many of whom have a zero-tax liability, are unaffected by the income increase, while middle- and higher-income taxpayers face higher effective tax rates. It is worth noting that inequality tends to marginally decrease, despite the reduction in progressivity; this is because the tax liability of very low-income individuals remains zero even as their incomes rise,[29] outweighing the negative impact of progressivity. To distinguish the impact of income growth from that of fiscal drag, we also compute the change in the inequality reduction capacity of the tax system —measured as the difference between gross and net income

28 For the definition of the Kakwani index, see footnote 23.
29 TTB elasticity is very low for individuals in the lowest income decile, nearly 90% of whom pay no personal income tax.

Gini – before and after income growth. This change is marginally negative (by 0.010 basis points), suggesting that the PIT system's inequality-reduction capacity improves slightly when incomes rise and tax parameters remain fixed. The inequality-reduction effect of fiscal drag is a common result in the literature (Immervoll 2005; Paulus et al. 2020).

TTB elasticities also differ substantially across income sources, reflecting differences in tax treatment, the contribution of each income group to the total PIT revenue and the degree of progressivity embedded in the PIT system (Chart 7).[30]

- *Labour income* exhibits an elasticity close to the overall PIT elasticity (and other EU countries) – around 1.9 in 2019 – since it represents the dominant component of household income and the main driver of the tax base.

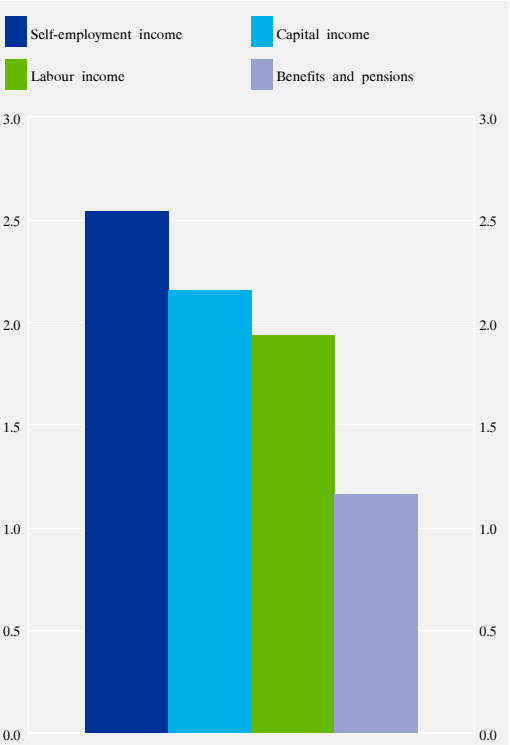
- *Self-employment income* shows the highest elasticity (estimated around 2.5 in 2019, the highest in the euro area), reflecting both labour market characteristics and specific features of the tax system. Although Greece has one of the largest shares of self-employed in the EU, their reported incomes are on average lower than those of wage earners and this group contributes disproportionally little to PIT revenues. The high elasticity arises from several interacting factors: a progressive effective tax structure, limited access to deductions and credits, and social security contributions that increase with the declared income (in 2019). Crucially, however, it also reflects the under-reporting of taxable income by many self-employed individuals. Since self-employed taxpayers are concentrated in the lower and middle parts of the income distribution, upward shifts in reported income can generate a significant fiscal drag, leading to a more than proportional increase in PIT revenues.

- *Capital income* in Greece displays a relatively higher TTB elasticity than typically observed in other EU countries (estimated around 2.2). This outcome reflects the progressive treatment applied to rental income, despite the fact that most capital gains, dividends and interest are taxed separately at flat rates.

- In contrast, *pensions and social benefits* display much lower elasticities (around 1.2, which places them among the lowest across EU countries) and are less vulnerable to fiscal drag.

These differences have important implications for revenue forecasting, since relying on a single aggregate elasticity may underestimate or overestimate tax responsiveness when income sources grow at different rates. Moreover, the

Chart 7 TTB elasticities by income source (2019)



Sources: EUROMOD and Bank of Greece calculations.

30 For detailed data, see Table A.6 in the Appendix.

variation in TTB elasticities by income source has distributional consequences, as the stronger responsiveness of labour and self-employment income implies that fiscal drag will be more concentrated among working-age taxpayers, while pensioners and recipients of benefits are relatively less affected.

5 FISCAL DRAG IN PRACTICE THROUGH COUNTERFACTUAL MICROSIMULATIONS

The second part of the study evaluates how fiscal drag evolved in practice during the recent period of high inflation. In this analysis, we account not only for the progressivity of the tax design but also for the policy actions taken during the period, such as the updating of nominal tax parameters. To do so, we compare the actual tax collection in 2023 with counterfactual scenarios in which tax parameters are either fully indexed or not updated at all since 2019.

5.1 METHODOLOGY: DEFINING COUNTERFACTUAL SCENARIOS

Actual fiscal drag can be quantified by isolating how much of the observed increase in PIT revenues between 2019 and 2023 was attributable *solely* to bracket creep, as opposed to income growth or policy changes. To do so, we disentangle the various drivers of tax revenue dynamics: the progressivity in the PIT system, nominal income growth, indexation practices and discretionary tax policy reforms. In this framework, *potential fiscal drag* is defined as the increase in PIT revenues that would have occurred in the period 2019-23 in the absence of any legislation changes or indexation practices since 2019. By contrast, *actual fiscal drag* corresponds to the portion of revenue growth that remains after accounting for any indexation practices and/or structural reform policies that may have mitigated the effect of bracket creep.

We implement this framework by simulating a set of counterfactual PIT systems for 2023 that differ only in the degree of indexation applied to the 2019 tax parameters. PIT revenues for 2019-23 are estimated based on the applicable legislation during each year (Baseline Scenario), using uprated incomes. For 2023 incomes, four alternative counterfactual scenarios are examined, applying the 2019 legislation under different indexation rules: (a) Scenario 1: No indexation, where all PIT parameters remain at their 2019 nominal values; and (b) Scenarios 2,3 and 4: Indexed systems, in which the 2019 PIT parameters are updated using different indexation metrics (namely, the HICP of the previous year, the HICP of the current year and tax base growth respectively). Since simulated tax revenues may differ from those reported in official statistics for 2019-23 for several reasons (as discussed in Section 2), we correct for these discrepancies by rescaling our results. Specifically, for each year of analysis we adjust our simulations by the ratio of the simulated tax revenues to the official ones.

We quantify actual and potential fiscal drag by comparing PIT revenues under the various simulation scenarios. "*Actual fiscal drag*" is calculated as the difference in PIT revenue (as a percentage of GDP) between the 2023 Baseline Scenario and the average of the three indexation scenarios (Scenarios 2, 3 and 4). "*Potential fiscal drag*" is estimated as the difference in PIT revenue between Scenario 1 (No indexation) and the average of the three indexation scenarios (Scenarios 2, 3 and 4). By comparing these two figures, it is possible to assess the extent to which discretionary tax policy changes have fully or partially offset the mechanical increase in revenue resulting from the erosion of the tax base. In particular, we define the *Offset Fiscal Drag Ratio* as:[31]

$$\text{Offset Fiscal Drag Ratio} = \frac{\text{offset fiscal drag}}{\text{potential fiscal drag}} = \frac{\text{potential fiscal drag} - \text{actual fiscal drag}}{\text{potential fiscal drag}} = 1 - \frac{(\text{Baseline Scenario}) - (\text{Average of Scenarios 2, 3 and 4})}{(\text{Scenario 1}) - (\text{Average of Scenarios 2, 3 and 4})}$$

31 The methodology is based on the analysis of Balladares and García-Miralles (2025).

Table 9 Counterfactual scenarios for the year 2023

	Baseline	Counterfactual scenarios			
		No indexation	Full indexation		
		(1)	(2)	(3)	(4)
PIT legislation	2023	2019	2019		
Nominal PIT parameters	2023	2019	2019 indexed		
Indexation practice	-	None	Lagged HCIP	Current HCIP	Tax-base growth

This measure abstracts from the magnitude of potential fiscal drag (which is closely linked to the progressivity of a country's tax system) and focuses on the impact of government action through tax reforms and indexation. A characterisation of the scenarios considered may be found in Table 9.

5.2 RESULTS: ACTUAL AND OFFSET FISCAL DRAG

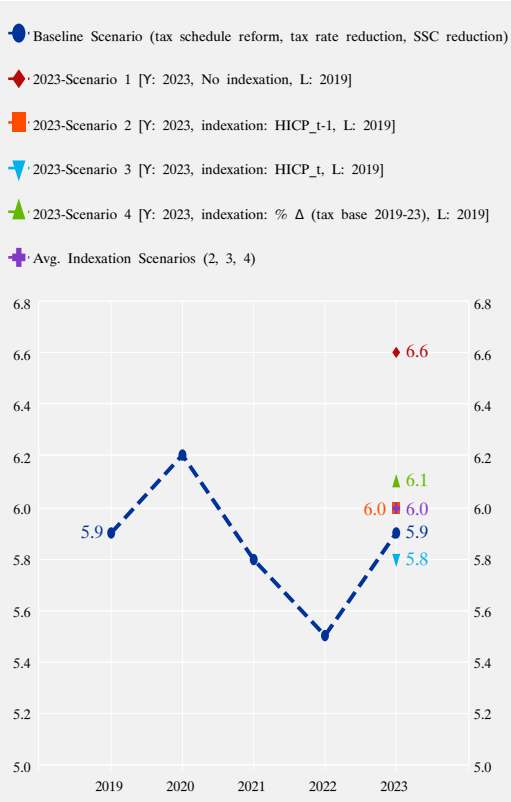
The tax policy pursued during 2019-23 fully compensated for the effects of fiscal drag, keeping PIT revenues (as a percentage of GDP) broadly constant. Chart 8[32] displays the evolution of PIT revenue as a percentage of GDP in Greece for each baseline system in the period 2019-23, rescaled as described earlier, as well as for each of the 2023 counterfactual scenarios considered. Compared to 2019, PIT revenues remained broadly unchanged in 2023, standing at 5.9% of GDP. In the absence of statutory indexation of tax parameters in Greece over that period, this development reflects the impact of structural tax reforms in the PIT system and social security contributions. In fact, maintaining the 2019 tax legislation without indexation (Scenario 1) would have increased PIT revenues in 2023 by 0.7 pps of GDP. Indexation Scenarios 2 and 4 would have resulted in smaller increases (0.2 and 0.1 pps of GDP, respectively), while Scenario 3 would have slightly reduced revenues compared to the baseline scenario (by 0.1 pps of GDP).

The simulation results show that the structural reforms during the examined period have not only fully offset potential fiscal drag, but have in fact overcompensated for it (by approximately 10%). In more detail, *potential fiscal drag*, measured as the difference in the PIT revenue to GDP ratio between Scenario 1 (No indexation) and the Average of the Indexation Scenarios, was estimated at 0.6 pps of GDP. *Offset fiscal drag*, measured as the difference in the PIT revenue to GDP ratio between Scenario 1 (No indexation) and the Baseline 2023 Scenario was estimated at 0.7 pps of GDP. This implies that the effect of potential fiscal drag was more than fully offset by government policies, keeping tax revenue (as a percentage of GDP) constant in an environment of strong inflationary pressures and rising nominal incomes.

In parallel, the tax reforms adopted in 2019-23 led to a modest reduction in the average effective tax rate (AETR), reflecting a decrease in the real tax burden on individuals, without losses in tax revenue (Chart 9).[33] In particular, the AETR marginally declined from 8.8% in 2019 to 8.7% in 2023 as the tax base grew faster (7.8%) than tax revenues (6.1%). Hence, the overcompensation of potential fiscal drag —through the aforementioned reforms— resulted in a reduction in the tax burden, without undermining the revenue performance of the system, which benefited from rising real incomes. It should be highlighted that, in the case of Greece, the offsetting of fiscal drag was driven entirely by the restructuring of the tax schedule and by the reductions in tax rates and social security contributions, with no contribution from indexation practices.

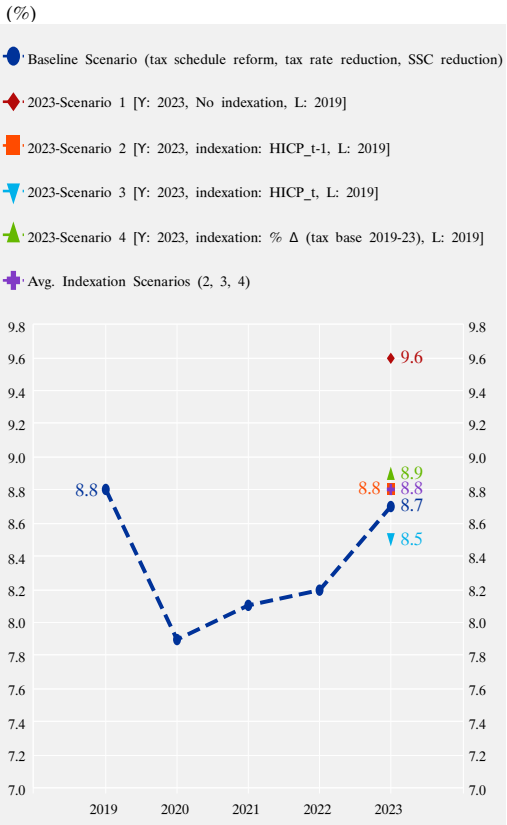
32 For detailed data, see Table A.7 in the Appendix.
33 For detailed data, see Table A.8 in the Appendix.

Chart 8 PIT revenues (as % of GDP) – Simulation scenarios



Sources: EUROMOD and Bank of Greece calculations.
Notes: Y: income, L: tax legislation, SSC: social security contributions.

Chart 9 Average effective tax rate – Simulation scenarios



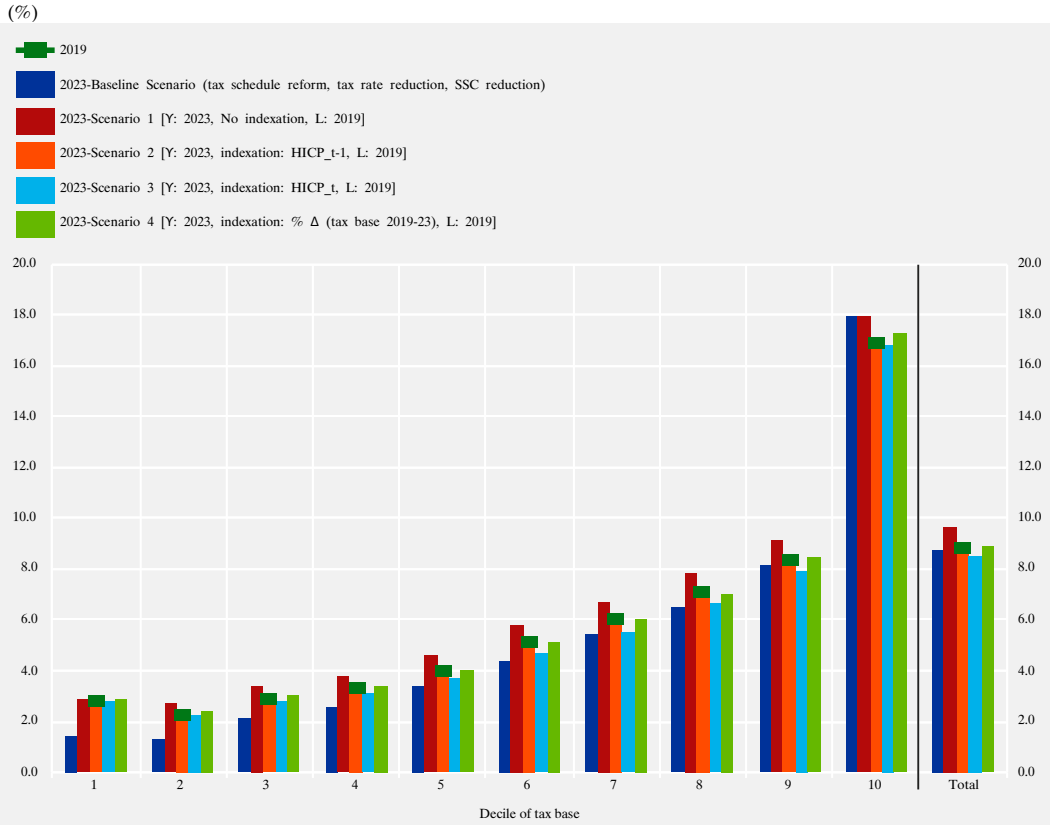
Sources: EUROMOD and Bank of Greece calculations.
Notes: Y: income, L: tax legislation, SSC: social security contributions.

The comparison of counterfactuals shows that the full indexation of PIT parameters with nominal tax base growth would almost entirely eliminate fiscal drag, whereas keeping legislation unchanged without indexation would have sharply raised the effective tax rates. Under Scenario 1 (No indexation, 2019 legislation), PIT revenues in 2023 would be 0.7 pps of GDP higher than in the Baseline Scenario, and the AETR would have been 0.9 pps higher, illustrating the full force of fiscal drag. On the other hand, Chart 9 shows that under Scenario 4 (full indexation based on nominal tax base growth), the AETR would be 8.9%, almost at the observed 2019 level (8.8%). This is consistent with the idea that keeping the legislation constant over time and updating parameters at the same rate as the growth of the nominal tax base achieves close to full offsetting of fiscal drag and keeps the effective tax rate constant.

The distributional analysis clearly indicates that, across all scenarios, the personal income tax burden (as measured by the average effective tax rate) is strongly concentrated at the top of the income distribution (Chart 10).[34] In every scenario, the average effective PIT rate increases with income decile, remaining very low for low-income households and rising progressively through the middle of the distribution, before peaking in the highest decile. This pattern confirms the progressivity of the PIT system and shows that, irrespective of the pol-

34 For detailed data, see Table A.9 in the Appendix.

Chart 10 Average effective tax rate by income decile – Simulation scenarios



Sources: EUROMOD and Bank of Greece calculations.
Notes: Y: income, L: tax legislation, SSC: social security contributions.

icy configuration, higher-income earners consistently contribute a disproportionately larger share of their income in taxes. Moreover, the alternative indexation or reform assumptions mainly affect the relative tax burden of low- and middle-income groups, while the overall contribution of top-income households remains structurally high.

Relative to 2019, the 2023 Baseline Scenario (which represents the actual PIT policy reforms implemented over 2019-23) redistributes the tax burden away from low- and middle-income households and towards the top of the income distribution, as it leads to lower average effective tax rates for all income deciles except the highest, with the strongest relief concentrated in the bottom part of the distribution,[35] while the top decile experiences a noticeable increase in its effective tax rate.[36] This pattern points to a policy choice to enhance progressivity and mitigate fiscal drag for most taxpayers, while relying more heavily on high-income earners. By contrast, the counterfactual with no indexation (Scenario 1) results in higher effective tax rates across all deciles, illustrating the pervasive impact of fiscal drag through bracket creep and the erosion of tax credits in a high-inflation environment. The indexation scenarios are much more "distribution-preserving" relative to 2019. In particular, Scenario 3 (indexation with concurrent HICP) would imply broadly lower effective tax rates from the middle of the income distribution upwards, including for top earners, suggesting a substantially stronger

35 The AETR declines by 1.4 pps and 1 pp for deciles 1 and 2 respectively.
36 The AETR increased by 1 pp for decile 10.

Table 10 Inequality, redistributive capacity and progressivity of the tax system – Simulation scenarios (2023)

	Baseline Scenario	Scenario 2	Scenario 3	Scenario 4
Gini index: tax base (pre-tax) (%)	0.3778	0.3766	0.3766	0.3766
Gini index: tax base (post-tax) (%)	0.3474	0.3500	0.3504	0.3499
Δ (Gini) (in percentage points)	*-0.0304*	*-0.0266*	*-0.0261*	*-0.0267*
Kakwani index	0.3211	0.2817	0.2876	0.2796

Sources: EUROMOD and Bank of Greece calculations.
Notes: Y: income, L: tax legislation, SSC: social security contributions.
Baseline Scenario (tax schedule reform, tax rate reduction, SSC reduction) ¦ Scenario 2 [Y: 2023, indexation: HICP_t-1, L: 2019] ¦ Scenario 3 [Y: 2023, indexation: HICP_t, L: 2019] ¦ Scenario 4 [Y: 2023, indexation: % Δ (tax base 2019-23), L: 2019].

reduction in the overall tax burden compared with the Baseline Scenario.

Against the background of the distributional evidence presented above, we explore the progressivity and inequality impact of the implemented reforms in 2019-23. The tax reforms implemented during the examined period —primarily the restructuring of the tax schedule and the reductions in rates— combined with social security contributions reforms, are estimated to have improved the redistributive capacity of the tax system more effectively than the counterfactual scenarios considered, thereby enhancing the system's progressivity and reducing inequality. The findings of the analysis (Table 10) show that the tax policies embedded in the 2023 Baseline Scenario lead to a greater reduction in the Gini index (based on taxable income) compared to all tax parameter indexation scenarios. At the same time, the Kakwani index is comparatively higher in the Baseline Scenario, pointing to the enhanced progressivity of the PIT against alternatives.[37] Increased progressivity translates into a fairer distribution of the tax burden, as the burden rises proportionally more for higher incomes, thereby enhancing the redistributive function of the tax system and contributing substantially to post-tax inequality reduction.

6 CONCLUSIONS

Fiscal drag is a critical issue for the fairness and sustainability of tax policy, as it leads to an increase in the tax burden without a corresponding improvement in taxpayers' ability to pay. As such, fiscal drag has significant implications for the equitable distribution of the tax burden – especially when incomes rise in nominal terms due to inflation, without a matching increase in purchasing power.[38]

The theoretical analysis shows that in 2019 the Greek PIT system embedded a strong degree of built-in progressivity, generating a notable potential for fiscal drag when tax parameters remain unchanged. The estimated tax-to-base elasticity —around 1.8— is broadly in line with the euro area range and implies that PIT revenues rise more than proportionally when nominal incomes increase. The decomposition of this elasticity reveals that the erosion of tax credits accounts for the overwhelming share of fiscal drag, while bracket progressivity plays a secondary role. The analysis also highlights substantial variation across income sources, with self-employment and labour income exhibiting the highest elasticities, while pensions and benefits are far less affected. The distributional analysis further reveals that elasticities are systematically higher among middle-income groups, indicating that bracket creep would disproportionately raise the tax burden for these taxpayers in the absence of policy action. Consistent with these patterns,

37 Note that the relevant index for 2019 was 0.274 (see Table 8).
38 Due to the widespread under-reporting of income in Greece, the observed income distribution is subject to significant uncertainty, hampering the design and evaluation of effective policy responses.

a uniform rise in incomes reduces the progressivity of the PIT system but leads to a slight decline in inequality, largely because many low-income individuals continue to have zero tax liabilities even after income increases. Overall, the 2019 Greek PIT system —given its progressive structure and the distribution of the tax base— was structurally susceptible to fiscal drag in the absence of indexation or policy intervention.

The empirical counterfactual analysis shows that the policy reforms implemented in Greece during the 2019-23 period managed to fully compensate for the effects of fiscal drag, lowering the average effective tax rate while maintaining revenue stability and reducing income inequality, outperforming alternative counterfactual scenarios (involving an indexation of tax parameters). Policy measures —such as the restructuring of the tax schedule, including lower marginal rates at the bottom, the introduction of a new low-rate bracket and the substantial reforms in social security contributions— played a decisive role in offsetting a large part of the potential revenue gains implied by the structure of the PIT system. The experience of 2019-23 demonstrates that the actual impact of fiscal drag depends crucially on policy choices: discretionary reforms —rather than indexation— were responsible for offsetting most of the revenue gains that could be realised as a result of the structure of the 2019 PIT system, thereby reducing the average tax burden.

Overall, fiscal drag can have significant effects on tax revenue collection, average tax rates and income distribution, with crucial implications for inequality and optimal tax design. Given the limited fiscal space, policymakers are called upon to strike the right balance between the need to ease the tax burden on taxpayers and the goal of safeguarding tax revenues. Quantifying fiscal drag and incorporating it into the formulation of medium-term fiscal strategies can enhance the accuracy of revenue forecasts and support the design of better-targeted policy interventions. At the same time, the mechanisms through which fiscal drag operates across the income distribution require the adoption of tailored policy responses. This insight is key to determining whether indexation of tax parameters should be pursued or not. Recent experience in Greece shows that enhancing the progressivity of tax policy can offset fiscal drag, while also contributing to a fairer distribution of the tax burden and improved tax compliance.

REFERENCES

Auerbach, A.J. and D.R. Feenberg (2000), "The significance of federal taxes as automatic stabilizers", *Journal of Economic Perspectives*, 14(3), 37-56.

Balasundharam, V., A. Kayastha and M. Poplawski-Ribeiro (2023), "Inflation indexation in public finances: a global dataset on current practices", IMF, Working Paper No. WP/23/264.

Balladares, S. and E. García-Miralles (2025), "Fiscal drag with microsimulation: evidence from Spanish tax records", Institut d'Economia de Barcelona (IEB), Working Paper No. 2025/08.

Belinga, V., D. Benedek, R. de Mooij and J. Norregaard (2014), "Tax buoyancy in OECD countries", IMF, Working Paper No. WP/14/110.

Boschi, M. and S. d'Addona (2019), "The stability of tax elasticities over the business cycle in European countries", *Fiscal Studies*, 40(2), 175-210, June.

Creedy, J. and N. Gemmell (2004), "The income elasticity of tax revenue: estimates for income and consumption taxes in the United Kingdom", *Fiscal Studies*, 25(1), 55-77, March.

Dolls, M., C. Fuest and A. Peichl (2012), "Automatic stabilizers and economic crisis: US vs. Europe", *Journal of Public Economics*, 96(3-4), 279-294, April.

García-Miralles, E., M. Freier, S. Riscado et al. (2025), "Fiscal drag in theory and in practice: a European perspective", ECB, Working Paper No. 3136.

Hack, L. (2025), "Progressive income taxation and inflation: the macroeconomic effects of bracket creep", SSRN, http://dx.doi.org/10.2139/ssrn.5268667.

Harding, A. (ed.) (1996), *Microsimulation and public policy*, Contributions to Economic Analysis Vol. 232, North Holland, Amsterdam.

Heer, B. and B. Süssmuth (2013), "Tax bracket creep and its effects on income distribution", *Journal of Macroeconomics*, 38(B), 393-408, December.

Immervoll, H. (2005), "Falling up the stairs: the effects of 'bracket creep' on household incomes", *Review of Income and Wealth*, 51(1), 37-62, March.

Immervoll, H. (2006), "Fiscal drag – an automatic stabiliser?", in Bargain, O. (ed.), *Micro-Simulation in action: policy analysis in Europe using EUROMOD*, Research in Labor Economics Vol. 25, Emerald Group Publishing Limited, Leeds, 141-163.

Kakwani, N.C. (1977), "Measurement of tax progressivity: an international comparison", *The Economic Journal*, 87(345), 71-80, March.

Leventi, C., A. Mazzon and F. Orlandi (2024), "Indexing wages to inflation in the EU: fiscal drag and benefit erosion effects", European Commission, JRC Working Paper on Taxation and Structural Reforms No. 8/2024.

Moriana-Armendariz, X. (2023), "The hidden effects of inflation - An examination of bracket creep and its implications for the income tax: evidence for Spain (1979-1987)", Master's thesis, Lund University, School of Economics and Management, Lund.

National Research Council (1991), "Improving information for social policy decisions - - the uses of microsimulation modeling: vol. I, review and recommendations", The National Academies Press, Washington, D.C.

OECD (2023), "Special feature: indexation of labour taxation and benefits in OECD countries", in *Taxing wages 2023: indexation of labour taxation and benefits in OECD countries*, OECD Publishing, Paris, 41-59.

Paulus, A., H. Sutherland and I. Tasseva (2020), "Indexing out of poverty? Fiscal drag and benefit erosion in cross-national perspective", *Review of Income and Wealth*, 66(2), 311-333, June.

Paulus, A. and I.V. Tasseva (2020), "Europe through the crisis: discretionary policy changes and automatic stabilizers", *Oxford Bulletin of Economics and Statistics*, 82(4), 864-888, August.

Price, R., T.T. Dang and J. Botev (2015), "Adjusting fiscal balances for the business cycle: new tax and expenditure elasticity estimates for OECD countries", OECD Economics Department Working Paper No. 1275.

Saez, E. (2003), "The effect of marginal tax rates on income: a panel study of 'bracket creep' ", *Journal of Public Economics*, 87(5-6), 1231-1258, May.
Sutherland, H. and F. Figari (2013), "EUROMOD: the European Union tax-benefit microsimulation model", *International Journal of Microsimulation*, 6(1), 4-26.
Sutherland, H., R. Hancock, J. Hills and F. Zantomio (2008), "Keeping up or falling behind? The impact of benefit and tax uprating on incomes and poverty", *Fiscal Studies*, 29(4), 467-498, December.
Waters, T. and T. Wernham (2022), "Reforms, roll-outs and freezes in the tax and benefit system", Institute for Fiscal Studies, R218 IFS Green Budget 2022 – Chapter 5.

APPENDIX

Table A1 Income uprating 2019-23

(1)+(2)-(3)-(4)	Disposable income	Uprating per year	Cumulative change 2019-23
1	*Original income*		
+	Earnings		
	Employment: civil servants	Wages and salaries per employee national accounts data	0%
	Employment: public enterprises	Wages and salaries per employee national accounts data	11.40%
	Employment: private sector	Wages and salaries per employee national accounts data	11.40%
	Self-employment	Wages and salaries per person employed and gross value added by sector national accounts data	14.70%
+	Income of children under 16	Wages and salaries per employee national accounts data	11.40%
+	Income from rent	0.75 * CPI	4.80%
+	Private pension	CPI	14.20%
+	Investment income	Based on housing costs	15.90%
+	Private transfers received	Wages and salaries per employee national accounts data	11.40%
-	Alimony payments	GDP deflator	13.50%
-	Other maintenance payments	GDP deflator	13.50%
2	*Benefits*		
2a	*Pensions*	Frozen up to 2022 uprated by the average of inflation and real income growth thereafter	7.80%
2b	*Means-tested benefits*		
+	Heating allowance	As announced by the government	198%
+	Minor social assistance benefits	Frozen	0%
+	Housing benefits	Based on Social Housing Organisation (OEK) subsidy rates	0%
+	Child benefit, long-term unemployment benefit, birth grant, lump-sum benefit for low-paid pensioners, guaranteed minimum income, housing allowance	Simulated	n/a
2c	*Non-means-tested benefits*		
+	Non-contributory disability benefits	Based on the severe disability benefit frozen until 2022, 8% increase in 2023	8%
+	Education allowances for students	Based on the scholarships provided by the State Scholarships Foundation (IKY)	0%
+	Minor family benefits	Frozen	0%
+	Sickness benefits	Wages and salaries per employee national accounts data	11.40%
+	Minor unemployment benefits	On the basis of unemployment assistance to the long-term unemployed	0%
+	Maternity benefits	Wages and salaries per employee national accounts data	11.40%
+	Unemployment insurance benefit, maternity benefit, parental benefit, lump sum support to vulnerable population groups	Simulated	n/a
3	*Taxes*	Simulated	n/a
4	*Social security contributions*	Simulated	n/a

Source: EUROMOD.

Table A2.1 Share of tax base by income source – Distributional analysis (2019)

Decile of tax base	Labour income	Pension and benefits	Self-employment income	Capital income
1	35.7	23.8	36.8	3.6
2	37.5	39.0	22.3	1.2
3	35.8	45.2	17.4	1.6
4	36.2	47.0	15.5	1.3
5	42.3	41.0	14.3	2.4
6	44.5	39.8	13.8	2.0
7	50.9	31.5	15.0	2.6
8	49.2	34.4	13.9	2.5
9	51.3	31.4	13.7	3.6
10	43.3	21.9	27.4	7.4
Total	***45.0***	***32.5***	***18.7***	***3.8***

Sources: EUROMOD and Bank of Greece calculations.

Table A2.2 Share of tax base by income source – Distributional analysis (2023)

Decile of tax base	Labour income	Pension and benefits	Self-employment income	Capital income
1	33.2	27.9	35.4	3.5
2	34.6	42.2	21.5	1.6
3	33.4	48.3	17.2	1.1
4	38.8	45.6	14.2	1.4
5	42.1	39.0	16.6	2.4
6	45.4	39.1	13.5	2.0
7	51.2	30.4	15.9	2.5
8	50.6	33.3	13.5	2.6
9	51.8	30.0	14.7	3.5
10	43.6	20.3	29.2	7.0
Total	***45.3***	***31.6***	***19.4***	***3.7***

Sources: EUROMOD and Bank of Greece calculations.

Table A3 Distribution of tax base and PIT liabilities across income deciles

Income decile	Share of total tax base		Share of total tax liability		Share with zero tax liability	
	2019	2023	2019	2023	2019	2023
1	1.2	1.3	0.4	0.2	87.6	88.2
2	3.8	3.9	1.0	0.6	76.0	73.8
3	5.2	5.3	1.7	1.2	58.7	53.4
4	6.5	6.4	2.4	1.8	54.4	51.2
5	7.6	7.5	3.5	3.1	33.5	19.6
6	8.9	8.9	5.1	4.5	11.8	7.9
7	10.4	10.5	7.1	6.4	2.7	1.0
8	12.7	12.7	10.2	9.5	0.0	0.1
9	15.6	15.5	15.0	14.5	0.0	0.0
10	27.9	28.1	53.6	58.2	0.0	0.0
Total	-	-	-	-	*32.3*	*29.7*

Sources: EUROMOD and Bank of Greece calculations.

Table A4 Composition of tax-to-base (TTB) elasticity by income decile (2019)

Income decile	Proportional effect	Tax deduction/ credit	Bracket progressivity	Total TTB
1	1.00	0.19	0.00	1.19
2	1.00	1.00	0.00	2.00
3	1.00	1.56	0.00	2.56
4	1.00	1.34	0.00	2.34
5	1.00	1.53	0.01	2.55
6	1.00	1.60	0.04	2.64
7	1.00	1.23	0.06	2.29
8	1.00	1.09	0.05	2.14
9	1.00	0.86	0.10	1.96
10	1.00	0.21	0.24	1.45
Total	*1.00*	*0.65*	*0.16*	*1.80*

Sources: EUROMOD and Bank of Greece calculations.

Table A5 Composition of theoretical fiscal drag by income decile (2019)

(%)

Decile	Tax deduction/ credit	Bracket progressivity
1	100.0	0.0
2	100.0	0.0
3	100.0	0.0
4	100.0	0.0
5	99.2	0.8
6	97.5	2.5
7	95.2	4.8
8	95.9	4.1
9	89.5	10.5
10	46.2	53.8
Total	***80.3***	***19.7***

Sources: EUROMOD and Bank of Greece calculations.

Table A6 TTB elasticities by income source

	2019	2023
Labour income	1.93	2.17
Benefits and pensions	1.16	1.04
Self-employment income	2.54	3.07
Capital income	2.15	2.21

Sources: EUROMOD and Bank of Greece calculations.

Table A7 PIT revenues (as % of GDP) – Simulation scenarios

Year	Baseline Scenario (tax schedule reform, tax rate reduction, SSC reduction)	Scenario 1 [Y: 2023, No indexation, L: 2019]	Scenario 2 [Y: 2023, indexation: HICP_t-1, L: 2019]	Scenario 3 [Y: 2023, indexation: HICP_t, L: 2019]	Scenario 4 [Y: 2023, indexation: % Δ (tax base 2019-23), L: 2019]	Avg. Indexation Scenarios (2, 3, 4)
2019	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%
2020	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
2021	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
2022	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
2023	5.9%	6.6%	6.0%	5.8%	6.1%	6.1%

Sources: EUROMOD and Bank of Greece calculations.
Note: Y: income, L: tax legislation, SSC: social security contributions.

Table A8 Average effective tax rate – Simulation scenarios

(%)

Year	Baseline Scenario (tax schedule reform, tax rate reduction, SSC reduction)	Scenario 1 [Y: 2023, No indexation, L: 2019]	Scenario 2 [Y: 2023, indexation: HICP_t-1, L: 2019]	Scenario 3 [Y: 2023, indexation: HICP_t, L: 2019]	Scenario 4 [Y: 2023, indexation: % Δ (tax base 2019-23), L: 2019]	Avg. Indexation Scenarios (2, 3, 4)
2019	8.8	8.8	8.8	8.8	8.8	8.8
2020	7.9	7.9	7.9	7.9	7.9	7.9
2021	8.1	8.1	8.1	8.1	8.1	8.1
2022	8.2	8.2	8.2	8.2	8.2	8.2
2023	8.7	9.6	8.8	8.5	8.9	8.9

Sources: EUROMOD and Bank of Greece calculations.
Note: Y: income, L: tax legislation, SSC: social security contributions.

Table A9 Average effective tax rate by income decile – Simulation scenarios

(%)

Decile	2019	2023-Baseline Scenario (tax schedule reform, tax rate reduction, SSC reduction)	2023-Scenario 1 [Y: 2023, No indexation, L: 2019]	2023-Scenario 2 [Y:2023, indexation: HICP_t-1, L: 2019]	2023-Scenario 3 [Y:2023, indexation: HICP_t, L: 2019]	2023-Scenario 4 [Y:2023, indexation: % Δ (tax base 2019-23), L: 2019]
1	2.8	1.4	2.9	2.9	2.8	2.9
2	2.3	1.3	2.7	2.4	2.3	2.4
3	2.9	2.1	3.4	2.9	2.8	3.0
4	3.3	2.6	3.8	3.3	3.1	3.4
5	4.0	3.4	4.6	3.9	3.7	4.0
6	5.1	4.4	5.8	5.0	4.7	5.1
7	6.0	5.4	6.7	5.8	5.5	6.0
8	7.1	6.5	7.8	6.9	6.6	7.0
9	8.4	8.1	9.1	8.3	7.9	8.4
10	16.9	17.9	17.9	17.1	16.8	17.2
Total	***8.8***	***8.7***	***9.6***	***8.8***	***8.5***	***8.9***

Sources: EUROMOD and Bank of Greece calculations.
Note: Y: income, L: tax legislation, SSC: social security contributions.