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BANK OF GREECE
EUROSYSTEM

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WORK (DIS)INCENTIVES FOR SOCIAL BENEFIT RECIPIENTS IN GREECE

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ABSTRACT

This paper investigates to what extent the strengthening of Greece's social safety net since the recent sovereign debt crisis has weakened work incentives for benefit recipients. Using the tax-benefit microsimulation model EUROMOD and its Hypothetical Household Tool (HHoT), we estimate participation tax rates (PTRs) and marginal effective tax rates (METRs) in 2024 for several stylised household types, accounting for the interaction between income taxes, social insurance contributions and means-tested benefits. Our results suggest that PTRs can reach near-prohibitive levels, particularly when transition into employment is associated with the withdrawal of the unemployment benefit. METRs are similarly distorted, exhibiting sharp kinks where means-tested benefits are abruptly withdrawn rather than gradually tapered. The paper concludes with some policy recommendations to improve work incentives, while preserving the anti-poverty gains achieved over the past decade.

Keywords: work incentives; social benefits; tax-benefit microsimulation; participation tax rates; marginal effective tax rates

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ΚΙΝΗΤΡΑ ΚΑΙ ΑΝΤΙΚΙΝΗΤΡΑ ΕΡΓΑΣΙΑΣ ΤΩΝ ΔΙΚΑΙΟΥΧΩΝ ΚΟΙΝΩΝΙΚΩΝ ΠΑΡΟΧΩΝ ΣΤΗΝ ΕΛΛΑΔΑ

Μαρία Φλεβοτόμου

Τράπεζα της Ελλάδος, Διεύθυνση Οικονομικής Ανάλυσης και Μελετών

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ΠΕΡΙΛΗΨΗ

Η παρούσα μελέτη εξετάζει κατά πόσον η ενίσχυση του συστήματος κοινωνικής προστασίας στην Ελλάδα μετά την οικονομική κρίση της προηγούμενης δεκαετίας έχει επηρεάσει αρνητικά τα κίνητρα εργασίας των δικαιούχων κοινωνικών παροχών. Με τη χρήση του υποδείγματος φόρων-παροχών EUROMOD και του συμπληρωματικού του εργαλείου για την ανάλυση υποθετικών νοικοκυριών (Hypothetical Household Tool – HHoT), εκτιμώνται για το 2024 οι συντελεστές φορολόγησης της συμμετοχής στην αγορά εργασίας (Participation Tax Rates) και οι πραγματικοί οριακοί φορολογικοί συντελεστές (Marginal Effective Tax Rates) ανά επίπεδο εισοδήματος για διάφορους αντιπροσωπευτικούς τύπους νοικοκυριών, λαμβάνοντας υπόψη την αλληλεπίδραση μεταξύ φόρου εισοδήματος, ασφαλιστικών εισφορών και κοινωνικών παροχών.

Τα αποτελέσματα δείχνουν ότι οι συντελεστές φορολόγησης που προκύπτουν από τη μετάβαση δικαιούχων κοινωνικών παροχών στην εργασία μπορεί να διαμορφωθούν σε ιδιαίτερα υψηλά επίπεδα, ιδίως όταν η ένταξη στην απασχόληση συνεπάγεται απώλεια του επιδόματος ανεργίας. Παρόμοιες στρεβλώσεις εμφανίζουν και οι πραγματικοί οριακοί φορολογικοί συντελεστές, οι οποίοι αυξάνονται απότομα στα επίπεδα εισοδήματος όπου οι κοινωνικές παροχές που χορηγούνται με εισοδηματικά κριτήρια διακόπτονται απότομα, αντί να περιορίζονται σταδιακά. Η μελέτη καταλήγει σε προτάσεις πολιτικής που αποσκοπούν στη βελτίωση των κινήτρων εργασίας, διατηρώντας ταυτόχρονα τα οφέλη από την αποτελεσματικότερη πολιτική κατά της φτώχειας, όπως έχει διαμορφωθεί κατά την τελευταία δεκαετία.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Κατά την τελευταία δεκαπενταετία το κοινωνικό κράτος στην Ελλάδα ενισχύθηκε σημαντικά. Μια σειρά μεταρρυθμίσεων ενίσχυσε το δίκτυ κοινωνικής προστασίας μέσω της θέσπισης νέων παροχών που χορηγούνται με εισοδηματικά κριτήρια, όπως το ελάχιστο εγγυημένο εισόδημα, το επίδομα στέγασης, το αναμορφωμένο επίδομα παιδιού και η οικονομική ενίσχυση (voucher) για βρεφονηπιακή φροντίδα. Παράλληλα, κατά την περίοδο της πανδημίας και της ενεργειακής κρίσης εφαρμόστηκαν πρόσθετα μέτρα στήριξης του εισοδήματος των νοικοκυριών.

Οι παρεμβάσεις αυτές συνέβαλαν ουσιαστικά στη μείωση του κινδύνου φτώχειας και την ενίσχυση της κοινωνικής συνοχής. Ωστόσο, όσο πιο γενναιόδωρο και στοχευμένο γίνεται ένα σύστημα παροχών, τόσο αυξάνεται ο κίνδυνος να περιοριστούν τα οικονομικά κίνητρα για ένταξη στην απασχόληση ή αύξηση των ωρών εργασίας. Το ζήτημα αυτό αποκτά ιδιαίτερη σημασία σε μια περίοδο κατά την οποία η ανεργία στην Ελλάδα έχει υποχωρήσει σημαντικά, ενώ ταυτόχρονα πολλές επιχειρήσεις αναφέρουν δυσκολίες στην κάλυψη διαθέσιμων θέσεων εργασίας.

Η παρούσα μελέτη εξετάζει κατά πόσον η ενίσχυση του συστήματος κοινωνικής προστασίας στην Ελλάδα έχει δημιουργήσει αντικίνητρα εργασίας για τους δικαιούχους κοινωνικών παροχών. Η βασική ιδέα είναι απλή: όταν ένα άτομο που λαμβάνει επιδόματα αποφασίζει να εργαστεί ή να αυξήσει τις ώρες εργασίας του, μέρος ή και το σύνολο των πρόσθετων αποδοχών του αντισταθμίζεται από την απώλεια κοινωνικών παροχών, την καταβολή φόρων και την πληρωμή ασφαλιστικών εισφορών. Στην περίπτωση αυτή, το καθαρό οικονομικό όφελος από την εργασία ενδέχεται να είναι περιορισμένο.

Τα ευρήματα της ανάλυσης υποδηλώνουν ότι σε ορισμένες περιπτώσεις τα αντικίνητρα για εργασία είναι ιδιαίτερα ισχυρά. Ειδικότερα, όταν η είσοδος στην απασχόληση συνεπάγεται ταυτόχρονα απώλεια του επιδόματος ανεργίας και μείωση ή ολική διακοπή άλλων κοινωνικών παροχών, το μεγαλύτερο μέρος του πρόσθετου εισοδήματος που προκύπτει από την εργασία ουσιαστικά εξανεμίζεται.

Αντίστοιχα εμπόδια εμφανίζονται και για άτομα που ήδη εργάζονται και εξετάζουν το ενδεχόμενο να αυξήσουν τις ώρες εργασίας τους ή να αποδεχθούν μια καλύτερα αμειβόμενη θέση. Σε αρκετές περιπτώσεις, μια σχετικά μικρή αύξηση του εισοδήματος μπορεί να οδηγήσει σε δυσανάλογη απώλεια κοινωνικών παροχών. Ως αποτέλεσμα, το καθαρό όφελος από την επιπλέον προσπάθεια ή την επαγγελματική ανέλιξη μειώνεται σημαντικά.

Αξίζει να σημειωθεί ότι τα σημαντικότερα αντικίνητρα δεν προκύπτουν τόσο από το ύψος των παροχών όσο από τον σχεδιασμό τους. Ορισμένες παροχές χορηγούνται στο ακέραιο έως ένα συγκεκριμένο εισοδηματικό όριο, έπειτα από το οποίο διακόπτονται εντελώς. Η απότομη απώλεια μιας παροχής μπορεί να επιφέρει σημαντική μείωση του διαθέσιμου εισοδήματος ενός νοικοκυριού, δημιουργώντας έντονα αντικίνητρα για αύξηση των ωρών εργασίας ή των αποδοχών. Αντίθετα, όταν οι παροχές μειώνονται σταδιακά καθώς αυξάνεται το εισόδημα, οι στρεβλώσεις αυτές είναι συνήθως ηπιότερες.

Τα αποτελέσματα της μελέτης δεν πρέπει να ερμηνευθούν ως επιχείρημα υπέρ της συρρίκνωσης της κοινωνικής προστασίας. Αντιθέτως, αναδεικνύουν μια θεμελιώδη πρόκληση της σύγχρονης κοινωνικής πολιτικής: η καταπολέμηση της φτώχειας, η διατήρηση ισχυρών κινήτρων για εργασία και ο περιορισμός του δημοσιονομικού κόστους αποτελούν στόχους που συχνά είναι αντικρουόμενοι.

Στην περίπτωση της Ελλάδος, η ενίσχυση του κοινωνικού κράτους μετά την κρίση βελτίωσε αισθητά την προστασία των οικονομικά ασθενέστερων νοικοκυριών. Παράλληλα, όμως, δημιούργησε συνθήκες υπό τις οποίες η μετάβαση από την ανεργία ή την αδράνεια στην απασχόληση δεν συνεπάγεται πάντοτε επαρκές οικονομικό όφελος. Το γεγονός αυτό αποκτά ιδιαίτερη σημασία σε μια οικονομία που εξακολουθεί να χαρακτηρίζεται από σχετικά χαμηλές αμοιβές σε αρκετούς κλάδους και από σημαντική παρουσία άτυπων μορφών απασχόλησης.

Η διεθνής εμπειρία υποδεικνύει ότι τα προβλήματα αυτά μπορούν να μετριαστούν μέσω κατάλληλου σχεδιασμού των παροχών. Ενδεικτικά, μια πρώτη κατεύθυνση πολιτικής είναι η σταδιακή και όχι απότομη μείωση των παροχών καθώς αυξάνεται το εισόδημα. Με τον τρόπο αυτό αποφεύγονται μεγάλες απώλειες διαθέσιμου εισοδήματος όταν ένα νοικοκυριό υπερβαίνει ελάχιστα ένα εισοδηματικό όριο. Μια δεύτερη κατεύθυνση αφορά τον καλύτερο συντονισμό των επιμέρους παροχών, ώστε τα εισοδηματικά κριτήρια να λειτουργούν με συνεκτικό τρόπο και να μην παράγουν ακούσιες αλληλεπιδράσεις. Τέλος, σε ορισμένες περιπτώσεις θα μπορούσε να εξεταστεί η διεύρυνση της πρόσβασης σε συγκεκριμένες υπηρεσίες κοινωνικού χαρακτήρα, όπως η βρεφονηπιακή φροντίδα, ανεξάρτητα από το επίπεδο εισοδήματος.

Συνολικά, η πρόκληση για τη δημόσια πολιτική είναι να διατηρηθούν τα σημαντικά κοινωνικά οφέλη που επιτεύχθηκαν κατά τα τελευταία έτη, περιορίζοντας παράλληλα τις στρεβλώσεις που αποθαρρύνουν την εργασία και την παραγωγική αξιοποίηση του ανθρώπινου δυναμικού.

WORK (DIS)INCENTIVES FOR SOCIAL BENEFIT RECIPIENTS IN GREECE*

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I INTRODUCTION

Unemployment in Greece, though well above the EU average (5.8% in 2025 in the 20-64 age group), has fallen steadily and significantly in recent years: from its peak during the country's debt crisis (27.6% in 2013) to 17.9% in 2019 and to 8.8% in 2025.¹ Meanwhile, labour shortages have emerged in manufacturing, tourism and agriculture. As a result, the job vacancy rate rose from 0.6% in 2019 to 2.2% in 2024, close to the EU average of 2.4%.² Although this rate subsequently fell to 1.7% in 2025, as labour shortages eased somewhat throughout Europe, Greek firms continued to report difficulties in hiring.³ Labour shortages coexisting with relatively high unemployment are usually attributed to skill mismatches, low pay (relative to workers' reservation wage), or – when pay is not particularly low – to a combination of poor working conditions and precarious seasonal employment, such as those prevailing in Greece's tourism industry.⁴

According to the academic literature, social transfer programmes can raise individuals' reservation wages, making work less attractive and potentially lowering labour supply (Mortensen 1977; Atkinson and Micklewright 1991; Blundell and MaCurdy 1999). In addition, anecdotal evidence and press reports suggest that social transfers may also play a role in discouraging benefit recipients from taking up jobs, tilting the scales from formal to informal work and from dependent employment to self-employment, genuine or bogus.⁵

More generally, the design of social transfers may contribute to what are known as poverty

and unemployment traps. In first-generation social assistance schemes (such as the Supplementary Benefit in the United Kingdom), work disincentives were often prohibitive. The combination of income taxes, national insurance contributions and loss of social transfers when recipients took up a low-paid job (often, the only one on offer), meant that their net income was no higher when in work than when on benefits.

The problem was compounded by the fact that the Supplementary Benefit was a “passport benefit”: claiming it made recipients eligible for other benefits too (such as housing allowances, free prescriptions for pharmaceuticals or free school meals for their children). By the same token, when recipients' earnings

* The authors would like to thank participants in the CRETE 2025 conference and the EUROMOD 2025 Annual Meeting for their insightful comments and constructive feedback. The results presented here are based on EUROMOD version J0.51. EUROMOD is maintained, developed and managed by the Joint Research Centre (JRC) of the European Commission in collaboration with Eurostat and national teams from the EU countries. We are indebted to the Institute for Social and Economic Research (ISER) and to the many people who have contributed to the development of the model. 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 Eurostat (2026a).

2 Eurostat (2026b).

3 ManpowerGroup (2025), *Έρευνα έλλειψης ταλέντων στην Ελλάδα 2025* (Talent Shortage in Greece Survey 2025), Kathimerini (2025), *Mismatch of jobs and skills in Greece*, To Vima (2025), *What young Greek employees want, and what employers (don't) offer*.

4 European Commission (2023), *Employment and Social Developments in Europe*, Brussels: European Commission; OECD (2024), *OECD Employment Outlook 2024*, Paris: OECD Publishing, To Vima (2024), *Greece ready to welcome tourists but businesses short of staff*.

5 Often referred to as false self-employment or dependent self-employment, this is commonly understood as involving persons/workers registered as self-employed whose conditions of employment are de facto dependent employment. National legislation and/or court decisions determine this status. This employment status is used to circumvent tax and/or social insurance liabilities, or employers' responsibilities. Source: OECD (2014), *Employment Outlook 2014*, Paris.



exceeded a certain level, the loss of the Supplementary Benefit had a cascade effect, as access to all these other benefits was also lost. In the early 1980s, at the point at which entitlement to free school meals was lost, an extra GBP 1 of earnings cost nearly GBP 3 in taxes, national contributions and lost benefits (Barr 1987). Clearly, recipients were better off on benefits than in employment. This phenomenon became widely known as the poverty trap: benefits enabled recipients to live just above the level of subsistence but prevented them from becoming self-reliant and escaping poverty altogether.

Before the sovereign debt crisis, in spite of high and rising total spending on social protection, income support for the poor and the unemployed in Greece was so limited that the poverty and unemployment traps afflicting more advanced systems of social protection could hardly have arisen. When Greece's sovereign debt crisis broke out in 2009, most poor families received little or no income support, while the country lacked a broad social assistance scheme of last resort (Matsaganis 2011; Matsaganis and Leventi 2014). But while the social protection system failed the poor and the unemployed, that very failure left intact the incentive of benefit recipients to seek work.

From the early 2010s, this pattern changed significantly, as a series of policy reforms strengthened the social safety net. New means-tested benefits were introduced: child benefit in 2013, guaranteed minimum income in 2017, housing benefit in 2019 and childcare voucher in 2022 (Laloti 2016; Matsaganis 2020; Flevotomou et al. 2026). In addition, the COVID-19 pandemic and the inflation shock associated with the war in Ukraine necessitated a significant number of income support measures designed to shield households' incomes and purchasing power. As a result, the anti-poverty performance of the country's welfare state improved considerably (Allen et al. 2025). As a corollary, concerns about work disincentives made their appearance for the first time ever.

This paper investigates whether the strengthening of the social safety net has inadvertently weakened the work incentives for benefit recipients and helped create poverty traps and unemployment traps. The paper's structure is as follows: After a brief introduction, Section 2 reviews the literature on the effects of social transfers on work (dis)incentives. Section 3 presents our data and methodology for establishing whether and to what extent social transfers affect work incentives in Greece. Section 4 discusses the results and Section 5 concludes with some reflections on the significance and policy relevance of this paper.

2 LITERATURE REVIEW

The relationship between social transfers and labour supply has generated a substantial body of theoretical and empirical research. The foundational concern is that if out-of-work benefits raise the reservation wage (i.e. the minimum wage at which a person is willing to accept a job), then they may reduce the incentive to seek or accept work (Mortensen 1977; Atkinson and Micklewright 1991; Blundell and MaCurdy 1999). The magnitude of this effect depends critically on the design of the benefit and tax systems, labour market conditions and the characteristics of the recipient population.

At a theoretical level, the standard model of labour supply predicts that means-tested benefits create work disincentives through two channels. The first is an income effect: higher out-of-work income raises the demand for leisure and lowers the incentive to seek employment (the extensive margin). The second is a substitution effect: as earned income rises and means-tested benefits are gradually withdrawn, the effective return to additional work falls, reducing the incentive to increase hours (the intensive margin). These disincentives are captured by the participation tax rate (PTR) and the marginal effective tax rate (METR) respectively, which jointly summarise the implicit tax on work as embedded in the

tax-benefit system (Immervoll 2004; Brewer et al. 2010; Bartels and Pestel 2016).

Empirical evidence from Europe and North America broadly confirms that high PTRs and METRs are associated with reduced labour market participation, particularly among secondary earners, lone parents and low-skilled workers (Eissa and Hoynes 2011; Bartels and Shupe 2023). The sensitivity of labour supply to financial incentives tends to be greater at the extensive margin, i.e. the decision of whether to work at all, than at the intensive margin and is consistently higher among women with young children. However, the magnitude of the difference between extensive and intensive margins varies across studies, countries and time periods (Chetty et al. 2011; Blundell et al. 2011).

A growing literature uses tax-benefit microsimulation models to calculate PTRs and METRs. Jara and Tumino (2013) provided a comparison of METRs across Europe, finding substantial cross-country variation driven by differences in tax schedules and benefit design. Jara et al. (2020) showed that unemployment insurance benefits influence substantially short-term participation tax rates. Also, the OECD regularly uses microsimulation techniques to calculate such indicators, enabling informative quantitative cross-country comparisons. According to their latest flagship report, “effective tax rates on labour income for a single worker earning the average wage rose across a majority of OECD countries for the fourth consecutive year in 2025” (OECD 2026).

The design features of benefit programmes matter greatly for the size of disincentive effects. Benefits paid in full up to a certain level of earnings, then fully withdrawn once earnings exceed that threshold, generate very high METRs at a certain income level, creating notches in the budget constraint that can act as barriers to an increase in labour supply (Kleven and Waseem 2013). Means-tested programmes relying on a small number of discrete rates (full/reduced) rather than a graduated taper also produce similar distortions.

But work disincentives may be strong even when programmes are better designed, with benefit amounts being set as a linear (negative) function of household income, such as:

$$B_i = G - \beta Y_i$$

where

B_i = the benefit amount of household i

Y_i = the income of household i

G = the income guarantee under the benefit programme considered

β = the taper rate, i.e. the rate at which the benefit amount is reduced as a recipient’s earned income increases.

If the taper rate is equal to one, recipients earning €1 more will have their benefit reduced by exactly €1 (METR = 100%), leaving total income unaffected and thereby reducing to zero the economic incentive to work. Even when the taper rate is below, but close to, one, taking into consideration the disutility of working, the opportunity cost and work-related expenses, a rational individual will choose not to work and live on social benefits. In general, the higher the taper rate, the weaker the incentive to work.

Earnings disregards, excluding part of the income earned from work when calculating the amount of benefit, were introduced precisely to address such disincentives. In several EU member states, minimum income programmes provide for an earnings disregard of typically 20% of income from labour, reducing the taper rate to 0.8 (METR = 80%), which is still a lot higher than the top marginal income tax rate (which in 2025 ranged from 10% in Bulgaria and Romania to 60.5% in Denmark).⁶

In-work benefit programmes, such as Earned Income Tax Credit in the US and Working

⁶ See <https://taxfoundation.org/data/all/eu/top-personal-income-tax-rates-europe/>.

Families' Tax Credit in the UK, introduced in 1975 and in 2003 respectively, aimed to boost work incentives by subsidising earnings over a low-income range, with generally positive employment effects noted among lone parents and secondary earners (Brewer et al. 2006; Meyer and Rosenbaum 2001). In 2013, Working Families' Tax Credit was merged with Job-seeker's Allowance, Housing Benefit and other social transfers into a Universal Credit, a policy reform specifically aimed to streamline income support and improve work incentives for benefit recipients (Pareliussen 2013). In fact, Universal Credit has a taper rate of 0.55 (METR = 55%), which is lower than most benefit programmes across Europe and beyond.

Research on the work incentive implications of the newly-bolstered social safety net in Greece is generally lacking. Existing contributions have focused primarily on the system's anti-poverty performance and the pros and cons of potential reforms (Allen et al. 2025). The interaction between the new means-tested benefits and the Greek personal income tax and social contribution system – and the disincentive effects that may emerge from these interactions – has received no systematic attention.

This paper contributes to filling this gap by providing estimates of PTRs and METRs for representative household types in Greece, decomposing estimated rates into different components (i.e. those caused by taxes, social contributions and social benefits) and drawing out the implications for policy design.

3 DATA AND METHODOLOGY

The analysis makes use of EUROMOD,⁷ the tax-benefit microsimulation model of the EU. The model uses survey data on gross incomes, labour market status and other characteristics of individuals and households, to which it applies the tax and benefit rules in place in order to simulate taxes, social insurance contributions and entitlements to cash benefits.

The components of the tax-benefit system that cannot be simulated (for example, those depending on prior contributions such as pensions) are read off the data.

EUROMOD has been validated both at micro and macro level and has been tested in numerous applications. Examples of such applications include several studies on the distributional impact of tax-benefit systems and on how policies have shaped income distributions over time, disentangling income changes due to policy reforms from changes due to the evolution of market incomes and changes in populations' underlying characteristics, analysing the impact of policy reforms on work incentives and measuring the impact of tax-benefit systems on dimensions other than income, such as health, quality of life, etc. For a comprehensive overview, see Sutherland and Figari (2013).

Over the years, several specialised tools and extensions have been added to broaden the model's capabilities. One of these is the EUROMOD Hypothetical Household Tool (EUROMOD-HHoT), used in this analysis. The tool allows users to generate hypothetical household datasets that can be processed by EUROMOD to simulate tax and benefit rules (Hufkens et al. 2019). These synthetic households are defined by a set of socio-economic attributes that users can tailor to the policy questions they are investigating.

By enabling the creation of custom data, EUROMOD-HHoT provides deeper insight into how policies affect households with particular characteristics, while giving users full control over the variables of interest. HHoT is fully integrated into the EUROMOD framework, ensuring that the simulated policy rules are identical to those applied in population-based microsimulations. This consistency allows for a seamless combination of representative distributional analysis with targeted hypothetical household analysis.

⁷ Version J0.51. For more information on the EUROMOD model, see <https://euromod-web.jrc.ec.europa.eu/>.

The hypothetical household approach has several advantages in the present context. It is independent of survey data, meaning that results are not affected by sampling error, income underreporting or survey data gaps. It provides a transparent and illustrative tool for examining the logic of the tax-benefit system, showing how disposable income responds to changes in labour market status or earnings for households with specific characteristics. Finally, it allows the computation of the full household budget constraint, i.e. the mapping from gross earnings to net disposable income across the earnings distribution, which is essential for identifying notches, spikes and flat segments in the effective marginal rate schedule.

PTRs operate at the extensive margin: they show the share of the additional household income lost as a result of extra income taxes and social contributions due, as well as means-tested social benefits being reduced or fully withdrawn, when a previously non-employed household member takes up a job.

Formally, the PTR facing individual i in household h is:

$$PTR_i = 1 - \frac{Y_h^w - Y_h^b}{E_i^w}$$

where:

E_i^w = gross earnings of individual i when in work

Y_h^w = household disposable income when individual i is in work

Y_h^b = household disposable income when individual i lives on benefits

To estimate PTRs for 2024, we used EURO-MOD-HHoT to create eight stylised households. All eight involved a couple (for simplicity: mother and father) with one child aged 2, living in rented accommodation, whose market income is exclusively labour income. We looked at changes in household disposable income when the mother moves from non-employment in period t_0 to taking up a full-

time job on the minimum wage in the next period t_1 .

Specifically:

- In households 1-4 (HH1-HH4), the mother received unemployment benefit in t_0 .
- In households 5-8 (HH5-HH8), the mother did not receive unemployment benefit in t_0 .
- In households 1 (HH1) and 5 (HH5), the father is not in work.
- In households 2 (HH2) and 6 (HH6), the father works part-time earning 50% of the (monthly) minimum wage.
- In households 3 (HH3) and 7 (HH7), the father works full-time earning 100% of the (monthly) minimum wage.
- In households 4 (HH4) and 8 (HH8), the father works full-time earning 150% of the (monthly) minimum wage.

This is shown in Table 1.

Table 1 Stylised household configurations in estimating PTRs

HH	Mother on unemployment benefit in t_0	Father earns
1	Yes	0 (not in work)
2	Yes	50% of minimum wage
3	Yes	100% of minimum wage
4	Yes	150% of minimum wage
5	No	0 (not in work)
6	No	50% of minimum wage
7	No	100% of minimum wage
8	No	150% of minimum wage

Notes: Households are couples (mother, father) with one child aged 2, living in rented accommodation, with no other market income except for labour income. The minimum wage in Greece in 2024 was €830 per month.

On the other hand, METRs operate at the intensive margin. They show the share of the additional labour earnings lost as a result of extra income taxes and social contributions due, as well as means-tested social benefits being reduced or fully withdrawn, when a household member works more or earns more.

Formally, the METR facing individual i in household h is:

$$METR_i = 1 - \frac{Y_h^1 - Y_h^0}{E_i^1 - E_i^0}$$

where:

E_i^1 = gross earnings of individual i in t_1 (when working more)

E_i^0 = gross earnings of individual i in t_0 (when working less)

Y_h^1 = household disposable income in t_1 (when individual i works more)

Y_h^0 = household disposable income in t_0 (when individual i works less)

To estimate METRs for 2024, we used the EUROMOD-HHoT to create four additional stylised households (households 9-12). We looked at how household disposable income changes as the mother's earnings increase (by increments of €100 per month). As above, all four scenarios involved a couple (for simplic-

Table 2 Stylised household configurations in estimating METRs

HH	Mother's earnings gradually increase	Father earns
9	from €0 to €4,200 per month	0 (not in work)
10	from €0 to €4,200 per month	50% of minimum wage
11	from €0 to €4,200 per month	100% of minimum wage
12	from €0 to €4,200 per month	150% of minimum wage

Notes: Households are couples (mother, father) with one child aged 2, living in rented accommodation, with no other market income except for labour income. The minimum wage in Greece in 2024 was €830 per month.

ity: mother and father) with one child aged 2, living in rented accommodation, whose only market income is labour income.

Specifically:

- In household 9 (HH9), the father is not in work.
- In household 10 (HH10), the father works part-time earning 50% of the (monthly) minimum wage.

Table 3 Main social benefits in Greece (2024)

Type of benefit	Monthly benefit rate		Annual income threshold
	1st and 2nd child	3rd+ child	
	Full rate: €70	Full rate: €140	Full rate: €6,000
Child benefit ¹	Reduced rate A: €42	Reduced rate A: €84	Reduced rate A: €10,000
	Reduced rate B: €28	Reduced rate B: €56	Reduced rate B: €15,000
	(per child)	(per child)	
Guaranteed minimum income ²	Income threshold minus assessed income (income disregard: 20% of earnings)		First adult: €2,592
	Max for a person living alone: €216		Each additional adult: €1,296
	Overall max per household: €972		Each child: €648
Housing benefit	First adult: €70		First adult: €7,000
	Each additional household member: €35		Each additional member: €3,500
	Overall max: €210		Overall: €21,000
Childcare voucher ³	Infants aged <2.5 years: €294		Up to 2 children: €27,000
	Toddlers aged 2.5-4 years: €237		Each additional child: €3,000
	(includes meals)		Overall: €36,000

Source: Organisation of Welfare Benefits and Social Solidarity (OPEKA).

1 Note that in 2024 an extra one and a half instalment was paid to eligible recipients in December.

2 Note that in 2024 an extra half instalment was paid to eligible recipients in December.

3 Note that the yearly voucher amount is €3,239; it is paid in 11 monthly installments.

- In household 11 (HH11), the father works full-time earning 100% of the (monthly) minimum wage.
- In household 12 (HH12), the father works full-time earning 150% of the (monthly) minimum wage.

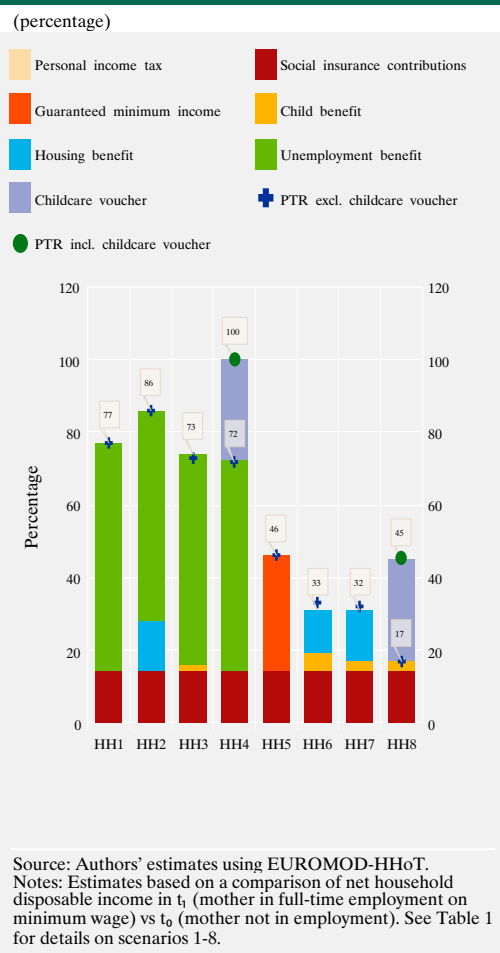
This is shown in Table 2.

In estimating PTRs and METRs, we look at the interactions between income taxes, social contributions and four social benefits: child benefit, guaranteed minimum income, housing benefit and childcare voucher. These were the most important means-tested benefits in operation in 2024. Their key characteristics are shown in Table 3.

4 RESULTS

Our estimates of participation tax rates for the eight stylised household configurations described in Table 1 are presented in Chart 1, which further breaks down PTRs into their main components. The results reveal that PTRs in Greece, as estimated based on the tax and benefit system in place in 2024, can be severely prohibitive. This is particularly the case in scenarios 1-4, under which the non-employed mother has to forego the unemployment benefit received in t_0 . In the first three scenarios, out of every €100 of gross earnings generated by the mother taking up a full-time job on the minimum wage, between €72 and €86 are effectively clawed back through extra social insurance contributions due and means-tested benefits being reduced or withdrawn. The most extreme case arises in scenario 4, where the father earns more than in the other scenarios. As a result of this, when the mother transitions to formal full-time employment on the minimum wage, the household loses not only the unemployment benefit, but also the childcare voucher, which results in a PTR of 99.6%. Clearly, at a participation tax rate as high as that, there is no financial incentive to take up formal work.

Chart 1 Estimated participation tax rates



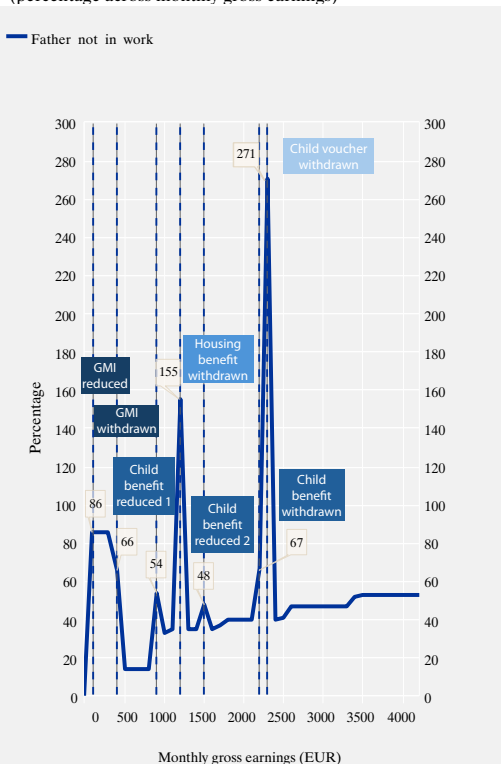
PTRs are considerably lower in scenarios 5-8, where the mother was not in receipt of unemployment benefit in t_0 .⁸ Still, PTRs remain significant, ranging from 32% to 46% across all four configurations.⁹ The level of the father's earnings plays a moderating role: the household's entitlement to guaranteed minimum income, housing benefit and child benefit is reduced as earnings increase across scenarios (in t_0), as a result of which PTRs are respectively less stark when the mother takes up a job (in t_1). This pattern is only reversed in scenario 8, where the father earns more and the addition of

⁸ In February 2026, the number of unemployed workers ([Unemployment by sex and age - monthly data, Eurostat](#)) exceeded the number of recipients of contributory unemployment benefit by about 77% ([Public Employment Service \(DYPA\) data](#)).

⁹ Note that the top marginal tax rate in 2024 for incomes in excess of €40,000 per year was 44%.

Chart 2 Estimated marginal effective tax rates under scenario 9

(percentage across monthly gross earnings)



Source: Authors' estimates using EUROMOD-HHoT.
Notes: Estimates based on changes in net household disposable income as mother's monthly gross earnings rise linearly from zero to €4,200 (i.e. approximately 5.1 times the minimum wage in 2024). See Table 2 for details on scenario 9.

the mother's earnings raises household income above the threshold of eligibility for childcare voucher, which is subsequently withdrawn.

Summing up, high PTRs result from several overlapping factors. First, the unemployment benefit (set at 55% of the daily minimum wage paid for 25 days), foregone when the mother takes up a formal job, is a significant consideration, particularly when the father is not in work or is on low pay. Second, entitlement to means-tested benefits is substantially reduced or fully terminated as earned income rises above the relevant thresholds. The interaction of benefit losses with social insurance contributions due produces PTRs that drastically reduce the financial reward from formal employment on the min-

imum wage (which is typically the entry wage for many workers). This points to a policy design which justifiably ensures a (low) income floor for households at the bottom of the distribution but erects obstacles to the aspiration to rise above that floor through their own effort.

Our estimate of marginal effective tax rates (METR) for scenario 9, the stylised household configuration where the father does not work, is described in Chart 2. This suggests how the household's net disposable income increases as the mother's monthly gross earnings rise linearly from zero to €4,200, approximately equal to 5.1 times the minimum wage in 2024.

Clearly, the METR schedule is markedly non-linear, exhibiting both extended flat segments and sharp kinks at specific points. At very low levels of earnings, METRs are mostly driven by the gradual withdrawal of guaranteed minimum income (GMI). Specifically, programme rules provide for a 20% earnings disregard (in other words, €0.20 out of each additional €1 earned are not taken into account, so that the guaranteed minimum income benefit is only reduced by €0.80). Combined with social insurance contributions, paid from the first €1 of earnings, and the extra half GMI instalment at the end of the year, which behaves like a "passport benefit", this results in a METR of 86%.¹⁰

The earliest spike occurs at the income range where the amount of the guaranteed minimum income benefit the household is eligible for begins to decrease; the second one arises when the GMI amount falls below €10 per month (the lowest amount payable), at which point the benefit is fully withdrawn. The next one occurs where the child benefit becomes payable at reduced rate A. Meanwhile, above a household taxable income of €10,000 per year, personal income tax is also due, which raises the METR to 33% and then to 35%. Further up, as soon as the household's taxable income crosses the €14,000 line, the entire housing benefit

¹⁰ Note that incorporating the extra half GMI instalment to the basic GMI amount would lead to a reduction in METR by 3 percentage points, from 86% to 83%.

(worth €1,680 per year) is suddenly withdrawn, resulting in a really sharp kink. More spikes can be found higher up, where the child benefit becomes payable at reduced rate B, before it is fully withdrawn. But the sharpest kink of all is located where the household's taxable earnings exceed €27,000, at which point households lose eligibility for the childcare voucher (worth €3,239 per year). Thereafter, as eligibility for all means-tested benefits is exhausted, METRs are driven by taxes and social contributions alone, gradually rising from 40% to 53% (corresponding to annual taxable income in excess of €40,000).

A very similar pattern can be seen in scenarios 10-12 (working father), as shown in the Appendix. In these scenarios, the father's earnings merely shift the METR schedule to the left, as the mother's contribution causes the household to lose eligibility for this or that benefit at an earlier point. In scenario 12 (father earns 150% of the minimum wage), the household is not entitled to either guaranteed minimum income or housing benefit, even when the mother has zero earnings, so spikes in METRs are caused by the interaction of social contributions and income tax with child benefit and, especially, childcare voucher.

Clearly, the worst kinks are associated with social transfers that are either paid at the full rate or not at all – in the case of Greece in 2024: housing benefit and childcare voucher. The design of these benefits not only erects financial barriers at the extensive margin (affecting the decision of whether to work or not), shown up as high PTRs, but also creates strong disincentives at the intensive margin (affecting the decision of whether or not to work more hours and/or for a higher hourly wage), shown up as high METRs, for mothers already in employment.¹¹

5 CONCLUSIONS AND POLICY IMPLICATIONS

In a certain sense, all anti-poverty policies face a trilemma between lifting the greatest number

of families out of poverty, preserving work incentives for benefit recipients and limiting fiscal costs (which can also be seen as preserving work incentives for taxpayers). Policy makers may meet at most two of these policy objectives, but not all three at the same time.

For instance, very low or non-existent social benefits cost taxpayers little and score high on work incentives for benefit recipients, but of course fail dramatically in terms of poverty relief. At the other extreme, generous social transfers available for all eliminate poverty and avoid inactivity traps but require a high level of fiscal spending. The middle way, chosen by many governments in Europe and beyond, to opt for relatively adequate benefits that are, however, tightly targeted, performs well in terms of poverty relief and keeps fiscal costs reasonably low but introduces strong work disincentives for recipients. In Greece, the strengthening of the social safety net since the crisis, a period when important means-tested benefits were introduced, significantly improved the anti-poverty performance of the welfare state and at the same time worsened work disincentives or introduced some where previously none existed.

As pointed out, work disincentives are part and parcel of anti-poverty policy: policy makers can make work disincentives disappear by eliminating all income support to the non-working poor. If, on the other hand, governments decide to offer the non-working poor some income guarantee that enables them to live on benefits, recipients may well choose to continue to do just that.

It is important to understand that the reluctance of benefit recipients to take up jobs is not the result of some moral failing on their part:

¹¹ PTRs and METRs are structural indicators that summarise the financial incentives embedded in the tax-benefit system; they do not, in themselves, constitute evidence of actual behavioural responses. However, as seen in Section 2, empirical evidence from Europe and North America broadly confirms that high PTRs and METRs are associated with reduced labour market participation for specific population groups.

the combined effect of income taxes, social contributions and reductions or withdrawals of social benefit is that work may often not pay (at least not in the relevant range of low-paid work usually on offer). In view of that, the decision of benefit recipients not to work is perfectly rational: it results from utility maximisation under constraints (Blundell and MaCurdy 1999; Brewer et al. 2010).

The resulting poverty or inactivity trap is not a Greek exception: as mentioned earlier, work disincentives used to be very high even in the countries which pioneered comprehensive social assistance (e.g. the UK). The combination of income taxes, national insurance contributions and loss of social benefits while on low earnings meant that recipients' net income was often no higher when in work than when living off benefits. Even now, for a non-negligible minority of workers in a number of countries, METRs can be close to 100% or higher (Jara et al. 2020).

But are poverty and inactivity traps the real risk in Greece? Arguably, punitively high PTRs and METRs are more likely to result in some workers taking up jobs in the informal sector, while continuing to claim benefits rather than not working at all (Dellas et al. 2024). Viewed from this perspective, the disincentive to take up a formal job, resulting from the recently introduced social benefits (and their interaction with taxes and social contributions), may not so much cause poverty traps and inactivity traps but contribute to the perpetuation of the country's low-wage/low-value added growth model (Pissarides et al. 2023).

To some extent, work disincentives are due to poor policy design: PTRs and METRs are unnecessarily high when (i) a country's social protection system relies excessively on means testing, and (ii) benefit rules carelessly and haphazardly interact with the rest of the tax-benefit system. In the case of Greece, where universal non-contributory benefits are absent and benefit rules are set idiosyncratically and not in an integrated fashion, both of these con-

ditions seem to be currently met to a considerable extent.

It follows that better policy design can reduce PTRs and METRs, and improve work incentives. As pointed out above, this would not be costless: it would require some increase in fiscal spending.

What can realistically be done? To ease work disincentives, while keeping budget costs reasonably low, policy makers should carefully redesign benefit entitlement rules and their interaction with taxes and social contributions.

Various policy recommendations stem directly from the results of this work. The first is to smooth out kinks in the effective tax schedule by eliminating cases where a benefit is either available in full or not available at all (as in housing benefit and childcare voucher).

To a lesser extent, kinks also result from the practice of relying on a small number of benefit rates (e.g. full rate/reduced rate A/reduced rate B, as in child benefit). In view of this, the second policy recommendation would be to reduce the amount of benefit as recipients' income rises by applying elementary algebra instead (along the lines of $B_i = G - \beta Y_i$, as in the guaranteed minimum income).

The third recommendation would be to set the taper rate β , at which social benefits are gradually reduced as household income rises, at a level well below 100%, also taking into account income taxes and social contributions. Smoothing kinks and replacing discrete thresholds with continuous tapers are primarily distributional and structural changes that need not necessarily entail higher aggregate spending. By contrast, reducing taper rates, while preserving income guarantees or extending benefit eligibility to new groups via smoothing withdrawal rates while keeping benefit rates constant, would require additional fiscal resources.

Some additional, broader policy implications emerge from the relevant literature, e.g.

streamlining benefits by following good practices in benefit design; defining assessed income as broadly as possible, taking into account other social benefits, ordering sequentially (guaranteed minimum income last) and avoiding exceptions. For instance, the case for excluding non-contributory disability benefits from assessed income when the amount of guaranteed minimum income benefit due is calculated seems unclear.

Another policy implication pertains to setting equivalence scales consistently, unless there are compelling reasons to the contrary. For example, there is evidence that economies of scale in consumption are not as great at low levels of income as they tend to be higher up the income distribution (Garbuszus et al. 2021). As a result of this, a more generous equivalence scale is called for when designing means-tested benefits. In contrast, the equivalence scale used in both child benefit and guaranteed minimum income in Greece (assigning a weight of 0.25 to each child) assumes *greater* economies of scale in consumption than the modified OECD equivalence scale (assigning a weight of 0.3 to each child) commonly applied by academic researchers and statistical agencies in Europe.

A final policy implication entails considering making some social benefits available to all,

irrespective of income. Universal social benefits are certainly costly and hence a hard sell in a country as indebted as Greece. Nevertheless, there is a strong case for universal access to affordable high-quality childcare from a social investment perspective. There is strong evidence of significant short- and long-term benefits of childcare, in terms of higher mothers' employment and better child outcomes, respectively. In view of these, it has been established that high-quality childcare leads to higher lifetime earnings of both mothers and children, which in turn translate into greater tax revenues, which more than outweigh the immediate costs. Heckman and Karapakula (2019), in their review of the long-term impact of the Perry Preschool Project in the US in the 1960s on the children and siblings of the original participants, have estimated the rate of return on investment to be as high as 13%. More recently, a study of a policy reform in Spain lowering the age of eligibility for publicly provided universal preschool from 4 to 3 years of age estimated that the benefits, in the baseline scenario, were four times as high as the costs (van Huizen et al. 2019). Making the childcare voucher in Greece available to all families with children of the relevant age would be a step towards reaping all these benefits and in the process eliminating the work disincentives stemming from its current means-tested design.

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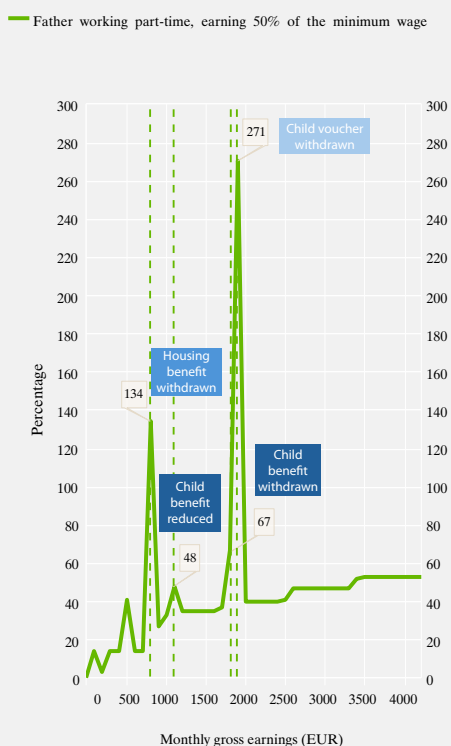
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APPENDIX

Chart A1 Estimated marginal effective tax rates under scenario 10

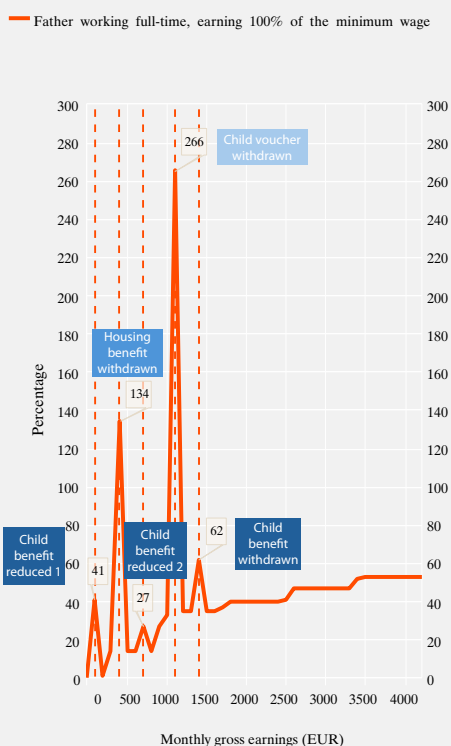
(percentage across monthly gross earnings)



Source: Authors' estimates using EUROMOD-HHoT.
Notes: Estimates based on changes in net household disposable income as mother's monthly gross earnings rise linearly from zero to €4,200 (i.e. approximately 5.1 times the minimum wage in 2024). See Table 2 for details on scenario 10.

Chart A2 Estimated marginal effective tax rates under scenario 11

(percentage across monthly gross earnings)

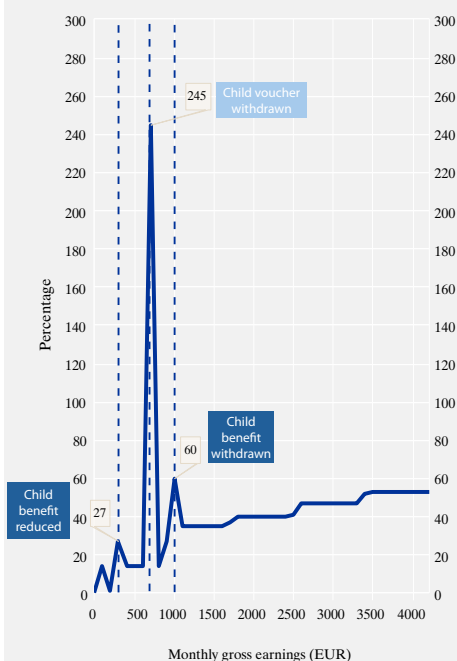


Source: Authors' estimates using EUROMOD-HHoT.
Notes: Estimates based on changes in net household disposable income as mother's monthly gross earnings rise linearly from zero to €4,200 (i.e. approximately 5.1 times the minimum wage in 2024). See Table 2 for details on scenario 11.

Chart A3 Estimated marginal effective tax rates under scenario 12

(percentage across monthly gross earnings)

— Father working full-time, earning 150% of the minimum wage



Source: Authors' estimates using EUROMOD-HHoT.

Notes: Estimates based on changes in net household disposable income as mother's monthly gross earnings rise linearly from zero to €4,200 (i.e. approximately 5.1 times the minimum wage in 2024). See Table 2 for details on scenario 12.

STRUCTURAL AND CYCLICAL FACTORS OF THE CURRENT ACCOUNT BALANCE AND THE CASE OF GREECE

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ABSTRACT

This paper investigates the structural and cyclical determinants of the current account balances for European economies, focusing especially on the factors underlying recent fluctuations in the Greek current account balance. Specifically, we investigate the long-run and short-run determinants of EU countries' current account balances, using panel data analysis. The long-run drivers are identified as structural, while the short-run as cyclical. Subsequently, these estimates are used to calculate the contribution of the cyclical and structural components to the changes in Greece's current account balance over the recent period. Our results indicate that the changes in the Greek current account balance recorded in recent years are associated with improvements in its structural component, while the short-term negative change of the current account balance in 2024 is attributed to cyclical factors. These findings suggest that efforts to encourage investment in critical areas, *inter alia* through the Recovery and Resilience Facility, to improve the investment environment and pursue structural reforms, are in the right direction.

Keywords: current account balance; structural component; cyclical component; panel data analysis

JEL classification: F32; F40; C23

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ΔΙΑΡΘΡΩΤΙΚΕΣ ΚΑΙ ΚΥΚΛΙΚΕΣ ΣΥΝΙΣΤΩΣΕΣ ΤΟΥ ΙΣΟΖΥΓΙΟΥ ΤΡΕΧΟΥΣΩΝ ΣΥΝΑΛΛΑΓΩΝ: Η ΠΕΡΙΠΤΩΣΗ ΤΗΣ ΕΛΛΑΔΟΣ

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ΠΕΡΙΛΗΨΗ

Η παρούσα μελέτη διερευνά κατά πόσον οι μεταβολές στο ισοζύγιο τρεχουσών συναλλαγών της Ελλάδος οφείλονται σε παροδικές κυκλικές επιδράσεις ή/και σε μόνιμους διαρθρωτικούς παράγοντες που επηρεάζουν το εξωτερικό ισοζύγιο της οικονομίας. Σε πρώτο στάδιο, εκτιμώνται οικονομμετρικά υποδείγματα τύπου panel, με τα οποία εντοπίζονται οι σημαντικότεροι προσδιοριστικοί παράγοντες που επηρεάζουν το ισοζύγιο τρεχουσών συναλλαγών των χωρών της ΕΕ, τόσο σε μακροχρόνιο ορίζοντα, οπότε οι σχετικοί προσδιοριστικοί παράγοντες αξιολογούνται ως διαρθρωτικοί, όσο και σε βραχυχρόνιο ορίζοντα, στην οποία περίπτωση οι σχετικοί παράγοντες αξιολογούνται ως κυκλικοί. Σε δεύτερο στάδιο, οι συντελεστές που έχουν προκύψει από τις ως άνω εκτιμήσεις χρησιμοποιούνται προκειμένου να υπολογιστεί η συμβολή της κυκλικής και της διαρθρωτικής συνιστώσας στις μεταβολές του ισοζυγίου τρεχουσών συναλλαγών της Ελλάδος κατά την πρόσφατη περίοδο. Σύμφωνα με τα εμπειρικά ευρήματα, η συμβολή της διαρθρωτικής συνιστώσας στις μεταβολές του ισοζυγίου τρεχουσών συναλλαγών παραμένει θετική τη διετία 2023-24, αντανακλώντας τη σημαντική βελτίωση της ανταγωνιστικότητας, του επενδυτικού περιβάλλοντος και των θεμελιωδών μεγεθών της ελληνικής οικονομίας, συμπεριλαμβανομένης της αύξησης των επενδύσεων σε κρίσιμους τομείς μέσω του Μηχανισμού Ανάκαμψης και Ανθεκτικότητας. Συνεπώς, ενδείκνυται να συνεχιστεί η επίτευξη δημοσιονομικών πρωτογενών πλεονασμάτων και να υλοποιηθούν περαιτέρω διαρθρωτικές μεταρρυθμίσεις για την ενίσχυση της ανταγωνιστικότητας και του εξαγωγικού προσανατολισμού των ελληνικών επιχειρήσεων, καθώς αυτοί είναι παράγοντες που, όπως διαφαίνεται από τις εκτιμήσεις, επηρεάζουν θετικά το ισοζύγιο τρεχουσών συναλλαγών της Ελλάδος.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Από το 2020 και έπειτα, η εξέλιξη του ισοζυγίου τρεχουσών συναλλαγών των οικονομιών της Ευρωπαϊκής Ένωσης (ΕΕ) χαρακτηρίστηκε από έντονες διακυμάνσεις, απόρροια μιας σειράς εξωγενών διαταραχών. Σε αυτό το ευμετάβλητο περιβάλλον, η Ελλάδα, μετά τη σημαντική διόρθωση του ελλείμματος του ισοζυγίου τρεχουσών συναλλαγών της την περίοδο 2013-19, κατέγραψε εκ νέου διεύρυνσή του κατά τα έτη 2020-22, ως αποτέλεσμα των περιορισμών στην οικονομική δραστηριότητα την περίοδο της πανδημίας και της ανόδου των τιμών της ενέργειας. Το 2023 καταγράφηκε διόρθωση σε -6,8% του ΑΕΠ, από -10,7% του ΑΕΠ το 2022. Ωστόσο, το 2024 το έλλειμμα του ισοζυγίου τρεχουσών συναλλαγών διευρύνθηκε κατά 0,4 της ποσοστιαίας μονάδας (ποσ. μον.) και διαμορφώθηκε σε -7,2% του ΑΕΠ. Η εξέλιξη αυτή αποδίδεται πρωτίστως στη διεύρυνση του ελλείμματος στο εμπορικό ισοζύγιο αγαθών, καθώς οι εξαγωγές αγαθών μειώθηκαν, ενώ οι αντίστοιχες εισαγωγές αυξήθηκαν, αντανakλώντας αφενός την επιβράδυνση της οικονομικής δραστηριότητας των κύριων εμπορικών εταίρων της χώρας και αφετέρου την αύξηση των εισαγωγών κεφαλαιακών αγαθών και τον χαμηλό βαθμό υποκατάστασης των εισαγόμενων αγαθών από εγχωρίως παραγόμενα.

Η παρούσα μελέτη διερευνά κατά πόσον οι μεταβολές του ισοζυγίου τρεχουσών συναλλαγών της Ελλάδος οφείλονται σε παροδικές κυκλικές επιδράσεις ή/και σε μόνιμους διαρθρωτικούς παράγοντες που επηρεάζουν το εξωτερικό ισοζύγιο της οικονομίας. Σε πρώτο στάδιο, εκτιμώνται οικονομετρικά υποδείγματα τύπου panel, με τα οποία εντοπίζονται οι σημαντικότεροι προσδιοριστικοί παράγοντες που επηρεάζουν το ισοζύγιο τρεχουσών συναλλαγών των χωρών της ΕΕ, τόσο σε μακροχρόνιο ορίζοντα, οπότε οι σχετικοί προσδιοριστικοί παράγοντες αξιολογούνται ως διαρθρωτικοί, όσο και σε βραχυχρόνιο ορίζοντα, στην οποία περίπτωση οι σχετικοί παράγοντες αξιολογούνται ως κυκλικοί. Σε δεύτερο στάδιο, οι συντελεστές που έχουν προκύψει από την εκτίμηση των βραχυχρόνιων (κυκλικών) παραγόντων για τις χώρες της ΕΕ εφαρμόζονται στα δεδομένα για την ελληνική οικονομία, προκειμένου να υπολογιστεί η συμβολή της κυκλικής συνιστώσας στις μεταβολές του ισοζυγίου τρεχουσών συναλλαγών της Ελλάδος κατά την πρόσφατη περίοδο (2023-24). Το υπολειπόμενο μέρος των μεταβολών, που προκύπτει μετά την αφαίρεση της συμβολής της κυκλικής συνιστώσας από τη μεταβολή του ισοζυγίου τρεχουσών συναλλαγών, αποδίδεται σε διαρθρωτικούς παράγοντες. Συνεπώς, η μεθοδολογία αυτή επιτρέπει την ποσοτικοποίηση της κυκλικής και της διαρθρωτικής συνιστώσας της μεταβολής του ισοζυγίου τρεχουσών συναλλαγών για την ελληνική οικονομία.

Τα εμπειρικά αποτελέσματα καταδεικνύουν ότι η διακύμανση του ισοζυγίου τρεχουσών συναλλαγών της Ελλάδος κατά τα έτη 2023-24 οφείλεται σε σημαντικό βαθμό σε κυκλικούς παράγοντες. Ειδικότερα, οι εκτιμήσεις των οικονομετρικών υποδειγμάτων για τις χώρες της ΕΕ αναδεικνύουν ως στατιστικά σημαντικούς διαρθρωτικούς προσδιοριστικούς παράγοντες του ισοζυγίου τρεχουσών συναλλαγών, μεταξύ άλλων, τη θέση των καθαρών απαιτήσεων έναντι του εξωτερικού, το ύψος του δημοσιονομικού πλεονάσματος/ελλείμματος, το σχετικό επίπεδο εισοδήματος και τον ρυθμό μεταβολής της μακροχρόνιας τάσης της παραγωγικότητας, τον βαθμό εξωστρέφειας της εμπορικής δραστηριότητας και την ποιότητα του ρυθμιστικού πλαισίου. Επιπροσθέτως, ως στατιστικά σημαντικοί βραχυχρόνιοι προσδιοριστικοί παράγοντες αναδεικνύονται, μεταξύ άλλων, οι κυκλικές συνιστώσες του ύψους της χρηματοπιστωτικής επέκτασης και του μοναδιαίου κόστους εργασίας.

Από την εφαρμογή των εκτιμώμενων συντελεστών για τις χώρες της ΕΕ σε δεδομένα για την ελληνική οικονομία διαπιστώνεται ότι η κατά 0,4 ποσ. μον. διεύρυνση του ελλείμματος του ισοζυγίου τρεχουσών συναλλαγών στην Ελλάδα για το έτος 2024 αποδίδεται πρωτίστως σε κυκλικούς παράγοντες. Αυτοί συνέβαλαν αρνητικά, κατά 2,5 ποσ. μον., στη μεταβολή του ισοζυγίου

τρεχουσών συναλλαγών, αντανακλώντας πιθανώς την επιβράδυνση της εξωτερικής ζήτησης και την αύξηση των εισαγωγών. Αντίθετα, η συμβολή των διαρθρωτικών παραγόντων στη μεταβολή του ισοζυγίου τρεχουσών συναλλαγών το 2024 ήταν θετική και εκτιμάται σε 2,1 ποσ. μον., δεν ήταν ωστόσο επαρκής για να αντισταθμίσει την αρνητική επίδραση της κυκλικής συνιστώσας.

Συνολικά, το ισοζύγιο τρεχουσών συναλλαγών της Ελλάδος το 2024 διαμορφώθηκε σε -7,2% του ΑΕΠ, έλλειμμα το οποίο εκτιμάται ότι οφείλεται κυρίως σε διαρθρωτικά χαρακτηριστικά της οικονομίας. Ωστόσο, η συμβολή της διαρθρωτικής συνιστώσας στις μεταβολές του ισοζυγίου τρεχουσών συναλλαγών παραμένει θετική τα τελευταία δύο έτη, αντανακλώντας τη σημαντική βελτίωση της ανταγωνιστικότητας, του επενδυτικού περιβάλλοντος και των θεμελιωδών μεγεθών της ελληνικής οικονομίας. Αξιοσημείωτη ήταν η αύξηση των επενδύσεων τα τελευταία έτη, οι οποίες, με τη συνδρομή του Μηχανισμού Ανάκαμψης και Ανθεκτικότητας, κατευθύνθηκαν σε κρίσιμους τομείς, όπως οι υποδομές, η ενέργεια και τα ψηφιακά δίκτυα, συμβάλλοντας τόσο στην άμεση αύξηση της οικονομικής δραστηριότητας και τη βελτίωση του ισοζυγίου τρεχουσών συναλλαγών όσο και στη βελτίωση των μεσοπρόθεσμων προοπτικών ανάπτυξης.

Η μελέτη καταλήγει στο συμπέρασμα ότι ενδείκνυται να συνεχιστεί η επίτευξη δημοσιονομικών πρωτογενών πλεονασμάτων και να υλοποιηθούν περαιτέρω διαρθρωτικές μεταρρυθμίσεις για την ενίσχυση της ανταγωνιστικότητας και του εξαγωγικού προσανατολισμού των ελληνικών επιχειρήσεων, καθώς αυτοί είναι παράγοντες που, όπως διαφαίνεται από τις εκτιμήσεις, επηρεάζουν θετικά το ισοζύγιο τρεχουσών συναλλαγών της Ελλάδος. Επιπροσθέτως, η βελτίωση της παραγωγικότητας και των επενδύσεων σε κεφαλαιακά αγαθά και η μείωση της εξάρτησης από τις εισαγωγές, μέσω της σταδιακής υποκατάστασης των εισαγόμενων αγαθών με εγχωρίως παραγόμενα, αναμένεται ότι θα συνέβαλλαν στη μείωση της ευαισθησίας του ισοζυγίου τρεχουσών συναλλαγών σε βραχυχρόνιες (κυκλικές) διακυμάνσεις.

STRUCTURAL AND CYCLICAL FACTORS OF THE CURRENT ACCOUNT BALANCE AND THE CASE OF GREECE*

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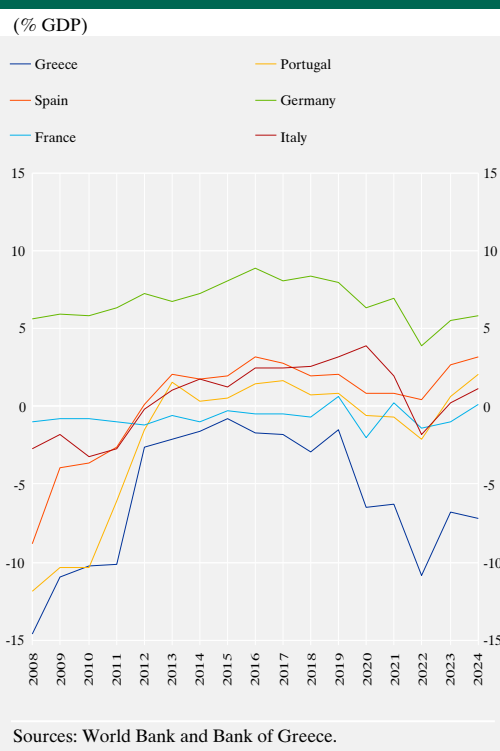
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I INTRODUCTION

Over the past several years, the evolution of the current account balances (CAB) in the European Union (EU) economies has been marked by strong fluctuations, stemming from a series of exogenous shocks. Specifically, the adverse effects of the COVID-19 pandemic and the subsequent stringent restrictions imposed on economic activity, the disruptions in supply chains and the soaring energy prices, which fuelled strong broad-based inflationary pressures, adversely affected the external balances of EU countries. As depicted in Chart 1, several European economies recorded a deterioration in their current account balance during 2021-22, which is mainly attributed to the sharp rise in energy costs and import prices. However, from 2023 onwards, many economies are showing signs of a gradual normalisation of their external balances, primarily reflecting the gradual easing of inflationary pressures and more specifically the de-escalation of energy and import prices and the restoration of supply chains.

Greece recorded a significant decline of its current account deficit during 2008-19, underpinned by the sharp correction of the large macroeconomic imbalances that had built up in the run-up to the economic crisis of 2008 (see, e.g., Backinezos et al. 2020), as well as the return to a regime of fiscal discipline, with the achievement of primary surpluses. According to data from the Bank of Greece, the current account deficit recorded a remarkable reduction, from -15.3% of GDP in 2008 to -2.1% of GDP in 2019. However, it subsequently widened again in the period 2020-22, due to the negative consequences of the restrictions imposed on economic activity during the pandemic and the elevated energy prices from the end of 2021 onwards, reaching -10.7% of GDP

Chart 1 Current account balance of selected EU countries



in 2022. In 2023, another significant correction of the CAB was recorded, bringing it down to -6.8% of GDP. However, in 2024 the current account deficit widened again slightly by 0.4 percentage points, i.e. to -7.2% of GDP.¹

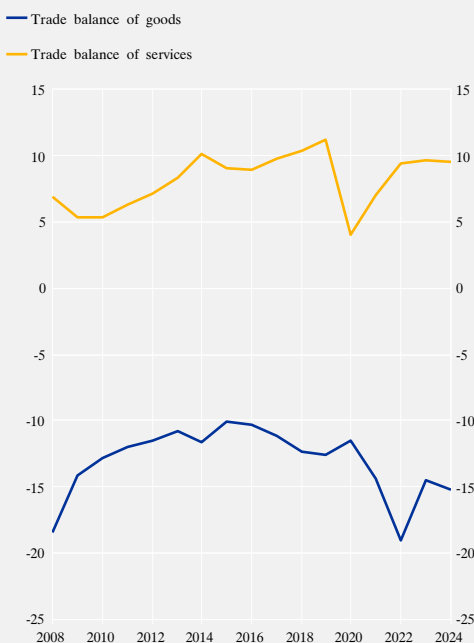
These recent developments are mainly attributed to the further widening of the deficit in the trade balance of goods. As depicted in Charts 2 and 3, exports of goods remained lower than

* 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 See Bragoudakis (2024) for an analysis of the evolution of the CAB in Greece during the pandemic and the recent energy crisis.

Chart 2 Trade balance of Greece

(% GDP)



Source: Eurostat.

the corresponding imports, maintaining the negative trade balance of goods, despite a positive trend in the current account balance in recent years. This reflects, on the one hand, the slowdown in the economic activity of the country's main trading partners and, on the other hand, the increase in imports of capital goods to support domestic investment, as well as the low degree of substitution of imported consumption goods by domestically-produced goods. On the contrary, exports of services remained higher than imports of services, mainly reflecting the strong tourism performance recorded in the recent years. However, they were not sufficient to mitigate the negative trade balance of goods.

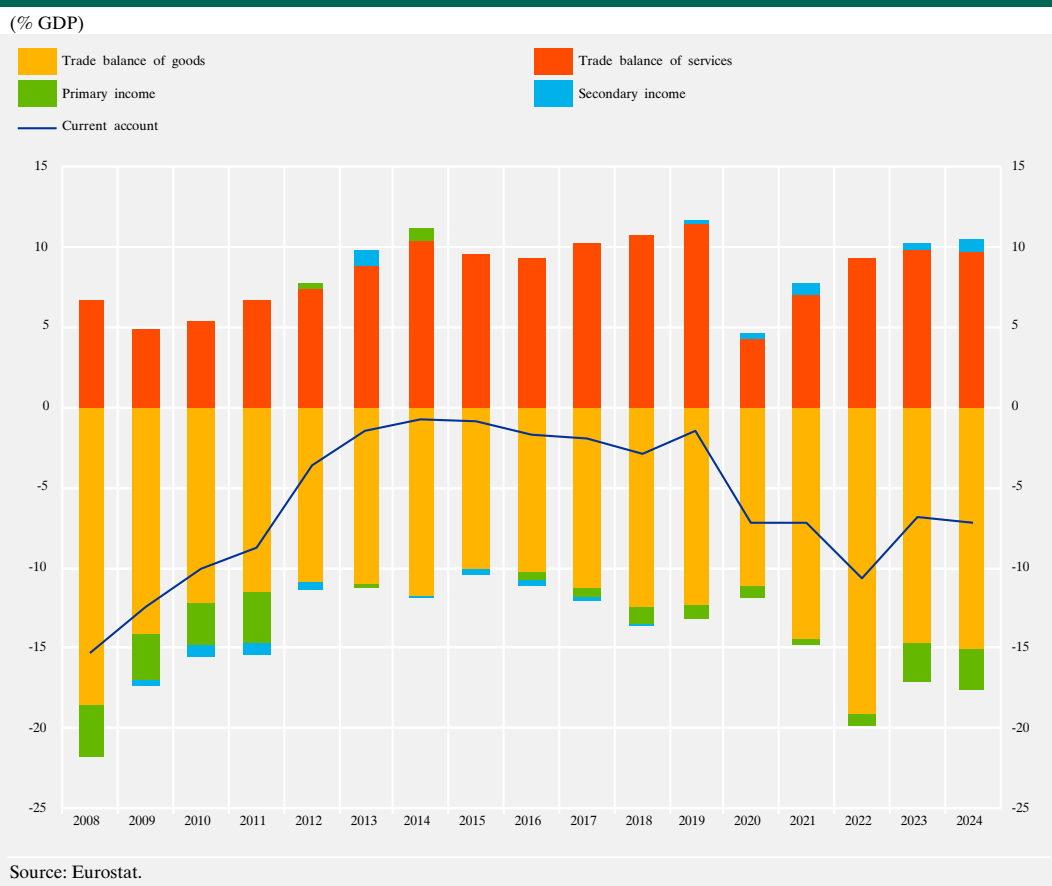
The recent fluctuations in the Greek current account balance bring to the forefront the question of whether they are attributed to transitory cyclical effects or reflect permanent structural factors that drive the external balance of the economy. Identifying whether structural or cyclical factors have driven the

recent changes in the current account balance is essential in order to gauge its future trajectory and evaluate the effectiveness of alternative policies that could potentially contribute to the gradual narrowing of the current account deficit.

Against this background, the objective of this paper is, first, to investigate the structural and cyclical determinants of the current account balances for the European economies and, subsequently, to identify the structural or cyclical components of the recent changes in the Greek current account balance. To do so, we adopt the empirical methodology proposed by Cheung et al. (2010, 2013) and Chinn and Prasad (2003), in which the changes in the current account balance are decomposed into their cyclical and structural components.

The contribution of our paper is twofold. First, we investigate the long- and short-run determinants of current account balances using panel data analysis for the EU countries. The long-run drivers of the CAB, including, *inter alia*, institutional and competitiveness factors, are identified as structural, while the short-run determinants are viewed as cyclical. Our approach allows the estimation of the parameters that reflect the magnitude and direction of the impact of each individual determinant on the current account for the EU economies in our sample. Second, we focus on the case of Greece. The coefficients obtained from the estimation of the short-term (cyclical) factors for EU countries are applied to the data for the Greek economy, in order to calculate the contribution of the cyclical component to the changes in Greece's current account over the recent period. The residual obtained after subtracting the contribution of the cyclical component from the total change in the current account is attributed to structural factors. Therefore, the second stage of our empirical methodology allows for the quantification of the cyclical and structural components of the change in the current account balance for the Greek economy.

Chart 3 Components of the Greek current account



Our findings can be summarised as follows: First, the estimation results from the panel regressions for EU countries highlight as statistically significant a number of structural determinants of the current account balance, *inter alia*, the position of net foreign assets, the fiscal balance over GDP, relative income and the rate of long-term economic growth, the degree of trade openness and the quality of the regulatory framework. In addition, the cyclical components of private credit to GDP and unit labour costs are identified as statistically significant short-term determinants of EU current accounts. In a second step, by applying the cyclical coefficients estimated for the EU countries to Greek data, we show that the fluctuation of Greece's current account deficit over the years 2023-24 is due, to a significant extent, to cyclical factors. On the contrary, the contribution of the structural

component to changes in the Greek current account balance has remained positive over the last two years of the sample, arguably reflecting the significant improvements in competitiveness, the investment environment and the fundamentals of the Greek economy achieved in recent years.

The rest of the paper is organised as follows: Section 2 provides a brief literature review. Section 3 discusses our data sample and presents our empirical strategy, while Section 4 introduces our main findings. Finally, Section 5 concludes.

2 LITERATURE REVIEW

The determinants of current account balances have been extensively examined in interna-

tional macroeconomics, particularly in the context of research on global imbalances, external sustainability and macroeconomic adjustment within monetary unions. The literature distinguishes between cyclical determinants, associated with temporary fluctuations in economic activity and financial conditions, and structural determinants, which influence saving, investment and competitiveness, and, through these, the CAB over the medium to long term. In this vein, emphasis has been placed on the role of structural reforms and improvements in the investment environment in fostering sustainable current account adjustment.

Early empirical contributions include DeBelle and Faruquee (1996), who analyse current account balances using cross-sectional and panel-data techniques for industrial and developing economies. Their findings suggest that demographic factors, fiscal balances, stages of development and terms-of-trade movements significantly affect external balances. This paper was among the first to distinguish between short- and long-run determinants of the CAB. Chinn and Prasad (2003) later investigated medium-term determinants of current account balances across industrial and developing countries, using panel regressions. They show that government budget balances, net foreign asset positions, demographic variables and relative income levels are key determinants of external positions. Their results support the “twin deficits” hypothesis for advanced economies and underline the importance of institutional and financial development in shaping saving-investment balances. Importantly, their benchmark reduced-form framework was widely adopted in the literature.

Building on their approach, Cheung et al. (2010, 2013) explicitly distinguish between cyclical and structural factors behind current account balances. Using a panel of 94 countries spanning the period from 1973 to 2008, they demonstrate that output gaps, commodity price fluctuations and temporary demand shocks explain short-run movements in current

accounts, whereas structural characteristics exert more persistent effects. In particular, labour market flexibility, product market regulation and institutional quality are found to influence competitiveness, productivity and resource allocation between tradable and non-tradable sectors. Their findings notably suggest that better financial regulation as well as structural reforms aimed at strengthening the business climate can improve current account balances over the medium term, by bolstering export performance and enhancing productive efficiency.

Beyond the aforementioned seminal papers, several studies in this strand of the literature focus on the role of structural policies and institutional reforms. Kennedy and Sløk (2005) examine how such structural reforms in labour markets, product markets and financial markets affect current accounts and find that, while many do have a significant impact on current account developments, the size of their contribution is quite limited. Ju and Wei (2007) show that labour market rigidities influence the speed and persistence of current account adjustment. Chinn and Ito (2007) update and extend the research by Chinn and Prasad (2003) by additionally incorporating the effects of the legal environment and the level of institutional development and exploring their interplay with fiscal balances and financial development as regards their impact on the current account. Kerdrain et al. (2010) examine how labour market reforms, financial liberalisation and product market deregulation affect saving and investment dynamics and find that structural reforms influence current accounts both directly and indirectly through productivity growth and investment responses. Gruber and Kamin (2007) additionally explore the impact of financial crises on current accounts.

The literature on Greek current account imbalances also emphasises the interaction between structural weaknesses, macroeconomic policy distortions and cyclical developments, particularly in the period preceding the

sovereign debt crisis.² A broad consensus has emerged that the substantial widening of the Greek current account deficit after euro area accession reflected not only strong domestic demand and credit expansion, but also persistent competitiveness losses and structural weaknesses in the productive base of the economy. Brissimis et al. (2010) identify declining external competitiveness, financial liberalisation and increased capital inflows following participation in the Economic and Monetary Union (EMU) as central determinants of the deterioration in Greece's external position. Their analysis, based on co-integration techniques, suggests that the Greek current account deficit became increasingly unsustainable due to weak export performance and excessive reliance on non-tradable sectors. Similarly, the Bank of Greece repeatedly stressed in its publications that low export diversification, rigid product and labour markets, limited technological intensity and chronic investment inefficiencies constrained the adjustment capacity of the Greek economy (Athanasoglou et al. 2010; Bank of Greece 2020a). Arghyrou and Chortareas (2008) further argued that EMU participation reduced borrowing costs and relaxed external financing constraints, thereby facilitating persistent external deficits without corresponding productivity gains. In addition, Gibson et al. (2012) emphasised the role of fiscal imbalances and institutional weaknesses in amplifying external vulnerabilities during the pre-crisis period. More recent studies underline that the subsequent correction of the Greek current account deficit after 2010 resulted partly from cyclical compression in domestic demand during the recession, but also from structural reforms that improved labour cost competitiveness and export performance (Backinezos et al. 2020; Bank of Greece 2020b; IMF 2019). The literature generally concludes that durable external adjustment in Greece depends on sustained productivity growth, stronger tradable sectors, improvements in the investment environment and higher-quality institutions rather than solely on demand-side contraction.

In sum, the literature suggests that current account balances are shaped by the interaction between cyclical conditions and structural characteristics. While temporary fluctuations in output and financial conditions explain short-run developments, medium- and long-run outcomes depend critically on productivity, competitiveness, institutional quality and the investment environment. Academic research and institutional analyses converge on the conclusion that structural reforms enhancing productivity, export capacity and business conditions are essential for sustainable external adjustment, particularly in euro area economies where nominal exchange rate adjustment is limited.

3 DATA AND EMPIRICAL METHODOLOGY

3.1 DATA DESCRIPTION

Our sample covers the EU27 member countries for the period 1970-2024. The panel dataset is unbalanced; thus, there are differences in the length of the series for some variables by country, due to missing data (especially during the 1970s). Also, for the institutional variables the dataset starts from the 1990s, so the sample is reduced accordingly. The sources of our data include the World Bank, the European Commission, the Energy Institute Statistical Review of World Energy, the BIS and the 2024 update of the external wealth of nations database by Lane and Milesi-Ferretti (2018).

As our dependent variable, we use the current account balance over GDP drawn from the World Bank. Moreover, we control for a series of explanatory variables that are widely used in the relevant empirical literature (see, e.g.,

² Following the sovereign debt crisis, European institutions increasingly linked persistent current account deficits to weak competitiveness and insufficient structural adjustment. Notably, the European Commission, within the framework of the Macroeconomic Imbalance Procedure, emphasises the importance of labour market flexibility, productivity growth and efficient resource allocation in correcting external imbalances (European Commission 2016).

Chinn and Ito 2007; Chinn and Prasad 2003; Gruber and Kamin 2007; Altayligil and Çetrez 2020). These include macroeconomic, demographic, financial and institutional factors. As macroeconomic factors, we include, among others, the per capita GDP growth rate (used as a proxy for productivity growth), the stage of economic development (the variable used to proxy for the stage of economic development is the relative (to the EU) income per capita), the net foreign assets-to-GDP ratio, the government primary budget balance over GDP, trade openness (defined as exports plus imports over GDP), oil prices and oil consumption. As demographic factors, we use the youth and old age dependency ratios, and as financial indicators, the credit-to-GDP ratio and financial development indices. We also use real effective exchange rates (REER) and unit labour costs as measures of a country's competitiveness. Regarding the institutional determinants, we use the World Governance Indicators from the World Bank.

Following Cheung et al. (2010, 2013) and Gruber and Kamin (2007), we express all the explanatory variables as deviations from their GDP-weighted EU mean (except for net foreign assets), since current account balances are relative measures depending on the developments in other countries.³

3.2 EMPIRICAL STRATEGY

To assess the structural and cyclical factors that determine current account balances in the EU, we work in two stages. First, we estimate the medium-term or structural factors that drive current accounts. Second, we focus on their short-term or cyclical determinants.

3.2.1 ESTIMATION OF STRUCTURAL DETERMINANTS

To examine the structural factors that shape the movements of current account balances in the EU, we estimate the medium-term trends of our explanatory variables. To do so, we estimate the following general specification, using ordinary least squares (OLS):

$$\begin{aligned}\overline{CA}_{i,t} = & \bar{\alpha} + \bar{\beta}_1 \bar{X}_{i,t} \\ & + \bar{\beta}_2 \bar{I}_{i,t} + \bar{\beta}_3 \bar{Z}_{i,t} + c_i + \tau_t + \varepsilon_{i,t}\end{aligned}\quad (1)$$

where $\overline{CA}_{i,t}$ is the medium-term trend value of the CAB in country i at time t and $\bar{X}_{i,t}$ is the vector of the medium-term trend values of macroeconomic, demographic and financial variables. This serves as our benchmark specification. Moreover, we examine the role of institutional and competitiveness factors, augmenting our regression equation with these factors, where $\bar{I}_{i,t}$ is the vector of the medium-term trend values of institutional variables and $\bar{Z}_{i,t}$ is the vector of the medium-term trend values of competitiveness variables. We calculate the medium-term trend values as the non-overlapping four-year averages of all variables. As a result, we rule out any cyclical fluctuations and reduce the possibility of measurement errors.⁴ Finally, equation (1) includes country fixed effects, c_i , time effects, τ_t , and $\varepsilon_{i,t}$ which is a zero-mean error term. Variations in the set of variables included give rise to different models examined.⁵

3.2.2 ESTIMATION OF CYCLICAL DETERMINANTS

Following the relevant literature (see, e.g., Cheung et al. 2010, 2013), the cyclical component of each variable is constructed as the annual deviation from its four-year overlapping (moving) average. This filtering method smooths out temporary shifts, while maintaining the slower-

³ It is worth noting that Cheung et al. (2010, 2013) convert their explanatory variables into deviations from their GDP-weighted world mean; in contrast, we use the EU GDP-weighted mean as our baseline, since we want to explain differences between EU member states relative to the EU average. For robustness, we could examine the same relationship using the GDP-weighted world mean, since several EU countries direct the bulk of their exports towards non-EU countries. We leave this approach for future work.

⁴ It is worth noting that Cheung et al. (2010, 2013) use the non-overlapping five-year averages of all variables to approximate their medium-term trend values; however, we use the four-year averages to gain observations mainly due to the fact that we focus our analysis only on the EU economies, in contrast to the corresponding literature where larger samples of countries are used (e.g. developing vs developed).

⁵ Moreover, as a robustness check, we perform instrumental variable two-stage least squares estimations (IV-2SLS) to address any reverse causality issues driven by the potential endogeneity between fiscal balances and current account balances. Following the related literature (Cheung et al. 2013), we use government effectiveness as an instrument in the IV estimation. The resulting estimates corroborate the robustness of our main OLS estimates. Results are available upon request.

moving structural path of the data. The cyclical components therefore capture only temporary movements of the factors examined in the structural estimations, away from their corresponding medium-term trajectories. For instance, these transitory changes could capture short-lived changes in income, competitiveness, credit conditions or trade dynamics.

Next, we estimate a dynamic version of equation (1), in order to identify the short-term determinants of the current account balances, using as regressors the cyclical components of each variable. The specification for the short-term or cyclical estimations is:

$$\widehat{CA}_{i,t} = \tilde{\alpha} + \rho \widehat{CA}_{i,t-1} + \tilde{\beta}_1 \tilde{X}_{i,t} + \tilde{\beta}_2 \tilde{I}_{i,t} + \tilde{\beta}_3 \tilde{Z}_{i,t} + c_i + \tau_t + \varepsilon_{i,t} \quad (2)$$

where $CA_{i,t}$ denotes the cyclical component of the current account balance of country i at time t , and so on for the other variables with a tilde.

Thus, except for the cyclical components of the various variables, the short-term equation also includes the lagged value of the cyclical component of the current account balance. Estimating equation (2) by least squares would provide biased estimates, due to the presence of the lagged dependent variable as an additional regressor, in addition to the endogeneity caused by the reverse causality between fiscal and current account balances. To this end, we adopt the generalized method of moments (GMM) estimators by Arellano and Bover (1995) which produce consistent estimates of the parameters in the presence of unobserved heterogeneity and simultaneity caused by correlation between the regressors and the error term. The consistency of the estimates depends on the validity of the instrumental variables set, which are tested using the Hansen test for the validity of orthogonality conditions (over-identifying restrictions).

3.2.3 CALCULATION OF THE IMPLIED CYCLICAL CONTRIBUTIONS

Finally, we calculate the fraction of the change in Greece's current account during the years

2023-24 that can be attributed to cyclical and structural drivers. To decompose the change in the current account balance (CAB) into its cyclical and structural components, we follow the approach by Cheung et al. (2010). Specifically, the changes in the current account balance can be split into changes in its cyclical and its structural components, i.e.:

$$\Delta CA_t = \Delta CA_t^{cyc} + \Delta CA_t^{str} \quad (3)$$

We multiply the constructed cyclical components of our explanatory variables by the corresponding estimated coefficients obtained from our baseline panel GMM estimation for the EU27 countries, i.e. a version of equation (2), in which we exclude institutional and demographics variables.⁶ This provides a measure of each variable's short-run (cyclical) contribution to the year-on-year change in the Greek current account balance. Summing up these contributions, we obtain the total estimated cyclical component of the change in the Greek current account balance for each year. Specifically, the change in the total cyclical component is determined using the coefficients derived from the estimation of the cyclical CA and the changes in the cyclical components of each of the explanatory variables, as follows:

$$\Delta CA_{GR,t}^{cyc} = \rho \widehat{CA}_{GR,t-1} + \tilde{\beta}_1 \Delta \tilde{X}_{GR,t} + \tilde{\beta}_2 \Delta \tilde{I}_{GR,t} + \tilde{\beta}_3 \Delta \tilde{Z}_{GR,t} \quad (4)$$

The structural contribution is then obtained residually, as the difference between the observed change in the current account and the estimated cyclical component, i.e.:

$$\Delta CA_{GR,t}^{str} = \Delta CA_{GR,t} - \Delta CA_{GR,t}^{cyc} \quad (5)$$

This residual measure represents the underlying and persistent forces influencing Greece's external balance, i.e. those not driven by short-

⁶ These variables move slowly and are not expected to exhibit significant cyclical variation. However, we have also estimated the cyclical specification including some of these variables and our results remain qualitatively robust. Results are available upon request.

term fluctuations. These can be attributed to slow-moving changes in the fundamental characteristics of the Greek economy.

4 RESULTS

4.1 STRUCTURAL (MEDIUM-TERM) CURRENT ACCOUNT BALANCE DETERMINANTS IN EU COUNTRIES

Table 1 reports the estimation results of our baseline structural specification, i.e. the specification which does not incorporate institutional and competitiveness factors. The first five columns present the results obtained when we allow for country fixed effects, while columns 6-10 report the results with both country and time fixed effects.⁷

The estimates obtained from our baseline specification, i.e. equation (1) without the terms $\bar{\beta}_2 \bar{I}_{i,t} + \beta_3 \bar{Z}_{i,t}$, are broadly in line with the existing empirical literature on the determinants of current account balances. Our findings corroborate a statistically significant positive relationship between fiscal and current account balances, supporting the “twin deficits” hypothesis. In general, the magnitude of this coefficient is broadly similar to the values suggested by the literature (see, e.g., Gruber and Kamin 2007; Cheung et al. 2013; Altayligil and Çetrez 2020). The coefficient is very close to 0.3 across all the reported specifications, implying that a 1 percentage point increase in the government deficit (surplus) is associated with a 0.3 percentage points increase in the current account deficit (surplus).

Moreover, we find positive and statistically significant coefficients for the net foreign assets (NFA) to GDP ratio, implying that a country’s net foreign asset position affects the current account through the accumulation of past CABs or through direct changes in the net primary income. Also, we observe a negative statistically significant relationship between the current account balance and economic growth across 5 of the 10 specifications exam-

ined. This result can be attributed to the fact that, on the one hand, higher economic growth increases import demand to support investment and consumption and, on the other hand, a higher medium-term trend per capita GDP growth is translated into higher productivity growth, which in turn could attract foreign capital flows since they are expected to provide higher rates of return. We also detect a positive and statistically significant relationship between trade openness and the CAB, across all the specifications, which might suggest that, over the long run, trade openness is associated with more export-led growth, as the absence of barriers to trade allows domestic industries to tap into larger global markets. In a similar vein, we get significant positive coefficients (with only one exception) for the stage of economic development, which is proxied by the relative (to the EU) income per capita and negative coefficients for the squared relative income per capita. This result is consistent with the stage-of-development hypothesis advanced by Chinn and Prasad (2003) and Cheung et al. (2010, 2013). Within the EU, countries at a more advanced stage of development tend to exhibit higher saving relative to investment and stronger external positions, while relatively less developed economies often rely more heavily on external financing to support capital accumulation and economic growth. However, the negative coefficient of the squared term confirms the U-shaped relationship documented in the related literature (e.g. Cheung et al. 2013), i.e. the CAB improves with income up to a point, then declines.

Finally, we find a negative coefficient for the oil consumption value, reflecting the high energy import dependency of the EU economies as well as the fact that countries with higher oil consumption are more vulnerable to oil price shocks, worsening their terms of trade. Both effects put downward pressure on CABs. Additionally, we get a positive coefficient for the

⁷ We have also examined the case with time effects only and our results remain qualitatively the same. We do not report them due to space limitations. These results are available upon request.

Table 1 Structural determinants of the CAB (OLS)

Dependent variable (CAB/GDP)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Net Foreign Assets/GDP	0.022** (0.010)	0.015 (0.010)	0.015 (0.011)	0.022** (0.010)	0.015 (0.012)	0.032*** (0.011)	0.027** (0.010)	0.026** (0.011)	0.021 (0.015)	0.021* (0.011)
Primary balance/GDP	0.324** (0.121)	0.360** (0.131)	0.358*** (0.111)	0.317** (0.120)	0.345** (0.139)	0.306*** (0.092)	0.341*** (0.108)	0.343*** (0.096)	0.218** (0.101)	0.309*** (0.106)
Relative income	0.090*** (0.029)	0.036 (0.039)	0.119*** (0.029)	0.090*** (0.028)	0.112** (0.043)	0.029 (0.039)	-0.011 (0.047)	0.056 (0.039)	-0.073** (0.028)	0.036 (0.044)
Relative income squared	-0.031*** (0.010)	-0.019* (0.011)	-0.033*** (0.008)	-0.031*** (0.010)	-0.050*** (0.013)	-0.014 (0.012)	-0.005 (0.014)	-0.016 (0.011)	0.007 (0.007)	-0.031*** (0.010)
Growth (per capita GDP)	-0.187 (0.117)	-0.269* (0.143)	-0.140 (0.124)	-0.191 (0.138)	-0.301** (0.124)	-0.188* (0.109)	-0.229* (0.130)	-0.141 (0.123)	-0.029 (0.198)	-0.245* (0.120)
Trade openness	0.075*** (0.024)	0.065** (0.026)	0.071*** (0.023)	0.075*** (0.024)	0.113*** (0.022)	0.065** (0.030)	0.056* (0.031)	0.061** (0.028)	0.106*** (0.031)	0.090*** (0.028)
Oil consumption per capita		-0.988* (0.496)					-0.724 (0.449)			
Youth dependency ratio			0.303** (0.118)					0.277** (0.105)		
Private credit to GDP				-0.002 (0.014)					-0.029** (0.012)	
Financial development index					-0.050 (0.048)					-0.075** (0.031)
Country effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time effects	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
Observations	261	254	261	260	219	261	254	261	260	219
R-squared	0.228	0.204	0.260	0.226	0.292	0.480	0.458	0.505	0.481	0.541
Number of countries	27	26	27	27	27	27	26	27	27	27

Note: The dependent variable is the current account balance over GDP. Robust standard errors in parentheses, *** p<0.01, ** p<0.05 and * p<0.1.

youth dependency ratio⁸ and negative coefficients for the private credit to GDP as well as the financial development index. Deeper financial markets reduce the need for precautionary savings through easier access to credit for households and firms, lowering current account balances.

Table 2 presents the estimation results after incorporating institutional and competitiveness factors in our baseline specification (i.e. including $\beta_2 \bar{I}_{i,t} + \beta_3 \bar{Z}_{i,t}$ to the regression equation). The coefficients of the main macroeconomic control variables remain qualitatively similar to those from the baseline estimations (see Table 1). Regarding the institutional variables examined, we report only the estimated coefficients for regulatory quality and the voice and accountability variables which are found to be negative and statistically significant (increases

in these indices are associated with improved specific aspects of institutional quality).⁹ This result is also evident in the studies by Gruber and Kamin (2007) and Cheung et al. (2013). Improved institutional quality reduces uncertainty around future economic conditions, leading to lower precautionary savings. Furthermore, a more business-friendly institutional environment increases the inflows of foreign capital, reducing the current account balance. Also, we get negative coefficients for

8 We obtain similar positive coefficients for the old age dependency ratio (but statistically significant only for one regime). The positive relationship may reflect the fact that, within the EU economies and in a relative and medium-term context, a higher age dependency ratio may boost national savings and improve the CAB for the euro area, in line with the extended life-cycle hypothesis (see Bank of Greece (2026), *Annual Report 2025*, Box IV.6).

9 We also examined the following variables from the World Bank Governance Indicators: political stability, government effectiveness, rule of law and control of corruption. However, we do not report them, since we obtained statistically insignificant coefficients.

Table 2 Structural determinants of the CAB (OLS, including institutional and competitiveness factors)

Dependent variable (CAB/GDP)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Net Foreign Assets/GDP	0.019** (0.009)	0.017* (0.009)	0.018 (0.012)	0.016 (0.010)	0.024** (0.010)	0.021 (0.012)	0.020 (0.012)	0.027** (0.012)	0.019 (0.012)	0.033*** (0.011)
Primary balance/GDP	0.501*** (0.162)	0.539*** (0.157)	0.322** (0.124)	0.446** (0.168)	0.264** (0.122)	0.477*** (0.152)	0.507*** (0.149)	0.304*** (0.108)	0.422** (0.163)	0.262** (0.099)
Relative income	0.088** (0.032)	0.075** (0.030)	0.118** (0.056)	0.122** (0.051)	0.094*** (0.032)	0.072 (0.045)	0.061 (0.044)	0.052 (0.058)	0.095* (0.049)	0.031 (0.039)
Relative income squared	-0.026*** (0.009)	-0.023*** (0.008)	-0.035** (0.014)	-0.035*** (0.012)	-0.037*** (0.010)	-0.020 (0.013)	-0.017 (0.012)	-0.019 (0.014)	-0.027** (0.011)	-0.018* (0.010)
Growth (per capita GDP)	-0.303*** (0.085)	-0.333*** (0.094)	-0.202 (0.125)	-0.377*** (0.092)	-0.325*** (0.108)	-0.247** (0.098)	-0.275** (0.101)	-0.166 (0.125)	-0.317*** (0.112)	-0.299** (0.116)
Trade openness	0.064** (0.027)	0.061** (0.028)	0.073** (0.027)	0.066** (0.027)	0.078*** (0.023)	0.041 (0.026)	0.038 (0.027)	0.066* (0.033)	0.043 (0.027)	0.068** (0.029)
Regulatory quality	-0.034* (0.018)					-0.025* (0.015)				
Voice and Accountability		-0.040* (0.021)					-0.034* (0.017)			
REER_CPI			-0.005 (0.004)					-0.005 (0.003)		
REER_ULC				-0.004 (0.004)					-0.004 (0.003)	
Real Unit Labour Cost					-0.010** (0.004)					-0.007** (0.004)
Country effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time effects	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
Observations	206	206	224	206	261	206	206	224	206	261
R-squared	0.292	0.285	0.211	0.281	0.259	0.484	0.483	0.439	0.479	0.495
Number of countries	27	27	24	27	27	27	27	24	27	27

Note: The dependent variable is the current account balance over GDP. Robust standard errors in parentheses, *** p<0.01, ** p<0.05 and * p<0.1.

some competitiveness indicators, i.e. the real effective exchange rate (REER) based on the consumer price index (CPI) and the unit labour cost (ULC) as well as for the real unit labour cost; however, we get statistically significant estimates only for the latter and their magnitude seems smaller compared to the remaining structural determinants. This may indicate that the competitiveness indices are in fact related mainly to the short-run fluctuations of the CAB, as discussed in the next subsection.

4.2 CYCLICAL (SHORT-TERM) CURRENT ACCOUNT BALANCE DETERMINANTS IN EU COUNTRIES

To assess the short-run drivers of the current account balances in the EU, we estimate equa-

tion (2) using the cyclical components of our explanatory variables, i.e. the variables after removing their medium-term trend component. It is worth noting that we do not include in our short-run estimations the cyclical components of variables relating to e.g. institutional quality and demographics, since they are not expected to exhibit cyclical variation.¹⁰ Therefore, we focus only on the cyclical components of the macroeconomic variables examined in the baseline specification of the structural estimations (i.e. net foreign assets, government balance, relative income and its squared term, trade openness and economic

¹⁰ We have also experimented with alternative specifications including these variables and our results do not alter qualitatively.

growth). In addition, we augment our baseline specification with competitiveness and financial factors (specifically, with credit to GDP and real unit labour cost) that exhibit short-term fluctuations and are expected to affect the cyclical component of the CAB.

We estimate the cyclical specification using the system generalized method of moments (GMM) estimator (Arellano and Bover 1995), including a lagged dependent variable to capture persistence.¹¹ The potentially endogenous variables – net foreign assets and the government primary balance – are instrumented using their own lagged values (lags 2-3), while the remaining controls are treated as predetermined or weakly exogenous and included as standard instruments in the level equation. Also, following Cheung et al. (2013), we estimate an augmented version of our specification that includes per capita oil consumption volume as well as a variable that captures oil price shocks. This latter variable is defined as the Brent crude oil price multiplied by a weight, which is computed as the trend share of oil consumption volume in GDP, relative to the EU average and allows oil price shocks to affect countries asymmetrically, depending on their structural oil dependence. Hence, in this way, both volume and price can affect the short-run fluctuations of the current account. Table 3 presents the resulting estimates.

Our empirical estimations provide statistically significant coefficients for the lagged value of the current account balance, indicating a significant degree of persistence. Moreover, we get a negative statistically significant coefficient for the oil price shock variable, implying intuitively that a short-run rise in oil prices worsens the current account balances. Finally, and most interestingly, we get negative and statistically significant coefficients for the real unit labour cost and the private credit to GDP ratio. Regarding the former, a short-term increase in the real unit labour cost is associated with a deterioration in a country's competitiveness, hurting exports and leading to a decrease in the current account balance. Also, temporary

Table 3 Cyclical determinants (IV-GMM estimations)

Variables	(1)	(2)
(CAB/GDP) _{t-1}	-0.519*** (0.149)	-0.527*** (0.144)
Primary balance/GDP	0.175 (0.256)	0.176 (0.205)
Growth (per capita GDP)	-0.036 (0.056)	-0.032 (0.053)
Trade openness	-0.089 (0.078)	-0.087 (0.085)
NFA/GDP	0.021 (0.024)	0.020 (0.027)
Real Unit Labour Cost	-0.030*** (0.010)	-0.029** (0.011)
Credit to GDP	-0.037* (0.018)	-0.039** (0.018)
Oil consumption per capita		-0.016 (0.019)
Oil shock ¹		-0.005* (0.002)
Constant	-0.001 (0.000)	0.001 (0.001)
Hansen's test p-value	0.329	0.362
Observations	664	664
Number of countries	17	17

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05 and * p<0.1.

¹ Oil shock is defined as the oil price multiplied by a weight, which is defined as the trend share of oil consumption volume in GDP, relative to the EU average. This variable allows oil price shocks to affect countries asymmetrically depending on their structural oil dependence.

increases in the supply of credit are associated with lower saving and higher consumption and investment, i.e. higher aggregate demand. As a result, the rise in imports of capital and consumption goods leads to a deterioration in current account balances over the short run. We find a negative coefficient of trade openness in the cyclical estimation, in contrast to the corresponding structural estimate. This could perhaps be attributed to its definition as the sum of exports and imports over GDP. In this case, it could likely reflect the procyclicality of imports. During economic expansions, open economies experience stronger increases in

¹¹ We also performed several OLS estimations using the same set of control variables and our results are similar to those obtained in GMM estimations. However, we only report GMM estimation results, since we also control for endogeneity issues. Results are available upon request.

their demand for imports – particularly for intermediate and capital goods – which temporarily deteriorates their current account balance. In contrast, the positive effect found in the structural estimation arguably reflects the long-run benefits of trade openness through improved competitiveness and export capacity. The coefficients of the rest of the explanatory variables are of the same sign as in the structural estimations; however, they are not statistically significant. This could suggest that their effects are more relevant at medium-term horizons rather than in driving short-run fluctuations. Thus, they should be interpreted with caution.

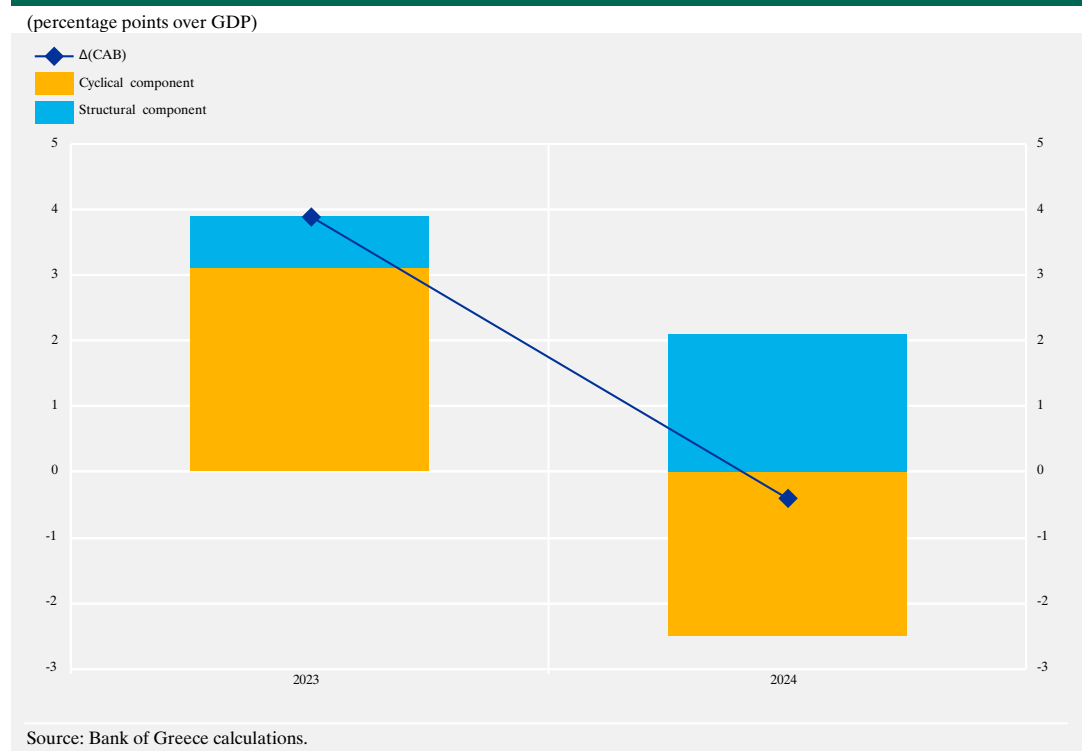
4.3 CONTRIBUTION OF CYCLICAL FACTORS TO CHANGES IN THE GREEK CURRENT ACCOUNT BALANCE

In this section, we apply the estimated cyclical coefficients to the actual change in the Greek current account balance observed in the data, so as to compute the cyclical component of the

recent fluctuations. Specifically, we multiply the estimated coefficients obtained from our baseline panel GMM estimation (column (1) in Table 3) by the constructed cyclical components of our explanatory variables. These calculated values provide an estimate of each variable's short-run (cyclical) contribution to the year-on-year change in the current account balance. Summing up these contributions, we obtain the total estimated cyclical component for each year. The structural contribution is then obtained residually, as the difference between the change in the current account balance and its estimated cyclical component. This residual is interpreted as capturing the underlying and persistent forces influencing Greece's external balance, i.e. those not driven by short-term demand fluctuations.

Chart 4 presents the structural and cyclical contributions to the change of the current account balance for Greece during 2023-24. Despite the fact that the level of the current account deficit is mainly due to structural

Chart 4 Change in the current account balance of Greece, structural and cyclical components



characteristics of the Greek economy (see Bank of Greece (2026), *Annual Report 2025*, Box IV.4), the recent changes in the CAB indicate a gradual improvement in its structural component, with the short-term negative fluctuation of the CAB in 2024 being attributable to cyclical factors.

Our analysis reveals that the 0.4 percentage points widening of the current account deficit in Greece for 2024 (from -6.8% to -7.2%) was primarily driven by cyclical factors. Specifically, the cyclical component made a negative contribution of 2.5 percentage points to the change in the current account balance, reflecting weaker external demand and higher demand for imports. On the contrary, the contribution of structural factors to the change in the current account balance in 2024 was positive, estimated at 2.1 percentage points, but not sufficient to offset the negative impact of the cyclical component. It is worth noting that the contribution of the structural component to the change in the CAB over the last two years remains positive, arguably reflecting the significant structural reforms and improvement in competitiveness of the Greek economy, as well as the gradual establishment of an investment-friendly environment. Moreover, the significant increase in investment recorded in recent years, supported by the funds from the Recovery and Resilience Facility, has been directed to critical sectors such as infrastructure, energy and digital networks. Although the rise in investment may initially increase imports of capital goods and weigh on the current account balance, it is expected to strengthen the productive base of the economy, improve competitiveness and support a more sustainable external position over the medium term.

5 CONCLUSION

This paper examines the structural and cyclical determinants of the current account balances for the European economies in general and Greece in particular and explores to what extent the recent fluctuations in the Greek cur-

rent account balance can be attributed to cyclical or structural components. Applying a two-stage empirical approach, we first decompose the possible determinants of the CAB into their structural and cyclical components, where the structural component is defined as the non-overlapping four-year average, while the cyclical component is defined as the annual deviation from the corresponding overlapping four-year average. Next, we identify the statistically significant structural and cyclical determinants of the current account balances for the European economies. Our empirical findings suggest that medium-term trends of the government budget balance, the net foreign assets position, the degree of trade openness, the stage of economic development and the regulatory quality are significant structural determinants of the CABs. By contrast, the short-term fluctuations in the CAB are primary related to the cyclical component of credit supply and labour costs.

Furthermore, we apply the estimated cyclical coefficients to the actual change in the Greek current account balance observed in the data during 2023-24, so as to derive its total cyclical component. Then, the structural contribution is derived residually, as the difference between the change in the current account balance and the estimated cyclical component. Our analysis indicates that the recent changes in the Greek CAB are associated with an improvement of its structural component, with the short-term negative change of the CAB in 2024 being attributed to cyclical factors. Additionally, we observe a positive contribution of the structural component to the change in the CAB over the last two years (2023-24), implying that the fundamental characteristics and competitiveness of the Greek economy have gradually improved, affecting economic growth and current account balances.

Our findings have significant policy implications. First, maintaining fiscal prudence so as to continue achieving fiscal primary surpluses could be beneficial for the continued improvement of the structural component of

the current account balance. Second, accelerating structural reforms to boost productivity and strengthen the competitiveness and export orientation of Greek businesses can also underpin the narrowing of the persistent current account deficit in Greece. Third, improving productivity and investment in capital goods and reducing dependence on

imports, through the gradual substitution of imported goods with domestically produced goods, should contribute to reducing the sensitivity of the current account balance to short-term (cyclical) fluctuations. Finally, preventing increases in labour costs could contribute to partially offsetting short-term pressures on external balances.

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THE ROLE OF ECONOMIC UNCERTAINTY IN THE INVESTMENT AND EMPLOYMENT GAP IN THE GREEK ECONOMY

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ABSTRACT

This study examines the extent to which economic uncertainty acts as a deterrent to business decisions regarding investment and employment. Focusing on the Greek economy, which has experienced successive and prolonged crises, we find that uncertainty exerts a significant negative impact on economic activity, with the magnitude of this effect varying across sectors, firm size and measurement method. Using microdata from Business and Consumer Surveys (BCS), we construct new uncertainty indices for the Greek economy. These indices are positively correlated with existing measures, while also allowing for a more granular analysis of uncertainty at both the sectoral and firm levels. The macroeconometric analysis shows that uncertainty acts as a constraint on both investment and employment, with effects that are substantial and persistent, lasting beyond one year. The microeconometric analysis further reveals significant heterogeneity and asymmetry in these effects, depending on firms' expectations, sectoral characteristics and firm size. Overall, the findings highlight the importance of measuring and systematically monitoring economic uncertainty. Such measurement enables the timely identification of constraints faced by firms in their investment and employment decisions and provides valuable insights for the design and implementation of policy measures aimed at mitigating the adverse effects of uncertainty and strengthening economic resilience.

Keywords: uncertainty; investment gap; employment

JEL classification: E22; E24; C23; C32

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Ο ΡΟΛΟΣ ΤΗΣ ΟΙΚΟΝΟΜΙΚΗΣ ΑΒΕΒΑΙΟΤΗΤΑΣ ΣΤΟ ΚΕΝΟ ΕΠΕΝΔΥΣΕΩΝ ΚΑΙ ΑΠΑΣΧΟΛΗΣΗΣ ΤΗΣ ΕΛΛΗΝΙΚΗΣ ΟΙΚΟΝΟΜΙΑΣ

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ΠΕΡΙΛΗΨΗ

Η μελέτη αναδεικνύει τον βαθμό στον οποίο η οικονομική αβεβαιότητα δρα ως ανασχετικός παράγοντας στις επιχειρηματικές αποφάσεις για επενδύσεις και απασχόληση. Η εξέταση της περίπτωσης της ελληνικής οικονομίας, η οποία διένυσε μια περίοδο διαδοχικών και παρατεταμένων κρίσεων, δείχνει ότι η οικονομική αβεβαιότητα έχει σημαντική αρνητική επίδραση στην οικονομική δραστηριότητα. Η ένταση της επίδρασης διαφοροποιείται ανάλογα με τον κλάδο, το μέγεθος της επιχείρησης, αλλά και τη μέθοδο μέτρησης. Αξιοποιώντας μικροδοδεμένα από τις έρευνες οικονομικής συγκυρίας, κατασκευάζονται συμπληρωματικοί δείκτες αβεβαιότητας για την ελληνική οικονομία, οι οποίοι σχετίζονται θετικά με υφιστάμενους συγκεντρωτικούς δείκτες και επιπλέον επιτρέπουν την εξέταση της αβεβαιότητας ανά τομέα και επιχείρηση. Από τη μακροοικονομική προσέγγιση προκύπτει ότι η αβεβαιότητα δρα ανασχετικά τόσο στις επενδύσεις όσο και στην απασχόληση, με σημαντική ένταση και διάρκεια, η οποία ξεπερνάει το έτος. Η μικροοικονομική προσέγγιση αναδεικνύει την ύπαρξη σημαντικής ετερογένειας και ασυμμετρίας στις επιδράσεις της αβεβαιότητας, ανάλογα με το είδος των επιχειρηματικών προσδοκιών (θετικές ή αρνητικές), τον τομέα δραστηριότητας και το μέγεθος της επιχείρησης. Συμπερασματικά, η ποιοτική μέτρηση και συστηματική παρακολούθηση της αβεβαιότητας επιτρέπουν αφενός την έγκαιρη καταγραφή των προκλήσεων που εγείρονται για τις επιχειρήσεις αναφορικά με σχέδια επενδύσεων και απασχόλησης, αφετέρου προσφέρουν πολύτιμη τεκμηρίωση για τον σχεδιασμό και την υλοποίηση μέτρων πολιτικής που θα στοχεύουν στην άμβλυνση των αρνητικών επιπτώσεων από κρίσεις αβεβαιότητας και στην ενίσχυση της ανθεκτικότητας της οικονομίας.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Η οικονομική αβεβαιότητα αποτελεί σημαντικό ανασχετικό παράγοντα στις επιχειρηματικές επενδύσεις και στην κατανάλωση των νοικοκυριών, με αρνητικές συνέπειες για την απασχόληση, τα εισοδήματα, την οικονομική ευημερία και την κοινωνική συνοχή. Συνεπώς, η καταγραφή και ανάλυση της έντασης της αβεβαιότητας είναι ιδιαίτερα χρήσιμες προκειμένου, μεταξύ άλλων, να διευκολύνονται οι αποφάσεις των φορέων της αγοράς και να προσαρμόζονται ανάλογα οι προτεραιότητες οικονομικής πολιτικής, με γνώμονα τη βελτίωση της αποτελεσματικότητάς τους.

Στη μελέτη που ακολουθεί χρησιμοποιούνται δύο συμπληρωματικές μεθοδολογικές προσεγγίσεις, προκειμένου να εκτιμηθούν οι ποσοτικές επιδράσεις της αβεβαιότητας στην οικονομική δραστηριότητα. Αφενός, εκτιμώνται μακροοικονομετρικά οι αρνητικές επιδράσεις της αβεβαιότητας στις επενδύσεις και την απασχόληση σε επίπεδο συνολικής οικονομίας και βασικών τομέων, ενώ αναδεικνύεται η διάρκεια των επιδράσεων σε βάθος έως και δύο ετών. Αφετέρου, εκτιμάται μικροοικονομετρικά, δηλαδή με στοιχεία σε επίπεδο επιχείρησης, πώς αυτές οι επιδράσεις διαφοροποιούνται ανά τομέα και μέγεθος επιχείρησης.

Κατασκευή δεικτών αβεβαιότητας

Η μελέτη επικεντρώνεται σε τρεις δείκτες που κατασκευάζονται από στοιχεία της Έρευνας Οικονομικής Συγκυρίας. Ο πρώτος δείκτης αβεβαιότητας υπολογίζεται με βάση τη διασπορά των επιχειρηματικών προσδοκιών: μεγαλύτερη ετερογένεια στις προσδοκίες μεταφράζεται ως υψηλότερη αβεβαιότητα και αντίστροφα. Ο δεύτερος δείκτης βασίζεται στα εκ των υστέρων σφάλματα πρόβλεψης των επιχειρήσεων αναφορικά με τη μελλοντική πορεία της οικονομικής τους δραστηριότητας. Τέλος, ο τρίτος δείκτης αβεβαιότητας κατασκευάζεται σε επίπεδο επιχείρησης και βασίζεται σε απαντήσεις σχετικά με τον βαθμό δυσκολίας πρόβλεψης της μελλοντικής τους ανάπτυξης.

Παρά τη συμμετρία στον τρόπο κατασκευής των δεικτών, γίνεται φανερό ότι η αβεβαιότητα για το σύνολο της οικονομίας επιδεινώνεται συστηματικά σε περιόδους ύφεσης και κρίσης. Επιπλέον, αναδεικνύονται διαφορές στη χρονική καταγραφή της αβεβαιότητας ανάλογα με τη μέθοδο μέτρησης. Για παράδειγμα, φαίνεται ότι η αυξημένη διασπορά μεταξύ των σφαλμάτων πρόβλεψης των επιχειρήσεων συνδέεται με μεγαλύτερη διασπορά στις προβλέψεις που θα διαμορφώσουν το επόμενο τρίμηνο. Η περιγραφική ανάλυση σε επίπεδο επιχείρησης αποτυπώνει τομεακές αποκλίσεις στη διαχρονική εξέλιξη της αβεβαιότητας, καθώς και υψηλότερη ένταση της εκτιμώμενης αβεβαιότητας μεταξύ των μικρότερων επιχειρήσεων.

Μακροοικονομική προσέγγιση

Για το σύνολο της οικονομίας προκύπτει ότι η αύξηση της αβεβαιότητας έχει σημαντικές αρνητικές επιδράσεις στις επενδύσεις και την απασχόληση, με διάρκεια που εκτείνεται σε βάθος πέραν του έτους. Συγκεκριμένα, εκτιμάται ότι μια απρόσμενη αύξηση της αβεβαιότητας κατά μία τυπική απόκλιση οδηγεί σε άμεση υποχώρηση των επενδύσεων κατά περίπου 200 εκατ. ευρώ, η οποία εμφανίζεται ήδη από τα πρώτα τρίμηνα μετά τη διαταραχή και διατηρείται για περίοδο τουλάχιστον δύο ετών. Για την πρώιμη περίοδο της ελληνικής κρίσης (2009-2015), όταν καταγράφηκε σημαντική απόκλιση του ποσοστού επενδύσεων μεταξύ Ελλάδος και ΕΕ27, η αυξημένη αβεβαιότητα εκτιμάται ότι συνέβαλε περίπου στο ένα τέταρτο του ετήσιου επενδυτικού κενού. Αντίστοιχα, η απασχόληση εμφανίζει έντονα αρνητική αντίδραση σε μια αύξηση της αβεβαιότητας, με την επίδραση της τελευταίας να κορυφώνεται τρία τρίμηνα μετά την αρχική διαταραχή. Η μεταβλητότητα των επενδύσεων και της απασχόλησης φαίνεται να επηρεάζεται περισ-

σότερο από διαταραχές στην αβεβαιότητα σε τομείς όπως οι υπηρεσίες και η βιομηχανία. Ενδεικτικά, η όξυνση της αβεβαιότητας στην αρχή της ελληνικής κρίσης (2009-2010) φαίνεται να εξηγεί την πτώση των επενδύσεων στη βιομηχανία κατά 0,5 δισεκ. ευρώ σε βάθος διετίας, που αντιστοιχεί περίπου στο ένα τέταρτο της καταγεγραμμένης μείωσης των επενδύσεων στον τομέα την ίδια περίοδο.

Μικροοικονομική προσέγγιση

Οι επιδράσεις της αβεβαιότητας στις επιχειρηματικές αποφάσεις παρουσιάζουν ασυμμετρία και ετερογένεια, ανάλογα με το εάν οι προσδοκίες της επιχείρησης είναι αισιόδοξες ή απαισιόδοξες, τον τομέα δραστηριότητας, καθώς και το μέγεθος της επιχείρησης. Όσον αφορά το σύνολο της οικονομίας εκτιμάται ότι έως περίπου το 40% της μείωσης της απασχόλησης την περίοδο 2010-2013, καθώς και το ένα τρίτο του καταγεγραμμένου επενδυτικού κενού έναντι της ΕΕ την περίοδο 2009-2015 μπορούν να αποδοθούν στην αβεβαιότητα.

Η επίδραση της αβεβαιότητας στις επενδυτικές αποφάσεις διαφοροποιείται έντονα ανάλογα με τις μελλοντικές προσδοκίες των επιχειρήσεων, καθώς είναι αρνητική όταν η επιχείρηση έχει απαισιόδοξες ή ουδέτερες προσδοκίες, αλλά μη σημαντική όταν οι προσδοκίες είναι αισιόδοξες. Αντίστοιχα, παρατηρείται ασύμμετρη επίδραση της αβεβαιότητας στην απασχόληση, καθώς η ένταση της αρνητικής επίδρασης είναι μεγαλύτερη όταν οι προσδοκίες είναι απαισιόδοξες και μικρότερη όταν είναι αισιόδοξες.

Ο βαθμός επίδρασης της αβεβαιότητας στις επιχειρηματικές αποφάσεις διαφοροποιείται επίσης ανάλογα με το μέγεθος της επιχείρησης. Ενδεικτικά, αναφορικά με τις επενδύσεις, μόνο οι μικρομεσαίες επιχειρήσεις φαίνεται να επηρεάζονται σημαντικά από την όξυνση της αβεβαιότητας. Αυτό αποτελεί ένδειξη ότι η αβεβαιότητα αποτελεί εμπόδιο στη μεγέθυνση και επέκταση των μικρομεσαίων επιχειρήσεων και στον υγιή ανταγωνισμό. Αναφορικά με την απασχόληση φαίνεται ότι οι μεσαίες και μικρές επιχειρήσεις επηρεάζονται πιο έντονα από ό,τι οι μεγάλες, οι οποίες ενδεχομένως συσσωρεύουν εργατικό δυναμικό (labour hoarding) λόγω υψηλότερης ανθεκτικότητας μετά από διαταραχές του οικονομικού κύκλου. Σε τομεακό επίπεδο, οι επενδύσεις στη βιομηχανία φαίνεται να πλήττονται περισσότερο από την όξυνση της αβεβαιότητας, ενώ η απασχόληση μειώνεται σημαντικά σε επιχειρήσεις του δείγματος που δραστηριοποιούνται στη βιομηχανία και το εμπόριο.

Συμπεράσματα

Η αξιοποίηση νέων, συμπληρωματικών δεικτών μέτρησης της αβεβαιότητας συμβάλλει περαιτέρω στην ποσοτικοποίηση των αρνητικών επιδράσεων που έχει η αβεβαιότητα στα επιχειρηματικά σχέδια για επενδύσεις και απασχόληση στην ελληνική οικονομία. Επιπλέον, αναδεικνύει τη σημαντική ετερογένεια αυτών των επιδράσεων, ανάλογα με το είδος των προσδοκιών (θετικές ή αρνητικές), τον κλάδο και το μέγεθος των επιχειρήσεων. Η ποσοτική μέτρηση και η συστηματική παρακολούθηση της αβεβαιότητας επιτρέπουν την έγκαιρη καταγραφή των προκλήσεων που εγείρονται για τις επιχειρήσεις αναφορικά με επικείμενα σχέδια για τις επενδύσεις και την απασχόληση. Παράλληλα, προσφέρουν πολύτιμη τεκμηρίωση για τον σχεδιασμό και την υλοποίηση μέτρων πολιτικής που θα στοχεύουν στην άμβλυνση των αρνητικών επιπτώσεων σε μελλοντικές περιόδους αβεβαιότητας και την ενίσχυση της ανθεκτικότητας των επιχειρήσεων και ευρύτερα της οικονομίας.

THE ROLE OF ECONOMIC UNCERTAINTY IN THE INVESTMENT AND EMPLOYMENT GAP IN THE GREEK ECONOMY*

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I INTRODUCTION

Economic uncertainty has emerged as a significant deterrent to investment and household consumption, with adverse effects on employment, income, economic performance and social cohesion. Measuring and analysing uncertainty is therefore essential for supporting decision-making by economic agents and for guiding effective economic policy.

Empirical evidence from the literature highlights two key stylised facts. First, uncertainty increases during periods of recession and major economic or political shocks. Second, higher uncertainty is negatively associated with key macroeconomic variables, such as output, investment and employment. Uncertainty leads firms to postpone investment and hiring decisions (“wait-and-see” behaviour), while indirectly increasing financing costs through the financial system. At the same time, the relationship is bidirectional, as economic downturns can themselves generate additional uncertainty.

The aim of this study is to examine the relationship between uncertainty and firms’ decisions regarding investment and employment,

controlling for key macroeconomic factors. In addition to examining existing uncertainty indices for the Greek economy, the study constructs new indices at broad sectoral level (Industry, Construction, Retail Trade and Services) and firm level, using microdata from the Business and Consumer Surveys (BCS).¹

The main research question concerns the impact of uncertainty on investment and employment at the aggregate, sectoral and firm levels. In this context, the study contributes to the literature in three ways: (a) it focuses on Greece during a highly volatile period due to successive crises; (b) it develops new uncertainty indices based on microdata; and (c) it highlights heterogeneity in the effects of uncertainty across sectors and firm characteristics, such as size.

The literature proposes three main approaches to measuring uncertainty: (a) text-based indices derived from news coverage; (b) financial market indicators reflecting risk conditions;

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¹ For more information on the BCS, see footnote 6.

and (c) survey-based measures capturing the dispersion and volatility of expectations. This study adopts the third approach, constructing new monthly uncertainty indices for Greece based on BCS data and assessing their robustness through comparison with existing indicators.

Uncertainty has been shown to constrain investment and employment at the European level (EIB 2024) and has played a central role during the Greek debt crisis (Hardouvelis et al. 2024). Despite recent improvements, the Greek economy continues to exhibit an investment gap and relatively low employment levels compared to other European countries. This raises an important policy question regarding the role of uncertainty reduction in supporting economic recovery.

The study is structured as follows: Section 2 presents the literature review; Section 3 describes the methodological framework; Section 4 presents the empirical results; and Section 5 concludes.

2 LITERATURE REVIEW

In recent years, recurring economic downturns, coupled with heightened uncertainty in the global economic environment, have led to extensive research on the role of uncertainty in shaping economic activity. Although uncertainty is a key determinant of economic decisions, it remains methodologically difficult to capture, as it is not directly observable. This makes it particularly challenging to assess its precise impact on economic outcomes.

Economic uncertainty can be defined as a situation in which future economic outcomes, events or conditions cannot be predicted with certainty by economic agents (Bloom 2014). In other words, it reflects situations in which the probabilities of an event occurring or not are, in essence, impossible to determine (Runde 1998). In this context, Jurado et al. (2015) define uncertainty as the component of a variable's volatility that cannot be explained or

predicted based on the information available at the time of forecasting. Similarly, Carriero et al. (2018) argue that uncertainty is the part of volatility that is common across multiple macroeconomic and financial variables. That is, uncertainty is defined in terms of how synchronised volatility increases across multiple variables simultaneously.

Given that uncertainty is not directly measurable, unlike variables such as GDP, inflation or unemployment, there is no single, universally accepted uncertainty indicator (Bloom 2014). As a result, the literature has developed various methodologies for its empirical approximation. Broadly, three main approaches are used: (a) text-based measures, which record the frequency of keywords and phrases in news coverage; (b) survey-based indicators, which utilise data from economic sentiment surveys to capture the dispersion and volatility of market participants' expectations; and (c) measures based on the volatility of macroeconomic and financial variables.

A prominent example of the first approach is the Economic Policy Uncertainty (EPU) index developed by Baker et al. (2016), which is based on the frequency of specific keywords in ten major US newspapers. Specifically, the index counts the number of articles that simultaneously refer to economy-, policy- and uncertainty-related terms divided by the total number of articles. This methodology has been applied to the Greek economy by Fountas et al. (2018) and Hardouvelis et al. (2024), who constructed similar indices using domestic press sources.² Meanwhile, Ahir et al. (2018) developed the World Uncertainty Index (WUI), covering 143 countries,³ based on the frequency of the term “uncertainty” (and its derivatives) in reports published by the *Economist Intelligence Unit*.

² Fountas et al. (2018) developed a monthly index using articles from *Kathimerini* that simultaneously include terms related to the economy, policy and uncertainty. Hardouvelis et al. (2024) extended this approach by using a broader set of keywords and a larger sample of newspapers (*To Vima*, *Ta Nea*, *Naftemporiki* and *Kathimerini*), producing a range of uncertainty indices for Greece.

³ Greece included.

An alternative approach relies on business survey data. Bachmann et al. (2013) constructed uncertainty indices using microdata from business surveys in Germany and the US, based on both ex-ante forecast disagreement and ex-post forecast errors, and found a strong correlation between these measures.⁴ A key advantage of this approach lies in the fact that it measures uncertainty directly from the perspective of firms, i.e. the actual decision-makers, rather than external experts or market-based proxies.

More recently, Business and Consumer Surveys (BCS) have incorporated explicit questions on uncertainty, further enhancing measurement capabilities. Since 2021, the harmonised questionnaires used in BCS have included questions regarding the ease with which future business activity can be predicted.⁵ This development has increased research interest, as reflected in the annual EU BCS Workshops and in relevant studies. For example, Sabourin (2024) examines how uncertainty affects household expectations and consumption behaviour, while Hölzl (2025) explores the relationship between uncertainty and elections in Austria using BCS microdata. Other contributions, such as those of Claveria (2020), analyse sectoral uncertainty during the COVID-19 pandemic using cross-country survey data.

These developments have significantly improved the understanding of uncertainty dynamics and their interaction with broader economic conditions. Empirical evidence consistently shows that uncertainty is counter-cyclical, increasing during periods of economic downturn and major shocks. Bloom (2009) documents sharp rises in uncertainty during events such as the Cuban Missile Crisis, the assassination of J.F. Kennedy, the 1973 oil crisis and the 9/11 terrorist attacks in the US. Similar patterns are observed in the EPU index developed by Baker et al. (2016), which peaks during the Gulf Wars, the collapse of Lehman Brothers and the European debt crisis.

Bachmann et al. (2013) find that uncertainty rises significantly during recessions in both

Germany and the US, a result also confirmed by Bloom (2014), who emphasises that uncertainty tends to increase sharply during downturns and decline during recovery phases. Moreover, uncertainty appears to be more pronounced in developing economies. Jurado et al. (2015) and Ludvigson et al. (2021) further confirm its countercyclical behaviour, while Scotti (2016) documents increases in uncertainty during the 2008-2009 financial crisis and the subsequent European debt crisis.

The countercyclical nature of uncertainty has led to extensive research on its impact on key economic variables such as output, investment and employment. Empirical studies show that increases in uncertainty have negative and often persistent effects on economic activity. Bachmann et al. (2013) find that sharp increases in uncertainty lead to declines in output and employment in both Germany and the US, with stronger and more persistent effects in the latter. Similarly, Jurado et al. (2015) show that higher uncertainty reduces real economic activity and employment.

Basu and Bundick (2017) demonstrate that uncertainty shocks lead to declines in investment and employment, with peak effects occurring after one year. Baker et al. (2016) estimate that increases in uncertainty can reduce investment by up to 6% and employment by 0.35% in the US. Leduc and Liu (2016), using survey data from households, find that uncertainty shocks lead to sustained increases in unemployment lasting up to three years. Scotti (2016) reports similar findings, while Gatopoulos et al. (2019) highlight the role of uncertainty in weakening economic activity in Greece during the debt crisis.

⁴ As noted by Bachmann et al. (2013), ex-ante forecast disagreement has been used extensively to estimate the level of uncertainty. See, among others, Zarnovitz and Lambros (1987); Ferderer (1993); Bomberger (1996); Giordano and Söderlind (2003); Bond and Cummins (2004); Fuss and Vermeulen (2008); Clements (2008); Popescu and Smets (2010); and Baker et al. (2016).

⁵ Respondents are asked to select from the following options: easy, moderately easy, moderately difficult, difficult. BCS in Greece are conducted on a monthly basis by the IOBE. For more information on the BCS, see footnote 6.

Beyond macroeconomic effects, the literature also examines the impact of uncertainty at the firm level. One strand of research uses aggregate uncertainty indices to analyse firm performance (Vardar et al. 2025), while another constructs firm-specific measures of uncertainty (Fiori and Scoccianti 2023). Alternative proxies include stock price volatility (Leahy and Whited 1996; Bond and Cummins 2004), analysts' earnings forecasts (Bond and Cummins 2004) and text-based indicators derived from corporate reports (He et al. 2022). In the Greek context, business survey data have been used to measure sales predictability (Botsis et al. 2024).

Empirical studies have also investigated the relationship between firm-level investment and uncertainty using survey-based measures (e.g. Kang et al. 2014). Guiso and Parigi (1999), using survey data from Italian firms, find that uncertainty weakens Italian firms' response to demand. Similarly, Bontempi et al. (2010) and Bianco et al. (2013) show that investment is particularly sensitive to uncertainty in family-owned firms, with higher uncertainty leading to reduced investment activity. Kolev and Randall (2024), analysing European firms, find a statistically significant negative effect of uncertainty on both investment and employment.

Several theoretical concepts have been proposed to explain these findings. A widely accepted explanation is the presence of adjustment frictions, which give rise to the “wait-and-see” effect (Bernanke 1983; Dixit and Pindyck 1994; Bloom 2009; and Bloom et al. 2018). Under conditions of uncertainty, firms postpone irreversible decisions, such as investment and hiring, until more information becomes available, leading to a temporary slowdown in economic activity.

Another explanation focuses on financial frictions. Increased uncertainty raises the perceived risk of investment and the cost of external financing, thereby reducing firms' access to capital and limiting investment activity (Gilchrist et al. 2014; Christiano et al. 2014; Arellano et al. 2019).

However, part of the literature emphasises reverse causality, arguing that uncertainty may also arise as a consequence of economic downturns rather than solely as their cause. According to this “by-product” hypothesis, recessions disrupt established economic relationships and business practices, thereby creating an environment of increased uncertainty (Bachmann and Moscarini 2011).

3 METHODOLOGY

3.1 CONSTRUCTION OF UNCERTAINTY INDICES

In addition to existing measures, this study develops two new uncertainty indices for the Greek economy using primary data from the monthly Business and Consumer Surveys (BCS)⁶, following the methodological framework of Bachmann et al. (2013). These indices capture uncertainty both at broad sectoral level (Industry, Construction, Retail Trade and Services) and for the economy as a whole. Specifically, they are based on ex-ante forecast disagreement (EXAFD) and ex-post forecast errors (EXPFE) regarding firms' expectations of future economic activity.

Covering approximately 700 firms per month, BCS provide detailed information on past and expected business conditions across key sectors, which form a suitable basis for the construction of uncertainty indices (see Table 1).

To construct the uncertainty index based on ex-ante forecast disagreement (EXAFD), responses on firms' expectations regarding future activity are used (Industry – Q5, Construction – Q4, Services – Q3, Retail Trade – Q4). Let $POS_{i,t}$ denote the percentage of firms in sector i at time t expecting an increase in activity and $NEG_{i,t}$ the percentage expecting a decrease. The sectoral uncertainty index is defined as:

⁶ The BCS have been conducted by the IOBE since 1981 on behalf of the European Commission, as part of the Joint Harmonised EU Programme of BCS, managed by the DG ECFIN.

Table 1 BCS questions for the construction of uncertainty indices

Sector	Questions
Industry	Q1. How has your production developed over the past 3 months? It has: a) Increased, b) Remained unchanged, c) Decreased
	Q5. How do you expect your production to develop over the next 3 months? It will: a) Increase, b) Remain unchanged, c) Decrease
Construction	Q1. How has your building activity developed over the past 3 months? It has: a) Increased, b) Remained unchanged, c) Decreased
	Q4. How do you expect your firm's total employment to change over the next 3 months? It will: a) Increase, b) Remain unchanged, c) Decrease
Services	Q2. How has demand for your company's services changed over the past 3 months? It has: a) Increased, b) Remained unchanged, c) Decreased
	Q3. How do you expect the demand for your company's services to change over the next 3 months? It will: a) Increase, b) Remain unchanged, c) Decrease
Retail Trade	Q1. How have your business sales developed over the past 3 months? They have: a) Increased, b) Remained unchanged, c) Decreased
	Q4. How do you expect your business sales to change over the next 3 months? They will: a) Increase, b) Remain unchanged, c) Decrease

Note: All questions follow the [guidelines](#) of the DG ECFIN on the harmonised BCS.

$$EXAFD_{i,t} = \sqrt{(POS_{i,t} + NEG_{i,t}) - (POS_{i,t} - NEG_{i,t})^2} \quad (1)$$

The aggregate index for the total economy is obtained as the weighted average of sectoral indices, where the weights $w_{i,t}$ correspond to each sector's share in Gross Value Added (GVA):

$$EXAFD_t = \sum_{i=1}^4 w_{i,t} EXAFD_{i,t} \quad (2)$$

Greater disagreement among firms about future business conditions leads to higher values of the $EXAFD_i$ index. This dispersion in expectations signals difficulty in forming a common forecast, reflecting increased uncertainty about economic prospects. Conversely, when firms share similar expectations, disagreement is limited, forecasts converge and the index remains low, indicating a more predictable and certain economic environment.

A second measure is based on ex-post forecast errors (EXPFE), capturing deviations between firms' expectations and realised outcomes. For each firm j , the forecast error is defined as:

$$FE_{j,t} = Real_{j,t+3} - Forecast_{j,t} \quad (3)$$

where $Forecast_{j,t}$ denotes the expected change in activity over the next quarter and $Real_{j,t+3}$ the realised outcome. Responses are coded as +1 (increase), 0 (no change) and -1 (decrease), generating forecast errors ranging from -2 to +2 (see Table 2).

The uncertainty index based on the ex-post forecast errors (EXPFE_{*i,t*}) is defined as the standard deviation of the forecast errors of all firms j in sector i at time t :

$$EXPFE_{i,t} = \text{std}(FE_{j,t}) \quad (4)$$

Similarly with the $EXAFD_i$ index, the aggregate index for the total economy is computed as the weighted average of the sectoral indices:

$$EXPFE_t = \sum_{i=1}^4 w_{i,t} EXPFE_{i,t} \quad (5)$$

High values of $EXPFE_t$ indicate greater dispersion in firms' forecast errors, signalling strong real uncertainty and difficulty in predicting future business conditions. Conversely, when forecast errors are small and similar across firms, the index remains low, reflecting a more predictable environment, where firms can assess the future more accurately.

Table 2 Possible values of ex-post forecast errors

	<i>Real_{j,t+3}</i>		
	Increase (+1)	Remain unchanged (0)	Decrease (-1)
<i>Forecast_{j,t}</i>	Increase (+1)	0	-1
	Remain unchanged (0)	+1	0
	Decrease (-1)	+2	+1

Note: For example, if a firm predicts that its economic activity will increase in the following quarter, then *Forecast_{j,t}* = +1. If, however, at the end of that quarter, its activity decreases, i.e. *Real_{j,t+3}* = -1, then the forecast error is *FE_{j,t}* = -2.

Finally, a supplementary index based on the mean absolute forecast error (*MEXPFE_t*) is also constructed. In this context, equation (6) presents this index at the sectoral level, while equation (7) defines it for the total economy:

$$MEXPFE_{i,t} = \text{mean}(|FE_{j,t}|) \quad (6)$$

$$MEXPFE_t = \sum_{i=1}^4 w_{i,t} MEXPFE_{i,t} \quad (7)$$

In addition to aggregate indices, firm-level uncertainty indices are constructed to examine how uncertainty affects firms' performance and decision-making, taking into account firm-specific characteristics. These indices are also based on primary data from the monthly BCS.

The micro-based index is derived from firms' responses regarding the ease with which future business activity can be predicted.⁷ Responses are coded as a categorical variable ranging from 1 (easy) to 4 (difficult), with higher values indicating greater uncertainty.⁸

3.2 MACROECONOMETRIC MODEL

In this study, a Vector Error Correction Model (VECM) is employed to analyse the dynamic interactions and interdependencies among the variables of interest. The VECM provides a suitable framework for capturing both short-run dynamics and long-run equilibrium relationships, making it particularly useful for examining the transmission of shocks.

For *k* endogenous variables, the VECM model can be expressed in matrix form as:

$$\Delta Y_t = \alpha + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (8)$$

where

$\Pi = \sum_{i=1}^p A_i - I_k$, $\Gamma_i = -\sum_{j=i+1}^p A_j$, $Y_t = [y_{1,t}, y_{2,t}, \dots, y_{k,t}]'$ is a $k \times 1$ vector of endogenous variables, A_i are the $k \times k$ matrices of the coefficients, α is a $k \times 1$ vector of constants and ε_t is a $k \times 1$ vector of error terms assumed to be white noise. The matrix I_k denotes the $k \times k$ identity matrix.

The matrix Π contains information about the long-run relationships among the variables and can be decomposed as $\Pi = \omega \mu'$, where μ represents the cointegrating vectors and ω the speed of adjustment coefficients.

3.3 MICROECONOMETRIC MODEL

This section presents the model used to estimate the effect of uncertainty on investment and employment at the firm level:

$$Y_{ist} = \beta_1 \text{Uncertainty}_{ist} + \beta_2 \text{firm controls}_{ist} + \delta_{st} + \varepsilon_{ist} \quad (9)$$

⁷ The exact wording of the question in the Industry, Services, Retail Trade and Construction survey is: "The future development of your business situation is currently a) easy to predict, b) moderately easy to predict, c) moderately difficult to predict and d) difficult to predict".

⁸ Data for this measure are available from May 2021, implying a relatively limited time series.

The dependent variable Y_{ist} is defined in two alternative ways: (i) the firm's gross investment as a percentage of net tangible fixed assets from the previous period and (ii) the annual percentage change in employment. Gross investment is calculated as the change in net tangible fixed assets plus depreciation. The indices i , s and t denote firm, sector and year, respectively.

The main explanatory variable, $Uncertainty_{ist}$, captures firms' subjective perceptions of the difficulty in forecasting future activity, based on microdata from the BCS. The dataset covers the period 2021-2024 and includes approximately 1,000 firms, allowing for cross-sectional analysis of firm heterogeneity. The vector $firm\ controls_{ist}$ includes control variables that may influence firms' investment decisions, notably firm size dummies. The term δ_{st} captures year and sector fixed effects, controlling common characteristics across time and sectors. Finally, ε_{ist} denotes the error term.

4 EMPIRICAL ANALYSIS

4.1 DATA AND DESCRIPTIVE ANALYSIS

To assess the impact of uncertainty on invest-

ment and employment, the analysis combines the newly-constructed uncertainty indices with data on gross fixed capital formation, employment, gross value added and interest rates. Table 3 summarises the variables used in both the macroeconomic and microeconomic estimations.

Table 4 presents the correlation coefficients between the various uncertainty indices. Most indices exhibit positive and statistically significant correlations, indicating that, despite methodological differences, they consistently capture fluctuations in uncertainty in the Greek economy. This is further supported by Charts 1 and 2, where the indices display similar trends and peaks during periods of heightened uncertainty.

More specifically, the EXAFD index shows a positive and statistically significant correlation with the uncertainty index developed by Fountas et al. (2018) (FKT), suggesting that higher uncertainty in news-based measures is associated with greater dispersion in business expectations. The EXPFE index shows a weaker but still positive correlation with the uncertainty index developed by Hardouvelis et al. (2024) (HKKS), while EXAFD and EXPFE are also

Table 3 Variables

Variable	Description	Source
<i>Macroeconomic</i>		
EXAFD	Uncertainty index	BCS (IOBE)
EXPFE	Uncertainty index	BCS (IOBE)
GFCF	Gross fixed capital formation	Eurostat (namq_10_an6)
GVA	Gross value added	Eurostat (namq_10_a10)
EMP	Employment	Eurostat (lfsq_egan2)
Spread	Interest rate spread between new business loans and the euro area average	European Central Bank (MIR.M.GR.B.A2I.AM.R.A.2240.EUR.N)
<i>Microeconomic</i>		
Uncertainty	Average value of the subjective firm uncertainty index	BCS (IOBE)
Future Expectations	Average value of firm forecasts in the same year	BCS (IOBE)
Investment Rate	Ratio of gross investment to the previous period's net capital	ICAP Data.prisma
Employment Growth	Firm employment growth rate	ICAP Data.prisma
Size	Firm size based on turnover	ICAP Data.prisma

Table 4 Correlation matrix of uncertainty indices

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) WUI	1.000					
(2) FKT	0.556***	1.000				
(3) HKKS	0.133	0.456***	1.000			
(4) EXAFD	0.173*	0.315***	0.146	1.000		
(5) EXPFE	-0.014	0.106	0.245**	0.291**	1.000	
(6) MEXPFE	0.031	0.059	0.182	0.114	0.916***	1.000

Notes: Each correlation between two variables is calculated based on the longest available time series. In particular, the correlations of the EXAFD index, as well as the correlations between the existing uncertainty indices (WUI, FKT, HKKS), refer to the period 1998 Q1-2024 Q3, whilst those of the EXPFE and MEXPFE indices refer to the period 2008 Q1-2024 Q3. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

positively correlated. A particularly strong correlation is observed between EXPFE and MEXPFE.

These findings suggest that the indices are largely complementary rather than identical, capturing different aspects of uncertainty. News-based indices reflect the broader climate

of uncertainty, while survey-based indices capture uncertainty as perceived by actual decision-makers (Bachmann et al. 2013).⁹ This is illustrated more clearly in Chart 3, where periods of high uncertainty according to the FKT

⁹ An examination of the correlations between different lags of the uncertainty indices does not provide clear evidence that any of these indices can function as leading indicators.

Chart 1 EXAFD index and existing uncertainty indices (1998 Q1-2024 Q3)

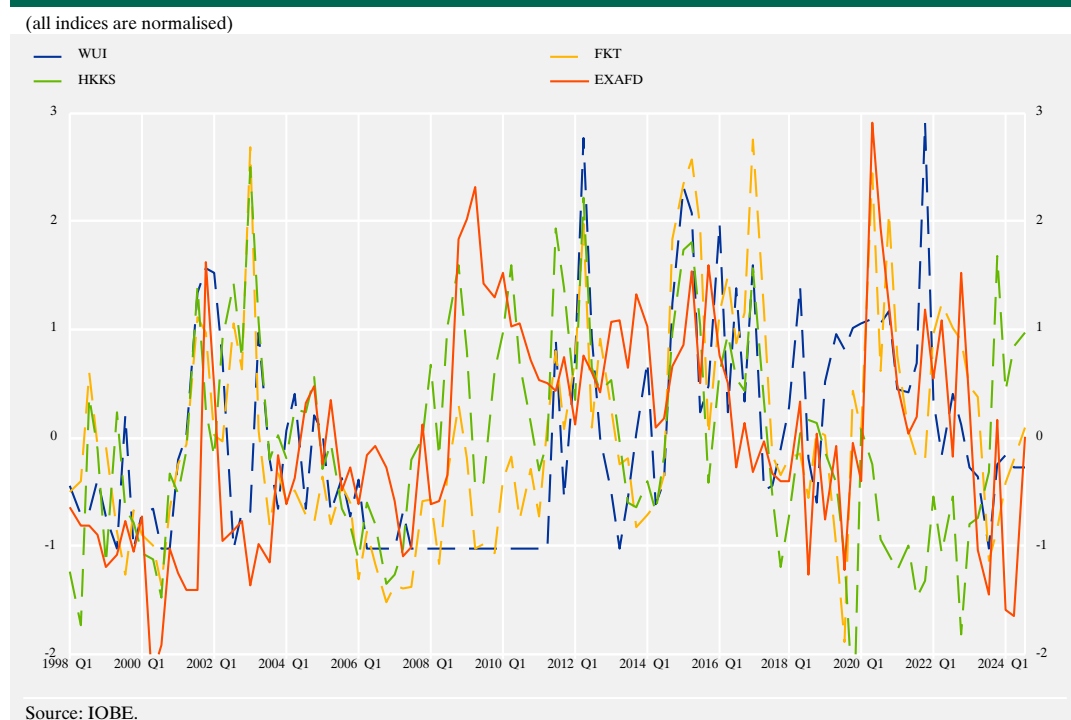
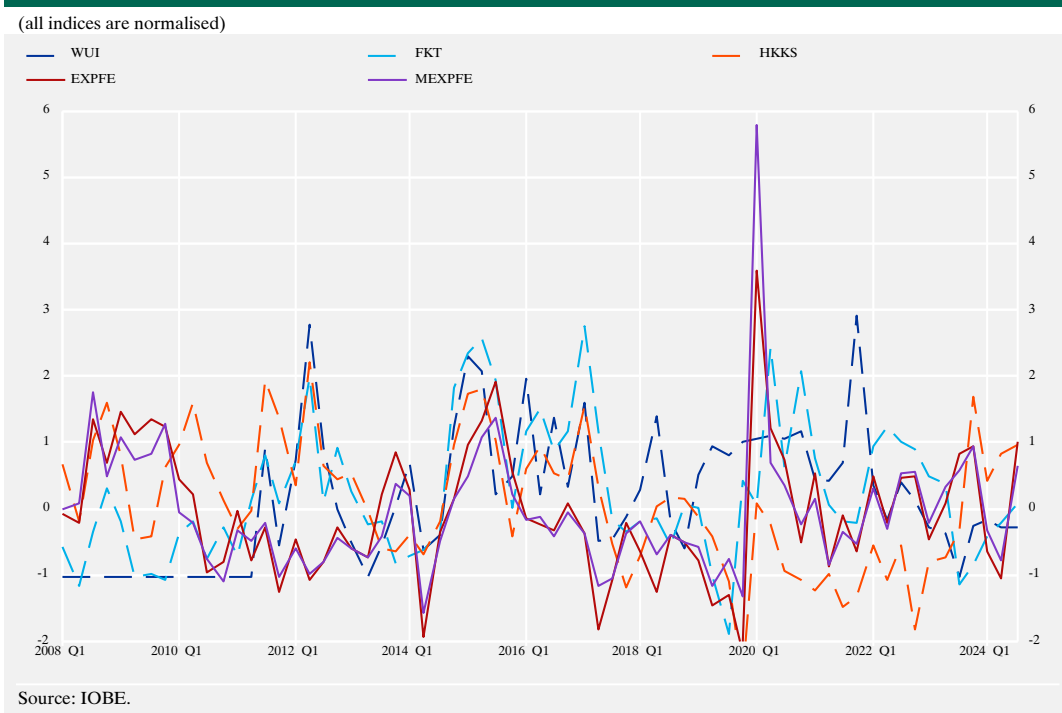


Chart 2 EXPFE, MEXPFE and existing uncertainty indices (2008 Q1 – 2024 Q3)



index coincide with above-average values of both EXAFD and EXPFE.

In particular, Chart 3 presents the evolution of the EXAFD and EXPFE indices, revealing a sequence of distinct phases of high uncertainty, which are directly linked to major economic, political and geopolitical events. After relatively low levels in the early period, an increase in 2001 reflects global shocks (i.e. the terrorist attack of 11/9 in the US, the dot-com crisis), while at the same time the Greek economy was preparing for its transition to the euro, which took place in January 2002. A sharp increase follows the 2008 global financial crisis, with persistently high levels during the 2010-2016 debt crisis, particularly in 2015-2016 amid heightened political and financial instability. Additional peaks are observed during the COVID-19 pandemic and the 2022 energy crisis associated with the Russia-Ukraine war.

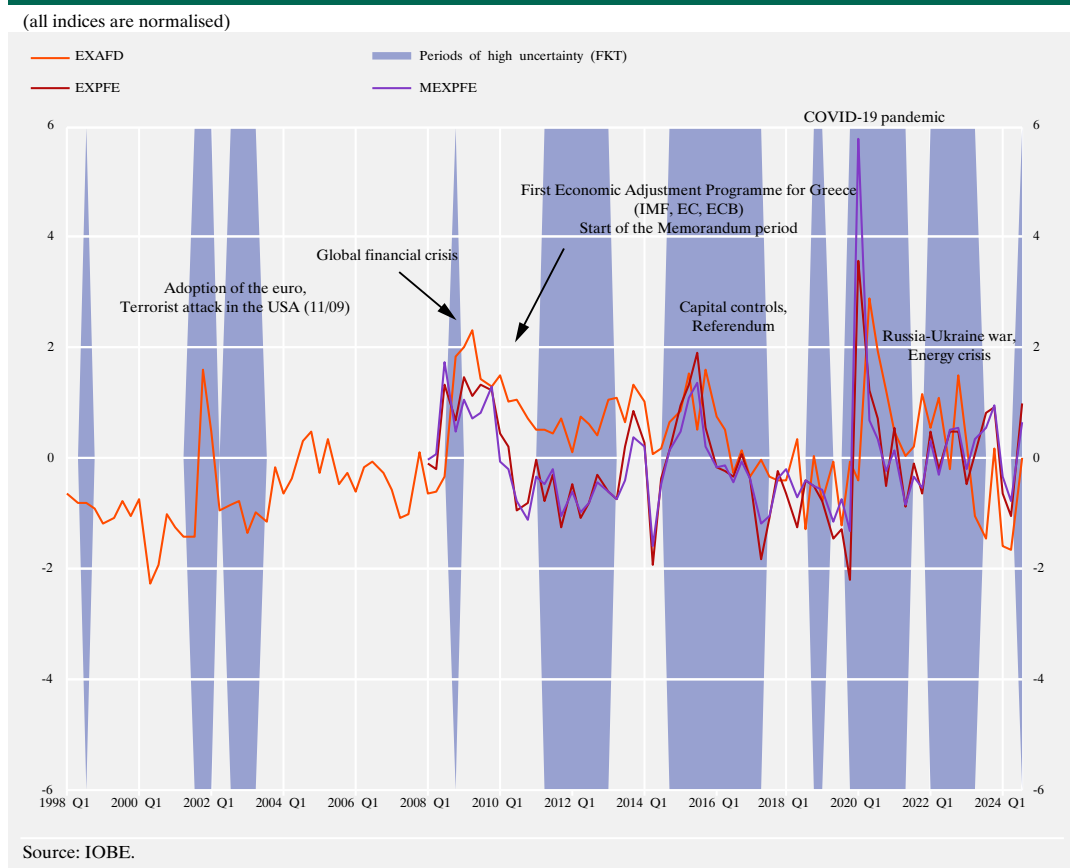
Notably, the EXPFE index appears to lead EXAFD by one quarter, as confirmed by the positive and statistically significant correlation

between $EXAFD_t$ and $EXPFE_{t-1}$ ($p=0.494$), suggesting that increased dispersion among firms' realised forecast errors is associated with greater dispersion in the forecasts they will make for the following quarter.

Chart 4 further shows that EXAFD and EXPFE identify similar periods of high uncertainty, although EXAFD captures more frequent and prolonged periods of high uncertainty. The divergence observed during 2010-2013 reflects the fact that, although firms had heterogeneous expectations regarding the future course of their activity, leading to relatively high values for the EXAFD index, most of them made negative forecasts, which were ultimately confirmed. Consequently, forecast errors remained relatively small and with low dispersion, resulting in the EXPFE index recording lower values.

In summary, despite methodological differences, all indices consistently capture periods of heightened uncertainty associated with major shocks in the Greek economy. In this

Chart 3 EXAFD, EXPFE and MEXPFE indices over periods of high uncertainty identified by FKT (1998 Q1-2024 Q3)



context, the newly-developed indices prove particularly useful, as they capture uncertainty from the perspective of firms, that is, the actual decision-makers.

In what follows, an initial assessment of the relationship between uncertainty, investment

and employment is conducted using the EXAFD and EXPFE indices.

According to Table 6, there is substantial variation in investment across sectors, both in scale and in investment intensity (GFCF/GVA), reflecting the structural characteristics of the

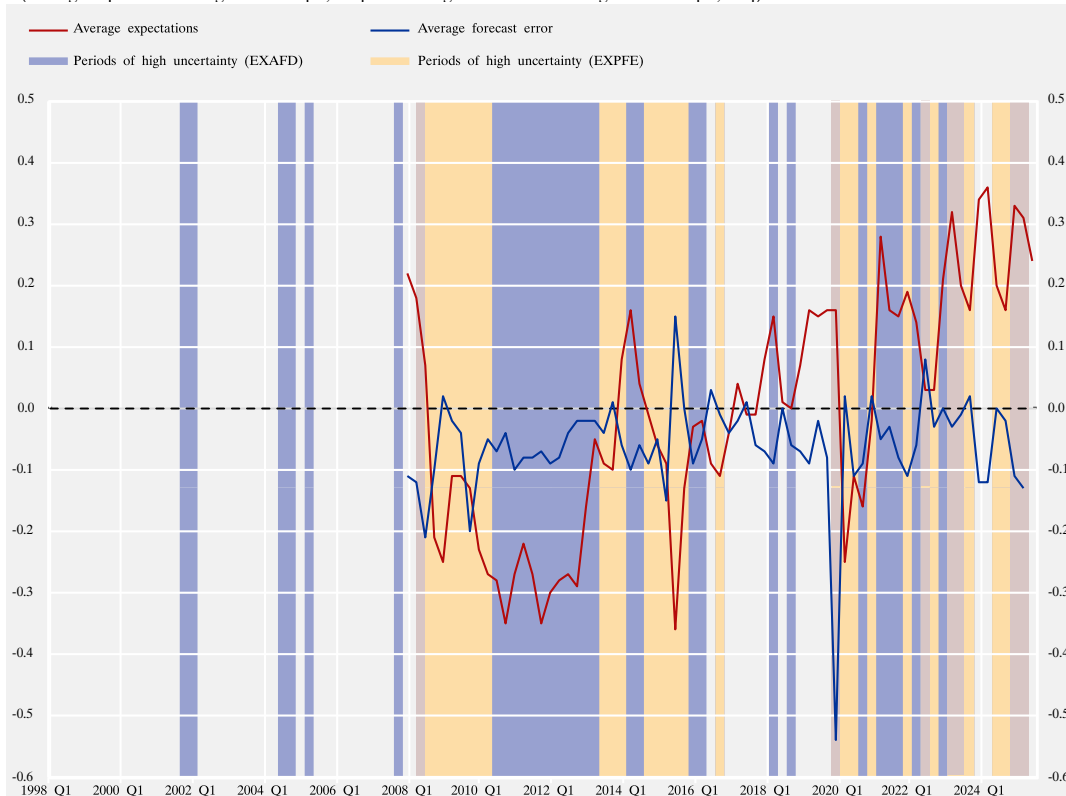
Table 5 Correlation matrix of new uncertainty indices

Variables	(1)	(2)	(3)	(4)	(5)
(1) EXAFD	1.000				
(2) EXPFE	0.291**	1.000			
(3) MEXPFE	0.114	0.916***	1.000		
(4) L.EXPFE	0.494***	0.382***	0.209*	1.000	
(5) L.MEXPFE	0.434***	0.371***	0.240**	0.916***	1.000

Note: The correlations between the new uncertainty indices refer to the period 2008 Q2-2025 Q2. The coefficient (L.) denotes a one period lag ($t-1$). The symbols *, ** and *** denote statistical significance at the 10%, ** 5% and 1% levels, respectively.

Chart 4 Periods of high uncertainty identified by EXAFD and EXPFE (1998 Q1-2025 Q3)

(average expectations range between [-1, +1] and average forecast error ranges between [-2, +2])



Source: IOBE.

Greek economy. The Services sector records the highest average investment (around EUR 3.6 billion), while Industry and Retail Trade exhibit lower but more stable levels. In terms of investment intensity, the total economy averages around 20%, with higher ratios in Construction and Services and consistently lower levels in Retail Trade.

As shown in Chart 5, total investment follows three broad phases. Between 1998-2007, it increased steadily, peaking at EUR 16.1 billion. This was followed by a sharp decline (2008-2016), with investment falling by nearly 65% due to the global financial crisis, the domestic debt crisis, reduced bank financing and the heightened uncertainty prevailing during that period. Since 2017, investment has gradually recovered, although it remains below pre-crisis levels. A temporary slowdown

occurred in 2020 due to the COVID-19 pandemic, followed by a rebound supported by the Recovery and Resilience Facility (RRF). Despite this recovery, the investment gap relative to the EU27 has widened since 2009 and remains above 5 percentage points of GDP in 2024.¹⁰

Regarding the relationship between uncertainty and investment, the results in Table 7 indicate a negative and statistically significant relationship between most uncertainty indices and total investment, suggesting that higher uncertainty acts as a deterrent to investment activity. Furthermore, a negative and statistically significant correlation between the EXAFD index and investment is observed for the Services and Construction sectors,

¹⁰ https://ec.europa.eu/eurostat/databrowser/view/nama_10_an6_custom_21109050/default/table?lang=en.

Table 6 Descriptive statistics for GFCF (1998 Q1-2025 Q2)

Variables	Count	Mean	SD	Min	Max	Skewn.	Kurt.
<i>EUR millions</i>							
Total economy	110	8415.03	3030.226	4316.4	16084.5	.327	1.955
Industry	110	973.113	228.686	484.143	1466.151	.065	2.391
Construction	110	1055.62	764.54	157.046	2975.245	.447	1.969
Retail Trade	110	489.288	148.086	268.582	912.046	.679	2.865
Services	110	3652.43	1853.447	1386.891	8143.16	.342	1.75
<i>Investment intensity (GFCF/GVA)</i>							
Total economy	110	.198	.059	.114	.317	.07	1.423
Industry	110	.163	.035	.089	.221	-.226	1.888
Construction	110	.231	.124	.056	.472	-.053	1.516
Retail Trade	110	.092	.024	.049	.144	.027	2.323
Services	110	.223	.112	.086	.415	.203	1.294

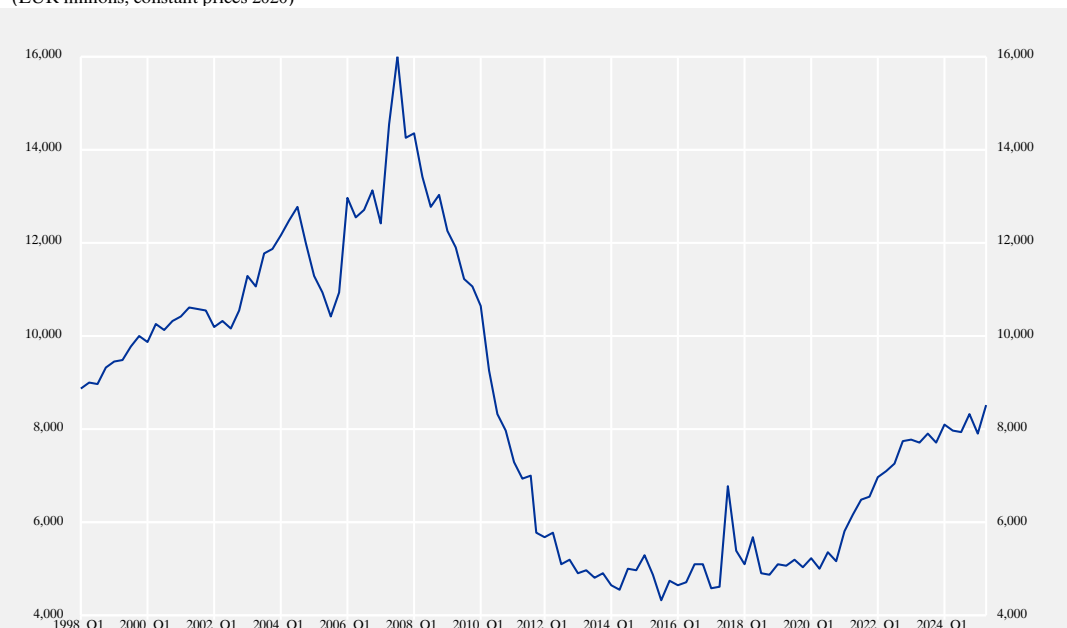
whereas, for Industry and Retail Trade, the correlations are not statistically significant.

When focusing on periods of prolonged uncertainty (Table 8), the negative relationship

becomes stronger for both total investment and investment in the Services and Construction sectors. Furthermore, the correlation between uncertainty and investment in the Industry and Retail Trade sectors remains weaker but still

Chart 5 GFCF in the total economy (1998 Q1-2025 Q2)

(EUR millions; constant prices 2020)



Sources: Eurostat. IOBE calculations.

Table 7 Correlation between uncertainty indices and GFCF

Variables	WUI	FKT	HKKS	EXAFD	EXPFE
Total economy	-0.538***	-0.505***	-0.044	-0.322***	0.275**
Industry	-0.072	-0.113	-0.238**	-0.119	0.294**
Construction	-0.555***	-0.508***	-0.006	-0.265***	0.205*
Retail Trade	-0.279***	-0.26***	-0.031	0.031	0.232*
Services	-0.551***	-0.523***	-0.038	-0.323***	0.174

Note: Each correlation between two variables is calculated using the longest available time series. Specifically, the correlation between GFCF and the WUI, FKT and HKKS indices refers to the period 1998 Q1-2024 Q3; the correlation with the EXAFD index refers to 1998 Q1-2025 Q2; and the correlation with the EXPFE index refers to 2008 Q1-2025 Q2. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

negative and statistically significant, suggesting that a climate of persistent uncertainty has a negative impact even on sectors that typically exhibit greater resilience. These findings highlight the fact that it is not only the intensity but also the duration of uncertainty that plays a decisive role in shaping investment decisions, exacerbating the phenomena of postponement or cancellation of investment plans.

Finally, the relationship between uncertainty and investment is most clearly illustrated in Chart 6, which shows that periods of high uncertainty (shaded areas) largely coincide with declining investment at both aggregate and sectoral levels.

The impact of uncertainty also extends to the labour market, influencing firms' behaviour regarding both the creation and retention of jobs.

As shown in Chart 7, employment follows a pattern similar to that of investment. Between 1998 and 2008, employment increased steadily, reaching 4.53 million employed persons, fol-

lowed by a sharp decline during the crisis period, with employment falling by around 25% between 2008 and 2013. A gradual recovery began in 2014, was interrupted in 2020 by the pandemic, before resuming and reaching 4.2 million in 2025.

According to Table 9, the Services sector accounts for the largest share of employment (over 25%), followed by Retail Trade, while Industry and Construction show significantly lower levels of employment.

Table 10 shows that uncertainty is generally negatively correlated with employment at the aggregate level, while, at the sectoral level, the EXAFD index is negatively and significantly correlated with employment in Industry and Construction, whereas a positive correlation is observed in Services.

Overall, these results suggest that higher uncertainty negatively affects employment decisions, both in terms of hiring and job retention. This effect becomes more pronounced during periods of prolonged uncertainty (Table

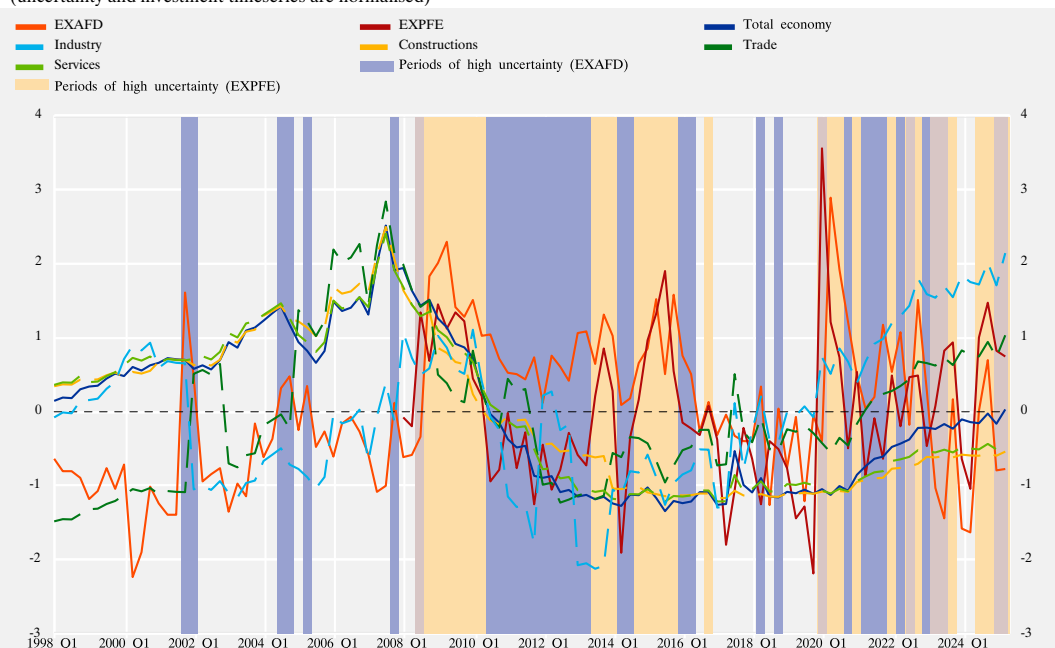
Table 8 Correlation between prolonged uncertainty (EXAFD index) and GFCF

Variables	Total economy	Industry	Construction	Retail Trade	Services
h3Q_EXAFD	-0.439***	-0.160*	-0.314***	-0.173*	-0.421***

Note: The correlations between the variables refer to the period 1998 Q1-2025 Q2, while the variable h3Q_EXAFD denotes periods of high uncertainty lasting more than three consecutive quarters. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Chart 6 Uncertainty and GFCF

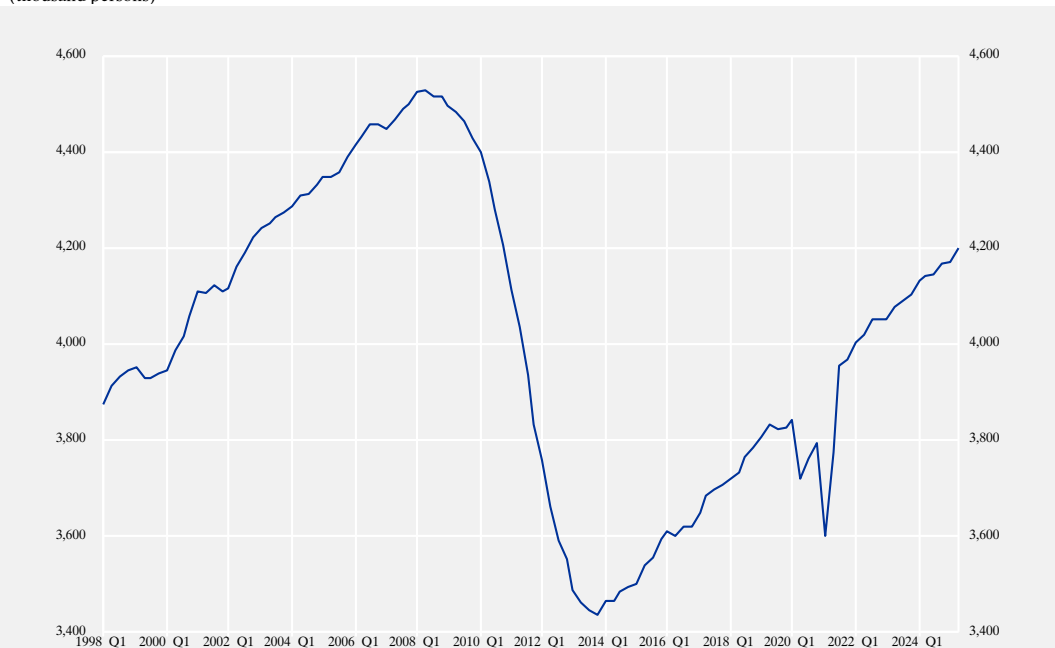
(uncertainty and investment timeseries are normalised)



Source: IOBE.

Chart 7 Employment in the total economy (1998 Q1-2025 Q2)

(thousand persons)



Sources: Eurostat. IOBE calculations.

Table 9 Descriptive statistics for employment

(thousand persons)

Variables	Count	Mean	SD	Min	Max	Skewn.	Kurt.
Total economy	110	4007.32	319.423	3435.26	4528.09	-.085	1.904
Industry	110	522.157	96.258	372.68	646.74	-.073	1.372
Construction	110	248.029	94.922	135.21	403.94	.2	1.39
Retail Trade	110	712.061	59.226	613.78	834.33	.398	2.113
Services	110	1100.493	119.068	861.89	1379.54	.068	2.641

Table 10 Correlation between uncertainty and employment

Variables	WUI	FKT	HKKS	EXAFD	EXPFE
Total economy	-0.552***	-0.467***	0.016	-0.208**	0.234*
Industry	-0.418***	-0.356***	-0.083	-0.522***	0.244**
Construction	-0.638***	-0.520***	0.129	-0.232**	0.101
Retail Trade	-0.463***	-0.385***	0.031	-0.055	0.237**
Services	0.011	-0.014	-0.041	0.174*	0.165

Notes: Correlations between any two variables are calculated using the longest available time series. Specifically, the correlation between employment and the WUI, FKT and HKKS indices refers to the period 1998 Q1-2024 Q3; the correlation with the EXAFD index refers to 1998 Q1-2025 Q2; and the correlation with the EXPFE index refers to 2008 Q1-2025 Q2. The symbols *, ** and *** denote statistical significance at the 10%, ** 5% and 1% levels, respectively.

11), both across the total economy and in the Industry and Construction sectors. A negative and significant relationship is also observed in Retail Trade during such periods.

Finally, Chart 8 shows that periods of high uncertainty (as indicated by the EXAFD and EXPFE indices) largely coincide with declines in employment.

Turning our focus to firm-level analysis, Chart 9 shows the monthly average of the micro-uncertainty index by sector, based on firms' responses in the BCS. The index captures firms' subjective perceptions of the difficulty in

forecasting their future performance and ranges from 1 to 4, with 4 indicating the highest level of uncertainty.

The Retail Trade sector exhibits the highest and most persistent levels of uncertainty, particularly from mid-2024 onwards, possibly reflecting recent US protectionist trade policies. The Construction sector follows, with notably high uncertainty in 2021, likely linked to the COVID-19 pandemic. On average, Industry ranks next, followed by Services. A general increase in uncertainty is observed across all sectors in early 2022, associated with Russia's invasion of Ukraine and the energy

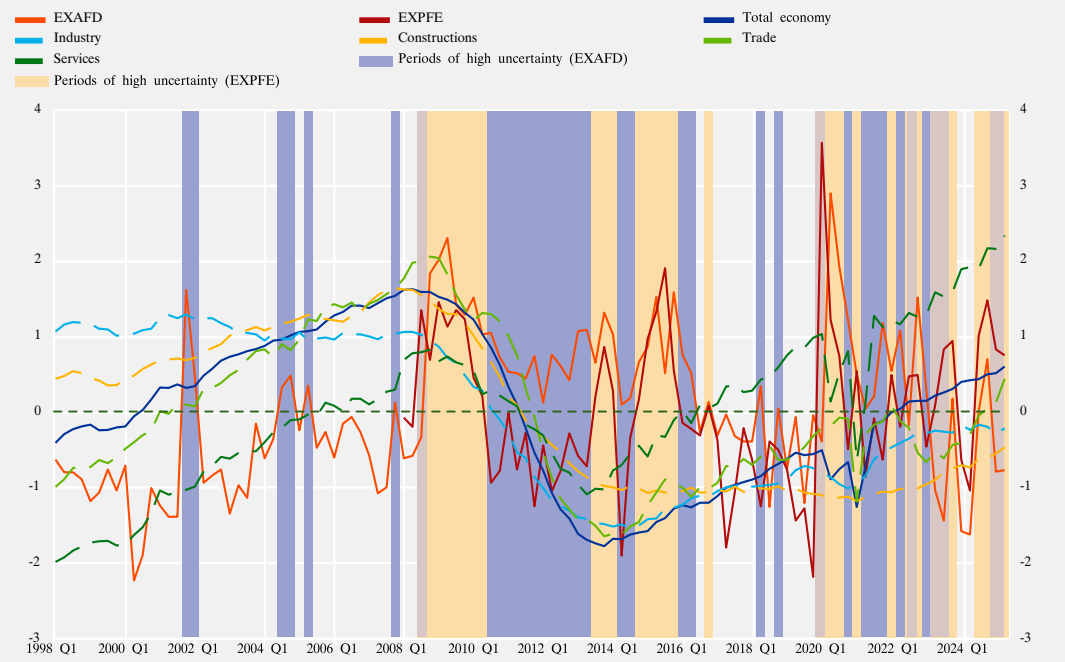
Table 11 Correlation between prolonged uncertainty (EXAFD index) and employment

Variables	Total economy	Industry	Construction	Retail Trade	Services
h3Q_EXAFD	-0.373***	-0.589***	-0.317***	-0.200**	-0.020

Notes: The correlations between the variables refer to the period 1998 Q1-2025 Q2, while the variable h3Q_EXAFD denotes periods of high uncertainty lasting more than three consecutive quarters. The symbols *, ** and *** denote statistical significance at the 10%, ** 5% and 1% levels, respectively.

Chart 8 Uncertainty and employment

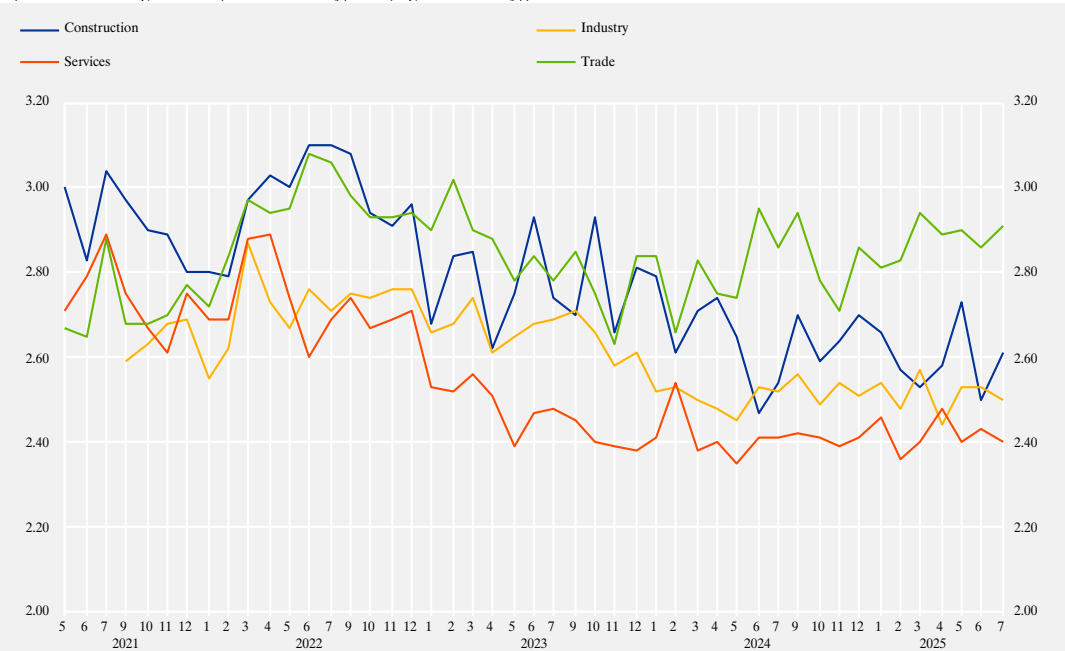
(uncertainty and employment timeseries are normalised)



Source: IOBE.

Chart 9 Micro-uncertainty index by sector (2021 M5-2025 M7)

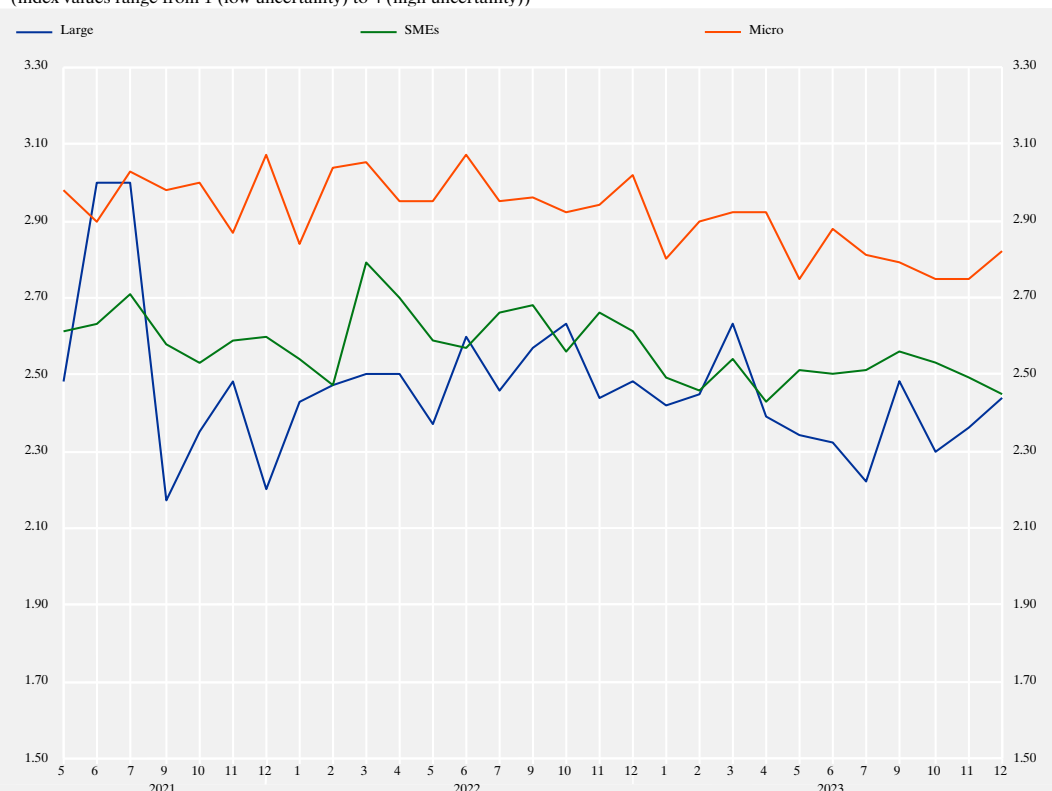
(index values range from 1 (low uncertainty) to 4 (high uncertainty))



Source: IOBE.

Chart 10 Micro-uncertainty index by firm size (2021 M5-2023 M12)

(index values range from 1 (low uncertainty) to 4 (high uncertainty))



Sources: IOBE and ICAP Data.Prisma.

Note: Firm size classification based on turnover data from the ICAP database.

crisis, with more persistent effects in Construction and Retail Trade.

In addition, Chart 10 presents the micro-uncertainty index by firm size,¹¹ showing a negative relationship between size and uncertainty. In particular, very small firms consistently report higher uncertainty than small, medium and large firms.

Chart 11 depicts the relationship between uncertainty and the investment rate using firm-level data, where each data point corresponds to the average uncertainty index for a given company over the course of a year. According to our findings, a negative and statistically significant relationship¹² is identified between the two variables, with a coefficient of -0.037116. In contrast, Chart 12 shows a positive relationship between firms' average annual sales

expectations and the investment rate, as stronger expected performance is associated with higher investment.

4.2 RESULTS FROM MACROECONOMETRIC ESTIMATIONS

Following on from the previous analysis, this section shifts the focus to investigating the dynamic effects of uncertainty on investment and employment at both aggregate and sectoral levels.

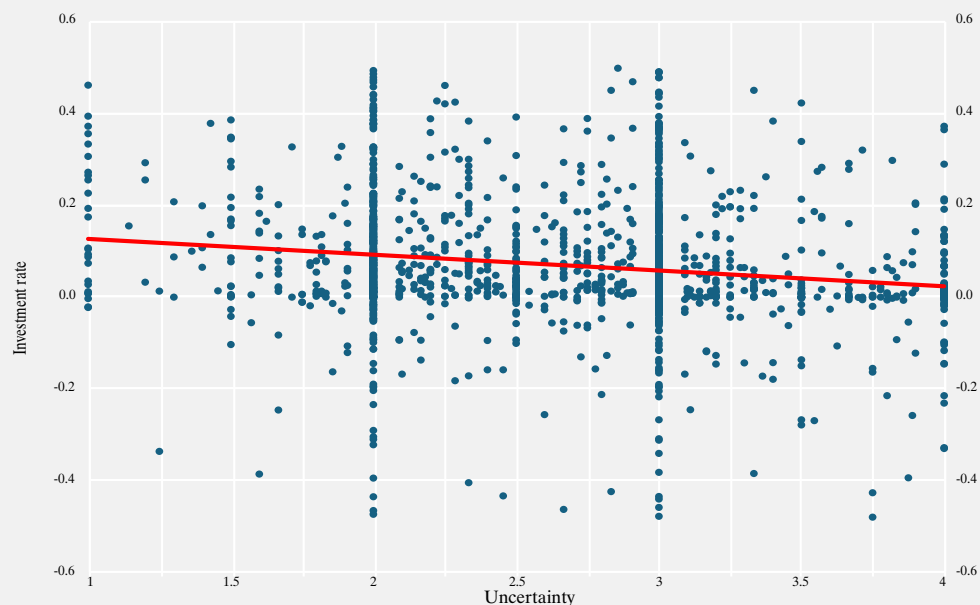
To this end, a Vector Error Correction Model (VECM) is employed, with the uncertainty index EXAFD as the main shock variable,

¹¹ Firms are classified by turnover into very small (up to EUR 2 million), small and medium-sized (EUR 2-50 million) and large (over EUR 50 million).

¹² At 1% significance level.

Chart 11 Firm-level uncertainty and investment rate

(investment rate: y-o-y growth and uncertainty index [1, 4])



Sources: IOBE and ICAP Data.Prisma.

Notes: The uncertainty index has been calculated for each firm and each year as the average of the firm's responses regarding the ease with which future business activity can be predicted (see footnote 5) throughout the year. Furthermore, the investment rate variable has been restricted to the range between -50% and 50% to exclude outliers.

Chart 12 Average expectations and investment rate at firm level

(investment rate: y-o-y growth and future expectations index [-1, +1])



Sources: IOBE and ICAP Data.Prisma.

Notes: Average expectations have been calculated for each firm and each year as the average value of the firm's responses regarding the ease with which future business activity can be predicted (see footnote 5) throughout the year, where a value of 1 corresponds to an increase and a value of -1 to a decrease of the expected sales. Furthermore, the investment rate variable has been restricted to the range between -50% and 50% to exclude outliers.

gross fixed capital formation (GFCF) and employment (EMP) as response variables and gross value added (GVA) and the interest rate spread (Spread) as controls.

Chart 13 presents the Cholesky-ordered impulse response functions (IRFs) for the economy as a whole. A one-standard-deviation increase in uncertainty leads to an immediate decline in investment of approximately EUR 200 million, persisting for up to two years. This sustained negative effect reflects the postponement or cancellation of investment decisions under uncertainty, consistent with the “wait-and-see” mechanism. For example, the rise in uncertainty during 2009 (2.31 standard deviations), as a result of the global financial crisis, is estimated to have reduced investment by EUR 3.3 billion over the period 2009-2011 (around 1.7% of the 2011 GDP), accounting for roughly one-quarter of the investment gap with the EU27 in 2011.

At the same time, employment also declines following an uncertainty shock, with the effect peaking after three quarters and resulting in losses of 20,000-25,000 jobs. For example, the increase in the uncertainty index by 2.31 standard deviations in 2009 is estimated to have contributed, over the period 2009-2011, to a loss of approximately 58,000 jobs (1.5% of the 2011 employment), corresponding to approximately 20% of the total annual decline in 2011. This lagged response reflects the gradual transmission of uncertainty to the labour market through reduced investment and economic activity.

Overall, the findings from Chart 13 suggest that uncertainty can act as a source of macro-economic disturbances, with persistent and adverse effects on both investment dynamics and employment.

Furthermore, Table 12 shows that uncertainty shocks explain a modest, but non-negligible share of investment variation, peaking at 4.75% after three quarters. In contrast, their contribution to employment variation is more pronounced, reaching up to 18% over a two-year horizon.

Sectoral results (Chart 14) reveal significant heterogeneity in investment responses¹³. In Industry, a one-standard-deviation increase in uncertainty leads to a persistent decline in investment of around EUR 40 million, suggesting a longer postponement of investment decisions under conditions of heightened uncertainty. For instance, during 2009-2011, uncertainty is estimated to have reduced industrial investment by EUR 0.5 billion (around one-quarter of the total decline). In Services, the impact is stronger, with investment falling by up to EUR 200 million within one year, reflecting the high dependence of investment decisions in this sector on the prevailing general climate of uncertainty and expectations regarding future demand trends.

In contrast, the Retail Trade sector exhibits a milder response (around EUR 10-20 million), while Construction shows no systematic or persistent reaction. This is confirmed by Table 13, where uncertainty explains less than 0.2% of investment variation in Construction. Over a two-year horizon, uncertainty accounts for approximately 13% of investment variation in Industry and 24% in Services, compared to around 4.5% in Retail Trade.

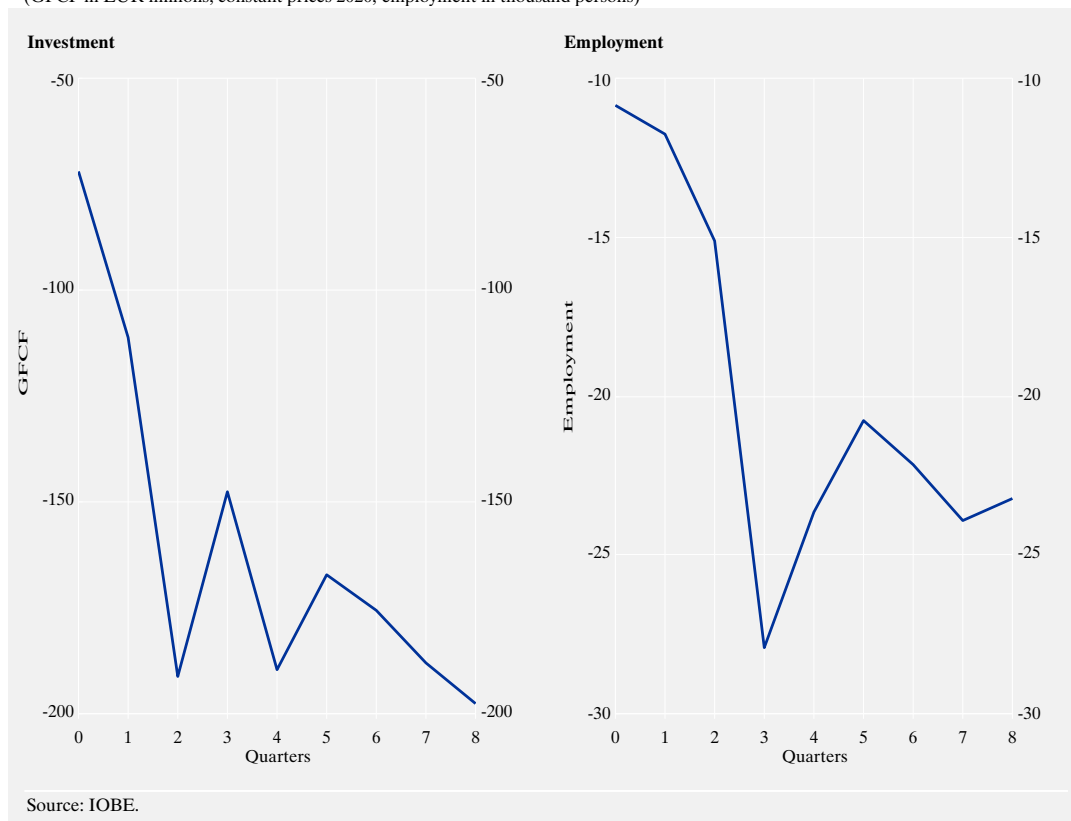
Overall, these findings highlight the fact that the impact of uncertainty on investment varies significantly across sectors, depending on their structural characteristics.

In line with Chart 14, Chart 15 presents the IRFs for employment following a positive shock of one standard deviation in uncertainty, reflecting a heterogeneous reaction across sectors. In particular, employment declines in Industry and Services, with estimated losses of around 6,000 and 10,000 jobs, respectively, over two years, indicating that the postponement and contraction of investment act as a constraint on both the creation of new jobs and the retention of existing ones. In contrast, the impact is more

¹³ As with the model for the total economy, the Cholesky ordering has been applied in the IRFs for the sectors, where uncertainty is placed first in the estimated models.

Chart 13 Impulse responses of investment and employment to an uncertainty shock in the total economy

(GFCF in EUR millions, constant prices 2020; employment in thousand persons)



limited in Retail Trade and Construction, where losses do not exceed 4,000 jobs.

Finally, uncertainty also explains a substantial share of employment variation in Services (around 12% over two years) and in Industry

(around 9.5%), indicating higher labour market sensitivity in these sectors. In Construction and Retail Trade, the corresponding contribution remains below 4%.

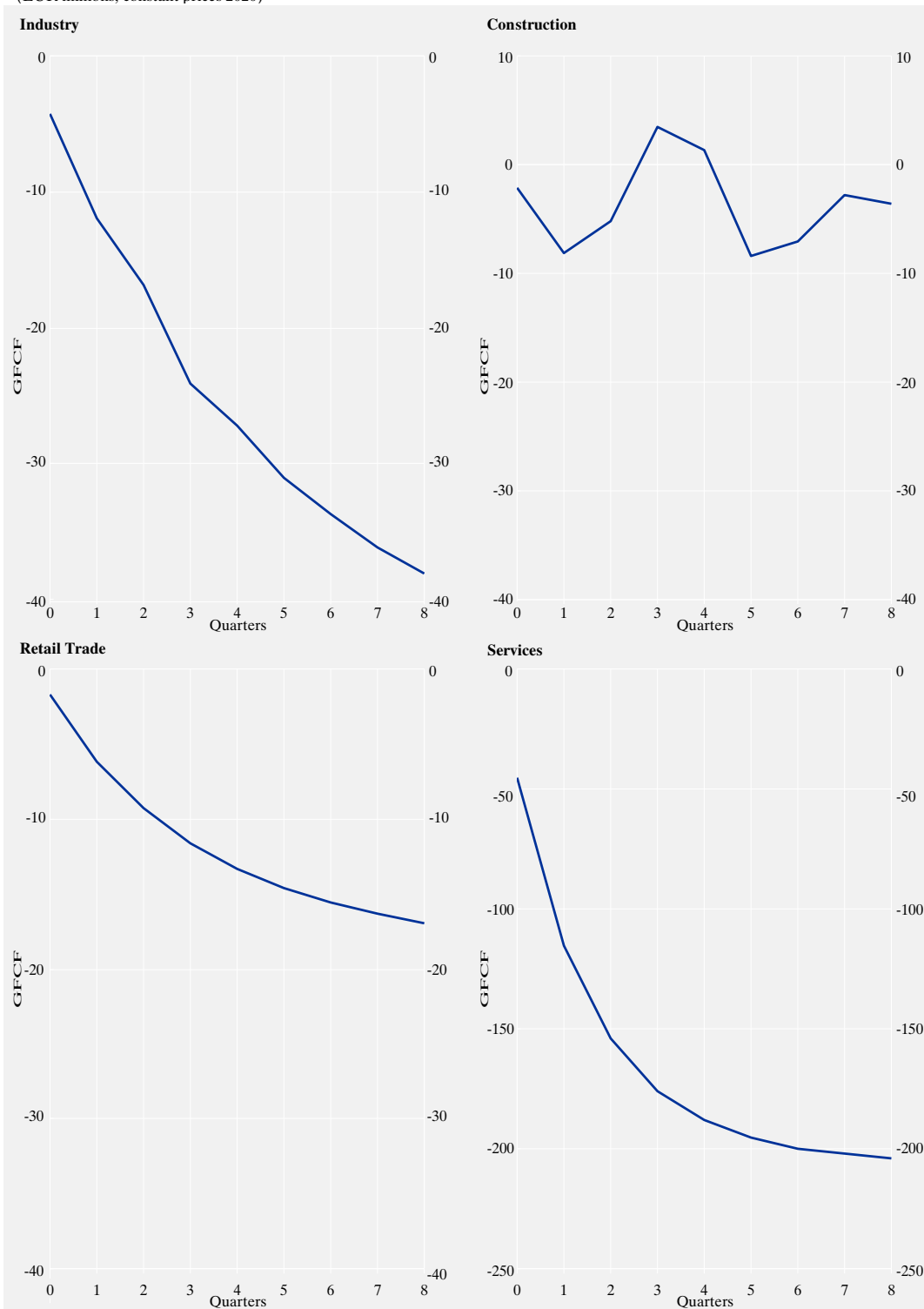
Overall, the results show that uncertainty acts

Table 12 Forecast error variance decomposition (FEVD) – Total economy

Quarters	Investment	Employment
1	1.25%	14.53%
2	2.27%	16.68%
3	4.75%	22.81%
4	4.28%	29.77%
5	4.57%	28.97%
6	4.45%	25.59%
7	4.29%	21.65%
8	4.22%	18.32%

Chart 14 Impulse responses of investment to an uncertainty shock by sector

(EUR millions; constant prices 2020)



Source: IOBE.

Table 13 Forecast error variance decomposition (FEVD) of investment by sector

Quarters	Industry	Construction	Retail Trade	Services
1	0.16%	0.03%	0.08%	2.51%
2	0.97%	0.20%	0.60%	8.90%
3	2.12%	0.18%	1.28%	14.12%
4	4.16%	0.15%	1.99%	17.80%
5	6.23%	0.11%	2.69%	20.32%
6	8.50%	0.14%	3.35%	22.05%
7	10.73%	0.14%	3.95%	23.28%
8	12.86%	0.12%	4.49%	24.17%

as a significant source of macroeconomic disturbances, with persistent negative effects on investment and employment and considerable heterogeneity across sectors.

4.3 RESULTS FROM MICROECONOMETRIC ESTIMATIONS

The following regression results examine the relationship between uncertainty and two key variables: investment growth and employment growth. Panel regressions with sector-year fixed effects are used to control for unobserved heterogeneity. Overall, the results indicate a consistent negative relationship between uncertainty and both variables, with significant heterogeneity across firm size and expectations.

The sample includes 1,231 observations for investment and 921 for employment, with dependent variables restricted to the range $[-0.5, 0.5]$ to limit outliers. The R^2 values (0.10-0.15) are typical for firm-level panel data.

For the investment growth rate (Table 15), uncertainty has a statistically significant negative effect (-0.0120 , $p < 0.05$), implying that a one-unit increase in uncertainty (0.7 standard deviations) reduces the investment rate by 1.2 percentage points. Given the elevated uncertainty during the period 2009-2015 (0.9 standard deviations above the long-term average), this corresponds to a reduction of around 1.6

percentage points annually. Compared to the investment gap with the EU, which averaged 5.2 percentage points annually over the same period, uncertainty is estimated to account for approximately one-third of this gap.

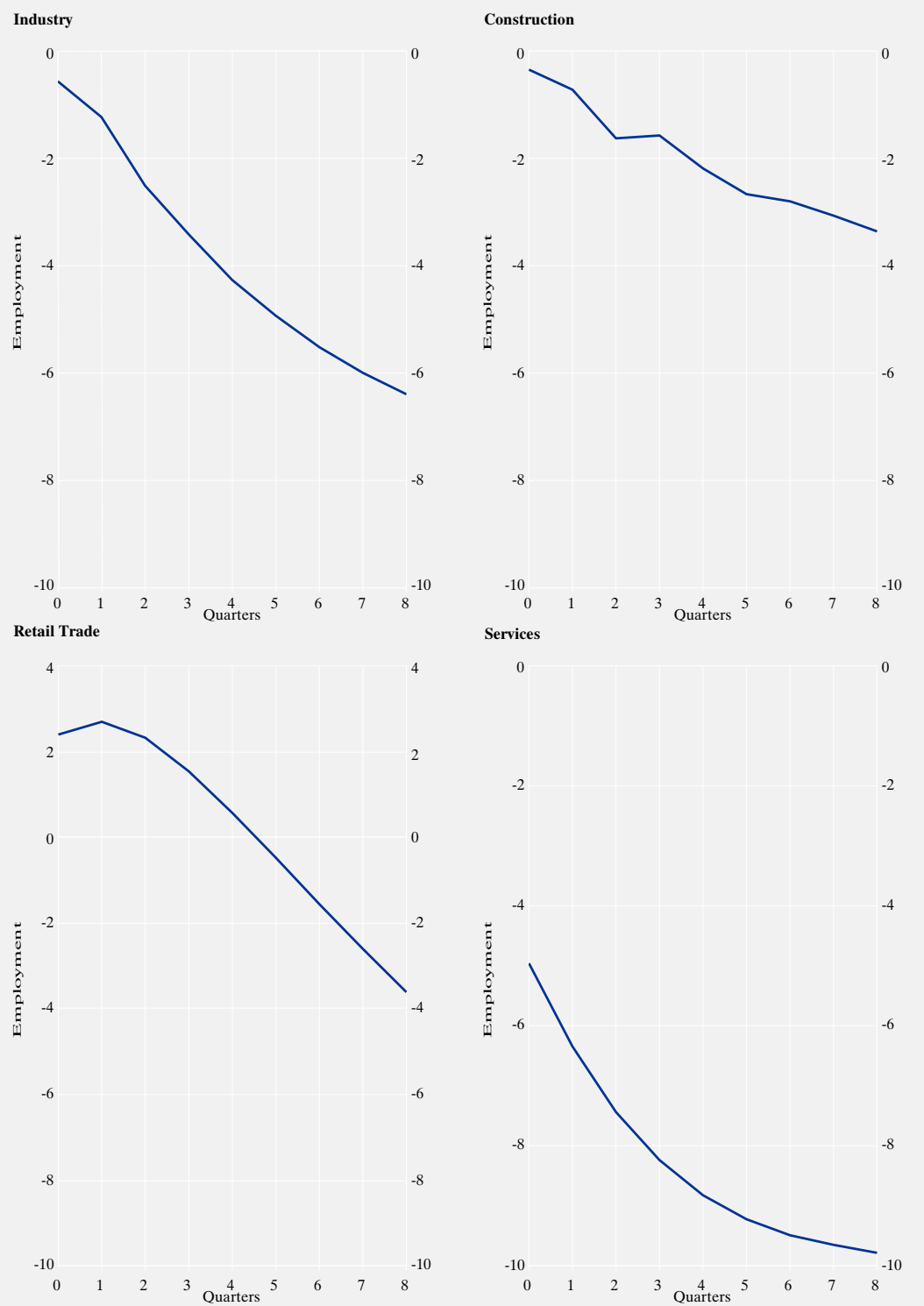
Moreover, the effect varies with firms' expectations (Table 15, model 2). Specifically, it is strongest under negative expectations (-0.0120), moderate under neutral expectations (-0.0104) and insignificant under positive expectations (-0.0030). This asymmetry suggests that uncertainty reinforces investment declines, primarily during periods of pessimism, consistent with the findings of Fiori and Scoccianti (2023).

The findings also highlight heterogeneity in the impact of uncertainty on investment decisions across firm size (Table 15, model 3). Small firms exhibit the strongest negative response (-0.0304 , $p < 0.01$), followed by medium-sized firms (-0.0102 , $p < 0.1$), while large firms show no significant effect. This indicates that uncertainty disproportionately constrains the growth and expansion of smaller firms.

At sectoral level (Table 15, model 4), Industry is most affected (-0.0204 , $p < 0.01$), while no significant effects are found in Construction, Services or Retail Trade. The absence of statistically significant effects in these sectors may be related to the limited time-series coverage of the microeconomic dataset.

Chart 15 Impulse responses of employment to an uncertainty shock by sector

(thousand persons)



Source: IOBE.

Table 14 Forecast error variance decomposition (FEVD) of employment by sector

Quarters	Industry	Construction	Retail Trade	Services
1	0.69%	0.77%	4.45%	3.05%
2	1.55%	1.82%	5.87%	5.12%
3	3.65%	4.28%	6.09%	7.17%
4	5.39%	3.73%	5.47%	8.85%
5	6.87%	3.86%	4.56%	10.11%
6	7.97%	3.93%	3.84%	11.04%
7	8.82%	3.73%	3.61%	11.72%
8	9.47%	3.59%	3.93%	12.22%

Table 15 Regression results with investment growth rate as the dependent variable

Variables	(1)	(2)	(3)	(4)
<i>Uncertainty</i>	-0.0120** (0.0054)			
<i>Future Expectations × Uncertainty</i>				
Negative × Uncertainty		-0.0120** (0.0058)		
Neutral × Uncertainty		-0.0104* (0.0058)		
Positive × Uncertainty		-0.0030 (0.0066)		
<i>Size × Uncertainty</i>				
Large × Uncertainty			0.0099 (0.0068)	
Medium × Uncertainty			-0.0102* (0.0057)	
Small × Uncertainty			-0.0304*** (0.0056)	
<i>Sector × Uncertainty</i>				
Construction × Uncertainty				0.0077 (0.0161)
Industry × Uncertainty				-0.0204*** (0.0062)
Services × Uncertainty				-0.0049 (0.0084)
Retail Trade × Uncertainty				-0.0036 (0.0079)
<i>Size Controls</i>				
Medium	-0.0516*** (0.0111)	-0.0514*** (0.0111)		-0.0519*** (0.0111)
Small	-0.1143*** (0.0134)	-0.1121*** (0.0134)		-0.1139*** (0.0134)
<i>Constant</i>	0.1638*** (0.0164)	0.1533*** (0.0171)	0.1068*** (0.0146)	0.1634*** (0.0164)
<i>Observations</i>	1,231	1,231	1,231	1,231
<i>Adjusted R²</i>	0.0961	0.0991	0.0918	0.1009

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include fixed sector-year effects.

According to the results presented in Table 16, uncertainty has an even stronger impact on employment (-0.0187, $p < 0.01$), implying that a one-unit increase in uncertainty reduces employment by 1.8%. For the period 2009-2013 (when uncertainty was 1 standard deviation above average), this corresponds to a 2.5% annual decline, suggesting that up to 40% of the observed employment contraction (6.2% annually) can be attributed to uncertainty.

The negative effect on employment is observed across all expectation categories but

decreases as expectations improve (from -0.0187 to -0.0139). Regarding firm size, all categories show a negative response to uncertainty, although small and medium-sized firms exhibit stronger effects, while large firms appear more resilient, possibly due to labour hoarding behaviour (Botelho 2024).

At the sectoral level, Industry again shows the strongest negative effect (-0.0240, $p < 0.01$), followed by Retail Trade (-0.0178, $p < 0.05$), while Construction and Services do not show statistically significant effects.

Table 16 Regression results with the growth rate in employment as the dependent variable

Variables	(1)	(2)	(3)	(4)
<i>Uncertainty</i>	-0.0187*** (0.0064)			
<i>Future Expectations × Uncertainty</i>				
Negative × Uncertainty		-0.0187*** (0.0069)		
Neutral × Uncertainty		-0.0182*** (0.0067)		
Positive × Uncertainty		-0.0139* (0.0076)		
<i>Size × Uncertainty</i>				
Large × Uncertainty			-0.0128* (0.0077)	
Medium × Uncertainty			-0.0211*** (0.0065)	
Small × Uncertainty			-0.0197*** (0.0068)	
<i>Sector × Uncertainty</i>				
Construction × Uncertainty				-0.0238 (0.0186)
Industry × Uncertainty				-0.0240*** (0.0072)
Services × Uncertainty				-0.0034 (0.0112)
Retail Trade × Uncertainty				-0.0178* (0.0089)
<i>Size Controls</i>				
Medium	-0.0212* (0.0121)	-0.0213* (0.0122)		-0.0202* (0.0122)
Small	-0.0232 (0.0166)	-0.0212 (0.0167)		-0.0213 (0.0166)
<i>Constant</i>	0.0865*** (0.0187)	0.0814*** (0.0194)	0.0708*** (0.0167)	0.0821*** (0.0189)
<i>Observations</i>	921	921	921	921
<i>Adjusted R²</i>	0.0408	0.0400	0.0406	0.0410

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All models include fixed sector-year effects.

Overall, the results confirm that uncertainty significantly reduces both investment and employment, with a stronger impact on the latter. The effects are asymmetric and heterogeneous, depending on expectations, firm size and sector. Regarding investment, the effect is significant only for firms with negative or neutral expectations, as well as for small and medium-sized enterprises. For employment, the impact of uncertainty is more pronounced during periods of pessimism and among small and medium-sized firms. Among the key sectors of economic activity, Industry appears to be particularly vulnerable during periods of heightened uncertainty.

These findings highlight the importance of monitoring uncertainty and further developing firm-level indicators to better capture its impact on business decisions.

5 CONCLUSIONS

Using microdata from BCS and methodology proposed in the literature, this study constructs supplementary uncertainty indices for the Greek economy. These indices enable the analysis of economic impact through the channel of business decisions, across sectors of economic activity and firm size. The results highlight asymmetries and significant heterogeneity in the effects of uncertainty, depending on firms' expectations, sectoral characteristics and firm size.

The descriptive analysis outlines the key properties of the new indices. It confirms their positive correlation with existing uncertainty measures based on alternative methodologies and identifies distinct periods of elevated uncertainty in the Greek economy during 1998-2024. Three indices are examined: one based on the dispersion of business expectations, one based on firms' ex-post forecast errors and a firm-level indicator reflecting perceived difficulty in forecasting future activity. The results indicate that uncertainty is countercyclical, increasing during recessions, in line with inter-

national evidence. Differences across measurement approaches also emerge, divergence in forecast errors tends to be followed by more diverse expectations, while firm-level indicators reveal higher perceived uncertainty among smaller firms.

Two complementary methodological approaches are used to estimate the effects of uncertainty. The macroeconometric analysis shows that increases in uncertainty have significant and persistent negative effects on investment and employment, lasting for more than one year. A one-standard-deviation increase in uncertainty leads to an immediate decline in investment of approximately EUR 200 million, while employment declines with a lag, peaking after three quarters. During the early phase of the Greek crisis (2009-2015), uncertainty is estimated to have contributed to approximately one-quarter of the investment gap with the EU27, while the effects are particularly pronounced in sectors such as Services and Industry.

The microeconometric analysis confirms that the effects of uncertainty are asymmetric and heterogeneous. At the aggregate level, uncertainty is estimated to account for up to 40% of the decline in employment during 2010-2013 and to reduce the annual investment rate by approximately 1.6 percentage points over 2009-2015. These effects vary significantly across firms: they are stronger under pessimistic or neutral expectations and weaker when expectations are optimistic. Small and medium-sized enterprises are more adversely affected than large firms, both in terms of investment and employment, reflecting their lower resilience and greater sensitivity to uncertainty. At the sectoral level, Industry appears to be particularly vulnerable to uncertainty shocks.

The findings underscore the importance of reducing uncertainty through credible and predictable economic policies. A reduction in uncertainty by one standard deviation is estimated to increase the annual investment rate by approximately 1.7 percentage points and

employment by around 2.5%, contributing to a faster recovery and narrowing of the gap with other European economies.

In conclusion, the use of new, complementary uncertainty indicators enhances the measurement of uncertainty and improves the under-

standing of its impact on business decisions in the Greek economy. The results highlight the importance of systematically monitoring uncertainty, both for the timely identification of constraints on investment and employment and for the design of effective policy measures aimed at strengthening economic resilience.

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APPENDIX

Table A1 Lag length selection

Lags	Akaike Information Criterion (AIC)				
	Total economy	Industry	Construction	Retail Trade	Services
0	45.772	36.597	39.365	36.320	43.662
1	36.887	27.499*	28.308	27.461*	34.512*
2	37.162	27.741	28.355	27.838	34.662
3	37.47	27.874	28.311	28.112	34.687
4	36.764*	27.939	28.120*	28.221	34.529

Note: The * denotes the optimal number of lags in each model. For the Industry sector model, two lags were selected in order to better capture the dynamic interdependencies among the sector's variables.

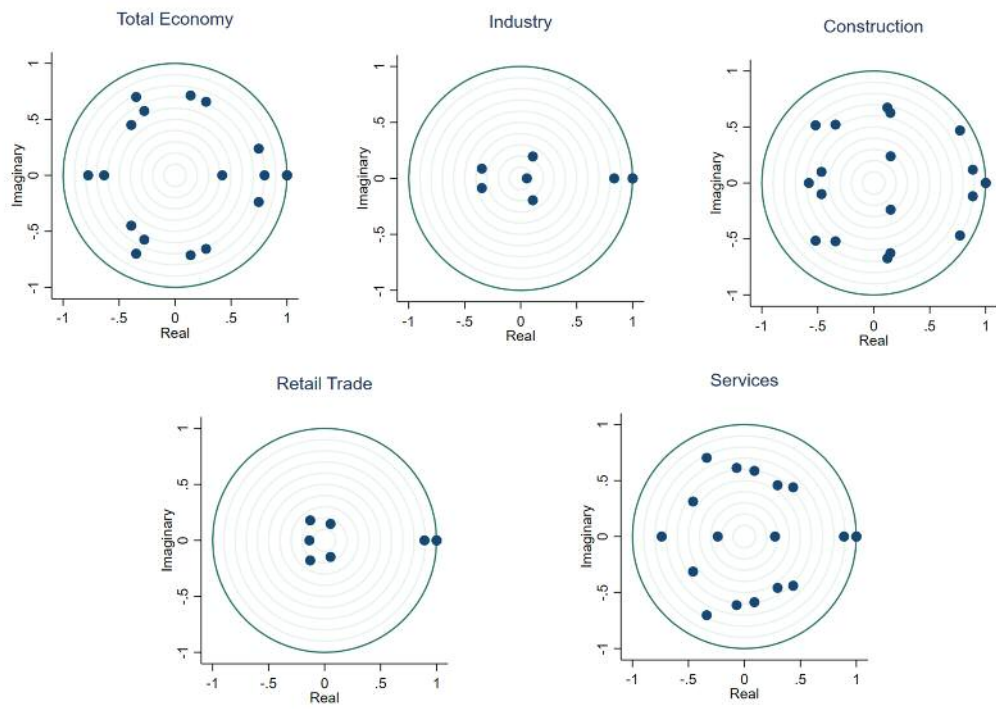
Table A2 Johansen Cointegration test results

Rank	Trace Statistic					
	Total economy	Industry	Construction	Retail Trade	Services	5% Critical Value
0	86.091	75.350	134.781	84.437	100.295	68.52
1	44.154*	44.242*	62.095	47.237	49.023	47.21
2	25.115	17.053	25.934*	27.076*	20.132*	29.68
3	8.511	5.528	8.012	10.156	5.869	15.41
4	0.273	0.412	1.214	3.443	0.014	3.76

Note: The * denotes the number of cointegration relationships in each model.

Chart A1 Model stability conditions

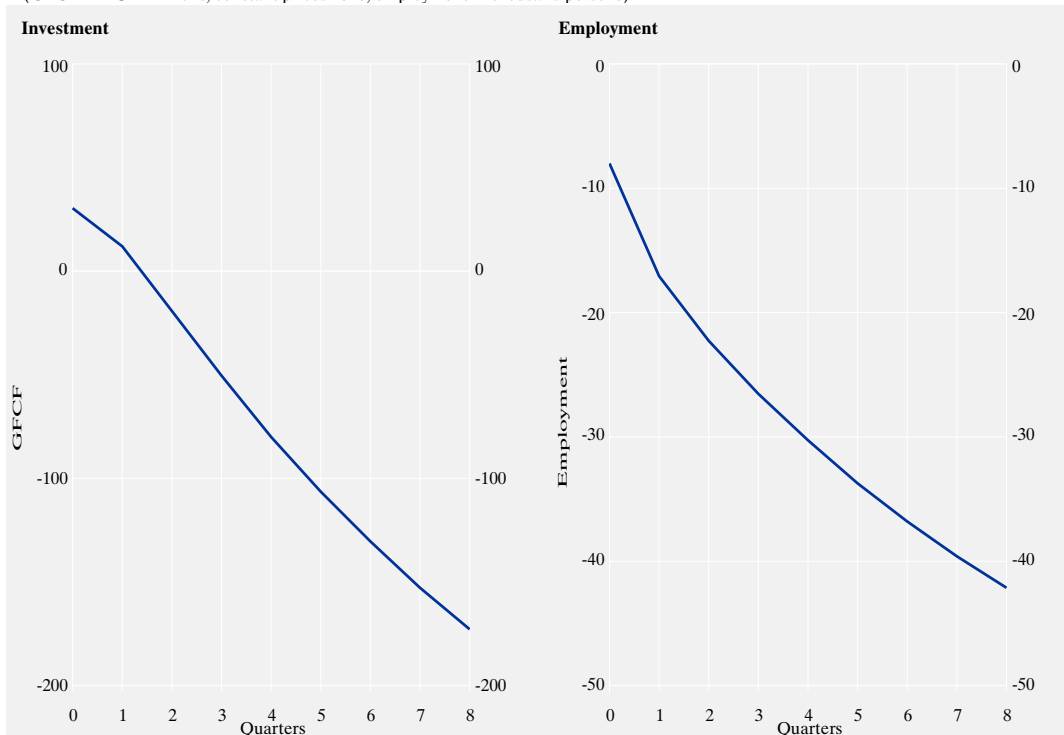
(roots of the companion matrix)



Source: IOBE.

Chart A2 Impulse responses of investment and employment to an uncertainty shock in the total economy – EXPFE index

(GFCF in EUR millions, constant prices 2020; employment in thousand persons)



Source: IOBE.

Table A3 Forecast error variance decomposition (FEVD) – Total economy – EXPFE index

Quarters	Investment	Employment
1	0.42%	3.17%
2	0.23%	9.20%
3	0.20%	14.49%
4	0.38%	18.53%
5	0.72%	21.28%
6	1.15%	22.98%
7	1.60%	23.93%
8	2.05%	24.38%

ON INFLATION PERCEPTIONS AND EXPECTATIONS FOR GREEK AND EURO AREA CONSUMERS: EVIDENCE FROM THE CONSUMER EXPECTATIONS SURVEY

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ABSTRACT

This paper empirically investigates how inflation perceptions and inflation expectations are shaped for Greek and euro area consumers, using data from the Consumer Expectations Survey (CES). We document that median inflation perceptions as well as short-term, medium-term and long-term inflation expectations over time are higher in Greece than in the euro area. In favour of the supply-side narrative of inflation expectations, we find that consumers' inflation expectations are negatively correlated with their expectations for economic growth, while they are positively correlated with their expectations for the unemployment rate in Greece and the euro area. We also show that inflation perceptions are strongly and positively associated with inflation expectations, yet the magnitude of this association declines as the inflation forecast horizon lengthens. Finally, the results also indicate that the impact of socioeconomic variables on inflation expectations varies between Greek and euro area consumers and is heterogeneous across different forecast horizons.

Keywords: inflation expectations; inflation perceptions; consumer expectations survey

JEL classification: D12; D84; E31; E52; E58

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ΟΙ ΑΝΤΙΛΗΨΕΙΣ ΚΑΙ ΟΙ ΠΡΟΣΔΟΚΙΕΣ ΤΩΝ ΚΑΤΑΝΑΛΩΤΩΝ ΓΙΑ ΤΟΝ ΠΛΗΘΩΡΙΣΜΟ ΣΤΗΝ ΕΛΛΑΔΑ ΚΑΙ ΣΤΗ ΖΩΝΗ ΤΟΥ ΕΥΡΩ: ΕΥΡΗΜΑΤΑ ΑΠΟ ΤΗΝ ΕΡΕΥΝΑ ΠΡΟΣΔΟΚΙΩΝ ΤΩΝ ΚΑΤΑΝΑΛΩΤΩΝ (CES)

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ΠΕΡΙΛΗΨΗ

Η μελέτη διερευνά εμπειρικά πώς διαμορφώνονται οι προσδοκίες των καταναλωτών για τον πληθωρισμό στην Ελλάδα και στη ζώνη του ευρώ, χρησιμοποιώντας δεδομένα από την Έρευνα Προσδοκιών των Καταναλωτών (CES). Η περιγραφική ανάλυση καταδεικνύει ότι οι διάμεσες αντιλήψεις για τον πληθωρισμό, καθώς και οι διάμεσες βραχυπρόθεσμες, μεσοπρόθεσμες και μακροπρόθεσμες προσδοκίες για τον πληθωρισμό διαχρονικά είναι υψηλότερες στην Ελλάδα από ό,τι στη ζώνη του ευρώ. Διαπιστώνεται επίσης ότι οι προσδοκίες των καταναλωτών για τον πληθωρισμό εμφανίζουν αρνητική συσχέτιση με τις προσδοκίες τους για τον ρυθμό οικονομικής ανάπτυξης, ενώ παρουσιάζουν θετική συσχέτιση με τις προσδοκίες τους για την ανεργία στην Ελλάδα και στη ζώνη του ευρώ. Αυτό συνάδει με την υπόθεση ότι οι καταναλωτές συνδέουν τις προσδοκίες τους για τον πληθωρισμό με παράγοντες από την πλευρά της προσφοράς. Τα αποτελέσματα δείχνουν ότι οι αντιλήψεις για τον πληθωρισμό συσχετίζονται θετικά και στατιστικά σημαντικά με τις πληθωριστικές προσδοκίες, ωστόσο το μέγεθος αυτής της συσχέτισης μειώνεται όσο ο χρονικός ορίζοντας πρόβλεψης του πληθωρισμού επιμηκύνεται. Τέλος, τα αποτελέσματα καταδεικνύουν ότι η επίδραση των κοινωνικοοικονομικών μεταβλητών στις πληθωριστικές προσδοκίες διαφέρει μεταξύ των καταναλωτών στην Ελλάδα και στη ζώνη του ευρώ και παρουσιάζει ετερογένεια ανάλογα με τον χρονικό ορίζοντα πρόβλεψης.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Η μελέτη διερευνά εμπειρικά πώς διαμορφώνονται οι προσδοκίες των καταναλωτών για τον πληθωρισμό στην Ελλάδα και στη ζώνη του ευρώ, χρησιμοποιώντας δεδομένα από την Έρευνα Προσδοκιών των Καταναλωτών (Consumer Expectations Survey – CES) που διεξάγει η ΕΚΤ. Η CES είναι μια μηνιαία διαδικτυακή έρευνα στην οποία συμμετέχουν περίπου 19.000 ενήλικοι καταναλωτές από 11 χώρες της ζώνης του ευρώ, ανάμεσα στις οποίες και η Ελλάδα. Οι πληροφορίες που συλλέγει περιλαμβάνουν, μεταξύ άλλων, μηνιαία δεδομένα σχετικά με τις αντιλήψεις των καταναλωτών για τον πληθωρισμό σήμερα σε σχέση με τους προηγούμενους δώδεκα μήνες, καθώς και τις προσδοκίες τους για τον πληθωρισμό τους επόμενους δώδεκα μήνες και σε ορίζοντα τριών και πέντε ετών.

Η περιγραφική ανάλυση καταδεικνύει ότι τόσο οι διάμεσες αντιλήψεις όσο και οι διάμεσες βραχυπρόθεσμες, μεσοπρόθεσμες και μακροπρόθεσμες προσδοκίες των καταναλωτών στην Ελλάδα είναι υψηλότερες από ό,τι στη ζώνη του ευρώ. Το εύρημα αυτό, ωστόσο, δεν περιορίζεται στην Ελλάδα, αλλά παρατηρείται και σε άλλες χώρες της ζώνης του ευρώ, όπως για παράδειγμα στην Πορτογαλία. Διαπιστώνεται επίσης ότι στην Ελλάδα και στη ζώνη του ευρώ οι προσδοκίες των καταναλωτών για τον πληθωρισμό εμφανίζουν αρνητική συσχέτιση με τις προσδοκίες τους για τον ρυθμό οικονομικής ανάπτυξης, ενώ παρουσιάζουν θετική συσχέτιση με τις προσδοκίες τους για την ανεργία στην Ελλάδα και στη ζώνη του ευρώ. Αυτό συνάδει με την υπόθεση ότι οι καταναλωτές συνδέουν τις προσδοκίες τους για τον πληθωρισμό με παράγοντες από την πλευρά της προσφοράς, δηλαδή οι υψηλότερες πληθωριστικές προσδοκίες συνδέονται με απαισιόδοξες προοπτικές για την οικονομία.

Τα αποτελέσματα από το εμπειρικό υπόδειγμα δείχνουν ότι οι αντιλήψεις για τον πληθωρισμό επηρεάζουν θετικά τις πληθωριστικές προσδοκίες των καταναλωτών για τους επόμενους δώδεκα μήνες, τα επόμενα τρία και τα επόμενα πέντε χρόνια στην Ελλάδα και στη ζώνη του ευρώ. Το μέγεθος της θετικής αυτής επίδρασης μειώνεται όταν ο χρονικός ορίζοντας πρόβλεψης του πληθωρισμού αυξάνεται. Αυτό συνάδει και με το γεγονός ότι και οι διάμεσες προσδοκίες των καταναλωτών μειώνονται στην Ελλάδα και στη ζώνη του ευρώ όταν ο χρονικός ορίζοντας πρόβλεψης αυξάνεται από δώδεκα μήνες σε τρία και σε πέντε χρόνια.

Επιπλέον, τα αποτελέσματα καταδεικνύουν επίσης ότι υπάρχει ετερογένεια στην επίδραση των κοινωνικοοικονομικών μεταβλητών στις πληθωριστικές προσδοκίες ανάλογα με τον χρονικό ορίζοντα πρόβλεψης. Για την Ελλάδα, ο χρηματοοικονομικός αλφαριθμητισμός και η εκπαίδευση δεν συσχετίζονται με τις βραχυπρόθεσμες πληθωριστικές προσδοκίες. Αντιθέτως, οι μεσοπρόθεσμες και μακροπρόθεσμες προσδοκίες για τον πληθωρισμό αυξάνονται όταν τα επίπεδα χρηματοοικονομικού αλφαριθμητισμού και εκπαίδευσης είναι χαμηλά. Επίσης, σε αντίθεση με τη ζώνη του ευρώ, η ύπαρξη συντρόφου εμφανίζει ισχυρή θετική συσχέτιση με τις πληθωριστικές προσδοκίες στην Ελλάδα. Επιπρόσθετα, οι περιορισμοί ρευστότητας, η δυσχερής χρηματοοικονομική κατάσταση και η δυσκολία πρόσβασης σε τραπεζική χρηματοδότηση έχουν μεγαλύτερη θετική επίδραση στις πληθωριστικές προσδοκίες για τους καταναλωτές στην Ελλάδα από ό,τι στη ζώνη του ευρώ.

Συμπερασματικά, η μελέτη εμβαθύνει την κατανόησή μας για το πώς οι καταναλωτές στην Ελλάδα και στη ζώνη του ευρώ διαμορφώνουν τις προσδοκίες τους για τον πληθωρισμό. Επιπλέον, επισημαίνει ότι η επίδραση των αντιλήψεων για τον πληθωρισμό στις προσδοκίες για τον πληθωρισμό διαφοροποιείται ανάλογα με τον χρονικό ορίζοντα της πρόβλεψης. Επίσης, αναδεικνύει την ετερογένεια των προσδοκιών για τον πληθωρισμό σε ομάδες καταναλωτών με συγκεκριμένα κοινωνικοοικονομικά χαρακτηριστικά. Η κατανόηση του μηχανισμού διαμόρ-

φωσης των προσδοκιών των καταναλωτών για τον πληθωρισμό συμβάλλει σημαντικά στον σχεδιασμό μιας αποτελεσματικής νομισματικής πολιτικής και στη βελτίωση της επικοινωνίας των κεντρικών τραπεζών.

ON INFLATION PERCEPTIONS AND EXPECTATIONS FOR GREEK AND EURO AREA CONSUMERS: EVIDENCE FROM THE CONSUMER EXPECTATIONS SURVEY*

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I. INTRODUCTION

For central banks, inflation expectations have become a key tool in conducting monetary policy. In the euro area, the ECB has often relied on stable inflation expectations to assess policy choices. As Christine Lagarde (ECB 2026) said: “Inflation has been at around our two per cent target, longer-term inflation expectations are well anchored, and the economy has shown resilience over recent quarters”. The ECB, among other central banks, has invested in setting up and fielding surveys that collect direct measures of expectations of households and firms as a source of information to help improve monetary policy and central bank communication (see D’Acunto and Weber 2024).

To this end, the ECB launched the Consumer Expectations Survey (CES) in April 2020 to measure expectations and household behaviour in a timely and consistent manner across the euro area countries. The survey’s country coverage has been expanded by adding to the six original countries, i.e. Belgium, Germany, Spain, France, Italy and the Netherlands, an additional set of five countries in April 2022, i.e. Austria, Finland, Ireland, Greece and Portugal. Therefore, since April 2022, the CES collects, at a monthly frequency, Greek data on consumer perceptions about past inflation as well as expectations about future inflation over the next twelve months and between two and three years ahead.

At the same time, academic research has been making progress in enhancing our understanding of how consumers form their beliefs about future inflation and how these beliefs feed into their economic decisions, thus becoming crucial for the design of monetary policy. In particular, prior research has shown that inflation expectations matter for their consumption decisions (see Bachmann et al. 2015; Duca-Radu et al. 2021; and D’Acunto et al. 2022).

This paper, using CES data, provides useful insights into: a) how Greek consumers form their perceptions and their short-, medium- and long-term expectations about inflation and b) whether and to what extent inflation perceptions and expectations in Greece differ from those in the euro area. It contributes and relates to the literature in several important ways. First, it documents the evolution of consumers’ inflation perceptions and expectations in Greece over time. Second, it shows how perceptions and expectations about inflation correlate with macroeconomic indicators, namely the expected economic growth rate and the unemployment rate. This is in line with the “supply-side narrative” documented in the study of Coibion et al. (2023), whereby higher inflation expectations are associated with bad news and a more pessimistic outlook for the economy.

Third, we document how Greek consumers’ inflation perceptions impact their expectations about inflation extending the relevant literature (see, among others, Dräger 2015; Cavallo et al. 2017; Arioli et al. 2017; Stanisławska et al. 2021; D’Acunto et al. 2021; as well as Stanisławska and Paloviita 2024). Fourth, we provide evidence on the heterogeneity of inflation expectations in Greece across socioeconomic groups, which adds to previous studies (see Arioli et al. 2017; Del Giovane et al. 2009; and Weber et al. 2022, among others).

The remainder of the paper is structured as follows: Section 2 describes the data and outlines the empirical methodology. Section 3 illustrates the evolution of inflation perceptions and expectations over time and how inflation expectations are correlated with macroeconomic indicators. Section 4 presents the results and Section 5 concludes.

* The views expressed in this article are of the author and do not necessarily reflect those of the Bank of Greece. The author is responsible for any errors or omissions.

2 DATA AND EMPIRICAL DESIGN

We use the CES dataset from April 2022 to December 2025, which covers eleven euro area countries (EA11) including Greece. The CES is a monthly online survey of around 19,000 adult consumers, which features a panel component that ensures monitoring of the same respondents over time.¹ Among other expectation measures, the CES collects at a monthly frequency data on consumer perceptions about past inflation as well as expectations about future inflation over the next twelve months, between two and three years ahead and five years ahead. In that way, the CES captures effectively the cross-section and time-series variation of households' inflation expectations. It also collects a wide range of socioeconomic characteristics, such as age, gender, education, financial literacy, household size, income, etc. The wealth of information collected by the CES enables us to explore the heterogeneity in consumer inflation expectations across specific demographic and socioeconomic groups.

Our empirical model is of the following form:

$$E(\text{Inflation}_{i,t+12}) = \beta_0 + \beta_1 \text{Perceived Inflation}_{i,t} + \beta_2 X_{i,t} + Y_t + I_i + \epsilon_{i,t} \quad (1)$$

where $E(\text{Inflation}_{i,t+12})$ is the dependent variable and represents short-term inflation expectations, i.e. inflation expectations over the next twelve months.

With respect to the independent variables of the model, *Perceived Inflation* reflects the subjective consumers' perceptions of how prices have changed over the past twelve months compared to today, capturing their realised inflation experiences at the individual level. A vector X of sociodemographic variables is also included and consists of age, gender, partner status, education, household size, low level of financial literacy (LFL), unemployment status, income quintiles, homeownership status, mortgage holder status, liquidity constraints, hard financial situation and hard credit access.

Financial literacy is measured in the CES according to a standardised set of questions developed by Lusardi and Mitchell (2011). The CES asks three multiple-choice questions to help us assess consumers' understanding of a) interest rate compounding, b) nominal vs real values and c) portfolio risk diversification. We categorise the respondents with lower scores as those with a low level of financial literacy.

Respondents that face liquidity constraints are identified among those who report that – when thinking about their available financial resources, including access to credit, savings, loans from relatives or friends, etc. – they would not have sufficient financial resources to pay for an unexpected payment equal to one month of their household income. Consumers that are subject to a hard financial situation are those who responded that their household is much or somewhat worse off compared to twelve months ago. Finally, consumers that find it hard to access credit are those who reported that it is much or somewhat harder to obtain credit or loans compared to twelve months ago.

Y_t denotes the wave dummies to account for time effects and I_i denotes country dummies to account for country effects for the pooled EA11 dataset.

Equation (1) is rewritten as the following two equations, when the outcome variable is inflation expectations three years ahead and inflation expectations five years ahead, respectively.

$$E(\text{Inflation}_{i,t+3y}) = \beta_0 + \beta_1 \text{Perceived Inflation}_{i,t} + \beta_2 X_{i,t} + Y_t + I_i + \epsilon_{i,t} \quad (2)$$

and

$$E(\text{Inflation}_{i,t+5y}) = \beta_0 + \beta_1 \text{Perceived Inflation}_{i,t} + \beta_2 X_{i,t} + Y_t + I_i + \epsilon_{i,t} \quad (3)$$

We also enhance the empirical specification described in equations (1), (2) and (3) to account for individual fixed effects (FE).

¹ For a detailed description of CES, see Bańkowska et al. (2021) and Georgarakos and Kenny (2022).

3 INFLATION PERCEPTIONS AND EXPECTATIONS OVER TIME AND THE SUPPLY-SIDE NARRATIVE

The left panel of Chart 1 illustrates the evolution of inflation, based on the Harmonised Index of Consumer Prices (HICP), in Greece and the euro area during the period between April 2022 and December 2025. There was a sharp increase in inflation in 2022, owing to disruptions in global supply chains caused by the pandemic, as well as inflationary pressures in the energy sector, which were intensified by the war in Ukraine. In Greece, the HICP inflation rate rose from 9.1% in April 2022 to 12.1% in September 2022, reaching its peak value, while, in the euro area, it increased from 7.5% in April 2022 to its highest point of 10.6% in October 2022.

Subsequently, as a result of the ECB's monetary policy, inflation in the euro area declined significantly, from 10.6% to 1.7% in September 2024, its lowest level during the period under review, and reached the inflation target of 2% in December 2025. In Greece, the HICP decreased from 12.1% in September 2022 to 2.9% in December 2025. Also, note that inflation in Greece rose from 2.5% in June 2024 to 3.2% in August 2024, mainly due to increases in energy and services prices.

The left panel of Chart 1 also shows that median inflation perceptions in Greece are higher than those in the euro area based on CES data.² Moreover, other euro area countries, such as Portugal, also exhibit higher inflation perceptions than the euro area as a whole. While median perceptions about inflation for Greek consumers remained at high levels until April 2024 – reaching a maximum of 25% in February 2023 – they have been declining at a steady pace, falling to 10.1% in December 2025. Median inflation perceptions for euro area consumers follow a similar pattern. While they sustained high levels of 10% until March 2023, they started to decline gradually, resulting in a rate of 3.2% in December 2025.

We also observe that inflation perceptions are systematically higher than the actual inflation

rate throughout the entire period for Greece and for the euro area since October 2022. Compared to the euro area, the overestimation of perceived inflation in Greece is both stronger and more persistent, indicating that Greek consumers overreact more to news about inflation than their euro area counterparts. This pattern is also observed in other euro area countries, such as Portugal (see Chart 1, left panel).

The overestimation bias in consumers' inflation perceptions is well documented in several studies (see Arioli et al. 2017; Abildgren and Kuchler 2021; as well as Reiche and Meyler 2022, among others). These studies highlight the fact that part of this bias may reflect that the respondents may have another price concept in mind, such as food prices, rather than consumer prices in general when interviewed about their perceptions about inflation.

The right panel of Chart 1 (left axis) depicts the median inflation expectations over the next twelve months for Greece and the euro area. We observe that the trend in inflation expectations mirrors that of inflation perceptions. However, consumers' inflation expectations are noticeably lower than their perceptions. Furthermore, as with perceptions, consumer inflation expectations in Greece and Portugal are higher than those in the euro area. Short-term inflation expectations in Greece and the euro area reached their peak levels – 14.6% and 5.8%, respectively – at the same time as the HICP also peaked in Greece and in the euro area, i.e. in September and October 2022, respectively. Since then, median inflation expectations declined in Greece and in the euro area reaching 7.7% and 2.8%, respectively, in December 2025. This significant decline in consumer inflation expectations is primarily the outcome of the ECB's restrictive monetary policy, characterised by the implementation of ten consecutive substantial interest rate increases between July 2022 and September 2023.

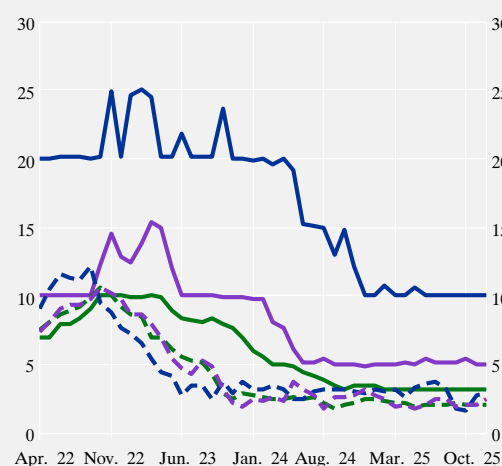
² This is also in line with the EU-Harmonised Consumer Expectations Survey.

Chart 1 Inflation perceptions and inflation expectations

(percentage changes)

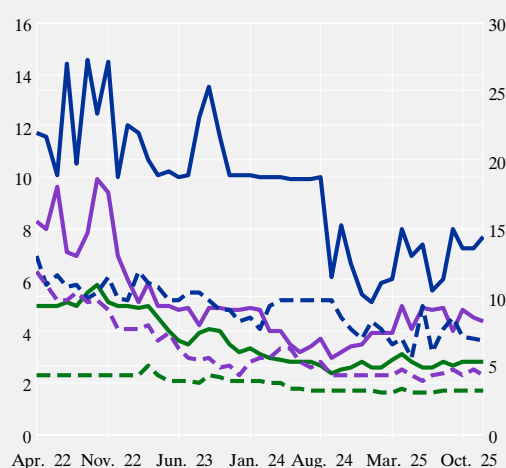
Median inflation perceptions and HICP: Greece, Portugal, EA11

— Perceived inflation EA11
— Perceived inflation EL
— Perceived inflation PT
— HICP EA
— HICP EL
— HICP PT



Median inflation expectations over the next 12 months. Inflation uncertainty: Greece, Portugal, EA11

— Inflation exp. 1y EA11
— Inflation exp. 1y EL
— Inflation exp. 1y PT
— Median inflation uncertainty EA11
— Median inflation uncertainty EL
— Median inflation uncertainty PT



Source: Consumer Expectations Survey (CES).

Notes: Weighted data. Consumers' inflation perceptions and expectations are winsorised at the most extreme two percentiles to deal with outliers. Inflation uncertainty (right-hand side axis) is based on the respondent-specific probability distributions derived from the probabilistic bin question on inflation expectations. Note that the number of underlying bins increased from eight to a total of ten as of July 2022. The implied inflation uncertainty is computed as the interquartile range between the 75th and the 25th percentile of the respondent-specific subjective distribution. CES data span the period from April 2022 to December 2025.

The probabilistic question on inflation expectations over the next twelve months in the CES enables the elicitation of a subjective probability distribution of inflation expectations (over the next 12 months) that is consumer-specific. In particular, respondents are asked to allocate 100 points across specific intervals of changes in prices (bins) to indicate the likelihood of future inflation. Therefore, inflation uncertainty can be measured as the interquartile range from the respondent-specific subjective distribution and is shown in the right panel of Chart 1 (right axis). Not surprisingly, we notice that inflation uncertainty increases when inflation expectations are high and decreases as inflation expectations decline sub-

stantially. Inflation uncertainty decreases for Greek consumers from 6.9% in April 2022 to 3.6% in December 2025 and from 2.3% to 1.7% for euro area consumers over the same period.

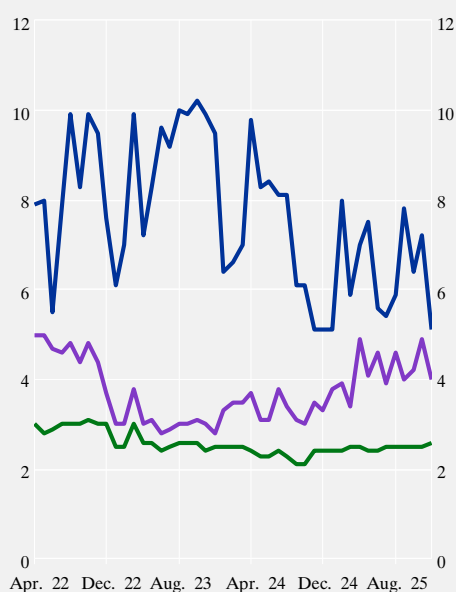
Medium-term consumer inflation expectations in Greece and the euro area are considerably lower than short-term expectations. In particular, as with one year ahead expectations, three years ahead inflation expectations are higher and exhibit greater volatility in Greece and Portugal compared to the euro area (see Chart 2, left panel). Medium term inflation expectations in Greece reached their maximum level of 10.2% in October 2023, but subsequently declined significantly to 5.1% in December

Chart 2 Inflation expectations three and five years ahead

(percentage changes)

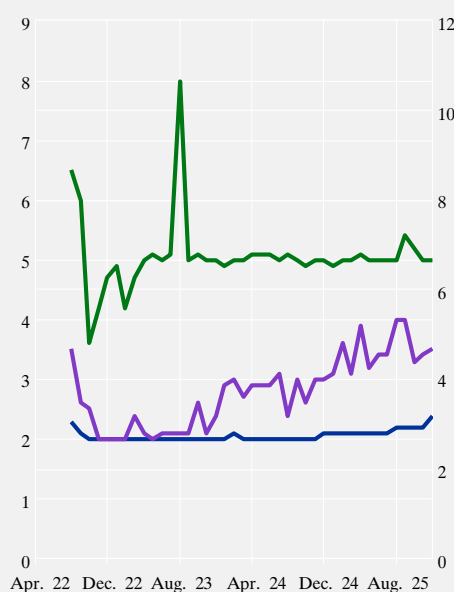
Median inflation expectations 3 years ahead in Greece, Portugal and EA11

— Inflation exp. 3y EA11
— Inflation exp. 3y EL
— Inflation exp. 3y PT



Median inflation expectations 5 years ahead in Greece, Portugal and EA11

— Inflation exp. 5y EA11
— Inflation exp. 5y EL
— Inflation exp. 5y PT



Source: Consumer Expectations Survey (CES).

Notes: Weighted data. Consumers' inflation expectations three and five years ahead are winsorised at the most extreme two percentiles to deal with outliers. CES data for inflation expectations three years ahead span the period from April 2022 to December 2025. CES data for five years ahead inflation expectations span the period from August 2022 to December 2025.

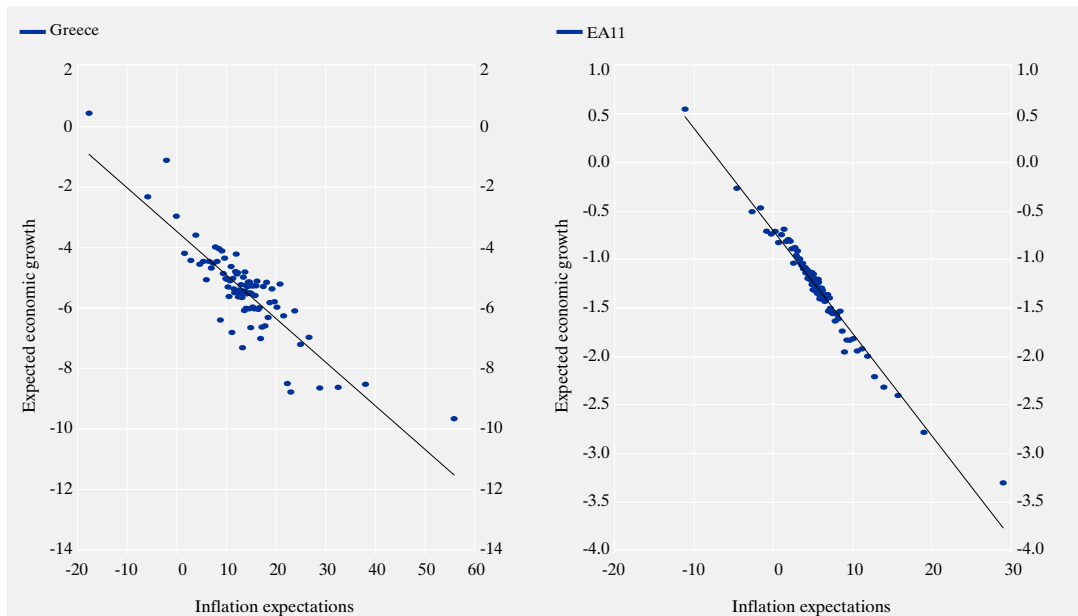
2025. On the other hand, three years ahead inflation expectations in the euro area peaked at 3.1% in October 2022 but, since then, they declined, standing at 2.6% in December 2025.

Long-term inflation expectations for Greek and euro area consumers remain relatively stable over extended periods of time without undergoing substantial variations (see Chart 2, left panel). Median five years ahead inflation expectations in Greece remained broadly unchanged at 5% for two years, from September 2023 to August 2025. They increased a bit since then, reverting back to 5% in December 2025. Likewise, median five years ahead inflation expectations in the euro area remained broadly unchanged at 2.1% for approximately

three years, from September 2022 to July 2025, and then they increased to 2.4% in December 2025. On the other hand, long-term inflation expectations in Portugal exhibit greater volatility.

Chart 3 illustrates a clear negative association between consumers' expectations of economic growth and inflation for both Greece and the euro area. This association appears consistent with a "supply-side narrative", where higher inflation expectations are mainly associated with a pessimistic economic outlook and lower expectations about economic growth, and is documented in Coibion et al. (2023). Further, Chart 4 shows a clear positive association between inflation expectations and expecta-

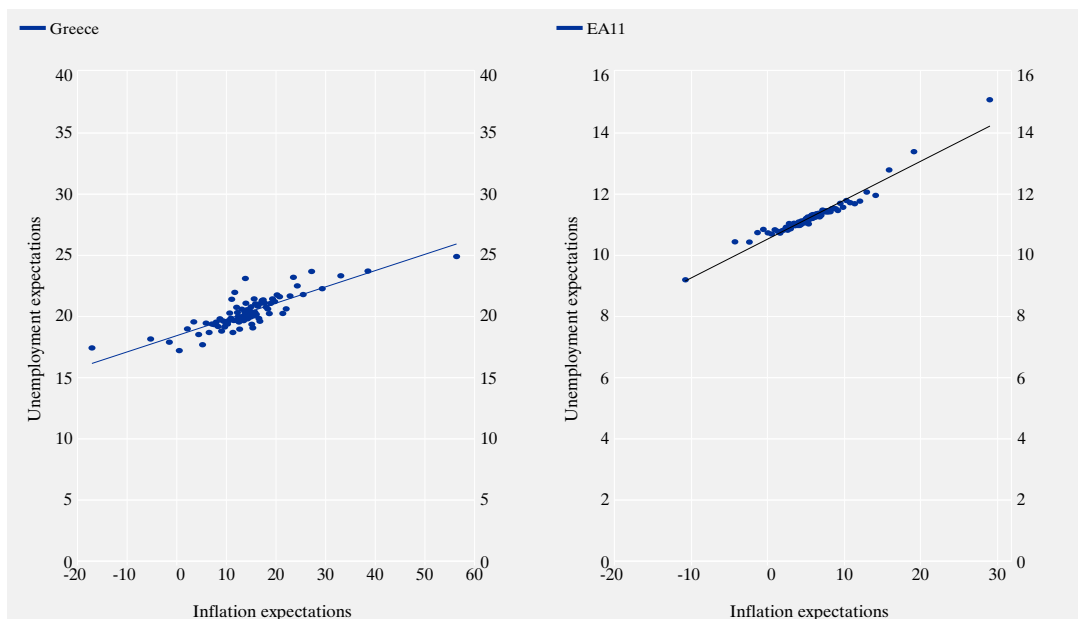
Chart 3 Association between inflation expectations and expected economic growth



Source: Consumer Expectations Survey (CES).

Notes: The chart plots inflation expectations over the next twelve months and economic growth rate expectations over the next twelve months for Greece and EA11. Both series are winsorised at the most extreme two percentiles to deal with outliers. The linear fit considers wave and individual specific fixed effects. CES data span the period from April 2022 to December 2025.

Chart 4 Association between inflation expectations and expected unemployment rate



Source: Consumer Expectations Survey (CES).

Notes: The chart plots expectations about inflation and the unemployment rate over the next twelve months for Greece and EA11. Both series are winsorised at the most extreme two percentiles to deal with outliers. The linear fit considers wave and individual specific fixed effects. CES data span the period from April 2022 to December 2025.

tions about the unemployment rate for both Greece and the euro area, providing additional evidence on the supply-side narrative that high consumers' inflation expectations are correlated with negative economic sentiment.

4 EMPIRICAL RESULTS

We present the results from a linear regression model of short-term inflation expectations described in equation (1). Table 1 shows that inflation expectations over the next twelve months are positively and strongly associated with inflation perceptions in Greece and the euro area, although the effect is relatively higher for Greek consumers. The effect of some socioeconomic variables on inflation expectations is heterogeneous in Greece compared to the euro area. In addition, while women and consumers with a low level of financial literacy have higher inflation expectations in the euro area, gender and financial literacy do not impact inflation expectations in Greece. Consumers' inflation expectations increase with age in Greece and the euro area. Nevertheless, while the effect is not significant at 5% for the two age groups in Greece, the effect is positive only for the last age category for euro area consumers, i.e. consumers aged 55 and above. We observe that income is negatively related to inflation expectations for both Greece and euro area consumers. However, for Greece the effect is negative in one of the highest income groups (quintile 4), whereas for the euro area the effect is positive in the lowest income group (quintiles 1 and 2). Previous studies have also shown that age, gender and income are correlated with inflation expectations (see Arioli et al. 2017; Ehrmann et al. 2017; and Abildgren and Kuchler 2021, among others). Partnership status is positively and strongly associated with inflation expectations in Greece. However, there is no significant impact of partnership status on inflation expectations in the euro area. Holding a mortgage is negatively associated with short-term inflation expectations for euro area consumers, but this effect is absent for Greek con-

Table 1 Regression model of short-term inflation expectations I

	<i>E(Inflation_{i,t+12})</i>	
	Greece	EA11
Perceived inflation	0.5805*** (0.0496)	0.4954*** (0.0109)
Women	-1.0609 (0.6646)	0.1566*** (0.0558)
Age: 35-54	0.7778* (0.4659)	-0.0660 (0.2191)
Age: 55+	1.1146* (0.5749)	0.6813*** (0.2480)
High education level	-1.1619 (0.7623)	-0.0506 (0.0465)
Household size	-0.3986* (0.2387)	0.0596*** (0.0213)
LFL	0.6131 (0.6119)	0.1926*** (0.0428)
Unemployed	0.9255 (0.8254)	-0.0244 (0.1024)
Partner	1.9426*** (0.5829)	-0.0486 (0.0552)
Home ownership	-1.5084* (0.8129)	-0.0286 (0.0667)
Home mortgage	0.0986 (0.3970)	-0.2825*** (0.0500)
Income – Q1	0.7228 (0.8152)	0.2507*** (0.0794)
Income – Q2	0.9221* (0.5341)	0.2184*** (0.0615)
Income – Q3	0.2648 (0.4834)	0.0837 (0.0564)
Income – Q4	-1.1372** (0.5677)	-0.0243 (0.0510)
Liquidity constraints	0.8250** (0.3453)	0.4764*** (0.0451)
Hard financial situation	1.2546*** (0.2325)	0.5588*** (0.0443)
Hard credit access	1.8244*** (0.3019)	0.6251*** (0.0355)
Country FE	NO	YES
Wave FE	YES	YES
Observations	47,185	918,908
R-squared	0.5369	0.4851

Notes: We use a linear regression model of inflation expectations over the next twelve months. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from April 2022 to December 2025.

sumers. While household size is not related to inflation expectations for Greek consumers at the 5 percent confidence level, its effect is positive for euro area consumers. In addition, edu-

Table 2 Regression model of short-term inflation expectations II

	<i>E(Inflation_{t,t+12})</i>	
	Greece	EA11
Perceived inflation	0.4036*** (0.0158)	0.3702*** (0.0037)
Income – Q1	2.8093* (1.6564)	0.4835** (0.1969)
Income – Q2	2.7694* (1.5861)	0.4874*** (0.1575)
Income – Q3	0.7223 (0.8300)	0.2925*** (0.1092)
Income – Q4	0.3918 (0.6381)	0.2681*** (0.0706)
Liquidity constraints	0.0824 (0.2795)	-0.0798** (0.0378)
Hard financial situation	0.5707*** (0.1969)	0.3417*** (0.0250)
Hard credit access	0.2786 (0.1758)	0.1850*** (0.0247)
Country FE	NO	YES
Wave FE	YES	YES
Individual FE	YES	YES
Observations	41,775	872,844
R-squared	0.7870	0.71541

Notes: We use a linear regression model of inflation expectations over the next twelve months accounting for individual fixed effects. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from April 2022 to December 2025.

cation, home ownership and unemployment are not associated with inflation expectations for both Greece and euro area countries.

Interestingly, liquidity constraints, hard financial situation and hard credit access are positively associated with short-term inflation expectations, albeit the impact is stronger for Greek compared to euro area consumers. In particular, the estimated coefficients of liquidity constraints and hard financial situation are twice as high for Greece, while the impact of hard credit access is three times higher.

In Table 2 we present the results from a linear regression model of short-term inflation expectations using the same empirical specification as in equation (1) but this time we also account

for individual fixed effects. Controlling for individual fixed effects, the impact of inflation perceptions on inflation expectations over the next twelve months is similar for Greece and the euro area with the estimated coefficient of 0.4 for perceived inflation. The inference on the impact of the remaining variables is qualitatively the same, with the exception of liquidity constraints and hard credit access. Liquidity constraints are not associated with inflation expectations for Greek consumers and euro area consumers (at 5 percent confidence level). Unlike the euro area, hard credit access is not related to inflation expectations over the next twelve months in Greece.

We present the results from a linear regression model of medium-term inflation expectations described in equation (2). Table 3 shows that the perceived inflation also has a positive and strong effect on medium-term inflation expectations for both Greece and the euro area. A one-percentage-point increase in inflation perceptions raises three-year-ahead inflation expectations by 0.5 percentage points on average for Greek consumers, compared to 0.4 percentage points for euro area consumers.

In line with the findings for inflation expectations over the next twelve months, the qualitative impact of age, gender, partnership status and mortgage holder status on three-year-ahead inflation expectations is the same for Greek and euro area consumers. Low financial literacy is positively associated with medium-term inflation expectations in both Greece and the euro area. However, the estimated coefficient for Greek consumers is six times larger than that for euro area consumers. Unlike in the euro area, where education has a muted effect, a high level of education significantly reduces inflation expectations three years ahead in Greece. Medium-term inflation expectations increase with income in the euro area, but this association does not apply to Greek consumers. Finally, the positive effect of liquidity constraints, hard financial situation and hard credit access on inflation expectations three years ahead is stronger for Greek consumers

Table 3 Regression model of medium-term inflation expectations I

	<i>E(Inflation_{i,t+3y})</i>	
	Greece	EA11
Perceived inflation	0.5142*** (0.0631)	0.3765*** (0.0146)
Women	-0.8315 (0.8691)	0.1573** (0.0761)
Age: 35-54	1.0458* (0.6173)	0.3696*** (0.0654)
Age: 55+	1.3493* (0.8190)	0.5480*** (0.0729)
High education level	-2.5077** (1.0210)	-0.0779 (0.0616)
Household size	-0.4864 (0.3352)	0.0693** (0.0290)
LFL	1.8142** (0.7499)	0.3821*** (0.0536)
Unemployed	0.7357 (1.0154)	0.1941 (0.1362)
Partner	2.2890*** (0.7961)	0.0164 (0.0759)
Home ownership	-1.6453 (1.0980)	-0.0917 (0.0960)
Home mortgage	-0.4864 (0.5597)	-0.2602*** (0.0646)
Income – Q1	1.7333 (1.0851)	0.4241*** (0.1092)
Income – Q2	1.1735 (0.7842)	0.3001*** (0.0801)
Income – Q3	1.0098 (0.7114)	0.0735 (0.0713)
Income – Q4	-0.7536 (0.7057)	-0.0261 (0.0653)
Liquidity constraints	0.9431** (0.4199)	0.4257*** (0.0608)
Hard financial situation	0.8871*** (0.3012)	0.6681*** (0.0589)
Hard credit access	2.8270*** (0.3890)	0.7434*** (0.0485)
Country FE	NO	YES
Wave FE	YES	YES
Observations	47,185	918,908
R-squared	0.3717	0.2923

We use a linear regression model of inflation expectations three years ahead. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from April 2022 to December 2025.

compared to their euro area counterparts.

In Table 4 we augment the empirical specification described in equation (2) to account for

Table 4 Regression model of medium-term inflation expectations II

	<i>E(Inflation_{i,t+3y})</i>	
	Greece	EA11
Perceived inflation	0.2877*** (0.0136)	0.2200*** (0.0036)
Income – Q1	-0.2311 (1.6330)	0.2282 (0.1956)
Income – Q2	-0.1591 (1.5006)	0.3634** (0.1570)
Income – Q3	-0.9664 (0.9612)	0.2276** (0.1131)
Income – Q4	-0.1679 (0.6819)	0.2445*** (0.0742)
Liquidity constraints	0.4892* (0.2858)	-0.0095 (0.0388)
Hard financial situation	0.4657** (0.2187)	0.1797*** (0.0328)
Hard credit access	0.0281 (0.1983)	0.1291*** (0.0333)
Country FE	NO	YES
Wave FE	YES	YES
Individual FE	YES	YES
Observations	41,775	872,845
R-squared	0.7526	0.6637

Notes: We use a linear regression model of inflation expectations three years ahead accounting for individual fixed effects. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from April 2022 to December 2025.

individual fixed effects. Compared to the results presented in Table 3, the qualitative effect of inflation perceptions on medium-term inflation expectations is identical for Greece and the euro area, though the magnitude of the estimated coefficient is smaller in both cases. All the remaining variables enter the same sign as those reported in Table 2.

Table 5 displays the results from a linear regression model of long-term inflation expectations for Greece and the euro area. Our results show that, for both Greek and euro area consumers, perceptions about current inflation compared to the past twelve months still affect five-year-ahead inflation expectations, though the estimated coefficients are smaller in mag-

Table 5 Regression model of long-term inflation expectations I

	<i>E(Inflation_{i,t+5y})</i>	
	Greece	EA11
Perceived inflation	0.4444*** (0.0800)	0.3012*** (0.0179)
Women	-1.5637 (1.0670)	0.0756 (0.0909)
Age: 35-54	1.2466* (0.6922)	-0.4249*** (0.0708)
Age: 55+	1.5272* (0.8323)	0.5069*** (0.0778)
High education level	-2.7747** (1.2090)	-0.0923 (0.0685)
Household size	-0.6149* (0.3391)	0.0663** (0.0313)
LFL	1.8326*** (0.6959)	0.3275*** (0.0538)
Unemployed	-0.0713 (0.9591)	0.1282 (0.1474)
Partner	2.5399*** (0.8824)	-0.0292 (0.0851)
Home ownership	-1.9196 (1.3161)	-0.1784 (0.1147)
Home mortgage	-0.5974 (0.5586)	-0.2732*** (0.0684)
Income – Q1	1.2455 (1.0087)	0.3828*** (0.1169)
Income – Q2	1.5036* (0.8305)	0.2894*** (0.0862)
Income – Q3	1.0830 (0.8092)	0.0382 (0.0735)
Income – Q4	-0.7361 (0.6770)	-0.0605 (0.0657)
Liquidity constraints	0.3478 (0.4412)	0.2795*** (0.0639)
Hard financial situation	0.7588** (0.3137)	0.5338*** (0.0703)
Hard credit access	2.6200*** (0.4239)	0.6204*** (0.0543)
Country FE	NO	YES
Wave FE	YES	YES
Observations	42,723	839,426
R-squared	0.3058	0.2132

Notes: We use a linear regression model of inflation expectations five years ahead. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from August 2022 to December 2025.

nitude than those for medium-term expectations (i.e. 0.4 and 0.3, respectively). In addition, as with medium-term inflation expectations, education, partnership status and

Table 6 Regression model of long-term inflation expectations II

	<i>E(Inflation_{i,t+5y})</i>	
	Greece	EA11
Perceived inflation	0.1881*** (0.0141)	0.1533*** (0.0034)
Income – Q1	0.8948 (1.5006)	0.1755 (0.1980)
Income – Q2	0.7495 (1.1351)	0.2212** (0.1527)
Income – Q3	-0.1285 (0.8582)	0.1896* (0.1125)
Income – Q4	0.8736* (0.4600)	0.2487*** (0.0722)
Liquidity constraints	0.1034 (0.3902)	-0.0711* (0.0427)
Hard financial situation	0.1674 (0.2426)	0.1289*** (0.0326)
Hard credit access	0.1893 (0.2161)	0.1384*** (0.0326)
Country FE	NO	YES
Wave FE	YES	YES
Individual FE	YES	YES
Observations	37,490	795,084
R-squared	0.7419	0.6442

Notes: We use a linear regression model of inflation expectations five years ahead accounting for individual fixed effects. Survey weights are used. Wave fixed effects are included but not reported. For the EA11 dataset, country fixed effects are also included. The sample includes robust standard errors in parenthesis. The symbols ***, ** and * denote statistical significance at 1%, 5% and 10%, respectively. CES data span the period from August 2022 to December 2025.

financial literacy are strongly associated with long-term inflation expectations in Greece. While hard financial situation and hard credit access impact long-term inflation expectations, the effect of liquidity constraints is not statistically significant for Greek consumers. Finally, among euro area consumers, the influence of socioeconomic variables on long-term inflation expectations closely mirrors that observed for medium-term inflation expectations, as reported in Table 3.

According to Table 6, when accounting for individual fixed effects, the effect of perceived inflation on inflation expectations five years ahead for both Greece and the euro area is lower and similar, with the estimated coefficient of inflation perceptions standing at

approximately 0.2. Moreover, we find that long-term inflation expectations in Greece are driven exclusively by inflation perceptions, as no other variables appear to exert any significant influence on them. For euro area consumers, income, hard financial situation and hard credit access are associated with inflation expectations five years ahead.

5 CONCLUDING REMARKS

This paper, using the CES data, empirically investigates how inflation perceptions and inflation expectations are shaped for Greek and euro area consumers. Descriptive evidence shows that inflation perceptions and expectations closely track the movements in the official inflation rate, as measured by the Harmonised Index of Consumer Prices (HICP). In addition, we document that median inflation perceptions as well as short-term, medium-term and long-term inflation expectations over time are higher in Greece than in the euro area. Moreover, inflation uncertainty tends to increase when inflation expectations are elevated, though it remains relatively stable over time and is not subject to large fluctuations.

We also provide support for the supply-side narrative documented in Coibion et al. (2023), which posits that consumers generally tend not to associate higher inflation with stronger demand and higher economic growth, but instead higher inflation expectations are associated with bad news and a more pessimistic outlook for the economy. In particular, we find that consumers' inflation expectations for the next twelve months are negatively correlated with their expectations for economic growth over the same period, while they are positively correlated with their expectations for the unemployment rate in both Greece and the euro area.

The results show that inflation perceptions have a positive impact on inflation expectations over the next months, as well as three years and five years ahead for Greece and the euro area. As the forecast horizon increases,

the effect of inflation perceptions is lower, providing evidence of the downward sloping of the term structure of inflation expectations. This is further supported by the fact that median inflation expectations decrease when the forecast horizon lengthens from twelve months to three and five years ahead. These findings provide a positive indication of the anchoring of inflation expectations, as consumers expect inflation to decline over time.

The results also indicate that the impact of socioeconomic variables on inflation expectations is heterogeneous across different forecast horizons. For Greek consumers, financial literacy and education are not associated with short-term inflation expectations. However, medium and long-term inflation expectations increase with a low level of financial literacy and education. Unlike the euro area, partnership status is strongly and positively related to inflation expectations in Greece.

In addition, the positive impact of liquidity constraints, hard financial situation and hard credit access on inflation expectations is more pronounced for Greek consumers than for their euro area counterparts. Notably, the magnitude of the estimated coefficients of these variables diminishes once we control for individual fixed effects.

Overall, this study provides useful insights on how Greek consumers form their inflation expectations across different forecast horizons, using data from the CES. The CES is particularly well-suited for this purpose, as it collects novel and timely information on consumers' inflation perceptions, as well as their short-, medium- and long-term inflation expectations. In addition, the granularity of the data allows us to examine heterogeneity in expectations formation across different socioeconomic groups of consumers. Furthermore, it complements measures of inflation expectations derived from financial markets, deepening our understanding on the formation of inflation expectations, which has major implications for monetary policy and central bank communication.

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THE CULTURAL AND CREATIVE INDUSTRIES IN GREECE

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ABSTRACT

This paper examines the economic role of Cultural and Creative Industries (CCIs), with a focus on Greece. Beyond their cultural and social value, these industries have a meaningful, though often underestimated, economic value. CCIs generate income, employment, trade and innovation. They usually account for a relatively modest share of economic activity and employment; in Greece, they account for about 1.7% of value added and about 3% of employment in the business economy. The Greek CCIs are characterised by a higher level of human capital relative to the rest of the economy, but firms are smaller and less productive than in the EU. However, there are signs of recent internationalisation of the industry, with exports growing in some sub-categories. The sector faces structural changes, particularly in terms of access to finance, since firms rely heavily on intangible assets and operate under uncertain demand conditions, both of which are inherent characteristics of CCIs. Policy coordination in different areas is needed in order for all stakeholders to be taken into consideration. Improvement of financial tools and adaptation to digitalisation and AI are key to unlocking the sector's full economic and cultural potential.

Keywords: cultural and creative industries; industry studies; Greece

JEL classification: Z11; L82; O34

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ΟΙ ΠΟΛΙΤΙΣΤΙΚΕΣ ΚΑΙ ΔΗΜΙΟΥΡΓΙΚΕΣ ΒΙΟΜΗΧΑΝΙΕΣ ΣΤΗΝ ΕΛΛΑΔΑ

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ΠΕΡΙΛΗΨΗ

Το παρόν άρθρο εξετάζει τον οικονομικό ρόλο των Πολιτιστικών και Δημιουργικών Βιομηχανιών (ΠΔΒ), με έμφαση στην Ελλάδα. Πέρα από την πολιτιστική και κοινωνική τους αξία, αυτές οι βιομηχανίες συνεισφέρουν στην οικονομία, αν και η συνεισφορά τους συχνά υποτιμάται. Οι ΠΔΒ δημιουργούν εισόδημα και απασχόληση, ενώ ενισχύουν το εμπόριο και την καινοτομία. Συνήθως αντιπροσωπεύουν ένα σχετικά μικρό μερίδιο της οικονομικής δραστηριότητας και της απασχόλησης. Στην Ελλάδα αντιπροσωπεύουν περίπου το 1,7% της προστιθέμενης αξίας και περίπου το 3% των θέσεων εργασίας της επιχειρηματικής οικονομίας. Το ανθρώπινο κεφάλαιο που απασχολείται είναι υψηλότερο σε σύγκριση με την υπόλοιπη οικονομία, αλλά οι επιχειρήσεις είναι μικρότερες και λιγότερο παραγωγικές από ό,τι στην ΕΕ. Ωστόσο, υπάρχουν ενδείξεις πρόσφατης διεθνοποίησης του κλάδου και αυξανόμενων εξαγωγών κάποιων υποκατηγοριών. Ο τομέας αντιμετωπίζει διαρθρωτικές προκλήσεις, ιδίως όσον αφορά την πρόσβαση στη χρηματοδότηση, καθώς οι επιχειρήσεις κατέχουν σε μεγάλο βαθμό άυλα περιουσιακά στοιχεία, ενώ λειτουργούν υπό συνθήκες αβέβαιης ζήτησης, χαρακτηριστικά τα οποία είναι εγγενή στις ΠΔΒ. Είναι αναγκαίος ο συντονισμός των πολιτικών σε διάφορους τομείς, ώστε να λαμβάνονται υπόψη όλα τα εμπλεκόμενα μέρη. Η βελτίωση των χρηματοοικονομικών εργαλείων και η προσαρμογή στην ψηφιοποίηση και την Τεχνητή Νοημοσύνη είναι το κλειδί για την πλήρη αξιοποίηση του οικονομικού και πολιτιστικού δυναμικού των ΠΔΒ.

ΜΗ ΤΕΧΝΙΚΗ ΣΥΝΟΨΗ

Το παρόν άρθρο εξετάζει πώς οι πολιτιστικές και δημιουργικές δραστηριότητες, όπως ο κινηματογράφος, η μουσική, το θέατρο αλλά και η αρχιτεκτονική και το βιβλίο, συμβάλλουν στην οικονομία παγκοσμίως και ειδικά στην Ελλάδα. Οι εν λόγω δραστηριότητες καλύπτουν ένα ευρύ φάσμα, από τις παραδοσιακές τέχνες έως τα σύγχρονα ψηφιακά μέσα. Ενώ ο πολιτισμός συχνά θεωρείται κυρίως ως αγαθό με ευρέα κοινωνικά οφέλη, διαδραματίζει επίσης οικονομικό ρόλο, δημιουργώντας θέσεις εργασίας, εισόδημα και εξαγωγές, αλλά και υποστηρίζοντας την καινοτομία.

Οι Πολιτιστικές και Δημιουργικές Βιομηχανίες (ΠΔΒ) συνήθως αντιπροσωπεύουν σχετικά μικρό μερίδιο της οικονομικής δραστηριότητας και της απασχόλησης. Στην Ελλάδα ο τομέας συνεισφέρει περίπου το 1,7% της προστιθέμενης αξίας και περίπου το 3% των θέσεων εργασίας της επιχειρηματικής οικονομίας, έναντι 1,9% και 3,8% στην ΕΕ αντίστοιχα. Επί του παρόντος, οι τρεις μεγαλύτεροι υποκλάδοι, με μερίδιο 15% έκαστος, είναι οι “Δραστηριότητες αρχιτεκτόνων”, η “Εκτύπωση και αναπαραγωγή προεγγεγραμμένων μέσων” και η “Παραγωγή κινηματογραφικών ταινιών, βίντεο και τηλεοπτικών προγραμμάτων, ηχογραφήσεις και μουσικές εκδόσεις”. Οι ΠΔΒ στην Ελλάδα απασχολούν εργατικό δυναμικό υψηλού μορφωτικού επιπέδου, αλλά οι ελληνικές επιχειρήσεις τείνουν να είναι μικρότερες και λιγότερο παραγωγικές σε σχέση με τις αντίστοιχες στην Ευρωπαϊκή Ένωση. Οι εξαγωγές παραμένουν σχετικά περιορισμένες, αν και ορισμένοι τομείς, όπως η οπτικοακουστική παραγωγή και τα βιντεοπαιχνίδια, παρουσιάζουν ανάπτυξη και οι Έλληνες δημιουργοί είναι ολοένα πιο ορατοί διεθνώς.

Μία από τις μεγαλύτερες προκλήσεις που αντιμετωπίζει ο τομέας είναι η πρόσβαση στη χρηματοδότηση. Πολλές δημιουργικές επιχειρήσεις βασίζονται σε ιδέες και πνευματική ιδιοκτησία, αντί για φυσικά περιουσιακά στοιχεία, γεγονός που δυσχεραίνει την εξασφάλιση τραπεζικών δανείων. Επιπλέον, η ζήτηση για δημιουργικά προϊόντα μπορεί να είναι απρόβλεπτη, με αποτέλεσμα να αυξάνεται ο επενδυτικός κίνδυνος. Η δημόσια χρηματοδότηση παίζει σημαντικό ρόλο, καθώς οι πολιτιστικές δραστηριότητες δημιουργούν οφέλη για την κοινωνία που δεν αντικατοπτρίζονται πλήρως σε οικονομικούς όρους. Στην Ελλάδα οι δημόσιες δαπάνες για τον πολιτισμό έχουν αυξηθεί τα τελευταία χρόνια, αν και εξακολουθούν να υστερούν σε σχέση με τον μέσο όρο της ΕΕ. Τα ευρωπαϊκά προγράμματα επίσης παρέχουν σημαντικές ευκαιρίες χρηματοδότησης. Ωστόσο, οι ιδιωτικές επενδύσεις, τα νέα εργαλεία χρηματοδότησης (όπως τα επιχειρηματικά κεφάλαια ή το crowdfunding) και οι συνεργασίες, ιδίως οι διεθνείς συμπαραγωγές, είναι επίσης απαραίτητες.

Όσον αφορά τις μελλοντικές εξελίξεις, οι ψηφιακές τεχνολογίες και η τεχνητή νοημοσύνη μετασχηματίζουν τον τομέα, δημιουργώντας τόσο ευκαιρίες όσο και προκλήσεις. Επιτρέπουν στους δημιουργούς να προσεγγίσουν μεγαλύτερο κοινό και να αναπτύξουν νέα επιχειρηματικά μοντέλα, αλλά απαιτούν επίσης νέες δεξιότητες. Για την ανάπτυξή τους οι ΠΔΒ χρειάζονται συντονισμένες παρεμβάσεις σε διάφορους τομείς, όπως η πρόσβαση στη χρηματοδότηση και η εκπαιδευτική πολιτική για την ενίσχυση των δημιουργικών, ψηφιακών αλλά και επιχειρηματικών δεξιοτήτων. Με αυτόν τον τρόπο οι ΠΔΒ θα μπορούσαν να συμβάλουν περισσότερο στην ελληνική οικονομία και κοινωνία.

THE CULTURAL AND CREATIVE INDUSTRIES IN GREECE*

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I INTRODUCTION

Culture plays a fundamental role in societies by expressing and shaping identities and values. In Europe, a continent marked by deeply rooted national identities, culture emerges as the primary driver of a collective sense of belonging among EU citizens.¹ With cultural expression through art, heritage, media, design and creative practice, societies reflect on their past, discuss the present and visualise the future. Cultural activities also contribute to individual well-being and improve the quality of life.

But what exactly does the term “culture” describe? A universally accepted definition of culture does not exist and probably never will. As early as 1952, Kroeber and Kluckhohn surveyed the extensive literature on culture and compiled over 160 distinct definitions, a fact which suggests that the term varies across disciplines and perspectives. According to UNESCO “culture should be regarded as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and [...] encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs” (UNESCO 2001).

Beyond its intrinsic social value, culture is increasingly recognised as a significant economic force. People, organisations and firms engaged in cultural and creative assignments transform creativity, skills and intellectual property into marketable goods and services, generating income, employment and trade and spurring innovation. Thus, the concept of “cultural industry” becomes relevant. In earlier times, culture and industry were argued to be opposites and the term “cultural industry” was occasionally even used with a derogatory connotation for the popular means that were distracting the masses (Carey 1992). However, today it is very common to refer to cultural

industries as simply those industries that produce cultural goods and services.

The concept of cultural industry has changed over time in line with the changing definition of creativity, which differentiated the scope of activities included in the definition of the industry. Originally, “cultural industries” were thought to describe activities with a strong artistic component but, later, the scope of cultural industries broadened.² A new term, “creative industries”, emerged, which went beyond the arts to include “any activity producing symbolic products with a heavy reliance on intellectual property” (UNCTAD 2004). So, although cultural industries refer to forms of cultural production and consumption that have at their core a symbolic or expressive element, creative industries refer to a much wider productive set, including goods and services produced by the cultural industries often depending on some type of innovation (UNESCO 2013). The content generated by creative industries is typically protected by copyright. Activities range from traditional upstream activities, such as the art crafts, performing arts and literature, to more technology- and services-oriented “downstream” activities, such as advertising, design, publishing and media-related activities.

A widely used framework underlying many definitions of cultural and creative industries (CCIs) is the concentric circles model, whether by industry (Throsby 2000) or by occupation (Florida 2002). The idea is that

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¹ European Commission (2017a).

² For a discussion on the evolution of the term over time, see Moore 2014.

cultural value originates at the core; moving away from the core, the degree of cultural or creative intensity diminishes. In Throsby's model, the core consists of "the arts" (music, dance, theatre, literature, visual arts, crafts, etc.). Moving away from the core, industries increasingly combine creative input with other forms of capital and labour, producing goods that progressively become less "purely cultural", such as publishing, distribution and advertising. In Florida's work, the core consists of occupations such as artists, writers, thinkers, innovators, scientists, engineers, etc. who, at the outer layers, are surrounded by a broader "creative class" engaged in problem-solving and professional activities.

The concept of creative industries came along with the broad wave of the digital era and it is continuously evolving with innovation and digitalisation which enable the introduction of new creative products. It is right to say that today creative industries stand at the crossroads between the arts, business and technology. Thus, intellectual capital coupled with technological applications provide the main source of wealth in the CCIs, especially for technology-centred industries, such as software programming and video games. For this reason, technological progress and a high degree of experimentation targeted to satisfy the unpredictable and changing tastes that characterise these markets are key to achieving sustained growth.

Of course, structural heterogeneity still characterises CCIs, highlighting the coexistence of high-productivity digital subsectors and labour-intensive traditional activities (Valiati and Möller 2025).

Lastly, while there is no consensus on the above definitions in the academic literature, given the blurring lines between these industries, the common practice is to consider cultural and creative industries together, due to the large overlaps between their activities and, thus, the two terms are often used interchangeably (Jeffcutt and Pratt 2002).

The study proceeds as follows: Section 2 discusses some key characteristics of the industry in the context of macroeconomics and industrial economics. Section 3 introduces definitions and statistical concepts. Section 4 sets the international picture of the industry, while Section 5 focuses on the Greek industry. Section 6 discusses funding options and Section 7 concludes.

2 SOME DISTINCTIVE FEATURES OF THE INDUSTRY

The benefits of cultural and creative goods and services accrue to more people in a given community than the private agent consuming them. According to Throsby (2010), this feature stems from three distinctive characteristics of arts: "(i) an *existence* value (people value the arts simply because they exist); (ii) an *option* value (people wish to retain the option that they may wish to consume the arts at some time in the future); and (iii) a *bequest* value (people think it is important to pass the arts on to future generations)". Thus, cultural and creative goods and services combine characteristics of both private and public goods and, hence, are considered mixed goods. Given the existence of positive externalities, the market tends to undervalue them, impacting the funding options of CCIs (the issue is further discussed in Section 6).

Moving beyond the traditional economic analysis approach of a market-failure model of arts and culture, Caves (2002) with his famous "seven economic properties" suggests that CCIs are fundamentally shaped by uncertainty of demand and tension between artistic creativity and commercial organisation. With this seminal work, he placed at the centre of the analysis contracts, incentives and organisational arrangements, rather than tastes or subsidies alone.

Another school of thought advances the idea of evolutionary market dynamics or an innovation-based approach (see e.g. Potts 2011; KEA

European Affairs 2009). Culture-based creativity, with the development of new products and services, nurtures innovation. While the innovation literature has traditionally focused on technological R&D, the role of creativity as a complementary driver of innovation is increasingly being recognised (Cropley 2006; OECD 2022). CCIs businesses are themselves highly innovative,³ although there are difficulties in measuring their innovation, as relevant surveys fail to properly capture innovation in non-traditional industrial sectors (OECD 2022). Innovation in CCIs is different from innovation in other sectors of the economy – innovation practices are individuated and non-routinised but, at the same time, interdisciplinary. Still, CCIs contribute to innovation throughout the economy, either directly by providing goods and services for use in innovation activity or indirectly through the exchange of knowledge and ideas. The impact materialises via supply chain linkages between firms in CCIs and other industries (Bakhshi et al. 2008; Müller et al. 2009) or via cultural and creative professionals working outside the cultural and creative sectors.⁴ This unexpected, but very welcome, positive externality is very important in an era when economies become increasingly innovation-led. A type of innovation particularly relevant in the case of CCIs is digital innovation. Cultural and creative content drives demand for electronics and digital devices, culture-dedicated devices (e.g. TV sets) and multi-functional devices (e.g. tablets), while also acting as a key driver of demand for high-bandwidth telecoms services (UNESCO 2015). This creates a virtuous circle whereby cultural creation increases the relevance and diffusion of new technologies among consumers and contributes to digital literacy, thereby further encouraging digital innovation and technological adoption. Digitalisation is a critical driver of the creative economy and artificial intelligence is expected to play a crucial role in creative industries (UNCTAD 2024; PwC 2023).

From an industrial policy point of view, CCIs have certain peculiarities. The structure of the industry is closer to that of an oligopoly. In the

OECD countries, the share of large enterprises earning more than 40% of the annual turnover is less than 1%; in the EU and the OECD countries the industry is populated by very small enterprises (OECD 2022; HKU 2010). However, cost structures, demand uncertainty and intellectual property rights give a monopolistic flavour to the industry (Towse and Hernández 2020). A notable characteristic of cultural goods is the high fixed cost of producing the original, with subsequent copies having a small marginal cost, a characteristic of natural monopolies. This monopolistic tendency is further boosted by digitalisation, as it not only further reduces marginal costs, but also enhances network effects, i.e. demand-side externalities, where the value of a product increases with the number of people consuming it. Finally, Florida (2002) concludes that the “3 T’s” are essential for the development of the industry: Technology (technological infrastructure), Talent (educated workforce) and Tolerance (“live and let live”), later augmented by the fourth “T” being the Territorial assets/quality of place (Florida 2012).

3 DEFINING AND CLASSIFYING THE CULTURAL AND CREATIVE INDUSTRIES

In order to measure the value of the activity and assess the economic impact of culture, we need to move from a normative definition of culture to a definition of something measurable. This is not as straightforward as for other, more typical, cases of economic activities. To define the industry, we need to identify the domains where culture is expressed through human creativity.

One approach would be to focus on activities relevant to the production network of cultural goods and services. A wider perimeter of CCIs

³ See Müller et al. 2009; Bird et al. 2020; Gkypali and Roper 2018 for case studies.

⁴ OECD (2022) estimates that 40% of cultural and creative jobs are in other sectors (e.g. industrial designers working in the automotive industry). Lee and Rodríguez-Pose (2014) find that cultural and creative professionals may be more robust drivers of innovation than cultural and creative sectors themselves.

Table 1 Definition of cultural and creative industries (CCIs)

UNESCO	EUROSTAT
Advertising	Advertising
Architecture	Architecture
Books	Books and press
Gaming	Heritage
Music	Archives
Movie	Libraries
Newspapers and magazines	Performing arts
Performing arts	Audio-visual and multimedia
Radio	Art crafts
TV	Visual arts
Visual arts	

Sources: UNESCO (2015) and Eurostat (2012).

would include the creation, production and distribution of cultural content. UNESCO defines CCIs as activities “whose principal purpose is production or reproduction, promotion, distribution or commercialization of goods, services and activities of a cultural, artistic or heritage-related nature” (UNESCO 2015) and classifies them in 11 sectors: Advertising, Architecture, Books, Gaming, Music, Movie, Newspapers and magazines, Performing arts, Radio, TV and Visual arts (see Table 1). Eurostat (2012) has a similar classification, grouping the CCIs in 10 *domains* (Heritage, Archives, Libraries, Books and press, Visual arts, Performing arts, Audiovisual & multimedia, Architecture, Advertising, Art crafts) based on 6 economic *functions*: Creation, Production & Publishing, Dissemination & Trade, Preservation, Education, Management & Regulation. Under this approach, software and ICT sectors are not included in the cultural and creative industries.

After identifying the domains and activities relevant to culture, the next step is the compilation of the dataset. Transitioning from the theoretical concept to the operational concept is not straightforward. For example, regarding statistics on employment, it is necessary to classify the sectors of employment and the occu-

pations that are relevant to culture. This should include anyone working in a culture-related economic activity regardless of their occupation, but it should also include all individuals with a culture-related occupation regardless of the economic activity. However, there is no agreed-upon definition of CCIs at the international level. Even within Europe, Member States use different sector delimitations, where they sometimes omit some sub-sectors. Another challenge in providing uniform monitoring data on CCIs stems from the poor or inadequate data collection mechanisms and the outdated statistical classifications. For all these reasons, the economic weight of CCIs has been partially described and, thus, misunderstood and undervalued for a long time.

Eurostat addressed this problem by building a database for *culture statistics*.⁵ Specifically, following up on the 2012 theoretical concept, Eurostat built a cross-sectoral database with various statistics relating to culture, including value added, employment, trade, expenditure, etc. Culture is defined as encompassing 23 activities. These activities correspond to NACE Rev. 2 codes of different level of granularity, ranging between 2- to 4-digit subsectors (see Table 2). What is unusual here is that these activities fall under several NACE sections due to the collaborative nature of creative processes which engage a range of professions. Thus, apart from activities classified under the typical Arts, Entertainment and Recreation section (R), cultural activities also come under Manufacturing (C), Information and Communication (J) and other sections. For Greece, in 2023, the value added of Section R corresponds to only 13% of the industry’s value added under Eurostat’s wider definition of CCIs; this small share of what is typically perceived by national accounts as “culture” highlights the importance of a correct identification of the industry. The database covers the period 2010 onwards but a structural break between

⁵ Culture statistics are not collected through a single survey, but data come from different Eurostat data collections. For more information, see <https://ec.europa.eu/eurostat/web/culture/overview>.

Table 2 Codes for economic activities classified as “cultural” in Eurostat’s culture statistics

NACE Rev. 2 codes	Economic activity
C18	Printing and reproduction of recorded media
C32.12	Manufacture of jewellery and related articles
C32.2	Manufacture of musical instruments
G47.61	Retail sale of books in specialised stores
G47.62	Retail sale of newspapers and stationery in specialised stores
G47.63	Retail sale of music and video recordings in specialised stores
J58.11	Book publishing
J58.13	Publishing of newspapers
J58.14	Publishing of journals and periodicals
J58.21	Publishing of computer games
J59	Motion picture, video and television programme production, sound recording and music publishing activities
J60	Programming and broadcasting activities
J63.91	News agency activities
M71.11	Architectural activities
M74.1	Specialised design activities
M74.2	Photographic activities
M74.3	Translation and interpretation activities
N77.22	Renting of video tapes and disks
P85.52	Cultural education
R90	Creative, arts and entertainment activities
R91.01	Library and archives activities
R91.02	Museums activities
R91.03	Operation of historical sites and buildings and similar visitor attractions

Source: Eurostat (2018).

2020 and 2021 limits the scope of the time series analysis.⁶

As a last technical note, it is underlined that the practical/operational coverage of Eurostat’s culture statistics can differ from the 2012 theoretical scope and vary between statistical domains; advertising is the only division out of the ten categories of Table 1 not included in CCI activities at all. The operational coverage is a function of the statistical coverage of the surveys and the level of detail available in the classifications used in data collections. Notwithstanding these limitations, the database provides a consistent and comparable set of data that allows robust analysis. This is the dataset that the present study will mainly use.

4 THE GLOBAL LANDSCAPE

Culture and creativity account for 3.1% of the global Gross Domestic Product (GDP) and 6.2% of total employment (UNESCO 2022). To carry out an international comparison of CCIs and circumvent the theoretical and sta-

⁶ For the period 2010-20, value added is measured at factor costs, contrary to the period 2021-23. Moreover, data coverage differs for CCIs and the business economy, with broader coverage observed in later years in both cases. In more detail, prior to 2021 there is no data for the CCIs subsectors P85.52 (Cultural education), R90 (Creative, arts and entertainment activities), R91.01 (Library and archives activities), R91.02 (Museums activities) and R91.03 (Operation of historical sites and buildings and similar visitor attractions), while the non-farm business economy is defined as sections B to N, plus S95, excluding K. For the period 2021-23, data for CCIs cover the whole perimeter as per Eurostat’s definition, while non-farm business economy is defined as sections B to S, excluding O and S94.

tistical problems discussed, UNESCO also uses revenues. Thus, in 2013, CCIs generated USD 2,250 billion of revenues, i.e. about 3% of world GDP, and 29.5 million jobs or 1% of the world's active population.⁷ Figures might not sound significant, but in terms of worldwide sales they exceed those of other important industries, e.g. telecom services (USD 1,570 billion). However, there are significant differences across countries. The OECD shows that, even among major G20 economies, the share of the cultural and creative industries in total value added ranges from 0.7% in Mexico to 3% in the USA, while their share in employment ranges between 1% in Turkey and 2.1% in Australia (OECD 2021).

In terms of sub-industries, UNESCO (2015) shows that visual arts and television are the two most important industries, which together account for more than a third of the economic value generated by CCIs (39% of sales and 35% of jobs). It is worth noting that the labour intensity of the different industries is not proportional to revenues, with e.g. the music industry having the second highest level of employment, with a share of 13%, while it generates only 3% of total revenues.

In terms of geographical distribution of the CCIs, UNESCO (2015) cites that Asia-Pacific is the biggest CCIs market, generating 33% of global sales, being the area with the largest consumer base. The employment share is 43% of CCIs jobs worldwide. The second largest CCIs market, although very close to the first, is Europe with a revenue share of 32% and an employment share of 26%. The importance of the continent is attributed to its history, as it enjoys a unique concentration of heritage and arts institutions. Moreover, Europe also remains a cultural trendsetter on the global stage. North America accounts for 28% of global revenues and is a champion in TV, movies and radio and at the forefront of digital transformation. The employment share is 16%. The areas that follow are Latin America and the Middle East with revenue

shares of 6% and 3% and an employment share of 7% and 3% respectively.

In the pre-pandemic period, CCIs were growing fast, with growth in cultural and creative sectors outpacing output growth in many countries (OECD 2021). But the COVID-19 pandemic placed CCIs under a lot of pressure, as they were among the most severely affected due to their nature of close physical interactions. The impact was particularly severe, with an exception in the publishing, social media, IT and software subsectors (Khlystova et al. 2022). This is related to the fact that the COVID-19 crisis accelerated major trends in digitalisation. So, although more traditional subsectors of the CCIs, such as museums and libraries, have been unable to fully exploit the digital technologies and infrastructure for online delivery of their products, other subsectors used them extensively and weathered the storm.

According to PwC, the annual growth of the global entertainment and media industry, a key component of the creative economy, has slowed since 2021 and is expected to decline each year until 2027 (PwC 2023). Of course, growth varies across industries and countries.

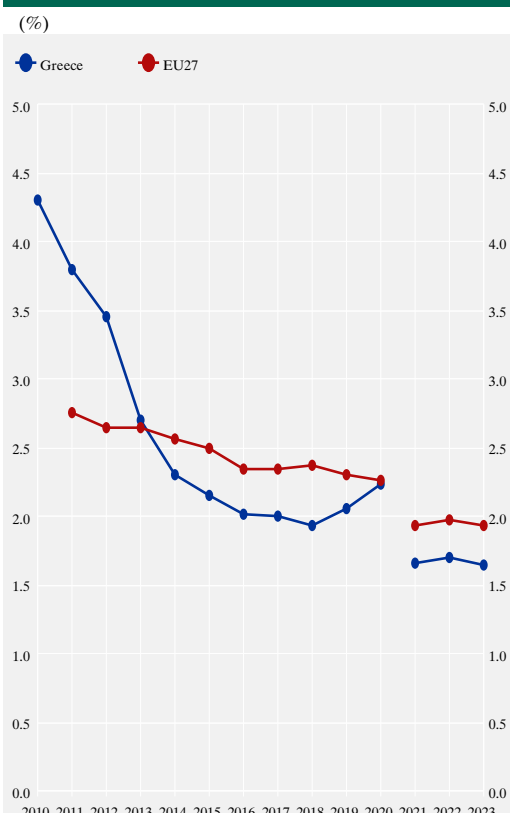
5 THE CULTURAL AND CREATIVE INDUSTRIES IN GREECE

Having introduced the relevant theoretical and statistical concepts, the study proceeds to examine the Greek industry. There are only a few studies on the Greek CCIs, with Lazaretou (2014) being the most relevant one.⁸ The present study updates and extends her analysis, benefitting from the richer data currently available: first, it uses Eurostat's dataset for the broad definition of CCIs, and, second, it offers an extended discussion of funding options.

⁷ UNESCO (2015).

⁸ Other studies, although focused on movie production, include IOBE (2014) and διαΝΕΟσις (2021).

Chart 1 Value added of the cultural and creative industries (CCIs) as a percentage of total value added in the non-farm business economy



Sources: Eurostat, Culture statistics and Structural Business Statistics.

Notes: Figures represent nominal values. For the period 2010-2020, value added is measured at factor costs; CCIs do not include subsectors P85.52 (Cultural education), R90 (Creative, arts and entertainment activities), R91.01 (Library and archives activities), R91.02 (Museums activities) and R91.03 (Operation of historical sites and buildings and similar visitor attractions); and the non-farm business economy is defined as sections B to N, plus S95, excluding K. For the period 2021-2023, both the numerator and the denominator are broader; data for CCIs cover the whole perimeter of the industry, as defined by Eurostat (2012), and the non-farm business economy is defined as sections B to S, excluding O and S94. Data are classified according to NACE Rev. 2.

The (gross) value added of their CCIs in Greece in 2023 was EUR 1.7 billion or 1.7% of value added in the non-farm business economy.^{9,10} Therefore, their weight in the economy is very small and very close to the corresponding EU average (1.9%). Unfortunately, the time series is short and has a break between 2020 and 2021, due to changes in methodology and coverage, limiting our ability to study the performance of the industry over time. During the crisis, the industry was shrinking faster

compared to the total economy (in the years 2010 to 2013 the share of the CCIs dropped sharply, mainly due to the decline in architectural, programming and printing activities). However, the sector's value added has been recovering over the last years, with the weight of the CCIs in the business economy remaining constant and very close to that in the EU (see Chart 1).

Regarding the size of subsectors, in 2023 the three largest were “Architectural activities”, “Printing and reproduction of recorded media” and “Motion picture, video and television programme production, sound recording and music publishing activities”, each having a share of around 15% in the total value added of the CCIs, followed by “Creative, arts and entertainment activities” and “Programming and broadcasting activities” with 10% shares (see Chart 2). “Book publishing” and “Publishing of newspapers” account for around 6-7% each, while all other subsectors have shares below 3%. The structure of the industry in Greece is generally close to that of the EU (the only exception being the larger share of “Specialised design activities” in the EU).

Employment

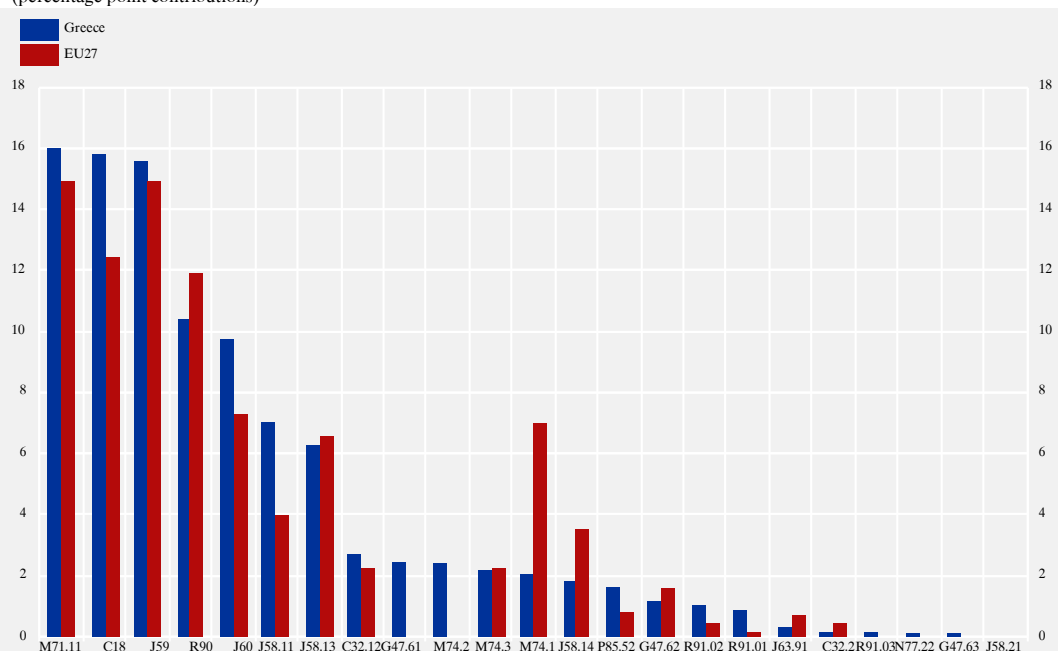
In 2023, CCIs in Greece employed about 105,500 persons, i.e. about 3% of employment in the business economy (see Chart 3). The sector's employment share is higher than its share in value added, suggesting that the industry is relatively labour intensive.

⁹ The data on (gross) value added come from Eurostat's Structural Business Statistics (SBS), where value added is defined as the gross income from operating activities after being adjusted for operating subsidies and indirect taxes. SBS value added is not directly comparable with gross value added in the national accounts. Although national accounts use SBS data as a key input, several adjustments are made. For further information, see Chapter 21 in the European system of accounts – ESA 2010 (Eurostat 2013).

¹⁰ The business economy is defined as the total economy excluding sections A (Agriculture, forestry and fishing) and O (Public administration and defense; compulsory social security), division S94 (Activities of membership organisations) and sections T (Activities of private households as employers; undifferentiated goods- and services-producing activities of households for own use) and U (Activities of extraterritorial organisations and bodies). Data are classified according to NACE Rev. 2.

Chart 2 Subsectors' contribution to total value added in the cultural and creative industries (2023)

(percentage point contributions)



Sources: Eurostat, Culture statistics and Structural Business Statistics.

Notes: The NACE Rev. 2 codes shown correspond to: M71.11 Architectural activities; C18 Printing and reproduction of recorded media; J59 Motion picture, video and television programme production, sound recording and music publishing activities; R90 Creative, arts and entertainment activities; J60 Programming and broadcasting activities; J58.11 Book publishing; J58.13 Publishing of newspapers; C32.12 Manufacture of jewellery and related articles; G47.61 Retail sale of books in specialised stores; M74.2 Photographic activities; M74.3 Translation and interpretation activities; M74.1 Specialised design activities; J58.14 Publishing of journals and periodicals; P85.52 Cultural education; G47.62 Retail sale of newspapers and stationery in specialised stores; R91.02 Museums activities; R91.01 Library and archives activities; J63.91 News agency activities; C32.2 Manufacture of musical instruments; R91.03 Operation of historical sites and buildings and similar visitor attractions; N77.22 Renting of video tapes and disks; G47.63 Retail sale of music and video recordings in specialised stores and J58.21 Publishing of computer games.

There are no data for the EU for the following subsectors: Retail sale of books in specialised stores (G47.61); Photographic activities (M74.2); Operation of historical sites and buildings and similar visitor attractions (R91.03); Renting of video tapes and disks (N77.22); Retail sale of music and video recordings in specialised stores (G47.63) and Publishing of computer games (J58.21).

Looking at the demographics of employment in the CCIs, in 2024, people working in the CCIs are highly educated: about 60% of the cultural and creative employees hold a tertiary degree, compared to 40% in the overall workforce (see Chart 4). This is a common characteristic of employment in this industry internationally (OECD 2022).

Most persons employed in the CCIs work in permanent positions (89%) and have a single job (97%), exhibiting employment figures similar to those in the total economy. However, fewer people in the CCIs work full-time, although their percentage is still high (84% in CCIs vs 93% in the total economy). About 37% are self-employed, against 27% in the total

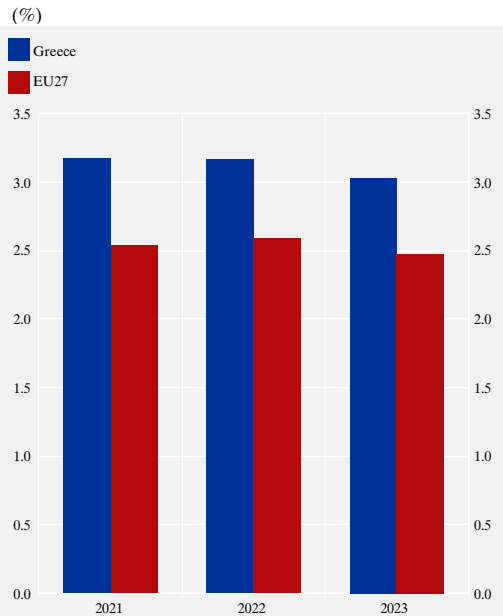
economy. Finally, employment is overall balanced in terms of gender. These demographics of employment in the Greek CCIs are similar to those in the EU, although the shares in Greece are generally higher.

The labour productivity of the industry in Greece exhibits a significant lag compared to the EU (see Chart 5). However, this finding is not idiosyncratic to the CCIs: the Greek economy as a whole has very low productivity compared to the EU.

Firms

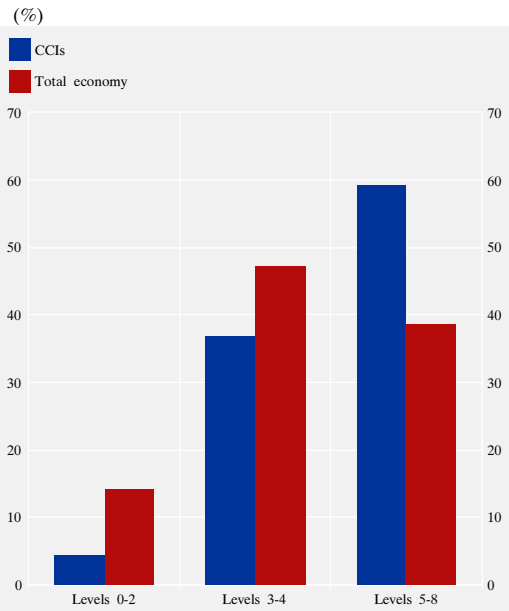
The size of the average firm in the industry, measured by the number of persons employed,

Chart 3 Number of persons employed in CCI as a percentage of total employment in the business economy



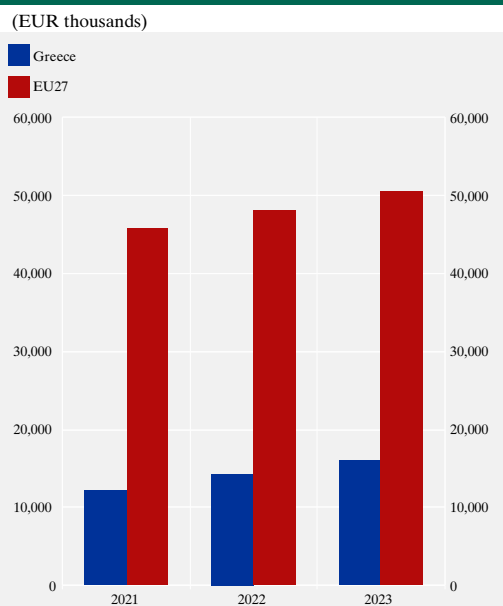
Sources: Eurostat, Culture statistics and Structural Business Statistics.
Note: The business economy is defined as sections B to S, excluding O and S94 (NACE Rev. 2).

Chart 4 Educational attainment in CCI and in the total economy (2024)



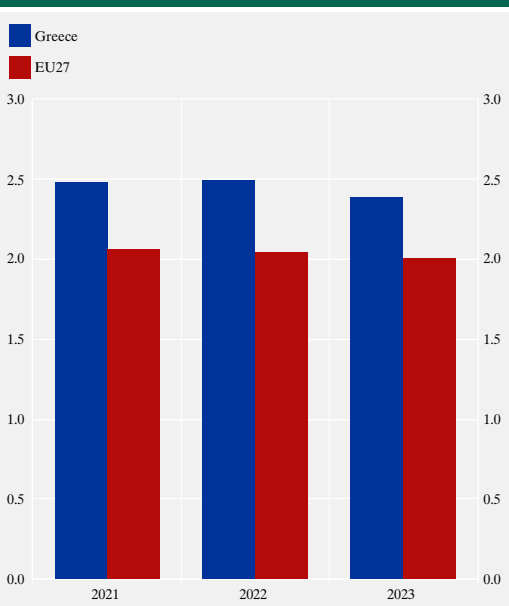
Source: Eurostat, EU labour force survey (EU-LFS).
Note: The levels of education attainment correspond to Less than primary, primary and lower secondary education (levels 0-2), Upper secondary and post-secondary non-tertiary education (levels 3 and 4) and Tertiary education (levels 5-8).

Chart 5 Labour productivity: value added per person employed



Sources: Eurostat, Culture statistics and Structural Business Statistics.

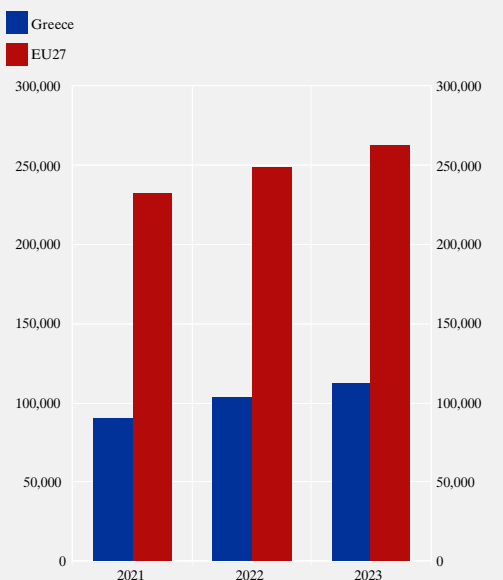
Chart 6 Average number of persons employed per CCI enterprise



Sources: Eurostat, Culture statistics and Structural Business Statistics.

Chart 7 Net turnover per CCI enterprise

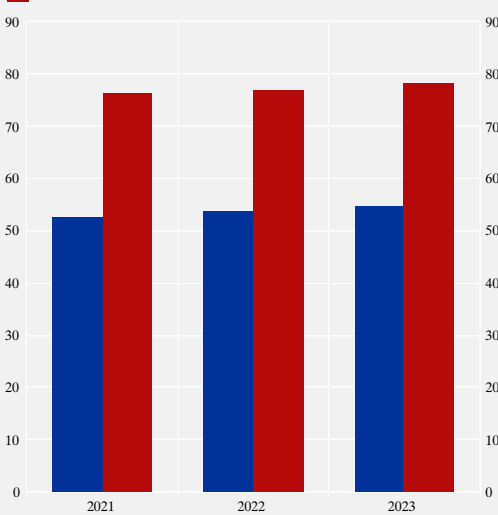
(EUR thousands)



Sources: Eurostat, Culture statistics and Structural Business Statistics.

Chart 8 Labour productivity in CCIs compared to the business economy

Greece
EU27



Sources: Eurostat, Culture statistics and Structural Business Statistics.

Note: Labour productivity is measured as the ratio of value added to persons employed. The business economy is defined as sections B to S, excluding O and S94 (NACE Rev. 2).

is slightly larger in Greece compared to the EU (2.5 vs 2 persons per firm in 2023), as shown in Chart 6. However, in 2023, the average Greek firm generated a turnover of EUR 100,000, which is lower compared to the EU average of more than EUR 250,000 (see Chart 7).

This is related to the lag of labour productivity in Greece against the EU, as already discussed, but also to the productivity lag of CCI firms compared to other sectors of the Greek economy. Specifically, Greek CCI enterprises are about 50% as productive as enterprises in the business economy on average, whereas the same figure in the EU stands at 80% (see Chart 8).

Trade

CCIs account for a very small share of total Greek exports over the last years (about 0.5% for both goods and services). Compared to the EU, Greek goods exports have been underperforming since the outbreak of the debt crisis.¹¹ The main exporting destinations include

Greece's traditional export markets, such as the USA, Cyprus and the UK, but also Ireland and Switzerland for services. Imports mainly originate from China, Ireland, Italy and the UK.

The CCIs' goods balance has been consistently in deficit over the last 15 years (see Chart 9). In 2024, exports of CCI goods amounted to EUR 220 million. The main export goods in 2024 were jewellery (25%), books (24%) and video game consoles (19%). Over time, jewellery and books have had consistently high shares, although video game consoles is a category which gained momentum only recently (see Chart 10).

The CCIs' services balance has been in surplus over the last 15 years (see Chart 11).¹² In 2024, exports of CCI services amounted to EUR 678

¹¹ Such a comparison is not possible for services exports due to data limitations.

¹² It should be noted that goods and services data come from different sources (International Merchandise Trade Statistics and Balance of Payments, respectively) and cannot be combined in order to calculate the overall balance.

Chart 9 Trade in goods as a percentage of GDP



million and were heavily concentrated in two subsectors: audiovisual services (47% of the total) and advertising, market research and public opinion polling services (41%). These two subsectors have maintained consistently high shares over the last 15 years (see Chart 12). Imports are concentrated in the same two subsectors, which account for 47% and 32% of the total, respectively, followed by news agency services (16%).¹³

Overall, if the ratio of exports to value added is used as a proxy of export orientation (given that data on CCI output is not available), the industry showed some export dynamism during the debt crisis, mainly due to exports of services. However, since 2016 the industry's exports have plateaued, although certain products and services have grown, including video game consoles and audiovisual services.

¹³ The class "News agency services" includes news syndicate and news agency activities furnishing news, pictures and features to the media.

Chart 10 Exports of CCI goods by category as a percentage of total CCI exports of goods

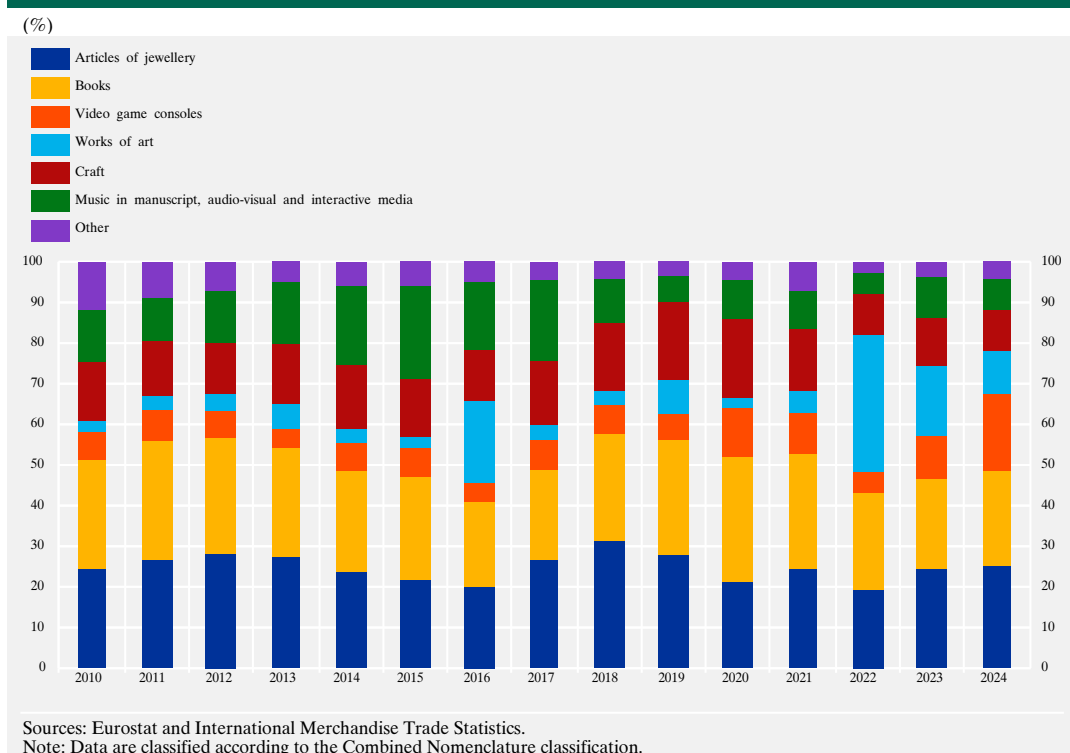
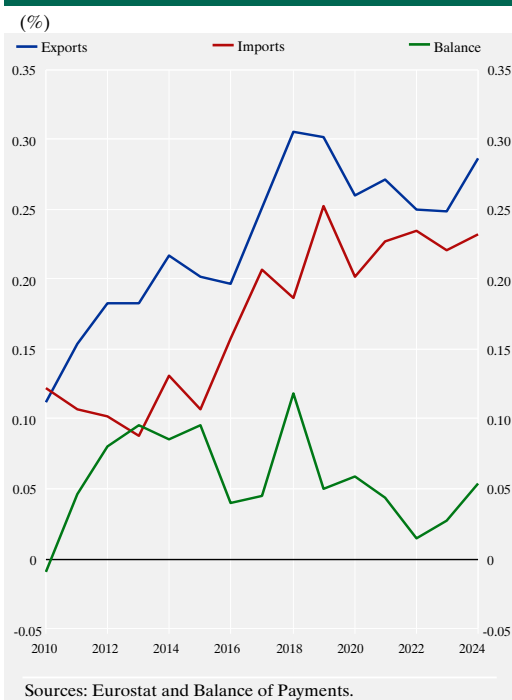


Chart 11 Trade in services as a percentage of GDP

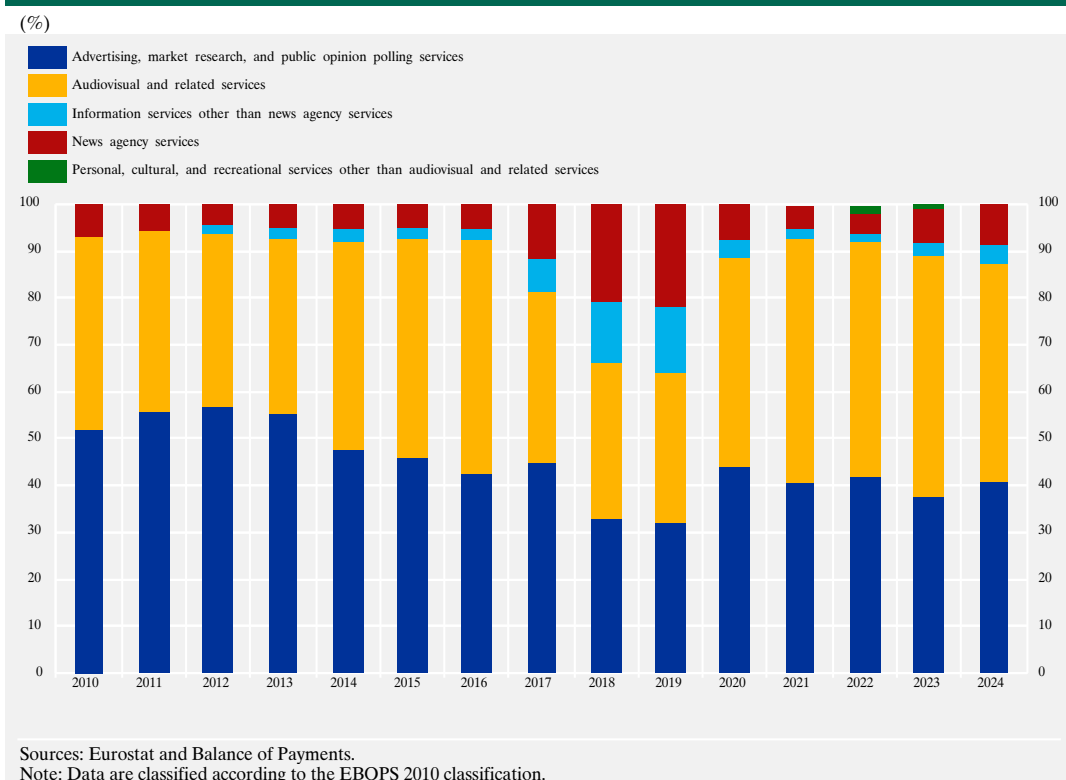


6 FUNDING

This section discusses funding options for firms in the CCIs. Various funding sources and instruments are available to CCIs, ranging from self-finance to public and private financing or mixed funding models. The variety of instruments used reflects the complexity and peculiarities involved in the production and distribution of cultural and creative goods and services.

Public support measures can include grants, loans, tax incentives, cash rebates and guarantee schemes. The case for public funding of the CCIs rests on the fact that the social value of their output exceeds monetary and financial returns. CCIs generate economy-wide spillovers not captured in prices, such as enhancing social cohesion, delivering urban regeneration and contributing to innovation, as well as positive externalities, including unlocking investment, improved health outcomes, educational attainment and workforce skills (Fancourt and Finn

Chart 12 Exports of CCI services by category as a percentage of total CCI exports of services



2019; Crossick and Kaszynska 2016). These positive economic spillovers are being under-recognised due to challenges in quantification (Centre for Economics and Business Research 2025). Public support measures for CCIs also address market failures, such as by taking on the risks of experimentation that otherwise would be unaffordable or inaccessible. This risk is inherent in CCIs due to the often niche and unpredictable market demand; value depends on adoption and diffusion, not just production.

Although there are strong arguments for subsidies and state support for CCIs, market funding is also important. However, lending to CCIs has peculiarities mainly related to the role of intellectual property rights in financing and their use and perceived value as collateral. Firms in the CCIs are of a particular nature in the sense that companies own largely intangible assets – intellectual property, applications, even simple ideas. The intangible nature of assets creates a market failure, as they are not easily accepted as collateral by banks. On the side of financial intermediaries, another market failure lies in their limited sector expertise; they are not familiar with considering “experimental”, “original”, “smart” or “creative” projects for funding, so it is not easy for them to assess the potential profits and business risk of CCIs. For industrial sectors, especially in the “analog era”, a bank loan could be secured by the building and machinery of the factory, which are assets with a high recovery rate in a possible default. However, this is highly improbable in the case of CCIs, especially in the digital era where the need for physical capital is much lower. Moreover, creative industries tend to be high-risk industries, which is primarily related to the fact that they are subject to shifts in taste and fashion – although new technologies (applied to both production and distribution) are not just a threat to existing activities, but they also open new entry opportunities (UNCTAD 2004). Furthermore, regarding creators/producers or artists, in their majority individuals and very small firms, they often do not possess the managerial skills to locate available sources of funding or, even more, to draft a solid business plan.

For all these reasons, a large part of creative activity remains outside the traditional credit channel, which results in a financing gap. Therefore, for the funding of CCIs less conventional financing tools are needed, e.g. private financing such as venture capital and private equity. Private investment in culture can also take the form of direct investment sponsorship or patronage/donation or even crowdfunding. Very common in CCIs are also risk mitigating schemes, such as guarantee schemes, which aim to stimulate investment by sharing the risks of investors.

Lastly, there are public-private financing instruments and guarantee schemes. Governments can provide leverage vis-à-vis private financiers, like business angels, venture capital funds and banks.

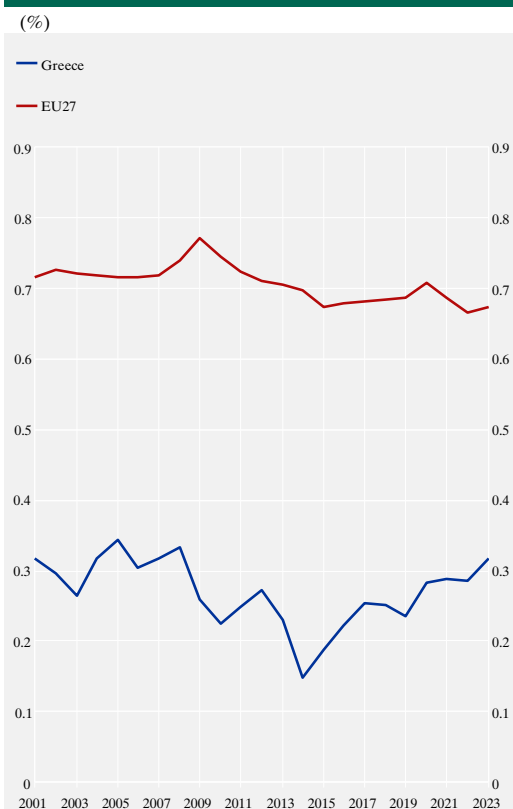
Europe

Currently, in Europe, “Creative Europe 2021-2027” is the European Commission’s flagship programme targeted to support the CCIs.¹⁴ Funding is provided through grants and the budget amounts to EUR 2.44 billion, a 66% increase compared to the previous programme. The programme has a dual target, namely: (i) to promote the European cultural and linguistic diversity and heritage, and (ii) to provide financial support to firms of the industry, particularly those in the audiovisual sector. The audiovisual sector is the dominant sector and is set to receive 58% of the funding. Moreover, the “Cultural and Creative Sectors Guarantee Fund” provides guarantees for loans and is designed to improve access to debt financing for micro companies and SMEs.¹⁵

¹⁴ The “Creative Europe 2021-2027” programme is managed by the “European Education and Culture Executive Agency” on behalf of the European Commission. It is divided in 3 strands, namely Culture, Media and the Cross-sectoral strand and focuses on the effort to make CCI companies more inclusive, more digital and environmentally more sustainable.

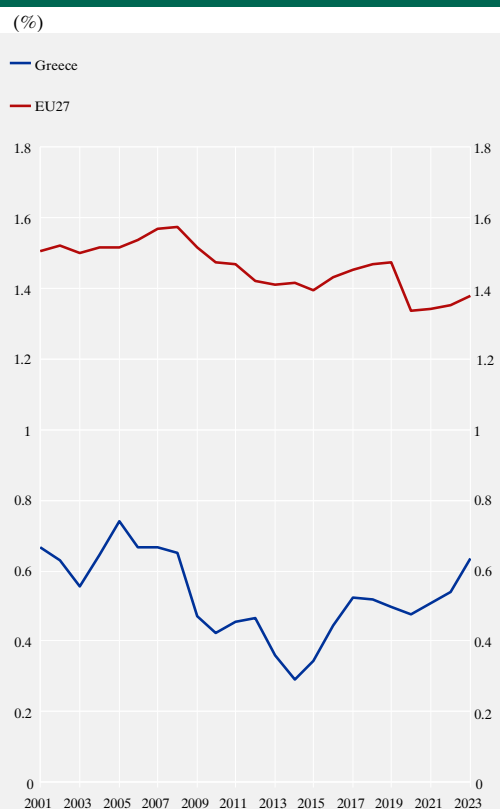
¹⁵ The “Cultural and Creative Sectors Guarantee Fund” is managed by the European Investment Fund and utilises EU budgetary resources. The guarantees are provided free of charge to financial intermediaries, absorbing part of the risk they take, thus resulting in improved access to debt finance for the CCIs businesses. EU budgetary allocation of EUR 251 million is expected to support more than EUR 2 billion of financing for European SMEs and small public enterprises in the cultural and creative sectors (Interreg).

Chart 13 Public spending on culture as a percentage of GDP



Sources: Eurostat and Culture statistics.
Note: Public spending includes the functions “Cultural services” (08.2) and “Broadcasting and publishing services” (08.3) under the Classification of the Functions of Government (COFOG).

Chart 14 Public spending on culture as a percentage of total spending



Sources: Eurostat and Culture statistics.
Note: Public spending includes the functions “Cultural services” (08.2) and “Broadcasting and publishing services” (08.3) under the Classification of the Functions of Government (COFOG).

Regarding market funding, debt finance is the form of funding that is least used by CCI companies due to the limited investor understanding of the industries and the issues with collateral (European Commission 2016). According to the same report, equity finance in various forms, including venture capital, business angels or seed capital funding, is often popular with CCI companies due to conditions of financing being tailored to the specific needs of the company, while public-private schemes have proved to be effective tools to activate private financiers.

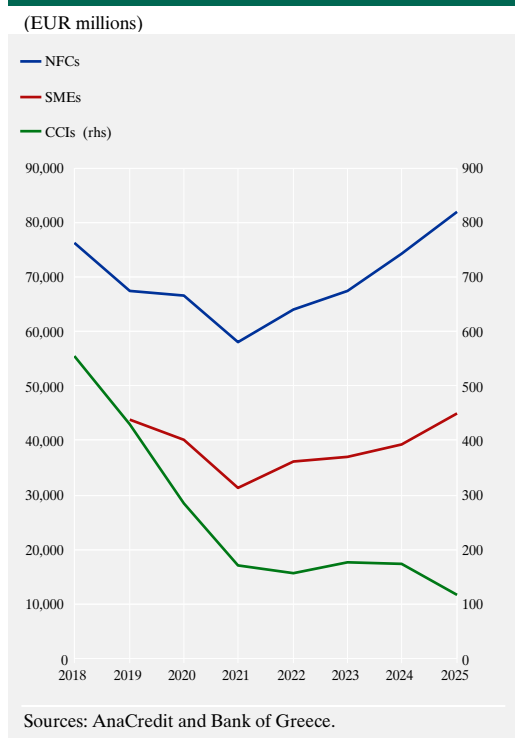
Greece

Greek CCI firms can draw funds from the above European programmes but, most impor-

tantly, they can draw funds from domestic sources. Regarding public sources, the available data refer to a narrower concept of CCIs encompassing only “Cultural services” and “Broadcasting and publishing services”, which, however, account for a large part of culture-related government expenditure.¹⁶ According to these data, public spending for culture-related functions has been trending upwards in recent years (see Chart 13). In 2023, it was around EUR 700 million or 0.3% of GDP, reaching its pre-crisis level. Moreover, culture-related public spending accounts for an increasing share of

¹⁶ Data are drawn from the database on general government expenditure by function. The coverage of culture is determined by the functions of expenditure as identified in the Classification of the Functions of Government (COFOG), i.e. “Cultural services” and “Broadcasting and publishing services”, which account for a large part of culture-related government expenditure.

Chart 15 Outstanding amounts of bank credit to CCI companies and NFCs from domestic financial institutions



total government expenditure over the past decade (see Chart 14). Compared to the EU average, public spending in Greece, as a percentage of GDP and as a share of total spending, is consistently about half the EU share.

Regarding funding from domestic monetary financial institutions, Chart 15 draws data from the AnaCredit dataset on credit extended to companies under the wider definition of CCIs.¹⁷ Data suggest that there has been a decreasing trend in recent years. Specifically, outstanding amounts of loans by Greek banks to CCI companies decreased from about EUR 554 million in 2018 to EUR 117 million in 2025. It should be noted that the sharp drop between 2018 and 2021 probably reflects the management of non-performing loans, which removed these loans from the balance sheets of Greek banks. However, from 2021 onwards the outstanding amount of bank loans to CCIs stalled, or even decreased in 2025, contrary to the increasing

gross credit flows to non-financial corporations (NFCs) in general and to SMEs.

Finally, an alternative channel of funding is international co-productions. Co-productions facilitate access to broader financing schemes, European funds and foreign distribution networks, while sharing risk among partners. Such partnerships not only allow the growth of the industry's activity, but also enable the transmission of know-how in the various creative fields. At the same time, they strengthen the integration of Greek producers into international value chains and increase the export potential of the industry, creating long-term benefits that go beyond an individual project. Of course, international partnerships generate multiplier effects for the domestic economy, by mobilising local human resources, technical infrastructure and supporting services.

7 CONCLUSIONS

Creativity is not a given resource. However, unlike labour or capital, or even traditional technologies, it is a resource that is deeply embedded in a country's social and historical context.

The perimeter of cultural and creative industries (CCIs) includes a wide range of creative activities combining the creation, production and distribution of cultural content. CCIs contribute to economies through job creation, value generation and innovation. The measurement of the economic impact of CCI activities has been constrained for a long time by the lack of agreement on definitions and comparable data. Thus, the economic weight of CCIs has been partially described and, therefore, misunderstood and undervalued for a long time. Recently, Eurostat built a dataset around culture-related activities adopting a much wider definition of CCIs than the one used in national accounts.

¹⁷ AnaCredit reports loans above the threshold of EUR 25,000. Given that many CCI firms are small, the dataset might exclude some of the loans towards CCI companies. Thus, the figures reported here should be viewed as a lower bound.

This paper shows that the Greek CCIs are relatively small in absolute size, although their share in the business economy is close to the EU average. Currently, the three largest sub-sectors, each having a share of 15% in the value added of CCIs, are “Architectural activities”, “Printing and reproduction of recorded media” and “Motion picture, video and television programme production, sound recording and music publishing activities”. The industry is populated by smaller and less productive firms compared to the EU average. However, it employs people with high levels of educational attainment, higher than those in the total economy. Since 2016, the exports of the industry have plateaued, although certain products and services have experienced growth, including video game consoles and audiovisual services. Greek artists often excel on international stages, while recently there have been encouraging signs regarding the internationalisation of the Greek industry reflected in the international film productions hosted in Greece and the distribution of Greek series through global streaming platforms.

Challenges in accessing finance are one of the critical obstacles to growth. The consideration of the CCIs’ social impact, beyond their profitability, constitutes a rationale for public support. The study finds that public expenditure in Greece on culture-related activities has increased in recent years, contrary to bank funding. It is important for companies to use available European funding. But it is even more

important to seek market funding by combining traditional strategies (reputation, sponsorship) with modern finance (IP-backed investment) in order to make creative projects “investable” or attract international co-productions.

CCIs are seen today as part of complex and interconnected value chains (European Commission 2017b). As such, policymakers are advised to design the relevant policies using ecosystem approaches in order to take into consideration all stakeholders, including firms, micro and large, not-for-profit organisations, suppliers and academia (European Commission 2018; UNESCO 2025). Thus, the effective development of CCIs involves the coordination of policy in different areas, including access to finance, educational policy to enhance creative, digital, but also business skills, and strong institutional frameworks. These are important for supporting innovation, copyright protection, competitiveness, internationalisation, exports and, of course, cultural value.

Digitalisation and AI thrive by impacting both demand and supply in the industry, changing the business models, the skills needed and the ways people engage with culture. Entrepreneurs today can sell and disseminate content to larger audiences and reach new markets, raising opportunities to mitigate costs and increase revenues. The Greek industry should keep pace with these developments and stay tuned in to the scene.

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WORKING PAPERS (JANUARY – JUNE 2026)

This section contains the abstracts of *Working Papers* authored by Bank of Greece staff and/or external authors and published by the Bank of Greece. The unabridged version of these texts is available on the Bank of Greece's website (www.bankofgreece.gr).

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Can higher education levels improve tax compliance?

Working Paper No. 355

Emmanouil Taxiarchis Gazilas and Zacharias Bragoudakis

This paper examines how governance and education affect VAT compliance in 25 EU nations between 2008 and 2022. The dependent variable is the VAT gap, which is the difference between expected and actual VAT revenue. GDP growth is included as a macroeconomic control, while governance metrics, including regulatory quality and corruption control, are examined alongside education indicators, such as primary, secondary and tertiary enrolment. The research takes into account time and country-specific heterogeneity using a fixed effects panel regression.

According to the results, higher levels of education are linked to improved VAT compliance, indicating that education increases civic engagement and tax morale. While higher corruption is associated with increased VAT gaps, stronger regulations also improve compliance. Additionally, the findings show the way human capital, institutional quality and economic conditions interact to shape fiscal outcomes. The findings also provide policymakers with evidence that integrating social and institutional strategies can increase tax collection and decrease tax evasion.

Outlier-robust evaluation of fixed-event macroeconomic survey expectations

Working Paper No. 356

Panagiotis Delis and Georgios Kontogeorgos

Evaluating macroeconomic forecasts for their unbiasedness and efficiency is essential for policymakers, economists and investors. The degree to which these stakeholders incorporate expectations into their decision-making processes depends heavily on how these forecasts have been formed. Existing methodologies do not explicitly address critical dimensions, such as the variability of bias across target events and forecast horizons, the forecast errors' heteroscedasticity and the potential state-dependence in bias. More importantly, they encounter difficulties during high-uncertainty periods, which can lead to inac-

curate inference due to the presence of outliers. Apart from generalising the unbiasedness tests, this study contributes to the literature on both strong and weak efficiency by incorporating these aspects. Finally, the proposed methods are applied to the expectations of a crucial survey of the US economy, namely, the Survey of Primary Dealers (SPD). The findings from this application indicated that interested parties should investigate unbiasedness and efficiency in an outlier-robust way, while also allowing for greater flexibility in the methods regarding the variables and periods examined.

Consumer price stickiness in the euro area during an inflation surge

Working Paper No. 357

Erwan Gautier, Cristina Conflitti, Daniel Enderle, Ludmila Fadejeva, Alex Grimaud, Eduardo Gutiérrez, Valentin Jouvanceau, Jan-Oliver Menz, Alari Paulus, Pavlos Petroulas, Pau Roldan-Blanco and Elisabeth Wieland

The authors use CPI micro data for nine euro area countries to document new evidence on consumer price stickiness in the euro area during the 2021-24 inflation cycle. In 2022, the monthly frequency of price changes reached 12%, compared with a pre-pandemic average of 8%, before falling quickly in 2023 and more slowly in 2024, ending close to its pre-pandemic level. The decline in the frequency of price changes was faster for food and non-energy industrial goods (NEIG) than for services, where frequencies remained elevated in 2024. The overall frequency rose mainly because there were more price increases, while

the magnitude of the average size of the price increases or decreases changed only marginally during the surge. Products with a larger imported-energy cost share responded more strongly and hazard-rate evidence shows that the probability of price adjustments increases with the gap between actual and optimal prices, consistent with state-dependent pricing and a steepening of the Phillips curve. To illustrate the implications of this state dependence, a macro model suggests that peak inflation would have been almost 1 percentage point lower if the frequency had not responded to the inflation surge.

Bond funds' risk taking and monetary policy

Working Paper No. 358

Sofia Anyfantaki, Haris Giannakidis, Dimitris Malliaropulos, Petros Migiakis and Filippos Petroulakis

Using granular security-level data from bond funds domiciled in the US and the euro area, the authors identify a market-based risk-taking channel of monetary policy transmission via the credit-risk and the maturity structure of bond funds' portfolios. They measure credit risk at the fund level as the weighted average credit rating of the fund's bond holdings and find that accommodative monetary policies by the Fed and the ECB are associated with increased risk

in bond funds' portfolios. Interestingly, risk-taking is more pronounced for funds with longer-term holdings relative to short-term ones and unconventional monetary policy exerts stronger market-based risk-taking effects than interest rate policy. Finally, the authors find that the Fed's monetary policy has a stronger impact on funds' risk-taking behaviour than the ECB's, highlighting the dominant role of US monetary policy in global financial markets.

Threshold-based policies and distortions in housing markets

Working Paper No. 359

Dimitris Karamanis, Christos Kotsogiannis and Evangelia Papapetrou

This paper examines how investment thresholds embedded in residence-by-investment programmes shape housing market outcomes. The analysis exploits a reform of Greece's golden visa scheme that selectively doubled the minimum real estate investment requirement – from €250,000 to €500,000 – across municipalities. Using comprehensive administrative data on property transactions from 2017-24, the study

combines a bunching framework with a difference-in-differences design to identify behavioural responses to eligibility thresholds and their spatial equilibrium effects. Under the initial regime, pronounced bunching in transaction prices is observed around the €250,000 cutoff, indicating that the threshold was a salient determinant of pricing behaviour. Following the reform, this bunching disappears in municipal-

ities subject to the higher threshold, while persisting in unaffected areas. Consistent with this pattern, the treated municipalities experience a relative deceleration in price growth, alongside increased transaction activity in nearby markets that remain eligible under the lower threshold.

The results demonstrate that residency-investment thresholds may operate as active policy instruments that distort housing price distributions and reallocate demand across space, highlighting the importance of threshold design for housing-market outcomes.

Trend inflation and inflation expectations in high dimensional vector autoregressions

Working Paper No. 360

Dimitrios P. Louzis

This paper introduces a new class of large vector autoregression (VAR) models with a hybrid trend structure that explicitly incorporates both trend inflation and inflation expectations, proxied by long-term survey forecasts and statistical filters. The author develops efficient Bayesian estimation methods leveraging recent advances in matrix precision algorithms,

substantially reducing computational costs and enabling large-scale forecasting exercises. Using a dataset of 20 US macroeconomic variables, he shows that incorporating trend inflation and survey-based expectations within a high-dimensional VAR framework markedly improves inflation forecast accuracy relative to widely used large-VAR benchmarks.

Cryptokurtosis: frequent trading fuels higher losses

Working Paper No. 361

Stavros Degiannakis, George Filis and Grigorios Siourounis

The authors assess the impact of cryptocurrencies' ultra-high-frequency trading on financial stability. Focusing on three well-established cryptocurrencies, namely Bitcoin, Ethereum and Sui, they show that, as the trading frequency increases, so do the excess potential losses of the investors, over and above the anticipated losses based on the

Value-at-Risk. This is led by the exponential growth of the kurtosis that is exhibited at high-frequency trading. Given that currently the minimum capital requirements do not differentiate between the trading frequency but only between the type of crypto assets groups, the authors show that such overlook poses a threat to financial stability.

The transmission of monetary policy through credit standards: evidence on loan application discouragement in the euro area

Working Paper No. 362

Georgios Mermelas and Athanasios Tagkalakis

This study examines the impact of monetary policy and its announcements on firms' loan

application discouragement, operating through changes in credit standards. The authors merge

firm-level data from the Survey on the Access to Finance of Enterprises (SAFE) with bank-level data from the Bank Lending Survey (BLS) for twenty euro area countries, covering the period from the first half of 2009 to the second half of 2024. The findings indicate that, following a monetary policy-induced tightening of credit standards, firms with higher turnover, stronger credit records and more stable balance

sheets exhibit a lower propensity to become discouraged from applying for loans. Conversely, firms with weaker characteristics are more adversely affected. Importantly, these effects persist even when the analysis is restricted to firms with a very low probability of loan rejection, indicating that monetary policy induces a self-restriction mechanism that operates in addition to the traditional credit supply channel.

Short-term inflation projections: the new BOG'STIP model

Working Paper No. 363

Zacharias Bragoudakis, Alexandros Karakitsios and Evangelia Kasimati

This paper outlines the operational framework of the new Short-Term Inflation Projections model for the Greek economy (hereinafter “BoG'STIP model”), currently employed by the Bank of Greece within the context of the Eurosystem's inflation projection exercises. The new BoG'STIP model is designed to produce monthly projections for the Greek inflation over a 36-month horizon, providing critical input for monetary policy decisions. It consists of a set of short-term dynamic equations for the Harmonised Index of Consumer Prices (HICP) and its main components, estimated with emphasis on both the statistical fit and the economic plausibility of the estimated coefficients. Using a pseudo real-time forecasting setup, the model is estimated over the period 1995-2021 and generates projections for 2022-

24. The findings indicate that the BoG'STIP model outperforms benchmark models, such as AR and ARIMA, across most HICP components except for energy, confirming its robustness and practical value despite certain limitations. The model also exhibits strong forecasting performance for headline inflation, particularly at the 12-month horizon, and effectively captures broader inflationary trends even over longer horizons (up to 36 months). The paper contributes both operationally, by documenting a projection framework compatible with the Eurosystem's Broad Macroeconomic Projection Exercise (BMPE) and Narrow Inflation Projection Exercise (NIPE), and empirically, by providing a transparent and policy-ready inflation forecasting tool tailored to the Greek economy.

Central bank reserves and banks' portfolio rebalancing in the euro area

Working Paper No. 364

Athanasios Lampousis and Petros Migiakis

An important consequence of unconventional monetary policy is a substantial increase in the amount of reserves held in banks' balance sheets. In this article, the authors analyse whether a higher level of reserves affects credit supply in the real economy. Using data for

euro area banks after the ECB initiated asset purchases in 2014-15, they show that reserve creation related negatively to bank security holdings and positively to bank loans, in line with portfolio rebalancing theories. The results account for endogeneity in reserve holding and

are less pronounced for banks with a higher risk of deposit outflows. However, reserve-induced lending is not limited to monetary easing. During the 2022-23 ECB tightening cycle, reserve-rich banks mitigated credit declines to firms, impairing transmission. Results were

stronger for banks facing frictions related to market fragmentation and financial constraints. Overall, the authors' work implies that central bank reserves can have far-reaching consequences for monetary policy transmission through the bank lending channel.

Modelling house price dynamics in Greece

Working Paper No. 365

Dimitrios Karamanis, Dimitrios P. Louzis, Evangelia Papapetrou and Anastasia Theofilakou

This paper studies the long-run dynamics of real house prices in Greece and their structural drivers. The authors develop a Bayesian VAR model with time-varying unconditional means that allows to decompose real house prices into a slow-moving structural trend and a transitory cyclical component. The proposed empirical framework accounts for structural changes in the housing market and episodes of heightened macroeconomic volatility. Applied to Greece over 2002-25, it identifies a pronounced and

persistent upward shift in the long-run house price trend from 2017 onward. The historical decomposition of the structural shocks attributes this shift mainly to self-reinforcing house price dynamics, but also to the joint effect of strong demand and constrained supply in the housing market. Allowing for time variation in the long-run equilibrium of house prices yields a more appropriate assessment of potential housing market imbalances compared with a constant steady state benchmark.

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