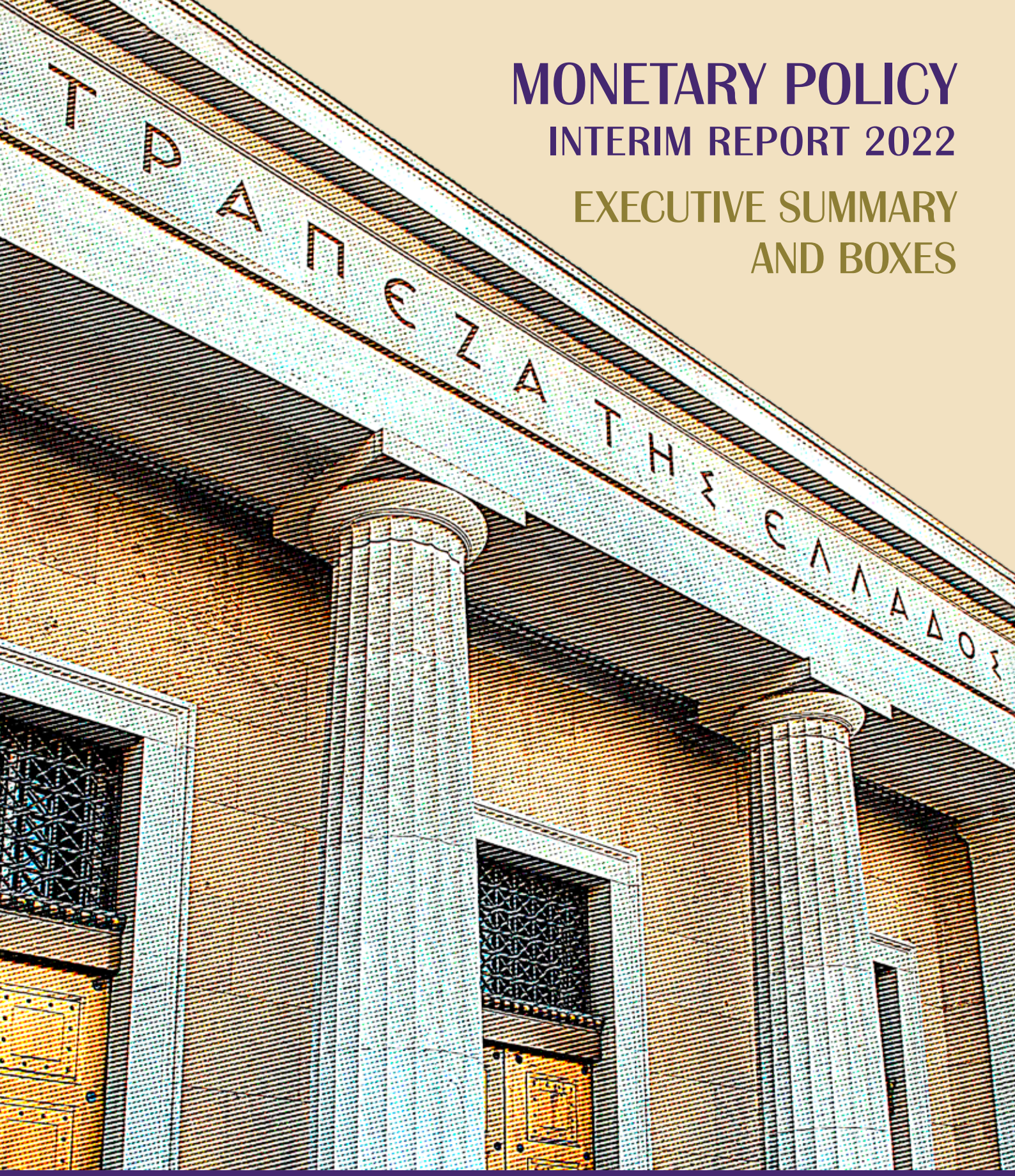
MONETARY POLICY
INTERIM REPORT 2022
EXECUTIVE SUMMARY AND BOXES



DECEMBER
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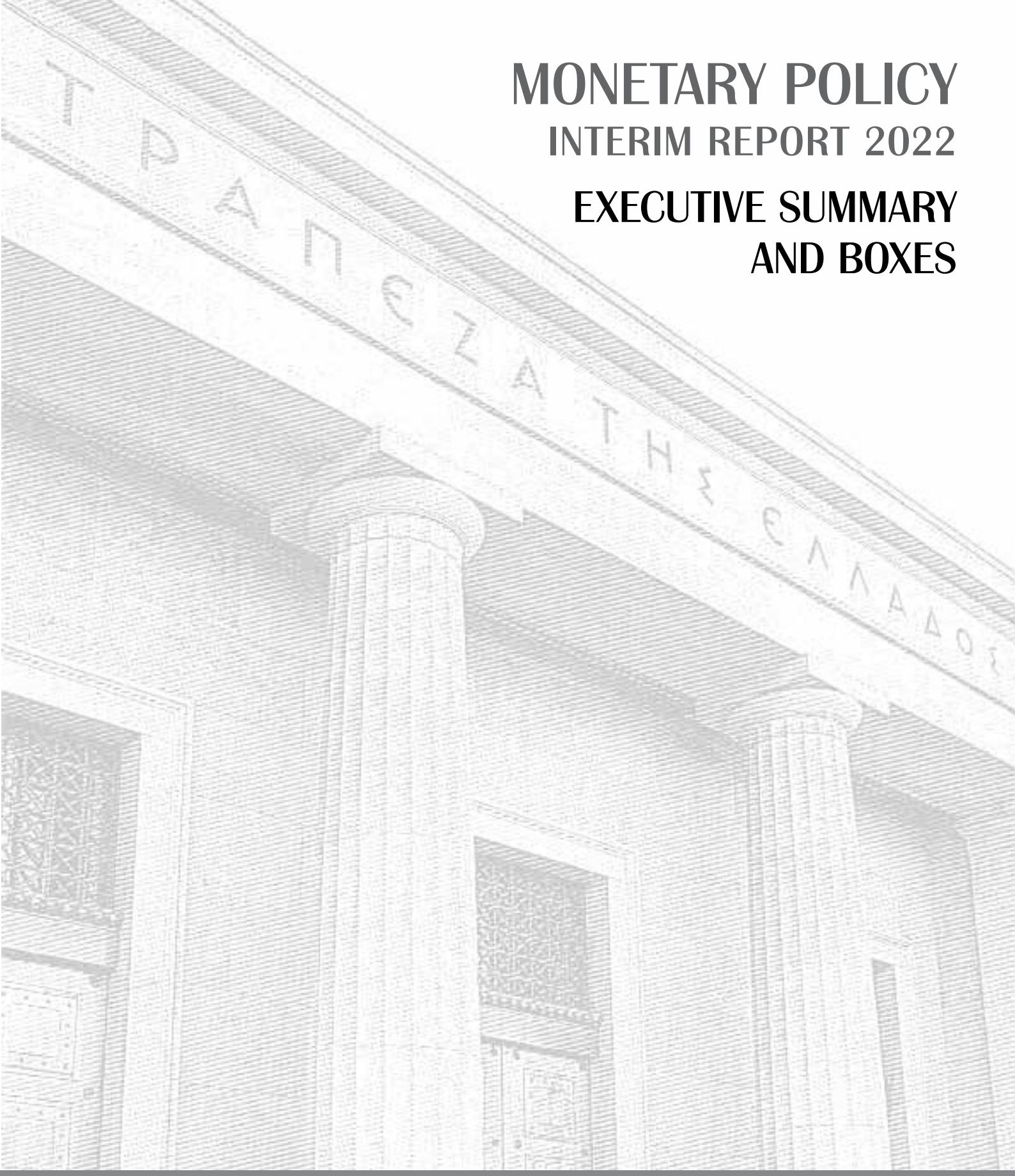

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Economic Analysis and Research Department

DOI: https://doi.org/10.52903/monpol.en202212sp.ed

https://www.bankofgreece.gr/Publications/Inter_NomPol2022_en_Summary_Boxes.pdf

ISSN: 2732-9593 (online)

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EXECUTIVE SUMMARY

STRONG GROWTH OF THE GREEK ECONOMY IN 2022 – SLOWER GROWTH PROJECTED FOR 2023

1 INTRODUCTION

The energy crisis, which was exacerbated after Russia's invasion of Ukraine in early 2022, has resulted in a sharp rise in inflation. This led to interventions by monetary authorities, with central banks drastically raising their interest rates, although the rise in inflation was in most cases driven by negative supply shocks, in particular higher energy costs due to the war in Ukraine, the direct impact of which cannot be easily countered by monetary policy. Yet, the dynamic response of central banks signals their determination to contain aggregate demand and rein in second-round inflationary effects, as well as to anchor inflation expectations with a view to averting a self-sustaining increase in inflation and reaching the price stability target in the medium term. While the key aim of central banks is clear, there is a policy dilemma as to the appropriate size of interest rate increases, hence the output loss that monetary authorities can accept in the short term, in order to stabilise inflation over the medium term.

Monetary policy normalisation, coupled with geopolitical risks and increased uncertainty, leads to tighter financial conditions and higher risk aversion on the part of investors, resulting in heightened volatility, rising bond yields and falling stock prices.

On the domestic front, rising energy costs and declining real disposable income adversely affect businesses and households and increase income inequality. Moreover, higher lending rates increase the cost of debt servicing for firms and households, while the still very low levels of deposit rates deprive them of an additional source of income.

In the face of high and persistent inflation, there are mounting pressures for increases in wages and pensions, as well as for support measures to limit losses in household real disposable income. Given that lower income groups of population are disproportionately harder hit by high inflation, support measures are deemed necessary. However, such measures should be targeted, temporary and in line with the available fiscal space. This is necessary because fiscal policy should maintain a restrictive stance in order to act complementarily to monetary policy in curbing inflation, while at the same time ensuring fiscal stability. Any future wage increases (e.g. in the statutory minimum wage) should be in line with the economy's capabilities, not fuel a further rise in inflation and, overall, not undermine the competitiveness gains achieved over the past decade.

Inflationary pressures and the concomitant rise in interest rates lead to an improvement in banks' net interest income, but also to a deterioration in banks' funding conditions, while they could also result in an increase in credit risk associated with the emergence of a new generation of non-performing loans.

In this adverse environment that poses significant challenges to economic policy, the Greek economy continued to grow at strong rates in the first nine months of 2022, driven by private consumption, investment and a large rise in tourism and shipping receipts. The better-than-expected performance of the Greek economy leads to an upward revision of the 2022 growth forecasts published by the Bank of Greece last June. Support measures aimed at containing the impact of the energy crisis on households and businesses contributed to this upward surprise. Nevertheless, the prolongation of the energy crisis due to the ongoing war in Ukraine, which keeps inflation at very high levels, has weighed on business and consumer confidence.

This, together with the withdrawal of monetary policy accommodation, is expected to lead to slower economic growth in 2023. On the other hand, the effective utilisation of funds under the EU's multiannual budget 2021-2027 and the European recovery instrument NextGenerationEU could mitigate the impact of the energy crisis on the economy.

Against this backdrop, an unwavering policy focus, especially in the area of fiscal policy, on obtaining investment grade rating for Greek government bonds should be a non-negotiable national goal, as its achievement would have beneficial effects across all sectors of the Greek economy.

2 DEVELOPMENTS AND PROSPECTS

Strong growth in the first nine months of 2022 – Significant rise in inflation and growing uncertainty

The Greek economy maintained its growth momentum in the first nine months of 2022 (5.9% year-on-year), despite rising inflationary pressures and the impact of Russia's invasion of Ukraine. Pent-up household demand and accumulated private sector savings related to the pandemic, together with the strong performance of the tourism sector and the ongoing fiscal support, contributed to the pick-up in economic activity. Growth was mainly driven by private consumption, goods and services exports, and investment, the latter also on the back of stronger corporate profits. By contrast, a negative contribution to GDP change came from an increase in imports, largely as a result of soaring import energy prices, strong growth of private consumption and investment, as well as the robust performance of industrial production. Most indicators of economic activity, such as industrial production, retail sales and car sales, continued to suggest positive –albeit decelerating– growth rates through to the third quarter. However, business confidence across all sectors fluctuated and, like consumer confidence, deteriorated gradually, reflecting strong inflationary pressures and widespread concerns about global energy supply. Manufacturing output also declined, according to the Purchasing Managers' Index (PMI), after a long period of an upward trend.

The most significant impact of the ongoing energy crisis is an increase in the general level of prices, which reduces households' real disposable income and undermines the outlook for the economy. Inflation, as measured by the rate of change in the Harmonised Index of Consumer Prices (HICP), surged in the eleven months of 2022, to 9.5% on average, reflecting very high increases in energy and food prices. Over the same period, core inflation rose to 5.5% on average, as higher energy and food costs pushed the prices of services and non-energy industrial goods upwards.

In 2022, the Greek real estate market attracted strong investor interest and demand for residential and prime commercial uses. However, despite the sustained dynamics, the increasingly high costs of materials and energy, the rise in interest rates and inflationary pressures have already had visible effects, with a decline in construction activity and in expectations for the real estate sector. The fact that the observed rise in the prices of and demand for prime properties is closely linked to foreign fund inflows makes the prospect of continued strong growth in the real estate market vulnerable to international headwinds, especially in terms of energy sufficiency and cost. However, the interest in the Greek real estate market, in particular the prime property segment, remains strong and is expected to remain so in the period ahead, supported by large-scale development projects in the Attica region, as well as by the improvement of infrastructure across the country.

The strong growth of economic activity was accompanied by significant improvements in the labour market during the first nine months of 2022. Headcount employment rose by 6.6% year-on-year, the unemployment rate dropped to 12.6% and long-term and youth unemployment

rates declined considerably. The labour force grew for a sixth consecutive quarter after a long period of continuous contraction. At the same time, there are signs of a labour market tightening, as in certain sectors (e.g., tourism, construction and manufacturing) labour demand, particularly for higher-skilled positions, seems to be harder to meet than in the recent past. However, data available up to October 2022 suggest a slowdown in employment growth in the second half of the year.

The international competitiveness of the Greek economy continued to improve in terms of unit labour cost, but worsened in terms of relative prices. The structural competitiveness of the Greek economy, despite the progress made in recent years towards improving the business environment, remains low by European and international standards. However, efforts to improve the business environment, a stable and credible fiscal policy framework and the absorption of available funds under the Recovery and Resilience Facility have helped to attract foreign direct investment, primarily in tourism, but also in the technology and IT sectors. Foreign direct investment inflows hit a two-decades high of EUR 5.6 billion in 2021, up from EUR 2.9 billion in 2020. For 2022, on the basis of data available up to October, they are expected to increase further.

In the January-October 2022 period, the current account of the balance of payments posted a deficit of EUR 13.6 billion, up by EUR 6.3 billion year-on-year. This development is mainly attributable to a deterioration in the balance of goods, as imports of goods outpaced the respective exports. Over the same period, a considerable increase in the surplus of the services balance, mainly reflecting a remarkable rebound of travel receipts and, to a lesser extent, an improved sea transport balance, only partly offset the higher deficit of the balance of goods. In particular, travel receipts in the January-October 2022 period were 70.4% higher year-on-year, reflecting a huge increase of 92.1% in arrivals. In current prices, receipts reached 97.4% and arrivals 88.9% of the respective 2019 figures. In the same period, the primary and secondary income accounts deteriorated.

Financial developments: rising bond yields, falling stock prices, upgrade of the Greek sovereign credit rating

In the course of 2022, international financial conditions deteriorated considerably, as interest rate increases by central banks with a view to tackling inflation led to a significant rise in bond yields and to a slowdown in new bond issuance worldwide, especially by low-rated issuers. Furthermore, the more unfavourable global economic outlook contributed to higher market volatility and falls in stock prices.

The tightening of international monetary and financial conditions had an upward impact on the borrowing costs of Greek government and Greek non-financial corporations, as expected. Greek bond yields were actually more sensitive to international volatility than those of other European countries, on account of their lower credit rating and the limited depth of the secondary bond market. Stock prices have been highly volatile; however, due to the resilience of the Greek economy, they have declined less than in the euro area or the United States.

On the other hand, developments in the credit rating of the Greek sovereign have been positive: so far in 2022, two rating agencies have upgraded their credit assessments of the Greek sovereign, reducing the minimum distance to the investment grade to just one notch. This development has also benefited other Greek-based bond issuers, including banks, whose credit ratings have also been upgraded over the same period.

In the ten months of 2022, domestic private sector deposits continued to grow, although at a much slower pace than in the previous two years, while the annual rate of expansion of bank credit to non-financial corporations accelerated on account of the strong economic recovery and increased financing needs amid higher inflation. Bank credit to households has continued

to contract, albeit at a slower pace. The interest rate increases by the European Central Bank (ECB) have led to a rise in domestic bank rates that is expected to continue.

Fiscal developments: lower primary deficit and debt ratios - support measures to mitigate the impact of high inflation

According to the second EDP notification of fiscal data for 2018-2021 by the Hellenic Statistical Authority (ELSTAT) in October 2022, the general government primary deficit was 5.0% of GDP and general government debt 194.5% of GDP in 2021.

During July-October 2022, energy prices increased further, which made necessary the expansion of fiscal measures in support of incomes. The financing of such measures was facilitated by increased resources of the Green Transition Fund, based on the taxation of energy producers' excess profits and increased proceeds from the auction of emission permits, and by tax revenue windfalls of approximately EUR 4.5 billion during January-October 2022, mainly on account of higher nominal GDP.

In 2022, the general government primary deficit and debt ratios are both expected to improve relative to 2021, due to the withdrawal of most of the pandemic-related support measures; the rise in nominal GDP, as suggested by the current strong growth momentum; the sharp rise in inflation; and the fact that the energy-related support measures were, to a large extent, financed in a fiscally neutral way. Specifically, the measures to address the energy crisis are estimated to have totalled around EUR 10.7 billion in 2022, with only EUR 4.8 billion (or 2.3% of GDP) financed out of the State Budget and the remainder from the increased resources of the Green Energy Transition Fund.

According to the Introductory Report on the 2023 Budget, the general government primary deficit in 2022 is estimated at 1.6% of GDP, while the debt-to-GDP ratio is expected to decline by 25.6 percentage points to 168.9% of GDP, mainly owing to an estimated rise of 15.7% in nominal GDP. The projections of the Bank of Greece foresee a primary deficit ratio of 1.4% of GDP and a debt ratio of 169.6% of GDP.

Projections: faster-than-expected growth in 2022, slower growth in 2023

According to Bank of Greece projections, the growth rate of the Greek economy is expected to turn out at 6.2% in 2022; this figure has not incorporated the latest provisional quarterly national accounts data for the third quarter, which were released after the cut-off date for Eurosystem staff macroeconomic projections.

In 2023, the growth rate is projected to slow down to 1.5%, due to an expected weakening in euro area economic activity and a significant decline in private consumption growth. Moreover, both fiscal and monetary policy are expected to have a restrictive impact on activity in 2023.

Subsequently, the growth rate of the Greek economy is expected to rebound, reaching 3.0% in 2024 and 2.8% in 2025. These rates can be achieved, conditional on a de-escalation of the geopolitical crisis, a fall in energy prices, continued boost to the Greek economy from international tourism, progress with the implementation of investment projects and a stable growth outlook for the euro area.

Turning to individual GPD components, consumer spending is estimated to have continued to grow in 2022, at an even faster pace than in the previous year, reflecting higher employment and its positive impact on incomes, as well as the release of pent-up demand, also using the high savings accumulated during the pandemic. In the years ahead, consumer spending growth is projected to weaken, owing to an expected slowdown in real disposable income growth, while the labour market is expected to continue on its positive path, albeit at a slower pace.

Investment is expected to grow very strongly over the entire projection horizon (2022-2025), by 10% per annum on average, supported by the improved liquidity situation of the banking sector and the use of available European funds. In particular, over the coming years, Greece will receive around EUR 40 billion in support from the EU's long-term budget 2021-2027 and EUR 30 billion from the Recovery and Resilience Facility by 2026. These resources are expected to mobilise additional private resources. At the same time, Greece is expected to attract increased foreign direct and indirect investment.

Exports of goods showed resilience during the pandemic. After an increase of 13.8% in 2021, they are projected to keep growing in 2022 and 2023, but at a somewhat slower pace, due to the deteriorating outlook for the euro area and the global economy. Exports of services are projected to recover strongly this year and move slightly upwards in the coming years. At the same time, however, imports are also expected to increase throughout the projection horizon, as a result of the pick-up in domestic demand, in particular investment.

The gradual decline in unemployment and the increase in headcount employment are expected to continue in 2023-2025, as a result of a gradual pick-up in economic growth, which should be supported by the implementation of the National Recovery and Resilience Plan.

Inflation, as measured by the Harmonised Index of Consumer Prices, is projected to stand at a very high level in 2022, at 9.4%, driven by the rising prices of energy but also of food. It is expected to gradually moderate in 2023 and further in 2024, to 5.8% and 3.6%, respectively, mainly on account of the expected decline in energy prices and negative base effects. Inflation excluding food and energy is projected to turn out at 4.6% in 2022 and to remain equally high in 2023, reflecting strong inflationary pressures from the non-energy industrial goods and services components.

Regarding fiscal aggregates, the general government primary balance (based on ESA) is projected in the Introductory Report on the 2023 Budget to be a surplus of 0.7% of GDP in 2023. This improvement relative to 2022, is driven by the expected increase in tax revenue –mainly from indirect taxes and the corporate income tax– and by a decrease (of EUR 3 billion) in primary expenditure of the State Budget, which will stem from the withdrawal of the largest part of measures adopted in response to the pandemic and the energy crisis, as well as from the lower physical deliveries of military equipment. General government debt is projected to decline from 168.9% of GDP in 2022 to 159.3% of GDP in 2023, mainly on account of an estimated rise in nominal GDP.

The sustainability of public debt is not undermined by the observed increase in Greek government bond yields. Based on the favourable composition of public debt, about 76% of which consists in medium to long term liabilities to the official sector, as well as the very favourable repayment profile under the agreed debt relief measures, there are no significant risks stemming from rising borrowing costs. Therefore, the updated estimates of the Bank of Greece suggest that, despite the observed increase in Greek government bond yields, risks to debt sustainability are contained over the medium term, provided that the fiscal measures taken in response to the pandemic and the energy crisis are temporary and that the European funds are effectively utilised. In the long term, however, there is increased uncertainty, as the gradual refinancing of accumulated debt to the official sector on market terms will increase the exposure of Greek government debt to interest rate and market risk, which eliminates any room for a relaxation of primary surplus assumptions.

Macroeconomic projections are surrounded by increased uncertainty and risks

The outlook for the economy is subject to uncertainties and risks, mainly related to exogenous factors. In particular, the growth rate of the Greek economy could decline further in the event of (i) a further escalation of the war in Ukraine, as this would lead to a sharper slowdown of the

global economy; (ii) higher and more persistent inflation, which would lead to higher-than-expected increases in nominal wages and thus set in motion a self-sustaining rise in inflation; (iii) a new wave of the pandemic; (iv) a low absorption rate of EU funds; (v) the emergence of a new generation of non-performing loans due to the pandemic and the energy crisis, after the end of government support measures; and (vi) a delay in the formation of government after the elections and in the fulfilment of economic policy commitments. Heightened geopolitical tensions in the south-eastern Mediterranean region also pose a downside risk to the Greek economy.

3 WORLD ECONOMY

Slowdown in global economic recovery and trade, rising inflation

Since the beginning of the war in Ukraine, the outlook for the world economy has changed dramatically, with a stronger GDP slowdown and higher inflation, amid heightened uncertainty and high geopolitical and financial risks. For 2022 as a whole, global GDP growth is estimated by the IMF to decline from 6.0% in 2021 to 3.2% in 2022 and further to 2.7% in 2023. Real GDP growth will decelerate in both the advanced and the emerging and developing economies, but significantly more mildly in the latter group of countries. In emerging and developing economies, China plays a major role in the projected slowdown, with its GDP projected, in 2022 and 2023, to grow at the lowest rate in four decades (excluding the year of the pandemic), mainly due to the property sector crisis and the strict COVID-19 containment measures.

The slowdown in global economic activity during 2022, on account of inflationary pressures, deteriorating financial conditions and high geopolitical risk, led to a significantly slower pace of global trade growth. The lockdowns in China caused a contraction in aggregate demand and persistent global supply chain bottlenecks. Nevertheless, since mid-2022, supply-side distortions tended to diminish, contributing to lower international freight rates. The appreciation of the US dollar in the course of 2022 weighed further on the anaemic growth of global trade, given that a large part of trade transactions is denominated in dollars and the terms of trade for the other countries deteriorate as a result. According to the IMF, the volume of global trade in goods and services is projected to increase by 4.3% in 2022 and 2.5% in 2023 (compared with a strong recovery of 10.1% in 2021), due to the expected deceleration of world economy.

Global inflation proves to be higher and more persistent than previously projected, fuelled both by high and rising food and fuel prices and by the still robust, albeit slowing, private consumption. Although international supply chain bottlenecks are easing, they continue to play an important role, while real GDP in the United States, the euro area and the United Kingdom is estimated to have grown above potential in 2022, exerting further upward pressure on core inflation. According to the IMF, global inflation is projected at 8.8% in 2022 and 6.5% in 2023, up from 4.7% in 2021.

The energy-related implications of the ongoing war between Russia and Ukraine, the decline in real incomes and the necessary tightening of monetary policy in the face of historically high inflation have weakened the euro area economic outlook. Continued uncertainty about Europe's energy sufficiency has heightened volatility in energy commodity prices, mostly for natural gas, negatively affecting economic sentiment, demand and investment. By contrast, fiscal policy measures and the European recovery instrument NextGenerationEU boosted economic activity and employment prospects in the euro area. At the same time, the more gradual pace of monetary policy normalisation by the ECB compared with the Federal Reserve System led, on the one hand, to more favourable financial conditions in the euro area and, on the other, to a marked depreciation of the euro against the US dollar and a deterioration in the euro area terms of trade. According to the baseline scenario of the Eurosystem staff macroeconomic projections (December 2022), real euro area GDP is expected to grow by 3.4% in 2022, compared with 5.2% in 2021, followed by anaemic growth of 0.5% in 2023, due to weaker domestic and foreign demand. These estimates are highly heterogeneous across member countries, reflecting dif-

ferences in their exposure to Russian natural gas, the size of the manufacturing sector and the fiscal space available for supporting economically vulnerable groups against the energy crisis.

Throughout 2022, the surge in energy and other commodity prices, supply-side constraints, the ongoing strength of domestic demand and tightening labour markets, all contributed to inflation reaching a historical high in the euro area. Despite the successive increases in the ECB key interest rates, the depreciation of the euro added to import prices and inflationary pressures. Inflation in the euro area stood at 10.1% in November, up from 10.6% in October 2022 and 4.9% in November 2021. Inflation rates vary considerably across Member States, ranging from 6.7% in Spain to 21.4% in Estonia, mainly due to differences in national energy markets and policies. According to the Eurosystem staff projections (December 2022), HICP inflation in the euro area will rise to 8.4% in 2022, from 2.6% in 2021. It will decline gradually to 6.3% in 2023 and further to 3.4% in 2024, mainly on account of negative base effects, a fall in international energy prices and lower domestic demand. It will remain however above the ECB's target of 2%, as the pass-through of high energy prices to non-energy goods and nominal wage growth will keep inflation excluding energy and food at historically high levels, 3.9% in 2022 and 4.2% in 2023, from 1.5% in 2021. The 2% inflation target in the euro area, according to the December 2022 Eurosystem projections, is expected to be reached by the end of 2025.

The current projections for the global and European economies are surrounded by heightened uncertainty, and risks have increased. Risks to the growth and inflation outlook are associated with a number of potential adverse developments, such as an escalation of the war in Ukraine or spreading geopolitical tensions, continued pandemic effects in China, a new round of increases in international energy and food prices, and potential commodity shortages and food crisis in developing economies. In addition, tighter financial conditions and monetary policy normalisation at a varying pace across large economies remain a key issue. An excessive rise in key interest rates, guided by overly pessimistic forecasts for inflation and overly optimistic ones for growth, could prove equally wrong as a delayed response of monetary authorities based on the initial optimistic inflation forecasts. Meanwhile, the energy crisis and the need to support the most vulnerable households and enterprises has demonstrated once more the major importance of counter-cyclical fiscal policies which, in good times, can help build the necessary buffers and fiscal space for the adoption of discretionary fiscal policies in bad times. As regards the EU, designing a coherent medium-term fiscal framework is deemed necessary in a period of heightened uncertainty. In this light, the introduction of new revised fiscal rules in the euro area will send a clear message of alignment of economic policies with explicit objectives for fiscal sustainability.

4 THE SINGLE MONETARY POLICY

Euro area: successive interest rate increases to combat high inflation, and measures to safeguard monetary policy transmission

Starting from July 2022, the ECB's Governing Council raised the key ECB interest rates on several occasions, marking a gradual withdrawal of monetary accommodation and a shift to the stance required for inflation to return to its 2% medium-term target. The Governing Council has also indicated that interest rates would still have to rise significantly at a steady pace to reach levels that are sufficiently restrictive to ensure a timely return of inflation to this target. Keeping interest rates at restrictive levels would over time reduce inflation by dampening demand and would also guard against the risk of a persistent upward shift in inflation expectations.

In particular, at its July 2022 meeting, the Governing Council raised the key ECB interest rates by 50 basis points. The increase was larger than signalled in the previous month, reflecting an upward revision of the inflation outlook. It was also announced that forward guidance on the likely path of interest rates would be abandoned in favour of a meeting-by-meeting approach, depending on incoming data and the Governing Council's assessment of the state of the euro

area economy, in particular the inflation outlook. At each of the September and October meetings, the Governing Council raised the key ECB interest rates by a further 75 basis points, and again by 50 basis points at its latest meeting in December.

The Governing Council noted that the risks to the inflation outlook continued to be on the upside. These risks could materialise in the short term in the event of a further reduction in energy supply and a rise in retail prices for energy. The risks to the medium-term inflation outlook included a durable worsening of the production capacity of the euro area, inflation expectations rising above the Eurosystem's target, higher than anticipated wage rises, persistently higher energy and food costs, and a stronger pass-through of the increases in energy and food prices to consumer prices. On the other hand, if energy costs were to decline or aggregate demand were to weaken over the medium term, it would lower pressures on prices.

In July 2022, the Governing Council announced the establishment of a Transmission Protection Instrument (TPI) to support the effective transmission of monetary policy across all euro area countries. The TPI would be activated with secondary market purchases by the Eurosystem of public sector securities with a remaining maturity of between one and ten years issued in jurisdictions experiencing disorderly market dynamics not warranted by country-specific fundamentals. Purchases would be terminated either upon a durable improvement in transmission, or based on an assessment that persistent tensions are due to country fundamentals. To avoid potential interference with the appropriate monetary policy stance, should the TPI be activated, purchases under the TPI would be conducted such that they cause no persistent impact on the overall Eurosystem balance sheet.

At its October 2022 meeting, the Governing Council decided to recalibrate the terms and conditions of the third series of targeted longer-term refinancing operations (TLTRO III) to ensure that they are consistent with the broader monetary policy normalisation process, thereby reinforcing the transmission of policy rate increases to bank lending conditions across the euro area economy. More specifically, the measure introduces incentives for banks to reduce excess liquidity, thereby ensuring a stronger pass-through of higher ECB policy rates to euro area bank lending conditions, to help restore price stability over the medium term.

In December 2022, the Governing Council announced its intention to continue to reinvest in full the principal payments from maturing securities purchased under the APP until at least the end of February 2023. Thereafter, the APP portfolio would decline at a measured and predictable pace, with the Eurosystem not reinvesting all of the principal payments from maturing securities. The decline would amount to EUR 15 billion per month on average until the end of the second quarter of 2023, and its subsequent pace would be determined over time.

Lastly, as far as the PEPP is concerned, the Governing Council intends to reinvest the principal payments from maturing securities purchased under the programme until at least the end of 2024. In any case, the future roll-off of the PEPP portfolio will be managed to avoid interference with the appropriate monetary policy stance. The Governing Council will continue to apply flexibility in the reinvestment of maturing redemptions in the PEPP portfolio, with the aim of providing a first line of defence to counter risks to the transmission mechanism related to the pandemic.

5 FINANCIAL DEVELOPMENTS

Upward pressures on lending rates, stronger credit expansion to non-financial corporations and rising deposits

The increase in retail deposits over the past few years has improved liquidity conditions in the banking system, enabling banks to keep deposit rates very low despite the recent increases in Eurosystem policy rates. In future, policy rate increases will be passed through to bank deposit

rates, albeit heterogeneously across categories. A stronger pass-through is expected in interest rates on term deposits, which are used for saving or investment purposes and can more easily be substituted by other deposits or investment products, domestic or foreign.

The total cost of bank borrowing for non-financial corporations remained on average virtually unchanged in January-October 2022 compared with 2021, as banks refrained from broadly-based adjustments of their lending rates until September. As a result, the weighted average interest rate on corporate loans stood at 3.2% in January-October 2022, up from an average of 3.0% in 2021. The cost of bank borrowing for households has increased this year, as banks raised the rates on housing loans, following on earlier increases in consumer credit rates.

The pass-through of Eurosystem policy rate increases will likely be asymmetric across corporate and household loan rates. Specifically, the degree of incorporation of changes in policy and money market rates into bank lending rates tends to be higher for household loans than for loans to businesses, despite the fact that almost all new fixed-maturity loans to firms carry floating interest rates. The terms and conditions and the availability of credit to businesses will likely continue to be supported by the public funds available through co-funding and guarantee programmes and by the low-interest loans from the Recovery and Resilience Facility (RRF). This should mitigate the pass-through of banks' funding costs, which is a function of the single monetary policy stance, to lending rates.

Despite rising nominal interest rates, 2022 has been a year of strong and accelerating credit expansion to non-financial corporations, especially larger enterprises. In the first ten months of 2022, the monthly average net flow of bank credit to non-financial corporations was EUR 450 million, compared with only EUR 35 million in 2021. The flow of bank credit to households continued to fall year-on-year in the first ten months of 2022, albeit at a weaker rate. This deceleration reflected the fact that consumer credit growth turned positive in March, for the first time since 2010, and remained positive thereafter, even as housing loans kept posting negative rates of change.

The pick-up in credit growth to non-financial corporations is consistent with the strong rebound in GDP growth in 2022, as well as the increase in firms' financing needs due to the surge in inflation. Soaring energy and other commodity prices put firms' liquidity under strain. Similarly, heightened uncertainty due to the war in Ukraine gave rise to precautionary motives among non-financial corporations for holding excess cash. Moreover, the withdrawal of earlier COVID-19 support measures, including the repayable advance and bank loan moratoria, has unsurprisingly led to an increase in firms' demand for bank loans. On the supply side, the reduction of the ratio of non-performing loans has had a significant upward impact on bank credit. A further positive contribution came from strengthened bank liquidity as a result of customer deposit inflows in the first ten months of 2022, while the outstanding amounts of Eurosystem financing remained unchanged. A significant part of the recovery in credit growth was supported by the financial instruments of the European Investment Bank (EIB) Group and of the Hellenic Development Bank (HDB).

Looking forward, the tightening of monetary policy will weigh on banks' funding costs and hence on their ability to lend on favourable terms. In addition, the need to guard against the risk of a new generation of non-performing loans in 2023, as a result of the energy crisis, makes lenders more cautious about new loan origination. At the same time, the expected slowdown in economic activity will worsen the financial condition of firms and households, adding to credit risk. Credit expansion to firms is expected to slow, but still retain high annual rates as banks co-finance investment projects under the Recovery and Resilience Facility.

Between January and October 2022, the stock of deposits held by the domestic private sector increased by a cumulative EUR 4.2 billion to EUR 184.8 billion, similar to the level recorded in September 2011.

In greater detail, household deposits increased by EUR 3.2 billion in the January-October 2022 period, reflecting a significant rise in dependent employment (mainly in retail trade and tourism), as well as the income support measures to compensate for higher energy prices, which partly offset the negative impact from the drastic unwinding of COVID-19 support. Over the same period, deposits held by non-financial corporations recorded a small cumulative increase of EUR 0.8 billion, supported by stronger growth of credit to non-financial corporations and the rebound in retail sales and tourism receipts.

Demand for euro banknotes has resumed a downward path since mid-2021, after the temporary spike observed amid high uncertainty during the acute phase of the pandemic.

Banking system: profitability, decline in capital adequacy, reduction of non-performing loans

In the first nine months of 2022, Greek banks reported profits, as a result of non-recurring income, lower operating expenses and, most importantly, lower credit risk provisions that have been the key driver of the significant losses recorded in the first nine months of 2021.

In terms of capital adequacy, both the Common Equity Tier 1 ratio (CET1) and the Total Capital Ratio on a consolidated basis remained at 13.5% and 16.2%, respectively, in September 2022, unchanged from December 2021 and below the euro area average.

At end-September 2022, the quality of the loan portfolio on a solo basis improved, as non-performing loans (NPLs) stood at EUR 14.6 billion, down by EUR 3.8 billion from end-December 2021 and by EUR 94.1 billion from their March 2016 peak. The ratio of NPLs to total loans for the whole banking system declined further in the first nine months of 2022 (September 2022: 9.7%, December 2021: 12.8%), but remained significantly above the euro area average. All significant banks have already achieved their operational target for a one-digit NPL ratio.

Of the total NPL stock, corporate loans account for about 68%, housing loans for about 22%, while the remainder consists of consumer loans. At the end of September 2022, about 38% of NPLs were subject to forbearance measures. It should be noted, however, that a high share of forborne loans soon falls back into arrears.

6 CHALLENGES

At the current juncture, the most important policy challenge for the Greek economy is to tackle high inflation. Inevitably, the tightening of monetary policy will have negative implications for economic growth in the short term. On the domestic front, the restrictive fiscal policy stance is deemed to be the most appropriate, as it ensures public debt sustainability and complements monetary policy in addressing high inflation. On the other hand, the persistence of inflationary pressures reinforces the need for additional fiscal measures to further support households' real disposable income in order to mitigate the impact of higher prices (in particular of energy). Economic policy therefore faces a dilemma between macroeconomic stabilisation and fiscal sustainability.

If domestic inflation is higher than that of the euro area, the competitiveness of the Greek economy will deteriorate, which, together with the high dependence on imports of goods and services, could lead to a persistent deterioration of the current account balance. Moreover, rising interest rates add to the cost of refinancing public and private debt. However, interest rate risk in the case of government debt is relatively limited in the medium term, as a result of the favourable repayment profile of the debt, which is mostly held by the official sector, coupled with the timely introduction of interest rate swaps. Nevertheless, the existing favourable features of the accumulated public debt should not lead to complacency, given that the credit rating of

the Greek government is at best one notch below investment grade, while in the long run the debt becomes more vulnerable to interest rate risk.

In the labour market, the skill mismatches observed after the pandemic remain a serious problem, with firms finding it difficult to hire suitable staff, as workers either lack the required skills or have shifted to other sectors with better employment prospects. The simultaneous presence of double-digit unemployment rates and a high number of vacancies suggests high structural unemployment.

Another major challenge refers to strengthening the resilience of the country's energy system. This requires a diversification of energy supplies, a faster transition to renewable energy sources (RES), development of RES-generated power storage technologies, expansion of energy distribution networks and exploring possibilities of further exploitation of mineral resources.

On top of the challenges brought to the fore first by the pandemic and then by the energy crisis, the Greek economy continues to face chronic problems. Despite progress in improving public finances, reducing the tax burden and social security contributions and increasing openness, structural competitiveness remains comparatively low by European and international standards. For example, according to the IMD's world competitiveness indicators, Greece ranked 47th out of 63 countries in 2022. As noted in the IMD's World Competitiveness Yearbook 2022, the main challenges refer to introducing special programmes to ensure the digital transformation and adaptation of domestic industry in line with the principles of energy efficiency and circular economy; supporting the international expansion in new markets; conducting training programmes to improve the employability of workforce; and attracting significant FDIs. In addition, Greece ranks 58th out of 180 countries in the Corruption Perceptions Index according to the Transparency International Survey 2021, while the size of Greece's shadow economy is still substantial. In the survey's report, the size of self-employment is identified as the most important determinant of the size of the shadow economy. Furthermore, problems remain relating to the speed of the administration of justice, the efficiency of the public sector and –despite significant progress– the digital transformation of the economy, as well as longer-term challenges such as population ageing. Lastly, an additional challenge to the outlook for the Greek economy refers to ensuring sufficient fiscal space to finance increased defence spending in coming years in view of ongoing tensions in Greek-Turkish relations.

7 PRECONDITIONS FOR SUSTAINABLE GROWTH

In view of the medium-to-long-term challenges facing the Greek economy and the uncertainties relating to the international economic environment, high inflation and energy supply, the areas on which economic policy should focus are the following:

• **Containing part of the impact of high inflation on household income**, in particular for vulnerable groups of the population, in order to support consumption and preserve growth dynamics and social cohesion. However, income support to mitigate the impact of high inflation should be targeted and temporary and should be financed using the available fiscal space, without changing the restrictive fiscal stance. At the same time, energy cost subsidies should be accompanied by actions to foster energy saving and by incentives for reducing energy consumption.

Preserving the fiscal credibility achieved pre-pandemic through the maintenance of primary surpluses is paramount for regaining investment-grade rating. This is because Greece's fiscal performance and sustainability are crucial credit rating factors, much more so than for other European countries, as Greece continues to have one of the highest debt-to-GDP ratios in the world.

According to debt sustainability analysis by the Bank of Greece, the downward path of the debt ratio is expected to continue, while gross financing needs as a percentage of GDP are not projected to exceed the 15% threshold in the medium term (until 2030). In the longer term, however, there is increased uncertainty, as the gradual refinancing of accumulated debt to the official sector debt on market terms will increase the exposure of Greek government debt to interest rate risk. This implies that Greece should take advantage of the medium-term resilience of debt to ensure debt reduction through the achievement of sustainable primary surpluses, which, together with satisfactory GDP growth, would improve the country's chances of regaining investment-grade rating.

• The implementation of the investment projects linked to the Recovery and Resilience Facility. To this end, it is necessary to press ahead with the reforms included in the National Recovery and Resilience Plan "Greece 2.0", in particular those involving institutional interventions that help to further deregulate goods and services markets, cut red tape and promote export-oriented investments, thereby strengthening the resilience and structural competitiveness of the Greek economy.

The most effective and sustainable way to boost incomes in the medium to long term and reduce public debt is by achieving high and sustainable GDP growth; this in turn calls for increasing productive investment and completing outstanding reforms.

Moreover, the implementation of the National Recovery and Resilience Plan "Greece 2.0" will support investment and growth, thereby helping to preserve jobs and create new, better paid ones.

• Ensuring that wage cost developments preserve the competitiveness gains achieved over the last decade. Continued reforms and targeted support to households and businesses would contribute in this direction. In this context, the increase in the statutory minimum wage planned for next year should be in line with the actual capabilities of the economy, so as to avert a phase of second-round inflationary pressures fuelled by a wage-price spiral.

• Addressing existing distortions in the labour market. In particular, the unemployment rate, although declining steadily and significantly in recent years, remains one of the highest in the euro area. Moreover, the unemployment rate among vulnerable groups (youth, women) is still high, as is the proportion of the labour force which either works part-time and wants to work more hours or is available to work but is not looking for a job.

Also, the problem of skills mismatches remains significant. In order to alleviate these weaknesses, it is necessary to upgrade the technical education and training of vulnerable social groups, as this will equip them with the appropriate skills and improve their employment prospects, in particular in the context of the intended digital transition of the Greek economy.

There is a need to enhance the work-life balance framework in order to encourage the economically inactive population, especially women, to participate and remain in the labour market.

Institutional interventions to further alleviate or subsidise social security contributions in line with budgetary capabilities would lower non-wage costs and help tackle undeclared or underreported work.

Sustaining employment growth in well-paid jobs, as well as labour market participation, requires actions to strengthen demand in sectors and occupations with high added value, attract foreign direct investment and increase the extroversion of the Greek economy.

• **Accelerating the green transition and enhancing energy security.** The green transition towards a low-carbon economy is necessary not only for climate sustainability, but also for ensuring European strategic autonomy in terms of energy security.

Tackling the twin energy and climate crises requires accelerating and promoting investment in green technologies, improving energy distribution networks and expanding electricity interconnection infrastructures, as well as developing centralised energy storage systems.

In this direction, the REPowerEU Plan aims, in addition to gradually reducing the EU's dependence on Russian fossil fuels by 2027, at advancing the green transition by accelerating the rollout of renewable energy sources, saving energy, combining investments and reforms, diversifying energy supplies and thus improving Europe's energy security and autonomy.

In addition to targeting the green transition, Greece should also explore possibilities to enhance its energy security by utilising its natural resources, e.g. through hydrocarbon extraction.

• **Strengthening the resilience of the banking system** so that it can smoothly finance Greek businesses and households. Undoubtedly, the cleanup of bank balance sheets over the past few years has been instrumental in improving the aggregates of the banking sector, while rising prices in the real estate market imply higher value of properties held as collateral or owned by banks. However, uncertainty about the effects of interest rate increases, the weaker growth outlook of the Greek economy and the intensifying geopolitical and energy crisis leave no room for complacency. Against this background, the following challenges for the banking sector are highlighted:

First, the high stock of NPLs. The marked reduction of NPLs has so far relied mainly on securitisations using the Hellenic Asset Protection Scheme (the "Hercules plan") and on secondary market loan sales. However, the continuation of these strategies is becoming more difficult in view of pressures on capital adequacy. In addition, interest rate hikes are expected to weigh on households' and firms' debt servicing capacity, which, in conjunction with a weaker economic outlook, could lead to a new generation of NPLs, thereby weighing on bank asset quality.

Second, low core profitability. The increase in ECB interest rates is set to boost banks' net interest income in the short term, given that a very large part of bank loans carry floating rates. In the medium term, however, slowing economic activity and rising debt servicing costs could increase the cost of credit risk. Furthermore, banks' interest expenses are expected to increase with the phasing out of the ECB's emergency monetary policy measures to contain the impact of the COVID-19 pandemic, as well as by the need to issue bonds to meet prudential capital requirements, in particular the minimum requirement for prudential own funds and eligible liabilities (MREL).

Third, the level of banks' capital adequacy. Currently, the banking sector's capital adequacy is satisfactory. In the near term, it will be influenced by a number of factors, including (i) a possible deterioration in banks' internal capital generation capacity amid growing macroeconomic challenges and monetary policy tightening; (ii) costs related to the implementation of strategies to reduce the existing NPL stock and sufficient provisioning for credit risk, especially in view of the potential emergence of new NPLs; (iii) implementation of capital actions (e.g. synthetic securitisations) and the cost of issuing capital instruments (Additional Tier 1, Tier 2) to meet prudential capital requirements, including the MREL; and (iv) the evolution of new loan disbursements to households and non-financial corporations. In this regard, there is a risk that the share of deferred tax credits (DTCs) in banks' capital could increase further.

Fourth, the need to improve the financial soundness of Less Significant Institutions (LSIs): An improved LSI capital adequacy and possible mergers between LSIs would increase competition

in the domestic banking system, as well as specialisation at national and local level, enabling the provision of diversified and more competitive services to individuals and firms, especially small and medium-sized enterprises.

Finally, it should be noted that the transfer of NPLs out of the banking system does not automatically mean the removal of debt from the economy. The debt remains and is now managed by credit servicing firms (CSFs). The smooth functioning of the NPL secondary market is therefore key to a definitive debt resolution and, to this end, the effective use of all available tools is a prerequisite.

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The Greek economy grew faster than expected in the first nine months of 2022, benefiting from buoyant tourism receipts and a rebound in domestic demand. However, the adverse international macroeconomic environment weighs on the prospects of the European and Greek economies for the next year. Alleviating the impact of the energy crisis, but without compromising fiscal credibility, and maintaining the growth momentum in the period ahead are the main challenges facing economic policy. Despite the increased risks, the sizeable support available from European funds, coupled with the lower exposure of the Greek economy to the energy crisis compared with the EU average, and the favourable features of its public debt structure, creates such conditions that, should a more adverse scenario for the EU be realised, the impact on the Greek economy would not be so severe.

Moreover, the implementation of investments and reforms under the National Recovery and Resilience Plan “Greece 2.0” and the maintenance of fiscal credibility and stability can make possible an upgrade of Greece’s credit rating to investment grade in the course of next year. This is a very important objective, especially amid a tightening of monetary policy and of international financial conditions that have had an upward impact on Greek government bond yields. In this context, given that 2023 is a national election year, there is a need for an alignment and an understanding among the political forces in order to implement the key economic policy commitments and preserve what the Greek economy has achieved over the past ten years.

Box 1

THE DETERMINANTS OF GLOBAL NATURAL GAS PRICES AND THE ENERGY POLICY OF THE EU

Introduction

The European benchmark price for natural gas, as captured by the price index of the Dutch Title Transfer Facility (TTF), having followed a continuous upward path since the second half of 2021, skyrocketed to over 300 euros per megawatt hour (EUR/MWh) in August 2022, before plummeting to around EUR 100/MWh by late October 2022. Thereafter, global gas prices have been hovering at an average level of EUR 125/MWh, i.e. five times their 2019-21 average (around EUR 25/MWh). Given the design of the wholesale electricity market, natural gas, although accounting for a mere 15% of the energy mix for electricity generation in Europe,[1] still determines the market clearing price (formerly referred to as the "system marginal price"), as the combined weighted cost of nuclear and renewable energy sources (RES) is much lower.

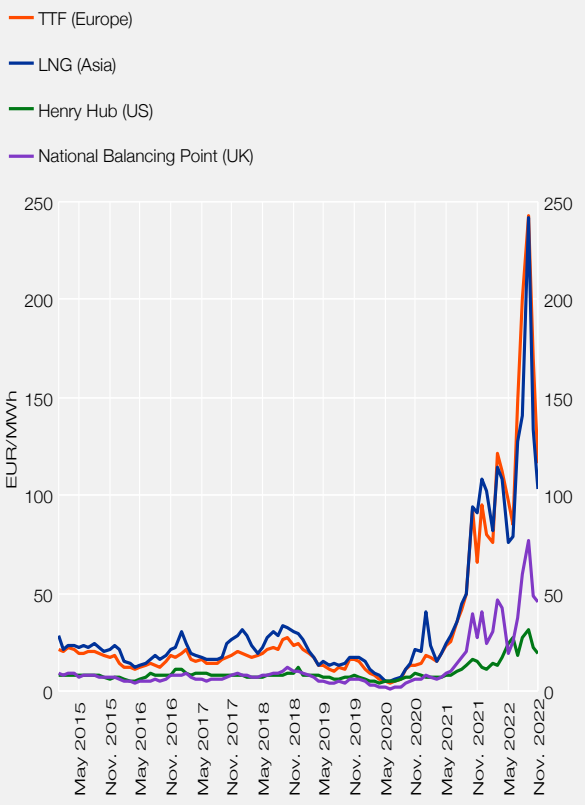
This box discusses the determinants of wholesale gas prices in Europe, provides an overview of the EU's interventions in the energy market to mitigate the impacts of the energy crisis and outlines the potential ensuing challenges for the green transition.

The natural gas market in the EU and the formation of prices in TTF contracts

The European Union's natural gas supply comes primarily from six countries (other than Russia): Algeria, Azerbaijan, Denmark, the Netherlands, Norway and the United States. In this regard, cross-border delivery prices of natural gas vary across EU Member States. For instance, according to data from the European Commission, average gas prices in the second quarter of 2022 ranged from EUR 86.9/MWh in France to EUR 106.6/MWh in Estonia, with the price of Azeri gas, in particular, standing at around EUR 90/MWh in Greece and Bulgaria, compared with only EUR 40/MWh for Algerian gas in Italy and Spain. Such price differentials may be explained by the fact that gas trading in the EU is largely conducted under bilateral long-term gas supply contracts between a domestic provider as buyer and a foreign supplier as seller, which take place over-the-counter (OTC) and are usually oil-indexed or hub-indexed.[2] In Europe, the Dutch pricing hub accounts for the bulk of gas trading, hence the TTF has become the European benchmark price for natural gas.

Natural gas futures prices are determined by intertemporal demand and supply factors. At the same time, as

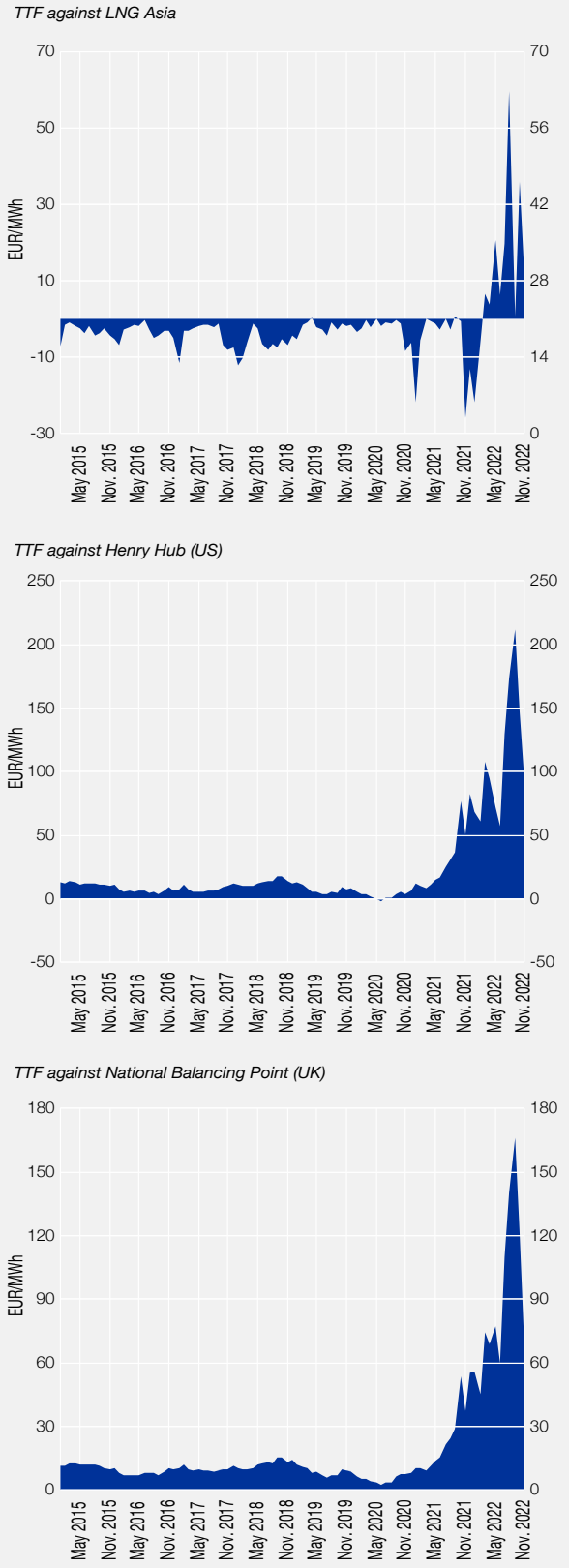
Chart A Natural gas prices in Europe, Asia, the United States and the United Kingdom



Sources: Refinitiv (data) and Bank of Greece (calculations).
Note: Natural gas prices at different pricing hubs have been converted from the domestic currency and the different units of measurement to euros per megawatt hour (EUR/MWh).

1 Based on Eurostat data for January 2019-July 2022 ("Net electricity generation by type of fuel").
2 By way of illustration, in the second quarter of 2022 exchange trading on the EU's stock markets accounted for about 60% of total natural gas trading, whereas bilateral contracts represented the remaining 40%. Conversely, in 2019 bilateral contracts accounted for around 65% of total natural gas trading and exchange trading for 35%. See European Commission, *Quarterly report on European gas markets*, Q2 2022.

Chart B Natural gas price differentials



Sources: Refinitiv (data) and Bank of Greece (calculations).
Note: All prices have been calculated in euros per megawatt hour (EUR/MWh).

the market for natural gas is not unified globally, but rather pricing takes place at a regional level, any changes in the conditions prevailing in the European gas market (e.g. due to supply-side factors) may lead to divergences in the gas price relative to the rest of the world. Chart A illustrates natural gas prices at the world's four most liquid pricing hubs:[3] at the Henry Hub (United States) and the National Balancing Point (United Kingdom), futures contracts are traded for physical delivery of natural gas at the dedicated locations, while the Dutch TTF natural gas futures contracts are for physical delivery through the transfer of rights at the Virtual Trading Point.[4] The Asian pricing hub provides spot prices of liquefied natural gas (LNG) cargoes that are ready for delivery. Prices at the four pricing hubs had moved along an identical path up until the second half of 2021, when TTF prices (followed by the Asian spot price) started to diverge from prices in US and UK contracts. Since early 2022, a sizeable price differential has been observed between the TTF contract and the other international gas futures contracts.

In particular, despite a sharp drop from end-August onwards, the prices of the TTF futures contracts continue to offer a significant premium over prices in the other contracts (see Chart B). In October 2022 the price of one megawatt hour of natural gas in Europe was around 27% higher compared with the Asian pricing hub and 2.5 to 6.5 times higher than prices at the UK and US pricing hubs, respectively. These price premiums have been an important pull factor for the reorientation of LNG cargoes from other parts of the world towards Europe, which appears to be explaining the connection of prices between the Asian hub and the Dutch hub (TTF). More specifically, the premium of the TTF price over the US LNG price is associated with a considerable increase in US LNG exports to Europe that has been observed during 2022. Thus, the higher price in European contracts led to gas imports from other, non-Russian exporters. As a result, total gas imports in Europe since July 2022, when Gazprom decided to cut off Russian gas flows via the Nord Stream pipeline for almost a month, have remained broadly unchanged relative to the two previous (non-win-

3 See Hafner, M. and G. Luciani (2022), Chapter 20: "The trading and price discovery for natural gas", in Hafner, M. and G. Luciani (eds.), *The Palgrave Handbook of International Energy Economics*.

4 See "NYMEX Rulebook" (https://www.cmegroup.com/content/dam/cmegroup/rulebook/NYMEX/2/220.pdf) for the United States and "ICE Endex: Dutch TTF Natural Gas Futures" for Europe (https://www.theice.com/products/27996665/Dutch-TTF-Gas-Futures).

ter) months of May and June,[5] because increased LNG imports counterbalanced the reduced deliveries of Russian natural gas. In this regard, the disruption in the supply of natural gas via Nord Stream does not seem to have affected the balance between supply and demand. Against this backdrop, the question still remains as to the drivers of soaring TTF prices in August 2022.

The divergences of natural gas prices across different futures contracts may also be explained by the activity on the TTF market. More specifically, trading volumes at the TTF hub have risen markedly in recent years, although natural gas production from Dutch reserves has fallen steeply. This is mainly due to the following two factors: (i) the actual commodity volumes that are settled at the Dutch pricing hub –and are thus TTF-indexed– mostly come from Russian pipeline gas supplies; and (ii) the TTF is largely used to hedge the risk from other natural gas trades. Therefore, the sharp rise in TTF trading volumes, despite the dwindling gas output in the gas field of the Netherlands, is to a large extent driven by interdealer transactions, with the TTF emerging as the main European benchmark price for arbitrageurs.[6]

Chart C Co-movement of TTF prices with the credit risk of European energy companies

Sources: Refinitiv (data) and Bank of Greece (calculations).
Note: The chart shows the evolution of the TTF index (blue line) for natural gas and of a credit risk indicator for various large European energy companies (red line). Both indices have been rebased to the beginning of 2022 (3 January 2022=100). The credit risk indicator has been calculated as the average of CDS spreads for the energy companies Equinor (Norway), Engie (France), Eni (Italy), Fortum (Finland) and Total (France) and the inverse share price (1/P) for Uniper (Germany).

In interdealer transactions, a long or short position, through a purchase or a sale, respectively, in the TTF contract, is typically accompanied by a reverse position in another gas product. If an exporter announces that it will reduce future supplies, as was the case with Russian natural gas by Gazprom, the trader will not be facing any problems, so long as its short positions in the TTF are fully hedged by gas supplies that have already been delivered or contracted. In practice though, it is possible to take positions beyond the availability of the physical commodity, in anticipation of supply contracts to be signed with gas exporters. If the dealer has unhedged short positions taken in order to earn profit from a possible future drop in prices, the dealer will face margin calls in the event of a rise in the price of the commodity. At this point, the dealer will have to cover its positions either by buying the commodity from other sources, e.g. on the spot market, or by using cash assets. This explains both the rise in Asian spot prices and the sharp increase in margin calls.[7]

Against this background, the companies that will end up with open short positions in natural gas are expected to face heightened investor concerns about potentially defaulting on TTF contracts. In a context of reduced natural gas supply in Europe and difficulties in directly finding other deliveries, this indeed happened, as evidenced by rising risk premia for major counterparties on the TTF market. Risk premia in credit default swaps (CDSs) for large energy companies in different European countries stood up to 2.5 times higher in August and September 2022 than on the day after the Russian invasion of Ukraine (see Chart C). This rise occurred in close connection

5 See European Commission, *Quarterly report on European gas markets*, Q2 2022, p. 12.
6 See "A story of success: the evolution of TTF trading", CME Group, April 2019 (https://www.cmegroup.com/education/articles-and-reports/a-story-of-success-the-evolution-of-ttf-trading.html).
7 See a relevant analysis in the Fed's *Financial Stability Report*, May 2022, entitled "Box 4.2. Commodity Market Stresses following Russia's Invasion of Ukraine" (https://www.federalreserve.gov/publications/2022-may-financial-stability-report-funding.htm).

with the surge in TTF prices during summer, i.e. after the supply of natural gas in Europe had largely normalised and the stocks had increased to levels higher than those observed in the respective months of past years.[8]

In the light of the above, the spike in the price of natural gas in Europe, as captured by prices in TTF contracts, is construed to be reflecting not only market fundamentals but also financial factors, such as counterparty risk premia. This finding is also confirmed by the significant decoupling of the TTF price from the risk premia of large European energy companies, ever since some EU countries provided government support to domestic energy companies either in the form of guarantee and liquidity provision or through bailout programmes.[9] The discussion on EU institutional interventions in the energy market seems to have also contributed to declining TTF prices since September.

The EU's energy policy, the energy crisis and challenges for the green transition

Since autumn 2021 the EU, in order to address the sharp increases in gas prices, has proposed a series of interventions aimed at ensuring the security of its energy supplies, reducing demand and containing prices. On the supply side, its key ambition is to become independent from Russian fossil fuels and enhance the resilience of the European energy system, through a diversification of energy supplies –party reflected in increased non-Russian LNG imports– and an accelerated roll-out of renewable energy.

In June 2022, the EU adopted a regulation stating that underground gas storage facilities must be filled up to at least 80% of their capacity at Member State level by 1 November 2022, and up to 90% in the following years, and setting intermediate targets for each Member State.[10] The EU's decision in October 2022 on voluntary joint purchases of gas, except for binding demand aggregation for a volume equivalent to 15% of storage filling needs, is expected to contribute in the same direction. Companies will be allowed to form a European gas purchasing consortium, in compliance with EU competition rules. Joint purchasing will help smaller Member States and in particular companies that are in a less favourable situation as buyers to access gas volumes at better conditions. At the same time, the EU has stepped up efforts to save energy, establishing voluntary reduction targets of 15% of natural gas demand between August 2022 and March 2023 and of 10% of electricity demand between December 2022 and March 2023, while the reduction target of 5% of the electricity consumption in peak hours became mandatory.

In October 2022, EU leaders asked the European Commission to urgently submit concrete legislative proposals on additional measures aimed at lowering energy prices, including a temporary dynamic price corridor for natural gas trading on the TTF to immediately limit episodes of excessive gas prices. Meanwhile, they endorsed the development of a new complementary price benchmark by early 2023, which more accurately reflects conditions on the gas market as well as the increasing role of LNG in the energy mix. It is important that EU leaders acknowledged the need for improvements in the functioning of energy markets to increase market transparency, alleviate liquidity stress and eliminate factors that amplify the volatility of gas prices, while ensuring the preservation of financial stability. Lastly, the European Council invited the Commission to speed up work on the structural reform of the electricity market, with a view to delinking electricity prices from those of gas.

Responding to EU leaders' call, the Commission submitted concrete legislative proposals to the EU Energy Council, including a market correction mechanism for the price of month-ahead TTF-derivatives and an intra-day volatility management mechanism for prices in energy derivatives markets. These proposals were subject to discussion and final approval by mid-December 2022.

8 For instance, at end-June and end-July 2022, gas storage facilities in the EU were at 55% and 65%, respectively, of their full capacity, which compares with 45% and 55%, respectively, in the same months of 2021, despite a milder winter.

9 According to a Bruegel paper entitled "National fiscal policy responses to the energy crisis", 21 October 2022 (https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices), between September 2021 and October 2022 EU governments provided support in various forms (liquidity, loans, bailouts and/or nationalisations) totalling about EUR 180 billion.

10 The Regulation provides that Member States without storage facilities should store 15% of their annual domestic gas consumption in stocks located in other Member States.

In the near term, the EU's energy strategy is to be complemented by emergency measures to support households and businesses at the national level, so as to mitigate the impacts of exceptionally high energy costs on consumption and production. Overall, the energy measures taken by the EU, to the extent that they will be successful in bringing natural gas prices down, limiting their excess volatility and reducing uncertainty, should allow Member States to conduct a more sustainable and effective fiscal policy and underpin economic growth. The EU's emergency measures adopted in September 2022 to redirect the surplus revenues from electricity producers using the so called "inframarginal technologies" (such as renewables, nuclear energy and lignite) towards supporting and protecting final electricity users (until June 2023), as well as the mandatory solidarity contribution based on the surplus profits of energy undertakings in the oil, gas, coal and refinery sectors (until December 2023), are expected to boost public revenue and mitigate the impacts of the energy crisis.[11]

Russia's invasion of Ukraine has forced the EU to take urgent measures so as to tackle the energy crisis; yet these measures do not conflict with the energy transition. Europe has already taken important steps towards clean energy with the adoption of the European Green Deal, which requires a reduction of at least 55% in greenhouse gas emissions by 2030, with natural gas being promoted as a so-called "transition fuel". As gas prices continue to rise and some countries are again resorting to solutions associated with high-emission fuels due to the current exceptional circumstances, the achievement of green transition targets might become a subject of discussion. On the other hand, the innate relationship between the ongoing crisis and overreliance on fossil fuel imports may prove to be a unique opportunity for revisiting the energy systems and urging European countries to increasingly use clean energy not only for environmental reasons but also for energy security purposes.

In March 2022, EU leaders agreed that Europe must phase out its energy dependency on Russia as soon as possible.[12] The measures in the REPowerEU action plan aim to end the EU's dependency on Russian fossil fuels by 2027, through accelerated transition to renewables, energy savings and diversification of energy supplies, with a view to improving Europe's energy security and autonomy. The effective implementation of the plan can lead to a structural transformation of the EU's energy system.[13] At the same time, according to the European Commission in the wake of the Russian invasion of Ukraine, the implementation of the energy efficiency measures should be expedited so as to increase more rapidly the energy resilience and independence of the EU.[14] Energy savings are seen as "the quickest and cheapest way to address the current energy crisis". The "Fit for 55" package is expected to reduce natural gas consumption by an estimated 30% by 2030, while more than one-third of this reduction will come from the attainment of the energy efficiency target.

In order to secure the EU's energy supply at affordable prices and to phase out dependency on Russian gas, the Commission established with the Member States the EU Energy Platform for voluntary joint natural gas, LNG and hydrogen purchases.[15] Furthermore, the Commission proposed to raise the 2030 target for renewables to 45% from 40% under the "Fit for 55" package, with the simplification and shortening of permitting processes being an essential precondition.[16] Part of the REPowerEU Plan is to double solar photovoltaic capacity by 2025 and install 600 GW by 2030, recognising the advantages of solar energy in meeting today's energy challenges. The EU Solar Strategy outlines a comprehensive vision to swiftly reap the benefits of solar energy and presents four initiatives to overcome the remaining challenges in the short term.[17] In parallel, the EU has put forward an action plan on biomethane and the acceleration of the renewable hydrogen market.[18] As delivering the REPow-

11 https://ec.europa.eu/commission/presscorner/detail/en/ip_22_5489.
12 https://www.consilium.europa.eu/en/meetings/european-council/2022/03/24-25/.
13 The green transformation of production could deliver gas savings of up to 35 bcm in natural gas by 2030, in addition to what is foreseen in the "Fit for 55" package, while savings of an additional 22 bcm could be secured from energy-intensive industries.
14 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0240&from=EN.
15 https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2387.
16 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022PC0222&from=EN.
17 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0221&from=EN.
18 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2022%3A230%3AFIN&qid=1653033922121.

erEU objectives requires an additional investment of EUR 210 billion, the Recovery and Resilience Fund (RRF) is expected to contribute a further EUR 225 billion for the financing of cross-border and national infrastructure as well as energy projects and reforms.

It is positive that the climate ambitions of the EU –both in the short and in the long term– are not called into question in the proposed package of measures to tackle the energy crisis. At the same time, the measures to redistribute the energy sector's surplus revenues to final consumers are expected to enable producers to cover their investment and operating expenses without compromising investments that are in line with the energy and climate goals for 2030 and 2050. All in all, the REPowerEU action plan offers opportunities to boost clean energy projects and provides additional funding, thereby speeding up the transition to green energy. However, the effectiveness of the plan hinges upon the implementation of the full "Fit for 55" package.

Conclusions

The disruption of Russian gas supply induced by the war in Ukraine, as well as the global competition to secure the supplies needed, partly justify the surge in natural gas prices. In this respect, the rise in the TTF price, to the extent that it is due to demand and supply factors, should be comparable with respective rises in the prices of alternative contracts. The rally in the TTF price during summer 2022, relative to prices on other benchmark indices, appears to be associated with traders' investment positions as well as increased portfolio risks after the aforementioned developments. As a consequence, government measures through the provision of liquidity or other forms of support, as well as the EU's decision to apply a dynamic price corridor alongside discussions about a gas price cap, exerted a downward effect on the pricing of risks and of other financial factors unrelated to supply or demand, and thus on natural gas prices in Europe. Uncertainty about natural gas prices over the medium term remains elevated, affecting both the developments in financial markets and the policies pursued.

Geopolitical developments clearly stress the urgent need to re-design ambitious yet realistic strategies for the transition to a low-carbon economy, with greater energy security. The green transition proves to be necessary not only for climate sustainability, but also for Europe's strategic autonomy. Tackling the twin energy and climate crises requires promoting and accelerating investment in green technologies, improving energy distribution networks and expanding electricity interconnection infrastructures, as well as developing centralised energy storage systems.[19]

19 According to recent research, renewable energy is associated with a significant decline in wholesale electricity prices in Europe, with an average impact of 0.6% for each 1 percentage point increase in the share of renewables. See Cevik, S. and K. Ninomiya (2022), "Chasing the Sun and Catching the Wind: Energy Transition and Electricity Prices in Europe", *IMF Working Papers*, WP/22/220, 4.11.2022.

Box 2

THE COMPARATIVE ADVANTAGES OF GREEK EXPORTS OF SERVICES OVER THE EU-27

A country's comparative advantage over the rest of the world or a reference group of countries describes its ability to produce a good or service at a lower cost than its competitors. Mapping exports of goods and services on the basis of comparative advantage enables to identify which sectors of the economy hold the best competitive position, i.e. the largest market share in relation to the country's total exports. Although there are extensive analyses of the comparative advantage of goods,[1] the analysis for services is limited. However, such an analysis is of particular relevance to Greece, as services account for more than 50% of the country's total exports of goods and services.

1 See e.g. Bank of Greece (2019), *Monetary Policy 2018-2019*, Box IV.3 "The comparative advantages of Greek exports".

This box aims to identify the services subsectors in which the country has a comparative advantage over the EU-27, in particular those that have improved their comparative position in recent years. Specific reference is made to the category "other business services",[2] which will likely be at the forefront of the next stage of globalisation (Baldwin 2022[3]).

In order to identify the sectors in which a country has a comparative advantage, the "Revealed Symmetric Comparative Advantage" (RSCA) index, proposed by Laursen (1998),[4] is commonly used in literature. The RSCA expands on the original "revealed comparative advantage" index (RCA, Balassa index[5,6]) and is defined as:

$$RSCA_i = \frac{RCA_i - 1}{RCA_i + 1}$$

For a given service *i*, the RSCA index takes values between -1 and + 1. A positive (negative) value means that the country has a comparative advantage (disadvantage) in this service over the reference group of countries ("world"). This analysis focuses on the 12 main service categories according to EBOPS 2010 (Extended Balance of Payments Services) classification. The data refer to Greek and EU-27 services exports to the rest of the world and cover the period 2010-2021. In addition, the RSCA index is calculated on the total exports of services, with a view to identifying the categories of services in which Greece has a comparative advantage over the EU-27.

Findings of the analysis

Greece has a comparative advantage over the EU-27 in its exports of transport and travel services, which together account for more than 85% of total service export receipts. Among the other services, construction services had a comparative advantage in the 2010-2014 period, which was lost in 2015-2019 and reinstated in the next two years (2020-2021). In the other categories of services, the country has no comparative advantage (see Charts A and B).

During 2010-2019, the RSCA index for travel services was on an upward path, which was halted by the COVID-19 pandemic. This is also reflected in the growing share of travel receipts in total service export receipts, which exceeded 45% in 2019. Over the same period, the respective share for the EU-27 declined, with travel services representing around 18% of total service export receipts in 2019.[7]

For transport services, the RSCA index remained broadly unchanged, reflecting developments in sea transport services, which account for about 85% of total transport receipts and have the highest RSCA across all services. As with travel receipts, the share of transport services in total service exports, at 43% for Greece in 2015-2019, compares favourably with that of the EU-27 (18%). Air transport, from a small comparative disadvantage over the EU-27 in 2010-2014, shifted to a marginal comparative advantage in 2015-2019.

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2 "Other business services" include research and development services, legal, accounting, consulting and technical services (such as architectural, engineering and scientific), etc.

3 Baldwin, R. (2022), "Globotics and Macroeconomics: Globalisation and Automation of the Service Sector", National Bureau of Economic Research, NBER Working Paper No. 30317, August, https://www.nber.org/papers/w30317.

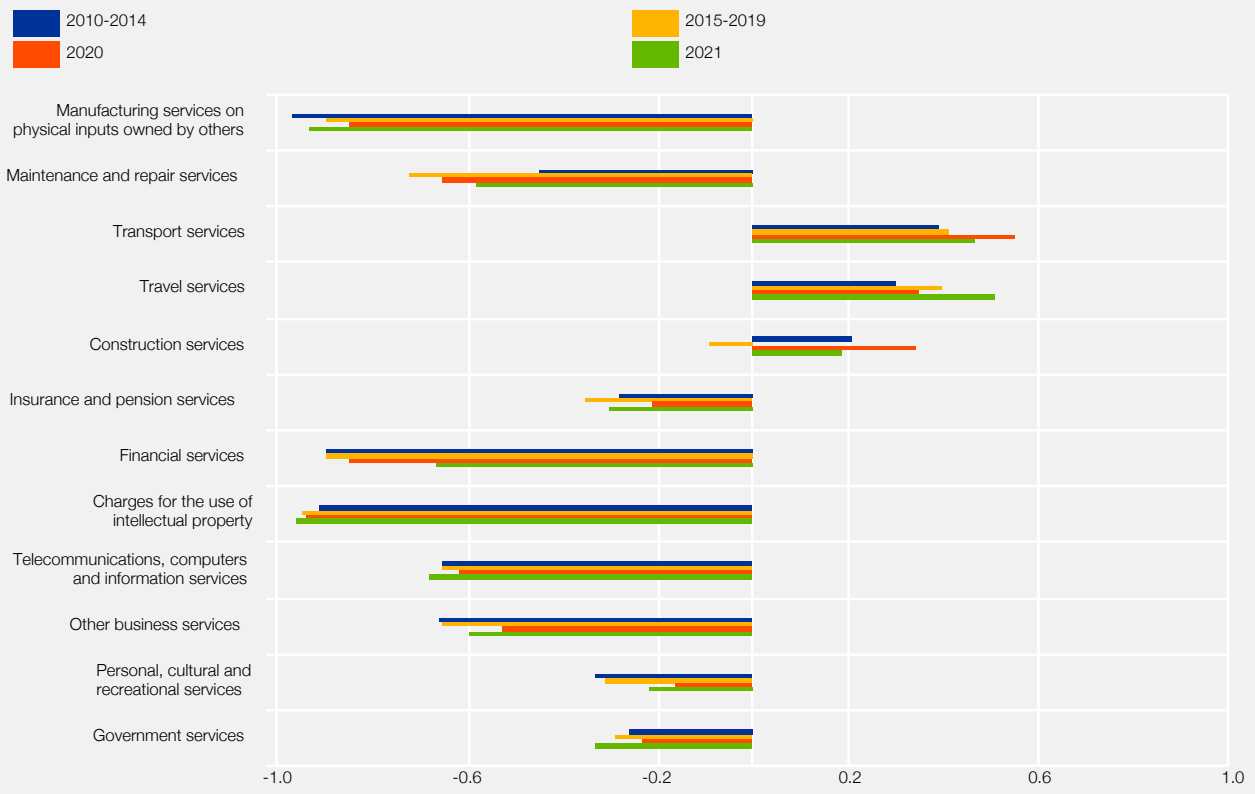
4 Laursen, K. (1998), "Revealed Comparative Advantage and the Alternatives as Measures of International Specialisation", DRUID Working Paper No. 98-30.

5 Balassa, B. (1965), "Trade Liberalisation and 'Revealed' Comparative Advantage", *The Manchester School*, 33 (2), 99-123.

6 $RCA_i = \frac{X_{ic}/X_c}{X_{iw}/X_w}$, where:
X_{ic} (X_{iw}): exports of service *i* from country *c* (from the "world" or the reference group of countries, *w*)
X_c (X_w): total service exports of country *c* (of the "world", w). The index may alternatively be expressed as:
$RCA_i = \frac{X_{ic}/X_{iw}}{X_c/X_w}$, where:
X_{ic}/X_{iw} is the export market share of service *i* and X_c/X_w is the total export market share of country *c*. This means that, when the country has a comparative advantage in a service, this service has a larger share in the global export market compared with the share of the country's total exports of services.

7 Among the EU-27 countries whose travel services account for more than 40% of their total export receipts and which have a comparative advantage in these services, Greece ranks fourth based on the RSCA index, after Croatia, Spain and Portugal, but higher than Italy.

Chart A Revealed Symmetric Comparative Advantage (RSCA) index of Greece over the EU-27



Source: Calculations based on Eurostat data.
Note: The RSCA index ranges between -1 and +1. A country has a comparative advantage in a service when the RSCA is > 0.

"Other business services" will likely be at the forefront of the next stage of globalisation.[8] Still, Greece has a comparative disadvantage over the EU-27 in these services, which is also reflected in their low share of about 5% in total service exports, compared with about 25% for the EU-27. However, for the subcategories of "legal services" and "scientific and other technical services",[9] RSCA indices improved (i.e. their comparative disadvantages declined) in the 2015-2019 period relative to 2010-2014.

Given the large share of travel and transport services in total Greek service exports, it seems relevant to repeat the above analysis for "other business services" only. This suggests that, within this category, Greece has a comparative advantage over the EU-27 for "legal services" and "scientific and other technical services".

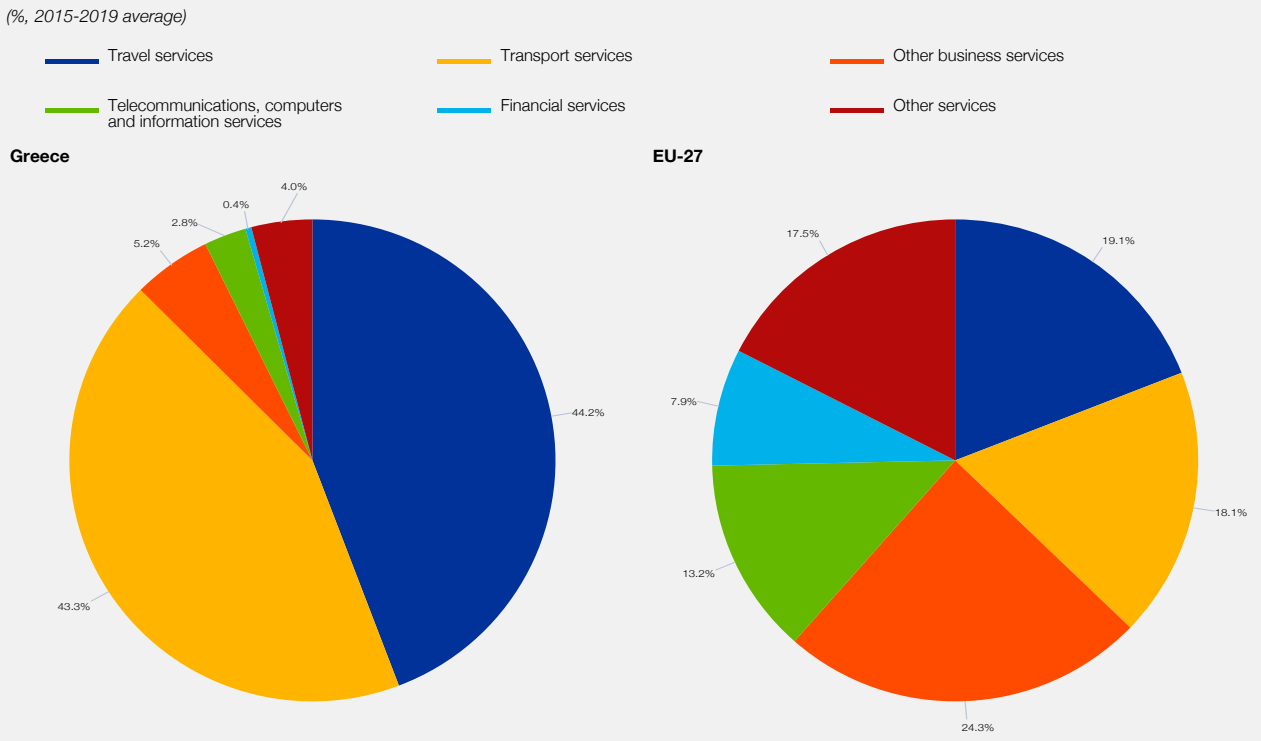
Conclusions

The above analysis showed that the two main services subsectors in which Greece has a comparative advantage (i.e. travel and transport services) together account for more than 85% of total service export receipts. This is an indication that Greece exploits its comparative advantage.

Furthermore, the analysis identified services subsectors which in recent years have gained –even if only marginal– comparative advantage or reduced their comparative disadvantage over the EU-27, such as air transport and construction services. On the other hand, Greece has a comparative disadvantage in the fast-growing subsector of "other business services", which represent a small share of total service exports. However, in recent

8 See e.g. Baldwin, R. (2022), op. cit.
9 The "scientific and other technical services" category includes technical testing and analysis services, surveying services, etc.

Chart B Structure of exports of services: Greece and EU-27



Source: Calculations based on Eurostat data.

years the comparative disadvantage has been declining for both "legal services" and "scientific and other technical services", although the combined share of these services in total service exports is still small (less than 1%).

The restructuring of Greek economy's production model should take into account –in addition to the services subsectors in which Greece already has a comparative advantage– also those that are improving their competitive position and are fast growing, even if their share in total service exports is currently low.

Box 3

FINAL ENERGY CONSUMPTION IN GREECE COMPARED WITH THE EURO AREA: A SECTORAL BREAKDOWN

Russia's invasion of Ukraine has exposed vulnerabilities in the energy sector at a national and European level, when the flow of energy commodities was disrupted, revealing the weaknesses of energy strategies and markets. Greece is currently undergoing a transformation phase in terms of energy production and consumption.[1] Energy production now also needs to take into account the environmental impact, as expressed by carbon footprint; however, modern clean energy is not available[2] in the quantity and at the time needed. This box discusses final energy consumption in Greece over the past decade (2010-2020), as well as changes in the structure of final

1 The energy sector comprises electricity generation, transmission and distribution; import, refining and distribution of petroleum products; and import, storage and distribution of natural gas. See Zioutou, P. and D. Sideris (2018), "The energy sector: developments and prospects", Bank of Greece, *Economic Bulletin*, No. 47.

2 Obstacles to advancing clean energy relate to the existence of patents, the high costs of investment and production and the small scale of production, which prevent economies of scale and often make investment unviable.

consumption, compared with the euro area as a whole. It also attempts to breakdown final energy consumption by sector of the economy and by type of energy consumed in each sector over the past decade. In other words, this box examines by whom and what type of energy is consumed, as well as how these have changed over the years, in order to identify the industries or sectors that are the most energy-consuming.

Selecting an optimal energy mix often involves striking a balance between economic and non-economic criteria, as some of the available options can be environmentally harmful, but more cost-effective and consistent with the need for energy security. In line with the EU's objectives,[3] it is essential to improve the efficiency[4] of available energy. Efficient domestic energy production means that more energy is generated from given resources, thus reducing the need for imports, while limiting depletion of resources. Greece's energy dependency[5] has been consistently above the EU average and is on an upward course. Meanwhile, energy productivity[6] deteriorated during the economic crisis, with only a slight gradual improvement over the past decade. Moreover, climate change has reinforced the need for a transition to clean energy through the use of renewable energy sources (RES), despite their higher –though declining– cost and still limited production. Apart from reducing the carbon footprint, RES can also lead to lower energy commodity imports.

Evolution of final energy consumption

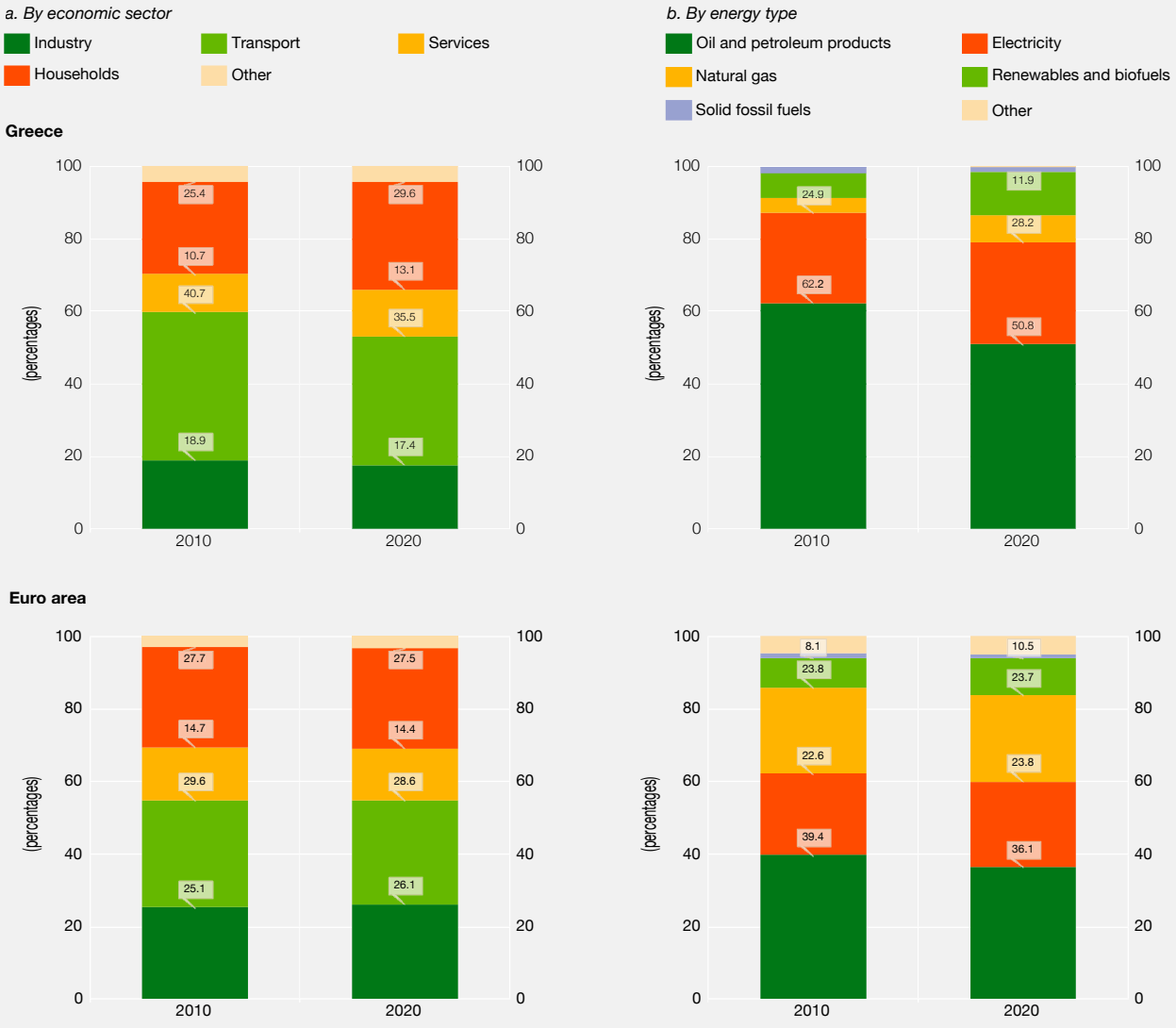
The shares of different energy sources in energy production and final consumption have varied over time in Greece relative to the euro area as a whole. Primary energy production in Greece remains more reliant on polluting sources, with variations from year to year. However, the recent pandemic years have seen a gradual increase in renewable energy production both in Greece and in the euro area. This is in line with initiatives to tackle climate change and promote green transition. Notably, in Greece the share of renewables in electricity generation ex-ceeded that of lignite and reached 21.7% in 2021, overshooting the EU target of 20%. This makes Greece one of the countries already meeting Goal 7 of the UN Sustainable Development Goals,[7] while hours of renewable-only energy consumption have already been recorded.

Final energy consumption refers to what is actually consumed by end-users, mostly in industry, transport and households.[8] To supply energy for final consumption, energy is used as input in a transformation stage, in which one form of energy is converted to another. Specifically, out of the initial total energy supply[9] after transformation, only 72% for Greece and 67% for the euro area are available to end-users for consumption (according to 2020 data, broadly unchanged from previous years), and the remainder is either consumed in the transformation process or is lost. For electricity generation in particular, the transformation stage is important, because other forms of energy are used as inputs. Specifically, of the initially supplied volume of all types of energy, 38% for Greece and 40% for the euro area were used as input in electricity generation. Turning to gas, the share of gas-fired electricity generation was 64.8% in Greece and 32.9% in the euro area in 2020. By contrast, 47.6% of the available renewable energy was used for electricity generation in Greece and 58.8% in the euro area in the same year.

Over the past decade, changes in final energy consumption across sectors and types of energy were larger for Greece than for the euro area as a whole (see Chart A). Transport is the most energy-consuming sector of the

3 The European Union has set the target of improving energy efficiency by 20%.
4 In power generation, efficiency refers to the amount of useful energy output relative to the input.
5 The energy dependency rate shows the extent to which an economy relies on imports to meet its energy needs. It is calculated as the share of energy imports in the gross total final domestic consumption of energy plus international shipping fuels. In 2020, this rate stood at 81% for Greece, compared with 62% for the euro area.
6 Energy productivity expresses the relationship between output and the amount of energy needed for its production and is calculated as the ratio of gross domestic product to gross energy use.
7 European Commission (2022), 2022 Country Report – Greece, Accompanying the document Recommendation for a Council Recommendation on the 2022 National Reform Programme of Greece and delivering a Council opinion on the 2022 Stability Programme of Greece.
8 Final energy consumption excludes transformation and distribution losses and energy needs for the energy generation process.
9 Total energy supply is defined as the domestically produced energy plus imports minus exports, shipping and aviation energy needs and changes in stocks (IEA definition).

Chart A Total final energy consumption



Source: Eurostat.

economy both for Greece and for the euro area. However, its share in total final domestic consumption is higher for Greece, at 35.5%, compared with 28.6% for the euro area. On the other hand, the share of transport in total domestic consumption dropped by 5.2 percentage points in Greece and by one percentage point in the euro area over the past decade. During the same period, the respective share of households increased in Greece, to 29.6% of total consumption in 2020, compared with a broadly stable share of 27.5% in the euro area. In line with the production model of the Greek economy, which is based more on the tertiary sector, industry contributed 17.4% to total energy consumption in 2020, compared with 26.1% in the euro area. Greek industry increased its energy productivity, as its share in consumption declined between 2010 and 2020 (see Chart A).

The share of oil and petroleum products in energy consumed has been decreasing in Greece, though remaining above the euro area average. Despite a significant decline in the consumption of oil and petroleum products between 2010 and 2020, this energy source still accounts for half of total consumption in Greece, compared with 35.1% in the euro area, followed by electricity (incorporating other energy sources as inputs) with a share of 28.2% in Greece and 23.8% in the euro area in 2020. The share of natural gas (in terms of total consumption only, excluding its transformation for electricity generation) was 7.6% in Greece, compared with 23.7% in the euro area. Renewables (for use in final consumption) increased their share to 11.9% for Greece in 2020, com-

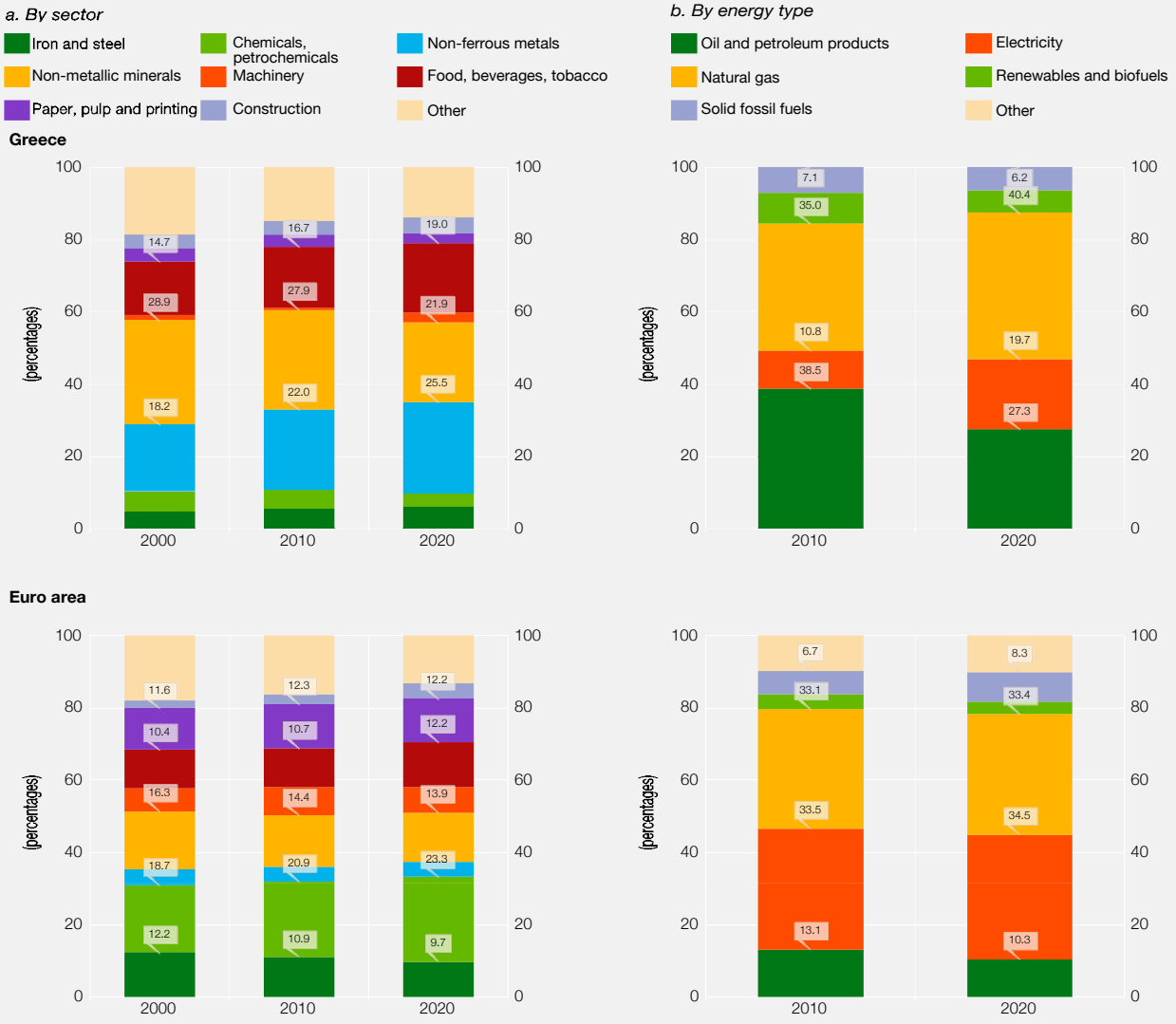
pared with 10.5% for the euro area. Greece's adjustment was faster, as the share of renewables in energy consumption rose by 5.1 percentage points, surpassing the respective figure for the euro area, which increased by 2.4 percentage points, while the share of solid fossil fuels is limited.

Evolution of final energy consumption in industry

Energy needs per unit of output[10] are determined by the structural and technological characteristics of an economy and vary depending on the level of economic development, as well as on climate-related, geographical and geopolitical factors affecting the country's energy system. Energy consumption in Greece was affected by the economic crisis and recession of 2011-2016, when energy demand and use declined.

Energy consumption by the industrial sector varies between Greece and the euro area, owing to the different structure of the respective economies (see Chart B). Two-thirds of the energy consumption by the Greek industrial sector is concentrated in three industries: non-ferrous metals, non-metallic minerals and food-beverages-tobacco.

Chart B Final energy consumption in industry



Source: Eurostat.

10 This variable is reflected in the energy intensity, calculated as the ratio of gross domestic energy consumption to gross domestic product.

Within the Greek industrial sector, the non-ferrous metals industry is the largest energy consumer, having steadily increased its share in final consumption since 2000, taking over the top position from the non-metallic minerals industry. The food-beverages-tobacco industry has also been consuming more and more energy on the back of increased standardisation. Energy consumption by the machinery industry is also on the rise, with its share increasing between 2010 and 2020.[11] In the euro area as a whole, energy consumption by the industrial sector appears to be less concentrated, with the largest and still growing share contributed by the chemical-petrochemical industry, followed by the non-metallic minerals industry, whose share has declined since 2000, and the food-beverage-tobacco industry with an increase of 1.5 percentage points over the reviewed period. No change is observed in the share of the paper and printing industry, which plays an important role in the euro area but has a lower weight in the Greek industrial sector.

The energy mix used in the industrial sector shows larger changes for Greece than for the euro area as a whole. Electricity has the largest share, 40% in 2020, up by 5.4 percentage points from 2010, at the expense of oil and petroleum products. Natural gas is also increasingly used. By contrast, in the euro area as a whole, gas has the largest share in energy consumption for industrial use (34.5% in 2020), making production of final and intermediate goods more vulnerable to the current circumstances of energy crisis. The industrial sectors of the euro area seem to have made a stronger shift towards renewables, increasing their share in consumption between 2010 and 2020, which contrasts with a small decline in Greece (see Chart B).

Evolution of final energy consumption in households

Most of the energy that households consume is used for heating their homes (see Chart C). Space heating accounted for 57.1% of household energy consumption in Greece in 2020 (euro area: 63%), up by 10 percentage points from 2010, compared with a decline in the euro area. The large and growing share of heating observed for Greece is likely associated with an ageing building stock, implying more energy needs due to thermal losses. Energy consumption for cooling is less important for most euro area countries due to their cooler climate, whereas in Greece it accounted for 4.2% of household energy consumption in 2020. Lighting, which includes standby mode consumption,[12] is another major component of total energy use in households. The share of water heating has been on the rise across all countries. Lastly, energy use for cooking decreased substantially in Greece, possibly reflecting increased consumption of ready-made meals.

Greek households have, to a certain degree, substituted natural gas for oil, while their euro area counterparts have turned more to electricity and air source heat pumps (the latter are classified under renewables). The main sources of energy for Greek households are electricity and oil, unlike in the euro area where gas is predominant (see Chart C). For heating purposes only, Greek households mainly use oil (46.7% in 2020, compared with 19.6% in the euro area) and, to a lesser extent, gas (16.9% in 2020, compared with 42% in the euro area). It should be noted that households in the euro area have increased their use of renewables for heating purposes in recent years.

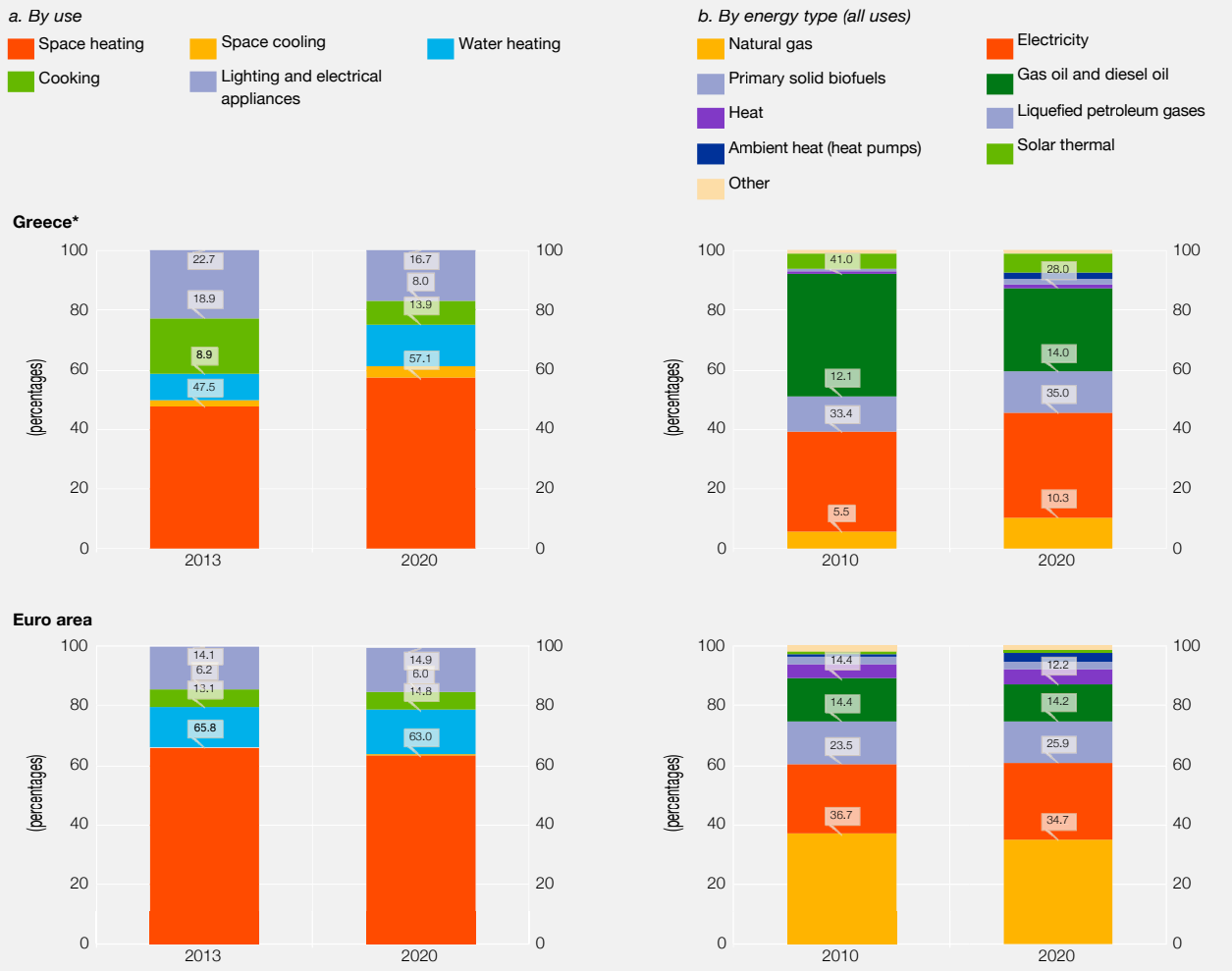
Evolution of final energy consumption in transport and services

The road transport sector is the most energy-consuming both in Greece and in the euro area, showing a slight increase over time (see Chart D, left-hand panel). However, a considerable proportion of energy consumption in Greece is attributable to domestic shipping (10% in 2020). In road transport, the 2010-2020 period saw a shift from motor gasoline to oil and diesel, which have become the dominant transport fuels in Greece (see Chart D, right-hand panel), followed by motor gasoline, whose share is almost twice as high in Greece as in the euro area countries in 2020. Liquefied petroleum gas (LPG) accounts for a small part of road transport energy use in Greece and much smaller in the euro area.

11 According to an IOBE study analysing direct and indirect energy costs, the sectors with the highest energy expenditure as a percentage of total input expenditure are manufacture of basic metals, logistics, chemicals, and shipping: IOBE (2022), *The Greek Economy*, Quarterly Report 01/22, Box 3.2.

12 Based on micro-data analysis, appliances left in standby mode account for one-quarter of a household's total power consumption. This would call for a responsible energy behaviour on the part of citizens, with a view to more energy saving. See Hionis, D. and G. Pragidis (2022), "Demand-side energy management using big data", in *The energy crisis and the Greek economy*, Economic Chamber of Greece (2022) [in Greek].

Chart C Final energy consumption in households



Source: Eurostat.
*Data for Greece by use are available from 2013 onwards.

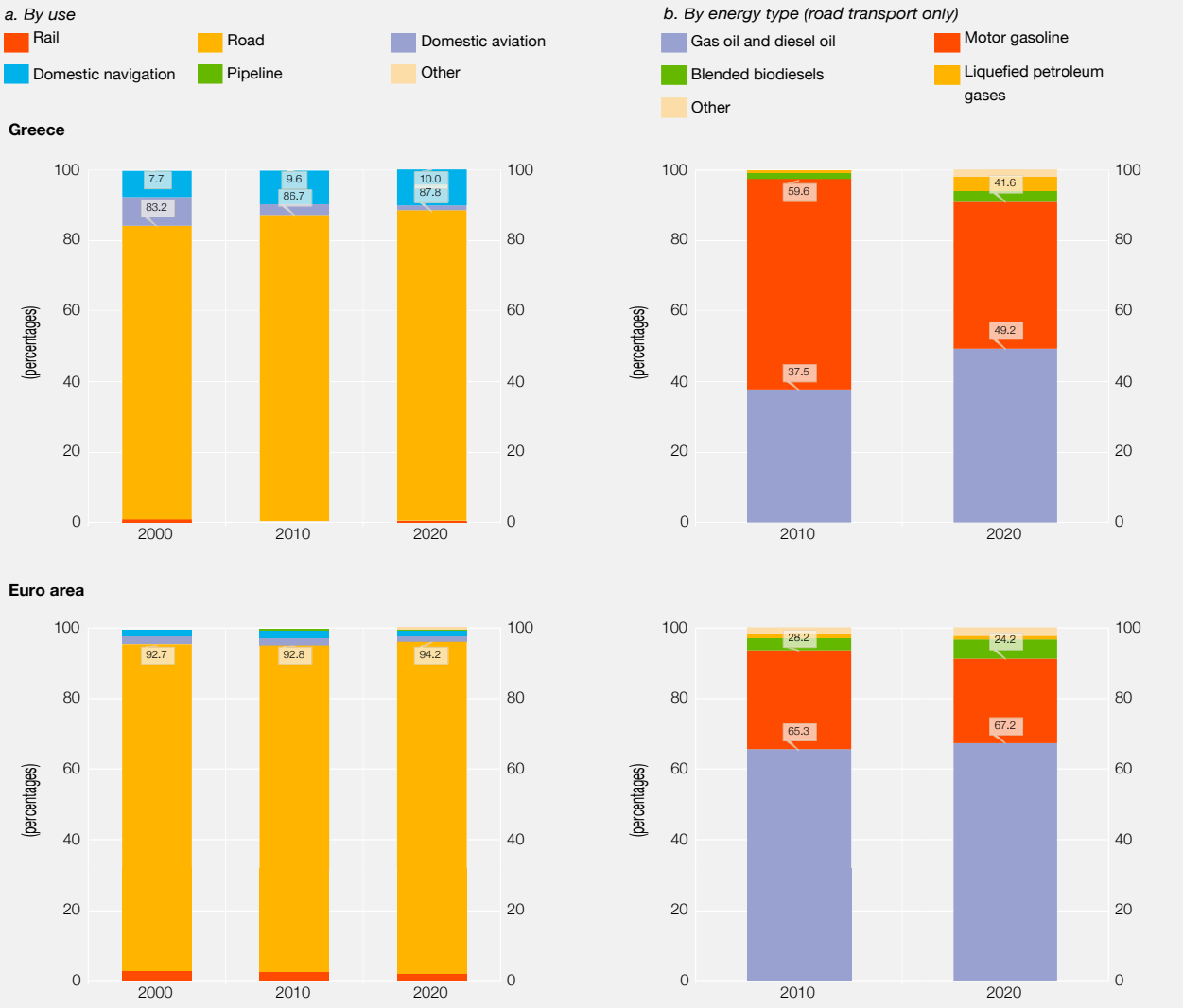
Lastly, the main type of energy used in the services sector is electricity. However, the use of renewables increased significantly between 2010 and 2020, and much more strongly in Greece than in the euro area. The use of gas, as a percentage of total energy consumption in the tertiary sector, is almost three times higher in the euro area than in Greece. The use of oil declined across all countries between 2010 and 2020.

Conclusions – Policy implications

Going forward, the evolution of energy consumption will depend on demographics, economic growth, costs and available technology. At the same time, environmental protection, tackling climate change and achieving the sustainability goals all call for a shift of the energy mix towards low-carbon sources –this transition should take into account the socio-economic impacts (e.g. changes in the composition of employment)– and improvements in energy efficiency. Besides, green transition is required for attaining the international goals and for complying with the EU regulatory framework;[13] at the same time, the energy crisis and geopolitical developments highlight the need to redesign energy strategies to ensure energy sufficiency and security. Moreover, in line with the objectives set out in Greece's National Energy and Climate Plan and the European REPowerEU framework, the share of renewables in the energy mix should be increased and that of lignite should be reduced accordingly, along with an improvement in energy efficiency. As the planet's fossil fuel resources are finite, it becomes increasingly ne-

13 UN Sustainable Development Goals (SDGs) and the European Green Deal.

Chart D Final energy consumption in transport



Source: Eurostat.

cessary to substitute them with renewable energy and raise energy efficiency, which would lead to lower energy consumption and greater savings.

Over the past decade, Greece clearly made significant progress, by changing its energy mix and promoting the use of renewables. Still, reliance on polluting energy sources, such as oil, remains. Compared with the euro area as a whole, Greece is less reliant on natural gas supply for final consumption. In fact, a significant part of its natural gas supplies are used as input for electricity generation, which provides flexibility with substitution possibilities in the face of gas supply disruptions. Despite an increase in recent years, the use of natural gas for final consumption is lower than in the euro area both in households and in the industrial sector, which reduces the risk in relative terms for Greece should gas supply be cut off.

Increased financing requirements stemming from the recent surge in energy prices add to the vulnerability of the Greek economy and exacerbate the current account deficit. At the same time, the need to support households and businesses against higher energy costs implies that fiscal resources have to be used, which could lead to higher public debt. Against this background, energy demand should be met by expanding the share of renewables in the energy mix (and other currently underexploited energy sources, such as hydrogen, biomass, wave power, geothermal power, etc.), as well as by developing new facilities and infrastructures for the production, marketing,

promotion, supply and storage of sufficient energy to meet the needs of end-users at any point in time. Technological advances are making the cost of renewables increasingly competitive, creating economies of scale and reducing –and possibly even reversing– the gap of their production cost vis-à-vis that of fossil fuels. The energy transition calls for immediate action to develop renewable energy, using the funds available from the Recovery and Resilience Facility (e.g. to upgrade the energy efficiency of buildings) and other European initiatives. Last but not least, the existing regulatory framework needs to be strengthened so as to encourage energy transition, through incentives, as well as research and development of renewable energy.

Box 4

DEBT SUSTAINABILITY ANALYSIS

This box provides an updated[1] analysis of Greek government debt sustainability at the current juncture that is characterised by a sharp reversal of accommodative monetary policy. Monetary policy normalisation is taking place amid unprecedented international inflationary pressures, which emerged just as economic activity was restarting after the peak of the COVID-19 pandemic and were exacerbated with Russia's invasion of Ukraine.

The scenarios specified below for the period 2022-2060 imply that, despite the observed increase in government bond yields, risks to debt sustainability are contained over the medium term, provided that the fiscal measures taken in response to the pandemic and energy crisis are temporary and that the European funds available under the Recovery and Resilience Facility (RRF) are effectively utilised. In the longer term, however, there is increased uncertainty, as the gradual refinancing of accumulated debt to the official sector on market terms will increase the exposure of Greek government debt to interest rate risk, which eliminates any room for a relaxation of primary surplus assumptions.

Description of scenarios

Based on the updated macroeconomic and fiscal assumptions of the Bank of Greece, eight scenarios have been considered, as follows:

Scenario 1 (baseline) assumes a return to a primary surplus from 2023 onwards, rising to 2.0% of GDP by 2025 and permanently remaining at this level thereafter. It is assumed that the fiscal space created by projected savings on ageing-related expenditure will be used to finance a shift towards a more growth-friendly fiscal policy mix.[2] Deficit-debt adjustments average 0.0% of GDP over the 2022-2060 period.[3] Potential GDP growth is assumed to develop in line with the latest Eurosystem staff projections in the first ten years of the projection horizon, before converging to 1.3% by 2070, according to the baseline projection in the 2021 European Commission's *Ageing Report*. This results in a higher potential growth rate compared with the *Ageing Report* by 0.1 percentage point in 2040 and equal to the *Ageing Report* as of 2050, as the positive impact from the utilisation of RRF funds and the improved fiscal policy mix progressively fades out.[4] Real GDP growth is projected to average 1.8% annually over the 2022-2060 period. In conjunction with an assumed long-term growth rate of 2% in the GDP deflator, nominal GDP grows by 4.2% on average over the same period, assuming that the output gap enters positive territory in 2022, widens up to the mid-2020s and closes by 2030.

1 This analysis has been enriched to offer a comprehensive narrative on the path of Greek government bond yields. It takes into account market expectations ten years ahead, as well as long-term assumptions regarding a range of domestic and international determinants of bond yields, including the credit rating of the Greek sovereign and the size of the Eurosystem's monetary policy portfolio.

2 In the baseline scenario of the European Commission's *Ageing Report 2021*, Greece is projected to record savings on age-related expenditure amounting to 1.9% of GDP in 2019-2045 and reaching 3.7% of GDP by 2070.

3 This figure includes, among other things, (i) privatisation proceeds of EUR 11 billion until 2040; and (ii) cash-accrual adjustments reflecting the deferral of interest payments on the bulk of EFSF loans until 2032, the disbursement profile of RRF grants and loans and estimates of net expenditure related to interest rate swap operations.

4 The *Ageing Report 2021* does not take into account any positive effects from the utilisation of RRF funds.

Interest rates on the existing stock of debt follow the path assumed by the Public Debt Management Agency in July 2022, except for interest rates on EFSF[5] and ESM loans, which are assumed to converge to 4.0% by 2050.[6] Account is also taken of a permanent waiver of the 2% step-up interest rate margin applying to the EUR 11.3 billion instalment of the EFSF programme used to finance a debt buyback. The interest rate on Greek Loan Facility (GLF) loans is calculated as the three-month Euribor plus 50 basis points, and interest rate swaps are assumed to cover all outstanding stock of GLF loans.[7] New bond issuance is assumed to take place over the whole projection horizon, with maturities of 3, 5, 7 and 10 years issued at constant shares of 10%, 40%, 25% and 25%, respectively. This implies a weighted average maturity of new issuance of 6.6 years, which is broadly in line with the historical record prior to the sovereign debt crisis. Yields on new issuance of 10-year bonds are determined endogenously, building on the time-varying coefficients model of Hondroyiannis and Papaoikonomou (2022).[8] The model allows market sensitivity to fundamental sources of risk to vary through time depending on the credit rating. Yields on 10-year bonds are computed given the estimated model parameters and based on assumptions regarding the evolution of their determinants.[9] The 10-year yield reaches 3.9% in 2032, in line with the T+10 forward rate implied by prevailing market rates under the pure expectations hypothesis, and averages 4.3% during 2022-2060. Yields on the 3-, 5- and 7-year maturities are derived from the model-generated 10-year yields in line with the evolution of the yield curve slope. The market borrowing rate, i.e. the weighted average of the 3-, 5-, 7- and 10-year yields, reaches 3.6% in 2032 and averages 3.9% during 2022-2060.

Chart A shows the projected baseline evolution of the market borrowing rate, decomposed into contributions from the following determinants: (a) debt-to-GDP ratio; (b) size of the Eurosystem's portfolio of securities held for monetary policy purposes ("monetary policy portfolio"); (c) risk-free rate; (d) yield curve slope; (e) global volatility; (f) Greek sovereign credit rating;[10] (g) liquidity of the Greek government bond market; (h) unemployment rate; and (i) an intercept. The contribution of each determinant reflects the evolution of the determinant itself and of the weight attached to it by the markets. The latter is determined endogenously for each time period and is influenced by the credit rating.[11] Among these determinants, the debt-to-GDP ratio, the Eurosystem's monetary policy portfolio and –to a lesser extent– the risk-free rate are found to have the greatest cumulative impact on

5 Under the debt relief measures agreed in the context of the financial assistance programmes, Greece was granted a deferral of interest payments on the largest part of EFSF loans until 2032. Deferred interest payments are treated as EFSF loans repayable with interest in 20 yearly instalments starting from 2032. The capitalisation of deferred interest adds to the stock of debt without affecting financing needs.

6 This is in line with the assumption for the long-term (nominal) euro interest rate in the *Ageing Report 2021*.

7 The average swap rate is assumed to be 2%. The three-month Euribor follows, in the short-term, the path implied by the forward curve and, in the long-term, the path of the risk-free rate, based on an estimated historical relationship. In particular, using monthly observations for the period January 1999-September 2022, an OLS regression between the three-month Euribor (Y) and €STR (X) is estimated as follows: Y = a + b*X. For the years before 2019, the €STR series has been calculated by subtracting a fixed spread of 8.5 basis points from the EONIA, according to the ECB press release of 31.5.2019.

8 Hondroyiannis, G. and D. Papaoikonomou (2022), "The effect of Eurosystem asset purchase programmes on euro area sovereign bond yields during the COVID-19 pandemic", *Empirical Economics*, 63: 6, pp. 2997-3026.

9 The risk-free rate is assumed to converge to 3.2% by 2050, in line with the historical average of the overnight EONIA rate before the great financial crisis (now replaced by €STR). The projection takes account of the increase in the ECB policy rates by 75 basis points in October 2022. The slope of the yield curve, calculated as the difference between 1-year and 10-year bond yields of AAA-rated sovereigns, is assumed to converge to its historical average of 1.2 basis points by 2050. The debt-to-GDP ratio is generated endogenously. The unemployment rate is assumed to converge towards Bank of Greece's latest estimate of NAIRU in 2030, which is 11.3%. Liquidity is measured as the ratio of Greek government debt to total euro area government debt and is assumed to converge to its historical average of 3.4% by 2050. The volatility index (VIX) is assumed to converge to its historical average of 20.2 by 2026. Euro area HICP inflation is assumed to converge to 2% by 2026. The credit rating of the German sovereign is assumed constant at "AAA". The Greek sovereign credit rating is assumed to be upgraded to investment grade in 2023, and a ceiling is set at "A+" for as long as the debt exceeds 60% of GDP. The size of the Eurosystem's monetary policy portfolio is assumed to gradually decline from EUR 5 trillion to EUR 1.5 trillion in 2050 and beyond. The pace of decline has been calibrated so that the yield on 10-year bonds in 2032 matches the T+10 forward rate implied by prevailing market rates under the pure expectations hypothesis, given all other assumptions.

10 The credit rating influences yields both as an independent variable and through its impact on the weight that markets attach to other yield determinants. Chart A shows its impact as an independent variable.

11 The credit rating does not affect the weights that markets attach to the risk-free rate, to the slope of the yield curve and to the credit rating itself.

the market borrowing rate. Despite the continued decline in the debt ratio, its effect on yields increases in the first years of the projection horizon as markets tend to attach far greater importance to public debt in times of high inflation. Thereafter, as euro area inflation falls down to lower levels and the credit rating of the Greek sovereign improves, the perceived importance of debt will tend to decrease again. In conjunction with the declining debt ratio itself, its upward effect on Greek sovereign yields also tends to weaken. By contrast, in the case of the Eurosystem's monetary policy portfolio and the risk-free rate, their contributions to the development of yields do not reflect changes in their perceived importance, but rather the evolution of these determinants themselves.

Based on these assumptions, the baseline scenario expects the debt ratio to follow a sustainable downward path, but to still remain above 100% over the medium term, reaching 61% in 2060 (see Chart B). The government's gross financing needs (GFNs) are projected to remain close to, but below, the 15% of GDP threshold in the medium term, and, in any case, below the 20% of GDP long-term threshold (see Chart C).

To assess the sensitivity of these results to different assumptions, seven alternative scenarios have been considered. Compared with the baseline, Scenarios 2 to 6 include more adverse assumptions, Scenario 7 is more optimistic, while Scenario 8 combines the adverse assumptions of Scenarios 2, 3, 4 and 5.

In **Scenario 2**, real and potential GDP growth are 0.5% lower than in the baseline, assuming that RRF funds are not effectively utilised and/or savings on ageing expenditure are not used to improve the fiscal mix. Given all the other assumptions and the endogenous determination of the market borrowing rate, this leads, compared with the baseline scenario, to a 28 percentage point higher debt-to-GDP ratio by 2060 (see Chart B) and a 5 percentage point higher GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 20 basis points higher on average during 2022-2060.

In **Scenario 3**, the primary balance in all years is assumed to be 1% of GDP lower than the baseline, due to fiscal fatigue and some of the temporary energy-related support measures becoming permanent. This translates, compared with the baseline scenario, into a 52 percentage point higher debt-to-GDP ratio by 2060 (see Chart B) and a 10 percentage point higher GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 40 basis points higher on average during 2022-2060. In the long run, the 20% of GDP long-term GFN benchmark is breached, and the downward path of the debt-to-GDP ratio is halted. Clearly, a 1% of GDP reduction in the primary balance target, combined with the materialisation of any of the other risks considered, would expose debt sustainability to unmanageable risks in the long run.

Scenario 4 assesses the impact of a permanent increase in global uncertainty (remaining one standard deviation above the historical average), accompanied by a permanent steepening of the yield curve (by one standard deviation) and a 100 basis point increase in the 10-year bond yield spread, as from 2023. Compared with the baseline scenario, this leads to a 13 percentage point higher debt-to-GDP ratio by 2060 (see Chart B) and a 2 percentage point higher GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 80 basis points higher on average during 2022-2060.

Scenario 5 assumes stronger and more persistent inflationary pressures in the euro area, resulting in a further tightening of monetary policy. Specifically, the euro area HICP inflation is assumed to be on average 1.7 percentage points higher than in the baseline scenario during the first three years of the projection horizon, falling back to 2% one year later than in the baseline. Also, the risk-free rate and the three-month Euribor are assumed to be 50 basis points higher in 2023. This leads, compared with the baseline scenario, to a 7 percentage point higher debt-to-GDP ratio in 2060 (see Chart B) and a 1 percentage point higher GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 50 basis points higher on average during 2022-2060.

Scenario 6 examines the effects of a more rapid contraction of the Eurosystem's monetary policy portfolio, to EUR 1 trillion by 2032 and to zero by 2050. This translates, compared with the baseline scenario, into a 35 percentage point higher debt-to-GDP ratio by 2060 (see Chart B) and a 7 percentage point higher GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 150 basis points higher on average during 2022-2060.

Scenario 7 assesses the effect of a faster credit rating upgrade. Specifically, this scenario removes the baseline assumption of an A+ credit rating cap for as long as debt exceeds 60% of GDP, and assumes that the highest credit rating is reached within the 2040s. This leads, compared with the baseline scenario, to a 6 percentage point lower debt-to-GDP ratio in 2060 (see Chart B) and a 1 percentage point lower GFN-to-GDP ratio (see Chart C), while the market borrowing rate is 20 basis points lower on average during 2022-2060.

Scenario 8 combines the assumptions of Scenarios 2, 3, 4 and 5, whereby public debt becomes unsustainable, as both the debt-to-GDP and GFN-to-GDP ratios become upward sloping in the long run. It is an extremely severe scenario, since, in addition to the simultaneous materialisation of the above adverse exogenous shocks, it also assumes a stubbornly short-sighted fiscal policy stance and a total absence of corrective measures. Importantly, however, even in this scenario, until the beginning of the next decade the debt ratio keeps falling and GFNs remain within the 15% of GDP limit. This points to the importance of the exceptionally favourable characteristics of the existing stock of debt, which provide considerable room for corrective action. On the other hand, this scenario highlights that, even if the debt ratio declines and GFN levels remain manageable over the medium term, this should not lead to complacency, as failure to take corrective action in a timely manner may come at a high price in the long run.

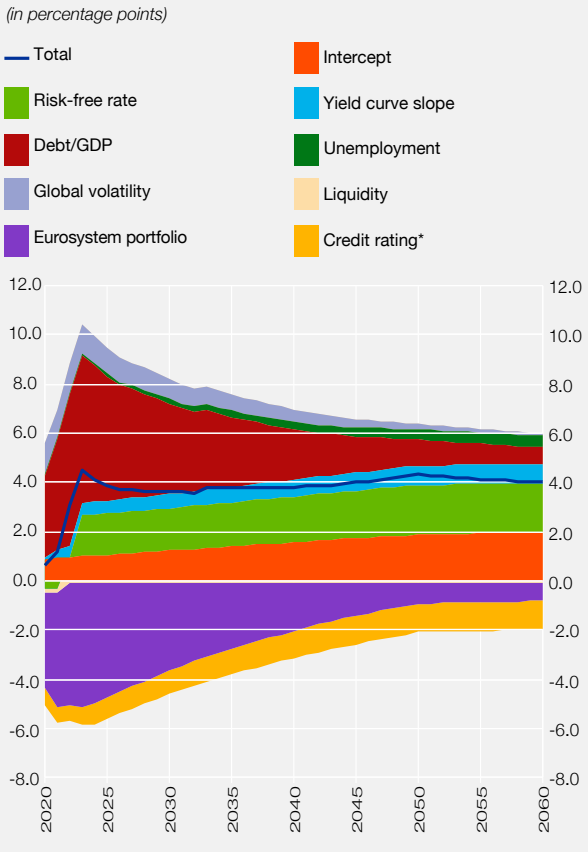
Conclusions

According to the simulation results, the projected evolution of the debt-to-GDP and GFN-to-GDP ratios up to the early 2030s shows little variation across the different scenarios considered, illustrating the public debt's medium-term resilience to possible adverse shocks. This is largely the result of the favourable repayment profile of debt to the official sector (thanks to the successive debt relief measures agreed in 2012, 2017 and 2018, combined with the PDMA's issuing strategy and the timely establishment of interest rate swaps, which have hedged interest rate risk on a relatively large share of Greek debt (GLF loan, 14% of the total), locking in the low interest rates of previous years.

While the current favourable characteristics of the debt stock are not of a permanent nature, they provide a sufficient window of opportunity for ensuring that public debt remains sustainable as official sector loans are gradually refinanced on market terms. The simulation results suggest that the debt ratio is a key determinant of the market borrowing rate. Its rapid reduction must be a priority for economic policy in coming years, bearing in mind that policy rates are unlikely to return to pre-crisis levels, even with the de-escalation of inflation. Therefore, public debt sustainability risks appear significantly increased after the end of the medium-term period in 2032 and, as the structure of public debt will have changed, they make it more vulnerable to negative shocks.

In this light, the next decade provides a unique window of opportunity for a rapid reduction of public debt, given that, despite the higher yields on new issuance, only a small portion of that debt is expected to be refinanced annually on market terms, while a significant share of liabilities to the official sector has already been hedged against interest rate risk. Moreover, economic growth is

Chart A Determinants of the market borrowing rate in the baseline scenario



Note: Estimates are based on the empirical model of Hondroyiannis and Papaoikonomou (2022).
The credit rating influences yields both as an independent variable and through its impact on the weight that markets attach to other yield determinants. The chart shows its impact as an independent variable.

Chart B Public debt

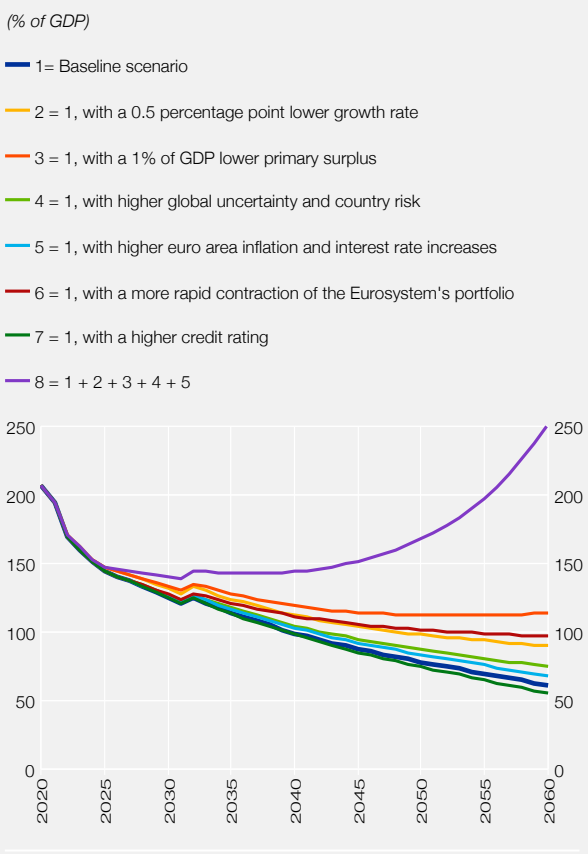
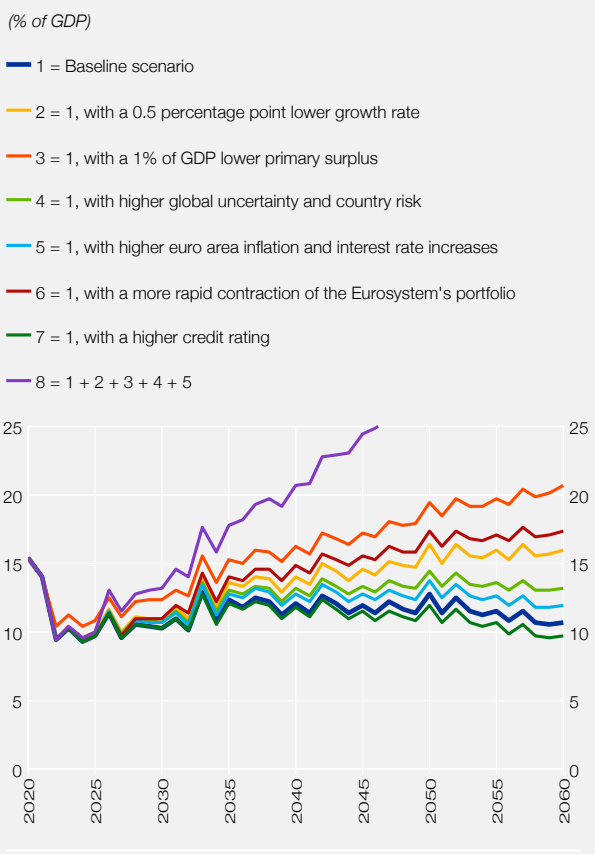


Chart C Gross financing needs



set to benefit significantly from the effective use of RRF funds and the implementation of a broad range of investments and reforms. Therefore, the interest rate-growth differential is expected to remain favourable, despite the anticipated deterioration in financial conditions.

Against this background, key policy priorities in the period ahead should be: (a) to secure an investment-grade rating, which should reduce volatility in the government bond market and allow the Hellenic Republic to differentiate its investor base and hold down its borrowing costs; (b) to safeguard fiscal credibility through a return to realistic primary surpluses; and (c) to put RRF funds to efficient use, which would raise the growth potential of the economy and facilitate the achievement of all policy priorities.

Box 5

THE RECENT STRENGTHENING OF CORPORATE LOAN GROWTH AND THE RISE IN INFLATION

The annual growth rate of bank loans to domestic non-financial corporations (NFCs) accelerated significantly in 2022, particularly from the second quarter onwards. The annual cumulative net flow of corporate loans as a percentage of GDP, having reached 4% at the end of 2020, the highest since 2010,[1] fell back to its 2019

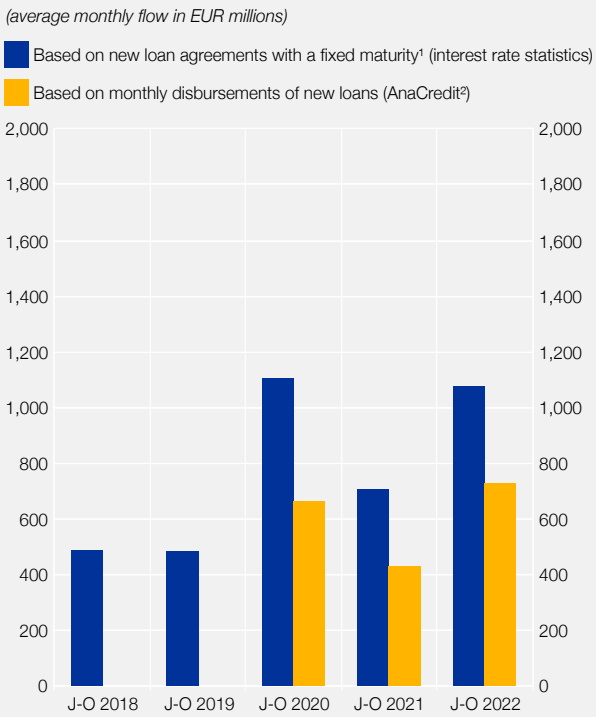
1 According to ELSTAT, a continuous series of GDP data revised with 2015 as base year is at present available from 2010 onwards.

level of 1% before rebounding to around 3.6% in the third quarter of 2022.[2] Recent developments in corporate loan growth are consistent with the strong recovery of the economy, but also coincide with a significant pick-up in inflation.

Amounts of new corporate loans (gross flow)

The gross flow of new bank loans to NFCs refers to: (a) the amounts stipulated in monthly new loan agreements with a fixed maturity, as recorded in MFI interest rate statistics;[3,4] and (b) the amounts of monthly disbursements of new loans based on AnaCredit data.[5] Deflating the amounts under (a) and (b) by the Harmonised Index of Consumer Prices (HICP),[6] it becomes clear that higher inflation has increasingly had a downward effect on real new lending volumes since the end of 2021, whereas this impact had been negligible in previous years. However, real gross flow of corporate loans between January and October 2022 remained over 50% higher than in 2021, almost double relative to 2018 or 2019 and close to its 2020 peak (see Chart A). In other words, when expressed in constant 2015 terms,[7] the amounts of new loans have remained this year at levels comparable with those recorded during the most acute phase of the pandemic and well above those seen in the pre-pandemic years.

Chart A New loans to NFCs in real terms (2018-2022)



Source: Bank of Greece.
¹ Excluding loan restructurings.
² AnaCredit data are available from December 2019 onwards.

In addition to the initial increase in firms' financing needs for working capital or investment purposes, rising inflation –fuelled by a series of disruptions and thus not fully expected– could also lead to successive upward revisions of firms' budgets. Thus, a potential initial decline in the real value of the gross flow of bank loans could be followed by firms' increased recourse to bank borrowing in coming months to compensate for higher-than-budgeted costs of inputs including capital goods. Of course at the same time firms' turnover may also increase (thus potentially reducing their borrowing needs), but this, in most cases, is outpaced by the rises in e.g. energy costs, costs for inputs in shortage, etc.

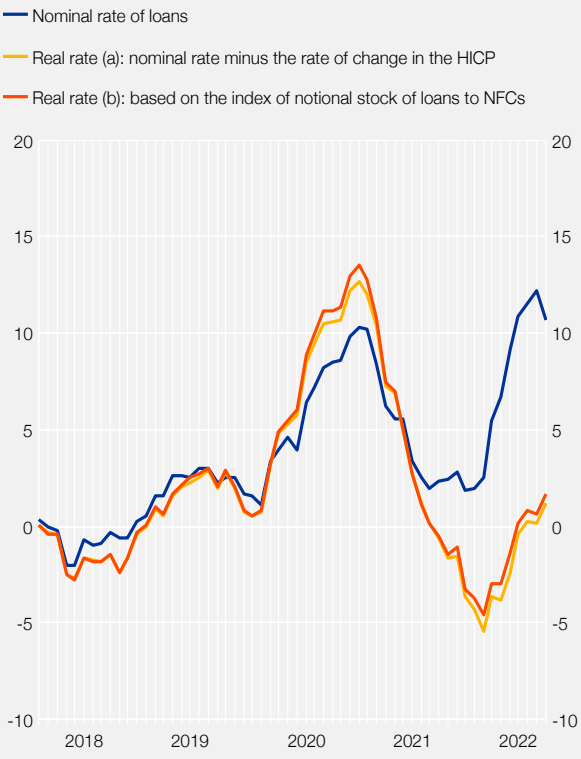
Annual growth rate and net flow of corporate loans

The annual growth rate of loans to domestic NFCs (calculated on the basis of monthly net flows) was expressed in real terms in two alternative ways: (a) by subtracting HICP inflation from the nominal growth rate of bank loans; and (b) by deflating the index of notional stock derived from monthly transactions in the context of Eurosystem

2 The respective figures for the euro area as a whole stood at 2.8% at the end of 2020, 1.7% at the end of 2021 and 3.3% in the third quarter of 2022.
3 Reference is made to the gross flow of loans to NFCs with a fixed maturity, which represent 85% of the total outstanding amount of corporate bank loans.
4 Excluding restructurings of existing loans.
5 In AnaCredit, new loans are defined as monthly disbursements of loans, in all currencies, whose inception date falls within the reference month; as a result, the amounts of new loans differ from the data reported in other statistical publications of the Bank of Greece, such as the interest rates statistics on new bank loans.
6 All real data in this box have also been calculated using, as an alternative to the HICP, the GDP deflator. However, in qualitative terms, the results remain the same.
7 Having been deflated by the HICP compiled by ELSTAT, all real figures are expressed in constant prices of 2015, which is the base year of the HICP.

Chart B Annual rate of change of loans to NFCs in nominal and real terms

(January 2018 - October 2022)



Sources: Bank of Greece and ELSTAT.

statistics,[8] and calculating the annual change of that index. As shown in Chart B, the real annual growth rate of bank loans, having temporarily exceeded the nominal rate during the pandemic, subsequently weakened markedly, turning (temporarily) negative in the last months of 2021 and the first months of 2022. However, from the second quarter of 2022 this downward trend started to reverse, and the rate has returned to slightly positive territory as of July 2022, overall ranging this year around levels similar to those observed in the period 2014-2018.

Until late 2021, there were no significant differences between the real and the nominal series of the 12-month cumulative net flow of corporate loans. Thereafter, the two series started to diverge gradually, and in October 2022 the real flow stood around 12% below the respective nominal figure.

In particular, the average monthly (positive) real net flow of corporate loans for the ten months from January to October 2022 is below the corresponding nominal figure, but still significantly above the real ten-month flow for 2021 or 2019. Also, it is below (by around 20%) the average for the respective ten-month period of 2020, a year when credit growth to firms accelerated markedly amid the exceptional circumstances of the pandemic.[9] As regards the components of net loan flows, it is noted that, due to the rise in inflation, the value of new loan disbursements is declining in real terms, exerting a downward effect on the real net flow. At the same time, however, principal payments on existing loans, which are contractually agreed and typically not adjusted for current inflation, are also falling in real terms, thereby having a counteracting upward effect on the real net flow of loans.

8 Under the statistical framework of the Eurosystem, the annual credit growth is calculated on the basis of monthly net flows of loans or an index of notional stock, which is derived from monthly net flows, adjusted for statistical events affecting outstanding balances (such as loan write-offs, reclassifications, exchange rate valuation differences, sales of loans derecognised from bank balance sheets, etc.) but not qualifying as transactions in economic terms. See also *Monetary Policy – Interim Report 2021*, Box 8, "Gross and net flow of bank credit", December 2021.

9 See also Box 6 "The impact of bank credit support schemes during the pandemic, and banks' lending capacity after the end of such schemes".

Box 6

THE IMPACT OF BANK CREDIT SUPPORT SCHEMES DURING THE PANDEMIC, AND BANKS' LENDING CAPACITY AFTER THE END OF SUCH SCHEMES

Introduction

This box discusses the role played by the guarantee scheme of the COVID-19 Guarantee Fund and the scheme for co-funded and interest-rate subsidised loans of the Entrepreneurship Fund (TEPIX II), as well as by the loan

payment moratoria, in supporting bank credit expansion to domestic firms during the pandemic. It also investigates whether in 2022, after the end of such measures, bank lending remained above or below the level that would have been predicted without the measures.

In more detail, the first two schemes, managed by the Hellenic Development Bank (HDB), were introduced to address the impact of the pandemic crisis on the financial condition and financing of businesses, especially in sectors strongly hit by the pandemic. The schemes contributed to a sharp increase in bank lending during 2020. Overall, by September 2022, HDB-supported loans to non-financial corporations (NFCs) had reached EUR 8.4 billion, of which EUR 6.4 billion in 2020 alone (according to HDB data on loan disbursements), with the largest contribution (EUR 6.2 billion) coming from the guarantee scheme of the COVID-19 Loan Guarantee Fund. The sectors that benefited the most from the schemes were retail and wholesale trade, industry and tourism.

The last cycle of the COVID-19 Loan Guarantee Fund scheme ended in June 2022, while the TEPIX II scheme remains in place and keeps providing co-funded loans for investment purposes, although with lower monthly flows.[1] However, although firms can no longer apply for and banks can no longer approve new loans under the COVID-19 Loan Guarantee Fund scheme but only under TEPIX II, these loans continue to provide support, as their outstanding stock included in total bank credit remains significant, as only about one-third has been repaid. A large part of the loans were granted for working capital, with a maturity of up to 5 years and a grace period. Thus, almost 2.5 years on from the first loan approvals in June 2020, firms continue to benefit from the two schemes and the liquidity obtained through these loans, which they repay in accordance with the agreed terms. This fact is important because, as will also be explained in the simulation exercise below, the monthly (or e.g. quarterly) quantification of the impact of these support measures on bank loan dynamics can only capture the first round of effects of the schemes until future monthly repayments are reflected in credit flows. It should be noted that the total outstanding amount of corporate loans also includes deferred loan payments under the moratoria provided by banks, but these represent very small amounts and, in any event, the measure applied until the end of the fourth quarter of 2022, with a return to normal repayment thereafter.

Analysis of simulation results

To assess the initial impact of credit support measures, by looking at the associated total disbursements of new loans, and the effects of the pandemic on credit dynamics, we simulate a hypothetical evolution of credit during the pandemic without the schemes. To this end, an error-correction model (ECM) is used, explaining the change in the outstanding stock of bank credit to NFCs in real terms, based on quarterly data. The key explanatory variables include real GDP and the real weighted average interest rate.[2] In particular, in order to examine the period when the schemes began (after the first quarter of 2020) without the coefficients of the variables being biased by the one-off, non-recurring increase in credit, the estimation period was intentionally limited to the period from the fourth quarter of 1996 to the fourth quarter of 2019. This is followed by an out-of-sample projection of credit over the period from the first quarter of 2020 to the third quarter of 2022, using the actual values of the explanatory variables for that period.

Chart A shows the results of the simulation exercise for bank credit to NFCs in real terms, in comparison with the actual data. The comparison suggests that in the subperiod from 2020Q1 to 2021Q2, in which most of the funds available under the schemes were absorbed, without these funds and in the context of the 2020 recession, the average stock of loans would have been well below the actual figure. Moreover, the average annual growth rate of loans would have been negative, at -0.7% in real terms (and, for the subperiod 2020Q2-2021Q1, also negative in nominal terms), whereas it actually turned out at 7.8% in real terms, thanks to the contribution of the schemes.

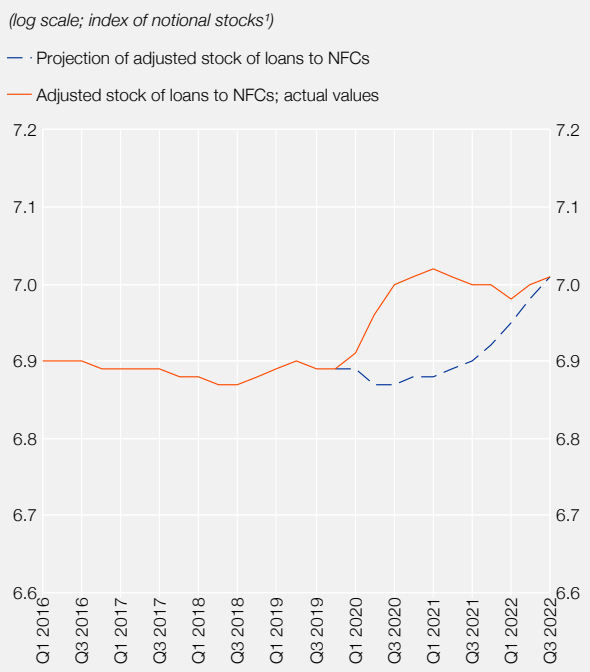
1 The scheme for co-funded investment and working capital loans under TEPIX II was introduced before the pandemic and was subsequently enriched during that period through the use of more HDB funds, under the same co-funding terms, and with additional interest rate subsidisation.

2 In more detail, short-term loan dynamics is determined by their adjustment to a long-term equilibrium between the levels of these variables, the lagged change in loans and the lagged or unlagged changes in the key explanatory variables. Other variables include dummy variables and the trend line. The equation is estimated in two steps, according to the Engle-Granger method.

The gap between the two figures showed significant fluctuations during the reviewed period, peaking at 13.5 percentage points in the fourth quarter of 2020; over the 2020Q1-2021Q2 subperiod, it averaged 8.6 percentage points, reflecting the impact of the pandemic on bank loans and the pandemic-induced initial contraction of economic activity. Correspondingly, the cumulative annual net flow of credit until the fourth quarter of 2020 would have been, without the schemes, EUR 9.5 billion lower than the actual figure. These gaps measure firms' additional liquidity needs due to the pandemic that were financed by banks either with backing from the credit support schemes or out of banks' own funds.[3] In addition to bank credit, a part of the total increased liquidity needs of firms was also met through fiscal measures, notably the "repayable advance" measure. It should be pointed out that the comparison made for the purposes of this exercise does not incorporate any interactions across variables which, in the absence of the credit support schemes for NFCs, would have resulted in several firms going bankrupt, thereby exacerbating the recession. Furthermore, without the schemes' dampening impact on borrowing costs, the bank interest rate for lending to businesses would have been higher, negatively affecting the affordability of loans. In a hypothetical absence of credit support measures, these adverse developments would also have impaired banks' strength (and hence their lending capacity in the post-pandemic period) via a rise in non-performing loans.

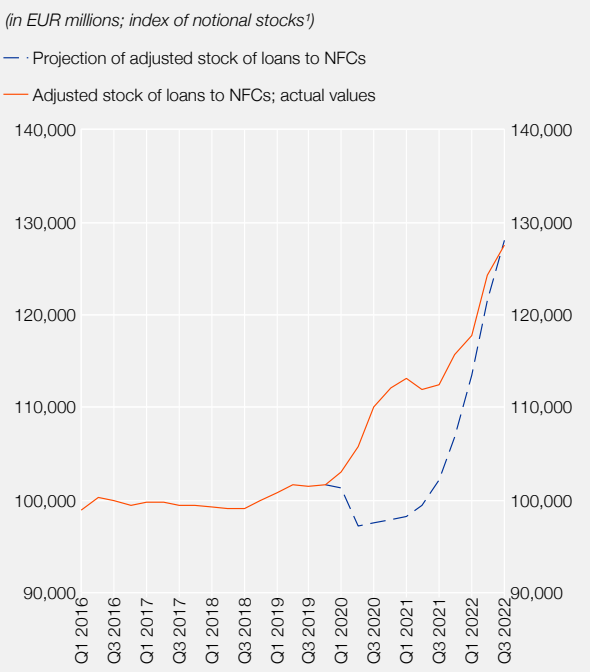
Actual credit developments in the subsequent subperiod, from 2021Q3 to 2022Q3, in nominal terms (see Chart B), indicate that, despite the lower uptake of support scheme funds –which, especially in the case of the Guar-

Chart A Bank loans to NFCs: Stock of loans in real terms (Q1 2016 - Q3 2022)



Sources: Bank of Greece, ECB, Statistical Data Warehouse, and ELSTAT for HICP data.
1 The adjusted stock is compiled on the basis of the index of notional stocks, which is calculated as the stock adjusted for write-offs, reclassifications, loan sales and exchange rate valuation differences. The annual percentage change in the adjusted stock of loans equals the adjusted annual rate of change of the unadjusted stock of loans. Index base: December 2010 (adjusted stock in December 2010 = actual value of unadjusted stock in December 2010).

Chart B Bank loans to NFCs: Stock of loans in nominal terms (Q1 2016 - Q3 2022)



Sources: Bank of Greece and ECB, Statistical Data Warehouse.
1 The adjusted stock is compiled on the basis of the index of notional stocks, which is calculated as the stock adjusted for write-offs, reclassifications, loan sales and exchange rate valuation differences. The annual percentage change in the adjusted stock of loans equals the adjusted annual rate of change of the unadjusted stock of loans. Index base: December 2010 (adjusted stock in December 2010 = actual value of unadjusted stock in December 2010).

3 It should be noted that the purely bank-funded credit extended to NFCs in the face of the pandemic included significant drawdowns on existing credit lines after March 2020. Also, according to the design of the HDB guarantee scheme, banks assumed the credit risk for 60% of the SME loan portfolio and for 70% of loans to large corporates backed by the COVID-19 Loan Guarantee Fund scheme.

antee Fund, had largely been exhausted by then– credit to NFCs continued to grow at strong annual rates. This was supported by sustained recovery in economic activity, along with higher inflation and a significant decline in interest rates in real terms. For the entire review period, the outstanding stock of loans to NFCs remained higher than would have been predicted without the schemes –its upward trend also reflects the positive impact of the same factors– given that, as mentioned above, the actual outstanding stock data include the part of scheme-supported loans that has not yet been repaid to banks.

Conclusions

Overall, the financing instruments and credit support measures during the pandemic were effective, as they seem to have contributed to averting a credit crunch amid the 2020 recession, while helping to more or less meet firms' increased liquidity needs. Firms continue to gradually repay part of the stock of these loans and, as inflation increases the cost of their payments, substitute this debt with new bank credit that no longer relies on public funds.

ISSN: 2732 - 9593 (online)